Biodiversity Development Assessment Report Waiver Request

Circular Quay Renewal Project

Report Date

19 June 2023

Prepared for:

LendLease

Prepared by:
Stantec Australia Pty Ltd

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT WAIVER REQUEST – CIRCULAR QUAY RENEWAL

Revision	Description	Author	Quality Check	Independent Review
1	Initial Draft for Client Review	Dane Fogliada	Kevin Roberts	Mark Vergara
2	Final	Dane Fogliada	Kevin Roberts	Mark Vergara
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5	Revised	Dane Fogliada	Kevin Roberts	Mark Vergara

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT WAIVER REQUEST – CIRCULAR QUAY RENEWAL

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Prepared by  _____
(signature)

Dane Fogliada

Reviewed by  _____
(signature)

Kevin Roberts

Approved by  _____
(signature)

Mark Vergara

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Overview

Section 7.9 of the *NSW Biodiversity Conservation Act 2016* (BC Act) requires that a State Significant Infrastructure (SSI) application must be accompanied by a Biodiversity Development Assessment Report (BDAR) unless the Planning Agency Head and the Environment Agency Head of the NSW Department of Planning and Environment determine that the proposed development is not likely to have any significant impact on biodiversity values. The determination is referred to as a BDAR waiver.

Transport for NSW is proposing to revitalise Circular Quay's transport interchange and key public spaces, also known as Circular Quay Renewal (the Project). Stantec, on behalf of Lendlease have prepared a request for a BDAR waiver for the terrestrial portion of the project. Potential impacts of the project on aquatic biodiversity values will be assessed in a separate specialist assessment and does not form part of this BDAR waiver request.

This BDAR waiver request has been prepared in accordance with ‘How to apply for a biodiversity development assessment report waiver for a Major Project Application’ (DPIE, 2019).

Abbreviations

BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BC Regulation	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
DP	Deposited Plan
DPE	Department of Planning and Environment
DPIE	Department of Planning, Industry and Environment
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GDEs	Groundwater Dependant Ecosystems
LGA	Local Government Authority
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PMST	Protected Matters Search Tool
RBA	Rapid Biodiversity Assessment
RM	Random Meander
SEARs	Secretary's Environmental Assessment Requirements
SSI	State Significant Infrastructure
SVTM	State Vegetation Type Mapping
TEC	Threatened Ecological Communities
TPZ	Tree Protection Zone
VI	Vegetation Integrity

1.0 INFORMATION REQUIREMENTS

The required information for the BDAR waiver request is outlined in **Table 1-1**.

Table 1-1 Information requirements for BDAR waiver request

Requirements	Item	Details
Administration	Proponent Name	Transport for NSW
	Project Information	Circular Quay Renewal project
	Suitably Qualified Person	Dane Fogliada, Experienced Environmental Scientist / Ecologist ▪ BSc (Environment), University of Wollongong ▪ Certificate Conservation and Land Management (TAFE NSW) ▪ BAM Accredited Assessor (BAAS 23010) ▪ Five years' experience undertaking environmental assessment, including field identification of flora and fauna and their habitats, as a consultant ecologist and for Shellharbour City Council. Kevin Roberts ▪ BSc (Hons), University of Newcastle ▪ MSc (Environment), Macquarie University ▪ Executive Masters (Public Administration), Sydney University ▪ BAM Accredited Assessor (BAAS1707) ▪ Over 35 years as an environmental scientist undertaking environmental assessments, developing policy and procedures for ecological assessment and advising on environmental design. Mark Vergara, National Ecology Lead/ Principal Environmental Consultant ▪ MSc Marine Science (Marine Biology), Philippines ▪ BSc Biology (Ecology), Philippines ▪ Assoc. Environmental Technology, USA ▪ Over 20 years experience undertaking ecological assessments including Vegetation Quality Assessments, Targeted Species Surveys, Impact Assessments, Environmental Approvals, Ecological Restoration, and Environmental Monitoring. Relevant qualifications of suitably qualified persons are attached as **Appendix B**.

<table>
<tr><th>Requirements</th><th>Item</th><th>Details</th></tr>
<tr><td rowspan="4">Site Details</td><td>Address, Lot and Deposited Plan (DP), Local Government Area (LGA)</td><td>Circular Quay W, Sydney New South Wales 2000.
Sydney City Council LGA.
The study area intersects 25 Lots/DP. Lots/DPs are listed below:
14 / 787934 | 23 / 831695 | 4 / 787934 | 203 / 1172321
10 / 787934 | 3 / 787934 | 31 / 848244 | 202 / 1172321
2 / 796811 | 3 / 818565 | 12 / 787934 | 201 / 1172321
6 / 787934 | 2 / 818565 | 5 / 787934 | 11 / 1193741
15 / 787934 | 33 / 848244 | 2 / 787933 | 9 / 787934
32 / 848244 | 2 / 787935 | 22 / 831695 | 11 / 847490
200 / 1172321</td></tr>
<tr><td>Description</td><td>The study area falls within a heavily modified/disturbed environment within the central business district of Sydney (Figure 1-1). Circular Quay is an important historic and cultural area of Sydney.
Terrestrial vegetation within the study area is limited with NSW State Vegetation Type Mapping (SVTM) indicating that there are no known Plant Community Types (PCTs) expected to occur within the study area (Figure 1-3).
The study area is predominately flat ranging from around 10 m to 1 m above sea level (ASL), and generally drains towards Sydney Harbour. The entirety of the terrestrial portion of the study area is mapped as Hawkesbury Sandstone, Narrabeen Group from the Triassic age. Soils are characteristic of medium to coarse-grained quartz sandstone with minor shale and laminite lenses (GS NSW, 2018)
Circular Quay has been extensively modified from its natural geology. The 1:100,000 Sydney Geological Sheet (Herbert, 1983) indicates the area is generally underlain by imported fill and sandstone. Marine sediments, located in the Sydney Harbour seabed and below, comprise of estuarine and alluvial sediments.
Soil landscape mapping indicates the site lies within an area of disturbed terrain, with a level plain to hummocky terrain, extensively disturbed by human activity, including complete disturbance, removal or burial of soil. Local relief <10 m, slopes <30%. Landfill includes soil, rock, building and waste materials. Original vegetation completely cleared, replaced with turf or grassland (OEH, 2013).
No conservation reserves are located within proximity to the study area. It is noted that the Royal Botanic Garden is located approximately 50 m to the east of the study area.</td></tr>
<tr><td>Location Map</td><td>Refer Figure 1-1</td></tr>
<tr><td>Site Map</td><td>Refer Figure 1-2</td></tr>
<tr><td>Proposed Development</td><td>Project Description</td><td>The Project includes the following key features:
• replacement of the existing wharves, including Wharf 1, with new accessible wharves</td></tr>
</table>

Requirements	Item	Details
		• replacement and widening of the southern promenade • upgrades to Circular Quay Station, including new escalators and lifts • replacement of operational facilities, including new staff amenities • new built form to the east and west of the existing station • renewal of First Fleet Park • new and upgraded public amenities including provision for retail uses.

Locality Map

Circular Quay Renewal Project
Sydney and The Rocks, NSW

Project Code: 304500912-GS-001(6)
Drawn By: SC, Checked By: TMB
Rev: 01
Date: 2023-03-03
Figure No: 1-1

Stantec

Legend

- Study Area
- Major NSW Town
- Major Watercourse
- Distance Buffer

Major Road

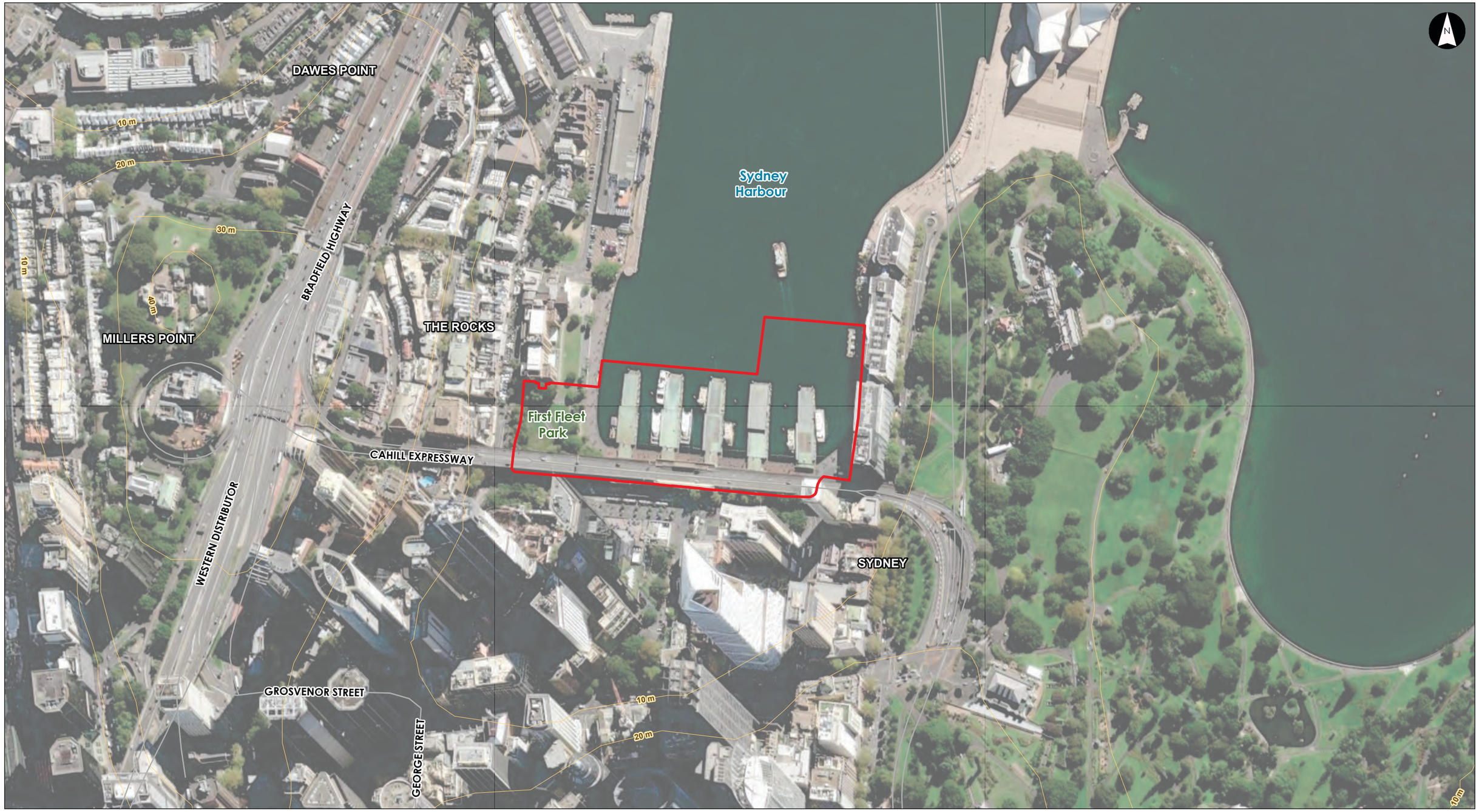
- Motorway
- Primary Road
- Major Waterbody

Notes:
1. Map displayed in GDA 1994 MGA Zone 56

References:
1. Basemap (Esri)
2. Major NSW Town (NSW SS)
3. Major Road (NSW SS, 2019)
4. Major Watercourse & Waterbody (NSW SS)

0 2.5 5 7.5 10 12.5 Kilometres

Scale at A3: 1:270,000



Study Area

Circular Quay Renewal Project
Sydney and The Rocks, NSW

Project Code: 304500912-GS-001(3)
Drawn By: SC, Checked By: AS
Rev: 02
Date: 2023-03-06
Figure No: 1-2

Stantec

Legend

- Study Area
- 10m Contour
- Major Road

Notes:
1. Map displayed in GDA 1994 MGA Zone 56

References:
1. Aerial imagery supplied by Esri (April, 2022)
2. 10m Contour (LPI LiDAR, 2013)
3. Major Road (NSW SS, 2019)

0 50 100 150 200 Metres

Scale at A3: 1:4,000

1.1 IMPACTS ON BIODIVERSITY VALUES

Proponents must address all the impacts on biodiversity values to which the Biodiversity Offset Scheme (BOS) applies. Biodiversity values are defined in the BC Act under Section 1.5 and Clause 1.4 of the Biodiversity Conservation Regulation 2017 (BC Regulation). Clause 6.1 of the BC Regulation prescribes additional impacts on biodiversity values to be assessed under the BOS. The BDAR waiver request must explain whether each value is relevant to the site and/or the project and provide supporting information to explain the likelihood and extent of any potential impacts, including prescribed impacts.

Table 1-2 provides details on biodiversity values at the study area and information on how the project may impact upon these biodiversity values. Supporting illustrations are provided as **Figure 1-3**, **Figure 1-4** and **Figure 1-5**. A preliminary biodiversity assessment was conducted by suitably qualified ecologists, which is appended in full (**Appendix A**).

Table 1-2 Description of biodiversity values within the study area

<table>
<tr><th>Meaning</th><th>Description</th></tr>
<tr><td colspan="2">1.1.1 Vegetation Abundance (Clause 1.4(b) BC Regulation)</td></tr>
<tr><td>Occurrence and abundance of vegetation at a particular site.</td><td>
The study area was assessed by suitably qualified ecologists on 11 January 2023. A combination of survey methods were used and included:

Tree assessment for habitat features
Rapid assessment of terrestrial vegetation through random meander
Assessment of habitat values for terrestrial threatened species

Findings from the site visit and desktop searches have been summarised below.
The existing vegetation mapping (NSW State Vegetation Type Map (SVTM) and Sydney Metropolitan Area (VIS_ID 4489)) did not assign vegetation values within the study area to any native plant community type (PCT) (Figure 1-3). Ground-truthed vegetation mapping reclassified vegetation values within the study area as shown in Figure 1-4.
Vegetation within the study area could not be attributed to any known naturally occurring PCT. Patches of planted native and exotic species were detected throughout the study area, although majority of the area is cleared and dominated by urban development.
A summary of vegetation and cleared land is provided in the table below:
<table>
<tr><th>Vegetation Type</th><th>PCT</th><th>Potential TEC</th><th>Area within study area (ha)*</th></tr>
<tr><td>Planted Native/Exotics</td><td>NA</td><td>NA</td><td>0.39</td></tr>
<tr><td>Cleared Land</td><td>NA</td><td>NA</td><td>1.42</td></tr>
<tr><td>Total Area</td><td></td><td></td><td>2.21</td></tr>
<tr><td colspan="4">*Only terrestrial biodiversity has been included in area calculations</td></tr>
</table>
The study area has been separated into two areas of planted native/exotic vegetation, which are described in more detail below.
First Fleet Park
Vegetation is contained within designated garden beds along the borders of the grassed and concrete areas of First Fleet Park and surrounding pedestrian walkways. Vegetation cannot be attributed at any known naturally occurring PCT.
Dominant canopy species included the exotic cultivar species Pepper Tree (Schinus areira), Southern Magnolia (Magnolia grandiflora) and Cabbage Tree Palm (Livistona australis), along with the native Port Jackson Fig (Ficus rubiginosa). Understorey species were dominated by three native species Gymea Lily (Doryanthes excelsa), Spiky-headed Mat-rush (Lomandra longifolia) and Coast Banksia (Banksia integrifolia).
</td></tr>
</table>

	General Plantings Planted vegetation was detected throughout other sections of the study area, generally as isolated plantings surrounded by concrete. Dominant species include the native Cabbage Tree Palms (*Livistona australis*) and exotic Dwarf Date Palm (Phoenix dactylifera) It should be noted that select vegetation may be retained throughout the study area where design and Tree Protection Zones (TPZ) allow. In addition, the project involves development of urban green space with native landscaping which will replace some impacted vegetation
1.1.2 Vegetation Integrity (Section 1.5(2)(a) BC Act)	
Degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state.	The study area is located within a highly disturbed environment, and as described above, vegetation within the study area is not associated within any known PCTs and much of the site is cleared and dominated by urban development. A total of 30 flora species were recorded within the study area, including 12 native species (40%) and 18 exotics (60%) across 25 families. **0** shows the full list of flora species recorded within the site during the site inspection. It is acknowledged that plot-based floristics and vegetation integrity surveys are required as a condition of Section 4.3 of the Biodiversity Assessment Method (BAM) (NSW DPIE, 2020) to accurately characterise floristics and vegetation integrity scores (VI scores) for PCTs. However, as the entirety of the study area is characterised by isolated patches of planted exotics and native species, plot-based floristics and vegetation integrity surveys were not able to be conducted. No threatened flora species were identified during the site inspection and vegetation types present within the study area are not associated with any known State or Commonwealth listed threatened ecological communities (TECs). Presence of TECs is highly unlikely due to the modified surrounds and lack of natural habitat. As such, an assessment of commensuration to determine any listing status was not possible.
1.1.3 Habitat Suitability (Section 1.5(2)(b) BC Act)	
Degree to which the habitat needs of threatened species are present at a particular site.	Habitat suitability for threatened species is very limited given the highly disturbed and modified environment within and surrounding the study area. Availability of suitable habitat within the study area is generally limited to scattered stands of planted cultivar, cleared land and man-made structures. No threatened flora were detected during the site inspection in January 2023 and the likelihood of occurrence assessment completed (see Appendix C of **Appendix A**) found that no threatened flora species had above a low likelihood of occurrence. Much of the site is cleared, and the study area is regularly managed which would impede the procurement of most threatened flora species identified from desktop searches. Assessment of habitat suitability for threatened fauna species was also undertaken during the site inspection. In addition to the initial site inspection, targeted microbat surveys were undertaken in March 2023. These involved roost inspections and the use of a handheld bat detector, both on the wharves and underneath them via boat. While there was some suitable habitat for microbats, no evidence of use was found. Available habitat has been summarised in the table below.

Habitat value	Description
Foraging habitat	Foraging habitat is generally limited within the study area. Planted vegetation within the study area supports low structural and floristic diversity and are located in isolated patches separated by large spans of cleared and disturbed land. Foraging opportunities are likely constrained to highly mobile and urban-adapted species (e.g., Silver Gull (*Chroicocephalus novaehollandiae*) and Rainbow Lorikeet (*Trichoglossus moluccanus*)). Planted Figs (Port Jackson - *Ficus rubiginosa* and Rubber Plant - *Ficus elastica*) are intermixed around the study area which provide foraging resources for some native fauna species, including Grey-headed Flying-fox (*Pteropus poliocephalus*). Impact to threatened fauna foraging habitat due to vegetation removal is expected to be minor and isolated. Foraging habitat is limited within the study area. It is considered, however that some native fauna species, including Grey-headed Flying-fox, may have a transient presence within the study area during flowering and fruiting seasons. It is unlikely, however that species would frequent or breed within the available habitat of the study area. It is also noted that select vegetation may be retained where design and Tree Protection Zones (TPZ) allow. In addition, the project involves development of urban green space with native landscaping which will replace some impacted vegetation.
Burrows, nests and other fauna habitat	Welcome Swallow (*Hirundo neoxena*) were detected entering the roof space at wharf 6 and one hollow-bearing Pepper Tree (*Schinus areira*) (<10cm diameter) was detected in the south-west portion of the study area (First Fleet Park). The hollow-bearing tree may provide shelter or nesting for fauna species, although is unlikely of sufficient size to provide suitable habitat for threatened species other than potentially microbats. A targeted microbat survey, including roost inspection both on and under the wharves by boat and the use of a handheld bat detector, found no evidence of microbat habitation in the wharves. All potential crevices in wharf roof structures are sealed with fauna exclusion mesh and maintained by the Maritime Maintenance staff. No burrows or other fauna was detected within the study area during the site inspection. Potential removal of these features may disturb any resident fauna. It should be noted, however that habitat features occur in a highly trafficked and disturbed environment. Potential resident fauna are unlikely to be dependent on these features such that viable populations would be in danger of extinction. Mitigation measures in the form of pre-clearance surveys would be recommended prior to the removal of any vegetation.
Leaf litter	Leaf litter was minimal at the time of the site inspection as majority of the ground area is bitumen sealed, grassed, or mulched. The area is managed and likely subject to regular slashing, reducing the likelihood of a build-up of leaf litter.

Logs	No logs or significant fallen branches were detected within the study area. As the area is regularly maintained it is unlikely that logs or significant fallen branches are retained onsite for long periods of time.
Aquatic habitat	The study area is located partially within a bay of the Sydney Harbour. No other aquatic habitat was present within the study area. An assessment of the aquatic habitat and value to fauna species will be assessed in a separate specialist assessment and does not form part of this BDAR waiver request.

Potential Prescribed Impacts

1 - Karst, caves, crevices, cliffs, rocks and other geological features of significance

There are no karst, caves, crevices, cliffs, rocks or other geological features of significance within the study area.

2 – Human-made structures

Six wharves are present within the study area. As indicated above, a Welcome Swallow (*Hirundo neoxena*) was detected entering the roof cavity of Wharf 6 (illustrations of the type of man-mad structures are provided in Section 4.4.1 of **Appendix A**). Targeted microbat surveys both on and under the wharves, including roost inspection and the use of a handheld bat detector, found no evidence of microbat habitation in the wharves. Wharves will be replaced as part of the project, likely providing similar habitat following development.

3 – Non-native vegetation

Non-native vegetation intermixed with native plantings are present within the study area. It is highly unlikely that the removal of this vegetation would have a significant impact on any listed threatened species. Mitigation measures in the form of pre-clearance surveys would be recommended prior to the removal of any vegetation.

4 – Modification of habitat (e.g., light, noise)

Local noise and light levels may increase during the construction period of the project, and marginally following construction. However, given the highly trafficked and urban landscape of the study area and surrounds it is unlikely that any increased noise or light during construction or operation would substantially impact any threatened species.

Management measures such as noise limiters, turning off idling machines and appropriate work hours would be recommended to reduce the likelihood of impacts to native fauna during construction.

Threatened species that may use the area for feeding or as transient habitat identified in the likelihood of occurrence assessment (Appendix C of **Appendix A**) would be expected to easily avoid the area during construction and no more than minor and temporary impacts to these species is expected.

1.1.4 Threatened Species Abundance (Clause 1.4(a) BC Regulation)

Occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site.	A likelihood of occurrence was conducted following desktop search results and on-ground verification of ecological values within the study area (Appendix C of **Appendix A**). Eight threatened terrestrial species were identified as having at least a moderate likelihood of occurring within the study area: ▪ White-bellied Sea-Eagle (*Haliaeetus leucogaster*) – listed as vulnerable under the BC Act ▪ Eastern Osprey (*Pandion haliaetus*) – listed as vulnerable under the BC Act ▪ Grey-headed Flying-fox (*Pteropus poliocephalus*) – listed as vulnerable under the BC Act and EPBC Act ▪ Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) – listed as vulnerable under the BC Act ▪ Little Bent-winged Bat (*Miniopterus australis*) – listed as vulnerable under the BC Act ▪ Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – listed as vulnerable under the BC Act ▪ Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*) – listed as vulnerable under the BC Act ▪ Southern Myotis (*Myotis macropus*) – listed as vulnerable under the BC Act. Occurrence of these species would primarily be in transit, and it is unlikely they frequent or breed within the available habitat of the study area. Available breeding habitat within the study area does not constitute important habitat or contain available breeding habitat for listed threatened species. Impacts associated with the removal of human-made structures are provided above, in the 'Habitat Suitability' row of this table. Given that no microbats were detected during the targeted survey, it is unlikely the removal of the wharves would have a significant impact on the threatened microbat species listed above. As discussed above, no threatened flora were detected during the site inspection in January 2023 and the likelihood of occurrence assessment completed (see Appendix C of **Appendix A**) found that no threatened flora species had above a low likelihood of occurrence. Much of the site is cleared, and areas of vegetation are regularly managed which would impede the procurement of most threatened flora species identified from desktop searches.

1.1.5 Habitat Connectivity (Clause 1.4(c)BC Regulation)

Degree to which a particular site connects different areas of habitat of threatened species to facilitate the movement of those species across their range.	Connectivity of habitat within the study area and with adjacent land is highly limited. Planted vegetation is present in isolated patches and the study area is surrounded by a highly urbanised environment. Some connectivity may exist between the study area and adjacent Sydney Royal Botanic Gardens; however, these areas are linked by an urban landscape that does not offer optimum connectivity opportunities.

1.1.6 Threatened Species Movement (Clause 1.4(d) BC Regulation)	
Degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle.	The project would not impact the movement of threatened species due to the lack of native vegetation, particularly intact tracts of forest, within the study area. Further, the connectivity between the isolated patches of planted vegetation within the study area and surrounding vegetation is highly limited and do not form preferred movement corridors.
1.1.7 Flight Path Integrity (Clause 1.4(e) BC Regulation)	
Degree to which the flight paths of protected animals over a particular site are free from interference.	The flight paths of threatened species are unlikely to be impacted by the project. The setting for the project is within a heavily trafficked urban landscape that contains hundreds of similar sized buildings and infrastructure. No wind turbines, masts or similar structures that may obstruct flight path integrity are proposed as part of the project.
1.1.8 Water Sustainability (Clause 1.4(f) BC Regulation)	
Degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site.	The study area is located partially within a bay of the Sydney Harbour. An assessment of this aquatic habitat and potential value to fauna species will be assessed in a separate specialist assessment. No other aquatic habitat was identified within the study area. A review of the Atlas of Groundwater Dependant Ecosystems indicated that no known groundwater dependant ecosystems (GDEs) have been identified within the study area (BoM, 2022). A search of the EPBC Act Protected Matter Search Tool (PMST) was undertaken for the study area and a 5 km buffer area. There are no Wetlands of International Importance within 5 km of the study area. No coastal wetlands or littoral wetlands under the State Environmental Planning Policy (Resilience and Hazard) 2021 are mapped within the study area.

SVTM Vegetation Mapping

Circular Quay Renewal Project
Sydney and The Rocks, NSW

Project Code: 304500912-GS-001(4)
Drawn By: SC, Checked By: AC
Rev: 02
Date: 2023-03-09
Figure No: 1-3

Stantec

Legend

- Study Area
- Assessment Area
- Major Road

Plant Community Type (PCT)

- PCT 3594: Sydney Coastal Sandstone Foreshores Forest

Notes:
1. Map displayed in GDA 1994 MGA Zone 56

References:
1. Aerial imagery (April, 2022)
2. Major Road (NSW SS, 2019)
3. Plant Community Type (PCT) (NSW SVTM, 2022)

0 130 260 390 520 650 Metres

Scale at A3: 1:13,000

Ground-truthed Vegetation

Circular Quay Renewal Project
Sydney and The Rocks, NSW

Project Code: 304500912-GS-001(1)
Drawn By: SC, Checked By: TMB
Rev: 01
Date: 2023-03-06
Figure No: 1-4

Stantec

Legend

- Study Area
- Hollow-bearing Tree

Ground-truthed Vegetation

- Planted Native/Exotic

Notes:
1. Map displayed in GDA 1994 MGA Zone 56

References:
1. Aerial imagery supplied by Esri (April, 2022)
2. Cadastre (NSW SS, 2022)

0 25 50 75 100 Metres

Scale at A3: 1:2,000

LANE COVE TUNNEL
PACIFIC HIGHWAY
WARRINGAH FREEWAY
BRADFIELD HIGHWAY
BROADWAY
SOUTHERN CROSS DRIVE
CAHILL EXPRESSWAY
GROSVENOR STREET
Swift Parrot
Grey-headed Flying-fox
Powerful Owl
Grey-headed Flying-fox
White-bellied Sea-Eagle
Superb Fruit-Dove
Grey-headed Flying-fox
N

BioNet Atlas Threatened Species

Circular Quay Renewal Project
Sydney and The Rocks, NSW

Project Code: 304500912-GS-001(5)
Drawn By: SC, Checked By: TMB
Rev: 01
Date: 2023-03-06
Figure No: 1-5

Stantec

Legend

- Study Area
- 5 km Study Area Buffer

Threatened Species

- Fauna
- Flora
- Fungi

Major Road

- Motorway
- Primary Road

Notes:
1. Map displayed in GDA 1994 MGA Zone 56

References:
1. Aerial imagery (Esri, April 2022)
2. Major Road (NSW SS, 2019)
3. Threatened Species (DPE, December 2021)

0 500 1,000 1,500 2,000 Metres

Scale at A3: 1:40,000

2.0 REFERENCES

DPIE (2019). How to apply for a biodiversity development assessment report waiver for a Major Project Application. NSW and Department of Planning, Industry and Environment, 2019. https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/apply-biodiversity-development-assessment-report-waiver-190593.pdf

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APPENDIX A

Preliminary Biodiversity Assessment

Preliminary Biodiversity Investigation

Circular Quay Renewal Project

Report Date

19 June 2023

Prepared for:

LendLease

Prepared by:
Stantec Australia Pty Ltd

Revision	Description	Author		Quality Check		Independent Review	
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5	Revised	Sam Carr	19/06/23	Dane Fogliada	19/06/23	Mark Vergara	19/06/23

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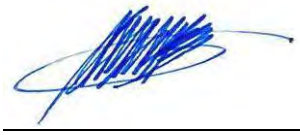
Prepared by  _____
(signature)

Sam Carr

Reviewed by  _____
(signature)

Dane Fogliada

Approved by  _____
(signature)

Mark Vergara

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Executive Summary

Transport for NSW are proposing to revitalise the transport hub at Circular Quay (the project). Stantec, on behalf of Lendlease have prepared a preliminary biodiversity investigation to help inform the planning approval process of the project. The preliminary biodiversity investigation focuses on:

- Identifying the terrestrial biodiversity values of the study area, and
- Potential impacts of the project on terrestrial biodiversity.

The preliminary biodiversity investigation included a desktop review of relevant information. A site inspection was also undertaken to ground-truth vegetation and to identify any key ecological values of the study area. Vegetation present within the study area is characterised as a mixture of planted exotics and natives that do not conform to any known Plant Community Types (PCTs) or Threatened Ecological Communities (TECs). No threatened flora were detected within the study area during the site inspection and impact to vegetation as a result of the project is expected to be minor and limited to approximately 0.39 ha of planted native / exotic vegetation.

A likelihood of occurrence assessment was conducted for threatened terrestrial biodiversity that identified eight fauna species that had at least a moderate likelihood of occurrence within the study area. No threatened fauna were detected within the study area during the site inspection and availability of suitable fauna habitat is generally limited to scattered stands of planted cultivar, cleared land and man-made structures.

It is considered unlikely that the project would have a significant impact on terrestrial biodiversity within the study area. Section 7.9 of the NSW *Biodiversity Conservation Act 2016* (BC Act) requires that a State Significant Infrastructure (SSI) application must be accompanied by a Biodiversity Development Assessment Report (BDAR) unless the Planning Agency Head and the Environment Agency Head of the NSW Department of Planning and Environment determine that the proposed development is not likely to have any significant impact on biodiversity values. As such, a BDAR waiver will be prepared and submitted to the Planning Agency Head and the Environment Agency Head seeking confirmation that preparation of a BDAR is not required for the terrestrial component of the project.

Abbreviations

AOBV	Areas of Outstanding Biodiversity Values
BAM	Biodiversity Assessment Method
BoM	*Bureau of Meteorology*
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
DAWE	Department of Agriculture, Water and the Environment
DECCEW	Department of Climate Change, Energy, the Environment and Water
DPE	Department of Planning and Environment
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GDEs	Groundwater Dependant Ecosystems
HTW	High Threat Weeds
LGA	Local Government Authority
LEP	Local Environmental Plan
MNES	Matters of National Environmental Significance
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PW	Priority Weed
PMST	Protected Matters Search Tool
RBA	Rapid Biodiversity Assessment
RM	Random Meander
SEARs	Secretary's Environmental Assessment Requirements
SSI	State Significant Infrastructure
SVTM	State Vegetation Type Mapping
TEC	Threatened Ecological Communities
TPZ	Tree Protection Zone
VI	Vegetation Integrity
WoNS	Weeds of National Significance

1.0 INTRODUCTION

CQC Partners (including the companies Capella Capital, Lendlease Construction and BESIX Watpac), on behalf of Transport for NSW are proposing to revitalise the transport hub at Circular Quay (the Circular Quay Renewal Project).

LendLease have engaged Stantec to develop a preliminary biodiversity investigation for the terrestrial component of the biodiversity assessment. A preliminary biodiversity investigation is required to help inform the planning pathways for the Circular Quay Renewal Project.

1.1 PROJECT PARTICULARS

The Project includes the following key features:

- replacement of the existing wharves, including Wharf 1, with new accessible wharves
- replacement and widening of the southern promenade
- upgrades to Circular Quay Station, including new escalators and lifts
- replacement of operational facilities including new staff amenities
- new built form to the east and west of the existing station
- renewal of First Fleet Park
- new and upgraded public amenities including provision for retail uses.

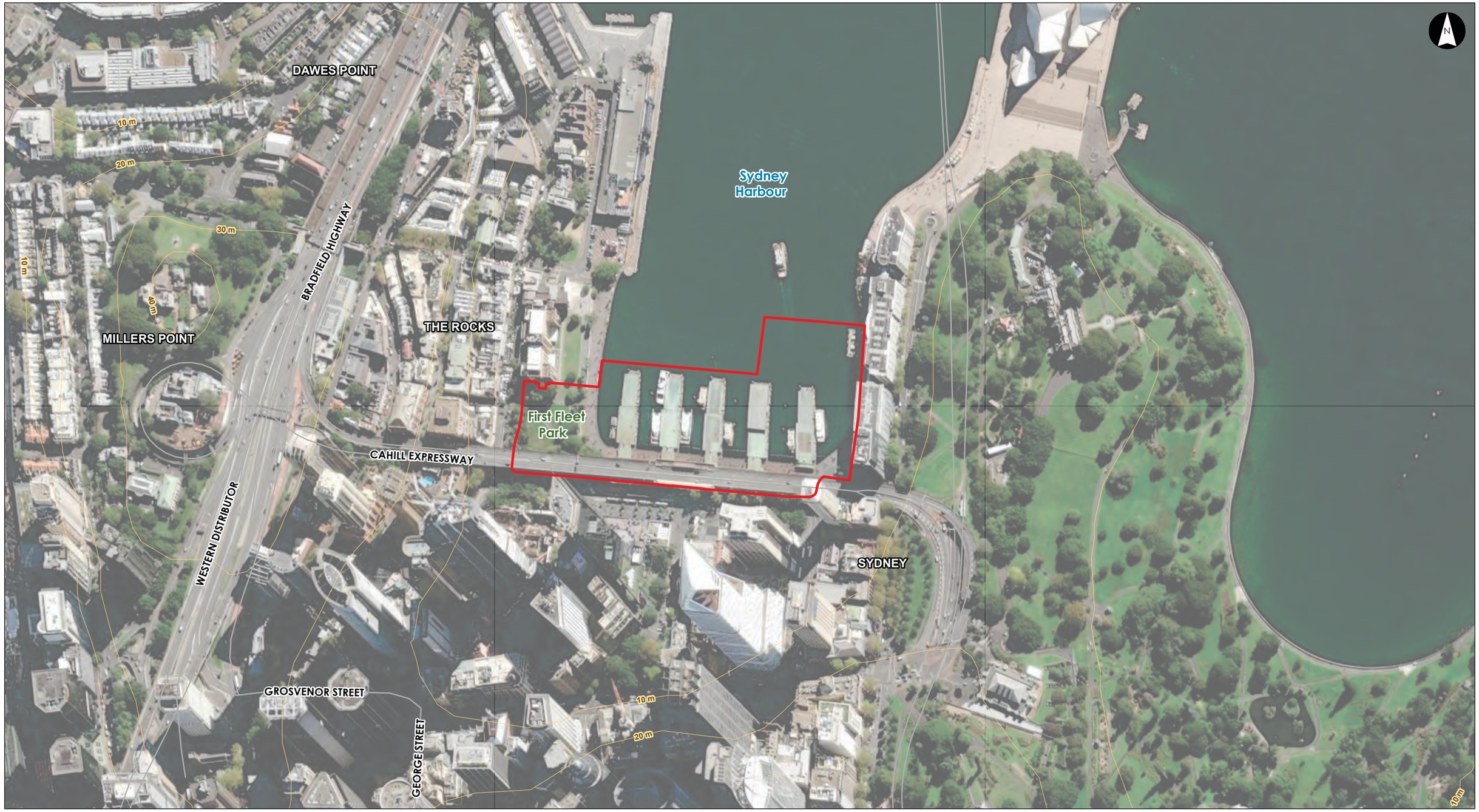
1.2 STUDY AREA

The study area is within Circular Quay, located along the southern border of the Sydney Harbour (**Figure 1-1**). Circular Quay is an important historical and cultural area. Other study area particulars are detailed in **Table 1-1**.

Table 1-1 Study area particulars

Attribute	Study area particulars
Locality	The study area is in Circular Quay. The study area is located across two suburbs, Sydney and the Rocks (NSW 2000), and partially within the Sydney Harbour.
LGA	Sydney City Council

Lot/DP	The study area intersects 25 Lots/DP. Lots/DPs are listed below: 14 / 787934 — 23 / 831695 — 4 / 787934 — 203 / 1172321 10 / 787934 — 3 / 787934 — 31 / 848244 — 202 / 1172321 2 / 796811 — 3 / 818565 — 12 / 787934 — 201 / 1172321 6 / 787934 — 2 / 818565 — 5 / 787934 — 11 / 1193741 15 / 787934 — 33 / 848244 — 2 / 787933 — 9 / 787934 32 / 848244 — 2 / 787935 — 22 / 831695 — 11 / 847490 200 / 1172321
LEP Land Zoning*	B8 – Metropolitan Centre SP2 – Infrastructure (Railway and Boating Facilities) RE1 - Public Recreation SCRA - Sydney Cove Redevelopment Authority Scheme
Study Area	~5 ha
Current Land Use	The study area falls within a heavily modified/disturbed environment within the central business district of Sydney. It is subject to increasing tourism, recreation, and transport practices. Circular Quay is also an important historic and cultural area of Sydney.
Topography	The study area is predominately flat ranging from around 10 m to 1 m above sea level (ASL), and generally drains towards Sydney Harbour.
Bioregion / Sub-region	Sydney Basin Region / Pittwater
NSW Landscape	Port Jackson Basin
Site Surface Geology and Soil Landscapes	Entirety of the terrestrial portion of the study area is mapped as Hawkesbury Sandstone, Narrabeen Group from the Triassic age. Soils have the following description - Medium to coarse-grained quartz sandstone with minor shale and laminite lenses (GS NSW, 2018) Soil landscape mapping indicates the site lies within an area of disturbed terrain, with the following landscape description: Disturbed Terrain – level plain to hummocky terrain, extensively disturbed by human activity, including complete disturbance, removal or burial of soil. Local relief <10 m, slopes <30%. Landfill includes soil, rock, building and waste materials. Original vegetation completely cleared, replaced with turf or grassland.
Conservation Reserves	No conservation reserves are located within proximity to the study area. It is noted that the Royal Botanic Gardens are located approximately 50 m to the east of the study area.
NSW WeedWise Local Areas	Greater Sydney
**As of the 26th of April 2023, land zoning within the study area will change in accordance with State Environmental Planning Policy Amendment (Land Use Zones) (No 6) 2022.*	



Study Area

Circular Quay Renewal Project
Sydney and The Rocks, NSW

Project Code: 304500912-GS-001(3)
Drawn By: SC, Checked By: AS
Rev: 02
Date: 2023-03-06
Figure No: 1-1

Stantec

Legend

- Study Area
- 10m Contour
- Major Road

Notes:
1. Map displayed in GDA 1994 MGA Zone 56

References:
1. Aerial imagery supplied by Esri (April, 2022)
2. 10m Contour (LPI LiDAR, 2013)
3. Major Road (NSW SS, 2019)

0 50 100 150 200 Metres

Scale at A3: 1:4,000

2.0 METHODOLOGY

2.1 DESKTOP REVIEW

A desktop review was undertaken to identify records of threatened flora, fauna and ecological communities, migratory species within 5 km of the study area (i.e., the locality). This included searches of online databases and a review of available spatial data and literature of relevance, including:

- Existing vegetation mapping as available in NSW BioNet Vegetation Information System (DPE, 2022)
- Local threatened species records within the NSW BioNet Atlas (DPE, 2022)
- Relevant Threatened Ecological Community (TEC) description and assessment guidelines (NSW DPIE, 2020)
- Predicted Matters of National Environmental Significance (MNES), including threatened species and ecological communities as per the Commonwealth's Protected Matters Search Tool (PMST)
- The Atlas of Living Australia database, to identify known records of threatened, least concern and pest species recorded within the vicinity of the study area
- Areas of Outstanding Biodiversity Value
- Sensitive ecological sites and conservation areas protected by local, State and Commonwealth planning instruments
- Existing biodiversity reports for the study area.

2.2 SITE INSPECTION

Site inspections were undertaken on 11 January, 9 March and 17 March 2023 by a suitably qualified ecologist, Dane Fogliada. A summary of the detailed survey effort and environmental conditions during the site inspections are presented in **Table 2-1** and **Table 2-2**, respectively.

Table 2-1 Site inspection survey effort

Date	Staff	Survey Period	Survey Effort
11/01/2023	Dane Fogliada and Jackson McCutchen	08:00 to 13:00	5.0 hours
09/03/2023	Dane Fogliada and Jackson McCutchen	10:00 to 12:00	2 hours
17/03/2023	Dane Fogliada and Jackson McCutchen	10:15 to 13:15	3 hours
			Total Effort 18.0 hours

Table 2-2 Environmental conditions at the time of site inspection (BoM, 2022)

Date	Temperature (°C)		Rainfall (mm)	Other observations
	Minimum	Maximum		
11/01/2023	20.7	27.0	0	A total of 3.4 mm of rain was recorded within 72 hours preceding the site inspection.

9/03/2023	16.7	28.4	0	No rain was recorded within 72 hours preceding the site inspection.
17/03/2023	20.0	31.6	0	A total of 10.4 mm of rain was recorded within 72 hours preceding the site inspection.
Temperature and rainfall observations are from Sydney (Observatory Hill – Station 066214), located approximately 1 km west of the study area.				

2.2.1 Survey Methods

The site inspection was informed by the desktop review and assisted in determining the value of terrestrial environments within the study area. Survey method and objectives are summarised below.

2.2.1.1 Preliminary Biodiversity Assessment

A Random Meander (RM) and Rapid Biodiversity Assessment (RBA) was conducted to ground-truth vegetation mapping and identify potential habitat in the study area. Biodiversity values and conditions within the study area were recorded. Field data was used to generate an updated map of the vegetation communities in each assessment area.

Fauna habitat features were collected as part of the site inspection. The availability and quality of habitat within the study area was assessed with respect to the following factors:

- Flora diversity and structure
- Type and extent of habitat types
- Habitat connectivity, including continuity with similar habitats within the study area
- Occupancy of key habitat features including hollow-bearing trees, man-made structures, where possible. Roost searches included signs of fauna activity (guano, etc.), use of a handheld acoustic bat detector and roost inspections.
- Systematic survey of the underside of the wharves by boat for microbat habitat features and evidence of habitation. Roost searches included signs of fauna activity (guano, etc.), use of a handheld acoustic bat detector and roost inspections.
- Degree of disturbance and degradation
- Topographic features such as aspect and slope.

Fauna encountered opportunistically during the site inspection were recorded.

Plot-based floristics and vegetation integrity surveys are required as a condition of Section 4.3 of the Biodiversity Assessment Method (BAM) (NSW DPIE, 2020) to accurately characterise floristics and vegetation integrity scores (VI scores) for plant community types (PCTs). As the entirety of the study area is characterised by isolated patches of planted exotics and native species (refer **Section 4.3**), plot-based floristics and vegetation integrity surveys were not able to be conducted.

2.3 SURVEY LIMITATIONS

Identification of the biodiversity values of the study area are limited by the methodology used for the site investigation undertaken to inform this preliminary biodiversity investigation. The site inspection has sampled the study area at an individual point in time (snapshot). A period of several seasons or years is often required to identify all species present within an area. As such, the biodiversity values of the study area recorded from this site inspection should not be seen as a complete/ comprehensive inventory.

Given the short period of time spent on site, the detection of certain species may be affected by:

- Seasonal migration (particularly migratory birds)
- Seasonal flowering periods (some species are cryptic and are unlikely to be detected outside of the known flowering period)
- Seasonal availability of food, such as blossoms for some fauna
- Weather conditions during the survey period (some species may go through cycles of activity related to specific weather conditions, for example frogs can be inactive during dry weather)
- Species lifecycle (cycles of activity related to breeding).

This preliminary biodiversity investigation was developed based on available data and the environmental conditions of the study area at the time of the site inspection and development of this report. Environmental conditions, including the presence of threatened species, can vary with time. To address this limitation, the assessment has aimed to identify the presence and suitability of the habitat for threatened species.

3.0 DESKTOP SEARCHES AND LITERATURE

3.1 DESKTOP SEARCHES AND LITERATURE REVIEW

3.1.1 BioNet Atlas Search

A search of the Department of Planning and Environment (DPE) BioNet Atlas for records of threatened species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) within 5 km of the study area was undertaken on 22 December 2022. The results from the BioNet Atlas database search indicated that 73 threatened or migratory species have been recorded within 5 km of the study area, including one amphibian, 31 birds, one insect, 15 mammal, two reptiles, 20 flora and two fungi species.

Threatened species that have been previously recorded within 5 km of the study area are listed in **Table 3-1**.

Table 3-1 BioNet Atlas species recorded threatened species within 5 km of the study area

Family	Scientific Name	Common Name	BC ACT	EPBC Act	Count
Amphibians					
Myobatrachidae	*Pseudophryne australis*	Red-crowned Toadlet	V	-	74
Birds					
Accipitridae	*Erythrotriorchis radiatus*	Red Goshawk	CE	V	1
	Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	37
	Hieraaetus morphnoides	Little Eagle	V	-	3
	Lophoictinia isura	Square-tailed Kite	V	-	1
	Pandion cristatus	Eastern Osprey	V	-	1
Anseranatidae	*Anseranas semipalmata*	Magpie Goose	V	-	10
Apodidae	*Hirundapus caudacutus*	White-throated Needletail	-	V,C,J,K	5
Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	E	E	1
	Ixobrychus flavicollis	Black Bittern	V	-	2
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow	V	-	3
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew	E	-	2
Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V	V	2
Columbidae	*Ptilinopus superbus*	Superb Fruit-Dove	V	-	6
Diomedeidae	*Diomedea exulans*	Wandering Albatross	E	E	1
	Thalassarche chrysostoma	Grey-headed Albatross	-	E	1
Estrildidae	*Stagonopleura guttata*	Diamond Firetail	V	-	1
Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher	V	-	2
	Haematopus longirostris	Pied Oystercatcher	E	-	2
Laridae	*Onychoprion fuscata*	Sooty Tern	V	-	2
	Sternula albifrons	Little Tern	E	C,J,K	3
Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	CE	CE	1
	Epthianura albifrons	White-fronted Chat	V	-	2

Family	Scientific Name	Common Name	BC ACT	EPBC Act	Count
	Epthianura albifrons	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	EP	-	2
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V	-	1
Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V	-	6
	Lathamus discolor	Swift Parrot	E	CE	8
Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	E	CE,C,J,K	8
Strigidae	*Ninox connivens*	Barking Owl	V	-	2
	Ninox strenua	Powerful Owl	V	-	286
Tytonidae	*Tyto novaehollandiae*	Masked Owl	V	-	2
	Tyto tenebricosa	Sooty Owl	V	-	1
Insects					
Petaluridae	*Petalura gigantea*	Giant Dragonfly	E	-	1
Mammals					
Petaluridae	*Petalura gigantea*	Giant Dragonfly	E	-	1
Balaenidae	*Eubalaena australis*	Southern Right Whale	E	E	2
Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V	-	1
Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V	E	1
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V	-	4
Miniopteridae	*Miniopterus australis*	Little Bent-winged Bat	V	-	21
	Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	90
Molossidae	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V	-	10
Otariidae	*Arctocephalus forsteri*	New Zealand Fur-seal	V	-	3
	Arctocephalus pusillus doriferus	Australian Fur-seal	V	-	6
Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V	-	1
Phascolarctidae	*Phascolarctos cinereus*	Koala	E	E	5
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	V	1195
Vespertilionidae	*Chalinolobus dwyeri*	Large-eared Pied Bat	V	V	2
	Myotis macropus	Southern Myotis	V	-	51
	Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	1

Family	Scientific Name	Common Name	BC ACT	EPBC Act	Count
Reptiles					
Cheloniidae	*Caretta*	Loggerhead Turtle	E	E	3
Dermochelyidae	*Dermochelys coriacea*	Leatherback Turtle	E	E	1
Flora					
Casuarinaceae	*Allocasuarina portuensis*	Nielsen Park She-oak	E	E	12
Dilleniaceae	*Hibbertia puberula*	<Null>	E	-	1
Doryanthaceae	*Doryanthes palmeri*	Giant Spear Lily	V	-	2
Elaeocarpaceae	*Tetratheca glandulosa*	<Null>	V	-	1
Elaeocarpaceae	*Tetratheca juncea*	Black-eyed Susan	V	V	2
Euphorbiaceae	*Amperea xiphoclada var. pedicellata*	<Null>	E	Extinct	1
Fabaceae (Mimosoideae)	*Acacia bynoeana*	Bynoe's Wattle	E	V	2
Fabaceae (Mimosoideae)	*Acacia terminalis subsp. Eastern Sydney*	Sunshine wattle	E	E	327
Lamiaceae	*Prostanthera marifolia*	Seaforth Mintbush	CE	CE	4
Myrtaceae	*Eucalyptus camfieldii*	Camfield's Stringybark	V	V	4
Myrtaceae	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V	V	5
Myrtaceae	*Eucalyptus pulverulenta*	Silver-leafed Gum	V	V	1
Myrtaceae	*Melaleuca biconvexa*	Biconvex Paperbark	V	V	1
Myrtaceae	*Melaleuca deanei*	Deane's Paperbark	V	V	1
Myrtaceae	*Rhodamnia rubescens*	Scrub Turpentine	CE	CE	1
Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	E	V	73
Orchidaceae	*Caladenia tessellata*	Thick Lip Spider Orchid	E	V	2
Poaceae	*Dichanthium setosum*	Bluegrass	V	V	1
Proteaceae	*Macadamia integrifolia*	Macadamia Nut	-	V	2
Proteaceae	*Persoonia hirsuta*	Hairy Geebung	E	E	4
Fungi					
Hygrophoraceae	*Hygrocybe collucera*	<Null>	E	-	1
	Hygrocybe griseoramosa	<Null>	E	-	1
	Hygrocybe reesiae	<Null>	V	-	1

Family	Scientific Name	Common Name	BC ACT	EPBC Act	Count

Key: BC ACT = Biodiversity Conservation Act 2016, EPBC ACT = Environment Protection and Biodiversity Conservation Act 1999, V = Vulnerable, E = Endangered, CE = Critically Endangered, C = China-Australia Migratory Bird Agreement, J = Japan-Australia Migratory Bird Agreement, K = Republic of Korea-Australia Migratory Bird Agreement.

3.1.2 Protected Matters Search Tool

A search of the Protected Matters Search Tool (PMST) was undertaken on 22 December 2022 and included a 5 km buffer to the study area. **Table 3-2** provides a summary of the results of the search.

An assessment of whether the project will have a significant impact to predicted MNES will be undertaken as part of the environmental assessment process. See **Appendix B** for the full PMST report.

Table 3-2 PMST's predicted MNES

MNES	PMST predicted	Applicability to study area
World Heritage Places	3	One of the three World Heritage Places, the Sydney Opera House (Buffer Zone only) is located within the study area. Potential impacts to World Heritage Items will be addressed in a separate specialist assessment.
National Heritage Places	8	Five of the 8 National Heritage Places are located within the study area, and include: • Hyde Park Barracks • First Government House Site • Sydney Harbour Bridge • Governors' Domain and Civic Precinct • Sydney Opera House. Potential impacts to National Heritage Places will be addressed in a separate specialist assessment.
Wetlands of International Importance*	0	NA
Great Barrier Reef Marine Park	None	NA
Commonwealth Marine Area	None	NA
TECs	Five TECs are predicted as 'likely to occur' within the 5 km locality: Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion - listed as endangered under the EPBC Act	Further assessment is presented in Section 3.2.2.1.

<table>
<tr><th>MNES</th><th>PMST predicted</th><th>Applicability to study area</th></tr>
<tr><td></td><td>Eastern Suburbs Banksia Scrub of the Sydney Region - listed as critically endangered under the EPBC Act

Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community - listed as endangered under the EPBC Act

Coastal Upland Swamps in the Sydney Basin Bioregion - listed as endangered under the EPBC Act

River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria - listed as critically endangered under the EPBC Act</td><td></td></tr>
<tr><td>Threatened Species</td><td>A total of 100 threatened species were predicted to occur within the 5 km locality as per table below. This included two conservation dependent fish species and two conservation dependent shark species.
<table>
<tr><th>Group</th><th colspan="3">Number of species predicted</th></tr>
<tr><th></th><th>Vulnerable</th><th>Endangered</th><th>Critically Endangered</th></tr>
<tr><td>Birds</td><td>24</td><td>11</td><td>6</td></tr>
<tr><td>Fish</td><td>2</td><td>2</td><td>0</td></tr>
<tr><td>Frogs</td><td>3</td><td>0</td><td>0</td></tr>
<tr><td>Mammals</td><td>5</td><td>6</td><td>0</td></tr>
<tr><td>Other</td><td>0</td><td>1</td><td>0</td></tr>
<tr><td>Plants</td><td>14</td><td>10</td><td>2</td></tr>
<tr><td>Reptiles</td><td>4</td><td>2</td><td>0</td></tr>
<tr><td>Sharks</td><td>2</td><td>0</td><td>1</td></tr>
<tr><td>Snail</td><td>0</td><td>1</td><td>0</td></tr>
</table></td><td>Further assessment of threatened terrestrial species was undertaken as shown in Section 3.2.2.2.

Potential impacts to threatened aquatic species will be addressed in a separate specialist assessment.</td></tr>
<tr><td>Migratory Species</td><td>A total of 69 listed migratory species were predicted to occur within the 5 km locality. However, these species included a number of marine species (mammals, reptiles, fish and pelagic birds) which were not considered relevant for this assessment.</td><td>Further assessment of migratory terrestrial species was undertaken as shown in Section 3.2.2.3.

Potential impacts to migratory aquatic species will be addressed in a separate specialist assessment.</td></tr>
<tr><td>Other Matters</td><td></td><td></td></tr>
<tr><td>Commonwealth Lands</td><td>A total of 196 Commonwealth Lands parcels were predicted to occur within 5 km of the study area.</td><td>17 of the 196 Commonwealth Land Parcels are located within the study area.

Potential impacts to Commonwealth Lands will be addressed in a separate specialist assessment.</td></tr>
</table>

MNES	PMST predicted	Applicability to study area
Commonwealth Heritage Places	60	7 of the 60 Commonwealth Heritage Places are located within the study area. Potential impacts to Commonwealth Heritage Places will be addressed in a separate specialist assessment.
Listed Marine Species	A total of 93 Listed Marine Species were predicted to occur within 5 km of the study area.	Potential impacts to Listed Marine Species will be addressed in a separate specialist assessment.
Whales and Other Cetaceans	A total of 10 Whales and other Cetaceans were predicted to occur within 5 km of the study area.	Potential impacts to Whales and Other Cetaceans will be addressed in a separate specialist assessment.
Critical Habitats	None	NA
Commonwealth Reserves Terrestrial	None	NA
Australian Marine Parks	None	NA
Habitat Critical to the Survival of Marine Turtles	None	NA
**It is noted that the PMST identifies Wetlands of International Importance within 10 km of the search area. As such, one Wetland of International Importance (Towra Point Nature Reserve) is identified on the PMST shown in Appendix B. This wetland is located over 5 km south of the study area and is separated from the study area by a large built-up area (residential and industrial land uses). No major watercourses directly connect the study area to the wetland.*		

3.1.3 Local Vegetation Mapping and Native Vegetation Extent

The study area is located within a highly disturbed environment and NSW State Vegetation Type Mapping (SVTM) indicated that there are no known PCTs expected to occur within the study area (**Figure 3-1**).

A site-based assessment was undertaken for assessment of native vegetation in line with Section 3.2 of the BAM. A combination of native vegetation as per desktop mapping resources and ground-truthed vegetation was used to estimate the percent native vegetation cover as follows:

- Existing vegetation mapping was used to estimate the percent native vegetation within the 1,500m Assessment Area. Native vegetation was identified based on the existing vegetation mapping from SVTM and aerial imagery
- Ground-truthed vegetation was used to estimate the portion of native vegetation within the study area.
- The percent native vegetation cover was calculated by estimating the percent cover of native vegetation in the 1,500m Assessment Area and study area.

A total of 0.68 ha (0.08 %) of native vegetation cover is present within the Assessment Area, which is part of class 0 - 10% as detailed under Section 3.2 of the BAM.

SVTM Vegetation Mapping

Circular Quay Renewal Project
Sydney and The Rocks, NSW

Project Code: 304500912-GS-001(4)
Drawn By: SC, Checked By: AC
Rev: 02
Date: 2023-03-09
Figure No: 3-1

Stantec

Legend

- Study Area
- Assessment Area
- Major Road

Plant Community Type (PCT)

- PCT 3594: Sydney Coastal Sandstone Foreshores Forest

Notes:
1. Map displayed in GDA 1994 MGA Zone 56

References:
1. Aerial imagery (April, 2022)
2. Major Road (NSW SS, 2019)
3. Plant Community Type (PCT) (NSW SVTM, 2022)

0 130 260 390 520 650 Metres

Scale at A3: 1:13,000

3.1.4 Groundwater Dependent Ecosystems

A review of the Atlas of Groundwater Dependant Ecosystems (BoM 2022) indicated that no known groundwater dependant ecosystems (GDEs) have been identified within the study area.

3.1.5 Areas of Outstanding Biodiversity Value (AOBV)

A review of the register of declared areas of outstanding biodiversity value (DPE, 2022) indicated that there are no mapped AOBV within the study area. The closest declared AOBV is approximately 8 km north-east of the study area at Manly, in Sydney's North Harbour. The area is declared critical habitat for an endangered population of little penguins (*Eudyptula minor*).

3.1.6 Grey-headed Flying Fox Mapping

Flying-fox camp census data is collected as part of the National Flying-fox Monitoring Program and publicly available through the Flying-fox Web Viewer (DCCEEW, 2022). The data suggests a nationally important flying-fox camp is situated approximately 4.7 km south-east of the study area, within Centennial Park (**Figure 3-2**). Grey-Headed Flying-fox, listed as vulnerable under the BC Act and EPBC Act have been regularly recorded at this camp. In 2021, 2,500-9,999 Grey-Headed Flying-fox were detected within the Centennial Park camp during surveys.

A secondary flying-fox camp is located at the Botanic Gardens, approximately 450 m south-east of the study area (**Figure 3-2**). No Grey-Headed Flying-fox have been recorded present at this camp by DCCEEW (2022), although a Grey-Headed Flying-fox species was sited within the Botanic Gardens in 2018 and recorded within the BioNet Atlas (OEH, 2022).

Grey-Headed Flying-fox have a considerably large home range (up to 50 km) and as such may have a transient presence within the study area during flowering and fruiting seasons.

Flying-fox Camp

Circular Quay Renewal Project
Sydney and The Rocks, NSW

Project Code: 304500912-GS-001(6)
Drawn By: SC, Checked By: TMB
Rev: 01
Date: 2023-03-06
Figure No: 3-2

Stantec

Legend

- Study Area
- Major Watercourse
- Major Road

Flying-fox Camp

- Nationally Important
- Other

Notes:
1. Map displayed in GDA 1994 MGA Zone 56

References:
1. Aerial imagery supplied by Esri (April, 2022)
2. Major Watercourses (LPI)
3. Major Road (NSW SS, 2019)
4. Flying-fox Camp (DECCW, 2022)

0 150 300 450 600 750 Metres

Scale at A3: 1:15,250

3.2 LIKELIHOOD OF OCCURRENCE

3.2.1 Threatened Species, Populations and Ecological Communities

Threatened biodiversity (e.g., TECs, threatened species and their habitats) listed under the BC Act and with known records within 5 km of the study area were determined using the BioNet Atlas (**Table 3-1**).

Although the database identified threatened biodiversity for consideration during site inspections, targeted surveys were not part of the scope of works for the present assessment. After the site inspection, an assessment of likelihood of occurrence was undertaken for all threatened terrestrial biodiversity identified with potential to occur within 5 km of the study area (**Appendix C**).

A total of 3 threatened terrestrial species were identified as having at least a moderate likelihood of occurrence:

- White-bellied Sea-Eagle (*Haliaeetus leucogaster*) – listed as vulnerable under the BC Act
- Eastern Osprey (*Pandion haliaetus*) – listed as vulnerable under the BC Act
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – listed as vulnerable under the BC Act and EPBC Act

Likelihood of occurrence of threatened aquatic species will be considered in a separate specialist assessment and does not form part of this preliminary biodiversity investigation.

3.2.2 Matters of National Environmental Significance

As detailed in **Section 3.2,** the PMST indicated that five of the eight MNES listed under the EPBC Act are known or predicted to occur within a 5 km locality surrounding the study area (**Appendix B**). The five MNES include World Heritage Places, National Heritage Places, and various TECs, threatened species and migratory species.

As indicated in **Section 3.2**, potential impacts to World Heritage Places and National Heritage Places, along with threatened and migratory aquatic species will be addressed in separate specialist assessments and do not form part of this preliminary biodiversity investigation.

Information obtained from the PMST search, along with local knowledge and information gathered from the study area during the site inspection was used to assess the likelihood of occurrence on MNES (**Appendix C**). The results of the assessments are provided in the following subsections.

3.2.2.1 Listed Threatened Ecological Communities

PMST report indicated five TECs were ‘likely’ to occur within the 5 km search locality and a further five were ranked as ‘may’ occur within the 5 km search locality.

Desktop vegetation mapping (NSW SVTM & DPE (2022)), however does not suggest presence of any potential TECs within the study area. Site investigation and ground-truthed vegetation (see **Section 4.2**) confirmed that no EPBC Act listed TECs are present within the study area.

3.2.2.2 Listed Threatened Species

PMST report indicated that 100 threatened species are known or predicted to occur within the 5 km locality around the study area.

A likelihood of occurrence assessment was undertaken for threatened terrestrial species listed under the EPBC Act (**Appendix C**). One species was considered to have at least a moderate likelihood of occurrence within the study area, the Grey-headed Flying-fox (*Pteropus poliocephalus*). The Grey-headed Flying-fox is listed as vulnerable under the BC Act and EPBC Act.

No threatened species listed as MNES were detected during site inspection (**Section 4.4**).

3.2.2.3 Listed Migratory Species

The PMST report indicated that 69 migratory species are known or predicted to occur within the 5 km locality around the study area.

A likelihood of occurrence assessment was undertaken for migratory terrestrial species listed under the EPBC Act (**Appendix C**). No listed migratory species were considered to have greater than a low likelihood of occurrence within the study area and no listed migratory bird species were recorded within the study area during the site inspection.

The study area does not contain suitable roosting or foraging habitat for migratory species identified in the PMST report. Occurrence of migratory species within the study area would likely be for transit only rather than for utilisation of habitat within the study area. As such, it is considered unlikely that migratory species would occur within the study area.

4.0 SITE INSPECTION

4.1 GROUND-TRUTHED VEGETATION

The existing vegetation mapping (NSW SVTM and Sydney Metropolitan Area (VIS_ID 4489)) did not assign vegetation values within the study area to any native PCT. Ground-truthed vegetation mapping reclassified vegetation values within the study area as shown in **Figure 4-1**.

Patches of planted native and exotic species were detected throughout the study area, although majority of the area is cleared and dominated by urban development. A summary of vegetation and cleared land is provided in **Table 4-1**.

Table 4-1 Vegetation types within the study area

Vegetation Type	PCT	Potential TEC	Approximate area within study area (ha)*
Planted Native/Exotics	NA	NA	0.39
Cleared Land	NA	NA	1.42
Total Area			2.21
**Only terrestrial biodiversity has been included in area calculations*			

Ground-truthed Vegetation

Circular Quay Renewal Project
Sydney and The Rocks, NSW

Project Code: 304500912-GS-001(1)
Drawn By: SC, Checked By: TMB
Rev: 01
Date: 2023-03-06
Figure No: 4-1

Stantec

Legend

- Study Area
- Hollow-bearing Tree

Ground-truthed Vegetation

- Planted Native/Exotic

Notes:
1. Map displayed in GDA 1994 MGA Zone 56

References:
1. Aerial imagery supplied by Esri (April, 2022)
2. Cadastre (NSW SS, 2022)

0 25 50 75 100 Metres

Scale at A3: 1:2,000

4.1.1 Planted Native/Exotics

4.1.1.1 First Fleet Park

Vegetated areas were detected containing a mixture of planted native and exotic species. Vegetation is contained within designated garden beds along the borders of the grassed and concrete areas of First Fleet Park and surrounding pedestrian walkways. Vegetation cannot be attributed at any known naturally occurring PCT.

Dominant canopy species included the exotic cultivar species Pepper Tree (*Schinus areira*), Southern Magnolia (*Magnolia grandiflora*) and Cabbage Tree (*Cordyline australis*), along with the native Port Jackson Fig (*Ficus rubiginosa*). Understorey species were dominated by three native species Gymea Lily (*Doryanthes excelsa*), Spiky-headed Mat-rush (*Lomandra longifolia*) and Coast Banksia (*Banksia integrifolia*).

No threatened flora species were identified during the site inspection.

Plate 4-1: Example of garden beds containing Southern Magnolia (*Magnolia grandiflora*) within First Fleet Park

Plate 4-2 – Example of Pepper Tree (*Schinus areira*) within First Fleet Park

Plate 4-3 –Understorey species and Jacaranda (*Jacaranda mimosifolia*) within managed grassed and concrete areas of First Fleet Park

4.1.1.2 General Plantings

Planted vegetation was detected throughout other sections of the study area, generally as isolated plantings surrounded by concrete. Dominant species include the native Cabbage Tree Palms (*Livistona australis*) and exotic Dwarf Date Palm (*Phoenix dactylifera*)

No threatened flora species were identified during the site inspection.

Plate 4-4: Examples of planted cultivar within the southern portion of the study area

4.2 THREATENED ECOLOGICAL COMMUNITIES

Vegetation types present within the study area are not associated with any known State or Commonwealth listed TECs. Presence of TECs is highly unlikely due to the modified surrounds and lack of natural habitat. As such, an assessment of commensuration to determine any listing status was not deemed necessary.

4.3 FLORA SPECIES

A total of 30 flora species were recorded within the study area, including 12 native species (60%) and 18 exotics (40%) across 25 families. The most diverse family was Poaceae (3 species).

No threatened flora were detected during the site inspection.

Appendix A shows the full list of flora species recorded within the site during the site inspection.

4.3.1 Exotic Flora

Weeds can be categorised into different categories with differing legislative context. Key weed categories and corresponding legislative context includes:

- Priority Weeds (PW) – identified within the LGA under the NSW *Biosecurity Act* 2015. Each species identified has specific biosecurity duties to be considered
- Weeds of National Significance (WoNS) – identified by the Commonwealth Government
- High Threat Weeds (HTW) – identified under the Biodiversity Assessment Method (BAM) under the *Biodiversity Conservation Act 2016*.

A total of 18 exotic species were recorded within the study area during the site inspection, two of which are identified as HTW species (**Table 4-2**). No PW or WoNS were detected within the study area at the time of the site inspection.

Table 4-2 HTW species

Species Name	Common Name
Cenchrus setaceus	Fountain Grass
Cenchrus clandestinus	Kikuyu, Kikuyu Grass

It is noted that under the *NSW Biosecurity Act 2015*, all landowners have the obligation to manage weeds as per the General Biosecurity Duty which states “All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable”.

4.4 FAUNA SPECIES

A total of 11 fauna species were observed within the study area during the site inspection, including 10 native fauna species and one introduced species. All detected fauna were birds common to urban areas and the Sydney region, including the Crested Pigeon (*Ocyphaps lophotes*), Australian White Ibis (*Threskiornis Molucca*) and Silver Gull (*Chroicocephalus novaehollandiae*).

No threatened fauna species were identified within the study area during the site inspection.

Appendix A shows the full list of fauna observed during the site inspection.

4.4.1 Fauna Habitat

The study area is located within a highly modified and disturbed environment with limited habitat resources available for native fauna species. Availability of suitable fauna habitat within the study area is generally limited to scattered stands of planted cultivar, cleared land and man-made structures.

Available habitat has been summarised in **Table 4-3**.

Table 4-3 Fauna habitat values

Habitat value	Description
Foraging habitat	Foraging habitat is generally limited within the study area. Planted vegetation within the study area supports low structural and floristic diversity and are located in isolated patches separated by large spans of cleared and disturbed land. Foraging opportunities are likely constrained to highly mobile and urban-adapted species (e.g., Silver Gull (*Chroicocephalus novaehollandiae*) and Rainbow Lorikeet (*Trichoglossus haematodus*)). Planted Figs (Port Jackson - *Ficus rubiginosa* and Rubber Plant - *Ficus elastica*) are intermixed around the study area which provide foraging resources for some native fauna species, including threatened bats (e.g., Grey-headed Flying-fox (*Pteropus poliocephalus*)). Evidence of foraging was observed in the south-west portion of the study area (First Fleet Park) (Plate 4-5).
Connectivity	Connectivity of habitat within the study area and with adjacent land is limited. Planted vegetation is present in isolated patches and the study area is surrounded by a highly urbanised environment. Some connectivity may exist between the study area and adjacent Sydney Royal Botanic Gardens; however, these areas are linked by an urban landscape that does not offer optimum connectivity opportunities.
Burrows, nests and other fauna habitat	A Welcome Swallow (*Hirundo neoxena*) nest was detected in Wharf 6 (Plate 4-6) and one hollow-bearing Pepper Tree (*Schinus areira*) (<10cm diameter) (Plate 4-7) was detected in the south-west portion of the study area (First Fleet Park). No burrows or other fauna was detected within the study area during the site inspection.
Leaf litter	Leaf litter was minimal at the time of the site inspection as majority of the ground area is bitumen sealed, grassed, or mulched. The area is managed and likely subject to regular slashing, reducing the likelihood of a build-up of leaf litter.
Logs	Logs provide habitat and temporary refuge to fauna species (e.g., reptiles, amphibians, and insects). No logs or significant fallen branches were detected within the study area. As the area is regularly maintained it is unlikely that logs or significant fallen branches are retained onsite for long periods of time.
Human-made fauna habitat	Six wharves and other man-made structures are present within the study area. These structures may provide potential roosting habitat for several bird and/or microbat species (Plate 4-6). As noted above, a Welcome Swallow (*Hirundo neoxena*) nest was detected in the roof of Wharf 6. The targeted bat surveys, which included roost inspection on the wharves and of the underside of the wharves by boat, and the use of a handheld bat detector, found no evidence of microbats roosting in the wharves. All potential crevices in wharf roof structures are sealed with fauna exclusion mesh and maintained by the Maritime Maintenance staff.
Aquatic habitat	The study area is located partially within a bay of the Sydney Harbour (Plate 4-8). No other aquatic habitat was present within the study area. An assessment of the aquatic habitat and value to fauna species will be assessed in a separate specialist assessment.

Plate 4-5: Figs within First Fleet Park showing evidence of foraging

Plate 4-6: Wharf 6 with Welcome Swallow (*Hirundo neoxena*) entering from the eastern border of First Fleet Park

Plate 4-7: Hollow-bearing (<10cm) Pepper Tree (*Schinus* areira) within First Fleet Park

Plate 4-8: Sydney Harbour

5.0 CONCLUSION

The project is located within a highly modified urban landscape that retains limited biodiversity values. Vegetation present within the study area is a mixture of planted exotics and natives that do not conform to any known PCTs or TECs. Impacts to native vegetation are expected to be minor. It is also noted that the project involves development of urban green space with native landscaping which will replace some of the impacted vegetation. Select vegetation may also be retained where design and Tree Protection Zones (TPZ) allow.

Man-made structures located within the study area, particularly the wharves, have the potential to provide roosting habitat for several bird and/or microbat species. The hollow-bearing tree within First Fleet Park may also provide shelter or nesting for fauna species. Removal of these structures has the potential to disturb resident fauna. Targeted surveys of the wharves, including roost inspections on and underneath the wharves found no evidence of microbats using the wharves as habitat, therefore it is unlikely that the removal of the wharves would have significant impact on microbat species. All potential crevices in wharf roof structures are sealed with fauna exclusion mesh and maintained by the Maritime Maintenance staff. Additionally, it should be noted that these habitat features occur in a highly trafficked and disturbed environment and potential resident fauna are unlikely to be dependent on these features such that viable populations would be in danger of extinction.

Impacts to fauna species due to vegetation removal are expected to be minor and isolated. Foraging habitat is generally limited within the study area. Planted vegetation within the study area supports low structural and floristic diversity and vegetation is generally located within isolated patches separated by large spans of cleared and highly urbanised land. It is considered, however that some native fauna species, including threatened bats (e.g., Grey-headed Flying-fox) may have a transient presence within the study area during flowering and fruiting seasons.

Listed threatened and/or migratory species have been recorded within a 5 km locality and have the potential to occur within the study area. However, given the study area does not contain suitable roosting or foraging habitat for migratory species, any occurrence of these species is unlikely to be permanent. It is considered unlikely that migratory species would be significantly impacted by the project.

It is considered unlikely that the project would pose a significant impact on any listed threatened species listed under the BC Act.

6.0 PROPOSED ASSESSMENT METHODOLOGY

Under Section 7.9 of the BC Act an application to carry out State Significant Infrastructure (SSI) is to be accompanied by a Biodiversity Development Assessment Report (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. It is considered unlikely that the project would have a significant impact on terrestrial biodiversity within the study area. As such, a BDAR waiver will be prepared and submitted to the Planning Agency Head and the Environment Agency Head seeking confirmation that preparation of a BDAR is not required for the terrestrial component of the project.

7.0 REFERENCES

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APPENDIX A

Flora and Fauna List

Appendix A FLORA AND FAUNA LIST

Appendix A-1 Flora Detected

Table 7-1 Flora detected during the site inspection

Family	Scientific Name	Common Name	Native Growth Form	Native/Exotic	BC Act	EPBC Act
Anacardiaceae	*Schinus areira*	Pepper Tree	-	E (Cultivar)	-	-
Apiaceae	*Hydrocotyle bonariensis*	Kurnell Curse / Pennywort	-	E	-	-
Araceae	*Philodendron sp.*	-	-	E (Cultivar)	-	-
Araeceae	*Zantedeschia aethiopica*	White Arum Lily	-	E	-	-
Arecaceae	*Livistona australis*	Cabbage Tree Palm	Palm & Palmlike	N	-	-
	Phoenix dactylifera	Dwarf Date Palm	-	E (Cultivar)	-	-
Asparagaceae	*Sansevieria trifasciata*	Mother-in-law's Tongue	-	E	-	-
Asteliaceae	*Cordyline australis*	Cabbage Tree	-	E (Cultivar)	-	-
Asteraceae	*Cirsium vulgare*	Spear Thistle	-	E	-	-
Bignoniaceae	*Jacaranda mimosifolia*	Jacaranda	-	E (Cultivar)	-	-
Dicksoniaceae	*Dicksonia antarctica*	Tree Fern	Tree Fern	N	-	-
Doryanthaceae	*Doryanthes excelsa*	Gymea Lily	Palm & Palmlike	N	-	-
Fabaceae/faboideae	*Trifolium repens*	White Clover	-	E	-	-
Haemodoraceae	*Anigozanthos flavidus*	Tall Kangaroo Paw	-	E	-	-
Juncaceae	*Juncus usitatus*	Common Rush	Grass & Grasslike	N	-	-
Lamiaceae	*Lavandula spp.*	-	-	E	-	-
Lomandraceae	*Lomandra longifolia*	Spiky-headed Mat-rush	Grass & Grasslike	N	-	-
Magnoliaceae	*Magnolia grandiflora*	Southern Magnolia	-	E (Cultivar)	-	-
Moraceae	*Ficus elastica*	Rubber Plant	-	E (Cultivar)	-	-
Moraceae	*Ficus rubiginosa*	Port Jackson Fig	Tree	N	-	-
Myrtaceae	*Eucalyptus saligna*	Sydney Blue Gum	Tree	N	-	-
	Lophostemon confertus	Brush Box	Tree	N	-	-
Phormiaceae	*Dianella caerulea*	Blue Flax-lily	Forb	N	-	-
Poaceae	*Cynodon dactylon*	Common Couch	Grass & Grasslike	N	-	-
	Cenchrus clandestinus	Kikuyu, Kikuyu Grass	-	E, HTW	-	-
	Pennisetum setaceum	Fountain Grass	-	E, HTW	-	-
Proteaceae	*Banksia integrifolia*	Coast Banksia	Tree	N	-	-
Strelitzeaceae	*Strelitzia juncea*	Bird of Paradise	-	E (Cultivar)	-	-

Family	Scientific Name	Common Name	Native Growth Form	Native/Exotic	BC Act	EPBC Act
Ulmaceae	*Celtis australis*	-	-	E (Cultivar)	-	-
Zamiaceae	*Macrozamia communis*	Burrawang	Cycad	N	-	-

Appendix A-2 Fauna Detected

Table 7-2 Fauna detected during the site inspection

Family	Common Name	Scientific Name	BC Act	EPBC Act	Method
Columbidae	Crested Pigeon	*Ocyphaps lophotes*	-	-	Seen/Heard
Threskiornithidae	Australian White Ibis	*Threskiornis molucca*	-	-	Seen
Laridae	Silver Gull	*Chroicocephalus novaehollandiae*	-	-	Seen/Heard
Psittacidae	Rainbow Lorikeet	*Trichoglossus haematodus*	-	-	Seen/Heard
Meliphagidae	Noisy Miner	*Manorina melanocephala*	-	-	Seen/Heard
Artamidae	Australian Magpie	*Cracticus tibicen*	-	-	Seen/Heard
Rhipiduridae	Willie Wagtail	*Rhipidura leucophrys*	-	-	Seen
Corvidae	Australian Raven	*Corvus coronoides*	-	-	Seen/Heard
Monarchidae	Magpie-lark	*Grallina cyanoleuca*	-	-	Seen/Heard
Hirundinidae	Welcome Swallow	*Hirundo neoxena*	-	-	Seen
Sturnidae	Common Myna	*Sturnus tristis**	-	-	Seen

APPENDIX B
PMST Report

EPBC Act Protected Matters Report

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

Report created: 22-Dec-2022

Summary

Matters of National Environment Significance

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

World Heritage Properties:	3
National Heritage Places:	8
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	10
Listed Threatened Species:	100
Listed Migratory Species:	69

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	196
Commonwealth Heritage Places:	60
Listed Marine Species:	93
Whales and Other Cetaceans:	10
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	50
Key Ecological Features (Marine):	None
Biologically Important Areas:	2
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Australian Convict Sites (Cockatoo Island Convict Site)	NSW	Declared property	In buffer area only
Australian Convict Sites (Hyde Park Barracks)	NSW	Declared property	In feature area
Sydney Opera House	NSW	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Centennial Park	NSW	Listed place	In buffer area only
Cockatoo Island	NSW	Listed place	In buffer area only
First Government House Site	NSW	Listed place	In feature area
Governors' Domain and Civic Precinct	NSW	Listed place	In feature area
Hyde Park Barracks	NSW	Listed place	In feature area
Sydney Harbour Bridge	NSW	Listed place	In buffer area only
Sydney Opera House	NSW	Listed place	In buffer area only
Indigenous			
Cyprus Hellene Club - Australian Hall	NSW	Listed place	In buffer area only

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Towra point nature reserve	Within 10km of Ramsar site	In buffer area only

Listed Threatened Ecological Communities [Resource Information]

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

Community Name	Threatened Category	Presence Text	Buffer Status
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area	In buffer area only

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In feature area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community likely to occur within area	In feature area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area	In buffer area only
Eastern Suburbs Banksia Scrub of the Sydney Region	Critically Endangered	Community likely to occur within area	In feature area
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur within area	In buffer area only
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area	In feature area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area	In buffer area only
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area	In feature area

Listed Threatened Species [Resource Information]

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

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
FISH			
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat known to occur within area	In feature area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
FROG			
Heleioporus australiacus			
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Litoria aurea			
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area	In feature area
Mixophyes balbus			
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
Chalinolobus dwyeri			
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
Isoodon obesulus obesulus			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area	In feature area
Notamacropus parma			
Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Petaurus australis australis](#)			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
[Pseudomys novaehollandiae](#)			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Pteropus poliocephalus](#)			
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
OTHER			
[Dendronephthya australis](#)			
Cauliflower Soft Coral [90325]	Endangered	Species or species habitat likely to occur within area	In buffer area only
PLANT			
[Acacia bynoeana](#)			
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Acacia pubescens](#)			
Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Acacia terminalis subsp. terminalis MS](#)			
Sunshine Wattle (Sydney region) [88882]	Endangered	Species or species habitat known to occur within area	In feature area
[Allocasuarina glareicola](#)			
[21932]	Endangered	Species or species habitat may occur within area	In buffer area only
[Allocasuarina portuensis](#)			
Nielsen Park She-oak [21937]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Asterolasia elegans](#)			
[56780]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Darwinia biflora [14619]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat likely to occur within area	In feature area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat may occur within area	In buffer area only
Lasiopetalum joyceae [20311]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area	In feature area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat may occur within area	In buffer area only
Prostanthera densa Villous Mintbush [12233]	Vulnerable	Species or species habitat may occur within area	In feature area
Prostanthera junonis Somersby Mintbush [64960]	Endangered	Species or species habitat may occur within area	In buffer area only
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area	In buffer area only
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area	In feature area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
SHARK			
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
SNAIL			
Meridolum maryae Maroubra Woodland Snail, Maroubra Land Snail [89884]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat likely to occur within area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area	In feature area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat known to occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]		Species or species habitat known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Species or species habitat known to occur within area	In feature area
[Calidris tenuirostris](#) Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Charadrius bicinctus](#) Double-banded Plover [895]		Species or species habitat known to occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
[Limosa limosa](#) Black-tailed Godwit [845]		Species or species habitat known to occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Numenius phaeopus](#) Whimbrel [849]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area	In feature area
Tringa brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Australian National University		
Commonwealth Land - Australian National University [13156]	NSW	In feature area
Commonwealth Bank of Australia		
Commonwealth Land - Commonwealth Bank of Australia [14331]	NSW	In buffer area only
Commonwealth Land - Commonwealth Bank of Australia [13158]	NSW	In feature area
Commonwealth Trading Bank of Australia		
Commonwealth Land - Commonwealth Trading Bank of Australia [14337]	NSW	In buffer area only
Communications, Information Technology and the Arts - Australian Broadcasting Corporation		
Commonwealth Land - Australian Broadcasting Commission [15605]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Australian Broadcasting Commission [13116]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Commission [13113]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Commission [13112]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [15607]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [15606]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [15511]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [13106]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [13107]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [13108]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [13109]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [13111]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [13110]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [13117]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [13115]	NSW	In buffer area only
Commonwealth Land - Australian Broadcasting Corporation [13114]	NSW	In buffer area only
Communications, Information Technology and the Arts - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [14329]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [14338]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [13121]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [13215]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [13131]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [14284]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [14280]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [13134]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [13153]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [13137]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [13195]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Australian Postal Commission [13164]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [14384]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [14348]	NSW	In buffer area only
Commonwealth Land - Australian Postal Corporation [15603]	NSW	In buffer area only
Commonwealth Land - Australian Postal Corporation [16009]	NSW	In buffer area only
Commonwealth Land - Australian Postal Corporation [13152]	NSW	In buffer area only
Commonwealth Land - Australian Postal Corporation [14342]	NSW	In buffer area only
Commonwealth Land - Australian Postal Corporation [14343]	NSW	In buffer area only
Commonwealth Land - Australian Postal Corporation [16021]	NSW	In feature area
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian & Overseas Telecommunications Corporation [13155]	NSW	In feature area
Commonwealth Land - Australian Telecommunications Commission [13216]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [13154]	NSW	In feature area
Commonwealth Land - Australian Telecommunications Commission [13157]	NSW	In feature area
Commonwealth Land - Australian Telecommunications Commission [14281]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [13136]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [13132]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [14383]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [13162]	NSW	In feature area
Commonwealth Land - Australian Telecommunications Commission [14388]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [14285]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [14279]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Corporation [13130]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Australian Telecommunications Corporation [13292]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [14339]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [14333]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [14332]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [14283]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [14282]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [14340]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [14341]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [14385]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [14349]	NSW	In buffer area only
Defence		
Defence - COCKATOO ISLAND DOCKYARD [10018]	NSW	In buffer area only
Defence - DEFENCE PLAZA SYDNEY [11179]	NSW	In buffer area only
Defence - DEGAUSSING RANGE [10039]	NSW	In buffer area only
Defence - DSTO PYRMONT - (SEE SITE 1177) [10015]	NSW	In buffer area only
Defence - DSTO PYRMONT - (SEE SITE 1177) [10016]	NSW	In buffer area only
Defence - DSTO PYRMONT - (SEE SITE 1177) [10017]	NSW	In buffer area only
Defence - FLEET BASE WHARVES [10023]	NSW	In buffer area only
Defence - FLEET BASE WHARVES [10021]	NSW	In buffer area only
Defence - FLEET BASE WHARVES [10022]	NSW	In buffer area only
Defence - FLEET BASE WHARVES [10024]	NSW	In buffer area only
Defence - FOREST LODGE (SYDNEY) TRG DEP [10071]	NSW	In buffer area only
Defence - GARDEN ISLAND [10014]	NSW	In buffer area only
Defence - HMAS KUTTABUL (AC 30/5 Lot4 DP218946) [11074]	NSW	In buffer area only
Defence - HMAS PENGUIN [11071]	NSW	In buffer area only
Defence - HMAS PLATYPUS - SPDU FOR DISPOSAL [10041]	NSW	In buffer area only
Defence - HMAS PLATYPUS - SPDU FOR DISPOSAL [10042]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - HMAS PLATYPUS - SPDU FOR DISPOSAL [10040]	NSW	In buffer area only
Defence - HMAS WATERHEN [10025]	NSW	In buffer area only
Defence - JENNER BUILDING [10034]	NSW	In buffer area only
Defence - KENSINGTON DEPOT [11110]	NSW	In buffer area only
Defence - KISMET/HMAS KUTTABUL-POTTS PT [11173]	NSW	In buffer area only
Defence - MARITIME COMD CTRE-POTTS POINT ; BOMERAH/TARANA [10032]	NSW	In buffer area only
Defence - MARITIME COMD CTRE-POTTS POINT ; BOMERAH/TARANA [10033]	NSW	In buffer area only
Defence - MARITIME HEADQUARTERS [11178]	NSW	In buffer area only
Defence - MILLER'S POINT TRAINING DEPOT [11118]	NSW	In buffer area only
Defence - NFI CHOWDER BAY (fuel depot) [10043]	NSW	In buffer area only
Defence - NORTH SYDNEY - HYDRO OFFICE [11161]	NSW	In buffer area only
Defence - OXFORD ST SYDNEY [11165]	NSW	In buffer area only
Defence - OXFORD ST SYDNEY [11167]	NSW	In buffer area only
Defence - OXFORD ST SYDNEY [11164]	NSW	In buffer area only
Defence - OXFORD ST SYDNEY [11166]	NSW	In buffer area only
Defence - OXFORD ST SYDNEY [11168]	NSW	In buffer area only
Defence - OXFORD ST SYDNEY [11169]	NSW	In buffer area only
Defence - PARKVIEW BUILDING - SYDNEY [11170]	NSW	In buffer area only
Defence - RANDWICK FRENCHMANS TRG [11163]	NSW	In buffer area only
Defence - RANDWICK FRENCHMANS TRG [11162]	NSW	In buffer area only
Defence - SPECTACLE ISLAND [10037]	NSW	In buffer area only
Defence - SPECTACLE ISLAND [10038]	NSW	In buffer area only
Defence - SPECTACLE ISLAND [10036]	NSW	In buffer area only
Defence - SPECTACLE ISLAND [10035]	NSW	In buffer area only
Defence - SYDNEY UNIVERSITY REGIMENT - DARLINGTON [11094]	NSW	In buffer area only
Defence - TRESCO [10044]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - VICTORIA BARRACKS - PADDINGTON [11119]	NSW	In buffer area only
Defence - VICTORIA BARRACKS - PADDINGTON [11121]	NSW	In buffer area only
Defence - VICTORIA BARRACKS - PADDINGTON [11120]	NSW	In buffer area only
Defence - WOOLLOOMOOLOO CARPARK [11176]	NSW	In buffer area only
Defence - WOOLLOOMOOLOO CARPARK [11177]	NSW	In buffer area only
Defence - WOOLLOOMOOLOO CARPARK [11174]	NSW	In buffer area only
Defence - WOOLLOOMOOLOO CARPARK [11175]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11084]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11091]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11085]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11090]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11080]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11092]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11083]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11082]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11075]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11076]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11077]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11081]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11089]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11088]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11078]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11079]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11087]	NSW	In buffer area only
Defence - ZETLAND NAVY SUPPLY CENTRE [11086]	NSW	In buffer area only
Defence - Defence Housing Authority		
Commonwealth Land - Defence Housing Authority [14330]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Defence Housing Authority [15956]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13177]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13176]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13175]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13174]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16056]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13179]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13178]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13172]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13171]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [15608]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13133]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13181]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13185]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13184]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13183]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13182]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13135]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [14346]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [14347]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [14344]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [14345]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16048]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13196]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13170]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13166]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13167]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Defence Housing Authority [13180]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16029]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [15590]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13169]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13168]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [15441]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16046]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16047]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [15718]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16045]	NSW	In buffer area only
Treasury - Reserve Bank of Australia		
Commonwealth Land - Reserve Bank of Australia [13148]	NSW	In buffer area only
Commonwealth Land - Reserve Bank of Australia [16499]	NSW	In feature area
Commonwealth Land - Reserve Bank of Australia [13149]	NSW	In buffer area only
Commonwealth Land - Reserve Bank of Australia [13138]	NSW	In buffer area only
Commonwealth Land - Reserve Bank of Australia [13159]	NSW	In feature area
Commonwealth Land - Reserve Bank of Australia [13150]	NSW	In buffer area only
Commonwealth Land - Reserve Bank of Australia [13151]	NSW	In buffer area only
Commonwealth Land - Reserve Bank of Australia [13160]	NSW	In feature area
Unknown		
Commonwealth Land - [13123]	NSW	In buffer area only
Commonwealth Land - [13122]	NSW	In buffer area only
Commonwealth Land - [13140]	NSW	In buffer area only
Commonwealth Land - [13141]	NSW	In buffer area only
Commonwealth Land - [13120]	NSW	In buffer area only
Commonwealth Land - [13987]	NSW	In buffer area only
Commonwealth Land - [13217]	NSW	In buffer area only
Commonwealth Land - [13139]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [13173]	NSW	In buffer area only
Commonwealth Land - [15670]	NSW	In buffer area only
Commonwealth Land - [13219]	NSW	In buffer area only
Commonwealth Land - [13218]	NSW	In buffer area only
Commonwealth Land - [13165]	NSW	In buffer area only
Commonwealth Land - [13161]	NSW	In feature area
Commonwealth Land - [13163]	NSW	In feature area
Commonwealth Land - [14386]	NSW	In buffer area only
Commonwealth Land - [14387]	NSW	In buffer area only
Commonwealth Land - [14336]	NSW	In buffer area only
Commonwealth Land - [14334]	NSW	In buffer area only
Commonwealth Land - [14335]	NSW	In buffer area only

Commonwealth Heritage Places			[Resource Information]
Name	State	Status	Buffer Status
Historic			
Admiralty House and Lodge	NSW	Listed place	In buffer area only
Admiralty House Garden and Fortifications	NSW	Listed place	In buffer area only
Barracks Block	NSW	Listed place	In buffer area only
Batteries A83 and C9A	NSW	Listed place	In buffer area only
Battery B42	NSW	Listed place	In buffer area only
Battery for Five Guns	NSW	Listed place	In buffer area only
Biloela Group	NSW	Listed place	In buffer area only
Buildings 31 and 32	NSW	Listed place	In buffer area only
Buildings MQVB16 and VB56	NSW	Listed place	In buffer area only
Buildings VB13, 15, 16 & 17	NSW	Listed place	In buffer area only
Buildings VB41, 45 & 53	NSW	Listed place	In buffer area only
Buildings VB60 and VB62	NSW	Listed place	In buffer area only
Buildings VB69, 75 & 76 including Garden	NSW	Listed place	In buffer area only

Name	State	Status	Buffer Status
Buildings VB83, 84, 85, 87 & 89	NSW	Listed place	In buffer area only
Buildings VB90, 91, 91A & 92	NSW	Listed place	In buffer area only
Building VB1 and Parade Ground	NSW	Listed place	In buffer area only
Building VB2 Guard House	NSW	Listed place	In buffer area only
Chain and Anchor Store (former)	NSW	Listed place	In buffer area only
Chowder Bay Barracks Group	NSW	Listed place	In buffer area only
Cockatoo Island Industrial Conservation Area	NSW	Listed place	In buffer area only
Commonwealth Avenue Defence Housing	NSW	Listed place	In buffer area only
Customs Marine Centre	NSW	Listed place	In buffer area only
Defence site - Georges Heights and Middle Head	NSW	Listed place	In buffer area only
Factory	NSW	Listed place	In buffer area only
Fitzroy Dock	NSW	Listed place	In buffer area only
Garden Island Precinct	NSW	Listed place	In buffer area only
Gazebo	NSW	Listed place	In buffer area only
General Post Office	NSW	Listed place	In feature area
Golf Clubhouse (former)	NSW	Listed place	In buffer area only
Headquarters 8th Brigade Precinct	NSW	Listed place	In buffer area only
Headquarters Training Command Precinct	NSW	Listed place	In buffer area only
HMAS Penguin	NSW	Listed place	In buffer area only
Kirribilli House	NSW	Listed place	In buffer area only
Kirribilli House Garden & Grounds	NSW	Listed place	In buffer area only
Mess Hall (former)	NSW	Listed place	In buffer area only
Military Guard Room	NSW	Listed place	In buffer area only
Military Road Framework - Defence Land	NSW	Listed place	In buffer area only
Naval Store	NSW	Listed place	In buffer area only
Navy Refuelling Depot and Caretakers House	NSW	Listed place	In buffer area only

Name	State	Status	Buffer Status
North Sydney Post Office	NSW	Listed place	In buffer area only
Office Building	NSW	Listed place	In buffer area only
Officers Mess, HQ Training Command	NSW	Listed place	In buffer area only
Paddington Post Office	NSW	Listed place	In buffer area only
Power House / Pump House	NSW	Listed place	In buffer area only
Prison Barracks Precinct	NSW	Listed place	In buffer area only
Pyrmont Post Office	NSW	Listed place	In buffer area only
Reserve Bank	NSW	Listed place	In feature area
Residences Group	NSW	Listed place	In buffer area only
Rigging Shed and Chapel	NSW	Listed place	In buffer area only
Shark Point Battery	NSW	Listed place	In buffer area only
Snapper Island	NSW	Listed place	In buffer area only
Spectacle Island Explosives Complex	NSW	Listed place	In buffer area only
Sutherland Dock	NSW	Listed place	In buffer area only
Sydney Customs House (former)	NSW	Listed place	In feature area
Thirty Terminal Squadron Precinct	NSW	Listed place	In buffer area only
Underground Grain Silos	NSW	Listed place	In buffer area only
Victoria Barracks Perimeter Wall and Gates	NSW	Listed place	In buffer area only
Victoria Barracks Precinct	NSW	Listed place	In buffer area only
Victoria Barracks Squash Courts	NSW	Listed place	In buffer area only
Woolwich Dock	NSW	Listed place	In buffer area only

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat likely to occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area	In feature area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In feature area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area overfly marine area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area overfly marine area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat likely to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area	In feature area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area overfly marine area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area overfly marine area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area overfly marine area	In feature area
Fish			
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In feature area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area	In feature area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area	In feature area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat known to occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In feature area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Urocampus carinirostris			
Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer			
Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri			
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus			
Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Pelamis platurus			
Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Sydney Harbour	National Park	NSW	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Construction and operation of the Westconnex New M5, Sydney, NSW	2015/7520	Controlled Action	Post-Approval	In buffer area only
Garden Island Hammerhead Crane Proposed Removal, NSW	2012/6430	Controlled Action	Post-Approval	In buffer area only
Moriah War Memorial College expansion	2002/575	Controlled Action	Post-Approval	In buffer area only
Relocation of Grey-Headed Flying-Fox Colony	2008/4646	Controlled Action	Post-Approval	In feature area
Sydney Opera House Building Renewal Program, NSW	2016/7825	Controlled Action	Post-Approval	In buffer area only
Sydney Opera House Building Renewal Program - Concert Hall and associated works	2017/7955	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
ABC Gore Hill, Lanceley Place Site Redevelopment	2002/908	Not Controlled Action	Completed	In buffer area only
ABC Proposed Sale of Property Commonwealth Land	2020/8855	Not Controlled Action	Completed	In buffer area only
Admiralty House, Kirribilli, foreshore works, NSW	2014/7357	Not Controlled Action	Completed	In buffer area only
Artarmon Helipad Relocation	2001/186	Not Controlled Action	Completed	In buffer area only
Construct and operate an aerial adventure park	2012/6239	Not Controlled Action	Completed	In buffer area only
Decommissioning of NMC and Camperdown Facility	2010/5645	Not Controlled Action	Completed	In buffer area only
Demolition and Removal of Two Naval Cottages	2008/4373	Not Controlled Action	Completed	In buffer area only
Demolition of Ablutions Block, Snapper Island, NSW	2018/8303	Not Controlled Action	Completed	In buffer area only
Fitout works, 4th Floor, Sydney Customs House, 31 Alfred Street	2004/1449	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Fuel Reduction Proposal Redfield Road, East Killara	2003/1238	Not Controlled Action	Completed	In buffer area only
Garden Island ADI Warehouse	2000/69	Not Controlled Action	Completed	In buffer area only
Georges River Program 2	2003/999	Not Controlled Action	Completed	In buffer area only
Gore Hill Conservation Management Plan	2000/109	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Internal Modifications to Reserve Bank of Australia	2008/4431	Not Controlled Action	Completed	In feature area
Noxious weed removal and controlled burn	2003/1272	Not Controlled Action	Completed	In feature area
Rabbit Control Anzac Rifle Range	2005/1940	Not Controlled Action	Completed	In feature area
RBA HOWP 65 Martin Place, NSW	2020/8870	Not Controlled Action	Completed	In feature area
Redevelopment 60 Martin Place, Sydney, NSW	2015/7490	Not Controlled Action	Completed	In feature area
Rehabilitation works of the Coogee Sewer Diversion Submain - Maxwell Avenue, Mar	2004/1683	Not Controlled Action	Completed	In feature area
Remediation of Contaminated Buildings	2005/1983	Not Controlled Action	Completed	In buffer area only
Remediation of Contaminated Soil	2005/1985	Not Controlled Action	Completed	In buffer area only
Sale of New South Head Road, Edgecliff	2001/302	Not Controlled Action	Completed	In buffer area only
sewage treatmemt plant process and reliability renewals project	2005/2186	Not Controlled Action	Completed	In buffer area only
Shipment of Spent Nuclear Fuel to USA	2007/3672	Not Controlled Action	Completed	In buffer area only
subdivision and development on the Rhodes Peninsula for residential and commerci	2003/1249	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Subdivision and sale of Commonwealth land in Pymble to Ku-ring-gai City Council	2004/1368	Not Controlled Action	Completed	In buffer area only
Subdivision of Precincts 3 and 12, St Patricks Estate	2004/1925	Not Controlled Action	Completed	In buffer area only
Supply of a gigabit ethernet connection with associated trenching, boring and ha	2007/3637	Not Controlled Action	Completed	In feature area
Sydney Desalination Plant	2005/2331	Not Controlled Action	Completed	In buffer area only
Sydney Metro Network Stage 2	2010/5307	Not Controlled Action	Completed	In buffer area only
Torpedo Factory Renewal Project	2020/8847	Not Controlled Action	Completed	In buffer area only
Undertake a controlled burn of the Eastern Suburbs Banksia Scrub at Byrne Cresce	2004/1728	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Construction works on SE corner of the grounds of Admiralty House	2012/6278	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Hyde Park Barracks Proposed New Passenger Lift	2017/7933	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Moriah Primary School, Centennial Park, Sydney	2004/1676	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Walking Track connecting Middle Head Rd & Balmoral Park	2002/572	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed	In feature area
Demolition and Removal of Five Naval Cottages	2008/4322	Referral Decision	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Referral decision				
Demolition of Naval Cottages & Revegetation as Part of SHFT's Headland Park	2005/2128	Referral Decision	Completed	In buffer area only
Relocation of Grey-Headed Flying-Fox Colony	2008/4568	Referral Decision	Completed	In feature area
Renovation and Landscape Rehabilitation of the Championship Course at Royal Sydney Golf Club	2022/9167	Referral Decision	Referral Publication	In buffer area only

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Dolphins			
Tursiops aduncus			
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur	In feature area
Sharks			
Carcharias taurus			
Grey Nurse Shark [64469]	Foraging	Known to occur	In feature area

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Sydney	Sydney Basin	BA website	In feature area

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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APPENDIX C

Likelihood Of Occurrence

Appendix C LIKELIHOOD OF OCCURRENCE

Threatened terrestrial species, populations and ecological communities, and terrestrial migratory species (listed under the BC Act and / or EPBC Act) that are known, or have potential, to occur within a 5 km radius of the study area have been considered in this section. The likelihood of occurrence within the study area of each species or TEC was assessed using the criteria described in **Table 7-3** and the findings presented in **Table 7-4**. This assessment was undertaken based on previous records, the results of the field survey and known species habitat requirements. **Table 7-4** also provides an assessment of the potential impact of the project on each species. All aquatic species have been excluded from this assessment.

Table 7-3 Likelihood of occurrence criteria

Likelihood Rating	Criteria
Known	The species was recorded within the study area during the field surveys.
High	It is likely that a species would inhabit or utilise habitat within the study area. Criteria for this category may include: ▪ Species recently and/or regularly recorded in contiguous or nearby habitat. ▪ High quality habitat or resources present within the study area. ▪ Species is known or likely to maintain a resident population surrounding the study area. ▪ Species is known or likely to visit during migration or in response to seasonal availability of resources present on site.
Moderate	Potential habitat for a species occurs within the study area. Criteria for this category may include: ▪ Species previously recorded in contiguous habitat albeit not recently (>10 years). ▪ Habitat present, but poor quality, depauperate or modified types and/or resources. ▪ Species has potential to utilise habitat during migration or seasonal availability of resources. ▪ Cryptic flora species with potential habitat within the study area that have not been targeted by surveys (for example, surveys were not undertaken with the flowering season).
Low	It is unlikely that the species inhabits the area, if it did, it would likely be a transient visitor. Criteria for this category may include: ▪ The study area does not support the specific habitat types or resources required by the species. ▪ The study area is beyond the current distribution of the species or is isolated from known populations. ▪ Non cryptic flora species not observed during targeted surveys.
None/Absent	The habitat within the study area is unsuitable for the species.

Table 7-4 Assessment of likelihood of occurrence of threatened species, populations and communities, and migratory species assessment of potential impacts

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Insects					
Giant Dragonfly (*Petalura gigantea*)	E	-	Bionet	Live in permanent swamps and bogs with some free water and open vegetation. Adults emerge from late October and are short-lived, surviving for one summer after emergence. Adults spend most of their time settled on low vegetation on or adjacent to the swamp. They hunt for flying insects over the swamp and along its margins. Adults fly over the swamp and along its margins hunting for flying insects.	Low. The study area lacks permanent swamp habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Snails					
Maroubra Woodland Snail (*Meridolum maryae*)	E	E	PMST	The species is found in the leaf litter of coastal vegetation communities, most commonly in heathland on foredunes also from areas of podsolised dunes/sand plains that support taller heath communities including Eastern Suburbs Banksia Scrub. Can dig several centimetres into soil during dry conditions. The species is typically active at night but can also move about on overcast or rainy days. The ability for individuals to disperse is expected to be similar to closely related camaenids which can move around 3.5 m in a day and 350 m in a lifetime	Low. The study area lacks dune habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Reptiles					
Broad-headed Snake (*Hoplocephalus bungaroides*)	E	V	PMST	The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevices or	Low. No suitable cliff edge habitat occurs within the study area. Therefore, it is unlikely that this species would occur in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				hollows in large trees within 500m of escarpments in summer.	
Frogs					
Giant Burrowing Frog (*Heleioporus australiacus*)	V	V	PMST	The northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites.	Low. The study area lacks suitable Dry Sclerophyll habitat. Therefore, it is unlikely that this species would be found in the study area.
Green and Golden Bell Frog (*Litoria aurea*)	E	V	PMST	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	Low. The study area lacks suitable Marsh habitat. Therefore, it is unlikely that this species would be found in the study area.
Red-crowned Toadlet (*Pseudophryne australis*)	V	-	Bionet	Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter. Red-crowned Toadlets are quite a localised species that appear to be largely restricted to the immediate vicinity of suitable breeding habitat. Red-crowned Toadlets are usually found as small colonies scattered along ridges coinciding with the positions of suitable refuges near breeding sites. Due to this tendency for discrete populations to concentrate at particular sites, a relatively small localised disturbance may have a significant impact on a local population if it occurs on a favoured breeding or refuge site.	Low. The study area lacks suitable Forest and dense vegetation habitat. Therefore, it is unlikely that this species would be found in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Stuttering Frog *(Mixophyes balbus)*	E	V	PMST	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.	Low. The study area lacks suitable Rainforest habitat. Therefore, it is unlikely that this species would be found in the study area.
Birds					
Magpie Goose (Anseranas semipalmata)	V	-	Bionet	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW.	Low. The study area lacks suitable Wetland habitat. Therefore, it is unlikely that this species would be found in the study area.
White-throated Needletail (*Hirundapus caudacutus*)	-	V, C,J,K	BioNet PMST	Non-breeding habitat only: Found across a range of habitats, more often over wooded areas, where it is almost exclusively aerial. Large tracts of native vegetation, particularly forest, may be a key habitat requirement for species. Found to roost in tree hollows in tall trees on ridge-tops, on bark or rock faces. Appears to have traditional roost sites.	Low. The study area lacks suitable native forest and hollow-bearing trees for habitat. Therefore, it is unlikely that this species would be found in the study area.
Australasian Bittern (*Botaurus poiciloptilus*)	E	E	PMST BioNet	In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly Bullrushes (*Typha* spp.) and Spikerushes (*Eleocharis* spp.).	Low. The study area lacks suitable Wetland habitat. Therefore, it is unlikely that this species would be found in the study area.
Curlew Sandpiper (*Calidris ferruginea*)	E	CE	Bionet PMST	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-	Low. The study area lacks suitable Estuarine habitat. Therefore, it is unlikely

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores.	that this species would be found in the study area.
Red Goshawk (*Erythrotriorchis radiatus*)	CE	V	Bionet PMST	Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers.	Low. The study area lacks suitable Riparian Forest habitat. Therefore, it is unlikely that this species would be found in the study area.
Black Bittern (*Ixobrychus flavicollis*)	V	-	BioNet	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	Low. The study area lacks suitable Wetland habitat. Therefore, it is unlikely that this species would be found in the study area.
White-bellied Sea-Eagle (*Haliaeetus leucogaster*)	V	-	BioNet	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest).	Moderate. The project contains suitable habitat for this species and this species may occur in the aerial space across the study area. Therefore, it is possible that this species would be found in the study area.
Little Eagle (*Hieraaetus morphnoides*)	V	-	BioNet	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. She-	Low. The study area lacks suitable Woodland habitat. Therefore, it is unlikely that this species would be found in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				oak or Acacia woodlands and riparian woodlands of interior NSW are also used.	
Square-tailed Kite (*Lophoictinia isura*)	V	-	BioNet	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland.	Low. The study area lacks suitable Woodland habitat. Therefore, it is unlikely that this species would be found in the study area.
Eastern Osprey (*Pandion haliaetus*)	V		Bionet	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water.	Moderate. The study area is adjacent to the coastal areas and open water this species prefers and this species may occur in the aerial space across the study area. Therefore, it is possible that this species would be found in the study area.
Bush Stone-curlew (*Burhinus grallarius*)	E	-	BioNet	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Nest on the ground in a scrape or small bare patch.	Low. The study area lacks suitable Woodland habitat. Therefore, it is unlikely that this species would be found in the study area.
Sooty Oystercatcher (*Haematopus fuliginosus*)	V	-	BioNet	Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.	Low. The study area lacks suitable Coastal habitat. Therefore, it is unlikely that this species would be found in the study area.
Pied Oystercatcher (*Haematopus longirostris*)	E	-	BioNet	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.	Low. The study area lacks suitable Coastal or Estuarine habitat. Therefore, it is unlikely that this species would be found in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Greater Sand-plover (*Charadrius leschenaultii*)	V	V, C,J,K	PMST	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders.	Low. The study area lacks suitable Coastal habitat. Therefore, it is unlikely that this species would be found in the study area.
Australian Painted Snipe (*Rostratula australis*)	E	E	PMST	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	Low. The study area lacks suitable Marshy habitat. Therefore, it is unlikely that this species would be found in the study area.
Red Knot (*Calidris canutus*)	-	E, C,J,K	PMST	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps.	Low. The study area lacks suitable Coastal or Estuarine habitat. Therefore, it is unlikely that this species would be found in the study area.
Great Knot (*Calidris tenuirostris*)	V	CE, C,J,K	PMST	Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms.	Low. The study area lacks suitable sheltered Coastal or Estuarine habitat. Therefore, it is unlikely that this species would be found in the study area.
Grey Falcon (*Falco hypoleucos*)	E	-	PMST	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	Low. The study area lacks suitable Woodland habitat. Therefore, it is unlikely that this species would be found in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Western Alaskan Bar-tailed Godwit (*Limosa lapponica baueri*)	-	V	PMST	Breed in north-east Siberia and western Alaska. The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas. *L. l. baueri* have shorted bills and longer wings, and are more common in NSW than *L. l. menbieri*.	Low. The study area lacks suitable habitat for this species. Although the study area is partially within a harbour the area is highly trafficked by marine vessels and lacks appropriate intertidal habitat or sandy beaches. Thus, it is unlikely that the species inhabits the area.
Eastern Curlew (*Numenius madagascariensis*)	-	CE, C,J,K	PMST	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms. The numbers of Eastern Curlew recorded during one study were correlated with wetland areas.	Low. The study area lacks suitable Coastal or Estuarine habitat. Therefore, it is unlikely that this species would be found in the study area.
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	V	E	PMST	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.	Low. The study area lacks suitable tall Eucalypt Forest habitat. Therefore, it is unlikely that this species would be found in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Glossy Black-Cockatoo (*Calyptorhynchus lathami*)	V	V	BioNet	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of she-oak occur. Black She-oak (*Allocasuarina littoralis*) and Forest She-oak (*A. torulosa*) are important foods.	Low. The study area lacks suitable She-oak Forest habitat. Therefore, it is unlikely that this species would be found in the study area.
South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*)	-	V	PMST	Inhabits open forest and woodlands where stands of she-oak occur. Black She-oak (*Allocasuarina littoralis*) and Forest She-oak (*A. torulosa*) are important foods.	Low. The study area lacks suitable She-oak Forest habitat. Therefore, it is unlikely that this species would be found in the study area.
Lesser Sand-plover (*Charadrius mongolus*)	V	E,C,J,K	PMST	In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves. The species also inhabits saltworks and near-coastal saltpans, brackish swamps and sandy or silt islands in river beds.	Low. The study area lacks suitable Coastal or Estuarine habitat. Therefore, it is unlikely that this species would be found in the study area.
Diamond Firetail (*Stagonopleura guttata*)	V	-	BioNet	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season).	Low. The study area lacks suitable Eucalypt Forest habitat. Therefore, it is unlikely that this species would be found in the study area.
Little Lorikeet (*Glossopsitta pusilla*)	V	-	BioNet	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g.	Low. The study area lacks suitable Eucalypt Forest habitat. Therefore, it is unlikely that this species would be found in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				paddocks, roadside remnants and urban trees also help sustain viable populations of the species.	
Swift Parrot (*Lathamus discolor*)	E	CE	PMST BioNet	Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*.	Low. The study area lacks suitable Eucalypt Forest habitat. Therefore, it is unlikely that this species would be found in the study area.
Sooty Tern (*Onychoprion fuscata*)	V	-	Bionet	Typically pelacic forager when not breeding. Large flocks can be seen soaring, skimming and dipping but seldom plunging in off shore waters. Breeds in large colonies in sand or coral scrapes on offshore islands and cays including Lord Howe and Norfolk Islands.	Low. This species is typically found in the open ocean or breeding on offshore islands. Therefore, it is unlikely that this species would be found in the study area.
Superb Fruit-Dove (*Ptilinopus superbus*)	V	-	Bionet	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows and lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn.	Low. The study area lacks suitable Rainforest, eucalypt, or acacia woodland habitat. There are records of this species migrating through Sydney, however it is unlikely that the species resides within the study area.
Barking Owl (*Ninox connivens*)	V	-	Bionet	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g.	Low. Although the species has been recorded in the locality, the study area lacks suitable Woodland and Open Forest habitat or suitable, large hollow-bearing trees. Therefore, it is considered

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				western NSW) due to the higher density of prey found on these fertile riparian soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species.	unlikely that this species would reside within the study area.
Powerful Owl (*Ninox strenua*)	V	-	BioNet	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple Angophora floribunda, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species.	Low. Although the species has been recorded in the locality, the study area lacks suitable Woodland, Open Forest and/or rainforest habitats. Further no suitable, large hollow-bearing trees are present within the study area. Therefore, it is considered unlikely that this species would reside within the study area.
Masked Owl (*Tyto novaehollandiae*)	V	-	BioNet	Found in a range of habitats, locally within sclerophyll forests and woodlands where appropriate/preferred prey species occur (being predominantly terrestrial mammals). Requires large Eucalypt hollows for nesting and prefers to roost in these hollows as well.	Low. The study area lacks suitable hollows and Eucalypt Forest habitat. Therefore, it is unlikely that this species would be found in the study area.
Sooty Owl (*Tyto tenebricosa*)	V	-	BioNet	Occurs in wet Eucalypt forest and rainforest with tall emergent trees, often in easterly facing gullies. Within these areas this species hunts for a range of mainly mammalian prey at all levels of the forest strata, even recorded feeding on ground. Roosts in tree hollow or dense canopy vegetation. Also nests in large Eucalypt tree hollows.	Low. The study area lacks the tall Eucalypt Forest preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Regent Honeyeater (*Anthochaera phrygia*)	CE	CE	PMST BioNet	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species.	Low. No suitable mature woodland/forest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	
Painted Honeyeater (*Grantiella picta*)	V	V	PMST	Inhabits Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests.	Low. No suitable Box-Gum Woodland or Box-Ironbark Forest occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Varied Sittella (*Daphoenositta chrysoptera*)	V	-	BioNet	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Low. The study area lacks suitable Eucalypt Forest habitat. Therefore, it is unlikely that this species occurs in the study area.
Eastern Bristlebird (*Dasyornis brachypterus*)	E	E	PMST	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone; all of these vegetation types are fire prone.	Low. No suitable heathy woodland or similar habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
White-fronted Chat (*Epthianura albifrons*)	V	-	BioNet	Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. Have been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves.	Low: The study area lacks suitable Wetland habitat. Therefore, it is unlikely that this species occurs in the study area.
Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)	V	-	BioNet	The Dusky Woodswallow is often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. At sites where Dusky Woodswallows are recorded the	Low: The study area lacks suitable open, dry sclerophyll forest habitat. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				understorey is typically open with sparse eucalypt saplings, acacias and other shrubs, including heath.	
Pilotbird *(Pycnoptilus floccosus)*	-	V	PMST	Pilotbirds are strictly terrestrial, living on the ground in dense forests with heavy undergrowth.	Low. No suitable dense forest or similar habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Antipodean Albatross (*Diomedea antipodensis*)	V	V	PMST	The majority of birds breed on Antipodes Island, with a small number of pairs breeding on Campbell Island. The Antipodean Albatross breeds biennially in colonies on ridges, slopes and plateaus of isolated subantarctic islands, usually in vegetation such as grass tussocks.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Gibson's Albatross (*Diomedea antipodensis gibsoni*)	V	V	PMST	This species is known only to breed on the Adams, Disappointment and Auckland Islands in the subantarctic Auckland Island group. Breeds biennially in colonies among grass tussocks on isolated subantarctis islands, using the wind to travel great distances both during and between breeding seasons.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Southern Royal Albatross (*Diomedea epomophora*)	-	V	PMST	Most of the royal albatross population is found between 30° S and 45° S. The majority of the world's population of southern royal albatrosses nest on the rat free Subantarctic Campbell Island, around 8,200 to 8,600 pairs.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely for this species occurs in the study area.
Wandering Albatross (*Diomedea exulans*)	-	V	PMST BioNet	The wandering albatross breeds on South Georgia Island, Crozet Islands, Kerguelen Islands, Prince Edward Islands, and Macquarie Island, is seen feeding year round off the Kaikoura Peninsula on the east coast of the South Island of New Zealand and it ranges in all the southern oceans from 28° to 60°. Wandering albatrosses spend most of their life in flight, landing only to breed and feed.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Northern Royal Albatross (Diomedea sanfordi)	-	E	PMST	The Northern Royal Albatross breeds in New Zealand waters. The main population (estimated at 6,500 to 7,000 pairs) nests on islands off the Chatham Islands, and up to 50 pairs nest at Taiaroa Head on the South Island. Away from its nesting sites this Albatross is circumpolar between 30 and 45 degrees south. The Northern Royal Albatross primarily forages in inshore and offshore waters over the continental shelf to the shelf edge.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Buller's Albatross (*Thalassarche bulleri*)	-	V	PMST	The southern subspecies (bulleri) breeds on the Snares and Solander islands with a total population of around 13,600 breeding pairs. In NSW waters it is a relatively common visitor between March and October, with few sightings outside this period. Occurs in both inshore and offshore waters, including the continental shelf break and pelagic waters.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Northern Buller's Albatross (*Thalassarche bulleri platei*)	-	V	PMST	This albatross only nests on islands off New Zealand. The northern subspecies (platei) nests on islands off Chatham Island with an estimated population of around 18,200 breeding pairs. Occurs in both inshore and offshore waters, including the continental shelf break and pelagic waters.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Shy Albatross (*Thalassarche cauta*)	V	E	PMST	Although uncommon north of Sydney, the species is commonly recorded off southeast NSW, particularly between July and November, and has been recorded in Ben Boyd National Park. This pelagic or ocean-going species inhabits subantarctic and subtropical marine waters, spending the majority of its time at sea.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Grey-headed Albatross (*Thalassarche chrysostoma*)	-	E	Bionet	The Grey-headed Albatross is marine, pelagic and migratory. Its habitat includes subantarctic, subtropical, and occasionally Antarctic waters in the Pacific, Indian, Atlantic and Southern Oceans	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.

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Chatham Albatross (*Thalassarche eremita*)	-	E	PMST	The Chatham albatross nests only on The Pyramid in the Chatham Islands. When not breeding they range in the South Pacific from Tasmania to Chile and Peru. From April to July they will utilize the Humboldt Current and go as far north as 6°S along the South American coast.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Campbell Albatross (*Thalassarche impavida*)	-	V	PMST	In NSW waters it is probably frequently overlooked due to the difficulties of separating it from the Black-browed Albatross. However, it appears to be a regular visitor occurring in most months of the year with peaks in winter during the non-breeding season. Occurs in both inshore and offshore waters, including the continental shelf break and pelagic waters.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Black-browed Albatross (*Thalassarche melanophris*)	V	V	PMST	This species migrates to waters off the continental shelf from approximately May to November and is regularly recorded off the NSW coast during this period. The species has also been recorded in Botany Bay National Park. Inhabits antarctic, subantarctic, subtropical marine and coastal waters over upwellings and boundaries of currents.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Salvin's Albatross (*Thalassarche salvini*)	-	V	PMST	The Salvin's albatross breed colonially on three disparate island groups in the Southern Ocean, Île des Pingouins in the Crozet Islands in the Indian Ocean and the Bounty Islands and The Snares to the south of New Zealand, The Pyramid, and Forty-Fours Island.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
White-capped Albatross (*Thalassarche steadi*)	-	V	PMST	This species breeds on a number of islands in New Zealand waters. Virtually the entire population nests in the Auckland Islands, comprising between 75,000 and 117,000 breeding pairs. A small number of pairs nest on Bollons Island in the Antipodes Islands and occasionally on The Forty-Fours in the Chatham Islands. Mostly observed in inshore and offshore waters over the continental shelf and less frequently	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				in pelagic waters off the shelf break. May occasionally enter larger bays.	
White-bellied Storm-Petrel (*Fregetta grallaria grallaria*)	V	V	PMST	A wide oceanic distribution in the south Pacific and Atlantic Oceans, ranging into tropical waters from various breeding grounds. Known to breed at various island groups including Lord Howe Island. Marine species and in Australia breeds only on offshore islands in the Lord Howe Island group.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Southern Giant Petrel (*Macronectes giganteus*)	E	E	PMST	The Southern Giant Petrel has a circumpolar pelagic range from Antarctica to approximately 20° S and is a common visitor off the coast of NSW. Over summer, the species nests in small colonies amongst open vegetation on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Northern Giant Petrel (*Macronectes halli*)	-	V	PMST	Northern Giant Petrel is pelagic and is found throughout the Southern Ocean north of the Antarctic Convergence Zone, and north through Chile, Argentina, South Africa, New Zealand, and half of Australia.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Orange-bellied Parrot (*Neophema chrysogaster*)	CE	CE	PMST	On the mainland, the Orange-bellied Parrot spends winter mostly within 3 km of the coast in sheltered coastal habitats including bays, lagoons, estuaries, coastal dunes and saltmarshes. The species also inhabits small islands and peninsulas and occasionally saltworks and golf courses. Birds forage in low samphire herbland or taller coastal shrubland.	Low: The study area lacks suitable sheltered coastal shrub habitat and the species has not been recorded in the area. Therefore, it is unlikely that this species occurs in the study area.
Gould's Petrel (*Pterodroma leucoptera leucoptera*)	V	E	PMST	Breeds on both Cabbage Tree Island, 1.4 km offshore from Port Stephens and on nearby Boondelbah island. The range and feeding areas of non-breeding petrels are unknown. The first arrival of Gould's petrel on cabbage tree Island occurs from mid to late September.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.

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				Principal nesting habitat is located within two gullies which are characterised by steeply, sloping rock scree with a canopy of Cabbage Tree Palms. They nest predominantly in natural rock crevices among the rock scree and also in hollow fallen palm trunks, under mats of fallen palm fronds and in cavities among the buttresses of fig trees.	
Australian Fairy Tern (*Sternula nereis nereis*)	-	V	PMST	The Fairy Tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline. The bird roosts on beaches.	Low. The study area lacks suitable coastal habitat. Therefore, it is unlikely that this species occurs in the study area.
Fairy Prion (*Pachyptila turtur subantarctica*)	-	V	PMST	The southern subspecies of the fairy prion was first recorded on Macquarie Island in 1956, with breeding confirmed in 1978. Breeding is currently known from only from two rock stacks off Macquarie Island, one near Langdon Point, the other near Davis Point (Brothers 1984) with a second location on Bishop and Clerk Islands nearby.	Low. The species is predominantly found offshore. Therefore, it is unlikely that this species occurs in the study area.
Little Tern (*Sternula albifrons*)	E	C,J,K	BioNet	Almost exclusively coastal, preferring sheltered environments; however, may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands.	Low. The study area lacks suitable coastal habitat. Therefore, it is unlikely that this species occurs in the study area.
Kermadec Petrel *(Pterodoma neglecta)*	V	V	PMST	Ranges over subtropical and tropical waters of the South Pacific. Balls Pyramid (near Lord Howe Island) and Phillip Island (near Norfolk Island) are the only known breeding sites in Australian waters. Breeds on islands across the South Pacific. In Australia it breeds on Ball's Pyramid and Phillip	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				Island (near Norfolk Island). Nests in a crevice amongst rocks.	
Indian Yellow-nosed Albatross *(Thalassarche carteri)*	-	V	PMST	The Indian Yellow-nosed Albatross is a marine bird, located in subtropical and warmer subantarctic waters. In the Australasian region, the species occupies inshore and offshore waters. The species nests on tussock-covered coastal cliffs and slopes, often in rocky situations.	Low. This species may fly over the study area; however, the study area lacks any suitable marine habitat. Therefore, it is unlikely that this species occurs in the study area.
Mammals					
Australian Fur-seal (*Arctocepthalus pusillus doriferus)*	V	-	BioNet	Reported to breed at Seal Rocks, near Port Stephens and Montague Island in southern NSW. Haul outs are observed at isolated places along the NSW coast. Prefers rocky parts of islands with flat, open terrain. They occupy flatter areas than do New Zealand fur-seals where they occur together. The Australian fur-seal prefers to utilise oceanic waters of the continental shelf for foraging and generally does not dive deeper than 150 m.	Low. No suitable Rocky habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
New Zealand Fur-seal (*Arctocephalus forsteri*)	V	-	Bionet	Prefers rocky parts of islands with jumbled terrain and boulders. Occurs in Australia and New Zealand. Reports of non-breeding animals along southern NSW coast particularly on Montague Island, but also at other isolated locations to north of Sydney.	Low. No suitable Rocky habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Spotted-tailed Quoll (*Dasyurus maculatus*)	V	E	BioNet PMST	Found in a variety of forested habitats. This species creates a den in fallen hollow logs or among rocky outcrops. Generally, does not occur in otherwise suitable habitats that are in close proximity to urban development.	Low. No suitable woodland/forest or similar habitat occurs within the study area, and the study area is in a heavily developed area typically avoided by this species. Therefore, it is unlikely that this species occurs in the study area.
Koala (combined populations of Qld, NSW and the ACT) (*Phascolarctos cinereus*)	E	E	BioNet PMST	Occurs in forests and woodlands where it requires suitable feed trees (particularly *Eucalyptus* spp.) and habitat linkages. Will occasionally cross open areas, although it becomes more vulnerable to predator attack and road mortality during these excursions.	Low. The study area lacks suitable feed trees and is isolated from other potential habitat areas. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Southern Brown Bandicoot (eastern) (*Isoodon obesulus obesulus*)	E	E	PMST	Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material. Nests may be located under Grass trees *Xanthorrhoea* spp., blackberry bushes and other shrubs, or in rabbit burrows.	Low. No suitable Heath habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Eastern Pygmy-possum (*Cercartetus nanus*)	V	-	BioNet	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable.	Low. No suitable Forest or Heath habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Squirrel Glider (*Petaurus norfolcensis*)	V	-	BioNet	Occurs in eucalypt forests and woodlands where it feeds on sap exudates and blossoms. In these areas tree hollows are utilised for nesting sites. This species also requires winter foraging resources when the availability of normal food resources may be limited, such as winter-flowering shrub and small tree species.	Low. No suitable Eucalypt Forest or similar habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Greater Glider (*Petauroides volans*)	-	V	PMST	The greater glider is an arboreal marsupial, largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. It is found in highest abundance typically in taller, montane, moist eucalypt forests, with relatively old trees and abundant hollows. The Greater Glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species.	Low. No suitable Eucalypt Forest or similar habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Yellow Bellied Glider *(Petaurus australis)*	V	V	PMST	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	Low. No suitable tall eucalypt forest occurs in the study area. Therefore, it is unlikely that this species occurs in the study area.
New Holland Mouse (*Pseudomys novaehollandiae*)	-	V	PMST	This species has a patchy distribution within open woodlands, heathlands and in hind dune vegetation throughout Eastern Australia.	Low. No suitable Forest or Heath habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Parma Wallaby (*Macropus parma*)	V	-	BioNet PMST	Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas. During the day they shelter in dense cover.	Low. No suitable Eucalypt Forest or similar habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Grey-headed Flying-fox (*Pteropus poliocephalus*)	V	V	BioNet PMST	This species forages over a large area for nectar/fruits. Seasonally roosts in communal base camps situated within wet sclerophyll forests or rainforests. Frequently observed to forage in flowering Eucalypts.	Moderate. This species has been recorded nearby the study area; however, the study area lacks habitat suitable for camps or foraging. Therefore, it is possible that this species may transit through the study area.
Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)	V	-	BioNet	Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.	Low. There are records of the species in the area adjacent to the study area, however following targeted microbat surveys no signs of bats were detected. Therefore, it is unlikely that this species occurs in the study area
Little Bent-winged Bat (Miniopterus australis)	V	-	BioNet	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night	Low. There are records of the species in the area adjacent to the study area, however following targeted microbat surveys no signs of bats were detected. Therefore, it is unlikely that this species occurs in the study area

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				forage for small insects beneath the canopy of densely vegetated habitats.	
Large Bent-winged Bat (*Miniopterus orianae oceanensis*)	V	-	BioNet	This species utilises a range of habitats for foraging, including rainforest, wet and dry sclerophyll forests, woodlands and open grasslands. Requires caves or similar structures for roosting habitat.	Low. There are records of the species in the area adjacent to the study area, however following targeted microbat surveys no signs of bats were detected. Therefore, it is unlikely that this species occurs in the study area
Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)	V	-	BioNet	This species is distributed south of Sydney extending north into south-eastern Queensland. There are no records west of the Great Dividing Range. Most records of this species have been reported from dry Eucalypt forest and woodland. It is expected that open forested areas and the cleared land adjacent to bushland, constitutes important habitat for this species. It is a predominantly tree-dwelling species, roosting in hollows or behind loose bark in mature Eucalypts.	Low. There are records of the species in the area adjacent to the study area, however following targeted microbat surveys no signs of bats were detected. Therefore, it is unlikely that this species occurs in the study area
Large-eared Pied Bat (*Chalinolobus dwyeri*)	V	V	BioNet PMST	This species forages in tall open forests and the edges of rainforest. It roosts in mine shafts and similar structures. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of Fairy Martin (*H. ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy.	Low. Although suitable habitat was present, following targeted microbat surveys no signs of bats were detected . Therefore, it is unlikely that this species occurs in the study area.
Southern Myotis	V	-	BioNet	Usually found near bodies of water, including estuaries, lakes, reservoirs, rivers and large	Low. Although suitable habitat was present, following targeted microbat

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
(*Myotis macropus*)				streams, often in close proximity to their roost site. Although usually recorded foraging over wet areas, it also utilises a variety of wooded habitats adjacent to such areas including rainforest, wet and dry sclerophyll forest, woodland, and swamp forest. Roosts in small colonies of between 15 and several hundred individuals in caves, mines and disused railway tunnels.	surveys no signs of bats were detected. Therefore, it is unlikely that this species occurs in the study area.
Greater Broad-nosed Bat (*Scoteanax rueppellii*)	V	-	BioNet	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings.	Low: The study area lacks the Eucalypt or Rain Forest and tree hollows preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Flora					
Acacia bynoeana (Bynoe's Wattle)	E	V	Bionet PMST	Small, prostrate shrub found in low heath, open woodland, dry sclerophyll, generally on loamy clays and sand. Occurs from the Lower Hunter south to the Southern Highlands. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Acacia pubescens (Downy Wattle)	V	V	PMST	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Flowers from August to October. Pollination of Acacia flowers is usually by insects and birds. The pods mature in October to December.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Acacia terminalis subsp. Eastern Sydney (Sunshine wattle)	E	E	Bionet PMST	Very limited distribution, mainly in near-coastal areas from the northern shores of Sydney Harbour south to Botany Bay. Coastal scrub and dry	Low. The study area lacks suitable habitat and the range of this species is known to be very limited. Therefore, it is

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				sclerophyll woodland on sandy soils. Habitat is generally sparse and scattered.	unlikely that this species occurs in the study area.
Amperea xiphoclada var. pedicellata	Extinct	Extinct	Bionet	Amperea xiphoclada var. pedicellata is known only from the type specimen collected in 1892 from Sydney, NSW. The species has not been observed since and is presumed to be extinct.	None: This species is extinct. Therefore, it is extremely unlikely that it occurs in the study area.
Allocasuarina portuensis (Nielsen Park She-oak)	E	E	Bionet PMST	The original known habitat of the Neilsen Park She-oak is at Nielsen Park, in Woollahra local government area. There are no plants left at the original site where it was discovered. However, propagation material has been planted successfully at a number of locations at Nielsen Park and other locations in the local area, e.g. Gap Bluff, Hermit Point and Vaucluse House.	Low. This species has a very limited range, mostly through intentional propagation. It has not been recorded at the study area. Therefore, it is unlikely that this species occurs in the study area.
Allocasuarina glareicola	E	E	PMST	Grows in Castlereagh woodland on lateritic soil. Found in open woodland with Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla and Melaleuca decora.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Asterolasia elegans	E	E	PMST	Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes Turpentine (Syncarpia glomulifera subsp. glomulifera), Smooth-barked Apple (Angophora costata), Sydney Peppermint (Eucalyptus piperita), Forest Oak (Allocasuarina torulosa) and Christmas Bush (Ceratopetalum gummiferum). Ecological knowledge about this species is very limited. The species is considered to be fire sensitive and reliant on seed germination after disturbance to maintain populations. A soil seedbank appears to be established by this species, so for a number of years following fire or other disturbance the species may not be apparent, but be present only as seed in the soil.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Caladenia tessellata (Thick-lipped Spider-orchid)	E	V	Bionet PMST	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Cryptostylis hunteriana (Leafless Tongue-orchid)	V	V	PMST	A very rare leafless, saprophytic orchid, which has a symbiotic relationship with a mycorrhizal fungi which provides the plant with all its nutrient requirements. This orchid remains underground for the majority of its lifecycle, flowering periodically when conditions are optimal to reproduce. This species is extremely cryptic as it does not flower every year. Known to occur within a range of habitats including woodlands to swamp heaths. The larger populations have been typically found in woodland dominated by *E. racemosa* (Scribbly Gum) and it prefers areas with an open grassy understorey. The species typically prefers moist sandy soils in sparse to dense heath and sedgeland, or moist to dry clay loams in coastal forests.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Dichanthium setosum (Bluegrass)	V	V	Bionet	Flowering time is mostly in summer. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). It is open to question whether the species tolerates or is promoted by a certain amount of disturbance, or whether this is indicative of the threatening processes behind its depleted habitat.	Low. The study area lacks suitable habitat and there are no recent local recordings of the species. Therefore, it is unlikely that this species occurs in the study area.
Doryanthes palmeri (Giant Spear Lily)	V	-	Bionet	Giant Spear Lily occurs on exposed rocky outcrops on infertile soils or on bare rock. It grows in a narrow band of vegetation along the cliff-tops and on steep cliff-faces or rocky ledges in montane heath next to	Low. The study area lacks suitable rocky cliff-top habitat. Therefore, it is unlikely that this species occurs in the study area.

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				subtropical rainforest, warm temperate rainforest or wet eucalypt forest.	
Darwinia biflora	V	V	PMST	Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Associated overstorey species include Eucalyptus haemastoma, Corymbia gummifera and/or E. squamosa. The vegetation structure is usually woodland, open forest or scrub-heath	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Eucalyptus camfieldii (Camfield's Stringybark)	V	V	Bionet PMST	Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Occurs mostly in small, scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Eucalyptus nicholii (Narrow-leaved Black Peppermint)	V	V	Bionet	Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Eucalyptus pulverulenta (Silver-leafed Gum)	V	V	Bionet	Grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum (Eucalyptus mannifera), Red Stringybark (E. macrorhynca), Broad-leafed Peppermint (E. dives), Silvertop Ash (E. sieberi) and Apple Box (E. bridgesiana).	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Genoplesium baueri (Yellow Gnat-orchid)	E	E	PMST	Grows in dry sclerophyll forest and moss gardens over sandstone.	Low. No suitable Dry Sclerophyll Forest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Haloragodendron lucasii (Hal)	E	E	PMST	Associated with dry sclerophyll forest. Reported to grow in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland.	Low. No suitable Dry Sclerophyll Forest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				Associated with high soil moisture and relatively high soil-phosphorus levels. Highly clonal, which implies the true population size may be considerably smaller than expected. Flowering occurs from August to November with fruits appearing from October to December.	
Hibbertia puberula	E	-	BioNet	Flowering time is October to December, sometimes into January. Occurs on sandy soil often associated with sandstone, or on clay. Habitats are typically dry sclerophyll woodland communities, although heaths are also occupied. One of the recently described subspecies also favours upland swamps.	Low. No suitable Dry Sclerophyll Forest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Lasiopetalum joyceae	V	V	PMST	Has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. It is currently known from 34 sites between Berrilee and Duffys Forest. Seventeen of these are reserved. Grows in heath on sandstone.	Low. This species is known to have a limited range and no suitable Heath habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Macadamia integrifolia (Macadamia Nut)	-	V	Bionet	The Macadamia Nut grows in remnant rainforest, preferring partially open areas such as rainforest edges.	Low. No suitable Rainforest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Melaleuca biconvexa (Biconvex Paperbark)	V	V	PMST BioNet	Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Melaleuca deanei **(Deane's Paperbark)**	V	V	Bionet PMST	The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. Flowers appear in summer but seed production appears to be small and consequently the species exhibits a limited capacity to regenerate.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.

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Persicaria elatior (Knotweed)	V	V	PMST	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Low. The study area lacks suitable habitat. Therefore, it is unlikely that this species occurs in the study area.
Pimelea curviflora var. curviflora	V	V	PMST	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowalnd Grassy Woodland habitat at Albion Park on the Illawarra coastal plain. Flowers October to May. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots. Likely to be fire tolerant species capable of resprouting following fire due to the presence of a tap root. Seedlings have been observed following fire.	
Pimelea spicata (Spiked Rice-flower)	E	E	PMST	In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. Flowers may appear at any time of the year, but are mostly seen in summer as they are probably related to rainfall.	Low. There is no record of this species in the locality and no suitable clay soils within the study area. Therefore, it is unlikely that this species occurs in the study area.
Persoonia hirsute (Hairy Geebung)	E	E	Bionet PMST	The Hairy Geebung is found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone. It is usually present as isolated individuals or very small populations.	Low. No suitable Dry Sclerophyll Forest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Prostanthera junonis (Somersby Mintbush)	E	E	PMST	The species is restricted to the Somersby Plateau. It occurs on both the Somersby and Sydney Town soil landscapes on gently undulating country over weathered Hawkesbury sandstone within open forest/low woodland/open scrub. It occurs in both disturbed and undisturbed sites. The dominant flowering period for this species is October to mid-	

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				December depending on weather/site conditions. The plant is very difficult to identify outside of this time. While mature plants appear to be incapable of resprouting after fire, it may trigger seed germination.	
Prostanthera marifolia (Seaforth Mintbush)	CE	CE	Bionet	Prostanthera marifolia is currently only known from the northern Sydney suburb of Seaforth and has a very highly restricted distribution within the Sydney Basin Bioregion. The single population is fragmented by urbanisation into three small sites. All known sites are within an area of 2x2 km.	Low. This species is known to have a limited range and is not recorded within the study area. Therefore, it is unlikely that this species occurs in the study area.
Prostanthera densa (Villous Mint-bush)	V	V	PMST	This species has been recorded from the Currarong area in Jervis Bay, Royal National Park, Cronulla, Garie Beach and Port Stephens (Gan Gan Hill, Nelson Bay). The Sydney and Royal National Park populations were thought possibly extinct, but the species is now known to occur at Bass and Flinders Point in Cronulla. Villous Mint-bush is generally grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea.	Low. There is no record of this species in the locality and no suitable Sclerophyll habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Rhizanthella slateri (Eastern Underground Orchid)	V	E	PMST	Habitat requirements are poorly understood, and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest.	Low. There is no record of this species in the locality and no suitable Sclerophyll habitat occur within the study area. Therefore, it is unlikely that this species occurs in the study area.
Rhodamnia rubescens (Scrub Turpentine)	CE	-	PMST BioNet	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Low. No suitable Rainforest or Wet Sclerophyll habitat occur within the study area. Therefore, it is unlikely that this species occurs in the study area.
Rhodomyrtus psidioides (Native Guava)	CE	-	PMST	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	Low. No suitable Rainforest or Wet Sclerophyll habitat occur within the study

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
					area. Therefore, it is unlikely that this species occurs in the study area.
Syzygium paniculatum (Magenta Lilly Pilly)	E	V	PMST BioNet	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest.	Low. No suitable Rainforest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Tetratheca glandulosa	V	-	Bionet	Topographically, the plant occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Soils are generally shallow, consisting of a yellow, clayey/sandy loam. Flowers July-November however residual flowers may persist until late December.	Low. No suitable topography or clayey type soil occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Tetratheca juncea (Black-eyed Susan)	V	V	Bionet		
Thesium australe (Austral Toadflax)	V	V	PMST	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (Themeda australis).	Low. No suitable Grassland habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Fungi					
Hygrocybe collucera	E	-	Bionet	Occurs in gallery warm temperate forests dominated by Lilly Pilly (Acmena smithii), Grey Myrtle (Backhousia myrtifolia), Cheese Tree (Glochidion ferdinandi) and Sweet Pittosporum (Pittosporum undulatum). Associated with alluvial sandy soils of the Hawkesbury Soil Landscapes with naturally low fertility and erodible.	Low. No suitable Warm Temperate Forest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Hygrocybe griseoramosa	E	-	Bionet	Occurs in gallery warm temperate forests dominated by Lilly Pilly (Acmena smithii), Grey Myrtle (Backhousia myrtifolia), Cheese Tree (Glochidion ferdinandi) and Sweet Pittosporum (Pittosporum undulatum). Associated with alluvial sandy soils of	Low. No suitable Warm Temperate Forest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				the Hawkesbury Soil Landscapes with naturally low fertility and erodible.	
Hygrocybe reesiae	V	-	Bionet	Occurs in gallery warm temperate forests dominated by Lilly Pilly (Acmena smithii), Grey Myrtle (Backhousia myrtifolia), Cheese Tree (Glochidion ferdinandi) and Sweet Pittosporum (Pittosporum undulatum). Associated with alluvial sandy soils of the Hawkesbury Soil Landscapes with naturally low fertility and erodible.	Low. No suitable Warm Temperate Forest habitat occurs within the study area. Therefore, it is unlikely that this species occurs in the study area.
Migratory Species					
Marine Birds					
Common Noddy (*Anous stolidus*)	-	-	PMST	During the breeding season, the Common Noddy usually occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. When not at the nest, individuals will remain close to the nest, foraging in the surrounding waters. Birds may nest in bushes, saltbush, or other low vegetation. They may also nest on the ground in Pigface (Carpobrotus spp.) or grass, on bare rock, on top of rocks protruding above vegetation, on shingle beaches, among coral rubble or in sand close to grassy areas.	Low. The study area lacks suitable marine habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Fork-tailed Swift (*Apus pacificus*)	-	-	PMST	The Fork-tailed Swift is almost exclusively aerial, flying from less then 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered	Low. The study area lacks suitable riparian habitat. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				with spinifex, open farmland and inland and coastal sand-dunes	
Flesh-footed Shearwater (*Ardenna carneipes*)	V	-	PMST	Marine,nest on Lord Howe Island in forests on sandy soils from Ned's Beach to Clear Place, with smaller colonies below Transit Hill and at Old Settlement Beach.	Low. The study area lacks suitable marine habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Sooty Shearwater (*Ardenna grisea*)	-	-	PMST	The Sooty Shearwater forages in pelagic (open ocean) sub-tropical, sub-Antarctic and Antarctic waters. Sooty Shearwaters may forage inshore occasionally, especially during rough weather.	Low. The study area lacks suitable marine habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Streaked Shearwater (*Calonectris leucomelas*)	-	-	PMST	This marine species can be found over both pelagic and inshore waters. It feeds mainly on fish and squid which it catches by surface-seizing and shallow plunges. It often associates with other seabirds and will follow fishing boats. Breeding begins in March in colonies on offshore islands, occupying burrows on forested hills. It undergoes transequatorial migration.	Low. The study area lacks suitable marine habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Antipodean Albatross (*Diomedea antipodensis*)	V	V	PMST	As above.	As above.
Southern Royal Albatross (*Diomedea epomophora*)	-	V	PMST	As above.	As above.
Wandering Albatross (*Diomedea exulans*)	-	V	PMST BioNet	As above.	As above.
Northern Royal Albatross (Diomedea sanfordi)	-	E	PMST	As above.	As above.
Lesser Frigatebird (*Fregata ariel*)	-	-	PMST	The Lesser Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes, and even on bare ground. It feeds mainly	Low. The study area lacks suitable marine habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				on fish (especially flying-fish) and squid, but also on seabird eggs and chicks, carrion and fish scraps.	
Great Frigatebird (*Fregata minor*)	-	-	PMST	The Great Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes and occasionally on bare ground. Fish, squid and chicks of other bird species (e.g. Sooty Terns) have all been identified as prey. It is frequently observed attempting to steal food from other bird species.	Low. The study area lacks suitable marine habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
White-tailed Tropicbird (*Phaethon lepturus*)	-	-	PMST	The white-tailed Tropicbird can be found over pelagic waters and the coasts of tropical and subtropical seas. The species is loosely colonial, nesting in rocky crevices or a sheltered scrape on the ground on small-remote islands. Nests are placed preferably in inaccessible spots on cliffs where take-off is easy.	Low. The study area lacks suitable marine habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Little Tern (*Sternula albifrons*)	E	-	PMST	As above.	As above.
Buller's Albatross (*Thalassarche bulleri*)	-	V	PMST	As above.	As above.
Indian Yellow-nosed Albatross *(Thalassarche carteri)*	-	V	PMST	As above.	As above.
Shy Albatross (*Thalassarche cauta*)	V	E	PMST	As above.	As above.
Chatham Albatross (*Thalassarche eremita*)	-	E	PMST	As above.	As above.
Campbell Albatross (*Thalassarche impavida*)	-	V	PMST	As above.	As above.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Black-browed Albatross (*Thalassarche melanophris*)	V	V	PMST	As above.	As above.
Salvin's Albatross (*Thalassarche salvini*)	-	V	PMST	As above.	As above.
White-capped Albatross (*Thalassarche steadi*)	-	V	PMST	As above.	As above.
Southern Giant Petrel (*Macronectes giganteus*)	E	E	PMST	As above.	As above.
Northern Giant Petrel (*Macronectes halli*)	-	V	PMST	As above.	As above.
Pacific Golden Plover (*Pluvialis fulva*)	-	-	PMST	In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as Sarcocornia, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. The species is also sometimes recorded on islands, sand and coral cays and exposed reefs and rocks. They are less often recorded in terrestrial habitats, usually wetlands such as fresh, brackish or saline lakes, billabongs, pools, swamps and wet claypans, especially those with muddy margins and often with submerged vegetation or short emergent grass.	Low. The study area lacks suitable coastal habitat. Therefore, it is unlikely that this species occurs in the study area.
Terrestrial Birds					
Oriental Cuckoo (Cuculus optatus)	-	-	PMST	Best identified by song, a mellow series of "boop-boop" notes, given in flight or from a high (often concealed) perch. When not singing, quiet and	Low. The study area lacks suitable Woodland habitat preferred by this

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				unobtrusive, foraging solitarily in upper and middle levels of boreal forest and mixed woodlands.	species. Therefore, it is unlikely that this species occurs in the study area.
White-throated Needletail (*Hirundapus caudacutus*)	-	V, C,J,K	PMST	As above.	As above.
Black-faced Monarch (*Monarcha melanopsis*)	-	-	PMST	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest.	Low. The study area lacks suitable rainforest habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Yellow Wagtail (*Motacilla flava*)	-	-	PMST	This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra. In the north of its range it is also found in large forest clearings. It breeds from April to August, although this varies with latitude. The nest is a grass cup lined with hair and placed on or close to the ground in a shallow scrape.	Low. The study area lacks suitable low vegetation habitat preferred by this species. Therefore, it is unlikely that this species occurs in the study area.
Satin Flycatcher (*Myiagra cyanoleuca*)	-	-	PMST	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	Low. The study area lacks Eucalypt-dominated forests. Therefore, it is unlikely that this species occurs in the study area.
Rufous Fantail (*Rhipidura rufifrons*)	-	-	PMST	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (Eucalyptus microcorys), Mountain Grey Gum (E. cypellocarpa), Narrow-leaved Peppermint (E. radiata), Mountain Ash (E. regnans), Alpine Ash (E. delegatensis), Blackbutt (E. pilularis) or Red Mahogany (E. resinifera); usually with a dense shrubby understorey often including ferns.	Low. The study area lacks Eucalypt-dominated forests. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Spectacled Monarch (*Symposiachrus trivirgatus*)	-	-	PMST	The Spectacled Monarch prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	Low. The study area lacks suitable mangrove habitat. Therefore, it is unlikely that this species occurs in the study area.
Wetlands Birds					
Common Sandpiper (*Actitis hypoleucos*)	-	-	PMST	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties.	Low. The study area lacks suitable coastal habitat. Therefore, it is unlikely that this species occurs in the study area.
Ruddy Turnstone (*Arenaria interpres*)	-	-	PMST	In Australasia, the Ruddy Turnstone is mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral.	Low. The study area lacks suitable coastal habitat. Therefore, it is unlikely that this species occurs in the study area.
Red Knot (*Calidris canutus*)	-	E, C,J,K	PMST	As above.	As above.
Sharp-tailed Sandpiper (*Calidris acuminata*)	-	-	PMST	In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and	Low. The study area lacks suitable coastal habitat. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season.	
Curlew Sandpiper (*Calidris ferruginea*)	E	CE, C,J,K	BioNet PMST	As above.	As above.
Pectoral Sandpiper (*Calidris melanotos*)	-	-	PMST	In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands.	Low. The study area lacks suitable Wetland habitat. Therefore, it is unlikely that this species occurs in the study area.
Red-necked Stint (*Calidris ruficollis*)	-	-	PMST	In Australasia, the Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores.	Low. The study area lacks suitable coastal habitat. Therefore, it is unlikely that this species occurs in the study area.
Great Knot (*Calidris tenuirostris*)	V	CE, C,J,K	PMST	As above.	As above.
Double-banded Plover (*Charadrius bicinctus*)	-	-	PMST	The Double-banded Plover is found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers.	Low. The study area lacks suitable Estuarine habitat. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
Greater Sand-plover (*Charadrius leschenaultii*)	V	V, C,J,K	PMST	As above.	As above.
Lesser Sand-plover (*Charadrius mongolus*)	V	E,C,J,K	PMST	As above.	As above.
Latham's Snipe (*Gallinago hardwickii*)	-	-	PMST	They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies)	Low. The study area lacks suitable Wetland habitat. Therefore, it is unlikely that this species occurs in the study area.
Bar-tailed Godwit (*Limosa lapponica*)	-	-	PMST	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats.	Low. The study area lacks suitable Estuarine habitat. Therefore, it is unlikely that this species occurs in the study area.
Black-tailed Godwit (*Limosa limosa*)	V	C,J,K	PMST	As above.	As above.
Eastern Curlew (*Numenius madagascariensis*)	-	CE, Bonn, C,J,K	PMST	As above.	As above.
Whimbrel (*Numenius phaeopus*)	-	-	PMST	The Whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms.	Low. The study area lacks suitable Estuarine habitat. Therefore, it is unlikely that this species occurs in the study area.
Eastern Osprey (*Pandion haliaetus*)	-	-	PMST	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally	Low. The study area lacks suitable Estuarine habitat. Therefore, it is unlikely that this species occurs in the study area.

Species / Population / Ecological Community Name	FM Act / BC Act	EPBC Act	Source	Habitat / Community Description	Likelihood of Occurrence
				travel inland along major rivers, particularly in northern Australia.	
Ruff (Reeve) (*Philomachus pugnax*)	-	-	PMST	In Australia the Ruff is found on generally fresh, brackish of saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and floodlands. They are occasionally seen on sheltered coasts, in harbours, estuaries, seashores and are known to visit sewage farms and saltworks	Low. The study area lacks suitable Wetland habitat. Therefore, it is unlikely that this species occurs in the study area.
Grey-tailed Tattler (*Tringa brevipes*)	-	-	PMST	The Grey-tailed Tattler is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide	Low. The study area lacks suitable Intertidal habitat. Therefore, it is unlikely that this species occurs in the study area.
Common Greenshank (Tringa nebularia)	-	-	PMST	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms.	Low. The study area lacks suitable Wetland or sheltered Coastal habitat. Therefore, it is unlikely that this species occurs in the study area.
Marsh Sandpiper (*Tringa stagnatilis*)	-	-	PMST	The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes	Low. The study area lacks suitable Wetland habitat. Therefore, it is unlikely that this species occurs in the study area.

APPENDIX B

Curriculum Vitae

Dane Fogliada

Environmental Scientist / Ecologist · 5 Years of Experience · Wollongong, NSW

Dane has over 5 years' consultancy and local government experience in NSW. His experience includes environmental approvals and ecology (terrestrial and aquatic). His collective experience has enabled him to work on a multitude of differing projects including works involving prioritisation ranking for Council departments as well as threatened species monitoring, survey and protection. Dane has had experience in formulating Land Management reports, Environmental Impact Assessment reports - including modifications to major project approvals, water quality testing, ecological impact assessment and applications of the Biodiversity Assessment Method (BAM) and preparation of Biodiversity Development Assessment Reports (BDAR) under the NSW *Biodiversity Conservation Act 2016*.

Mr. Fogliada's specific skills and experience include ecological assessment, including flora and fauna assessment project design and management. Flora Survey: Vegetation plots, vegetation ground-truthing, targeted flora surveys, TEC commensuration. Fauna Survey: targeted fauna surveys, spotlighting, acoustic detector surveys, harp trapping, elliot trapping. Management Plan preparation (Vegetation Management Plan, Threatened Species Management Plan, Weed Management Plan). Biodiversity Assessments (Flora and Fauna Impact Assessments, Biodiversity Assessments, Biodiversity Development Assessment Reports) and Biodiversity Constraints Assessments.

EDUCATION

Bachelor of Science (Environment), University of Wollongong, Wollongong, Australia, 2016

Certificate II Conservation and Land Management, TAFE NSW, Yallah, Australia, 2018

CERTIFICATIONS & TRAINING

Greencap BOS – Accredited Assessor Training

BAM Accredited Assessor Training – Completed (Awaiting BAAS)

NSW White Card, Wollongong, NSW, 2019

QLD SARC Statement of Attainment, Brisbane, QLD, 2020

Rail Industry Worker (RIW) Statement of Attainment, Sydney, NSW, 2020

MEMBERSHIPS

Member, Environment Institute of Australia and New Zealand

PROJECT EXPERIENCE

Ecology

Jervis Bay to Sussex Inlet Princes Highway Upgrade (Ecologist, 2021-Present)
Client: Transport for NSW
Stantec have been engaged by Transport for NSW to conduct biodiversity assessments in accordance with the BAM to determine values present within the proposed upgrade corridor. As part of these assessments Plot-based flora surveys, threatened flora and fauna surveys and habitat stratification were conducted as part of this project. Dane has been involved with the development of the biodiversity field campaign and reporting.

Dane Fogliada

Environmental Scientist / Ecologist · 5 Years of Experience · Wollongong, NSW

Cambridge Avenue Road Upgrade (Ecologist, 2022-Present)
Client: Transport for NSW
Stantec have been engaged by Transport for NSW to conduct biodiversity assessments in accordance with the BAM to determine values present within the proposed upgrade corridor. Assessments completed to date include targeted flora and fauna surveys.

Porters Creek Wetland Hydrology and Restoration Approach (Ecologist, 2020-Present)
Client: Central Coast Council
Stantec have been engaged by Central Coast Council to prepare a Revegetation Plan to combat hydrology impacts on Porters Creek Wetland. The plan encompasses programs for which Council will adopt in the future including Water Quality Monitoring Plan, Flora and Fauna Monitoring Plan and Revegetation Monitoring Plan. The plans will enable Council to make adaptive management steps to ensure works to date are having a positive ecological impact on the wetland. The works involved priority rankings and workshops to formulate a strategic approach to restoration and monitoring.

Mermaids Pool Plan of Management and Master Plan (Ecologist/Environmental Impact Assessor, 2020-Present)
Client: Wollondilly Shire Council
Stantec have been engaged by Wollondilly Shire Council to prepare a Plan of Management and Master Plan for the formalisation of the Mermaids Pool bushwalk. An ecological survey was also conducted to verify Plant Community Types and Rapid Ecological survey. This involved the opportunistic recording of fauna species including birds. A subsequent Targeted Threatened Species survey was conducted to identify known threatened flora species within the confines of the Study Area and informal tracks. The survey was conducted over four consecutive days and multiple species were identified.

Residential Subdivision, Tahmoor Road (Ecologist, 2021)
Stantec were engaged to prepare a BDAR in support of the proposed subdivision on Tahmoor Road. Field campaign included plot-based floristic surveys and targeted threatened species surveys in line with the relevant NSW survey guidelines.

Due Diligence Assessment (Ecologist, 2020-Present)
Client: Property NSW
Stantec have been engaged to prepare a Due Diligence assessment for Property NSW for the repurposing of one of their sites in NSW. Stantec are preparing a suite of supporting specialist investigations including a Biodiversity Values Assessment which involved a detailed flora and fauna assessment of the site.

Dane Fogliada

Environmental Scientist / Ecologist · 5 Years of Experience · Wollongong, NSW

Colebee Compensatory Habitat Ecological Impact Assessment (Ecologist, 2020-Present)
Client: Transport for NSW
Stantec have been engaged to prepare an Ecological Impact Assessment for Transport for NSW for the installation of habitat protection fencing for known threatened flora and fauna species. A detailed flora and fauna assessment was conducted which involved habitat detection of birds and land mammals. Work involved detailed GIS mapping using the in-field application, Collector.

Eden Mountain Bike Trail Network (Ecologist, 2022–Present)
Client: Forestry NSW
Stantec have been engaged to inform detailed design of a series of mountain bike trails in Nullica State Forest. Biodiversity surveys included vegetation stratification and TEC mapping. Impacts to the aquatic environment were also explored. Stantec have been engaged to inform detailed design of a series of mountain bike trails in Nullica State Forest. Biodiversity surveys included vegetation stratification and TEC mapping. Impacts to the aquatic environment were also explored.

Towong Bridge Replacement (Ecologist, 2022–Present)
Client: Transport for NSW
Stantec were engaged by Transport and Main Roads to conduct biodiversity assessments for a bridge replacement at the border of NSW and Victoria. Ecology surveys included habitat assessment, vegetation mapping and stratification and TEC tests.

Old Bulli Mine Rehabilitation (Ecologist/Environmental Impact Assessor, 2019-2020)
Client: RMS
Stantec have prepared a SEE to support the remediation and installation of fencing of the Old Bulli Mine Pit Top area. Stantec also conducted an Ecological Impact Assessment in support of the SEE. The impact assessment was supported by detailed GIS maps.

Sewer Main Installation (Ecologist, 2021)
Client: Bega Shire Council
Cardno now Stantec have been in consultation with Bega Shire Council to install a sewer pipeline across government land to service the community. This involved a detailed flora and fauna assessment in order to determine suitable alignment to reduce the impacts on biodiversity.

SPS BU8 Rising Main (Ecologist, 2020-Present)
Client: Wingecarribee Shire Council
Stantec have been in consultation with Wingecarribee Shire Council to install a mains pipeline across government land to service the community. This involved a detailed flora and fauna assessment in order to determine suitable alignment to reduce the impacts on biodiversity.

Tripoli Way Extension REF (Environmental Assessor, 2018-Present)
Client: Shellharbour City Council
Stantec have been in consultation with Shellharbour City Council for the development of a REF for the Tripoli Way Extension. The environmental review included input from a multitude of specialists including traffic, heritage and ecology.

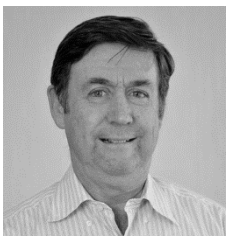
Dane Fogliada

Environmental Scientist / Ecologist · 5 Years of Experience · Wollongong, NSW

Beveles Avenue Bank Stabilisation (2019-Present)
Client: Wollongong City Council, Environmental Approvals
Stantec have been in consultation with Shellharbour City Council for the development of a REF for the Tripoli Way Extension. The environmental review included input from a multitude of specialists including traffic, heritage and ecology.

Dunmore Wetland Plan of Management (Ecologist/Environmental Impact Assessor, 2018)
Client: Shellharbour City Council
Shellharbour City Council needs to provide a Plan of Management for all reserves and wetlands from within Shellharbour LGA. The Plan of Management would later be used by Bush Regeneration staff as a guide to management of the wetland and prioritisation.

Pelican View Biodiversity Assessment (Ecologist, 2018)
Client: Shellharbour City Council
Shellharbour City Council conducted a BAM Assessment of the Pelican View Coastal Reserve. The assessment allowed Council to determine the current condition of the reserve and implement management approaches to increase its ecological value.



Kevin Roberts

Position in the organisation: APAC Regional Senior Principal Environment Technical Director Geosceinces and Environmental Services

Discipline: Ecology & Environment

Kevin is a leader in the field of environmental assessment management for major projects. He has over 35 years of experience in the assessment and management of environmental issues across a number of project areas and activities. Kevin currently provides technical and policy leadership for Stantec's environmental specialists across Australia. Kevin is currently assisitng WaterNSW to finalise the biodviersity assessments for the Warragamba Dam rasing project and led the review of the EIS scheduale and risk assessments for the Wyangala and Dungowan Dam rasiing projects

Kevin was the Principal Environment Manager for the WestConnex Delivery Authority (a major motorway project) with responsibility for establishing the environmental systems of the authority, undertaking the strategic and initial environmental assessments, liaison with regulators and developing the environmental criteria for design and construction contracts.

Kevin has extensive experience in providing environmental advice for projects (at strategic, development, construction and operational stages) including minor and major project environmental approvals, managing environmental incidents, developing restoration and offset strategies and delivery of training packages. He has a strong understanding of planning and regulatory environmental requirements developed managing consultancy and government agencies teams including natural resource managers, conservation agencies and environmental regulators. He has worked in senior roles for NSW Roads and Maritime Services, the Environmental Protection Authority, National Parks and Wildlife Service and the Department of Water Resources and has managed funding programs such as Bushcare and Landcare.

Kevin has led the preparation of referrals for many projects requiring consideration or approval under the Environmental Protection and Biodiversity Conservation Act 1999 (most recently the Albion Park Rail Bypass). Kevin has led the development and implementation of technical and policy advice as a senior biodiversity specialist for NSW Roads and Maritime Services including the preparation of guidelines and procedures.

EDUCATION AND MEMBERSHIPS

- B.Science (hons);
- M Environment Studies (hons);
- Executive Masters Public Administration (hons).
- MEIANZ and secretary of NSW EIANZ Branch
- MAICD
- Accredited Biodiversity Assessor under NSW Biodiversity Conservation Act

RELEVANT PROJECT EXPERIENCE

Warragamba Dam Raising

EIS review and biodviersity assessments

Dungowan and Wayangla Dam raisings

Strategic Risk assessments and EIS schedule review.

Inland Rail - Parkes to Narromine

Project Director - Biodiversity Offsets.

Western Harbour Tunnel and Beaches Link – Technical review of aquatic ecology and water quality assessment reports (current).

Snowy Hydro 2.0 - Project Director oversighting the preparation of the Aquatic Ecology and Water Quality Assessments as part of the project EIS.

Parkes Bypass (2018-present) - Environmental compliance lead for the detailed design and construction documentation for the new bypass.

State of the Environment Report - Shoalwater Bay - Project Director preparing report for Department of Defence.

Nelligen Bridge Upgrade – Environment Lead supporting detailed design and preparation of environment compliance and construction environmental management plans.

Sydney University Lands - Project Manager Biodiversity offsets providing advice to Sydney University on the offsetting options and values for a range of properties in western Sydney and Southern Highlands (current).

Stacey Street Upgrade – Project Director for preparation of preliminary environmental investigations for upgrade of intersection with Hume Highway (2017).

Pacific Highway Upgrade - Environmental Lead for

Arup-Cardno Joint Venture for detailed design of 36km section of the Woolgoolga to Ballina upgrade (2015-2017).

Albion Park Rail Bypass (2014-2017) - Cardno-Hyder joint venture – Environment lead for the EIS, Preferred Infrastructure Report, EPBC referral and Biodiversity Offsetting reports.

Management of environmental services contracts with NBN Co.Ltd, NSW Transport, Sydney Motorways Corporation and Roads and Maritime for NBN roll out; Parramatta Light Rail; Windsor Bridge, North Connex, Northern Beaches Hospital road upgrades and WestConnex (M4 Widening and M4 East)

Sydney Harbour Bridge Step Free access – Project Director preparation of REF (2017).

Woy Woy Rail Underbridge (2015) - Project Director for preparation of the REF for TfNSW.

M2 Toll Plaza Landslip (2015) - Kevin was Cardno project director for preparation of REF and Waste Classification for Transurban.

Business Cases Project manager for a range of business cases including Parramatta weir walkway, Marulan pavement rehabilitation, Heathcote Road upgrade.

Fowlers Road Upgrade – Environment review for REF, concept and detailed design.

Northern Road Intersection Upgrades (2015) Environment Director. Penrith City Council.

Country Rail Network - Reviews of Environmental Factors (REFs) for network upgrades, for John Holland Rail and UGL Regional Linx.

Transport Access Program (2015). Environment Manager and technical review.

Wildlife Connectivity Guidelines (2015) Kevin provided technical review and direction for the guidelines, prepared for RMS.

Second Crossing of the Murray River at Echuca (2012-2013). Kevin worked with VicRoads to prepare the environmental impact assessment and obtain approvals for the project.

Tender Design M4 widening (WestConnex) – Environment Lead for consortium led by McDonnel Dowell in partnership with Jacobs.

WestConnex (2012 – 2014) - As Principal Manager (Environment) for the 33km WestConnex Motorway Project, Kevin was responsible for management of the Strategic Environmental Assessment, Stage 1a EIS and commencement of Stage 1b and Stage 2 EIS.

Pacific Highway Upgrade – for RMS (2007-2014): As a Senior Environmental Specialist, Kevin led the environmental input into route options assessment and environmental assessment for Pacific Highway projects.

EPBC referrals

Preparation and negotiations of EPBC referrals on behalf of NSW Roads and Maritime for a range of major projects including Albion Park Rail Bypass; Woolgoolga to Ballina; Oxley Highway to Kempsey; Hume Highway Duplication; Hume Highway Bypasses; Princes Highway upgrade South Nowra and Dignams Creek.

Wildlife Connectivity Guidelines (2015) - Kevin provided technical review and direction for the guidelines, prepared for RMS.

Riparian regulation -Kevin was responsible in working for the Department of Land and Water Conservation managing the regulation of floodplain and riparian extractive industries including sand and gravel and alluvial mining across NSW.

MARK VERGARA

Group Leader – Ecology/ Principal - Environment

From the wetlands of Florida to the coral reefs of the Persian Gulf and Coral Triangle, urban forests and waterways of Southeast Asia, and terrestrial and aquatic ecosystems of Australia, Mark's had experiences that have made a far-reaching, meaningful difference in the environmental industry.

Mark is passionate in applying his local and overseas experience to environmental and ecological planning—guiding his clients in achieving project milestones with minimal impact to the environment. For over 20 years, Mark's held technical and leadership roles, leading, and working with multidisciplinary teams to achieve sustainable outcomes.

He is a DELWP-accredited Vegetation Quality Assessor and currently completing his Graduate Certificate in Arboriculture. He is Group Leader – Ecology at Stantec Australia.

EDUCATION AND MEMBERSHIPS

- GC Arboriculture (ongoing)
- Frontline Leadership Program (2022)
- New Leader Development Program (2021)
- Project Management Fundamentals (2018)
- Indigenous Studies ANZ (2017)
- MSc Marine Science - Marine Biology (2010)
- BSc Biology - Ecology (2000)
- Associate Environmental Technology (1997)
- Environment Institute of Australia and New Zealand, Member
- Ecological Consultants Association of Victoria, Committee Member
- Ecological Society of Australia, Member
- Society for Ecological Restoration, Member

PROJECT EXPERIENCE

INFRASTRUCTURE/UTILITY PROJECTS

> Jacka Reservoir Watermain Ecological Impact Assessment, ACT.

> Monaro Highway Upgrade Project, ACT. Major Projects Canberra.

> North East Link – Southern Package, VIC. Nel South Alliance

> Warrnambool Line Upgrade, VIC. Downer

> Barwon Heads Road Stage 2 Woodland Birds and Owls Targeted Surveys, VIC. ARUP/MRPV.

> Suburban Road Upgrade Native Vegetation Removal Reconciliation Mapping, VIC. ARUP/MRPV.

> North East Link – Primary Package, VIC. Spark DC

> Melbourne Airport Rail - Early Works, VIC. Laing O'Rourke.

> East Grampians Rural Pipeline Project, Victoria Dunstans, 2021

> North East Link – Early Works, VIC. CPB Contractors

> Road Upgrades, VIC. ARUP/MRPV

> Underground Utility Installations, VIC. AusNet Services, 2016 to 2021

> Crib Point to Pakenham Pipeline Project, VIC. APA Group, 2018

> Ecological and Arboricultural Assessments for Grimshaw Compound - North East Link Project. Metro Trains Melbourne. Ongoing.

> Ecological Assessments for various Level Crossing Removal Projects - Beaconsfield, Bonbeach, Carrum, Eel Race Road, Robinsons Road, Fitzgerald Road, Webb Street, Mt Derrimut. LXRP. 2021 – ongoing.

> Ecological Assessment for Pakenham Railway Line Safety Fencing. Pitt & Sherry. 2022.

> Ecological Assessment for Wallan Signalling Installation: Wallan, Heathcote Junction, Wandong. ARTC. 2021.

> Construction Impact Assessment for Proposed Road Works on Princes Highway, Werribee. Dept of Transport. 2020.

> Ecological Assessment for Ballarto Road Expansion, Carrum. Dept. of Transport. 2020.

> Ecological Assessment for Kingsbury Drive SUP, Bundoora. Dept. of Transport. 2021.

> Ecological Assessment for Telecommunications Facility, Falls Creek. 2020 – 2021.

> Ecological Assessment for Upfield Station Shared User Path. Dept. of Transport. 2020.

> Ecological Investigation for Chisholm Road Prison, Lara. John Holland. 2020.

> Ecological Services for Drysdale Bypass, Bellarine Peninsula. DECMIL. 2018.

MARK VERGARA

Group Leader – Ecology/ Principal - Environment

WATERWAY/COASTAL PROJECTS

- Warneet Boat Ramp. Better Boating Victoria.
- Environmental Impact of Groyne and Breakwater on Dendy Beach. Bayside City Council. Ongoing.
- Environmental and Biodiversity Assessment for Barwon River Revetment. DELWP. Ongoing.
- Brunswick Creek Structural Assessment. City of Melbourne. Ongoing.
- Environmental Management Plan for Bunjil Creek and Howey Creek, Gisborne. Macedon Ranges Shire Council. 2020 - 2021.
- Waterway Management Plan for Central Creek, Gisborne. Private Client. 2020-2021.
- Vegetation Monitoring and Algal Sampling for Royal Park Wetland. Melbourne Water. 2020-2021.
- Taxonomy & Ecology of a Nuisance Plant Species, Royal Park Wetland. Melbourne Water. 2021.
- Vegetation Monitoring for Maribyrnong River Semi-aquatic Planting. Melbourne Water. 2019.
- Dandenong Valley Park Wetlands Restoration. Melbourne Water. 2020.
- Ecological Assessment for Simons Creek, Plenty Road Upgrade
- Water Quality Monitoring for Laverton Creek, Truganina. ACE Contractors. 2020-2021.
- Vegetation Quality Assessment of a Coastal Complex in Flamingo Beach. 2021.
- Technical Review of the Kallang River – Bishan Ang Mo Kio Park Restoration Project. Public Utilities Board, Singapore. 2014.
- Environmental Planning for River of Life Masterplan and Detailed Design, Kuala Lumpur, Malaysia.
- Water Quality Impact Study for Kranji Reservoir Catchment, Singapore.
- Wetland Management Plan for the Johor Ramsar Sites, Malaysia.
- Biodiversity Impact Assessment of Kranji Marshes, Singapore
- Ecological Carrying Capacity of Tanjung Piai Nature Park, Malaysia
- Chevron Thailand Shore Base Alien Invasive Species Management, Thailand
- Medini Lake Restoration, Malaysia.
- Environmental Impact Studies for Dredging of Sungei Api Api and Sungei Sembawang, Singapore
- Artificial Reef Development in Singapore

DEFENCE PROJECTS

- Ecological Services for Fishermans Bend Redevelopment. ICON. Ongoing.
- Ecological Assessment and Native Vegetation Removal Reconciliation Mapping for Simpson Barracks. North East Link - Early Works. CPB Contractors. 2021 – 2022.
- Environmental Services for Point Wilson Explosives Area Waterside Infrastructure Remediation Project. CPB Contractors. 2021 – ongoing.
- Vegetation Monitoring for RAAF Williams Base, Point Cook Restoration Project. Broadspectrum. 2020 – 2021.
- Land Rehabilitation Works for HMAS Cerberus. Broadspectrum.2018.
- Land Rehabilitation Works for RAAF Williams Base, Laverton. Broadspectrum. 2018.

SUSTAINABILITY/ PLANNING PROJECTS

- Eco-1 ISC Credit Sustainability Review for Lathams Road Upgrade, VIC. Winslow Infrastructure.
- Eco-1 ISC Credit Sustainability Review for Sunbury Road Upgrade, VIC. Winslow Infrastructure.
- Annual Environmental Report and Annual Safety and Integrity Compliance Report for Air Liquide, Victoria
- Environmental Planning for River of Life Masterplan and Detailed Design, Kuala Lumpur, Malaysia.
- Initial Environmental Evaluation for a Masterplanning Project, Myanmar
- Environmental Planning for Napsan Resort Development, Philippines
- Post-development Biodiversity Impact Assessment of CleanTech Park, Singapore
- Carbon Footprint of Airport Fixed Ground Services, Singapore
- Feasibility Study for Waste-to-Energy Facility, Malaysia
- Global Best Practice in Urban Development, Japan
- Corporate Social Responsibility Initiatives for Johor Ramsar Wetlands, Malaysia
- Feasibility Study for the Pulau Ubin Clean and Renewable Energy Test-Bedding, Singapore
- Environmental Planning for Sentul Nirwana Masterplan, Indonesia
- WSUD Project for Sungei Tampines and Sungei Api Api, Singapore
- Sustainable Development Framework, Planning & Design for Marina Bay, Singapore