Kambala Sports Wellbeing and Senior Learning Precinct Biodiversity Development Assessment Report

Carmichael Tompkins Property Group Pty Ltd

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Template 2.8.1

Executive Summary

Eco Logical Australia Pty Ltd was engaged by Carmichael Tompkins Property Group on behalf of Kambala School to prepare a Biodiversity Development Assessment Report (BDAR) for the proposed Kambala Sports, Wellbeing and Senior Learning Precinct (KSWSLP). The Kambala School propose to redevelop the existing sporting facilities to provide modern sports fields, courts and additional sporting facilities.

Kambala School (referred to as 'the development site') is located in Rose Bay within the Woollahra local government area (LGA). The proposed development will be assessed as State Significant Development (SSD) (application number SSD_10385) in accordance with NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The Secretary's Environmental Assessment Requirements (SEARs) have been issued and require the preparation of a BDAR under the NSW *Biodiversity Conservation Act 2016* (BC Act).

This report has been prepared to meet the requirements of the Biodiversity Assessment Method (BAM) established under Section 6.7 of the NSW BC Act 2016. There are proposed to be direct impacts on the biodiversity values within the development site, which follow the avoid and minimise process in accordance with the BAM. The residual impacts were calculated using the BAM Credit Calculator (BAMC). Requirements of the Woollahra *Local Environment Plan 2014* (LEP) and *Development Control Plan 2015* (DCP) have also been addressed in this document.

The vegetation within the development site is highly disturbed with scattered planting of mature native species which have been incorporated into horticultural landscaped gardens (0.13 ha). In accordance with the BAM, all vegetation native to NSW must be assigned a Plant Community Type (PCT). Where native vegetation has been planted and does not clearly confirm to any PCT, a 'best-fit' PCT must be assigned. Based on the Office of Environment and Heritage (OEH 2016) mapping, soil profile and field validation of remnant vegetation retained within the development site, it was determined that the planted native vegetation conforms to *PCT 1778 Coastal sandstone foreshores forest_Planted*. The vegetation does not correspond to a threatened ecological community (TEC) under the NSW BC Act or Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act).

No threatened flora or fauna species were recorded within the development site. There is potential that highly mobile threatened species such as *Pteropus poliocephalus* (Grey-headed Flying-fox) may utilise the vegetation for foraging resources on occasion. Consideration has been given to these highly mobile species during the preparation of this BDAR.

Measures taken to avoid, minimise and mitigate impacts to the vegetation and species habitat present within the development site and methodologies to minimise impacts during construction and operation of the development have been included in this BDAR.

Following consideration of all the above aspects, the residual unavoidable impacts of the project were calculated in accordance with the BAM by utilising the BAMC. Under the BAM, **one (1)** ecosystem credits are required to offset the impact to 0.09 ha of *PCT 1778_planted.*

Veg zone	PCT #	PCT name	Vegetation integrity score	Trading Group	Impact (ha)	Credits required
1	1778	*Coastal sandstone foreshores forest*	25.5	Sydney Coastal Dry Sclerophyll Forest ≥ 90% cleared group (including Tier 2 or higher)	0.09	1

One Matter of National Environmental Significance (MNES) was identified as having potential to be adversely affected by the proposed works. *Pteropus poliocephalus* (Grey-headed Flying-fox) is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and it is considered that this species is likely to use some of the development site for foraging. An assessment of the Commonwealth Significant Impact Criteria was undertaken for the Grey-headed Flying-fox and concluded that the project is unlikely to have a significant impact on this species. As such, a referral to the Commonwealth is not recommended.

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
DCP	Development Control Plan
DoEE	Commonwealth Department of Environment and Energy
DPIE	NSW Department of Planning, Industry and Environment (previously known as NSW Department of Planning and Environment, DPE)
DPE	NSW Department of Planning and Environment (now known as DPIE)
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FM Act	NSW Fisheries Management Act 1994
GIS	Geographic Information System
GHFF	Grey-headed Flying-fox
GPS	Global Positioning System
HBT	Hollow-bearing tree
IBRA	Interim Biogeographic Regionalisation for Australia
KSWSLP	Kambala Sports, Wellbeing and Senior learning precinct
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Service
MNES	Matters of National Environmental Significance
NSW	New South Wales
OEH	NSW Office of Environment and Heritage (now part of DPIE)
PCT	Plant Community Type
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SMCMA	Sydney Metropolitan Catchment Management Authority
SSD	State Significant Development
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WM Act	NSW Water Management Act 2000

1. Project description provided by Ethos Urban

1.1 Introduction

This report supports a State Significant Development (SSD)application submitted to the Department of Planning, Infrastructure and Environment (DPIE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for the proposed redevelopment of the sports precinct of Kambala School at 794 -796 New South Head Road, Rose Bay.

This application is SSD by way of clause 8 and schedule 1 under *State Environmental Planning Policy (State and Regional Development) 2011* on the basis that the development is for the purpose of an existing school and has a Capital Investment Value of more than $20 million.

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements issued for the project by DPIE, ref no SSD-10385 issued on 24 November 2019.

1.1.1 Response to SEARs

Table 1: BDARs response to SEARs – Section 18 Biodiversity Assessment

SEARs requirements	Addressed in BDAR
Biodiversity impacts related to the proposed development (SSD 10385) are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), *Biodiversity Conservation Regulation 2017* (s6.8) and Biodiversity Assessment Method.	This BDAR reports assesses the biodiversity impacts and has been prepared in accordance with the BC Act, Biodiversity Conservation Regulation 2017 and BAM.
The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.	Avoiding impacts is addressed in Section 3.1 Direct impacts are addressed in Section 3.2. An assessment to determine if there were Prescribed Impacts was conducted in Section 3.1.3 and assessed in Section 3.2.4.
The BDAR must include details of the measures proposed to address the offset obligation as follows: • the total number and classes of biodiversity credits required to be retired for the development/project • the number and classes of like-for-like biodiversity credits proposed to be retired • the number and classes of biodiversity credits proposed to be retired in accordance with the variation rules • any proposal to fund a biodiversity conservation action • any proposal to make a payment to the Biodiversity Conservation Fund.	The BDAR has provided the total number of ecosystem credits required, like-for-like options and trading group in Section 3.5.5 (see Table 28).
If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.	The SSD has not requested approval to use the variation rules.
The BDAR must be submitted with all spatial data associated with the survey and assessment as per the BAM.	Spatial data will be submitted with the BDAR and uploaded into the BOAMs.

SEARs requirements	Addressed in BDAR
The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the Biodiversity Conservation Act 2016.	This BDAR has been prepared by an accredited person under the BC Act and peer reviewed by an accredited person as stated in Section 2 of this BDAR.
Where a Biodiversity Assessment Report is not required, engage a suitably qualified person to assess and document the flora and fauna impacts related to the proposal.	A BDAR is required for State Significant Developments which impact upon biodiversity values.

1.2 Background

1.2.1 Need for a Campus Masterplan

Kambala is an independent day and boarding school for girls up to 18 years. Kambala also has an early learning centre catering for approximately 70 girls and boys aged between 6 months and 4 years. The school was established in the late 1800s and moved to the current campus in 1913. The campus has evolved in an organic and ad-hoc manner over the last 100 years as the school and its demands have grown.

A new campus-wide planning approach offers the opportunity to strategically plan for the future in a sustainable and effective manner and to preserve the unique aesthetic and heritage qualities of the campus. The preparation of a campus-wide planning approach is also consistent with the School's 2019 – 2023 Strategic Plan which identified the need for a broader strategic plan to coordinate renewal and development in a feasible and staged manner.

1.3 The Site

Kambala is located at 794 -796 New South Head Road, Rose Bay and is within the Woollahra Council local government area (LGA). Situated in the eastern suburbs of Sydney, the School is approximately 8 km east of the Sydney CBD. The School is located on New South Head Road which is a classified road connecting the City with the eastern beaches. The School is surrounded by predominantly residential uses.

The campus is bound by New South Head (to the east), Bayview Hill Road (to the north) and Tivoli Avenue (to the west). Fernbank Boarding House is located at 1A -3 Bayview Hill Road opposite the Kambala School grounds. No works are proposed to this part of the campus in this DA. The locational context of the School is illustrated at Figure 1. Figure 2 provides an aerial map of the School and its immediate surrounds.

The School campus slopes down from New South Head Road in the east to the west and comprises a series of existing buildings in the western part of the campus that range in height and age. The south western and north western part of the campus accommodates much of the school's existing built form, while the eastern part has the school's sporting fields and courts.

The Kambala School building known as Tivoli House is in the heart of the campus. The house, its interiors, gateposts, gates and flanking walls with railing facing Tivoli Avenue, as well as 2 Norfolk Island Pines are listed as a heritage item in Woollahra Local Environmental Plan 2014 (WLEP 2014).

Within the School campus, the site of this SSDA is illustrated in Figure 3. The site proposed for new buildings is on top of the existing sports field and music building, as shown in green. The site proposed for demolition works and associated façade redevelopment and landscaping works is shown in red and is limited to a portion of the existing Hawthorne Building and the Arts building. The site of new landscape works is shown in yellow and includes all external spaces connecting these works. It is anticipated that the construction works will be staged, so the construction site for any given stage will be smaller than the overall site identified in Figure 3. The four key main buildings proposed at identified in Figure 3.

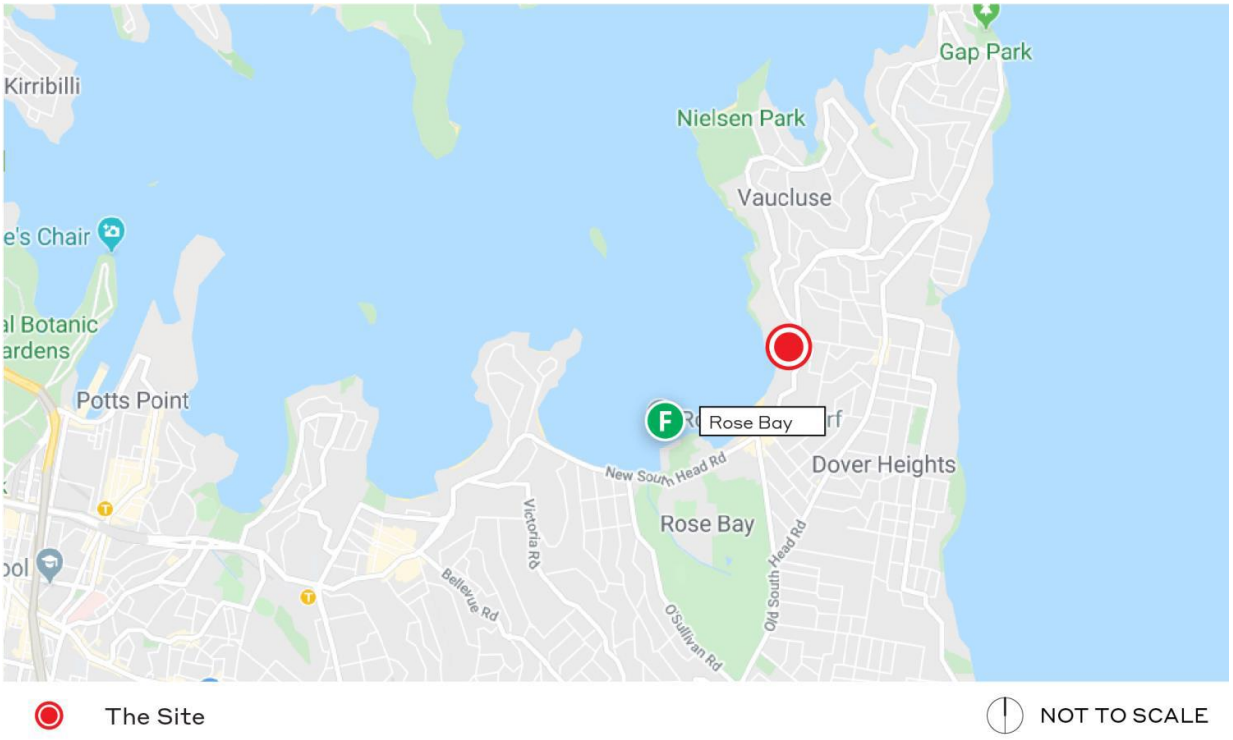

Figure 1: Kambala School Location Context Plan Source: Ethos Urban

Figure 2: Aerial Map of the Kambala Campus *Source: Near Map*

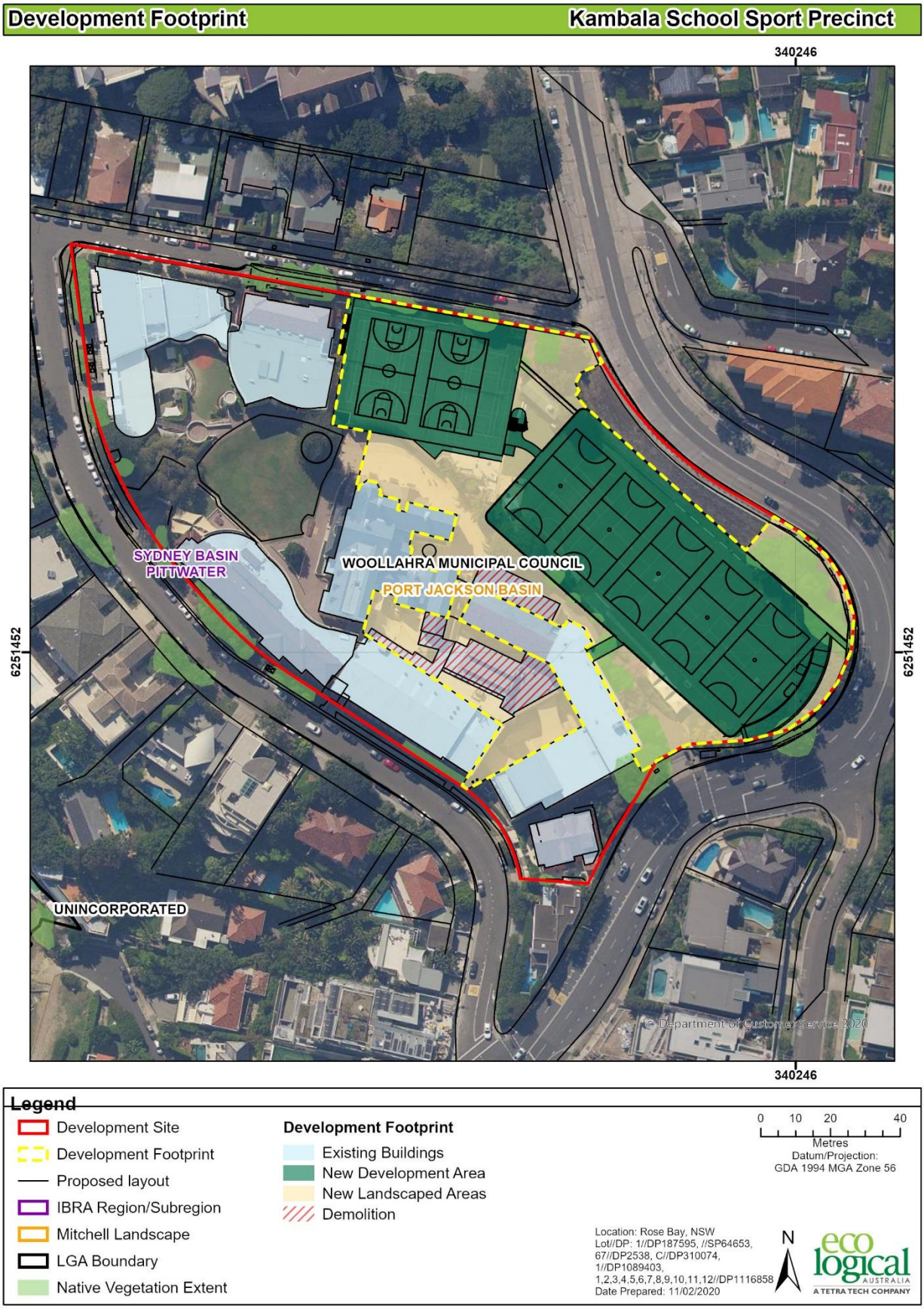

Figure 3: Development footprint

1.3.1 Legal Description and Ownership

The campus comprises several allotments, the legal descriptions of which are provided in Table 2 below. The existing campus has a site area of approximately 22,511m^2.

Table 2: Legal description

Address	Lot	Plan
794-796 New South Head Road	Lo 67	DP 2538
	Lot C	DP 210074
	Lot 1	DP 1089403
3 Tivoli Avenue	Null	SP 64653
3 Bayview Hill Road	Lot 1	DP 175832
1A Bayview Hill Road	Lot 45	DP 2538
1 Bayview Hill Road	Lot 46	DP 2538

1.4 Overview of proposed development

This SSD includes detailed plans for a new sport, wellbeing and senior learning precinct. Accordingly, consent is sought for the following:

- The excavation of part of the existing sports field to facilitate the construction of the following:
  - sports facilities including weights room and dance rooms;
  - indoor multipurpose sports courts for use by up to 1500 people;
  - innovative and flexible teaching and learning spaces;
  - amenities, store rooms, plant, circulation and ancillary spaces
  - reinstatement of the sports field surface on the roof (sports field and perimeter fencing)
  - spectator seating / bleachers.
- The removal of the tennis courts (currently on the roof of the music building), and the construction of the following:
  - a wellbeing centre, called the SHINE centre, to accommodate the Kambala SHINE program
  - a new staff centre, called the KITE centre, to accommodate staff workstations, meeting areas and amenities
  - reinstatement of the tennis courts, lighting and perimeter fencing on the new roof.
- a new eastern forecourt for the school, new external landscaped areas and new courtyards;
- minor works to the existing music building to facilitate a new connection to the new courtyard;
- the partial demolition of the Hawthorne building and the construction of a new façade, roof and landscaping; and
- the demolition of the Arts building and the construction of new facades to adjacent affected buildings, and new landscaping to the footprint of the demolished building.

2. Stage 1: Biodiversity assessment

2.1 Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Belinda Failes (BAAS18159), who is an Accredited Person under the NSW *Biodiversity Conservation Act 2016* (BC Act). A peer review has been undertaken by Nicole McVicar (BAAS18077) who is also an accredited person under the BC Act.

A list of definitions used in this report is provided in Appendix A.

2.1.1 General description of the development site

The development site is located at 794-796 New South Head Road, Rose Bay, is approximately 2.27 ha in size and zoned SP2 Infrastructure under the Woollahra *Local Environmental Plan 2014* (LEP).The development site has been subject to considerable vegetation disturbance as a result of historical disturbance. The development is bound by New South Head Road to the east and residential development to the north, south and west. Rose Bay within Sydney Harbour is located approximately 100 m directly west of the development site. Hermitage Foreshores Walk includes a vegetative corridor which extends along the foreshores north to Nielsen Park.

Vegetation within the development site consists of planted native species, horticultural plantings and opportunistic weeds. Open sporting fields and landscaped gardens are subject to regular garden maintenance activities.

The general description of the development site is displayed in the following maps:

- Site Map (Figure 4)
- Location Map (Figure 5).

2.1.2 Development site footprint

The proposed development (referred to as “the development footprint”) is located within the central and north-eastern portion of the development site and is provided in Figure 4. Scattered planted canopy trees and some landscaped gardens will be impacted or removed to accommodate the new development. Some trimming of canopy trees and landscaping works are also required and have been included in the development footprint.

2.1.3 Sources of information used

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

- BioNet Vegetation Classification System
- BioNet / Atlas of NSW Wildlife 5 km database search (Department of Planning, Industry and Environment (DPIE) January 2020a)
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act Protected Matters Search Tool 5 km database search (Department of Environment and Energy (DoEE) January 2020a)
- The Native Vegetation of the Sydney Metropolitan Area (Office of Environment and Heritage (OEH) 2016)

- Threatened Biodiversity Data Collection
- Biodiversity values map and threshold tool (online) (DPIE January 31 2020b)
- Aerial mapping (SixMaps)
- Additional Geographic Information System (GIS) datasets including soil, topography, geology and drainage
- Request for Secretary's Environmental Assessment Requirements (SEARS)(Ethos Urban 2019)
- Arboricultural Impact Assessment (ArborLogix 2020).

Figure 4: Site Map

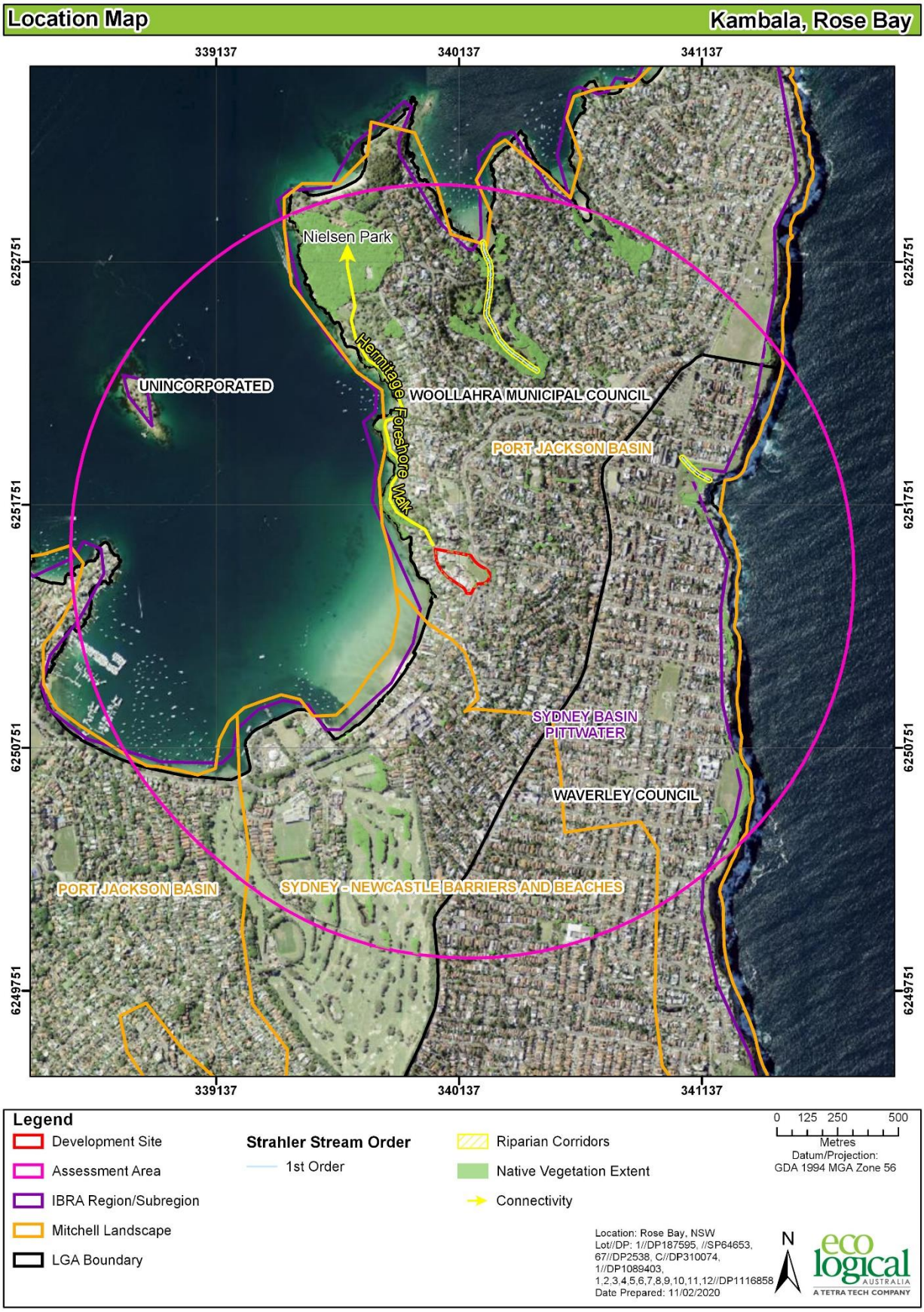

Figure 5: Location Map

2.2 Legislative context

Table 3: Legislative context

Name	Relevance to the project	Report Section
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Matters of National Environmental Significance (MNES) have been identified on or near the development site. An assessment under the Commonwealth Significant Impact Criteria has been undertaken for *Pteropus poliocephalus* (Grey-headed – Flying-fox) and it was determined that there is unlikely to be a significant impact as a result of the proposed development. This report does not require further assessment to MNES under the EPBC Act.	3.6.1
State		
Environmental Planning and Assessment Act 1979 (EP&A Act)	The proposed development is State Significant Development (SSD-10385) and is to be assessed under Part 4.1 (or 5.1) of the EP&A Act. Secretary's Environmental Assessment Requirements have been issued and require a Biodiversity Assessment as per Table 1.	All
Biodiversity Conservation Act 2016 (BC Act)	The proposed development requires submission of a BDAR (i.e. this report) under the BC Act.	All
Fisheries Management Act 1994 (FM Act)	The development does not involve impacts to Key Fish Habitat, does not involve harm to marine vegetation, dredging, reclamation or obstruction of fish passage. A permit or consultation under the FM Act is not required.	N/A
Local land Services Amendment Act 2016 (LLS Act)	The LLS Act does not apply to this development.	N/A
Water Management Act 2000 (WM Act)	The project does not involve works on waterfront land. A Controlled Activity Approval under s91 of the WM Act is not required.	N/A
Planning Instruments		
State Environmental Planning Policy (SEPP) (Vegetation in Non-Rural Areas) 2017	The Vegetation SEPP applies to development that does not require consent. As this project requires consent under the EP&A Act the Vegetation SEPP is not relevant.	N/A
State Environmental Planning Policy (SEPP) – (Coastal Management) 2018	The proposed development is not located on land subject to SEPP coastal management.	N/A
SEPP (Vegetation in Non-Rural Areas) 2017	This SEPP applies to development that does not require development consent. As this project requires consent under the EP&A Act, the Vegetation SEPP is not relevant.	N/A
SEPP No. 19 Bushland in Urban Areas	This SEPP does not apply to the development as the vegetation within the development site does not include remnant vegetation which requires protection under the SEPP. Nor does it contain rare or endangered flora and fauna species, or drainage lines. The development does not conflict with the aims of the SEPP No. 19	N/A
State Environmental Planning Policy (Koala Habitat Protection) 2019 (Koala Habitat Protection SEPP) (effective 1 March 2020)	This SEPP and the accompanying Koala Habitat Protection Guideline does not apply to land within the Woollahra LGA.	N/A

Name	Relevance to the project	Report Section

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005	The Sydney Regional Environmental Plan covers all the waterways of the Harbour, the foreshores and entire catchment. It establishes planning principles to be used by councils for planning instruments.
	The aim of the Plan is to protect the Sydney Harbour Catchment:
	• To ensure that the catchment, foreshores, waterways and islands of Sydney Harbour are recognised, protected, enhanced and maintained:
	  ○ as an outstanding natural asset, and
	  ○ as a public asset of national and heritage significance,
	  ○ for existing and future generations,
	• to ensure a healthy, sustainable environment on land and water,
	• to achieve a high quality and ecologically sustainable urban environment,
	• to ensure a prosperous working harbour and an effective transport corridor,
	• to encourage a culturally rich and vibrant place for people,
	• to ensure accessibility to and along Sydney Harbour and its foreshores,
	• to ensure the protection, maintenance and rehabilitation of watercourses, wetlands, riparian lands, remnant vegetation and ecological connectivity,
	• to provide a consolidated, simplified and updated legislative framework for future planning.
	The development site is located within the Sydney Harbour Catchment boundary due to its location adjacent to mapped areas of Wetlands Protection Areas.
		Section 3.6.2

Woollahra Local Environment Plan 2014 (LEP)	The development site is zoned SP2 Infrastructure under the Woollahra LEP. The development site is not subject Biodiversity or Riparian overlay under the LEP. The development site contains class 5 Acid Sulfate Soils and requires the implementation of a acid sulfate soils management plan.	Section 3.6.3
Draft Woollahra Development Control Plan (DCP) 2015	The development site is located on land mapped under the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 and therefore the DCP does not apply. The Draft Woollahra DCP does not contain any additional provisions relating to the development site.	N/A

2.3 Landscape features

2.3.1 IBRA regions and subregions

The development site falls within the Sydney Basin IBRA region and Pittwater subregion.

2.3.2 Mitchell Landscapes

The development site falls within the Port Jackson Basin Mitchell Landscapes as outlined in Table 4 (DECC 2002).

Table 4: Mitchell Landscapes

Mitchell landscape	Description	Area within development site (ha)
Port Jackson Basin	A diverse landscape of steep cliffs on Triassic quartz sandstone to beaches, estuaries and headlands of tributaries. General elevation from 0 to 80m and relief from 10 to 50m. Sandstone slopes and cliffs which supports forests	2.27 ha

Mitchell landscape	Description	Area within development site (ha)
	and woodlands dominated by *Eucalyptus piperita* (Sydney Peppermint), *Angophora costata* (Smooth-barked Apple) and sheltered gullies dominated by *Syncarpia glomulifera* (Turpentine).	

2.3.3 Rivers and streams

The development site does not contain any rivers or streams. Rose Bay is located within Sydney Harbour and has been included within the assessment area. Sydney Harbour is an open waterbody which is located approximately 100 m from the development site.

2.3.4 Wetlands

The development site does not contain any wetlands.

2.3.5 Connectivity features

The development site contains the connectivity features outlined in Table 5 and shown in Figure 5. Limited contiguous connections are present within the development site. A sporting field and steep concrete embankment is likely to prevent connectivity between patches of vegetation within the development footprint.

Scattered canopy vegetation provides a 'stepping-stone' corridor for highly mobile species across Kambala school and into Hermitage Foreshores Walk which lies directly west of the development site. The Hermitage Foreshores Walk contains a linear patch of vegetation between the foreshores of Rose Bay and residential development. The vegetation provides a connectivity link which extends northwards to Nielsen Park. Nielsen Park contains a small patch of core bushland. Connectivity does not extend beyond Nielsen Park.

Table 5: Connectivity features

Connectivity feature name	Feature type
Hermitage Foreshores Walk Vaucluse	Connectivity link
Nielsen Park	Core bushland

2.3.6 Areas of geological significance and soil hazard features

The development site does not contain areas of geological significance.

The development site is mapped as having Class 5 Acid Sulfate Soils. Acid sulfate soils are listed as soil hazard features.

2.3.7 Site context

2.3.7.1 *Method applied*

The site based method has been applied to this development.

2.3.7.2 *Percent native vegetation cover in the landscape*

The current percent native vegetation cover in the landscape was assessed in a Geographic Information System (GIS) using aerial imagery sourced from NearMap, using increments of 5%. The percent native vegetation cover within the 1,500 m buffer area (803 ha) is 4% (29.13 ha). This area was calculated using the existing Environment and Heritage (OEH) 2016 vegetation datasets. Native vegetation for the purpose of this step has included native/exotic urban vegetation but did not include weeds or urban exotic/native vegetation.

2.3.7.3 *Patch size*

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the development site. The patch size area is 24 ha. The patch size has included larger areas of Urban Exotic/Native vegetation as mapped by OEH (2016) including within the Woollahra Golf Course and vegetation directly north of the development site which could be verified from aerial photos or were validated during the field survey as native vegetation. Additionally, mapping of seagrass or small patches of unvalidated Urban Exotic/Native vegetation was not used in the percentage of native cover.

2.4 Native vegetation

2.4.1 Survey effort

The vegetation assessment was conducted on 31 January 2020 to identify the vegetation type and condition of the vegetation community within the development site (Figure 6). One full-floristic vegetation plot was surveyed to identify plant community types (PCTs) and threatened ecological communities (TECs) on the development site. A total of one vegetation integrity plot was undertaken on the development site in accordance with the BAM (Table 6) (Figure 7). A summary table of the extent of each PCT recorded within the development site and the amount of each PCT impacted is provided in Table 7. A modified version of the BAM integrity plot was undertaken to account for the narrow linear vegetation zone. The integrity plot was modified into a 10 m x 40 m plot and 10 m x 100 m transect configuration. Additionally, the transect was dissected to exclude the driveway due to its lack of biodiversity values. All field data collected including full-floristic and vegetation integrity plots are included in Appendix B.

The site visit also involved an assessment of habitat features, including hollow-bearing trees (HBTs), threatened species foraging resources and gaps in roof cavities suitable for threatened microchiropteran (microbat) species.

Table 6: Full-floristic and vegetation integrity plots

Veg Zone	PCT ID	PCT Name	Ancillary code	Condition	Total area (ha)	Plots required	Plots surveyed
1	1778	Coastal sandstone foreshores forest	Planted	Low	0.13	1	1

Table 7: Summary of the PCT in the development site and the extent of impacts and vegetation to be retained

PCT and Veg Zone	Impacted	Retained	TOTAL
PCT 1778*	0.09*	0.04	0.13
Exotic	0.10	0.09	0.19
Cleared**	0.92	1.03	1.95
TOTAL	1.11	1.16	2.27

* IMPACTED PCT 1778 INCLUDES DIRECT IMPACT FOR TREE REMOVAL AND INDIRECT IMPACT FOR TRIMMING AND LANDSCAPING (MORE INFORMATION IN SECTION 3.2.1)
** CLEARED AREAS INCLUDES BUILT ENVIRONMENTS AND SPORTING FIELDS

2.4.2 Plant Community Types present

The field survey confirmed that the vegetation within the development site has been cleared of remnant vegetation and re-established through landscaped plantings which includes native and exotic vegetation. The development site contains planted native canopy, shrubs and occasionally ground cover species which are native to NSW, however, not considered remnant vegetation. Under the BAM all vegetation native to NSW requires consideration as to the 'best fit' PCT. Based on the soil landscape, elevation and remnant vegetation located adjacent to the development site, it was determined that the best fit PCT for planted native vegetation was *PCT 1778 Coastal sandstone foreshores forest* (Table 8, Photo 1 and Figure 6). The development site does not contain any listed TECs under the BC or EPBC Act.

Justifications are provided below.

Table 8: Plant Community Type within the development site

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area (ha)	Percent cleared
1778	Coastal Sandstone Foreshores Forest	Sydney Coastal Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrubby sub-formation)	0.13	90

2.4.2.1 *PCT selection justification*

One planted PCT was recorded within the development site: *PCT 1778_Coastal Sandstone Foreshores Forest_planted*.

A desktop database assessment and site inspection did not record remnant vegetation within the development site.

Aerial photography interpretation of 1943 imagery identified that the development site has been substantially modified and does not contain remnant vegetation within the development site. Additionally, the 1943 imagery also indicated a substantial high-density residential development within the broader landscape surrounding the development site.

The desktop assessment identified one possible remnant patch of PCT 1778 located within 150 m north-west of the development site. It is likely that the development site would have had similar vegetation as the remnant patch prior to European settlement. Additionally, the development site shares a similar location in the landscape, connectivity and same soil types to the remnant patch.

The field survey confirmed that the vegetation within the development site has been planted and does not contain remnant vegetation. The vegetation within the development site contains a cluster of planted native species including canopy, shrubs and ground cover species within horticultural gardens. Taller native planted canopy species have been planted for stabilisation along the northern and eastern perimeter of the development site. Due to the planted nature of the vegetation within the development site, the vegetation is considered a modified form of PCT 1778 (i.e. planted) (see Photo 1).

A large stand of mixed native canopy species, occasional shrubs and predominately exotic ground cover species were recorded within the embankment which overlooks the existing sporting fields in the north-eastern corner of the development footprint. Canopy species include representative species of PCT 1778 such as *Glochidion ferdinandi* (Cheese Tree), *Angophora costata* (Sydney Red Gum) and *Eucalyptus botryoides* (Bangalay) and non-locally indigenous native species such as *E. saligna* (Sydney Blue Gum) *Toona ciliata* (Red Cedar) and *Araucaria heterophylla* (Norfolk Island Pine). Although these species are characteristic of PCT 1778, these species have been established through revegetation works along the embankment. The soil profile has been substantially modified and does not contain natural substrate. Additionally, the soil is unlikely to contain native seed bank.

Planted native canopy species have also been incorporated into raised garden beds including planted *Melaleuca styphelioides* (Prickly-leaved Tea Tree), *Archontophoenix cunninghamiana* (Bangalow Palm) and *Callistemon viminalis* (Weeping Bottlebrush) were located along the middle access driveway within the development footprint.

Exotic species were also represented within the embankment and within landscaped gardens throughout the development site, these include; *Quercus robur* (English Oak), *Jacaranda mimosifolia* (Jacaranda), *Ulmus parvifolia* (Chinese Elm), *Syagrus romanzoffiana* (Cocos Palms) and *Robinia pseudoacacia*.

Given that the development site does not contain remnant vegetation and contains planted native and exotic species, a quantitative analysis of the plot data cannot be used to determine the PCT. The PCT 1778 was selected based on remnant vegetation identified from desktop assessment and its location within the landscape. Native horticultural species have been planted which contain representative species of PCT 1778, however these are not considered remnant.

Table 9: PCT selection justification

PCT ID	PCT Name	Selection criteria	Justification
1778	*Coastal sandstone foreshores forest*	IBRA region, subregion, Mitchell landscape and planting of canopy and mid storey species *Eucalyptus botryoides*, *Angophora costata*, *Banksia integrifolia, Glochidion ferdinandi, Pittosporum undulatum* and *Elaeocarpus reticulatus*	This PCT has been accepted as the best fit PCT for planted native vegetation located in the development site based on the comparison of dominant canopy species between the VIS description and Mitchell Landscape description.

2.4.2.2 *Threatened Ecological Communities Justifications*

PCT 1778 is not listed as part of a threatened ecological community (TEC). There are no TECs located within the development site.

2.4.3 Vegetation integrity assessment

A vegetation integrity assessment using the Credit Calculator (BAMC) was undertaken and the results are outlined in Table 10.

Table 10: Vegetation integrity

Veg Zone	PCT ID	Condition	Impact area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
1	1778	Planted	0.09*	15.4	30.3	35.6	25.5

*IMPACTED PCT 1778 INCLUDES DIRECT IMPACT FOR TREE REMOVAL AND INDIRECT IMPACT FOR TRIMING OR LANDSCAPING (MORE INFORMATION IN SECTION 3.2.1)

Photo 1: Example of PCT 1778_planted with native planted canopy species and exotic ground cover on steep embankment within development footprint

Photo 2: Example of exotic vegetation on embankment to be impacted by the development footprint

Photo 3: Existing playing fields to be upgraded under the proposed works

Photo 4: Example of planted native and exotic vegetation to be impacted within the development footprint

Figure 6: Plant Community Types and native vegetation extent

Figure 7: Plot location, vegetation zones and habitat feature

2.5 Threatened species

2.5.1 Ecosystem credit species

Ecosystem credit species predicted to occur at the development site, their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 11.

Ecosystem credit species which have been excluded from the assessment and relevant justifications are also included in Table 11. An additional species was entered into the BAMC, *Ninox strenua* (Powerful Owl). This species was not listed as a candidate ecosystem credit species associated with the PCT 1778. However, there are 56 records for this species including a recent record from 2017 within the Woollahra Golf Course (600 m south-west) of the development site. Therefore, it was determined that this species should be considered a candidate for predicted ecosystem credit species.

Table 11: Predicted ecosystem credit species

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Anthochaera phrygia	Regent Honeyeater (Foraging)	N/A	High	CE	CE	Excluded Habitat features for this species are not present at this site. The development site does not comprise of key plant species required for foraging. There is only one historic BioNet record for this species from 1932 within a 5 km radius of the development site.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	N/A	Moderate	V	Not listed	Excluded No suitable vegetation to provide foraging/shelter/breeding habitat recorded within the development site. There are no BioNet records for this species.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Calyptorhynchus lathami	Glossy Black-Cockatoo (Foraging)	N/A	High	V	Not Listed	Excluded Habitat present is substantially degraded such that this species is unlikely to utilise the development site. The development site was not considered suitable due to disturbance and insufficient presence of foraging or sheltering habitat. There are only two BioNet records for this species within a 5 km radius of the development site.
Dasyurus maculatus	Spotted-tailed Quoll	N/A	High	V	E	Excluded Habitat features for this species are not present within the development site. This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage in. There is only one BioNet record for this species within a 5 km radius of the development site.
Glossopsitta pusilla	Little Lorikeet	N/A	High	V	Not Listed	**Included** Included in this assessment.
Haliaeetus leucogaster	White-bellied Sea-Eagle (foraging)	Waterbodies Within 1 km of a rivers, lakes, large dams or creeks, wetlands	High	V	Not Listed	**Included** Included in this assessment.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Lathamus discolor	Swift Parrot (Foraging)	N/A	Moderate	E	CE	**Included** Although habitat features associated with this species are not well present in the development site, the site may contain marginal foraging habitat for this species. There are no habitat features required for this species such as the favoured feed trees or lerp infestations. There are other feed trees present.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	N/A	High	V	Not Listed	**Included** Included in assessment.
Miniopterus australis	Little Bent-winged Bat (Foraging)	N/A	High	V	Not Listed	**Included** Included in assessment.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Foraging)	N/A	High	V	Not Listed	**Included** Included in assessment.
Ninox strenua	Powerful Owl (Foraging)	N/A	High	V	Not Listed	**Included** This species was entered into the BAMC as a candidate species as there are 56 BioNet records within a 5 km radius of the development site. The Powerful Owl may traverse the development site to utilise habitat in the north and south of the development site. There is potential supplementary foraging provided within the development site.
Pandion cristatus	Eastern Osprey (Foraging)	N/A	Moderate	V	Not Listed	Excluded There are no open water bodies which are utilised as foraging habitat for this species, present in the development site. There are only three BioNet records for this species within a 5 km radius of the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Phascolarctos cinereus	Koala (Foraging)	N/A	High	V	V	Excluded Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Habitat was not considered suitable due to the high disturbance and limited feed trees. There are three BioNet records for this species within a 5 km radius of the development site.
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	N/A	High	V	V	**Included** Included in assessment.

2.6 Species credit species

Species credit species predicted to occur at the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 12. Habitat assessments were undertaken during the field surveys on 31 January 2020 to determine the likelihood of threatened species occurring within the development site on an intermittent or permanent basis.

Habitat assessments involved searches of all possible hollow-bearing trees within the development site, on ground inspection using binoculars of roof cavities for possible entrance for microbats, and evidence of fauna use within the development site such as the presence of scats and markings.

One hollow-bearing tree (HBT) was recorded within the development site. No evidence of microbat occupation, in the form of scats, markings, were observed around the entrances. Three peri-urban bird species were observed foraging in the development site during site inspection, of which Rainbow Lorikeet (*Trichoglossus haematodus*) and *Dacelo novaeguineae* (Laughing Kookaburra) are known to utilise HBTs for nesting. These species are not listed as a threatened species under the BC or EPBC Acts.

The vegetation within the development site contains occasional foraging habitat for urbanised fauna species (birds and arboreal mammals). The vegetation within the development site lacks important habitat features and contains limited connectivity with core bushland. Therefore, fauna species utilising the vegetation on site is restricted to highly mobile species which may utilise urban landscape environments.

Table 12: Candidate species credit species

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Allocasuarina portuensis	Nielsen Park She-Oak	-	High	E	E	Excluded The presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially degraded such that this flora species is unlikely to persist within soil seedbank within the development site. There are 75 BioNet records for this species, these are known to occur in Nielsen Park which is located north of the site and does not include the development site.
Anthochaera phrygia	Regent Honeyeater (Breeding)	N/A	High	CE	CE	Excluded

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site is not located within areas mapped in the BOAMS as Regent Honeyeater important areas (dated 1 July 2020).
Calyptorhynchus lathami	Glossy Black-Cockatoo (Breeding)	N/A	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain larger patches of intact vegetation or trees with large hollows that are suitable for the species to utilise the site.
Eudyptula minor – endangered population	Little Penguin in the Manly Point Area (being the area on and near the shoreline from Cannae Point generally northwards to the intersection of Stuart Street and Oyama Cove Avenue, and extending 100 metres offshore from that shoreline)	N/A	High	Endangered population	Not Listed	Excluded The development area is located outside of geographic distribution for this species.
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	Other Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks,	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain suitable breeding habitat. Little Eagles rarely nest in highly urbanised environments and no nests were observed during field surveys. There are only 13

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		wetlands and coastlines				BioNet records for this species within 5 km of the development site.
Lathamus discolor	Swift Parrot (Important foraging areas)		Moderate	E	CE	Excluded Habitat features associated with this species are not present on the development site. The development site does not contain habitat features required for this species. The development site is not located within mapped important foraging areas for this species (dated 1 July 2020).
Leptospermum deanei	Leptospermum deanei	Waterbodies or within 100m of freshwater or estuarine streams	High	V	V	Excluded The presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially degraded such that this species is unlikely to utilise the development site. There are no BioNet records for this species within a 5 km radius of the development site.
Melaleuca biconvexa	Biconvex Paperbark	-	High	V	V	Excluded The presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially degraded such that this species is unlikely to utilise the development site. There is one BioNet record for this species within a 5 km radius of the development site.
Miniopterus australis	Little Bentwing-bat (Breeding)	Caves Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding	Very High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat (i.e. caves) that is suitable for the species to utilise the site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	Caves Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding	Very High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat such as caves, tunnels, mines or culverts.
Myotis macropus	Southern Myotis	Hollow bearing trees Within 200 m of riparian zone Other Bridges, caves or artificial structures within 200 m of riparian zone	High	V	Not Listed	Excluded Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Habitat is isolated and disturbed with a higher likelihood of this species using adjoining vegetation in better condition. Although the development site is located within 100 m of Rose Bay, the development footprint is located >200 m of Rose Bay. Additionally, the HBT is not considered suitable nesting tree due to the large entrance to the hollow.
Pandion cristatus	Eastern Osprey (Breeding)	Presence of stick-nests in living and dead trees (>15m) or artificial structures within 100m of a floodplain for nesting	Moderate	V	Not Listed	Excluded Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Habitat features for breeding including stick nests were not recorded within the development site.
Perameles nasuta – endangered population	Long-nosed Bandicoot, North Head	South of Addison Rd Manly Headland, including Sydney Harbor NP (north)	High	Endangered population	Not Listed	Excluded The development area is located outside of geographic distribution for this species.
Phascolarctos cinereus	Koala (Breeding)	Other	High	V	V	Excluded

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		Areas identified via survey as important				This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. Habitat present is substantially degraded such that this species is unlikely to utilise the development site for breeding. The development site is not located within areas identified as important habitat for this species.
Pteropus poliocephalus	Grey-headed Flying-fox (Breeding)	Other Breeding camps	High	V	V	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain any breeding sites (i.e. riparian corridors) that are suitable for the species to utilise.

2.6.1 Targeted surveys

Due to the high level of modification of vegetation within the development site and lack of potential habitat, targeted surveys were not conducted for species credit species.

Justification for the exclusion of species credit species is provided above in Table 12.

2.6.2 Use of local data

The use of local data is not proposed.

2.6.3 Expert reports

Expert reports have not been used as part of this BDAR.

3. Stage 2: Impact assessment (biodiversity values)

3.1 Avoiding impacts

3.1.1 Locating a project to avoid and minimise impacts on vegetation and habitat

The development has been located in a way which avoids and minimises impacts as outlined in Table 13.

Table 13: Locating a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed	Justification
Locating the project in areas where there are no biodiversity values	The project (i.e. the proposed development footprint) has utilised existing development areas, cleared lands and planted gardens. The development site does not contain areas with the highest biodiversity values.	The project has utilised the existing sporting grounds and modified areas within existing development site to reduce impacts to areas of high biodiversity values. Some native planted species have been retained within the development site and landscaping works will occur after the completion of the development to replace the loss of vegetation. Additionally, the proposed development has ensured that only one HBT will be impacted.
Locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition	The project has been located to utilise areas where native vegetation and threatened species habitat is in the poorest condition.	The project has been located to utilise areas in the east of the development site comprised of existing sporting fields and open space which represents an impact area of 0.92 ha. A small patch of planted native (0.09ha) and exotic vegetation (0.1 ha) will be impacted for the proposed works. However, this vegetation is in poor condition and does not represent intact native vegetation community. One HBT was recorded within the impact area, however, this hollow does not represent habitat for threatened fauna species.
Locating the project in areas that avoid habitat for species and vegetation in high threat categories (e.g. an EEC or CEEC), indicated by the biodiversity risk weighting for a species	The project has been located to avoid removal of vegetation in high threat categories.	The development site does not contain vegetation in high threat categories (such as TECs). The development site has utilised areas of cleared areas, planted native vegetation or exotic vegetation which is of lower biodiversity value.
Locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained	The project has been located to enable connectivity across the local area.	The project has been located to utilise open spaces where possible. A small amount of vegetation along the eastern boundary will be removed. The remaining vegetation along the eastern boundary will provide a stepping-stone habitat for highly mobile species. This will enable continued connectivity across the landscape for mobile fauna species.

3.1.2 Designing a project to avoid and minimise impacts on vegetation and habitat

The development has been designed in a way which avoids and minimises impacts as outlined in Table 14.

Table 14: Designing a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed	Justification
Reducing the clearing footprint of the project	The project has been designed to reduce the clearing footprint of the project.	The placement of the development site footprint has been strategically designed to reduce the extend of vegetation clearing. The footprint will utilise open space and cleared areas for development. Additionally, the development will involve a multistorey development to reduce the size of the footprint and reduce the extent of clearing of vegetation. .
Locating ancillary facilities in areas where there are no biodiversity values	Ancillary features have been located in areas where there are no biodiversity values.	Ancillary features will be located at the central and north-eastern side of the development site in predominantly cleared or planted vegetation areas with limited biodiversity value. Additionally, temporary ancillary features required during construction (such as stockpiles) will be located in open spaces and will not require the removal of native vegetation or biodiversity values.
Locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower vegetation integrity score)	Ancillary features have been located in areas where native vegetation is in the poorest condition.	Ancillary features will be located at the central and north-eastern portion of the development site in predominantly cleared lands or in areas where native vegetation has been planted.
Locating ancillary facilities in areas that avoid habitat for species and vegetation in high threat status categories (e.g. an EEC or CEEC)	Ancillary features have been located in areas that avoid habitat for species and vegetation in high threat categories.	The development site contains exotic and planted native vegetation which does not support vegetation in high threat categories (e.g. EEC or CEEC). The development site contains cleared lands which will be utilised for temporary ancillary facilities and will not impact upon high threat category vegetation.
Providing structures to enable species and genetic material to move across barriers or hostile gaps	The development has been designed to maintain a vegetated corridor enabling movement of species and genetic material.	The development site has been designed to retain some native vegetation as stepping-stone corridors for highly mobile species. Additionally, landscaping works will be conducted following the completion of works and will include revegetation along the northern boundary to improve connectivity for highly mobile species.
Making provision for the demarcation, ecological restoration, rehabilitation and/or	The majority of the native vegetation in the east of the development site will be	Vegetation to be retained in the development site will be subject to landscaping works following the completion

Approach	How addressed	Justification
ongoing maintenance of retained native vegetation habitat on the development site.	retained and will be subject to landscaping works.	of the project. This may include representative species of PCT 1778.
Efforts to avoid and minimise impacts through design must be documented and justified	The project has been designed to reduce the clearing footprint of the project.	The placement of the development site footprint has been strategically designed to avoid high biodiversity value areas and utilises mainly cleared lands and degraded vegetation.

3.1.3 Prescribed biodiversity impacts

The list of potential prescribed biodiversity impacts as per the BAM is provided below:

- Occurrences of karst, caves, crevices and cliffs - none occur within the development site
- Occurrences of rock - no rock outcrops or scattered rocks occur within the development site
- Occurrences of human made structures and non-native vegetation – **Yes, see below**.
- Hydrological processes that sustain and interact with the rivers, streams and wetlands - none occur within the development site.
- Proposed development for a wind farm and use by species as a flyway or migration route - the project does not involve any wind farm development.

The development site contains vegetation (native and non-native) and human made structures. Additional information regarding consideration of human made structures are provided below. Non-native vegetation was identified and assessed for any potential to provide habitat for threatened flora and fauna species, including presence of HBTs.

Human-made structures were recorded within the development site; one building will be removed and one building will be partially removed by the proposed works in the development footprint.

As the development site is located in a heavily urbanised area, almost the entire development site contains human made structures. Consideration was given during the literature review to buildings or structures that could potentially be utilised as a roosting resource by microbats. Visual surveys were conducted during the field survey to visually determine if the buildings within the development site contain potential openings, possibly utilised by microbats.

Potential threatened microbats surveyed include:

- • *Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat)
- • *Miniopterus australis* (Little Bentwing-bat)
- • *Miniopterus orianae oceanensis* (Large Bent-winged bat).

Existing buildings within the development site did not contain any visible small gaps which may contain potential roost sites for microbats. Additionally, most of the buildings are multi-storey with a corrugated iron flat roof which are not particularly suitable for microbats. However, the presence of roof-roosting microbats within the development footprint cannot be completely disregarded.

One HBT (tree 20 *Quercus robur* – English Oak) contained two hollows which were between 10-20cm wide. This tree was located within the development footprint and will be removed. Due to the size of

the hollow entrances these are not considered suitable for microbat roosting/breeding habitat. No additional hollows were recorded within the development site.

The development site contains a small number exotic and planted native palms *Archontophoenix cunninghamiana* (Bangalow Palm) and *Syagrus romanzoffiana* (Cocos Palm) and nectar producing species which may be utilised on occasion by one threatened fauna species, *Pteropus poliocephalus* (Grey-headed Flying Fox).

The development site has the prescribed biodiversity impacts as outlined in Table 15.

Table 15: Prescribed biodiversity impacts

Prescribed biodiversity impact	Description in relation to the development site	Threatened species or ecological communities effected
Impacts of development on the habitat of threatened species or ecological communities associated with: • karst, caves, crevices, cliffs and other geological features of significance, or • rocks, or • human made structures, or • non-native vegetation	The development site contains non-native vegetation and human made structures. The buildings were inspected during field surveys and do not provide potential microbat roosts. The vegetation within the development site contains fruit bearing and nectar producing non-native vegetation canopy, in landscaped areas which will be removed as part of the project.	Potential human made roosting habitat for threatened microbats: *Saccolaimus flaviventris* (Yellow-bellied Sheath-tail Bat), *Falsistrellus tasmaniensis* (Eastern False Pipistrelle), *Miniopterus australis* (Little Bentwing-bat) and *Miniopterus orianae oceanensis* (Large Bent-winged Bat). The development footprint will result in the clearance of 0.10 ha of non-native vegetation. This may result in a reduction of foraging habitat for threatened microbat species above the canopy of non-native vegetation and reduction of potential foraging for Grey-headed Flying-fox or for prey items of *Ninox strenua* (Powerful Owl).
Impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation	The development site contains nectar producing non-native vegetation canopy, in formal gardens which will be removed as part of the proposed development. The development site contains non-native vegetation for common urban arboreal mammals (possums) which provides foraging opportunities for threatened nocturnal bird species. The development will result in a reduction in the extent of foraging habitat and reduction in availability of their prey items.	Potential foraging habitat for other threatened microbat species above non-native vegetation canopy. Potential foraging habitat for *Pteropus poliocephalus* (Grey-headed Flying Fox (GHFF). Potential foraging habitat for *Ninox strenua* (Powerful Owl).
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	The proposed development will require the removal of non-native vegetation from within the development site. The development will result in a minor reduction in the extent of existing non-native vegetation within the	Reduction in extent of potential foraging habitat for Grey-Headed Flying-Fox. Reduction in extent of potential habitat for Powerful Owl.

Prescribed biodiversity impact	Description in relation to the development site	Threatened species or ecological communities effected
	development site which provides stepping-stone habitat between urban fragmented patches of vegetation.	Reduction in extent of foraging habitat for other threatened microbats.
Impacts of development on movement of threatened species that maintains their lifecycle	The proposed development will result in a reduction of vegetation within the development site and marginal loss of connectivity for mobile threatened species.	Reduction of movement for highly mobile species; Grey-headed Flying-fox, Powerful Owl and microbat species.
Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining)	The proposed works is located upslope of the Rose Bay in Sydney Harbour approximately 200 m away. There is a small chance that the works may result in a decline of water quality and impacts to marine vegetation.	Mitigation measures will be required to prevent sediment or erosion flow into Sydney Harbour from overland flow or into stormwater pipes.

3.1.3.1 *Locating a project to avoid and minimise prescribed biodiversity impacts*

The development has been located in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 16.

Table 16: Locating a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed	Justification
Locating the envelope of surface works to avoid direct impacts on the habitat features	The proposed development does have some direct impact on habitat features found in non-native vegetation and human-made structures. Habitat features impacted include HBTs, and foraging habitat for GHFF, Powerful Owl and threatened microbats.	The development has avoided complete removal of vegetation by designing the development within open cleared areas and utilising multistorey design to reduce the extent of the development footprint. Some vegetation and one HBT will be removed and is unavoidable as part of the works.
Locating the envelope of sub-surface works, both in the horizontal and vertical plane, to avoid and minimise operations beneath the habitat features, e.g. locating long wall panels away from geological features of significance or water dependent plant communities and their supporting aquifers	The development will involve deep construction into the soil horizon which may impact upon these geological features. However, the works will not impact upon water dependent plant communities.	The works do involve excavation of deep underground structures. As such the development may impact upon geological features. The development footprint is located approximately 200 m away from Rose Bay. Sediment and erosion measures are required to prevent impacts to marine environment including marine vegetation.
Locating the project to avoid severing or interfering with corridors connecting different areas of habitat, migratory flight paths to important habitat or preferred local movement pathways	The development will involve the removal of some native and exotic vegetation which forms a connective corridor along the northern and eastern perimeter.	The development site currently contains gaps within the corridors and only provides limited connectivity for highly mobile species. The proposed works are unlikely to result in changes to the connectivity for highly mobile species.

Approach	How addressed	Justification
		The development will result in the removal of some native and exotic vegetation along the eastern and northern perimeter, some connectivity will be retained as stepping-stone habitat for highly mobile species. Landscaping works may assist in connectivity.
Optimising project layout to minimise interactions with threatened and protected species and ecological communities, e.g. designing turbine layout to allow buffers around features that attract and support aerial species, such as forest edges, riparian corridors and wetlands, ridgetops and gullies	The development has been strategically placed to avoid impacts to areas of high biodiversity value.	The development has utilised the central and north-eastern portion of the development footprint which includes cleared lands and vegetation of low biodiversity values.
Locating the project to avoid direct impacts on water bodies	The development has been strategically placed to avoid impacts to water bodies	There are no defined waterbodies within the development site. The development footprint is located 200 m of Rose Bay within Sydney Harbour. Mitigation measures are required to prevent sediment and erosion control flow into Sydney Harbour.

3.1.3.2 *Designing a project to avoid and minimise prescribed biodiversity impacts*

The development has been designed in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 17.

Table 17: Designing a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed	Justification
Engineering solutions, e.g. proven techniques to minimise fracturing of bedrock underlying features of geological significance, water dependent communities and their supporting aquifers; proven engineering solutions to restore connectivity and favoured movement pathways	The development design will involve deep excavation of sandstone bedrock (greater than 5 m deep).	The development will involve deep excavation works of sandstone bedrock There are no known ground water or water dependent communities within the development site. The works are located 200 m from Sydney Harbour which contains water dependent communities. Mitigation measures will be provided to prevent impacts to potential water depended communities.
Design of project elements to minimise interactions with threatened and protected species and ecological communities, e.g. designing turbines to dissuade perching and minimise the diameter of the rotor swept area, designing fencing to prevent animal entry to transport corridors	The development design has utilised areas with minimal impacts to biodiversity values.	The development footprint contains cleared areas and existing built environment. The development site does not contain ecological communities and contains marginal habitat for threatened fauna species.

Approach	How addressed	Justification
Design of the project to maintain environmental processes critical to the formation and persistence of habitat features not associated with native vegetation	The formation of habitat features such as canopy species has been retained within the development site.	Some potential foraging habitat for Grey-headed Flying-fox and microbats will retained within the development site. Additional resources may be reinstated through landscaping works.
Design of the project to maintain hydrological processes that sustain threatened species and TECs	There are no threatened species or TECs which are depended upon hydrological processes recorded within the development site.	There are no hydrological process or threatened species or TECs which are depended upon these processes located within the development site.
Design of the project to avoid and minimise downstream impacts on rivers, wetlands and estuaries by control of the quality of water released from the site.	The project is designed to be located away from Rose Bay within Sydney Harbour and sediment and erosion control plan will be submitted as part of the SSD application.	The development site is located within 100 m of Rose Bay; however, the development footprint is located at the furthest extent of the development site, approximately 200 m away. A sediment and erosion control plan will be implemented to control water quality when release from the site.

3.2 Assessment of Impacts

3.2.1 Direct impacts

The direct impacts of the development on:

- native vegetation is outlined in Table 18
- prescribed biodiversity impacts are outlined in Section 3.2.4

Direct impacts including the final project footprint (construction and operation) are shown on Figure 8.

According to the arborist report, a total of 16 trees/shrubs will be removed including 0.02 ha of vegetation mapped as part of PCT 1778_planted.

The following trees representing PCT 1778_planted will be removed (mapped as 'direct' impacts in Figure 8):

- *Syzygium smithii* (Tree 18a)
- *Glochidion ferdinandi* (Tree 25)
- *Corymbia maculata* (Tree 29)
- *Callistemon sp.* (Tree 8)
- *Archontophoenix cunninghamiana* (Tree 2-4).

An additional 0.07 ha area of 'indirect' impacts have been included as part of the proposed development impacts (Figure 8). The 0.07 ha of indirect impacts have been included as part of the impact assessment of the proposed works due to possible disturbance of the vegetation during landscaping including the removal of the groundcover and shrub layer and potential impacts to canopy during construction (i.e. pruning).

A separate management zone has been included for 0.02 ha of direct removal of PCT 1778_planted vegetation and 0.07 ha for indirect impacts to PCT 1778_planted.

Under the BAMC the impact area is automatically increased from 0.09 ha of impact to 0.10 ha.

Table 18: Direct impacts to 'native vegetation' as defined under the BAM

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1778	Coastal sandstone foreshores forest	Sydney Coastal Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrubby sub-formation)	0.09*

*IMPACTED PCT 1778 INCLUDES 0.02 HA FOR TREE REMOVAL AND 0.07 HA PCT 1178 IMPACTED FOR DEVELOPMENT AND LANDSCAPING

3.2.2 Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 19.

Two management zones were added for PCT 1778 to account for different impacts on vegetation. This includes PCT 1778 where vegetation will be removed and areas where PCT 1778 will be disturbed during the construction works and landscaping. These areas were entered into the BAMC as separate management zones as some of the characteristics of the vegetation zone will remain (i.e. canopy structure). The future integrity score assumes that the canopy will remain (although slight trimming of

branches may occur). Therefore, the species diversity and percent cover will remain, however, ground cover and midstorey will be reduced (see Table 31 in Appendix B).

Table 19: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Management zone	Impact area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	1778	Planted	Direct	0.02	25.5	0	-25.5
1	1778	Planted	Indirect	0.07	25.5	5.5	-20.1

3.2.3 Indirect impacts

The indirect impacts of the development are outlined in Table 20. Indirect impacts are located in the development footprint and have been included as part of the impact assessment as provided in section above and displayed in Figure 8.

The proposed works may indirectly impact upon 0.07 ha of PCT 1778_planted. The indirect impacts include short-term trimming of outer branches of vegetation to accommodate the development. These areas will be revegetated following the construction phase.

No additional indirect area was included as part of this assessment as the works will not indirectly impact upon vegetation outside of the development site.

Table 20: Indirect impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Runoff during construction works	Confined to development site with sediment fencing	During heavy rainfall or storm events	During rainfall events	Short-term impacts
Noise, dust or light spill	Construction	Noise and dust created from machinery (no night works proposed therefore no light spill)	Noise and dust likely to carry beyond development site boundary	Daily, during construction works	Sporadic throughout construction period	Short-term impacts
Inadvertent impacts on adjacent habitat or vegetation	Construction	Damage to adjacent habitat or vegetation	Adjacent vegetation	Daily, during construction works	Throughout construction period	Short-term impacts
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Spread of weed seed or pathogens	Potential for spread into adjacent habitat	Daily, during construction works	Sporadic throughout construction period	Potentially long-term impacts
Vehicle strike	Construction / operation	Potential for native fauna to be struck by working machinery and moving vehicles	Within access road and development site	Daily, during both construction and operational phases.	Throughout life of project	Short-term impacts
Rubbish dumping	Construction / operation	Illegal dumping by local residents/ construction crews	Potential for rubbish to spread via wind into adjacent vegetation	Potential to occur at any time throughout construction or operational phases	Throughout life of project	Short-term impacts
Increase in pest animal populations	Construction / operation	Potential to increase if introduced	In vegetation in the southern portion of the development site	Potential to occur at any time throughout construction or operational phases	Throughout life of project	Short-term impacts

3.2.4 Prescribed biodiversity impacts

An assessment of impacts of the development on prescribed biodiversity impacts is outlined in Table 21 in accordance with Section 9.2.1of the BAM.

Table 21: Direct impacts on prescribed biodiversity impacts

BAM Criteria	Justification
9.2.1.3 The assessment of the impacts of the development on the habitat of threatened species or ecological communities associated with human made structures	
a) identify the human made structures with potential to be habitat for threatened species or ecological communities	The development site is located within a highly urbanised area. The proposed development will involve the removal of a number of existing educational building for redevelopment. A ground inspection of the buildings did not detect potential gaps suitable for microbat access into the roof cavities. No other human made structures with potential habitat for threatened species or ecological communities were identified in the development site.
b) identify the species and ecological communities likely to use the habitat	The following threatened microbat species may utilise buildings as occasional roosting habitat: *Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat) *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) *Miniopterus australis* (Little Bentwing-bat) and *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat). There are BioNet records for these species within a 5 km radius for these species.
c) describe the nature, extent and duration of short and long-term impacts	The impact involves the permanent removal of one building and partial removal of another building. This is considered a long-term impact. Construction works may result in the production of noise and vibration which is considered a short-term impact. These impacts are likely to be minor considering that no roosting habitat was recorded within the development footprint.
d) describe, with reference to relevant literature the importance within the bioregion of the habitat of these species or ecological communities	According to literature documented in Australian Bats (Churchill 2009) the preferred roosting habitat of the following species includes: • Yellow-bellied Sheathtail Bat – this species will utilise tree hollows or buildings in small groups. There is potential that this species may utilise the buildings and tree hollows recorded within the development site. • Eastern False Pipistrelle – this species generally roosts in eucalypt hollows but has been found in buildings • Little Bentwing-bat – this species forms specific maternity roosts in caves. They occasionally utilise buildings in the absence of other alternative roost locations (such as mines, culverts). There is potential that this species may on occasion utilise buildings as an alternative roost location. • Large Bent-winged Bat – this species primarily roosts in caves, however, it occasionally roosts in human made structures such as buildings. There is potential that this species may on occasion utilise buildings as an alternative roost location.

BAM Criteria	Justification
e) predict the consequences of the impacts for the local and bioregional persistence of the suite of threatened species and communities likely to use these areas as habitat, with reference to relevant literature and other published sources of information.	While these species of microbats have been known to utilise human structures for roosting, preferred roosting habitat for these species are non-human made structures (tree hollows or caves). Additionally, only one of the species is likely to utilise buildings more regularly including breeding times, this species is the Yellow-bellied Sheathtail Bat. The other species of microbats may utilise the buildings on occasion while traversing through the landscape or if other alternative roosting resources are not present. It should be noted that the development site provides marginal foraging and alternative roosting habitat in the form of buildings for a number of microbat species. The development site does not contain important habitat for these species. There is potential that the removal of the buildings may impact upon the number of available roosting resources (if the buildings actually contain suitable gaps in the roof cavity) for microbats migrating to breeding or non-breeding habitats such as the two Bentwing species. There is no available literature which has considered the impacts of removal of human made structures on microbat species. The Priority Action Statement for the Yellow-bellied Sheathtail-bat lists several recommended actions for help in the recovery of this species, those pertaining to retention of roosting habitat focus on the retention of large hollow-bearing trees and retention of vegetated areas. The Priority Action Statement for the Little Bentwing Bat and Eastern Bentwing Bat include further investigation of the wintering roosts for these species which includes tree hollows and undertaking restoration activities to create habitat and connectivity in the landscape. There is no mention of the use of buildings for Bentwing Bat species. The habitat within the development site is unlikely to be important for any of these microbat species.
9.2.1.4 The assessment of the impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation	
a) identify the species and ecological communities likely to use the habitat	Several non-native tree species are present in the development site which have been planted within residential gardens or are invasive weeds. Non-native species which have been identified as potential foraging species for Grey-headed Flying fox include Palm species.
(b) describe the nature, extent and duration of short and long-term impact	The proposed development will result in the permanent removal of a small number of non-native trees (listed above) which provide potential foraging habitat for Grey-headed Flying-fox.
(c) describe, with reference to relevant literature and other reliable published sources of information, the importance within the bioregion of the habitat to these species or ecological communities	These non-native foraging species are in relatively low abundance within the development site and most species would provide only small amounts of secondary foraging habitat. Flowering resources in the form of native planted *Eucalyptus, Melaleuca* and *Callistemon* sp. would more likely be utilised for foraging resources by Grey-headed Flying-fox.
(d) predict the consequences of the impacts for the local and bioregional persistence of the suite of threatened species and communities likely to	The consequences of the permanent removal of those species listed above for the local and bioregional persistence of the Grey-headed Flying-fox is predicted to be negligible.

BAM Criteria	Justification
use these areas as habitat, with reference to relevant literature and other published sources of information.	
9.2.1.5 The assessment of the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range must:	
(a) identify the area/s of connectivity joining different areas of habitat that intersect with the subject land and the areas of habitat that are connected according to Paragraph 4.2.1.3	The development site includes predominately disturbed and non-native species. The vegetation within the development site is a relatively small area and disconnected from areas of high biodiversity value. Connectivity across the development site is limited to scattered plantings. Due to the presence of major roads and urbanised landscape only highly mobile species are likely to utilise the vegetation within the development site.
(b) identify the species and ecological communities likely to benefit from the connectivity	The species most likely to utilise the connectivity would be Grey-headed Flying-fox, microbat species and Powerful Owl.
(c) describe the nature, extent and duration of short and long-term impacts	The proposed development will result in the impact to 0.09 ha of PCT 1778_planted native and 0.10 ha of exotic vegetation which forms a stepping-stone corridor for highly mobile species. As some vegetation will be retained, some connectivity will be retained within the development site and in the adjacent broader locality.
(d) describe, with reference to relevant literature and other reliable published sources of information, the importance of the area of connectivity within the bioregion	The connectivity is considered limited except for highly mobile species which easily move across disturbed landscapes. The connecting habitat provides potential foraging habitat for the above listed species, which is part of a fragmented network of urban vegetation within the eastern suburbs. Within the Sydney Basin Bioregion, the impact to 0.09 ha native planted and 0.10 ha of exotic vegetation is considered to provide negligible connectivity on a landscape scale. The removal of connecting habitat would not prevent the highly mobile Grey-headed Flying-fox, Powerful Owl or microbats from moving across the landscape in search of foraging resources. The removal of a small amount of connecting habitat from the development site is unlikely to be of importance to any threatened species within the bioregion considering the availability of connectivity retained within the development site and immediately adjacent to the development site.
(e) predict the consequences of the impacts for the bioregional persistence of the suite of threatened species and communities currently benefitting from the connectivity with reference to relevant literature and other published sources of information and taking into consideration mobility, abundance, range and other relevant life history factors.	The habitat to be removed forms part of a network or stepping stone habitat in the form of canopy and ground layer garden plantings. Only highly mobile species are likely to utilise the stepping-stone vegetation from the development site. Under the proposal, canopy species will be retained within the development site to provide additional connectivity. The proposed development will not result in a loss of connectivity for the highly mobile species likely to utilise it.

3.2.5 Mitigating and managing impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 22.

Table 22: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Protection or displacement of resident fauna	Minor	Negligible	Supervision by a qualified ecologist / licensed wildlife handler during tree removal in accordance with best practice methods.	Relocation of fauna in a sensitive manner	Prior to and during clearing works	Project Manager /ecologist
Installing artificial habitats for fauna in adjacent retained vegetation and habitat or human made structures to replace the habitat resources lost and encourage animals to move from the impacted site, e.g. nest boxes	Minor	Negligible	Any trees removed that have hollows/hollow trunks/fissures should be used as replacement hollows and attached to trees within the within the development site. If it is impractical to use salvaged hollows as replacement tree hollows, compensatory nest boxes should be installed within vegetation to be retained.	Replacement of habitat features removed	Prior to and during clearing works	Project Manager/ Ecologist
Programming construction activities to avoid impacts; for example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting	Minor	Negligible	Timing of vegetation removal (i.e. removal of HBT) should be planned to occur outside of the peak (spring) breeding season.	impacts to fauna during nesting/nursing avoided	During clearing works	Project Manager
Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance	Moderate	Minor	Install tree protection fencing around trees proposed for retention.	Trees to be retained not disturbed/impacted	Prior to any works occurring on site and to remain throughout duration of construction works	Project Manager
Sediment barriers to control the quality of water released from the site into the receiving environment	Minor	Negligible	Appropriate controls will be utilised to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways.	Erosion and sedimentation will be controlled	For the duration of construction works	Project Manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
			Soil and erosion measures such as sediment fencing, clean water diversion must be in place prior the commencement of the construction work.			
Noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise	Minor	Negligible	Considering the highly urbanised nature of the development site, the project is unlikely to result in impacts on wildlife resulting from noise. Daily timing of construction activities is recommended in accordance with Table 1 of Interim Noise Guidelines (2009)	Noise impacts associated with the development will be managed in accordance with guidelines	For the duration of construction works	Project Manager
Adaptive dust monitoring programs to control air quality	Minor	Negligible	Dust suppression measures will be implemented during construction works to limit dust on site. Commence revegetation as soon as practicable to minimise areas likely to create dust.	Mitigate dust created during construction activities	For the duration of construction works	Project Manager
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Moderate	Minor	Vehicles, machinery and building refuse should remain only within the development site and not impinge on the areas of retained native planted vegetation to be retained in the development site.	Spread of weeds prevented	Post-construction	Project Manager
Use of indigenous species from locally occurring plant community for landscape plantings in the development site	Minor	Negligible	No remnant native vegetation is present within the site. Native vegetation present consists of plantings and is in general not representative of an indigenous PCT 1178. It is recommended that landscape plantings be undertaken as part of the development by increasing the presence of locally indigenous species.	Areas within the development site will be landscaped using appropriate species	Throughout construction and following completion of construction activities	Project Manager
Making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the development site	Minor	Negligible	Landscaping in the development site is to use locality derived native species and those found within the PCT 1178 historically represented in the development site.	Areas within the development site will be landscaped using appropriate species	Throughout construction and following completion of construction activities.	Project Manager

3.2.6 Serious and Irreversible Impacts (SAII)

The development does not have any Serious and Irreversible Impacts (SAII). As the development footprint does not impact upon SAII consideration of SAII is not required for this report.

3.3 Risk assessment

A risk assessment has been undertaken for any residual impacts likely to remain after the mitigation measures (Section Table 21) have been applied. Likelihood criteria, consequence criteria and the risk matrix are provided in Table 23, Table 24 and Table 25 respectively.

Table 23: Likelihood criteria

Likelihood criteria	Description
Almost certain (Common)	Will occur, or is of a continuous nature, or the likelihood is unknown. There is likely to be an event at least once a year or greater (up to ten times per year). It often occurs in similar environments. The event is expected to occur in most circumstances.
Likely (Has occurred in recent history)	There is likely to be an event on average every one to five years. Likely to have been a similar incident occurring in similar environments. The event will probably occur in most circumstances.
Possible (Could happen, has occurred in the past, but not common)	The event could occur. There is likely to be an event on average every five to twenty years.
Unlikely (Not likely or uncommon)	The event could occur but is not expected. A rare occurrence (once per one hundred years).
Remote (Rare or practically impossible)	The event may occur only in exceptional circumstances. Very rare occurrence (once per one thousand years). Unlikely that it has occurred elsewhere; and, if it has occurred, it is regarded as unique.

Table 24: Consequence criteria

Consequence category	Description
Critical (Severe, widespread long-term effect)	Destruction of sensitive environmental features. Severe impact on ecosystem. Impacts are irreversible and/or widespread. Regulatory and high-level government intervention/action. Community outrage expected. Prosecution likely.
Major (Wider spread, moderate to long term effect)	Long-term impact of regional significance on sensitive environmental features (e.g. wetlands). Likely to result in regulatory intervention/action. Environmental harm either temporary or permanent, requiring immediate attention. Community outrage possible. Prosecution possible.
Moderate (Localised, short-term to moderate effect)	Short term impact on sensitive environmental features. Triggers regulatory investigation. Significant changes that may be rehabilitated with difficulty. Repeated public concern.
Minor (Localised short-term effect)	Impact on fauna, flora and/or habitat but no negative effects on ecosystem. Easily rehabilitated. Requires immediate regulator notification.
Negligible	Negligible impact on fauna/flora, habitat, aquatic ecosystem or water resources. Impacts are local, temporary and reversible. Incident reporting according to routine protocols.

Consequence category	Description
(Minimal impact or no lasting effect)	

Table 25: Risk matrix

Consequence	Likelihood				
	Almost certain	Likely	Possible	Unlikely	Remote
Critical	Very High	Very High	High	High	Medium
Major	Very High	High	High	Medium	Medium
Moderate	High	Medium	Medium	Medium	Low
Minor	Medium	Medium	Low	Low	Very Low
Negligible	Medium	Low	Low	Very Low	Very Low

Table 26: Risk assessment

Potential impact	Project phase	Risk (pre-mitigation)	Risk (post mitigation)
Vegetation clearing	Construction / operation	Medium	Low
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Medium	Low
Noise, dust or light spill	Construction	Low	Very Low
Inadvertent impacts on adjacent habitat or vegetation	Construction	Medium	Low
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Medium	Low
Vehicle strike	Construction / operation	Low	Very Low
Rubbish dumping	Construction / operation	Low	Very Low
Increase in predatory species populations	Construction / operation	Low	Very Low
Increase in pest animal populations	Construction / operation	Low	Very low
Increased risk of fire	Construction /operation	Low	Very Low
Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	Construction / operation	Low	Very Low
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Low	Very Low

3.4 Adaptive management strategy

This section is required for those impacts that are infrequent, cumulative or difficult to predict. Impacts associated with the proposed development have been considered and addressed in Section 3.5 and no further impacts are required to be addressed.

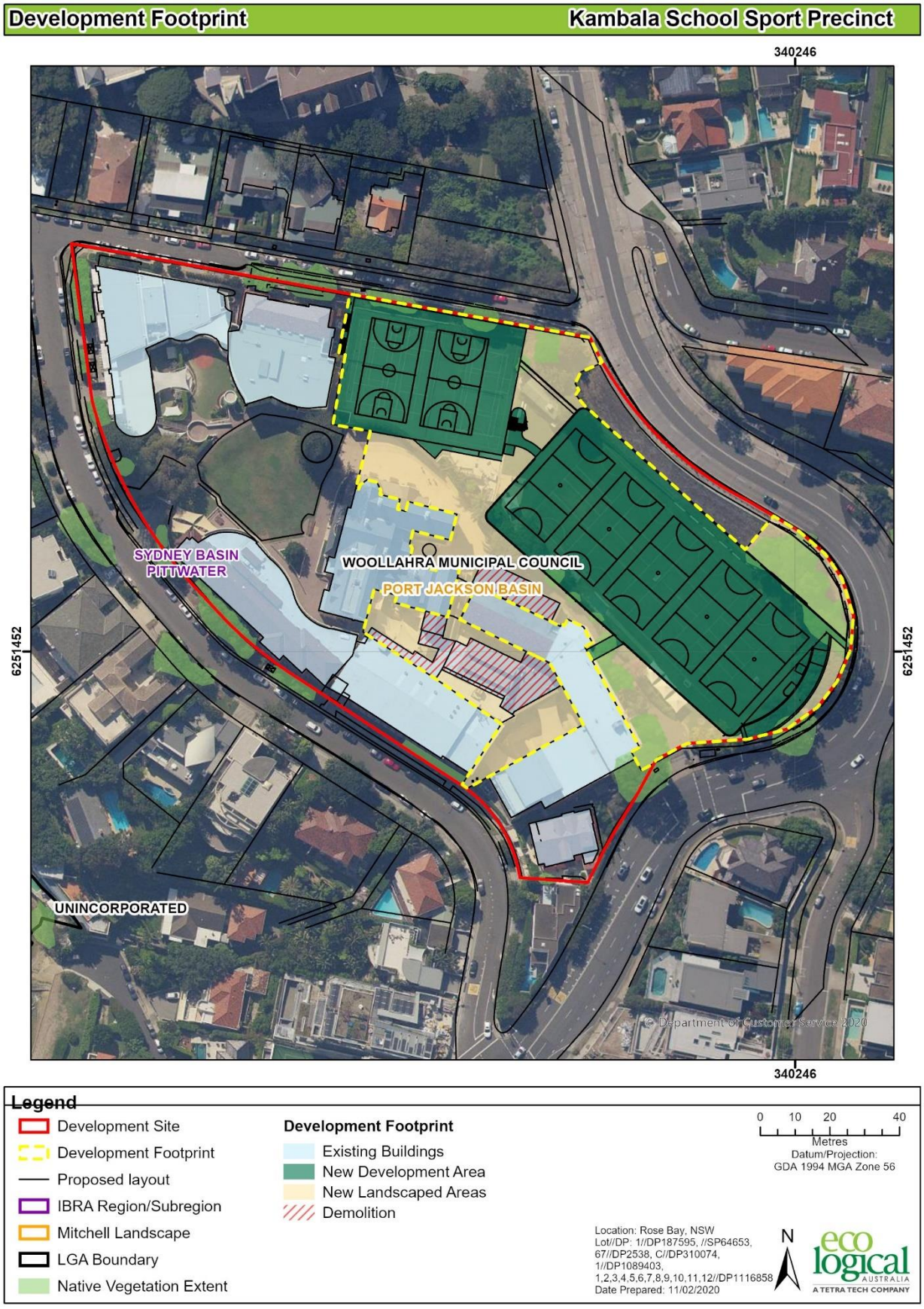

Figure 8: Final project footprint including construction and operation

3.5 Impact summary

Following implementation of the BAM and the BAMC, the following impacts have been determined.

3.5.1 Serious and Irreversible Impacts (SAII)

As discussed in Section 3.2.6, no candidate entities for SAII are present in the development site or are likely to be impacted by the development. As the development footprint does not impact upon SAII entities, no additional consideration of SAII are required for this report.

3.5.2 Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 27 and shown on Figure 9.

Table 27: Impacts to native vegetation that require offsets

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1778	Coastal sandstone foreshores forest	Sydney Coastal Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrubby sub-formation)	0.09

3.5.3 Impacts not requiring offsets

All native vegetation within the development site which will be removed requires offsets.

3.5.4 Areas not requiring assessment

Areas not requiring assessment include existing concrete driveways, exotic garden lawn and exotic vegetation. The development site contains build/cleared areas (0.92 ha) and exotic vegetation (0.10 ha) as shown in Figure 10. These areas were not consistent with any listed PCT, nor did they contain any threatened species. An assessment of Prescribed Impacts has been undertaken, hence further assessment under the BAM was not required. Areas not requiring assessment are shown on Figure 10.

3.5.5 Credit summary

The number of ecosystem credits required for the development are outlined in Table 28. A total of one (1) ecosystem credit is required for impacts to PCT 1778_planted. No candidate species credit species or likely habitat was recorded within the development site; hence no species credits are required to offset the development. A biodiversity credit report is included in Appendix C.

Table 28: Ecosystem credits required within development footprint

PCT ID	PCT Name	Credit class	Trading group	Total impact (ha)	Credits required
1778	Coastal Sandstone Foreshores Forest	Sydney Coastal Dry Sclerophyll Forests	Sydney Coastal Dry Sclerophyll Forests ≥ 90% cleared group (including Tier 2 or higher)	0.09	1

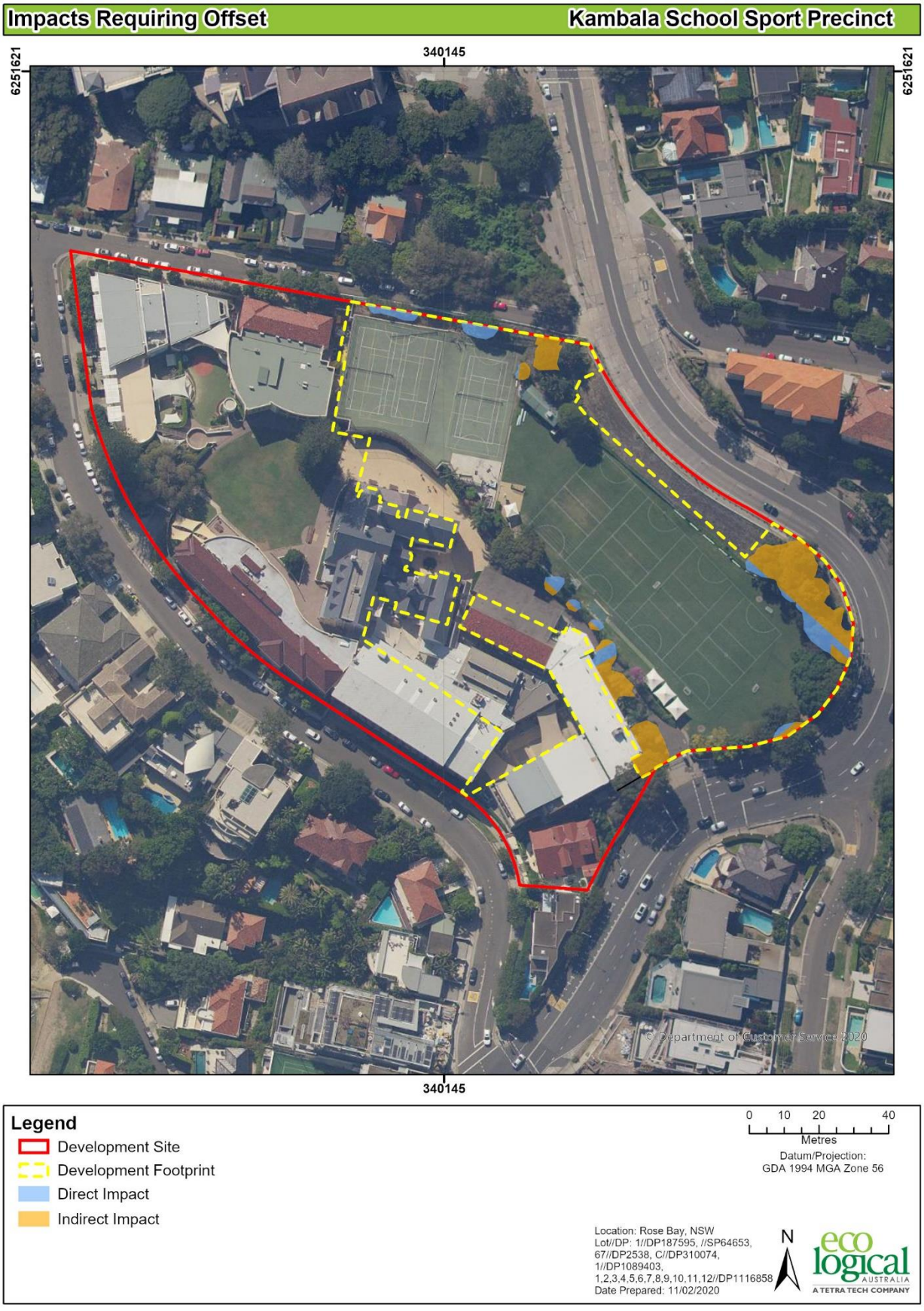

Figure 9: Impacts requiring offset

Figure 10: Areas not requiring assessment

3.6 Consistency with legislation and policy

Additional matters relating to impacts on flora and fauna which are not covered by the BC Act must also be addressed for the proposed development. Potential "Matters of National Environmental Significance" (MNES) in accordance with the EPBC Act have been addressed in Section 3.6.1. Matters relating to Sydney Regional Environmental Plan and Woollahra Council planning instruments have been addressed in Section 3.6.2, and 3.6.3 respectively.

3.6.1 *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where "Matters of National Environmental Significance" (MNES) may be affected. Under the Act, any action which "has, will have, or is likely to have a significant impact on a matter of MNES" is defined as a "controlled action", and requires approval from the Commonwealth Department of the Environment and Energy (DoEE), which is responsible for administering the EPBC Act (DoEE 2014).

The process includes conducting an Assessment of Significance for listed threatened species and ecological communities that represent a matter of MNES that will be impacted as a result of the proposed action. Significant impact guidelines (DoEE 2014) that outline a number of criteria have been developed by the Commonwealth, to provide assistance in conducting the Assessment of Significance and help decide whether or not a referral to the Commonwealth is required.

A habitat assessment and Likelihood of Occurrence was completed and one MNES *Pteropus poliocephalus* (Grey-headed Flying-fox) was assessed under the Act as there are 1161 BioNet records for this species within the broader landscape (5 km radius) of the development site.

Pteropus poliocephalus (Grey-headed Flying-fox)

The Grey-headed Flying-fox is listed as a Vulnerable species under the EPBC Act.

This species utilises a wide variety of habitats (including disturbed areas) for foraging and have been recorded travelling long distances on feeding forays (DPIE 2020b). Fruits and flowering plants of a wide variety of species are the main food source. The species roosts in large 'camps' of up to 200 000 individuals. Camps are usually formed close to water and along gullies, however, the species has been known to form camps in urban areas (DECCW 2009).

The Centennial Park Grey-headed Flying-fox (GHFF) nationally important camp is known from the locality to be within 5 km of the development site (DPIE 2020a). The vegetation within the development site provides potential foraging habitat. It is considered likely that this species would use the site on occasion for foraging purposes. According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have been recorded within the development site (DoEE 2020b).

Table 29: EPBC Act of Significance for *Pteropus poliocephalus* (Grey-headed Flying-fox)

Criterion	Assessment
Criterion a: lead to a long-term decrease in the size of an important population of a species	The Matters of National Environmental Significance Impact Guidelines 1.1 (Commonwealth of Australia, 2013) defines an important population as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal

Criterion	Assessment
	• Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species range No important populations have been recorded within the development site, however the site does provide potential foraging resources for an important population. The site does not support key source populations for breeding or dispersal, populations necessary for maintaining genetic diversity, or populations near the limit of the species range. According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the development site (DoEE 2020b). The nearest active GHFF camp occurs approximately 5 km to the south-east of the development site, within Centennial Park (DoEE 2020b).
Criterion b: reduce the area of occupancy of an important population	No important populations have been recorded within the development site, however, the vegetation within the development site may contain potential foraging resources for an important population. As the extent of vegetation removal is only minor and foraging resources will be retained in the development site. Therefore, the proposed works would not reduce the area of occupancy of an important population.
Criterion c: fragment an existing important population into two or more populations	No important populations have been recorded within the development site. The potential foraging habitat to be removed is marginal relative to adjacent potential habitat within the region. Whilst the potential foraging habitat may contribute as a 'stepping stone' for this highly mobile species to other more substantial foraging habitat sites, this function is unlikely to be significantly inhibited by the proposed works. Furthermore, this species has been recorded in urban environments and is likely to continue to forage adjacent to the development site and across the broader locality.
Criterion d: adversely affect habitat critical to the survival of a species	Approximately half of the potential foraging habitat in canopy trees within the development site will be removed by the proposal. These individual trees represent a negligible amount of potential foraging resources in the locality. Potential foraging habitat in the form of street trees will persist in close proximity to the development site. Given that this species is highly mobile (traveling up to 50 km to forage), it is considered unlikely that the works would adversely affect habitat critical to the survival of this species
e: disrupt the breeding cycle of an important population	According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the development site (DoEE 2020b). The nearest active GHFF camp occurs approximately 5 km to the south-west of the development site, within Centennial Park (DoEE 2020b). Thus, no important population of GHFF occurs within the development site, and the proposed works are unlikely to disrupt the breeding cycle of an important population.
Criterion f: Adversely affect habitat critical to the survival of a species; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The potential foraging habitat to be removed is marginal and of low quality. Given the small amount of potential foraging habitat to be removed, that potential foraging habitat will persist adjacent to the development site and across the locality, and that this species is highly mobile, it is unlikely that the habitat to be removed would cause the species to decline. Furthermore, according to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the development site (DoEE 2020c). The nearest active GHFF camp occurs approximately 5 km to the south-east of the development site, within Centennial Park (DoEE 2020b). Therefore, no known GHFF roosting camps for this species will be impacted by the proposed works.
Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed works will not result in the establishment of an invasive species that is harmful to GHFF.

Criterion	Assessment
Criterion h: Introduce disease that may cause the species to decline	The proposed works will not result in the introduction of a disease that is harmful to the GHFF.
Criterion i: Interfere substantially with the recovery of the species	Considering the above factors, the proposed works will not interfere substantially with the recovery of the species.
Conclusion	In consideration of the above, the proposed works are considered unlikely to have a significant impact on the GHFF.

3.6.2 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The development site is located within the Sydney Harbour Catchment area mapped under the Sydney Regional Environmental Plan. Provisions for Woollahra DCP, therefore, do not apply to the development.

Clause 13 of the SEPP applies to the development.

The planning principles for land within the Sydney Harbour Catchment are as follows:

a. development is to protect and, where practicable, improve the hydrological, ecological and geomorphological processes on which the health of the catchment depends,
b. the natural assets of the catchment are to be maintained and, where feasible, restored for their scenic and cultural values and their biodiversity and geodiversity,
c. decisions with respect to the development of land are to take account of the cumulative environmental impact of development within the catchment,
d. action is to be taken to achieve the targets set out in Water Quality and River Flow Interim Environmental Objectives: Guidelines for Water Management: Sydney Harbour and Parramatta River Catchment (published in October 1999 by the Environment Protection Authority), such action to be consistent with the guidelines set out in Australian Water Quality Guidelines for Fresh and Marine Waters (published in November 2000 by the Australian and New Zealand Environment and Conservation Council),
e. development in the Sydney Harbour Catchment is to protect the functioning of natural drainage systems on floodplains and comply with the guidelines set out in the document titled Floodplain Development Manual 2005 (published in April 2005 by the Department),
f. development that is visible from the waterways or foreshores is to maintain, protect and enhance the unique visual qualities of Sydney Harbour,
g. the number of publicly accessible vantage points for viewing Sydney Harbour should be increased,
h. development is to improve the water quality of urban run-off, reduce the quantity and frequency of urban run-off, prevent the risk of increased flooding and conserve water,
i. action is to be taken to achieve the objectives and targets set out in the Sydney Harbour Catchment Blueprint, as published in February 2003 by the then Department of Land and Water Conservation,
j. development is to protect and, if practicable, rehabilitate watercourses, wetlands, riparian corridors, remnant native vegetation and ecological connectivity within the catchment,

k. development is to protect and, if practicable, rehabilitate land from current and future urban salinity processes, and prevent or restore land degradation and reduced water quality resulting from urban salinity,
l. development is to avoid or minimise disturbance of acid sulfate soils in accordance with the Acid Sulfate Soil Manual, as published in 1988 by the Acid Sulfate Soils Management Advisory Committee.

The development is not in conflict with the planning principles provided that mitigation measures such as implementation of sediment and erosion control and acid sulfate management plan are implemented to protect the health of the Sydney Harbour Catchment area.

3.6.3 Woollahra Local Environmental Plan 2014 (LEP)

The development site is zoned SP2 Infrastructure which aims to:

- To provide for infrastructure and related uses
- To prevent development that is not compatible with or that may detract from provision of infrastructure

The development is consistent with the aims of the SP2 zoning.

The development site is not subject to the Biodiversity or Riparian overlay under the LEP.

Part 6.1 Acid Sulfate Soils

Clause 6.1 of the LEP is relevant to the development site. Acid sulfate soils have been mapped within the development site. Under the LEP, Clause 6.1 states the following:

- *The objective of this clause is to ensure that the development does not disturb, expose or drain acid sulfate soils and cause environmental damage.*
- *Development consent is required for the carrying out of works on land shown on the LEP Acid sulfate soils map.*
- *Development consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority.*

The development site has been identified as Class 5 Acid sulfate soils and will require an approved acid sulfate soils management plan to be implemented as part of the proposed works. The implementation of mitigation measures is likely to prevent issues relating to acid sulfate soils to be reduced.

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Appendix A Definitions

Terminology	Definition
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish
Broad condition state:	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Development site	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length
Local population	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
Mitchell landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.

Terminology	Definition
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines
Operational Manual	The Operational Manual published from time to time by OEH, which is a guide to assist assessors when using the BAM
Patch size	An area of intact native vegetation that: a) occurs on the development site or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site or stewardship site...
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5 cm within a vegetation zone.
Remaining impact	An impact on biodiversity values after all reasonable measures have been taken to avoid and minimise the impacts of development. Under the BAM, an offset requirement is calculated for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	Riparian buffers applied to water bodies in accordance with the BAM
Sensitive biodiversity values land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
Site-based development	A development other than a linear shaped development, or a multiple fragmentation impact development
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land? It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by OEH and accessible from the BioNet website.
Threatened species	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.

Terminology	Definition
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a development site, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs

Appendix B Vegetation plot data

Table 30: Vegetation integrity data (Composition, Structure and function)

Plot location data							
Plot no.	PCT	Vegetation Zone	Condition	Zone	Eastings	Northings	Bearing
1	1778	1	Planted	56	340241	6251481	144

Composition (number of species)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	7	3	1	1	1	0

Structure (Total cover %)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	45	6.4	5	0.1	1	0

Function											
Plot no.	Large Trees	Hollow trees	Litter Cover	Length Fallen Logs	Tree Stem 5-9	Tree Stem 10-1 9	Tree Stem 20-2 9	Tree Stem 30-49	Tree Stem 50-79	Tree Regen	High Threat Weed Cover
1	1	1	36	0	1	1	1	1	1	0	1.1

Table 31: Change in vegetation integrity scores for each management zone

Veg zone	Management zone	Area ha	Composition	Structure	Function	Vegetation integrity score	Change in score	Total Change in integrity score
1	Direct	0.02	0	0	0	0	-25.5	-21.3
1	Indirect	0.07	8.5	19.5	0	5.5	-20.1	-21.3

Table 32: Species matrix (species recorded by plot)

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover Plot 1	(%)	Abundance Plot 1
G		*Agapanthus spp.*	*		3		100
G		*Agave spp.*	*		0.1		2
G		*Anagallis spp.*	*		0.1		1
G		*Anredera cordifolia*	*	*	0.2		5
G		*Asparagus aethiopicus*	*	*	0.5		50

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) Plot 1	Abundance Plot 1
G		*Axonopus fissifolius*	*	*	0.1	10
U	Tree (TG)	*Banksia integrifolia subsp. integrifolia*			3	2
M		*Bidens spp.*	*		0.1	10
G		*Bromelia spp.*	*		0.2	10
M	Shrub (SG)	*Callistemon spp.*			0.2	1
U	Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana*			6	1
M		*Celtis sinensis*	*		0.1	50
G	Forb (FG)	*Commelina cyanea*			0.1	10
U	Tree (TG)	*Corymbia maculata*			6	2
G	Grass & grasslike (GG)	*Cynodon dactylon*			5	100
G		*Ehrharta erecta*	*	*	0.1	5
U	Tree (TG)	*Eucalyptus botryoides*			1	1
U	Tree (TG)	*Eucalyptus saligna*			3	1
U	Tree (TG)	*Glochidion ferdinandi var. ferdinandi*			20	2
G		*Hedera spp.*	*		2	10
U		*Jacaranda spp.*	*		10	1
M	Shrub (SG)	*Leptospermum petersonii*			0.2	1
M		*Ligustrum lucidum*	*	*	0.1	1
M		*Murraya spp.*	*		0.3	2
G	Fern (EG)	*Nephrolepis spp.*			1	50
G		*Nothoscordum spp.*			0.1	3
M		*Ochna serrulata*	*	*	0.1	1
G		*Olea europaea subsp. cuspidata*	*		0.1	1
G		*Parietaria judaica*	*		0.2	10
U		*Pinus spp.*	*		3	1
M	Shrub (SG)	*Pittosporum undulatum*			6	4
M		*Schefflera spp.*	*		0.3	1
M		*Solanum nigrum*	*		0.1	1
M		*Sonchus oleraceus*	*		0.1	5

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover Plot 1	(%)	Abundance Plot 1
M		*Syagrus spp.*	*		2		10
U	Tree (TG)	*Toona ciliata*			7		1
G		*Tradescantia pallida*	*		0.1		10
G		*Watsonia borbonica subsp. ardernei*	*		0.1		10

Scientific Name	Common Name	Native / Exotic / HTE
Angophora costata	Sydney Red Gum	N
Araucaria heterophylla	Norfolk Island Pine	N
Araujia sericifera	Moth Vine	E
Archontophoenix cunninghamiana	Bangalow Palm	
Doryanthes excelsa	Gymea Lily	N
Elaeocarpus reticulatus	Blueberry Ash	N
Fraxinus excelsior	Golden Ash	E
Hibbertia scandens	Climbing Guinea Flower	N
Lomandra longifolia	Matt-rush	N
Melaleuca linariifolia	Flax-leaved Paperbark	N
Melaleuca styphelioides	Prickly-leaved Tea-tree	N
Monstera deliciosa	Fruit Salad Plant	E
Quercus robur	English Oak	E
Strelitzia nicolai	Giant Bird of Paradise Fern	E
Syagrus romanzoffiana	Cocas Palm	E
Syzygium smithii	Lilly Pilly	N
Tristaniopsis laurina	Water Gum	N
Ulmus parvifolia	Chinese Elm	E

Appendix C EPBC Act Likelihood of Occurrence

from the Protected Matters Search Tool. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the site inspection and professional judgement. Some Migratory or Marine species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- 'known' = the species was or has been observed on the site
- 'likely' = a medium to high probability that a species uses the site
- 'potential' = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- 'unlikely' = a very low to low probability that a species uses the site
- 'no' = habitat within the study area and in the vicinity is unsuitable for the species.

A test of significance was conducted for threatened species or ecological communities that were recorded within the study area or had a higher likelihood of occurring and were not recorded during the site visit. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the study area intermittently for foraging. For these fauna species, the habitat present and likely to be impacted is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, a test of significance in reference to Commonwealth legislation was not considered necessary.

Information provided in the habitat associations' column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database and the NSW Threatened Species Data Collection.

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			FAUNA			
Anthochaera phrygia	Regent Honeyeater	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of *Casuarina cunninghamiana* (River Oak).	Unlikely - foraging habitat features associated with this species were not identified within the development site. The development site is not within an important breeding area for the species.	No	No – the species is highly mobile and preferable foraging habitat is available within the broader locality.
Apus pacificus	Fork-tailed Swift	M	Recorded in all regions of NSW. Riparian woodland., swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes.	Unlikely - suitable habitat not identified within the site.	N/A	No
Botaurus poiciloptilus	Australasian Bittern	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly *Typha* spp. (bullrushes) and *Eleocharis* spp. (spikerushes).	Unlikely - suitable habitat not identified within the site.	N/A	No
Calidris acuminata	Sharp-tailed Sandpiper	M	Summer migrant. Widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions. Shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	Unlikely - suitable habitat not identified within the site.	N/A	No
Calidris canutus	Red Knot	E	Red Knots are widespread around the Australian coast, less in the south and with few inland records. Small numbers visit Tasmania and off-shore islands. It is widespread but scattered in New Zealand. They breed in North America, Russia, Greenland and Spitsbergen. Red Knots are a non-breeding visitor to most continents.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Calidris ferruginea	Curlew Sandpiper	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	Unlikely - suitable habitat not identified within the site.	N/A	No
Calidris tenuirostris	Great Knot	CE	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 inlets, or exposed reefs or rock platforms.	Unlikely - suitable habitat not identified within the site.	N/A	No
Charadrius leschenaultii	Greater Sand Plover	V	Entirely coastal in NSW, foraging on intertidal sand and mudflats in estuaries, roosting during high tide on sandy beaches or rocky shores.	Unlikely - suitable habitat not identified within the site.	N/A	No
Charadrius mongolus	Lesser Sand Plover	E	Favours coastal areas including beaches, mudflats and mangroves where they forage. They may be seen roosting during high tide on sandy beaches or rocky shores.	Unlikely - suitable habitat not identified within the site.	N/A	No
Chalinolobus dwyeri	Large-eared Pied Bat	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	Unlikely - there is no suitable breeding habitat such as caves, overhangs, mines or culverts present for the species to utilise the site.	N/A	No
Dasyornis brachypterus	Eastern Bristlebird	E	There are three main populations: Northern - southern Qld/northern NSW, Central - Barren Ground NR, Budderoo NR, Woronora Plateau, Jervis Bay NP, Booderee NP and Beecroft Peninsula and Southern - Nadgee NR and Croajingalong NP in the vicinity of the NSW/Victorian border. Central and southern populations inhabit heath and open woodland with a heathy understorey. In northern NSW, habitat comprises open forest with dense tussocky grass understorey.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Dasyurus maculatus maculatus	Spotted-tailed Quoll	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Unlikely – suitable habitat, in the form of maternal den sites or large areas of relatively intact vegetation, were not identified within the site.	N/A	No
Diomedea antipodensis	Antipodean Albatross	V	The Antipodean Albatross is marine, pelagic and aerial. It is endemic to New Zealand, however forages on cephalopods, fish and crustaceans in open water in the south-west Pacific Ocean, Southern Ocean and the Tasman Sea, notably off the coast of NSW.	Unlikely - suitable habitat not identified within the site.	N/A	No
Dimedea antipodensis gibsoni	Gibson's Albatross	V	The Gibson's Albatross is marine, pelagic and aerial. It is endemic to New Zealand, however forages on cephalopods, fish and crustaceans in open water in the south-west Pacific Ocean, Southern Ocean and the Tasman Sea, notably off the coast of NSW.	Unlikely - suitable habitat not identified within the site.	N/A	No
Diomedea epomophora	Southern Royal Albatross	V	The Southern Royal Albatross is marine and pelagic. During the non-breeding season it has a wide and possibly circumpolar distribution, ranging north to about 35°S. It is moderately common throughout the year in offshore waters of southern Australia, mostly off southeastern NSW, Victoria and Tasmania. It has been observed where the water surface temperature is 6 to 20°C.	Unlikely - suitable habitat not identified within the site.	N/A	No
Diomedea exulans	Wandering Albatross	V	The Wandering Albatross is marine, pelagic and aerial. It occurs where water surface temperatures range from -2° to 24°C. In the Australasian region, it occurs inshore, offshore and in pelagic waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Diomedea sanfordi	Northern Royal Albatross	E	This species breeds on Chatham Island and Taiaroa Head on the South Island of New Zealand. It can be found in open waters off SE Australia.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Epinephelus daemelii	Black Rockcod	V	This species is a marine species.	Unlikely - suitable habitat not identified within the site.	N/A	No
Fregetta grallaria grallaria	White-bellied Storm Petrel		The White-bellied Storm-Petrel breeds on small offshore islets and rocks in the Lord Howe Island group, including Roach Island and Balls Pyramid. In the non-breeding season, it reaches and forages over near-shore waters along the continental shelf of mainland Australia.	Unlikely - suitable habitat not identified within the site.	N/A	No
Gallinago hardwickii	Latham's Snipe	M	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	Unlikely - suitable habitat not identified within the site.	N/A	No
Grantiella picta	Painted Honeyeater	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	Unlikely - suitable habitat not identified within the site.	N/A	No
Heleioporus australiacus	Giant Burrowing Frog	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	Unlikely - suitable habitat not identified within the site.	N/A	No
Hirundapus caudacutus	White-throated Needletail	M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Unlikely - suitable habitat not identified within the site.	N/A	No
Hoplocephalus bungaroides	Broad-headed Snake	V	Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney. Dry	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands.			
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E	Found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River. Heath or open forest with a heathy understorey on sandy or friable soils.	Unlikely - suitable habitat not identified within the site.	N/A	No
Lathamus discolor	Swift Parrot	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.	Potential – foraging habitat features associated with this species were identified within the development site.	Yes (minor foraging only)	No – the species is highly mobile and more foraging habitat is available within the broader locality.
Limosa lapponica baueri	Bar-tailed Godwit	M	Summer migrant to Australia. Widespread along the coast of NSW, including the offshore islands. Also numerous scattered inland records. Intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, bays, seagrass beds, saltmarsh, sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. Rarely inland wetlands, paddocks and airstrips.	Unlikely - suitable habitat not identified within the site.	N/A	No
Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit	CE	Mainly coastal, usually sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats. This species has been recorded across coastal Australia during non-breeding seasons.	Unlikely - suitable habitat not identified within the site.	N/A	No
Litoria aurea	Green and Golden Bell Frog	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region. Marshes, dams and stream-sides, particularly those containing	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			Typha spp. (bullrushes) or *Eleocharis* spp. (spikerushes). Some populations occur in highly disturbed areas.			
Macronectes giganteus	Southern Giant-Petrel	E	The Southern Giant-Petrel is marine bird that occurs in Antarctic to subtropical waters. It possibly concentrates north of 50° S in winter, as it is rare in waters of the southern Indian Ocean, but common off South America, South Africa, Australia and New Zealand. It occurs in both pelagic and inshore waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Macronectes halli	Northern Giant-Petrel	V	The Northern Giant-Petrel is marine and oceanic. Visits areas off the Australian mainland mainly during the winter months (May-October). Immature and some adult birds are commonly seen during this period in offshore and inshore waters from around Frenamtle (WA) to around Sydney (NSW).	Unlikely - suitable habitat not identified within the site.	N/A	No
Macquaria australasica	Macquarie Perch	E	Habitat for the Macquarie perch is on the bottom or mid-water in slow-flowing rivers with deep holes, typically in the upper reaches of forested catchments with intact riparian vegetation. Macquarie perch also do well in some upper catchment lakes. In some parts of its range, the species is reduced to taking refuge in small pools which persist in midland–upland areas through the drier summer periods.	Unlikely - suitable habitat not identified within the site.	N/A	No
Mixophyes balbus	Stuttering Frog	V	Along the east coast of Australia from southern Qld to north-eastern Victoria. Rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.	Unlikely - suitable habitat not identified within the site.	N/A	No
Monarcha melanopsis	Black-faced Monarch	M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park and Wombeyan Caves. It is rarely recorded farther inland. Rainforest, open eucalypt forests, dry sclerophyll forests and woodlands, gullies in mountain areas or coastal foothills, Brigalow scrub, coastal scrub, mangroves, parks and gardens.	Unlikely - habitat present is substantially degraded such that this species is unlikely to utilise the site for foraging or breeding.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Motacilla flava	Yellow Wagtail	M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA. Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	Unlikely - suitable habitat not identified within the site.	N/A	No
Myiagra cyanoleuca	Satin Flycatcher	M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies.	Unlikely - suitable habitat not identified within the site.	N/A	No
Neophema chrysogaster	Orange-bellied Parrot	CE	Breeds only in coastal south-west Tasmania and spends the winter in coastal Victoria and South Australia (March/April - October/November), mostly within 3 km of the coast. It nests in hollows in eucalypt trees which grow adjacent to its feeding plains.	Unlikely - suitable habitat not identified within the site.	N/A	No
Numenius madagascariensis	Eastern Curlew	CE	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records. Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	Unlikely - suitable habitat not identified within the site.	N/A	No
Pachyptila turtur subantarctica	Fairy Prion	V	Breeds on Macquarie Island and a number of other subantarctic islands outside of Australia. Some individuals may migrate towards New Zealand and southern Australia in winter.	Unlikely - suitable habitat not identified within the site.	N/A	No
Petauroides volans	Greater Glider	V	This population on the south coast of NSW is bounded by the Moruya River to the north, Coila Lake to the south and the Princes Highway and cleared land exceeding 700 m in width to the west. Eucalypt forests and woodlands.	Unlikely - habitat present is substantially degraded such that this species is unlikely to utilise the site for foraging or breeding.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Petrogale penicillata	Brush-tailed Rock-wallaby	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	Unlikely - suitable habitat not identified within the site.	N/A	No
Phascolarctos cinereus	Koala	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. Eucalypt woodlands and forests.	Unlikely - Habitat present is substantially degraded such that this species is unlikely to utilise the site for foraging or breeding.	N/A	No
Pommerhelix duralensis	Dural Land Snail	E	Endemic to NSW. Occurs along the northwest fringes of the Cumberland Plain, within the Hills Shire, Blue Mountains City, Penrith City, Hornsby Shire and Parramatta City LGAs. Shale-sandstone transitional landscapes. Found in Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest; Turpentine-Ironbark Forest; Shale/Sandstone Transition Forest; Turpentine Ironbark Margin Forest; Hinterland Sandstone Gully Forest; and Sydney Hinterland Transition Woodland.	Unlikely - Habitat present is substantially degraded such that this species is unlikely to utilise the site for foraging or breeding.	N/A	No
Prototroctes macraena	Australian Grayling	V	The historic distribution of the Australian Grayling included coastal streams from the Grose River southwards through NSW, Vic. and Tas. On mainland Australia, this species has been recorded from rivers flowing east and south of the main dividing ranges. This species spends only part of its lifecycle in freshwater, mainly inhabiting clear, gravel-bottomed streams with alternating pools and riffles, and granite outcrops but has also been found in muddy-bottomed, heavily silted habitat.	Unlikely - Habitat present is substantially degraded such that this species is unlikely to utilise the site for foraging or breeding.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Pseudomys novaehollandiae	New Holland Mouse	V	Fragmented distribution across eastern NSW. Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	Unlikely - suitable habitat not identified within the site.	N/A	No
Pterodroma leucoptera leucoptera	Gould's Petrel	E	The Australian subspecies of the Gould's Petrel breeds only on Cabbage Tree Island and on nearby Boondelbah Island, near Port Stephens, in NSW. Gould's Petrel is a pelagic marine species, spending much of its time foraging at sea and coming ashore only to breed.	Unlikely - suitable habitat not identified within the site.	N/A	No
Pterodroma neglecta neglecta	Kermadec Petrel	V	The Kermadec Petrel (western) is a pelagic seabird that occurs in tropical, subtropical and temperate waters of the Pacific Ocean. In Australia, the Kermadec Petrel (western) breeds on Balls Pyramid, which lies to the south of Lord Howe Island, and on Phillip Island, in the Norfolk Island group. It occasionally reaches the eastern coast of mainland Australia.	Unlikely - suitable habitat not identified within the site.	N/A	No
Pteropus poliocephalus	**Grey-headed Flying-fox**	**V**	**Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.**	**Likely – seasonal foraging habitat available within the study area. No camps identified within study area.**	**Yes (foraging only)**	**Yes**
Rhipidura rufifrons	Rufous Fantail	M	Coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW. Wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands.	Unlikely - suitable habitat not identified within the site.	N/A	No
Rostratula australis	Australian Painted Snipe	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas.	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Sternula nereis nereis	Australian Fairy Tern	V	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.	Unlikely - suitable habitat not identified within the site.	N/A	No
Synemon plana	Golden Sun Moth	CE	It is found in native open temperate grasslands and open grassy woodlands dominated by *Austrodanthonia* spp.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche bulleri	Buller's Albatross	V	This species breeds in New Zealand but regularly visits Australian marine waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche bulleri platei	Northern Buller's Albatross	V	This species is a non-breeding visitor to Australian waters. This species is mostly limited to the Pacific Ocean and Tasman Sea and not the east coast of Australia mainland.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche cauta cauta	Shy Albatross	V	Most common distribution occurs below 25o S in southeastern and Tasmanian shelf waters. During non-breeding seasons the Shy Albatross extends across the continental shelf in subantarctic and subtropical waters including NZ. It spends most of it's life out to sea coming to shore to breed in September at Stradbroke Island in Qld and south to Tasmania.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche cauta steadi	White-capped Albatross	V	This species breeds predominately in New Zealand. It may forage in marine waters off eastern mainland Australia.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche eremita	Chatham Albatross	E	The Chatham Albatross is a marine species that breeds on Pyramid Rock, Chatham Islands, off the coast of New Zealand. It occurs in subantarctic and subtropical waters and has been noted in shelf-	Unlikely - suitable habitat not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			waters around breeding islands, over continental shelves during the non-breeding season, and occurs inshore and offshore.			
Thalassarche impavida	Campbell Albatross	V	This species is a non-breeding migrant to Australian waters. Forages in temperate waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche melanophris	Black-browed Albatross	V	Commonly occuring in southern Australian waters in winter. Breeds on offshore Islands off southern Australia including Heard Is, Macquarie Is and McDonald Is, to name a few. It is a marine specialist foraging for fish, crustaceans and squid in Antarctic, subantarctic and temperate waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thalassarche salvini	Salvin's Albatross	V	The Salvin's Albatross is a non-breeding visitor to Australian waters.	Unlikely - suitable habitat not identified within the site.	N/A	No
Thinornis rubricollis rubricollis	Hooded Plover (eastern)	V	This species utilises sandy beaches along south-eastern Australia.	Unlikely - suitable habitat not identified within the site.	N/A	No
Tringa nebularia	Common Greenshank	M	Summer migrant to Australia. Recorded in most coastal regions of NSW; also widespread west of the Great Dividing Range. Terrestrial wetlands and sheltered coastal habitats.	Unlikely - suitable habitat not identified within the site.	N/A	No
			FLORA			
Acacia bynoeana	Bynoe's Wattle	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Acacia pubescens	Downy Wattle	V	Restricted to the Sydney region around the Bankstown-Fairfield-Rookwood and Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. Open woodland and forest, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Occurs on alluviums, shales and at the intergrade between shales and sandstones.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Acacia terminalis subsp. *terminalis*	Sunshine Wattle	E	Limited mainly to near-coastal areas from the northern shores of Sydney Harbour south to Botany Bay. Coastal scrub and dry sclerophyll woodland on sandy soils.	Unlikely - the presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially disturbed such that this species is unlikely to utilise the development site.	N/A	No
Allocasuarina glareicola	-	E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Castlereagh woodland on lateritic soil. Found in open woodland with *Eucalyptus parramattensis*, *Eucalyptus fibrosa*, *Angophora bakeri*, *Eucalyptus sclerophylla* and *Melaleuca decora*.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Asterolasia elegans	-	E	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Likely to occur in the western part of Gosford local government area. Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys.	Unlikely – the development site is not within the seven recognised populations of the species.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Caladenia tessellata	Thick Lip Spider Orchid	V	Currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Grassy sclerophyll woodland on clay loam or sandy soils, or low woodland with stony soil.	Unlikely –the development site is not within the recognised populations of the species.	N/A	No
Cryptostylis hunteriana	Leafless Tongue Orchid	V	in NSW, recorded mainly on coastal and near coastal ranges north from Victoria to near Forster, with two isolated occurrences inland north-west of Grafton. Coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest.	Unlikely - suitable habitat not identified within the site.	N/A	No
Darwinia biflora	-	V	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas, in an area bounded by Maroota, North Ryde, Cowan and Kellyville. Woodland, open forest or scrub-heath on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone.	Unlikely - suitable habitat not identified within the site.	N/A	No
Deyeuxia appressa	-	E	A highly restricted grass, known from only two pre-1942 records in Sydney area (Herne Bay and Georges River). This species may be extinct in the wild. The habitat and ecology of this species remains unknown.	Unlikely - suitable habitat not identified within the site.	N/A	No
Eucalyptus camfieldii	Camfield's Stringybark	V	Narrow band from the Raymond Terrace area south to Waterfall. Coastal heath on shallow sandy soils overlying Hawkesbury sandstone, mostly on exposed sandy ridges.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	In NSW it is known from Walcha-Niangala region (east of Tamworth) to just north of Glen Innes in NSW. This species is sparsely distributed but most commonly occurs in the central portions of its range.	Unlikely - the presence of this species was not identified (conspicuous	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				species) and suitable habitat was not identified within the site.		
Eucalyptus scoparia	Wallangarra White Gum	V	In NSW it is known from only three locations near Tenterfield. Open eucalypt forest, woodland and heaths on well-drained granite/rhyolite hilltops, slopes and rocky outcrops, typically at high altitudes.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Genoplesium baueri	Bauer's Midge Orchid	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Dry sclerophyll forest and moss gardens over sandstone.	Unlikely - suitable habitat not identified within the site.	N/A	No
Haloragodendron lucasii	-	E	Confined to a very narrow distribution on the north shore of Sydney. Dry sclerophyll forest and low open woodland on sheltered slopes near creeks, in moist sandy loam soils.	Unlikely - suitable habitat not identified within the site.	N/A	No
Hibbertia spanantha	Julian's Hibbertia	CE	Endemic to NSW where it is restricted to three locations. Currently only known from around Sydney. Grows in forest with canopy species including *Eucalyptus pilularis*, *E. resinifera, Corymbia gummifera and Angophora costata*. The understorey is open with species of Poaceae, Orchidaceae, Fabaceae and Liliaceae. The soil is identified as a light clay occuring on a shale sandstone soil transition."	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the site.	N/A	No
Leptospermum deanei	-	V	Hornsby, Warringah, Ku-ring-gai and Ryde LGAs in the Sydney region. Woodland, riparian scrub and open forest on lower hill slopes or near creeks, on sand or sandy alluvial soil.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
Melaleuca biconvexa	Biconvex Paperbark	V	Only found in NSW, populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Damp places, often near streams or low-lying areas on alluvial soils.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Melaleuca deanei	Deane's Paperbark	V	Ku-ring-gai/Berowra area, Holsworthy/Wedderburn area, Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Heath on sandstone.	Unlikely - the presence of this species was not identified (conspicuous species) and suitable habitat was not identified within the site.	N/A	No
Persicaria elatior	Tall Knotweed	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). Beside streams and lakes, swamp forest or disturbed areas.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the site.	N/A	No
Persoonia hirsuta	Hairy Geebung	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Unlikely - suitable habitat not identified within the site.	N/A	No
Pimelea curviflora var. *curviflora*	-	V	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south. Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	Unlikely - The presence of this species was not identified (conspicuous species) and it was determined that the	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				habitat is substantially degraded such that this species is unlikely to utilise the development site.		
Pimelea spicata	Spiked Rice-flower	E	Two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama). Well-structured clay soils. Eucalyptus moluccana (Grey Box) communities and in areas of ironbark on the Cumberland Plain. Coast Banksia open woodland or coastal grassland in the Illawarra.	Unlikely - suitable habitat not identified within the site.	N/A	No
Syzygium paniculatum	Magenta Lilly Pilly	V	Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Subtropical and littoral rainforest on gravels, sands, silts and clays.	Unlikely - The presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially disturbed such that this species is unlikely to utilise the development site.	N/A	No
Thesium australe	Austral Toadflax	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. Grassland on coastal headlands or grassland and grassy woodland away from the coast.	Unlikely - suitable habitat not identified within the site.	N/A	No

Appendix D Biodiversity credit report

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00019185/BAAS18159/20/00019186	Kambala School	18/06/2020
Assessor Name	Report Created	BAM Data version *
	01/07/2020	29
Assessor Number	BAM Case Status	Date Finalised
	Open	To be finalised
Assessment Revision	Assessment Type	
0	Major Projects	

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

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

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Coastal sandstone foreshores forest								
1	1778_Planted	21.3	0.1	0.25	High Sensitivity to Potential Gain	2.50		1
							Subtotal	**1**
							Total	**1**

BAM Credit Summary Report

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits

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