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Ecological Assessment Report

Proposed Residential Subdivision
16 Macpherson Street, Warriewood, NSW

Prepared for: Warrimac Pty Ltd

August 2023

AEP Ref 2564.01

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AEP Project Team	Jeremy Burrill Natalie Black Catherine Stanislaus

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Revision	Date	Name	Organisation
01	15/03/2023	William Allen	IPM Property
02	24/04/2023	William Allen	IPM Property
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Executive Summary

A residential development is proposed within Lot 4 DP 553816 at 16 Macpherson St, Warriewood, NSW. The development footprint comprises an area of approximately 0.8ha and the Subject Site is approximately 1.01ha. The Subject Site occurs within the Northern Beaches Council (LGA) and is zoned R3 – Medium Density Residential. The Subject Site is predominantly cleared and includes Narrabeen Creek which forms a distinct riparian zone within the site.

At the request of Warrimac Pty Ltd (the client), Anderson Environment & Planning (AEP) have undertaken the necessary investigations to inform the production of an Ecological Assessment Report (EAR) in accordance with *Section 5.5 of the Environmental Planning and Assessment Act, 1979 (*EP&A Act*)*

The report is specifically intended to indicate the likelihood of the proposed development having a significant impact on potentially occurring threatened species or ecological communities. In this regard, the report aims to recognise the relevant requirements of the *Environmental Planning & Assessment Act 1979*, the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Desktop assessment indicates that the development footprint does impose on Biodiversity Value Mapped Land (BV Mapped Land) under the BC Act. In desktop assessment of the Subject Site, areas of native remnant vegetation within the development footprint were mapped as:

- PCT 1795- Swamp Mahogany / Cabbage Tree Palm - Cheese Tree - Swamp Oak tall open forest on poorly drained coastal alluvium in the Sydney basin.

Ground-truthing vegetation present within the Subject Site determined that it consists of 0.10ha of Plant Community Type (PCT) 1795- *Swamp Mahogany / Cabbage Tree Palm - Cheese Tree - Swamp Oak tall open forest on poorly drained coastal alluvium in the Sydney basin.* The BAM Plots were undertaken within the PCT and represents a reasonable quality of vegetation, compared with that found in the majority of the wider locality.

Two *Syzygium paniculatum* trees were identified within the Subject Site during fieldwork. No hollow-bearing trees, nests or large trees suitable for raptors were observed in the development footprint.

Consideration of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) revealed that impacts on Matters of National Environmental Significance are considered unlikely to occur.

General recommendations are included at the end of this report for consideration to minimise localised impacts on biodiversity in general as a result of the development.

Study Certification and Licencing

The fieldwork and reporting were undertaken by Jeremy Burrill, BEnvSc (Mngt & Sustainability). The report was reviewed by Natalie Black BSc (Hons), MPL & Cert IV TAE & MSc (BAAS no. 19076) of Anderson Environment & Planning.

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101313;
- Animal Research Authority (Trim File No: 14/600(2)) issued by NSW Agriculture; and
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 14/600(2)) issued by NSW Agriculture.

Certification:

As the principal author, I, Jeremy Burrill, make the following certification:

The results presented in the report are, in the opinion of the principal author and certifier, a true and accurate account of the species recorded, or considered likely to occur within the Survey Area;

Commonwealth, state and local government policies and guidelines formed the basis of project surveying methodology, unless specified departures from industry standard guidelines are justified for scientific and/or animal ethics reasons; and

All research workers have complied with relevant laws and codes relating to the conduct of flora and fauna research, including the Animal Research Act 1995, National Parks and Wildlife Act 1974 and the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes.

Principal Author and Certifier:

Natalie Black

Senior Environmental Manager

Anderson Environment & Planning

BAAS: 19076

6 August 2023

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1.0 Introduction

A proposed residential subdivision is proposed at 16 Macpherson Street, Warriewood, NSW (the Subject Site). At the request of Warrimac Pty Ltd, (the Proponent), Anderson Environment & Planning (AEP) have undertaken necessary investigations for the production of an EAR. This assessment has been undertaken with reference to the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), the *NSW Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report is specifically intended to indicate the likelihood of the proposal having a significant impact on threatened species or ecological communities. In this regard, the report aims to recognise the relevant requirements of the EP&A Act, the BC Act and the EPBC Act and consideration of other relevant policies is given including *State Environmental Planning Policy (SEPP) (Biodiversity and Conservation) 2021* and *SEPP (Resilience and Hazards) 2021*. The purpose of this report is to:

- Describe the ecological values of the Subject Site;
- Explore the potential for threatened species to utilise the area; and
- Assess ecological impacts associated with the proposal against relevant legislation.

Potential ecological impacts on native species in general are also considered, as are recommendations for minimising any impacts within the scope of the development.

For the purposes of referencing, this document should be referred to as:

Anderson Environment & Planning (2023). *Ecological Assessment Report for proposed residential subdivision at 16 Macpherson St, Warriewood, NSW*. Unpublished report for Warrimac Pty Ltd, August 2023.

2.0 Site Particulars

Table 1 below provide the site details for the Subject Site.

Table 1 – Site Particulars

Detail	Comments
Client	Warrimac Pty Ltd
Address	16 Macpherson St, Warriewood
Title	Lot 4 DP 553816
Subject Site	The Subject Site comprises of the entirety of the Lot which is approx. 1.02ha
LGA	Northern Beaches Council
Zoning	R3 – Medium Density Residential
Minimum Lot Size	1ha
Current Land Use	The subject site comprises of a plant nursery with associated facilities. There is a residential dwelling at the front of the property. The rear of the property houses storage and growing equipment for the nursery, whilst also being partially cleared in the most northern section.
Surrounding Land Use	Areas to the south and west of the property are filled with mixed levels of residential properties, whilst to the east is a retirement village. Narrabeen Creek borders to the north and consists of a riparian area, walking paths and recreational areas.

Figure 1 depicts the extent of the Parent Lot and Subject Site overlain on an aerial photograph of the locality.

3.0 Proposed Development

The proposed development consists of a residential subdivision with a medium level density and associated civil works. The proposed development footprint concept (the Subject Site) is provided in **Figure 2**.

AEP

Title: Figure 1 - Site Location

Date: May 2023

Location: 16 Macpherson Road, Warriewood

Client: Warrimac Pty Ltd

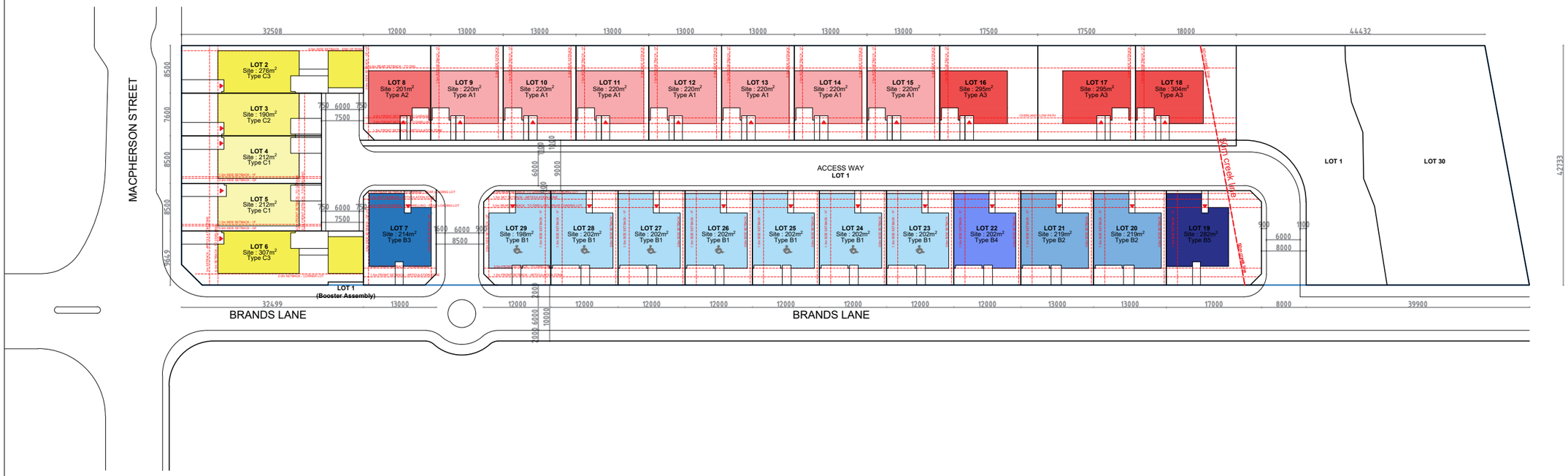
AEP ref: 2564.01

N

28 Lots
28 Dwellings
7 Adaptable (25%)

TYPES

A1	7	25%
A2	1	3.5%
A3	3	11%
B1	7	25%
B2	2	7%
B3	1	3.5%
B4	1	3.5%
B5	1	3.5%
C1	2	7%
C2	1	3.5%
C3	2	7%



1 LOT PLAN
SCALE 1:400@A1 / 1:800@A3

GENERAL NOTES:

- ALL WORKS TO COMPLY WITH BUILDING CODE OF AUSTRALIA, REQUIREMENTS OF RELEVANT STATUTORY AUTHORITIES/ LOCAL GOVERNMENT & RELEVANT AUSTRALIAN BUILDING STANDARDS
- DRAWINGS FOR THE PURPOSES OF DA ONLY - FURTHER CONSULTANT/ AUTHORITY COORDINATION WILL BE REQUIRED AT CC STAGE WHICH MAY IMPACT ON DESIGN AND PLANNING LAYOUTS
- ARCHITECTURAL PLANS TO BE READ IN CONJUNCTION WITH CONSULTANT'S DRAWINGS, SPECIFICATIONS & REPORTS
- COPYRIGHT OF DESIGN SHOWN HEREON IS RETAINED BY PBD ARCHITECTS AND AUTHORITY IS REQUIRED FOR ANY REPRODUCTION
- AREA SCHEDULES SUPPLIED ARE APPROXIMATE ONLY - FUTURE ALLOWANCE FOR VERTICAL SERVICE DUCTS, STRUCTURAL WALL SYSTEMS AND CONSULTANT INPUT WILL BE REQUIRED

LEGEND:

AW	AWNING
HW	HIGHLIGHT WINDOW
CU	A/C CONDENSER UNITS
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FS	FIRE STAIRS
MV	MECHANICAL RISER TO FUTURE DETAIL
GC	GARBAGE CHUTE
MB	MAILBOX TO FUTURE DETAIL
PB	PLANTERBOX
R	240L RECYCLING BIN
SK	SKYLIGHT
ST	STORAGE
WT	HOT WATER UNITS

ISSUE	DATE	DESCRIPTION
01	12.04.23	ISSUE FOR DA

N

CLIENT:
IPM PROPERTY

ARCHITECT:
PBD | ARCHITECTS

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Nominated Architect: Paul Buljevic NSW 7768

PROJECT:
28 TERRACES
16 MACPHERSON STREET
WARRIEWOOD
APR. 2023

DRAWING TITLE:
LOT PLAN

DRAWN BY: SS	CHECKED BY: HV	
SCALE: 1:400@A1 / 1:800@A3	DRAWING NO: DA 004	ISSUE: 01
PROJECT NO: 2235		

4.0 Scope and Purpose

Investigations were carried out at the site and by desktop searches to gather information required to adequately address the requirements of the *Section 5.5* of the EP&A Act. To ensure best practice this assessment has used the *Biodiversity Conservation Regulation 2017* (BCR), as well as Section 7.3 of the BC Act (known as the "5-part test") to guide the assessment for the proposed development.

Also afforded consideration were the Commonwealth EPBC Act, and relevant State Environmental Planning Policies (SEPPs).

The assessment approach was tailored to ensure that legislative requirements were met relating to threatened species and native species in general for the specific proposed development. This was achieved by background research and literature review, database searches, consultation, targeted ecological fieldwork and mapping, detailed habitat assessment, and ultimately impact assessment consideration against the type and form of development proposed.

Impact assessment was undertaken with due reference to the "*Threatened Species Test of Significance Guidelines"* (OEH, 2018).

Specifically, the scope of this study is to:

- Identify vascular plant species occurring within the site, including any threatened species listed under the BC Act or EPBC Act;
- Identify and map the extent of vegetation communities within the site, including any Endangered Ecological Communities (EECs) listed under the BC Act or EPBC Act;
- Identify any fauna species, including threatened and migratory species and populations or their habitats, which occur within the site or are known to occur in the wider locality;
- Assess the potential of the proposed development to have a significant impact on any threatened species, populations or ecological communities (or their habitats) identified from the site;
- Address other legislation and guidelines; and
- Describe measures to be implemented to avoid, minimise and mitigate potential impacts of the proposal.

In addition to the survey work conducted within the Subject Site, consideration has been afforded to the wider locality, via database searches within 10km of the site and via appreciation of habitat areas that may be linked ecologically to the site.

5.0 Methodology

5.1 Information Sources

Information and spatial data provided within this EAR has been compiled from various sources including:

- Aerial Photograph Interpretation (API) of the site and surrounding locality;
- NSW Biodiversity Value Mapping (2023);
- Regent Honeyeater, Swift Parrot and Migratory Shorebird Important Area Mapping;
- Regional mapping – The Native Vegetation of the Sydney Metropolitan Area. Volume 1 (OEH, 2016)
- NSW Department of Planning and Environment – State Environmental Planning Policy (Coastal Management) 2018 Maps
- NSW survey guidelines (DPIE 2020);
- DPIE Threatened Species, Populations and Ecological Communities website (*https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/Default.aspx?a=1*) (2021); and
- Collective knowledge gained from previous ecological survey and assessment in the Northern Beaches region over the past 25 years.

In addition, database searches were carried out, namely:

- Review of flora and fauna records held by the NSW DPIE Atlas of NSW Wildlife within a 10km radius of the site (February 2023); and
- Review of flora and fauna records held by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search within a 5km radius of the Subject Site (February 2023).

5.2 Field Survey

The field surveys for the site have been prepared and performed with due recognition of the State survey guidelines (DEC 2004 & DPIE 2020).

The size of the site, the type of native vegetation and habitats remaining, the status of existing and proposed surrounding land use and the level and type of habitat linkages to proximate bushland areas were considered in formulating the methodology employed and described below.

The assessment approach was tailored to undertake sufficient works to ensure that legislative requirements were met relating to threatened species and native species in general for the proposed specific development. Where any potential doubt remained over species impact, presence within the site was assumed to ensure that a conservative approach was employed.

Survey effort is scheduled in **Table 2.**

5.2.1 Vegetation Communities

Vegetation was surveyed utilising a variety of methods, as outlined below:

- Desktop regional mapping was extracted from The *Native Vegetation of the Sydney Metropolitan Area. Volume 1* (OEH, 2016) (**Figure 3**);
- Aerial Photo Interpretation (API) to identify any notable variations within the site;

- Consultation of 1:25,000 topographic map series for the area;
- Inspection of the site to ground truth the unit(s) identified; and
- Identification of the vegetation map unit occurred via identification of required dominant species in community structural layers.

The final derived vegetation map was based on dominant species present in the canopy, shrub and ground layers. The dominant species composition, structural and physical attributes were all considered when assigning the best fit ecological communities.

Consideration was given to the potential for the derived vegetation communities to constitute EECs as listed under the BC Act and/or EPBC Act. The floristic composition, geomorphological characteristics and geographical extent were important considerations in this process.

AEP

Title: Figure 3 - Regional Vegetation

Date: May 2023

Location: 16 Macpherson Road, Warriewood

Client: Warrimac Pty Ltd

AEP ref: 2564.01

AEP

Title: Figure 4 - Ground- truthed Vegetation

Date: May 2023

Location: 16 Macpherson Road, Warriewood

Client: Warrimac Pty Ltd

AEP ref: 2564.01

5.2.2 Flora

A general flora survey was undertaken to produce a flora species list for the site (**Appendix B**), to search specifically for threatened flora species known from the wider locality, and to gather data necessary to both derive vegetation community type(s) and to meet relevant survey guidelines. Such works included:

- Identification of all vascular plant species encountered during fieldwork;
- Site coverage was systematic to ensure all key points of the Subject Site were checked, and the Random Meander Technique (Cropper 1993) was also utilised to maximise species encountered;
- Two (2) BAM plots were carried outside the Subject Site, due to the degraded nature and past land use as a nursery; and
- A systematic approach to target threatened plant species at the site as per DPIE 2020.

5.2.3 Habitat

An assessment of the relative habitat values present within the Study Area was carried out, with focus on the Subject Site. This assessment focused primarily on the identification of specific habitat types and resources within the Subject Site favoured by known threatened species from the region. The assessment also considered the potential value of the Study Area for all major guilds of native flora and fauna.

The assessment was based on the specific habitat requirements of each threatened fauna species in regards to home range, feeding, roosting, breeding, movement patterns and corridor requirements. Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages.

In particular, focus was put on documenting the presence of key habitat features such as tree hollows. Hollows are an important resource utilised by a variety of forest fauna, and are particularly relevant for several of the likely key threatened species in this locality. Vertebrate and invertebrate species use hollows as diurnal or nocturnal shelter sites, for rearing young, feeding, thermoregulation, and to facilitate ranging behaviour and dispersal.

Tree hollows were surveyed within the Subject Site utilising the methodology of tree hollow identification set by DECC in the Biobanking Operation Manual (Seidel & Briggs, 2008), namely:

> *"A hollow is only recorded if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm across; (c) the hollow appears to have depth (i.e., you cannot see solid wood beyond the entrance); and (d) the hollow is at least 1 m above the ground (this omits hollows in cut stumps or at the base of trees)".*

5.2.4 Fauna

Fauna surveys have been carried out utilising techniques as outlined below**.** Fauna survey work was undertaken with reference to relevant guidelines and to add further information to the generated Expected Fauna Species List (**Appendix B**).

Mammals

The occurrence of mammals within the site was assessed by utilising habitat assessment as an analogue for presence. Such habitat includes foraging resources (blossom, herbaceous, prey etc), hollows and roosting habitat, connectivity and water availability, as outlined above.

Nocturnal survey was undertaken within the Subject site to identify any Koala or nocturnal fauna that may have been utilising the habitat present.

Incidental Observations & Secondary Indications

Incidental records of any fauna species observed during fieldwork were noted. This included opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of any resident or migratory species. Incidental fauna record is provided in **Appendix C**.

5.2.5 Field Surveys

Table 2 – Field Survey Periods

Date	Time	Field Activity	No. of Persons on Site
27/06/2022	13:30 - 19:00	• Habitat Assessment for threatened species • 2 x BAM Plot • General botanical survey using the random meander method • Hollow Bearing Tree (HBT) Survey • Incidental Flora and Fauna observations • Nocturnal Survey • Riparian Assessment • Diurnal Bird Survey	1
28/06/2022	07:45 - 09:00	• Ground- truth Vegetation	1

In addition, by applying rigorous habitat assessment to more mobile species identified in BioNet Atlas records within the locality, it was ensured that any possible use of the Subject Site by notable species was considered and accommodated within subsequent biodiversity assessment and management recommendations (refer to **Figure 5** for survey effort).

AEP

Title: Figure 5 - Survey Effort

Date: May 2023

Location: 16 Macpherson Road, Warriewood

Client: Warrimac Pty Ltd

AEP ref: 2564.01

6.0 Results

6.1 Regional Vegetation Mapping

Regional mapping of the Subject Site, mapped the areas of native vegetation as *PCT 1795 - Swamp Mahogany / Cabbage Tree Palm - Cheese Tree - Swamp Oak tall open forest on poorly drained coastal alluvium in the Sydney basin* (refer **Figure 4).**

6.2 Vegetation Communities

The Subject Site comprises approx. 1.01ha of which comprises of a number of different vegetation forms and conditions.

Ground-truthing vegetation present within the Subject Site determined that the remnant native vegetation consists of *PCT 1795 - Swamp Mahogany / Cabbage Tree Palm - Cheese Tree - Swamp Oak tall open forest on poorly drained coastal alluvium in the Sydney basin*. The BAM Plots were undertaken outside, but adjacent to the Subject Site to provide the best representation of the PCT in the local vicinity and in an area that retained remnant vegetation.

The Subject Site comprises of vegetation conditions consisting of:

- PCT 1795 – approx. 0.10ha;
- Planted Natives – approx. 0.108ha;
- Planted Exotics – approx. 0.13ha and;
- Cleared/ Existing Infrastructure- approx. 0.68ha;

Ground- truthed Vegetation mapping is shown in **Figure 5.**

6.2.1 PCT 1795 - Swamp Mahogany / Cabbage Tree Palm - Cheese Tree - Swamp Oak tall open forest on poorly drained coastal alluvium in the Sydney basin

The canopy species present within the Subject Site include *Eucalyptus robusta* (Swamp Mahogany), C*asuarina glauca* (Swamp Oak) and *Syzygium paniculatum* (Magenta Lilly Pilly). A thin line of canopy is located along the northern and north- eastern boundary which is connected to larger patches of intact remnant vegetation in the neighbouring creekline and lots. Sections of vegetation across from the creek have *Glochidion ferdinandi var. ferdinandi* (Cheese Tree) and *Melaleuca linariifolia* (Flax- leaved Paperbark) included in the canopy.

The mid storey was dominated by exotic species including *Magnolia sp.* (Magnolia), *Ipomoea indica* (Morning Glory), *Dracaena fragans* (Corn Plant). Native species such as *Acacia longifolia* (Sydney Golden Wattle) and *Acmena smithii* (Lilly Pilly) were the prominent shrubs present within the remnant vegetation areas.

The understorey is disturbed with pockets of bare ground and a high weed level due to encroachment from the riparian areas. Despite this, a number of native species are consistent throughout the groundcover particularly *Lomandra longifolia* (Spiky- headed Mat- Rush), *Dianelle, caerulea* (Blue Flax Lily), *Oplismenus aemulus* (Basket Grass) and *Gahnia clarkei* (Tall Saw- sedge). Several exotic grasses were present including *Cenchrus clandestine* (Kikuyu), *Paspalum dilatatum* (Paspalum), *Erharta erecta* (Panic Veldtgrass) and *Solanum americanum* (Glossy Nightshade).

Plate 1 – PCT 1795 in the Subject Site.

6.2.2 Threatened Ecological Communities

One TEC or endangered ecological community was identified on the edge of and adjacent lots to the Subject Site the BC Act-listed: *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and South East Corner Bioregions*.

The identification criteria for this TEC requires the following biotic attributes to be considered present:

- Retains associated humic clay loams and sandy loams soils;
- Waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains;
- Occurs below 20 m (though sometimes up to 50 m) elevation;
- Often on small floodplains or where the larger floodplains adjoin lithic substrates or coastal sand plains;
- Is situated within the NSW North Coast, Sydney Basin and South East Corner bioregions; and
- Retains some of the characteristic species associated with the TEC in the three stratums.

All six elements of the identification criteria were present in varying degrees in the remnant vegetation adjoining the Subject Site on the North and North eastern corner. However, the majority of the vegetation onsite is altered and disturbed with much of the understorey missing or invaded by significant weeds. The remaining vegetation on site is situated within the required bioregion (Sydney Basin IBRA). in a coastal catchment below 20m ASL on lands adjacent to a creek with soils that are hydric and periodically wet. Therefore, all of these diagnostic features are met. Two diagnostic species are also present with a dominant overstorey of *Eucalyptus robusta* (Swamp Mahogony) and a secondary layer of *Casuarina glauca*. Other native species present in the mid-storey include *Livistona australis* (Cabbage Palm) and *Acmena smithii* (Lilly Pilly). Several characteristic ground cover species were also present in the understory *Commelina cyanea* (Native Wandering Jew), *Lomandra longifolia*, *Dianelle, caerulea*, *Oplismenus aemulus* and *Gahnia clarkei*. The ground cover was heavily impacted by

significant weeds, with only small percentage of native cover remaining. Large areas of the understorey are also completely cleared.

Despite the altered and disturbed nature of the vegetation present on site, this TEC is considered to be present as a line of native canopy along the north-eastern and central-eastern boundary of the Subject Site (refer to **Figure 4** – mapped as PCT 1795). It is important to note that whilst this vegetation community meets the criteria established for the NSW BC Act description of the community is does not meet the criteria for the Commonwealth listing of the community. This is discussed further in **Section 8 and 9.**

6.2.3 Exotic Species

Under the *Biosecurity Act 2015*, all plants in NSW are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Twenty-seven (27) exotic species of plants have been identified within the Subject Site. Some of the species have been planted as part of the current land use. Notably three (3) exotic species present, *Asparagus aethiopicus* (Asparagus Fern), *Lantana camara* (Lantana) and *Cestrum parqui* (Green Cestrum) are listed as Priority Weeds of the Greater Sydney at the regional level by the Department of Primary Industries (DPI).

6.3 Threatened Species

During field surveys on site, two (2) *Syzygium paniculatum* (Magenta Lilly Pilly) trees were found present within the Subject Site. These trees are proposed to be removed and replanted within the Biodiversity Management Plan (BMP) Lands. No additional threatened flora or fauna species were recorded onsite during surveys.

Surveys identified that the Subject Site would offer minimal foraging habitat for more mobile species, such as birds and bats. Further, the Subject Site shows signs of past management, does not contain hollow bearing trees and has a disturbed mid storey and understorey as well as no upper storey reducing the value of this area for both ground and arboreal fauna species.

6.4 Habitat Assessment

Native vegetation –The Subject Site comprises 0.208ha of native vegetation, which consists of predominantly wet sclerophyll forest canopy and mid stratum and a heavily disturbed understory with a number of exotic species.

- **Hollow-bearing trees** – No hollow-bearing trees were recorded in the Subject Site.
- **Water features** – Narrabeen Creek is located within the Subject Site. (**Figure 1**).
- **Other habitat features** – No rocky outcrops or other ground habitat of note were observed in the Subject Site.
- **Patch size / connectivity** – The native vegetation on site occurs with a disturbed understorey with canopy. Vegetation within the Subject Site is directly connected to a large area of native vegetation of a similar PCT to the north, (approx. 11ha). The vegetation within the Subject Site therefore represents a very small patch, relative to the surrounding native vegetation.

6.5 Fauna

Fauna surveys undertaken have identified thirteen (13) species within the Subject Site, including ten (10) birds, two (2) reptiles and one (1) frog (**Appendix B**). The Subject Site provides suitable habitat for a range of different species though the lack of hollows likely limits arboreal mammals and other species that rely on hollows for roosting and breeding.

The site may contain foraging opportunities for other species, including mobile (flying) threatened species. They are considered to potentially utilise the site on an intermittent basis as part of a larger home range.

A list of fauna species present onsite has been generated for the site and is included within the Expected Fauna List in **Appendix B**.

6.6 Database Searches

Searches were undertaken of databases within a 10km radius of the Subject Site for BC Act listings and 5km radius for EPBC Act listings. Note that any records considered erroneous, historic only, or obviously of no relevance to the site in regards to habitat (e.g., marine species) were omitted.

The potential for listed threatened species to occur within the site is considered in **Table 3** and Subject Species are discussed in **Table 4.**

Table 3 - Threatened Species Appraisal

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Flora					
Tetratheca glandulosa		V		47	Vegetation structure varies from heaths and scrub to woodlands/open woodlands, and open forest. This species was not detected during the surveys. impacts to this species are considered unlikely.
Epacris purpurascens var. purpurascens		V		3	The closest BioNet Record is located approx. 2km from the Subject Site. This species was not detected during surveys. Considering the location of the closest record was greater than 2km from the Subject Site, impacts to the species area regarded as unlikely.
Chamaesyce psammogeton	Sand Spurge	E		13	This species grows on fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex and Prickly Couch. Flowering recorded in spring and summer. This species was not detected during surveys. Due to the soil composition on the Subject Site, impacts to this species are considered unlikely.
Grammitis stenophylla	Narrow-leaf Finger Fern	E		2	The two BioNet Record recorded are located approximately 3 kilometres from site. The species is found in moist places, usually near streams, on rocks or in trees, in rainforest and moist eucalypt forest. Due to the distance of the BioNet recording, it is unlikely that the proposal will impact the species.
Prostanthera densa	Villous Mint-bush	V	V	1	Only one record of this species occurs within a 10km radius of the Subject Site. This species was not recorded during surveys. The area to be cleared does not contain suitable habitat. This species is unlikely to be impacted by the proposed development.
Lasiopetalum joyceae		V	V	2	Only two record of this species occurs within a 10km radius of the Subject Site. This species was not recorded during surveys. The area to be cleared does not contain suitable habitat. This species is unlikely to be impacted by the proposed development.
Callistemon linearifolius	Netted Bottle Brush	V		5	Grows in dry sclerophyll forest on the coast and adjacent ranges. Preferrable habitat is not present within the Subject Site. Taking into consideration this species was not located within the site and the vegetation is dissimilar with the species habitat, the proposal will not impact this species.

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Eucalyptus camfieldii	Camfield's Stringybark	V	V	59	Occurs mostly in small scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas. This species was not recorded during surveys. The area to be cleared does not contain suitable habitat. This species is unlikely to be impacted by the proposed development.
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	4	This species is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield. BioNet records explain that species in the locality of the site are planted specimens. Therefore, this species is unlikely to be impacted by the proposed development.
Kunzea rupestris		V	V	1	The single BioNet record of this species is located approx. 2.5 kilometres to the west of the Subject Site. Grows in shallow depressions on large flat sandstone rock outcrops. Characteristically found in short to tall shrubland or heathland. The species was not recorded in the survey effort, consequently the proposal will highly unlikely impact the species.
Rhodamnia rubescens	Scrub Turpentine	E	CE	23	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species was not recorded during surveys. This species is unlikely to be impacted by the proposed development.
Syzygium paniculatum	Magenta Lilly Pilly	E	V	19	This species was found within the Subject Site. **SUBJECT SPECIES**
Genoplesium baueri	Bauer's Midge Orchid	E	E	2	Grows in dry sclerophyll forest and moss gardens over sandstone. The area to be cleared does not contain suitable habitat. This species is unlikely to be impacted by the proposed development.
Microtis angusii	Angus's Onion Orchid	E	E	74	A population exists in Ingleside, with the specimens existing within highly disturbed vegetation. Potential to exist in the EEC Duffys Forest Vegetation Community. This species was not recorded during surveys. This species is unlikely to be impacted by the proposed development.
Grevillea caleyi	Caley's Grevillea	E	CE	196	Commonly found in the endangered Duffys Forest ecological community of open forest, generally dominated by Eucalyptus sieberi and E. gummifera. No suitable habitat is present with the site and this species is unlikely to be impacted by the proposed development.

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Persoonia hirsuta	Hairy Geebung	E	E	6	Found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone. No suitable habitat is present with the site and this species is unlikely to be impacted by the proposed development.
Pimelea curviflora var. curviflora		V	V	13	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. No suitable habitat is present with the site and this species is unlikely to be impacted by the proposed development.
Fauna					
Amphibians					
Pseudophryne australis	Red-crowned Toadlet	V		116	The Red-Crowned Toadlet occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or capping's. Habitat is found on site with Narrabeen Creek located at the northern end of the site. **SUBJECT SPECIES**
Heleioporus australiacus	Giant Burrowing Frog	V	V	44	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Species has potential to use the Site as breeding and foraging habitat. **SUBJECT SPECIES**
Litoria aurea	Green and Golden Bell Frog	E	V	3	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.). Optimum habitat includes water-bodies that are unshaded and free of predatory fish. Preferable habitat is found within the site; therefore, the species has the potential to use the Subject Site. **SUBJECT SPECIES**

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Reptiles					
Caretta caretta	Loggerhead Turtle	E	E	6	Narrabeen Creek is not suitable habitat for this species due to the disturbed nature and lack of depth of the waterway. Considering the site lacks suitable habitat for this species, the impacts from this proposal will not impact this species.
Chelonia mydas	Green Turtle	V	V	10	Narrabeen Creek is not suitable habitat for this species due to the disturbed nature and lack of depth of the waterway. Considering the site lacks suitable habitat for this species, the impacts from this proposal will not impact this species.
Dermochelys coriacea	Leatherback Turtle	E	E	3	Narrabeen Creek is not suitable habitat for this species due to the disturbed nature and lack of depth of the watercourse. Considering the site lacks suitable habitat for this species, the impacts from this proposal will not impact this species.
Varanus rosenbergi	Rosenberg's Goanna	V		73	Found in heath, open forest and woodland. This species was not recorded during surveys. This species is unlikely to be impacted by the proposed development.
Aves					
Ptilinopus magnificus	Wompoo Fruit-Dove	V		2	Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests which are not present within the Subject Site and impacts are considered unlikely.
Ptilinopus regina	Rose-crowned Fruit-Dove	V		2	Occurs mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. This species was not recorded during surveys. This species is unlikely to be impacted by the proposed development.
Ptilinopus superbus	Superb Fruit-Dove	V		3	Inhabits rainforest and closed forests which are not present within the Subject Site and impacts are considered unlikely.
Diomedea exulans	Wandering Albatross	E	E	2	Marine bird. Suitable habitat is not present within the Subject Site and impacts are considered unlikely.

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Thalassarche cauta	Shy Albatross	V	V	3	Marine bird. Suitable habitat is not present within the Subject Site and impacts are considered unlikely.
Thalassarche melanophris	Black-browed Albatross	V	V	2	Marine bird. Suitable habitat is not present within the Subject Site and impacts are considered unlikely.
Ardenna carneipes	Flesh-footed Shearwater	V		2	Marine bird. Nests on Lord Howe Island. Suitable habitat is not present within the Subject Site and impacts are considered unlikely.
Botaurus poiciloptilus	Australasian Bittern	E	E	3	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Species unlikely to be impacted by the proposal as preferred habitat is not found on site.
Ixobrychus flavicollis	Black Bittern	V		25	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Species unlikely to be impacted by the proposal.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V		44	Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. No nest trees were located within the Subject Site and the species is considered unlikely to be impacted.
Hieraaetus morphnoides	Little Eagle	V		9	Species forages primarily in the canopy of open Eucalyptus Forest and woodlands. The habitat is not preferred for this species; therefore, the species is considered unlikely to be impacted.
Lophoictinia isura	Square-tailed Kite	V		4	Only four (4) record of species occurring within the locality. Site lacks the presence of any timbered habitats that the species might utilise. Considered highly unlikely to be impacted.
Pandion cristatus	Eastern Osprey	V		32	Species favours coastal areas, especially the mouths of large rivers, lagoons and lakes. There are lagoons and coastal waters nearby to the site, however proposed development will not impact these habitats and therefore the species is unlikely to occur on site.

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Burhinus grallarius	Bush Stone-curlew	E		10	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. Preferred habitat is not present within the Subject Site. Considered highly unlikely to be impacted.
Haematopus fuliginosus	Sooty Oystercatcher	V		7	Marine bird. Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Suitable habitat is not present within the Subject Site and impacts are considered unlikely.
Rostratula australis	Australian Painted Snipe	E	E	3	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Historical records are found within Warriewood Wetlands. Species unlikely to be impacted by the proposal.
Xenus cinereus	Terek Sandpiper	V		2	Marine bird. Favours mudbanks and sandbanks located near mangroves. Suitable habitat is not present within the Subject Site and impacts are considered unlikely.
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	3	Only three (3) record of species occurring within the locality. Species inhabits timbered, dry woodlands and open forests. Subject Site does not have suitable habitat. Considered highly unlikely to be impacted.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	104	Lives in coastal woodlands and drier forest areas, open inland woodlands, or timbered watercourses where its main food source, the casuarina (she-oak) is common. Site has potential habitat. **SUBJECT SPECIES**
Glossopsitta pusilla	Little Lorikeet	V		14	Forages primarily in the canopy of open Eucalyptus Forest and woodland. Subject Site does not have suitable habitat. Considered highly unlikely to be impacted.
Lathamus discolor	Swift Parrot	E	CE	25	The site is not mapped as important area for this species and impacts are considered unlikely.
Ninox connivens	Barking Owl	V		35	No suitable roosting habitat, such as large hollow bearing trees, is present within the site. However, the site may constitute suitable marginal foraging habitat. **SUBJECT SPECIES**

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Ninox strenua	Powerful Owl	V		490	No suitable roosting habitat, such as large hollow bearing trees, is present within the site. However, the site may constitute suitable marginal foraging habitat. **SUBJECT SPECIES**
Tyto novaehollandiae	Masked Owl	V		4	No suitable roosting habitat, such as large hollow bearing trees, is present within the site. However, the site may constitute suitable marginal foraging habitat. **SUBJECT SPECIES**
Tyto tenebricosa	Sooty Owl	V		1	No suitable roosting habitat, such as large hollow bearing trees, is present within the site. Atlas records are limited in the locality. Subject Site does not have suitable habitat. Considered highly unlikely to be impacted.
Anthochaera phrygia	Regent Honeyeater	E	CE	39	The site is not mapped as important area for this species and impacts are considered unlikely.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V		1	Inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. Atlas records are limited in the locality. Subject Site does not have suitable habitat. Considered highly unlikely to be impacted.
Daphoenositta chrysoptera	Varied Sittella	V		4	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches. While the species was not recorded during surveys, the habitat is potentially suitable. **SUBJECT SPECIES**
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		2	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacia and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. While the species was not recorded during surveys, the habitat is potentially suitable. **SUBJECT SPECIES**
Petroica boodang	Scarlet Robin	V		2	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. Atlas records are limited in the locality. Considered highly unlikely to be impacted.

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Mammals					
Dasyurus maculatus	Spotted-tailed Quoll	V	E	15	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Species was not recorded during surveys. Considered highly unlikely to be impacted.
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E	E	20	They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. Limited ground habitat is found within the site. Considered highly unlikely to be impacted.
Phascolarctos cinereus	Koala	E	E	35	All records nearby are greater than 20 years and are in locations not connected to the site. Considered highly unlikely to be impacted.
Cercartetus nanus	Eastern Pygmy-possum	V		445	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath. Shelters in tree hollows. No tree hollows were found and this species was not recorded during nocturnal surveys.
Petaurus norfolcensis	Squirrel Glider	V		6	Inhabits mature or old growth eucalypt forest and requires abundant tree hollows for refuge and nest sites. No hollow- bearing trees were present within the Subject Site. Considered highly unlikely to be impacted.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	137	This species was not recorded on site and the Subject Site does not contain known or suspected breeding habitat. Given the species is highly mobile it is unlikely that the proposed development will have a significant impact on this species.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		3	This species was not recorded on site and the Subject Site does not contain known or suspected breeding habitat. Given the species is highly mobile, it may occasionally forage on site. **SUBJECT SPECIES**
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V		23	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Species was not recorded during surveys. Considered highly unlikely to be impacted.

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	16	This species was not recorded on site and the Subject Site does not contain known or suspected breeding habitat. Given the species is highly mobile, it may occasionally forage on site. **SUBJECT SPECIES**
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		3	This species was not recorded on site and the Subject Site does not contain known or suspected breeding habitat. Given the species is highly mobile, it may occasionally forage on site. **SUBJECT SPECIES**
Myotis macropus	Southern Myotis	V		55	This species was not recorded on site and the Subject Site does not contain known or suspected breeding habitat. Given the species is highly mobile, it may occasionally forage on site. **SUBJECT SPECIES**
Scoteanax rueppellii	Greater Broad-nosed Bat	V		10	This species was not recorded on site and the Subject Site does not contain known or suspected breeding habitat. The waterbody provides potential foraging habitat for this species. **SUBJECT SPECIES**
Vespadelus troughtoni	Eastern Cave Bat	V		1	This species was not recorded on site and the Subject Site does not contain known or suspected breeding habitat. Given the species is highly mobile, it may occasionally forage on site. **SUBJECT SPECIES**
Miniopterus australis	Little Bent-winged Bat	V		57	This species was not recorded on site and the Subject Site does not contain known or suspected breeding habitat. Given the species is highly mobile, it may occasionally forage on site. **SUBJECT SPECIES**
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		123	This species was not recorded on site and the Subject Site does not contain known or suspected breeding habitat. Given the species is highly mobile, it may occasionally forage on site. **SUBJECT SPECIES**

Scientific Name	Common Name	NSW status	Comm. status	BioNet Records	Likelihood of Occurrence
Dugong dugon	Dugong	E		2	No suitable habitat is present within the site. Considered unlikely to be impacted.
Arctocephalus forsteri	New Zealand Fur-seal	V		10	No suitable habitat is present within the site. Considered unlikely to be impacted.
Eubalaena australis	Southern Right Whale	E	E	3	No suitable habitat is present within the site. Considered unlikely to be impacted.
Physeter macrocephalus	Sperm Whale	V		5	No suitable habitat is present within the site. Considered unlikely to be impacted.

7.0 Subject Species Considerations

The species identified for further consideration have been categorised into guilds in **Table 4.** By considering these species and their lifecycle needs, many other species are also inadvertently considered. The analysis below considers key lifecycle features for each guild of species in more detail, and assists in informing the subsequent 5-part test assessment (**Section 8**).

Table 4 – Species Analysis

Guilds/ Species	Key Habitat Feature	Comment
Flora *Syzygium paniculatum*	Presence within site	Two occurrences of the species are present within the Subject Site. The proposal includes the translocation of the species into the Biodiversity Management Plan Lands.
Amphibians Red- Crowned Toadlet Giant Burrowing Frog Green and Golden Bell Frog	Abundance of records, suitable foraging habitat on site.	No records of the species on site. The highly degraded nature of the Subject Site and high sediment loads within the creek would limit habitat for these species. It has been determined although habitat is present it is highly degraded and changing sediment loads significantly reduce the likelihood of the species occurring within the Subject Site, Therefore, it has been determined that the proposed development would have an impact on the species.
Small Birds Varied Sittella Dusky Woodswallow	Suitable foraging habitat on site.	No records of the species on site. The species are highly mobile and given the limited foraging and nesting within the Subject Site it has been determined likelihood of the species occurring within the Subject Site, Therefore, it has been determined that the proposed development would have an impact on the species. .
Glossy- Black Cockatoo	Suitable foraging habitat on site.	Large areas of foraging habitat on site. Targeted surveys for the species were undertaken with none recoded. The species is highly mobile and the Subject Site is highly urbanised requiring the likelihood for the species to frequent the Subject Site. No records of the species on site. Therefore, it has been determined that the proposed development would have an impact on the species.
Forest owls Powerful Owl, Masked Owl, Barking Owl	Abundance of records; marginal foraging habitat present on site.	No records of the species, and no nesting within the Subject Site. Foraging for the species is high, however, they are mobile species and are likely to utilise a large area within the region. Therefore, it has been determined that the proposed development would have an impact on the species.
Microbats Yellow- bellied Sheathtail- Bat, Eastern Coastal Free- tailed Bat, Large- eared Pied Bat, Eastern False Pipistrelle, Southern Myotis, Greater Broad- nosed Bat, Eastern Cave Bat, Little Bent-winged Bat and Large Bent winged Bat	Marginal foraging habitat on site.	No records of the species, and no roosting sites within the Subject Site. Foraging for the species is high, however, they are mobile species and are likely to utilise a large area within the region. Therefore, it has been determined that the proposed development would have an impact on the species.

8.0 5-Part Test Assessment

Section 7.3 of the BC Act lists five factors that must be taken into account in determining the significance of potential impacts of proposed activities on threatened species, populations, ecological communities and/or their habitats as listed within the BC Act.

The 5-part test is used to determine whether there is likely to be a significant impact, and thus whether the Biodiversity Offsets Scheme (BOS) is triggered.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

The Subject Site does not contain any hollow bearing trees, limiting providing roosting habitat for species such as birds, arboreal mammals, and microbats. Impacts to the native vegetation will be avoided and minimised where possible.

Flora

Two *Syzygium paniculatum* species were recorded within the Subject Site which are proposed to be cleared. However, translocation of this species will occur and will be protected under a Biodiversity Management Plan (BMP) within the Subject Site. Furthermore, compensatory planting within residue lands will further mitigate impacts as a result of the proposal.

Amphibians

These species were not detected during surveys. However, there is potential for this species to use the site for foraging with Narrabeen Creek located adjacent to the site. There is connectivity to retained riparian vegetation in which these species may forage therefore, the development is unlikely to significantly impact the species.

Birds

Threatened bird species were not recorded on site during field surveys or through previous surveys as recorded in BioNet. Marginal foraging habitat is present on site, but there is no evidence of site use for roosting, nesting or breeding purposes by small birds or Forest Owls. As such, it is considered that the site offers marginal foraging habitat. Therefore, the proposal was not deemed as likely to have an adverse effect on the life cycle of threatened bird species.

Microbats

Threatened microbat species have potential to utilise the site for foraging purposes. No evidence of roosting or breeding was found on site during surveys or as evidenced by BioNet records. The species are very mobile and the extent of the proposed impact area is very limited. As such, it is not considered that the proposal will lead to adverse impacts on the lifecycle of threatened microbat species.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

The vegetation found on the site identified as PCT 1795 aligns with the BC Act-listed endangered ecological community: Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and South East Corner Bioregions.

This community exists as a line of native canopy with a highly degraded mid & lower stratum. However, it is connected to larger areas of vegetation in neighbouring lots. Considering that the proposal involves the removal of 0.1ha of disturbed vegetation from this TEC and the presence of larger areas of the commensurate vegetation nearby, the removal of 0.1ha of this TEC is not expected to have an adverse effect on the extent of the ecological community or modify its composition in a way that puts its local occurrence at risk of extinction.

Additionally, 0.15ha of remnant PCT 1795 will be managed under a BMP, which will enhance the composition and increase the extent of Swamp Sclerophyll Forest within the area.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

Given that the area proposed to be cleared is minimal (0.10ha) and contains only foraging habitat for mobile species it is not considered there would be serious impacts to this species.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The proposed development occurs on the edge of a well-connected highly vegetated area and is already affected by edge effects and management from previous and current land-use. While a small portion of the habitat will be removed by the proposal, the wider nearby vegetation would continue to provide habitat values to fauna and flora species within the area as well as ensuring connectivity in the wider locality.

(d) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The vegetation to be directly impacted by the proposal does not provide significant habitat for threatened fauna species that may occur within the Subject Site, representing foraging habitat only. Removal of vegetation within the Subject Site will not result in isolated or fragmented habitat patches and will not impact the long-term survival of any threatened species of EEC in the locality.

(e) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

The proposed development will not directly or indirectly impact Areas of Outstanding Biodiversity Value.

(f) Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process (KTP)

The development has potential to contribute to the following KTPs:

- *Anthropogenic climate change*

The proposal will contribute in a small way to the processes causing Anthropogenic Climate Change via the removal of vegetation which acts as a carbon sink. However, due to the small number of trees to be impacted, it is considered an insignificant contribution to this KTP

- *Clearing of native vegetation*

The proposal will involve the removal of a small amount (approx. 0.208ha) of remnant native vegetation. However, the removal is not considered to contribute to this KTP in any notable magnitude.

- *Invasion and establishment of aggressive weed species and exotic perennial grasses*

Weed species and exotic grasses were recorded at the Subject Site. However, the proposed development will not contribute to this KTP, and may reduce the establishment of aggressive weed species by clearing and maintaining the vegetation within the proposed development.

- *Infection of native plants by Phytophthora cinnamomi*

There is potential for the development to contribute to this KTP during the clearing and construction phase. Appropriate hygiene protocols are outlined in **Section 13**. If such controls are implemented, the risk for the proposal to contribute to this KTP will be minimised.

- *Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae*

There is potential for the proposal to contribute to this KTP during the clearing and construction phase. Appropriate hygiene protocols are outlined within **Section 13**. If such controls are implemented, the risk for the development to contribute to this KTP will be minimised.

(i) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

Vegetation proposed to be removed is already fragmented and isolated from previous and current land use. The proposed development occurs on the edge of a well-connected highly vegetated area, and is already affected by edge effects and management from previous and current land-use.

While a small portion of the habitat will be removed by the proposal, the wider creek line revegetation would continue to provide habitat values to fauna and flora species within the area as well as ensuring connectivity in the wider locality. Similarly, ongoing maintenance and weed management works, as outlined in the BMP, improve habitat connectivity in the eastern area.

9.0 EPBC Act Assessment

A search was conducted in February 2023 for *Matters of National Environmental Significance* (MNES) as relevant to *the Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act). The following MNES are considered in this assessment.

World Heritage Properties:

The site is not a World Heritage area and is not in close proximity to any such area.

National Heritage Place:

Ku-ring-gai Chase National Park, Lion, Long and Spectacle Island Nature Reserve is located within the buffer area.

Wetlands of International Significance (declared Ramsar wetlands):

The site does not contain Ramsar wetland and is not in close proximity to such area

Great Barrier Reef Marine Park:

The site is not part of, or within close proximity to, the Great Barrier Reef Marine Park.

Commonwealth Marine Areas:

The site is not part of, or within close proximity to, any Commonwealth Marine Area.

Threatened Ecological Communities:

There are eight (8) Threatened Ecological Communities listed within 10 km of the Subject Site or in close proximity to the site. The Threatened Ecological Communities comprise of:

- *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community;*
- *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland;*
- *Coastal Upland Swamps in the Sydney Basin Bioregion;*
- *Eastern Suburbs Banksia Scrub of the Sydney Region;*
- *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia;*
- *Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion;*
- *River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria; and*
- *Subtropical and Temperate Coastal Saltmarsh.*

One TEC was identified under the NSW BC Act- Swamp Sclerophyll Forest on Coastal Floodplains. This community is considered to be the equivalent of *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland.* However, the disturbed and altered vegetation remaining onsite did not meet the criteria for the TEC under the EPBC act (refer to **Table 5** below).

All of the other above communities were not identified within the immediate vicinity of the proposed development and the development will not be impacting these threatened ecological communities.

Table 5 – EPBC Assessment for TEC presence- Coastal Swamp Sclerophyll Forest

Assessment of Key Diagnostics	
Key Diagnostics	**Assessment of features onsite**
Occurs on the mainland and islands near to the coast (within 20 km) from South East Queensland to south-eastern NSW specifically within these IBRA Bioregions: South Eastern Queensland (SEQ); NSW North Coast (NNC); Sydney Basin	Yes: vegetation occurs within the Sydney Basin IBRA.

Assessment of Key Diagnostics	
(SYB) and the Bateman sub-region of the South East Corner (SEC).	
Occurs in coastal catchments typically below 20m ASL, but occasionally up to 220m ASL	Yes: vegetation occurs in a coastal catchment below 20m ASL.
Occurs on hydric soils with inundation patterns ranging from intermittent to episodic.	Yes: vegetation occurs adjacent to a creek; the soils are hydric and periodically wet. Therefore, this diagnostic characteristic is met.
The vegetation structure varies from tall closed to open forest to woodland, to dense (closed) shrubland or scrub forest. Minimum crown cover (see footnote 5, p. 4) is at least 10%, but it is more typically in the range 50% to 70%.	Yes: the crown cover is at least 10%.
From South East Queensland to the Sydney Basin Bioregion, the canopy is typically dominated or co-dominated by Melaleuca quinquenervia and/or Eucalyptus robusta. In some areas, the canopy may be locally dominated by other melaleuca species including M. dealbata (SEQ bioregion) (rarely); M. biconvexa (mid-NSW coast to south of Sydney); M. decora (north of Shoalhaven), frequently with Parsonsia straminea climbing on the trunks of canopy species. In the SEC bioregion, M. ericifolia may occur as a dominant canopy or sub-canopy species.	Yes: vegetation has a high cover of *Eucalyptus robusta* .
Other tree species may occur in the canopy (or sub-canopy) in some areas, but they are not dominant across a patch, including Casuarina glauca, Banksia spp., Callistemon salignus, Corymbia intermedia (Pink Bloodwood), E. tereticornis, (Forest Red Gum/Queensland Blue Gum), E. longifolia (Woollybutt), E. botryoides (Southern Mahogany/Bangalay), E. ovata (Swamp Gum), Livistona australis and/or Lophostemon spp.	Yes: Casuarina glauca occurs in the canopy.
The understorey typically includes a variable ground layer, depending on the canopy cover and inundation rate/period. Tall sedges (typically Gahnia spp.) and/or ferns often dominate the ground layer, mixed with graminoids and other herbs, especially Imperata cylindrica (Blady Grass).	No: There is no native understory in the first BAM plot undertaken at the site, and only 3 native species comprising less than 2% of the cover in the second BAM plot. Therefore, the understorey does not constitute a variable ground layer. Instead, the ground cover consists of predominantly non-native species including but not limited to Ipomoea indica, Lantana Camara, Solanum Americanum and Xanthosoma sagittifolium, with a lack of ferns and native grasses. Therefore, this diagnostic feature is not met.

Condition classes, categories, and thresholds					Assessment
Patch size thresholds Biotic thresholds	Large patch The patch is at least 5ha. It may or may not be contiguous with other native vegetation.	Medium patch The patch is at least 2ha and less than 5 ha. It may or may not be contiguous with other native vegetation.	Small contiguous patch The patch is at least 0.25ha and less than 2ha and is part of a larger area of native vegetation of at least 5 ha.	Small patch The patch is at least 0.5ha and less than 2ha which is isolated or part of a small native vegetation remnant less than 5 ha in total.	Small contiguous patch The patch is at least 0.25ha and less than 2ha and is part of a larger area of native vegetation of at least 5 ha.
HIGH CONDITION Non-native	CLASS A A large patch that meets key diagnostics	CLASS B1 A medium patch that meets key	CLASS B2 A small patch that meets key	CLASS C1 A small patch which meets	No groundcovers are

Condition classes, categories, and thresholds					Assessment
species comprise < 20% of total ground layer vegetation cover*	AND has a predominantly native ground layer.	diagnostics AND has a predominantly native ground layer.	diagnostics AND has a predominantly native ground layer AND is contiguous** with another large area of native vegetation.	key diagnostics AND has a predominantly native ground layer.	dominated by exotics and weeds.
GOOD CONDITION Non-native species comprise 20% to 50% of total ground layer vegetation cover*	CLASS B1 A large patch that meets key diagnostics AND the ground layer is mostly native.	CLASS C1 A medium patch that meets key diagnostics AND the ground layer is mostly native.	CLASS C2 A small patch that meets key diagnostics AND has a mostly native ground layer AND is contiguous** with another large area of native vegetation	CLASS C2 A small patch that meets key diagnostics AND has a mostly native ground layer.	No groundcovers are dominated by exotics and weeds.
MODERATE CONDITION Non-native species comprise 50% - 80% of total ground layer vegetation cover*	CLASS C1 A large patch which meets key diagnostics AND the ground layer has at least 20% native vegetation cover.	CLASS C2 A medium patch that meets key diagnostics AND the ground layer has at least 20% native vegetation cover	Not protected	Not protected	Not protected
LOW CONDITION Non-native species comprise more than 80% of total ground layer vegetation cover*	CLASS C2 A large patch which meets key diagnostics, but the ground layer has low native vegetation cover.	Not protected	Not protected	Not protected	Not protected
Meet Criteria (referral required)		The *Coastal Swamp Sclerophyll Forest* does not meet the criteria for an EPBC, Act listed community. Therefore, no additional surveys or referral.			

*Refers to total perennial ground layer vegetation cover for the patch of the ecological community. Includes vascular plant species with a lifecycle of more than two growing seasons. It includes herbs (graminoids and forbs), grasses, shrubs, and juvenile plants of canopy species, but does not include annual plants, cryptogams, leaf litter or exposed soil.

**Contiguous means the patch is connected or within 30 m of another area of native vegetation. See Appendix B for further information on non-native/invasive alien plants associated with the Coastal Swamp Sclerophyll Forest.

Threatened Species:

Two *Syzygium paniculatum* trees have been identified on site. These trees will be translocated to the Biodiversity Management Plan Lands. Given these species have been planted with the previous use (nursey) and the proposal is translocation and management it has been determined that a referral is not required.

Given that the site does not contain suitable habitat, as per *EPBC referral guidelines for the vulnerable Koala* (DoE 2014), referral is not recommended.

Migratory Species:

There is potential for some of the migratory terrestrial species listed in the EPBC Act to visit the site on an irregular basis. However, it is considered that due to the small amount of native vegetation to be cleared, the proposal is unlikely to significantly affect the availability of potential habitat for such mobile species, or disrupt migratory patterns.

EPBC Act Assessment Conclusion:

Consideration of the EPBC Act revealed that it is unlikely that significant impacts on Matters of National Environmental Significance will occur as a result of the proposal. As such a referral is not considered likely to be necessary.

10.0 SEPP (Resilience and Hazards) 2021

The State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) commenced on 1 March 2022. The State Environment Planning Policy (Coastal Management) 2018 (Coastal Management SEPP) was one SEPP that was consolidated within the Resilience and Hazards SEPP 2021 under Chapter 2 Coastal Management. No policy changes were made as part of the consolidation nor did the legal effect of the existing SEPPs, with section 30A of the Interpretation Act 1987 applying to the transferred provisions. The consolidation was undertaken in accordance with section 3.22 of the Environmental Planning and Assessment Act 1979.

Investigations in accordance with the State Environmental Planning Policy (Resilience and Hazards) 2021 (R&H SEPP) found that the Subject Site is not within Coastal Wetlands Area or Littoral Rainforest Area.

Therefore, the R&H SEPP does not apply and no further assessment is required.

11.0 Water Management Act 2000

The objects of the *Water Management Act, 2000 (*WM Act), are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. Ecological Considerations within the objectives focus on applying the principles of ecologically sustainable development, to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality. There is also a focus on having an integrated management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna.

The assessment of the Subject Site showed Narrabeen Creek a second order stream runs through the Subject Site refer **Figure 1**. An assessment of the Creek and proposed development have been undertaken to ensure the objectives of WM Act have been implemented within the design of the proposed development.

In accordance with *Section 91* of the Wm Act, if there are works proposed within 40m of a watercourse a Controlled Activity Application is required. The creekline and riparian area is proposed to be reconstructed, regenerated and managed under a Biodiversity Management Plan. The proposed reconstruction includes the installation of a new standard creek profile.

To ensure protection of the upstream and downstream riparian area measure such as erosion and sedimentation controls are to be installed prior to construction commencing, and regularly inspected and maintained (weekly or after rain events) during construction works.

The Water Sensitive Urban Design (WSUD) measures will be incorporated within the detailed design of each stage to ensure Narrabeen Lagoon Catchment is maintained and enhanced for both quality and quantity.

In accordance with *Section 9*1of the WM Act a Controlled Activities Approval is required and has been prepared as part of this application. It is noted that a BMP has been prepared to accompany this DA, which can be utilised as part of the CAA for works within 40m of Waterfront Land.

12.0 Fisheries Management Act 1994

The objects of the *Fisheries Management Act, 1994 (*FM Act), are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. Ecological considerations within the objectives focus on the:

- Conservation of fish stocks and key fish habitats, threatened species, populations and ecological communities of fish and marine vegetation, and
- Promote ecologically sustainable development, including the conservation of biological diversity,

The assessment of the Subject Site showed Narrabeen Creek a second order stream runs through the Subject Site refer **Figure 1**. An assessment of the Creek and proposed development have been undertaken to ensure the objectives of FM Act have been implemented within the design of the proposed development.

In accordance with *Section 201* Dredge and Reclamation and *219 Blockage to Fish Passage* of the FM Act, a Permit is required to undertake the proposed works to reconstruct the creek bed and riparian corridor. Approval is required and has been prepared as part of this application

It is noted that a BMP has been prepared to accompany this DA and can be utilised as part of the FM Act permit for works proposed within Narrabeen Creek.

13.0 Pittwater Local Environmental Plan 2014

The Pittwater Local Environmental Plan, 2014, (LEP) commenced on 27 June 2014.

The particular aims of this plan are as follows:

- to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts,
- to promote development in Pittwater that is economically, environmentally and socially sustainable,
- to ensure development is consistent with the desired character of Pittwater's localities,
- to support a range of mixed-use centres that adequately provide for the needs of the Pittwater community,
- to retain and enhance land used for employment purposes that is needed to meet the economic and employment needs of the community both now and in the future,
- to improve access throughout Pittwater, facilitate the use of public transport and encourage walking and cycling,
- to encourage a range of housing in appropriate locations that provides for the needs of the community both now and in the future,
- to protect and enhance Pittwater's natural environment and recreation areas,
- to conserve Pittwater's European and Aboriginal heritage,
- to minimise risks to the community in areas subject to environmental hazards including climate change,
- to protect and promote the health and well-being of current and future residents of Pittwater.

The assessment in **Table 6** assesses relevant ecological clauses within the LEP to ensure the aims of the LEP can be achieved.

Table 6 – LEP Assessment

Clause Number	Clause	AEP Assessment
Land Use Table		
Objectives of zone	**Zone R3 Medium Density Residential**	
	To provide for the housing needs of the community within a medium density residential environment.	Addressed in the Statement of Environmental Effects (SEE)
	To provide a variety of housing types within a medium density residential environment.	Addressed in the SEE
	To enable other land uses that provide facilities or services to meet the day to day needs of residents.	Addressed in the SEE
	To provide for a limited range of other land uses of a low intensity and scale, compatible with surrounding land uses.	Addressed in the SEE
Permitted without consent	Home businesses; Home occupations	N/A

Clause Number	Clause	AEP Assessment
Permitted with consent	Attached dwellings; Bed and breakfast accommodation; Boarding houses; Building identification signs; Business identification signs; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling houses; Environmental protection works; Exhibition homes; Group homes; Health consulting rooms; Home-based child care; Home industries; Multi dwelling housing; Neighbourhood shops; Oyster aquaculture; Places of public worship; Residential flat buildings; Respite day care centres; Roads; Secondary dwellings; Semi-detached dwellings; Seniors housing; Serviced apartments; Tank-based aquaculture; Veterinary hospitals	Development proposal consists of a residential subdivision, construction of dwelling houses and semi- detached dwellings.
Prohibited	Any other development not specified in item 2 or 3	N/A
Part 6 – Urban release areas		
	6.1 Warriewood Valley Release Area	
6.1.1	The objectives of this clause are as follows— (a) to permit development in the Warriewood Valley Release Area in accordance with the Warriewood Valley Strategic Review Report and the Warriewood Valley Strategic Review Addendum Report, (b) to ensure that development in that area does not adversely impact on waterways and creek line corridors, protects existing native riparian vegetation and rehabilitates the creek line corridors.	Addressed in the SEE
6.1.2	This clause applies to the land in the Warriewood Valley Release Area.	Addressed in the SEE
6.1.3	Development consent must not be granted for development on land in a buffer area or sector or at an address mentioned in Column 1 of the table to this clause unless the consent authority is satisfied that the total number of dwellings shown opposite that buffer area, sector or address in Column 2 of that table will be erected.	Addressed in the SEE
6.1.4	Development consent must not be granted for development on land to which this clause applies unless the consent authority is satisfied that the proposed development will not have any significant adverse impact on any of the following— (a) opportunities for rehabilitation of aquatic and riparian vegetation, habitats and ecosystems within creek line corridors, (b) the water quality and flows within creek line corridors, (c) the stability of the bed, shore, and banks of any watercourse within creek line corridors.	The creekline is proposed to be reconstructed under this development with the installation of new natural channel with pool, riffles and meanders, which is to be managed under the Biodiversity Management Plan (BMP). To ensure protection of downstream riparian areas from erosion and sedimentation, controls are to be installed prior to construction commencing and regularly inspected and maintained throughout the construction process.
6.1.5	In this clause— ***buffer area*** means land identified as "buffer area" on the Urban Release Area Map.	Noted

Clause Number	Clause	AEP Assessment
	creek line corridor means land identified as "creek line corridor" on the Urban Release Area Map. ***sector*** means land identified as "sector" on the Urban Release Area Map. ***Warriewood Valley Release Area*** means the land identified as Warriewood Valley Release Area on the Urban Release Area Map.	
Part 7 – Additional Local Provisions		
7.1	**7.1 Acid Sulphate Soils**	
	1. The objective of this clause is to ensure that development does not disturb, expose or drain acid sulphate soils and cause environmental damage.	Addressed in the SEE
	2. Development consent is required for the carrying out of works described in the table to this subclause on land shown on the Acid Sulphate Soils Map as being of the class specified for those works. Class 4 – Works more than 2 metres below the natural ground surface. Works by which the water table is likely to be lowered more than 2 metres below the natural ground surface.	Addressed in the SEE
	3. 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.	Addressed in the SEE
	4. Despite subclause (2), development consent is not required under this clause for the carrying out of works if— (a) a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual indicates that an acid sulfate soils management plan is not required for the works, and (b) the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person proposing to carry out the works.	Addressed in the SEE

Clause Number	Clause	AEP Assessment
	5. Despite subclause (2), development consent is not required under this clause for the carrying out of any of the following works by a public authority (including ancillary work such as excavation, construction of access ways or the supply of power)— (a) emergency work, being the repair or replacement of the works of the public authority, required to be carried out urgently because the works have been damaged, have ceased to function or pose a risk to the environment or to public health and safety, (b) routine maintenance work, being the periodic inspection, cleaning, repair or replacement of the works of the public authority (other than work that involves the disturbance of more than 1 tonne of soil), (c) minor work, being work that costs less than $20,000 (other than drainage work).	Addressed in the SEE
	6. Despite subclause (2), development consent is not required under this clause to carry out any works if— (a) the works involve the disturbance of less than 1 tonne of soil, and (b) the works are not likely to lower the water table.	Addressed in the SEE
7.2	**7.2 Earthworks**	
	1. The objective of this clause is to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land.	Addressed in the Erosion and Sedimentation Control Plan (ESCP)
	2. Development consent is required for earthworks unless— (a) the earthworks are exempt development under this Plan or another applicable environmental planning instrument, or (b) the earthworks are ancillary to development that is permitted without consent under this Plan or to development for which development consent has been given.	Addressed in the ESCP
	3. In deciding whether to grant development consent for earthworks (or for development involving ancillary earthworks), the consent authority must consider the following matters— (a) the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development, (b) the effect of the development on the likely future use or redevelopment of the land,	Addressed in the ESCP

Clause Number	Clause	AEP Assessment
	(c) the quality of the fill or the soil to be excavated, or both, (d) the effect of the development on the existing and likely amenity of adjoining properties, (e) the source of any fill material and the destination of any excavated material, (f) the likelihood of disturbing relics, (g) the proximity to, and potential for adverse impacts on, any waterway, drinking water catchment or environmentally sensitive area, (h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development, (i) the proximity to and potential for adverse impacts on any heritage item, archaeological site or heritage conservation area.	
	4. In this clause— ***environmentally sensitive area*** has the same meaning as environmentally sensitive area for exempt or complying development in clause 3.3.	Noted
	Note— The *National Parks and Wildlife Act 1974*, particularly section 86, deals with harming Aboriginal objects.	
7.6	**7.6 Biodiversity**	
	1. The objective of this clause is to maintain terrestrial biodiversity by— (a) protecting native fauna and flora, and (b) protecting the ecological processes necessary for their continued existence, and (c) encouraging the conservation and recovery of native fauna and flora and their habitats.	The Subject Site provides minimal foraging habitat for more mobile species. Additionally, the absence of hollow bearing trees is considered a habitat constraint for arboreal mammals and other species that rely on such habitat features for roosting and breeding. More mobile (flying) threatened species are considered to potentially utilise the site on an intermittent basis, however they likely do so as part of a broader home range.
	2. This clause applies to land identified as "Biodiversity" on the Biodiversity Map.	A small patch along the north-eastern boundary of the Subject Site is mapped as "Biodiversity" on the Biodiversity Map.
	3. Before determining a development application for development on land to which this clause applies, the consent authority must consider— (a) whether the development is likely to have— (i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and (ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and	A marginal 0.208ha of native vegetation is proposed to be affected which is considered minimal due to the significant portion of similar PCT vegetation connected to the north of the site (11ha) that would provide more suitable habitat. The vegetation on site consists of predominately wet sclerophyll forest canopy and mid stratum and a heavily disturbed understorey with a number of exotic weeds. As such the vegetation within the Subject Site is considered a very small patch, relative to the surrounding vegetation.

Clause Number	Clause	AEP Assessment
	(iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and (iv) any adverse impact on the habitat elements providing connectivity on the land, and (b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.	*Syzygium paniculatum* (Magenta Lilly Pilly) trees were found present within the Subject Site and are proposed to be translocated within the Biodiversity Management Plan (BMP)
	4. Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that— (a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or (b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or (c) if that impact cannot be minimised—the development will be managed to mitigate that impact.	As above.

LEP Dictionary	
Acid Sulphate Soils Manual	the manual by that name published by the Acid Sulphate Soils Management Advisory Committee and made publicly available.
Ecologically sustainable development	Has the same meaning as in the Act
Eco-tourist facility	a building or place that: (a) provides temporary or short-term accommodation to visitors on a commercial basis, and (b) is located in or adjacent to an area with special ecological or cultural features, and (c) is sensitively designed and located so as to minimise bulk, scale and overall physical footprint and any ecological or visual impact. It may include facilities that are used to provide information or education to visitors and to exhibit or display items.
Entertainment facility	means a theatre, cinema, music hall, concert hall, dance hall and the like, but does not include a pub or registered club.
Environmental facility	means a building or place that provides for the recreational use or scientific study of natural systems, and includes walking tracks, seating, shelters, board walks, observation decks, bird hides or the like, and associated display structures.
Environmental protection	means works associated with the rehabilitation of land towards its natural state or any work to protect land from environmental degradation, and includes bush regeneration works, wetland protection works, erosion protection works, dune restoration works and the like, but does not include coastal protection works.
Estuary	means-- (a) any part of a river whose level is periodically or intermittently affected by coastal tides, or (b) any lake or other partially enclosed body of water that is periodically or intermittently open to the sea, or (c) anything declared by the regulations (under the Water Management Act 2000) to be an estuary, but does not include anything declared by the regulations (under the Water Management Act 2000) not to be an estuary
Waterbody	means a waterbody (artificial) or waterbody (natural).

LEP Dictionary	
Artificial waterbody	means an artificial body of water, including any constructed waterway, canal, inlet, bay, channel, dam, pond, lake or artificial wetland, but does not include a dry detention basin or other stormwater management construction that is only intended to hold water intermittently.
Natural waterbody	means a natural body of water, whether perennial or intermittent, fresh, brackish or saline, the course of which may have been artificially modified or diverted onto a new course, and includes a river, creek, stream, lake, lagoon, natural wetland, estuary, bay, inlet or tidal waters (including the sea).
Watercourse	means any river, creek, stream or chain of ponds, whether artificially modified or not, in which water usually flows, either continuously or intermittently, in a defined bed or channel, but does not include a waterbody (artificial).
Waterway	means the whole or any part of a watercourse, wetland, waterbody (artificial) or waterbody (natural).
Wetland	means— (a) natural wetland, including marshes, mangroves, backwaters, billabongs, swamps, sedgelands, wet meadows or wet heathlands that form a shallow waterbody (up to 2 metres in depth) when inundated cyclically, intermittently or permanently with fresh, brackish or salt water, and where the inundation determines the type and productivity of the soils and the plant and animal communities, or (b) artificial wetland, including marshes, swamps, wet meadows, sedgelands or wet heathlands that form a shallow waterbody (up to 2 metres in depth) when inundated cyclically, intermittently or permanently with water, and are constructed and vegetated with wetland plant communities.

14.0 Pittwater Development Control Plan 2004

The Development Control Plan, (DCP) commenced in 2004. The aim of the DCP is to facilitate development in accordance with the LEP. **Table 7** assess the relevant ecological clauses within the DCP demonstrating compliance.

Table 7 – DCP Assessment

Pittwater Development Control Plan 2004		
Clause Number	**Clause**	**AEP Assessment**
Section B – General Controls		
4.6.1	**4.6 – Wildlife Corridors** Development shall not directly impact on / or significantly reduce / degrade habitat for locally native species, threatened species, endangered populations or endangered ecological communities.	Two *Syzygium paniculatum* (Magenta Lilly Pilly) trees were found present within the Subject Site. These trees are proposed to be translocated within the BMP lands. The Subject Site is not mapped as "Wildlife Corridors" as such this clause does not apply.
4.6.2	Development shall retain, and provide an adequate buffer to, wildlife corridors.	N/A
4.6.3	Development shall provide wildlife corridors via creation, restoration, and / or regeneration of habitat.	N/A
4.6.4	Development shall not result in a significant loss of canopy cover or a net loss in native canopy trees.	N/A
4.6.5	Development shall ensure that at least 60% of any new planting incorporates native vegetation (as per species listed in Native Plants for Your Garden available on the Pittwater Council website). Landscaping is to be outside areas of existing bushland and not include environmental weeds.	N/A
4.6.6	Planting is to maximise linkage within the wildlife corridor.	N/A
4.6.7	Caretakers of domestic animals shall prevent them from entering areas of wildlife habitat.	N/A
4.6.8	Fencing, where permitted, shall be passable by native wildlife.	N/A
4.11.1	**4.11 – Land Adjoining Bushland** Development shall not adversely impact on the adjoining reserve.	The BMP entails the reconstruction of a new vegetation assemblage associated with PCT 1795/TEC which will provide connectivity to the areas of remnant vegetation adjacent to the Subject Site.

Pittwater Development Control Plan 2004		
Clause Number	**Clause**	**AEP Assessment**
4.11.2	Development shall ensure that at least 80% of any new planting incorporates native vegetation (as per species found on the site or listed in Native Plants for Your Garden available on the Pittwater Council website).	As above. / Addressed in the BMP
4.11.3	Landscaping works are to be outside areas of bushland and do not include Environmental Weeds.	Addressed in the BMP
4.11.4	Compliance with Council's Water Management for Development Policy is required.	Addressed in the SEE
4.11.5	Domestic animals will be restricted from entering bushland.	Addressed in the SEE
4.11.6	Development shall not result in a significant loss of canopy cover or a net loss in native canopy trees.	The BMP entails the reconstruction of a new vegetation assemblage associated with PCT 1795/TEC which will provide connectivity to the areas of remnant vegetation adjacent to the Subject Site.
4.11.7	Fencing, where permitted, shall be passable to native wildlife.	Addressed in the SEE
4.22.1	**4.22 – Preservation of Trees and Bushland Vegetation**	
	Authority to clear a tree or other vegetation is regulated in this plan in accordance with State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 i.e., 'Vegetation SEPP'. In particular, Part 2 of the Vegetation SEPP sets out the authority to clear vegetation and Part 3 provides for Council to declare under this DCP when a Vegetation Clearing Permit may be issued for clearing of vegetation. However, a permit under Part 3 of the Vegetation SEPP (clause 10(3)) cannot allow the clearing of vegetation that is or forms part of a heritage item or that is within a heritage conservation area, or that is or forms part of an Aboriginal object or that is within an Aboriginal place of heritage significance, unless the council is satisfied that the proposed activity: • is of a minor nature or is for the maintenance of the heritage item, Aboriginal object, Aboriginal place of heritage significance or heritage conservation area, and • would not adversely affect the heritage significance of the heritage item, Aboriginal object, Aboriginal place of heritage significance or heritage conservation area.	The vegetation within the Subject Site does not form part of a heritage item or within a heritage conservation area. The site also does not form a part of an Aboriginal object or within an Aboriginal place of heritage significance.

Pittwater Development Control Plan 2004		
Clause Number	**Clause**	**AEP Assessment**
4.22.2	A person shall not ringbark, cut down, top, lop, remove, poison, injure, or wilfully destroy tree or bushland vegetation that requires a Vegetation Clearing Permit under the provisions of Part 3 of the Vegetation SEPP. This includes damage to a tree or bushland vegetation by: • Damaging or tearing live branches and roots; • Damaging the bark, including attachment of objects using invasive fastenings, the fastening of materials around the trunk of trees which may result in a detrimental impact on tree health; • Tree topping, where large branches and/or the trunk of the tree is removed from the top of the trees canopy; • Tree lopping, where branches are removed to reduce the height and spread of the tree. • Damaging the root zone of a tree by way of compaction, including storage and stockpiling materials; • Changing of ground levels within the root zone of a tree by way of excavation, trenching, filling or stockpiling; • Underscrubbing of bushland vegetation; • Burning of vegetation (not part of a Hazard Reduction Certificate) ; or • Any other act or activity that causes the destruction of, the severing of trunks or stems of, or any other substantial damage to, some or all of the native vegetation in an area. An authority to clear vegetation is not required under the Vegetation SEPP: i. if it is clearing authorised by development consent i.e., a 'DA' under Part 4 of the Environmental Planning and Assessment Act 1979. Note: However, this authority to clear vegetation without a permit does not extend to clearing merely because it is a part of or ancillary to the carrying out of exempt development (see clause 8(1) of Vegetation SEPP). ii. if it is clearing of a kind that is an activity authorised by an approval, or carried out by a determining authority within the meaning of Part 5 of the Environmental Planning & Assessment Act after compliance with that Part. iii. if the clearing was an emergency firefighting act or emergency bush fire hazard reduction work within the meaning of the Rural Fires Act 1997 (the 'Act'), or bush fire hazard reduction work to which section 100C(4) of the Act applies or vegetation clearing work under section 100R of the Act.	Impacts to the native vegetation will be avoided and minimised where possible. The removal of 0.10ha of PCT 1795 and 0.108ha of planted natives is proposed and will not modify the composition of the vegetation and will not place any risk of the PCTs/TEC. Additionally, 0.15ha of vegetation will be committed to a BMP which entails the reconstruction of a new vegetation assemblage associated with PCT 1795/TEC in order to maintain connectivity to the areas of remnant vegetation located adjacent to the site.

Pittwater Development Control Plan 2004		
Clause Number	**Clause**	**AEP Assessment**
4.22.3	A Vegetation Clearing Permit is required for: a) Removal or cutting down of any tree over five (5) metres in height; b) Pruning of more than ten percent (10%) of a tree canopy. c) The removal or cutting down of vegetation in "Bushland". For the purpose of this clause "Bushland" means land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation (as defined by the Local Government Act 1993). Note: A description of native vegetation types or communities which constitute "Bushland" is provided in the adopted Warringah Natural Area Survey: Vegetation Communities and Plant Species - August 2005.	A BMP has been prepared to manage all vegetation and protect threatened flora. Compensatory planting within residue lands will further mitigate impacts as a result of the development proposal.
4.22.4	In applying for a Vegetation Clearing Permit, the applicant must demonstrate that any tree to be removed as part of a Vegetation Clearing Permit meets one or more of the criteria of the Removal of Tree Test in Appendix 16 (P21DCP) and the Tree Retention Assessment in Appendix 17 (P21DCP). An arborist report may be required to satisfy this requirement.	Addressed in the BMP
Section C – Development Type Controls		
	C6.2 – Natural Environment and Landscaping Principles	
6.2.1 Landscaping Principles	• Ensure that landscape design and planning is part of a fully integrated approach to site development. • Be sensitive to the site attributes and context, such as streetscape character, natural landform, soils, existing vegetation, views, land capability, and drainage. • Development must be designed to maximise the restoration, retention and preservation of indigenous trees, shrubs and groundcovers, as well as natural features, including wildlife corridors, fauna habitats, rock features and watercourses. • Provide planting schemes that reinforce the framework of endemic canopy trees with supplementary plantings species suitable for the understorey and groundcover. These may include species that have high ornamental qualities and/or provide food and habitat for native fauna and/or have aromatic flowers and foliage. In areas of high sensitivity only locally indigenous tree species should be used for the canopy. • Create visually pleasing environments that integrate the built form of the development into the natural and cultural landscapes of the Warriewood Valley. • Manage the micro-climate through the provision of canopy trees for shade resulting in the reduction in the buildings energy consumption.	Addressed in the BMP

Pittwater Development Control Plan 2004		
Clause Number	**Clause**	**AEP Assessment**
	• Deep soil areas are areas of soil unobstructed at any point by buildings or structures above or below the ground. Deep soil areas have important environmental benefits, such as allowing the infiltration of rain water into the water table and reduction of stormwater runoff, promoting healthy growth of large trees with large canopies and protecting existing mature trees. • Maximise landscaped areas for on-site infiltration of stormwater. • Integrate and form linkages with parks, reserves and transport corridors. • Complement the functions of the street e.g. reinforce desired traffic speed and behaviour; consider lines of sight for pedestrians, cyclists and vehicles promote safety and casual street surveillance. • Satisfy maintenance and utility requirements and minimise their visual impact. For example, undesirable visual elements such as blank walls, service areas, loading docks, and electrical sub-stations are adequately screened by shrub and tree plantings of suitable species at appropriate spacings. • Paving, structures, fencing and wall materials complement the architectural style and finishes of the buildings on the site.	
6.2.2 **Integration with Creekline Corridor and the Public Domain**	For land adjoining creekline corridors, buffer strips and reserves, preference should be given to local species identified as food sources for native fauna. Refer to the species lists contained in the Warriewood Valley Landscape Masterplan and Design Guidelines (Public Domain). • If the development site contains a section of Creekline Corridor, a landscape plan for the Creekline Corridor must be prepared. Details are to include: • the creek and floodway, particularly the Inner Creekline Corridor, being designed and constructed to contain the 1% Annual Exceedance Probability (AEP) flow; • a planting schedule (location, density and plant selection) to facilitate flora and fauna habitat; • the location of the pedestrian path/cycleway within the Outer Creekline Corridor, where practicable, and above the 20% AEP flood level; • if relevant, the location of any water quality control ponds and other water quality treatment measures; • extensive stands of Casuarina glauca, and groves of Eucalyptus robusta with other native feature trees, indigenous understorey and ground covers, which are to comprise a minimum of 75% of the total creekline corridor area;	Addressed in the BMP

Pittwater Development Control Plan 2004		
Clause Number	**Clause**	**AEP Assessment**
	• creekline interface such as details of boulder retaining walls instead of sheer block walls or steep batters; and • the landscaping treatment of the 25-metre wide Outer Creekline Corridor to appear as part of the public domain. The alignments of pedestrian paths/cycleways and associated landscaping must provide adequate sightlines for cyclists. Any part of residential lots, dwellings, garages, fences and other vertical built structures (wholly or in part) must not encroach into the 25-metre wide Outer Creekline Corridor.	
6.2.3 **Landscaping of existing and proposed Public Road Reserves**	Planting within the existing or proposed public road reserve is to be in accordance with the Warriewood Valley Landscape Masterplan and Design Guidelines (Public Domain) and the following: • street trees planted within the road verge placed at 6-12 metre intervals, dependent on the plant's location and species; • species selected in accordance with the species list in the Warriewood Valley Landscape Masterplan and Design Guidelines (Public Domain); • species selected must not interfere with existing or proposed power lines; • street trees 35-500 litre in size dependent of species and plant location; • street trees planted so as not to obstruct the free passage of pedestrians along the road verge or the future construction of a 1.5 metre footpath where none currently exists; • where possible, all existing trees over 3 metres in height are to be retained within the road reserve areas, with consideration to health and condition. Such trees are to be protected through perimeter 1.8-metre-high temporary fencing during the construction of works; and • grassed areas are to be turfed with couch species (weed free) to a maximum 4% grade.	Addressed in the SEE
6.2.4 **Landscaped Area**	A landscape plan documenting the proposed landscape treatment and planting species as selected from the Warriewood Valley Release Area Landscape Masterplan and Design Guidelines (Public Domain) (as amended), is to be submitted with the Development Application. Due to the smaller lot sizes anticipated in Warriewood Valley and the resultant smaller dimensions of landscaped area, areas intended for landscaping should be predominately areas of deep soil. Minor overhangs and protrusions such as Juliette balconies will be considered on merit. Planter boxes and rooftop gardens are not considered to be areas of deep soil. In designing and siting dwellings, the following principles should be adhered to:	Addressed in the SEE

Pittwater Development Control Plan 2004		
Clause Number	**Clause**	**AEP Assessment**
	• areas intended for landscaping should be predominately areas of deep soil; • the location of deep soil areas should, where possible, facilitate the retention of existing trees and vegetation; • basement car parking should be contained within the building footprint where possible to maximise areas of deep soil planting (refer to figure 1 below); and • deep soil areas should be co-located with areas of private open space or communal open space, in the case of residential flat buildings and multi dwelling housing, to provide shade and amenity for residents.	
6.2.5 **Communal Open Space Area**	25% of the site area is to be provided as communal open space within residential flat buildings, shop top housing, mixed use and multi dwelling housing developments. Areas of communal open space should be co-located with deep soil areas. They are to provide amenity for residents and are to receive a minimum of 50% direct sunlight to the principle usable part of the communal open space for a minimum of 2 hours between 9am and 3pm on 21 June. A landscape plan for communal open space areas is to be prepared, showing connection and utility of this communal open space area for future residents of the development.	Addressed in the SEE

15.0 Warriewood Valley Urban Land Release Water Management Plan

Clause 4.4 Watercourse and Creekline Corridor Preservation/Restoration

Objectives

As such, the creeks and associated corridors in this context are to be designed to fulfil the following functions in an integrated sense:

- Retention of previous areas within the sector to assist with preserving the water balance of the area.
- Provision of an increased distance from impervious areas to the stream which aids in slowing runoff and provides opportunities for filter strips to treat the runoff.
- Provision of meander space for the streams, which allows any long-term morphological changes to continue. Provided that these changes are very long term, there is little likelihood of issues (such as encroachment of stream meanders on development) being created.
- Provision of effective flood conveyance to carry the 1% Annual Exceedance Probability (AEP) flows and interim flood protection works where required.
- Protection against streambank erosion. In addition to this, since buildings are not on the channel, minor streambank erosion does not become a major issue.
- Provision of aesthetic value for properties with riparian frontages.
- Allowing access to the corridor for properties not directly associated with the corridor through pathways.
- Provision of increased pollutant removal opportunity through extensive use of filter strips for treating roof water and other runoff from riparian properties. (i.e. properties that are adjacent to watercourses).
- Provision of a common link between open space areas (defined in the Valley Masterplan).
- Provision of habitat and wildlife corridors.
- Provision for the retention of significant stands of remnant vegetation.
- Retention of creekline morphology.
- Reduction in stream warming. Urban Streams without buffer areas and riparian vegetation have less shading, and the stream water temperature can be elevated. This increases the likelihood of water quality issues.

Table 8 – Warriewood Valley Urban Land Release

Warriewood Valley Urban Land Release – Water Management Specification 2001		
Clause Number	**Clause**	**AEP Assessment**
4. Water Management Reports		
4.4.2 Shared Creek Sections	**4.4. Watercourse And Creekline Corridor Preservation/Restoration**	
	It is recognised that there are a number of sectors that share portions of the creeks and that sectors upstream and downstream boundaries are at various points along creek reaches. Issues relating to the management of the rehabilitation of the creeks are therefore likely to arise given the nature	Addressed in Creek engineering plans and Water Management Report (WMR).

Warriewood Valley Urban Land Release – Water Management Specification 2001		
Clause Number	**Clause**	**AEP Assessment**
	of the development on a sector-by-sector basis. For example, sectors may be developed at different times and thus provide limited scope for co-operative creek rehabilitation as a result. This also presents issues with respect to flooding; the implications of which are discussed in Section 4.5.4. There are a number of possible approaches to manage this issue including: • co-operation between sector Applicants to rehabilitate the creek at the same time and potentially using the same design engineer to prepare the creek sections, creek planting schedule and other relevant documentation for both sectors • after negotiation with the Applicant for an adjacent sector(s), rehabilitation of a portion of the creek across to the top of the opposite bank with possible MPB credit for any additional sections of the creek outside the sector to be negotiated under the Section 94 plan between Council, the Applicant for the sector in question and any other adjacent Applicants. Regardless of the approach devised, any rehabilitation works will require a transitional section between rehabilitated and unrehabilitated areas to minimise weed intrusion and any potential flood impacts (further discussed in Section 4.5.4).	
4.4.3 Establishment of Existing and Design Conditions	*Data Collection -* The existing creek conditions are to be established through survey of the creek (long section and cross sections at 25 metres maximum spacings and locations where there are existing hydraulic controls and where the channel cross section changes in width and/or depth). In the case of Fern Creek, some of the system is highly modified and survey of the surface will be necessary to establish the amount of earthworks required to re-establish the creekline. In addition to survey, the geotechnical conditions of the creek bed and banks are to be established. Grab samples of bed and bank material are to be subject to sieve analysis and a reconnaissance is to be made of the creek bed to establish the locations of rock outcrops (bed and banks), existing pool and riffle sequences and existing eroding locations. Sediment grain size distribution data will be required for the design phase. In addition to sediment sieve analysis, it is recommended that tests for potential and actual acid sulfate soils be undertaken as part of the site geotechnical assessment since the rehabilitation works to be undertaken may involve significant earthworks within areas that are highly likely to contain such soils. During the reconnaissance, stands of vegetation to be retained are to be identified, mapped with	Addressed in Creek engineering plans and Water Management Report (WMR).

Warriewood Valley Urban Land Release – Water Management Specification 2001		
Clause Number	**Clause**	**AEP Assessment**
	mapping to include an overlay with information derived from any other available studies of the area.	
	Design Flow Conditions - catchment using the RAFTS model (XP-Software, 1992) for the critical two-hour duration storm. Details of design flows on a sector-by-sector case for the post-developed peak flow conditions are provided as a table of upstream and downstream flowrates in Appendix B. It should be noted that the post-developed condition is contingent on the appropriate provision and design of on-site detention for all sectors (Section 4.6).	Addressed in Creek engineering plans and Water Management Report (WMR).
4.4.4 **Creek Design Requirements**	*Basic Design Guidelines –* The design of 'natural channels' is an extension of stream restoration, involving the creation of channels with the attributes of natural watercourses. These attributes include: • A meandering plan form in dynamic equilibrium with site characteristics. • A main channel with a floodplain (principally in middle and lower reaches). • A series of pools and riffle zones (rapids). • Native riparian and floodplain vegetation. Waterway design is to be in accordance with guidelines such as: • Guidelines for Stabilising Waterways, Standing Committee on Rivers & Catchments, Victoria (1991) • Guidelines for Natural Channel Design, I. D. & A. (1996) • A Rehabilitation Manual for Australian Streams, CRC for Catchment Hydrology (1999).	The section of creekline to be reconstructed to council's standard creek profile. Vegetation within the Aquatic Zone and Riparian Corridor consists of aquatic vegetation and native species accustomed to wetter conditions.
	Essential Design Requirements – a) <u>Corridor Widths</u> Average creek corridor widths have been set in the Warriewood Valley Development Control Plan generally at a 100m corridor width. Generally, public ownership corridor widths have been set at 50m on all creeks with the exception of some sections of Narrabeen Creek upstream of the proposed detention basin site, where the width is 30m. Private ownership buffers of 25m either side of the public buffers are required in all areas of development. Council has produced detailed documents, which show the extent and locations of corridors within the release. The Section 94 plan for Warriewood Valley details the corridor widths required for each sector.	Addressed in Subdivision Concept Plan and Water Management Report (WMR).

Warriewood Valley Urban Land Release – Water Management Specification 2001		
Clause Number	**Clause**	**AEP Assessment**
	b) Environmental Flow and Flood Conveyance In order to establish a channel and corridor with sufficient variability in depth to support a healthy ecosystem, the in-bank creek channel portion of the corridor must be designed to carry a maximum of the 50% AEP flood flows below bank full levels. Any creek design needs to consider this issue and accordingly provide for the continuance of this pattern of inundation as well as allow for flood flow conveyance.	Addressed in Creek engineering plans and Water Management Report (WMR).
	c) Channel Sections and Batter Slope Requirements The channel sections are to be constructed broadly in line with the present channel alignment and bed levels, with some straightening where severe restrictions presently exist. The aim of the works is to create a gently meandering stream within the multi-use corridor. Design batter slopes are to be no greater than the following (depending on the bank materials and any proposed stabilisation works): • 1V:3H for regularly wet areas and 1V:6H for water access points (defined as being the level to which daily flows rise to up to the 50% AEP or 1 in 2 year flow) • 1V:6H for frequently inundated areas (defined as being up to 20% AEP peak flood level) • 1V:8H for areas above the 20% AEP peak flood level.	Addressed in Creek engineering plans and Water Management Report (WMR).
	d) Planting and Integration with the Landscape Master Plan i) maintain existing native vegetation ii) remove exotic vegetation iii) restoration of native vegetation iv) continuity v) planting schedule, layout and densities vi) inhibiting weed growth	Planting schedules and revegetation species list are provided in the Biodiversity Management Plan (BMP).
	e) Fencing Restrictions Fences at the rear of riparian properties are to be limited to open mesh systems with opening sizes not smaller than 0.1m to allow unrestricted wildlife migration. The Warriewood Valley DCP contains a full description of fencing requirements with conceptual sketches.	N/A

Warriewood Valley Urban Land Release – Water Management Specification 2001		
Clause Number	**Clause**	**AEP Assessment**
	f) Pedestrian, Cycleway and Road Crossings The shared pedestrian path and cycleway is to be located at the outer edge of the public corridor as shown in Figures 3 and 4. The proposed location of the path/cycleway is shown on the Landscape Masterplan (2000) as well as on the Warriewood Valley Concept Masterplan (2000). The path/cycleway should avoid existing native vegetation. There are a number of issues that are to be considered and reported when submitting designs for embankments and crossings associated with watercourses. These include: • Facilitating the upstream and downstream movement of fish and invertebrates where this movement is significant. Drop structures and pipe culverts can hinder this movement. • Minimising scour downstream of the waterway crossing. Increased flow velocities through waterway crossings may scour the channel, resulting in erosion and habitat loss. • Assessing the impacts on upstream channel erosion of any creek 'realignment' works associated with waterway crossings. • Acknowledging that watercourses are in a state of 'dynamic equilibrium', and can change their location and form under natural conditions. Waterway crossings may restrict this dynamic process or be undermined by the process. • Providing an appropriate waterway area and geometry for creek crossings to minimise impact on upstream flood conditions. • All waterway crossings are to be free-spanning structures with peered approaches. Culverts are strongly discouraged by both the Department of Land and Water Conservation and NSW Fisheries. The deck obvert of spans should be set at the appropriate flood planning level listed in Section 4.5. • Where cycleways and walkways are designed to cross under bridges, thereby exposing the population to risk from rising floodwaters, appropriate signage is to be provided (See Section 4.5).	Addressed in Creek engineering plans and Water Management Report (WMR).

Warriewood Valley Urban Land Release – Water Management Specification 2001		
Clause Number	**Clause**	**AEP Assessment**
	g) Stormwater Discharge Points Where sector drainage connects to the creek systems, as outflows from water quality control ponds/wetlands or discharge points from filter strips, the flow joining the creek shall have parallel streamlines when joining the creek and are to be designed to include energy dissipation works. Headwalls and energy dissipation structures should have a natural appearance and should have their invert at the base of the creek to ensure there is no additional scour induced by their presence. Details of treatments of outlets are provided in Figure 6. Where the MPB option is not taken up by the Applicant and the land is transferred to Council, any outlet structures that form stormwater discharge points that are constructed must comply with the above requirements and must be located appropriately with consideration of both the existing and design watercourse and corridor. Interim works may therefore be required.	Addressed in the Stormwater Management Plan and Water Management Report (WMR).
4.4.5 **DLWC Permits and Approvals**	Following the enactment of the Bill, Part 3 of the new Act relates to approvals required. Approvals for creek works fall under the category 'Water Management Work Approvals' and 'Activity Approvals'. With respect to Water Management Work approvals, the Bill states that: *'There are three kinds of water management work approvals, namely, water supply work approvals, drainage work approvals and flood work approvals.* *A water supply work approval authorises its holder to construct and use a specified water supply work at a specified location.* *A drainage work approval confers a right on its holder to construct and use a specified drainage work at a specified location.* *A flood work approval confers a right on its holder to construct and use a specified flood work at a specified location within a floodplain.'* With respect to Activity Approvals, the Bill states that: *'There are two kinds of activity approvals, namely, controlled activity approvals and aquifer interference approvals.* *A controlled activity approval confers a right on its holder to carry out a specified controlled activity at a specified location in waterfront land or at a specified location in a water source protection zone.* *An aquifer interference approval confers a right on its holder to penetrate or interfere with an aquifer at a specified location, or in a specified area, in the course of carrying out specified activities.* ***Note.** Examples of where an aquifer interference approval may be needed include mining operations, road construction and any other large-scale activity that involves excavation.'* It is the responsibility of the Applicant to check with the Department of Land and Water Conservation on	A Controlled Activity Approval (CAA) application will be submitted to the Department of Planning and Environment (DPE). A Dredge and Reclaim Permit and Blockage to Fish Passage Permit will be submitted to the Department of Primary Industries (DPI).

Warriewood Valley Urban Land Release – Water Management Specification 2001		
Clause Number	**Clause**	**AEP Assessment**
	the matter of approvals required and the status of the enactment of various parts of the *Water Management Bill*.	
4.4.6 Monitoring	Monitoring and maintenance of engineered channels is necessary to detect bank erosion, widening, slumps, incision, aggradation and control excessive vegetation in the channel. As a guide, monitoring must be carried out after each major flow event, defined as greater than 50mm of rainfall in 24 hours measured at the Ingleside rain gauge (Section 4.1.1), or at an interval not exceeding six months. Monitoring must be carried out along the whole length of the channel with particular emphasis at bends and structures.	Addressed in Creek engineering plans and Water Management Report (WMR).
4.4.7 Reporting	This aspect of the Water Management Report is to provide information on: • mapping of the existing creek systems through detailed survey overlain with the proposed creekline in both plan and cross section • definition of corridor extents • location of remnant species of vegetation • monitoring and management (including an acid sulphate soils management plan - if required, vegetation management plan and mosquito risk assessment). The report is also to include a description of the monitoring plan for the creekline corridor. An acid sulfate soils management plan is to be prepared if there are actual or potential acid sulfate soils detected within the area to be restored. A vegetation management plan for the site is required for the corridor restoration. The plan is to include the following information: • Definition of each project task to be undertaken and its relationship to other tasks, how each task will be carried out and the likely duration of each task • Identification of plant species - only local native species are to be use as listed in the Landscape Masterplan (2000), species need to be identified from local plant stock sources and a check on any licences required • Maps and diagrams of planting layout.	The BMP addresses the management plan, timelines of tasks and species list for the riparian corridor restoration.

16.0 Recommendations

This proposed development will clear approx. 0.21ha of PCT 1795 and planted native vegetation. Impacts to the vegetation have been minimised as the vegetation is highly disturbed and provide limited habitat for fauna, whilst more intact remnant vegetation is present, adjacent to the site.

16.1 Implementation of the Biodiversity Management Plan

Implementation of the Biodiversity Management Plan (BMP). The purpose of the BMP is to;

- Reinstate a natural channel creating both ecological and hydraulic function within Narrabeen Creek.
- To provide a suitable location for the translocation of *Syzygium paniculatum* (Magenta Lilly Pilly)
- Regeneration vegetation in the north east of the Subject Site.

The BMP requires action to regenerate riparian lands while creating safe space within the proposed subdivision, incorporating best practice management of vegetation and fauna within the BMP Lands.

The overall BMP objectives are to provide:

- Education of the Plant Community Type (PCT)/TEC within the Subject Site;
- Protection and enhancement of The TEC/PCT 1795 vegetation community;
- Reconstruction using Council' design;
- Improving water quality and aquatic habitat;
- To assess and adjust weeding and planting regimes across the BMP;
- Areas of habitat for native flora and fauna, including locally occurring threatened species; and
- A long-term environmental conservation area, in a state of Natural Regeneration requiring nominal ongoing maintenance.

16.2 General Recommendations

General recommendations are made below for consideration to mitigate potential impacts on local biodiversity as a result of the development of the site.

- Temporary construction fencing around the Subject Site is to be erected during the construction phase to limit incursions of fauna and delineate the boundary of clearing works.
- Tree protection zones are to be established around retained trees/vegetation as per the arborist's report.
- Implement hygiene protocols for machinery,tyres and footwear to prevent the spread of weed propagules and pathogens (e.g., Chytrid Fungus) outside the development site (refer to DPE hygiene protocols);
- Best practice erosion and sedimentation (ERSED) and dust suppression control methods are to be adopted, enforced and maintained throughout any vegetation clearing works. Such are to be in accordance with "Managing Urban Stormwater, 3rd Edition (1998)" published by NSW Department of Housing, and Northern Beaches Council requirements.
- Incorporation of Water Sensitive Urban Design (WSUD) principles within stormwater infrastructure is to occur to minimise downstream hydrology changes.
- Where possible landscaping is to occur in conjunction with the proposed development and provide some future resources for native fauna in the area.

- Development of a Construction Environmental Management Plan (CEMP) that incorporates pre, during and post construction mitigation measure to reduce both direct and indirect impacts, such as lighting, vehicle strike, runoff, erosion, sedimentation etc.

16.3 Clearing Protocols

- Vegetation clearing is to be timed to avoid cold weather periods where overnight temperatures are forecast to be less than 12°C. Cold weather is likely to make it difficult for resident hollow dependent fauna to successfully relocate. This is particularly relevant for low body-weight species;
- A staged approach to clearing is to be undertaken to provide fauna the opportunity to disperse outside the area of impact. Staging to include;
    (i) Phase 1 Clearing: Underscrubbing;
    (ii) Phase 2 Clearing: Removal of non-habitat trees; and
    (iii) Phase 3 Clearing: Removal of habitat and connecting trees;
    (iv) All clearing works (Phase 1, 2 and 3) to be undertaken under the supervision of the Project Ecologist;
- Clearing should occur in a direction from previously disturbed lands towards retained lands;
- Implementation of clearing protocols, including pre-clearance surveys to identify habitat and vegetation to be retained, and survey for nocturnal arboreal mammals.
- All clearing works to be attended by a suitable equipped and experienced ecologist to deal appropriately with any displaced fauna species;
- All hollow bearing features (if located on site following pre-clearance surveys) will be sectionally lowered by tree climbers (where safe to do so);
- Any fauna rescued during vegetation clearing is to be assessed for injuries, and subsequently released to a suitable nearby location; this may require holding fauna until dusk for release in accordance with relevant animal ethics licencing and standards;
- If any fauna is injured during vegetation clearing, they are to be taken promptly to a nearby veterinarian or suitable wildlife carer contact;
- In addition, prior to clearing of any vegetation, an ecologist is to inspect the area for any signs of resident fauna requiring attention, and in particular nesting birds. Where such is identified, appropriate strategies are to be developed and instigated to minimise impacts. Pre-clearance surveys to include diurnal surveys, stag watching and nocturnal surveys; and
- Civil Construction staff to be inducted into pre-clearing and clearing protocols, and to identify environmental features for protection.

17.0 References

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Appendix A – Flora Species List

FLORA SPECIES LIST

The following list includes all species of vascular plants observed on site during fieldwork. It should be noted that such a list cannot be considered comprehensive, but rather indicative of the flora present on the site. It can take many years of flora surveys to record all of the plant species occurring within any area, especially plant species that are only apparent in some seasons such as Orchids.

A number of species cannot always be accurately identified during a brief survey, generally due to a lack of suitable flowering and/or fruiting material. Any such species are identified as accurately as possible, and are indicated in the list as thus:

- specimens that could only be identified to genus level are indicated by the generic name followed by the abbreviation “sp.”, indicating an unidentified species of that genus;
- specimens for which identification of the genus was uncertain are indicated by a question mark (“?”) placed in front of the generic, which is followed by the abbreviation “sp.” and;
- specimens that could be accurately identified to genus level, but could be identified to species level with only a degree of certainty are indicated by a (“?”) placed in front of the epithet.

Authorities for the scientific names are not provided in the list. These follow the references outlined below.

- Harden, G. (ed) (2000). *Flora of New South Wales, Volume 1*. Revised edition. UNSW, Kensington, NSW.
- Harden, G. (ed) (2002). *Flora of New South Wales, Volume 2*. Revised edition. UNSW, Kensington, NSW.
- Harden, G. (ed) (1992). *Flora of New South Wales, Volume 3.* UNSW, Kensington, NSW.
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Names of families and higher taxa follow a modified Cronquist System (1981).

Introduced species are indicated by an asterisk “*”.

Threatened species listed under the BC Act or the EPBC Act are indicated in **bold font** (none observed)**.**

Family	Scientific Name	Common Name
Apiaceae	*Hydrocotyle bonariensis**	Kurnell Curse / Pennywort
Araliaceae	*Hedera helix**	English Ivy
Araliaceae	*Schefflera arboricola**	
Arecaceae	*Phoenix sp.**	
Asparagaceae	*Asparagus aethiopicus**	Asparagus Fern
Asteraceae	*Ageratina adenophora**	Crofton Weed
Asteraceae	*Bidens pilosa**	Cobbler's Pegs
Asteraceae	*Cirsium vulgare**	Spear Thistle
Asteraceae	*Taraxacum officinale**	Dandelion
Casuarinaceae	*Casuarina glauca*	Swamp Oak
Commelinaceae	*Tradescantia fluminensis**	Wandering Jew
Commelinaceae	*Tradescantia zebrina**	Silvery Inch Plant
Convolvulaceae	*Ipomoea indica**	Morning Glory
Cyperaceae	*Carex sp.*	
Cyperaceae	*Cyperus eragrostis**	Umbrella Sedge
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge
Fabaceae	*Acacia longifolia*	
Fabaceae	*Senna pendula var. glabrata**	
Fabaceae	*Trifolium repens**	White Clover
Lomandraceae	*Lomandra longifolia*	Spiky-headed Mat-rush
Magnoliaceae	*Liriodendron tulipifera**	Tulip Poplar
Magnoliaceae	*Magnolia sp.**	Magnolia
Moraceae	*Ficus benjamina*	Weeping Fig
Moraceae	*Ficus sp.**	
Myrtaceae	*Acmena smithii*	Lillypilly
Myrtaceae	*Callistemon pinifolius*	Pine-leaved Bottlebrush
Myrtaceae	*Callistemon viminalis*	Weeping Bottlebrush
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany
Myrtaceae	*Melaleuca linariifolia*	Snow in Summer
Myrtaceae	***Syzygium paniculatum***	**Magenta Lilly Pilly**
Oleaceae	*Ligustrum sinense**	Small-leaved Privet
Phormiaceae	*Dianella caerulea*	Blue Flax-lily
Phyllanthaceae	*Glochidion ferdinandi var. ferdinandi*	Cheese Tree
Poaceae	*Cenchrus clandestinum**	Kikuyu
Poaceae	*Ehrharta erecta**	Panic Veldtgrass
Poaceae	*Oplismenus aemulus*	Basket Grass
Poaceae	*Paspalum dilatatum**	Paspalum
Sapindaceae	*Cupaniopsis anacardioides*	Tuckeroo
Solanaceae	*Cestrum parqui**	Green Cestrum
Solanaceae	*Solanum americanum**	Glossy Nightshade
Ulmaceae	*Ulmus parvifolia**	Chinese Elm
Urticaceae	*Parietaria judaica**	Pellitory
Verbenaceae	*Lantana camara**	Lantana
Violaceae	*Viola hederacea*	Ivy-leaved Violet

Appendix B – Expected Fauna Species List

EXPECTED FAUNA SPECIES LIST

The following list includes fauna species that could be reasonably expected to occur on the Subject Site at some point, given site attributes and location.

Key to records

Surveyed Observations

- Observed (O),
- Heard (W),
- Scat (P),
- Miscellaneous (M),
- Track/scratching's (F),
- Nest (E),
- Burrow (FB)

Scientific Name	Common Name	Surveyed observation
Galaxias maculatus	Common Jollytail	
Gobiomorphus australis	Striped Gudgeon	
Hypseleotris compressa	Empire Gudgeon	
Gambusia holbrooki	Mosquito Fish	
Crinia signifera	Common Eastern Froglet	W
Pseudophryne australis	Red-crowned Toadlet	
Litoria fallax	Eastern Dwarf Tree Frog	
Litoria peronii	Peron's Tree Frog	
Litoria phyllochroa	Leaf-green Tree Frog	
Litoria tyleri	Tyler's Tree Frog	
Litoria verreauxii	Verreaux's Frog	
Adelotus brevis	Tusked Frog	
Heleioporus australiacus	Giant Burrowing Frog	
Pygopus lepidopodus	Common Scaly-foot	
Acritoscincus platynotus	Red-throated Skink	
Cryptoblepharus virgatus	Cream-striped Shinning-skink	
Lampropholis delicata	Dark-flecked Garden Sunskink	O
Lampropholis guichenoti	Pale-flecked Garden Sunskink	
Tiliqua scincoides	Eastern Blue-tongue	
Intellagama lesueurii lesueurii	Eastern Water Dragon	O
Pogona barbata	Bearded Dragon	O
Morelia spilota	Carpet & Diamond Pythons	
Morelia spilota spilota	Diamond Python	
Hemiaspis signata	Black-bellied Swamp Snake	
Pseudechis porphyriacus	Red-bellied Black Snake	
Pseudonaja textilis	Eastern Brown Snake	
Phasianus colchicus	Common Pheasant	
Synoicus chinensis	King Quail	
Synoicus ypsilophora	Brown Quail	
Chenonetta jubata	Australian Wood Duck	
Ocyphaps lophotes	Crested Pigeon	O
Podargus strigoides	Tawny Frogmouth	
Eurostopodus mystacalis	White-throated Nightjar	
Aegotheles cristatus	Australian Owlet-nightjar	
Egretta garzetta	Little Egret	
Egretta novaehollandiae	White-faced Heron	
Egretta sacra	Eastern Reef Egret	
Accipiter fasciatus	Brown Goshawk	

Scientific Name	Common Name	Surveyed observation
Accipiter novaehollandiae	Grey Goshawk	
Pandion cristatus	Eastern Osprey	
Falco berigora	Brown Falcon	
Falco cenchroides cenchroides	Nankeen Kestrel	
Falco longipennis	Australian Hobby	
Recurvirostra novaehollandiae	Red-necked Avocet	
Vanellus miles	Masked Lapwing	
Tringa nebularia	Common Greenshank	
Xenus cinereus	Terek Sandpiper	
Chlidonias hybrida	Whiskered Tern	
Chroicocephalus novaehollandiae	Silver Gull	
Hydroprogne caspia	Caspian Tern	
Larus pacificus	Pacific Gull	
Sterna hirundo	Common Tern	
Sterna striata	White-fronted Tern	
Thalasseus bergii	Crested Tern	
Cacatua galerita	Sulphur-crested Cockatoo	O, W
Glossopsitta pusilla	Little Lorikeet	
Platycercus eximius	Eastern Rosella	W, O
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet	
Trichoglossus haematodus	Rainbow Lorikeet	O
Centropus phasianinus	Pheasant Coucal	
Chalcites basalis	Horsfield's Bronze-Cuckoo	
Chalcites lucidus	Shining Bronze-Cuckoo	
Cuculus optatus	Oriental Cuckoo	
Eudynamys orientalis	Eastern Koel	
Scythrops novaehollandiae	Channel-billed Cuckoo	
Ceyx azureus	Azure Kingfisher	
Dacelo novaeguineae	Laughing Kookaburra	W, O
Malurus cyaneus	Superb Fairy-wren	
Malurus lamberti	Variegated Fairy-wren	
Acanthorhynchus tenuirostris	Eastern Spinebill	
Caligavis chrysops	Yellow-faced Honeyeater	
Entomyzon cyanotis	Blue-faced Honeyeater	
Lichenostomus melanops	Yellow-tufted Honeyeater	
Lichmera indistincta	Brown Honeyeater	

Scientific Name	Common Name	Surveyed observation
Manorina melanocephala	Noisy Miner	W, O
Manorina melanophrys	Bell Miner	
Meliphaga lewinii	Lewin's Honeyeater	
Psophodes olivaceus	Eastern Whipbird	W
Artamus personatus	Masked Woodswallow	
Artamus superciliosus	White-browed Woodswallow	
Cracticus nigrogularis	Pied Butcherbird	
Gymnorhina tibicen	Australian Magpie	O
Rhipidura leucophrys	Willie Wagtail	
Rhipidura rufifrons	Rufous Fantail	
Corvus coronoides	Australian Raven	W
Grallina cyanoleuca	Magpie-lark	
Acrocephalus australis	Australian Reed-Warbler	
Cincloramphus mathewsi	Rufous Songlark	
Cincloramphus timoriensis	Tawny Grassbird	
Pycnonotus jocosus	Red-whiskered Bulbul	
Acridotheres tristis	Common Myna	O
Sturnus vulgaris	Common Starling	
Zosterops lateralis	Silvereye	
Passer domesticus	House Sparrow	
Antechinus stuartii	Brown Antechinus	
Petaurus breviceps	Sugar Glider	
Pseudocheirus peregrinus	Common Ringtail Possum	
Acrobates pygmaeus	Feathertail Glider	
Trichosurus vulpecula	Common Brushtail Possum	
Pteropus poliocephalus	Grey-headed Flying-fox	
Hydromys chrysogaster	Water-rat	
Mus musculus	House Mouse	
Rattus fuscipes	Bush Rat	
Rattus lutreolus	Swamp Rat	
Rattus norvegicus	Brown Rat	
Rattus rattus	Black Rat	
Rattus sp.	rat	
Canis lupus	Dingo, domestic dog	
Vulpes vulpes	Fox	
Felis catus	Cat	
Oryctolagus cuniculus	Rabbit	

Appendix C – Site Photos

Above: Start of BAM Plot 1;

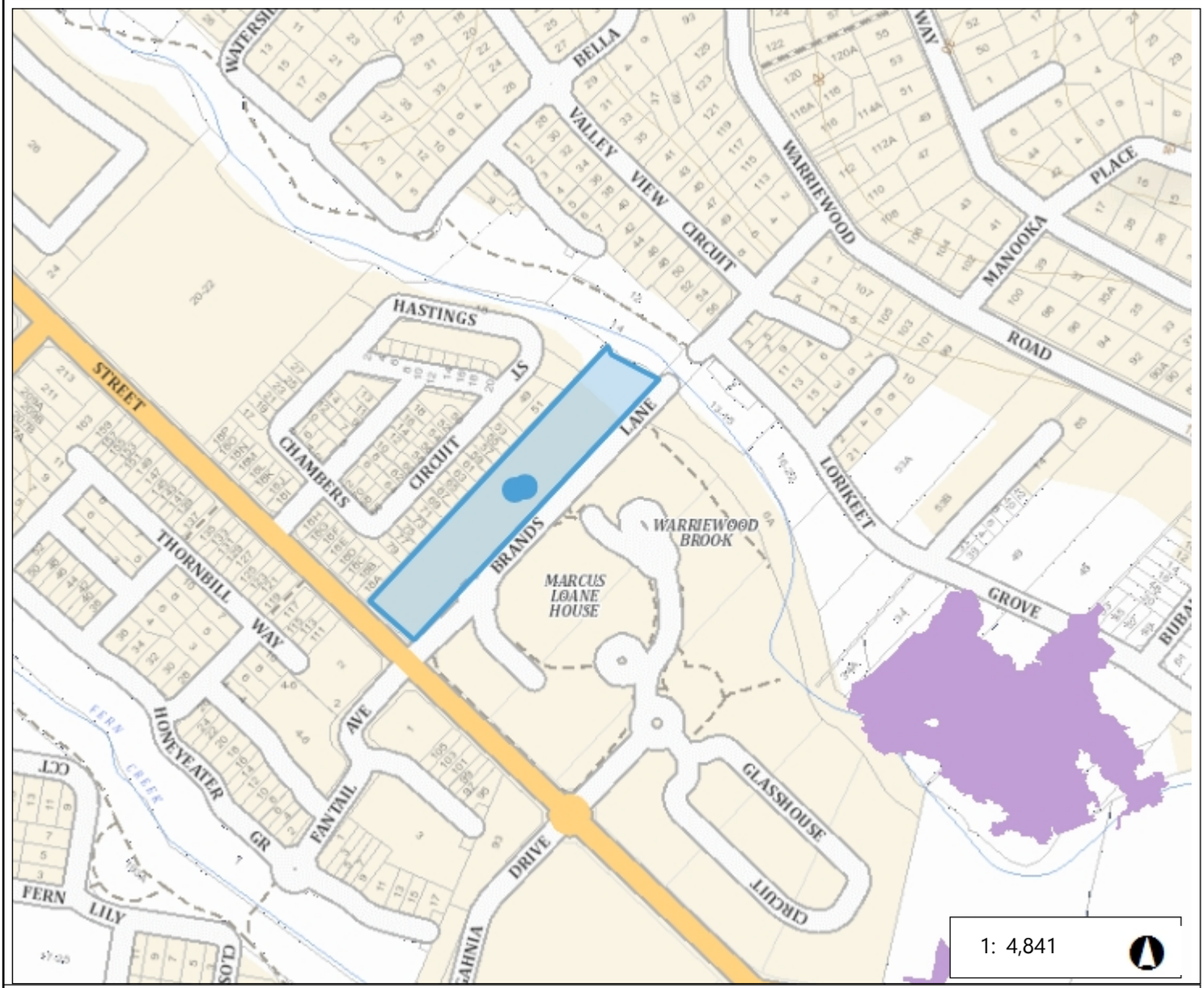
Below: Eastern Water Dragon

Above: Eucalypt canopy within Subject Site;

Below: Narrabeen Creek;

Appendix D – BOSET Report

Biodiversity Offset Scheme (BOS) Entry Threshold Map



245.9 0 122.96 245.9 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

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

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	23/02/2022 6:02 PM		**BDAR Required***
Total Digitised Area	0.91	ha	
Minimum Lot Size Method	Lot size		
Minimum Lot Size	1.02	ha	
Area Clearing Threshold	0.5	ha	
Area clearing trigger Area of native vegetation cleared	Unknown #		Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no		no
Date of the 90 day Expiry	N/A		

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is '"likely to significantly affect threatened species' as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOSET user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies will all aspects of the *Biodiversity Conservation Act 2016.*

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

Acknowledgement

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

Signature_____ Date:23/02/2022 06:02 PM

Appendix E – Author CVs

CATHERINE STANISLAUS

Curriculum Vitae

Frances is a Senior Ecologist and Lead Botanist with Anderson Environment and Planning, being an Accredited Assessor with over 12 years-experience in environmental impact assessment, environmental education, conservation land management, bush regeneration, wildlife rescue and rehabilitation, environmental sustainability, and environmental law.

Qualifications

- Bachelor of Commerce and Science (majoring in Ecology), UNSW, 2022

Further Education & Training

- NSW Class C Driver's Licence
- Graduated with Distinction in Ecology

Fields of Competence

- Terrestrial Ecology field survey, covering terrestrial flora and fauna

Relevant Employment History

2022 – Present	**Ecologist** Anderson Environment & Planning, Newcastle
2021	**ENVIRONMENTAL LABORATORY RESEARCH INTERNSHIP UNSW** Oyster Research Project

Relevant Volunteer Experience

2021	**LAKE ILLAWARRA, ENVIRONMENTAL CONSULTANCY PROJECT UNSW**

Jeremy Burrill

Curriculum Vitae

Jeremy works with AEP in the role of Ecologist. He is a graduate of environmental science and management, and has experience in voluntary roles in environmental fields, involving fauna and flora surveying, consultancy projects and natural resource management. His background in environmental fields with his growing ecological knowledge is utilised in a diverse array of applications in his current role.

Qualifications

- Bachelor of Environmental Science (Environmental Management and Sustainability) Deakin University (2020)

Further Education & Training

- Apply First Aid
- Victorian Driver's License
- Work Health & Safety General Construction Induction
- Work Safely at Heights

Fields of Competence

- Ecological field surveys
- Fauna surveys and trapping
- Natural resource management

Relevant Employment History

2020 – Present **Ecologist**
Anderson Environment & Planning, Newcastle

Currently employed by Anderson Environment & Planning to assist in the provision of consulting services to land, property, legal and government sectors. Covering ecological, project management, environmental, bushfire, planning services, advices, strategy and representation.

Volunteer Experience

- Overseas University Volunteer Placement (New Zealand, 2018)
- Industry Placement (Parks Victoria, 2019)

Natalie Black

Curriculum Vitae

Natalie works with AEP in the role of Senior Environmental Manager. She has extensive knowledge in environmental management, environmental planning, and report writing and assessment. With a detail understanding of planning, catchment management, coastal management and rehabilitation. Natalie has had a successful career with both state and local government in conservation, planning and field investigation roles. Natalie has also gained extensive communication skills and project management through her previous career in lecturing. Her background and experience in the ecological and planning fields is utilised in a diverse array of application in her current role.

Qualifications

- B.Sc (Hons), University of Newcastle, 2002 Sustainable Resource Management and Marine Science.
- Master Planning, University of Technology Sydney 2007.
- Certificate IV Training and Assessment at NSW TAFE 2012.
- BAM Assessor; accreditation number: BAAS19076.

Further Education & Training

- Evidence Gathering and Legal Process (Australian Institute of Environmental Health).
- Conflict Resolution Course (LGSA).
- Report Writing Course (LGSA).
- Powerful Presentation (LGSA).
- NSW Rural Fire Services Bush Fire Assessment
- Relocation of Threatened Species (Botanical Gardens Sydney).
- Sustainable Home Assessment Reduction Revolution.
- Flora and Fauna Survey Assessments Niche Environment and Heritage.
- First Aid TAFE.

Fields of Competence

- Environmental Planning
- Environmental Management and rehabilitation of catchments coastal waterways. Statement of Environmental Effects (preparation and assessing).
- Fish Passage
- Marine ecosystems including; mangroves, seagrasses, algae, Fauna and habitat assessment.
- vegetation.
- Communicating with a wide range of stakeholders.
- Development Application.
- Education in both Environmental and Planning industries.
- Koala Plans of Management.
- Policy Development.

Relevant Employment History

2019 – Present	**Senior Environmental Manager**
	Anderson Environment & Planning, Newcastle
2010 - 2019	**Principal Environmental Planner**
	Black Earth
2003-2010	**Natural Resource Manager and**
	Development Assessment Officer
	Lismore City
2002- 2003	**Jervis Bay Indigenous Fishing Strategy**