Dell Road, West Gosford - Ecological Assessment Report to Accompany Planning Proposal

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Template 2.8.1

Contents

List of Figures

List of Tables

Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offsets Scheme
BV Map	Biodiversity Values Map
DAWE	Department of Agriculture, Water and the Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EPA Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FFA	Flora & Fauna Assessment
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NW Act	*Noxious Weeds Act 1993* (NSW)
OEH	NSW Office of Environment and Heritage
PW	Priority Weed
TEC	Threatened Ecological Community
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
WoNS	Weeds of National Significance

Executive Summary

This assessment was prepared to accompany a Planning Proposal by Wales and Associates Pty Ltd for the rezoning and reclassification of land known as Lot 6 in DP3944, or 39 Dell Road, West Gosford. A preliminary impact assessment is provided regarding biodiversity impacts associated with the Planning *Proposal and future development of the land.*

This report outlines the biodiversity values present across the study area, from desktop literature review and vegetation validated during field survey. Potential ecological impacts were assessed in relation to State and Commonwealth legislation, namely the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The assessment concluded that the majority of the area proposed for rezoning was highly modified and predominantly cleared of native vegetation, with most of the native vegetation present within the area zoned as Deferred Matter. One Threatened Ecological Community (TEC), Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, listed as an Endangered Ecological Community (EEC) under the BC Act was mapped within part of the study area, which was assigned to Plant Community Type (PCT) 1723: *Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest of the Central Coast.* This community occurred in the north eastern corner of the study area and was in low to moderate condition with exotic species in the mid-storey and groundcover. Native open forest and large areas of disturbed grassland were also present in the study area.

The *Biodiversity Conservation Act 2016* (BC Act) came into effect on 25 August 2017, changing the way biodiversity (ecological) impacts are assessed and approved in NSW. The BC Act includes a framework for the assessment methodology and introduces a new Biodiversity Offsets Scheme (BOS) that applies at the Development Application stage. Impacts can be offset by purchasing and retiring biodiversity credits. If removal of 0.5 ha or more of native vegetation is proposed subsequent to the Planning Proposal being approved, area threshold criteria will be exceeded and entry into the BOS will be triggered. If both the clearing threshold is not triggered, Tests of Significance will need to be conducted.

The BC Act also has provisions that require the refusal of a development application that has a 'serious and irreversible impact' (SAII) on biodiversity values. The OEH have released guidelines for SAII – which include a list of species and ecological communities that are candidates for SAII. No vegetation communities in the study area are on the list of SAII.

These requirements under the BC Act will be addressed at the Development Application stage. For the purposes of the Planning Proposal, this report describes the biodiversity values of the site that may be affected by subsequent development.

1. Introduction

Eco Logical Australia (ELA) was commissioned by Robson Civil Project Pty Ltd to updated a previous ecological assessment, produced by Clarke Dowdle and Associates in 2017, to support a Planning Proposal to extend the part of the land zoned IN1 – General Industrial at 39 Dell Road and retain the rear of the property as DM - Deferred Matter (in force 7(a) – Conservation and Scenic Protection (Conservation) under the Interim Development Order No. 122).

The zone change would facilitate future industrial development and subdivision of that part of Lot 6 fronting Nells Road. The area identified for rezoning is primarily located on land that has previously been disturbed for quarry use and contains vegetation which is mostly in degraded condition, but has parts in various stages of regeneration.

1.1 Project Background Description

The subject site is known as Lot 6 in DP3944, 39 Dell Road at West Gosford. The existing site comprises of an old quarry, grassland, remnant vegetation and vegetation in various stages of rehabilitation. The owner is seeking to extend the IN1 - General Industrial zoning across a part of the site that was previously used for quarrying activities. The purpose of this to facilitate industrial development in the area. The owner has conducted market research which indicates a demand for a high quality, accessible and fully serviced industrial lands in the locality.

A Planning Proposal is being prepared, which seeks to extend the portion of land zones IN1 – General Industrial. The existing zoning of this area is DM - Deferred Matter (in force 7(a) – Conservation and Scenic Protection (Conservation) under the Interim Development Order No. 122), the rest of the site is also zoned DM. The part that is not subject to planning proposal is proposed to be dedicated to Central Coast Council through a Voluntary Planning Agreement (VPA).

1.2 Existing Conditions

1.2.1 Land Use

The subject site is known as Lot 6 in DP3944, 39 Dell Road, West Gosford. The site has a total area of 9.7 hectares. It has frontage to both Dell Road to the north and Nells Road to the east. The site lies adjacent to the highly developed West Gosford light industrial precinct on the north western fringe of the industrial area. To the north and west of the site are heavily vegetated slopes leading up to the Somersby Plateau. This land also provides connectivity to Brisbane Waters National Park and Strickland Nature Reserve further to the west.

The land which is proposed to be rezoned has been modified significantly throughout the past 50 years. Through the 1960's and 1970's an authorised quarry operated in the location to supply fill material to Council for the construction of Adcock Park, numerous industrial lots and public roads within the Gosford LGA. It continued to operate as a storage area for fill, gravel ballast and recycled materials through to 2004. Over the past 12 to 18 years, the site has been partially backfilled with soil and some concrete material from construction sites. The location of the site is shown in Figure 1**.**

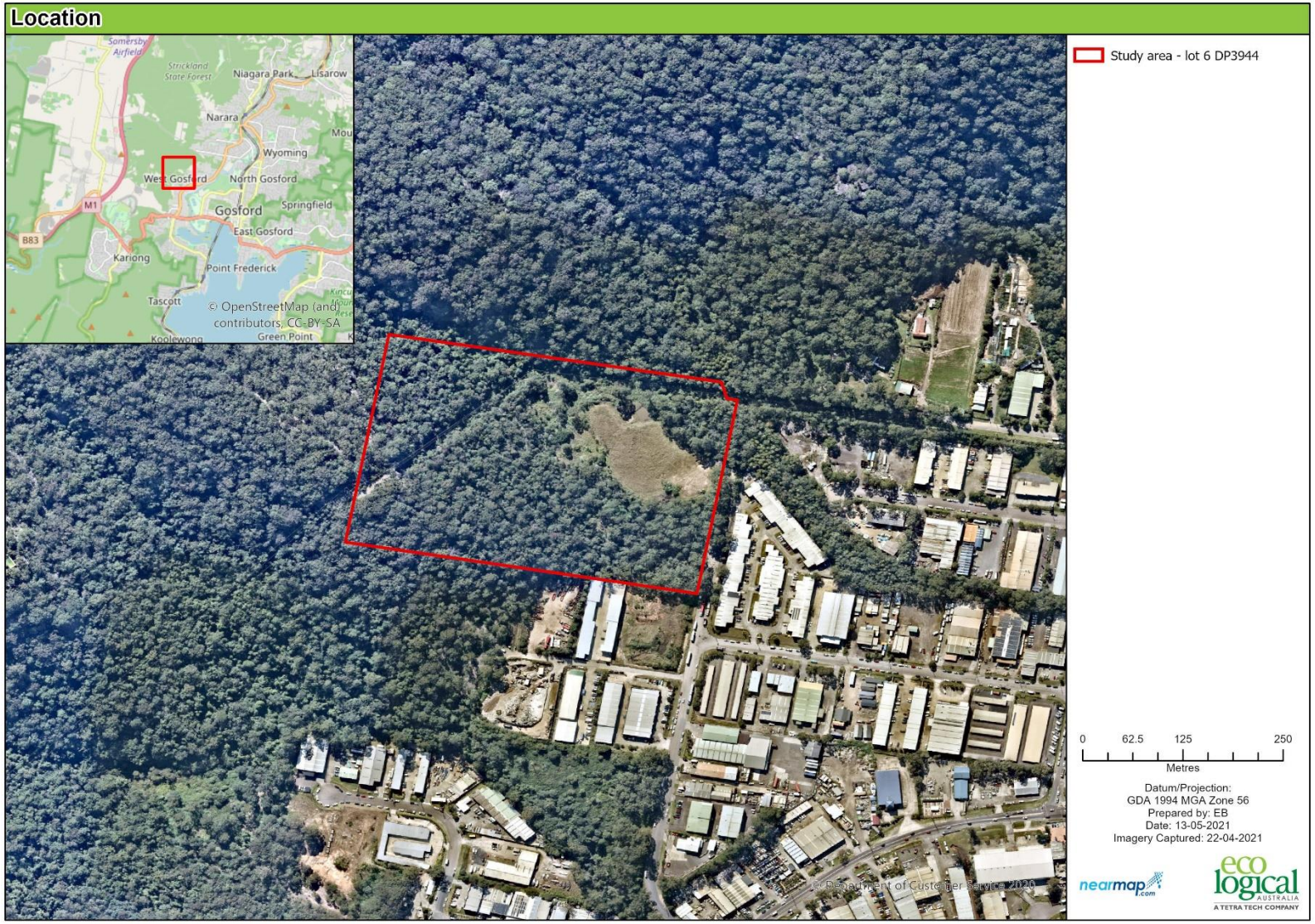

Figure 1: Location of the planning proposal

1.3 Future Conditions

1.3.1 Land Use

The proposal seeks to zone 2.33 ha of land to facilitate future industrial development and subdivision (Table 1). Current land zoning and proposed land zoning are shown in Figure 2 and Figure 3.

Table 1 Area Schedule

Use		Size (ha)
Future Industrial Development	Industrial purposes	2.33
Land to be dedicated to Council	Provide connectivity with existing bushland.	7.37
	TOTAL	**9.70**

1.4 Study Area

The study area is located at 39 Dell Rd, West Gosford and comprises of one lot, Lot 6 DP3944.

The majority of the study area is remnant native vegetation. The vegetation was identified as being consistent with vegetation community PCT 1579, *Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast*, and PCT 1723, *Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest of the Central Coast*. The area which is proposed to be rezoned comprises an area of compacted fill, used to rehabilitate the old quarry site, grass, some natives and invasive species around the edges of the disturbed land.

The subject site generally slopes from west to east with surface runoff at the base of the upward slope collected via an existing diversion drain and directed to the north of the disturbed lands to an existing sediment basin. Overflow is then directed to the existing watercourse along the northern boundary . Surface runoff from the disturbed areas on the eastern portion of the site falls generally to the watercourse and is filtered through existing riparian vegetation along the eastern boundary. An additional sedimentation basin exists adjacent to the eastern boundary.

1.5 Scope of Works

The Planning Proposal involves the following:

- Rezone the area indicated in Figure 3 from DM – Deferred Mater to IN1 – General Industrial, to facilitate future industrial development and subdivision
- Dedicate the remaining 7.37 hectares of land to Council through a Voluntary Planning Agreement

1.6 Terminology

The following key terms and definitions are used in this ecological assessment:

- Planning proposal – the proposed rezoning and reclassification of lands within the study area.
- Subject site – the area directly affected by the proposal
- Study area – means the subject site and additional areas surveyed for the proposal including those areas likely to be directly or indirectly affected by the proposal.

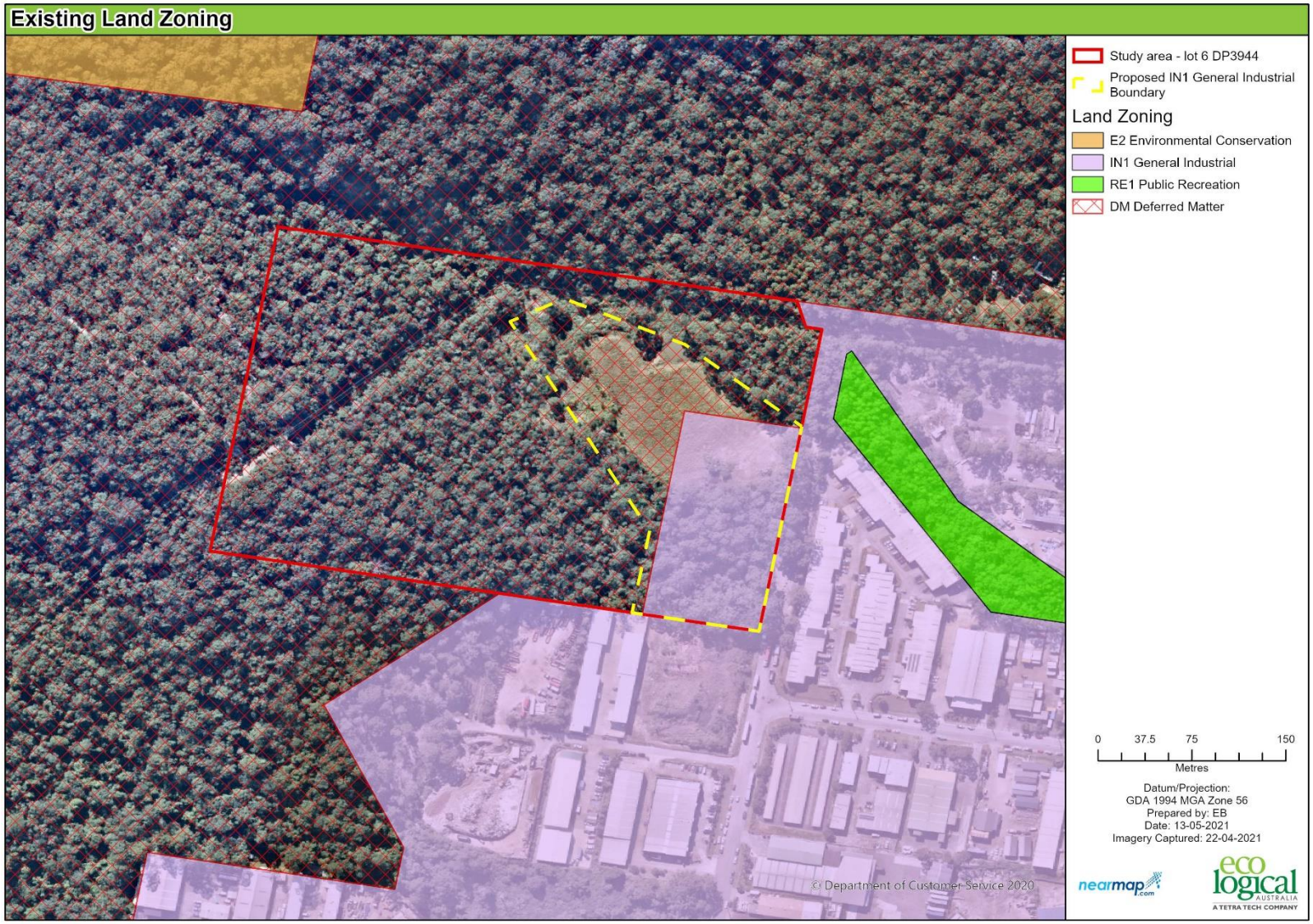

Figure 2: Current land zoning within the study area

Figure 3: Proposed land zoning within the study area

2. Legislative Context

Table 2 below provides a description of the relevant legislative context for the ecological assessment. Approvals and/or legislative consideration will be required for the development of the study area. This report addresses the objectives and requirements of the legislation as it relates to biodiversity and ecological values.

Table 2: Legislative context

Name	Relevance to the project	Section in this report
	Commonwealth	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Matters of National Environmental Significance (MNES) have been identified as having a potential to occur within the locality. An action that has a significant impact on MNES will be a Controlled Action and require approval from the Minister for the Environment. Whilst a Planning Proposal is not an 'action' under the EPBC Act, this report, describes the presence of MNES in the study site.	Section 5.3
	State	
Biodiversity Conservation Act 2016 (BC Act)	The BC Act outlines the assessment requirements to determine whether proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats under section 7.3 and whether the Biodiversity Offsets Scheme (BOS) will be triggered. Whilst Planning Proposals (i.e. rezoning land) do not trigger the offset scheme, this report lists the potential impacts that may trigger entry into the BOS at the DA stage.	Section 5.2
Biodiversity Conservation Regulation 2017 (BC Regulation)	The Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the BC Regulation. The study area does not contain land identified on the Biodiversity Values Map.	Section 5.2.2
Biosecurity Act 2015	Under this Act, priority weeds have been identified for Local Government Areas and assigned strategies to contain, remove or manage. Occupiers of land (this includes owners of land) have responsibility for taking appropriate action for priority weeds on the land they occupy. The site contains 16 weeds listed under the Biosecurity Act.	Section 4.5
Fisheries Management Act 1994 (FM Act)	The development does not involve harm to mangroves or other protected marine vegetation, dredging, reclamation or blocking of fish passage, and therefore a permit under the FM Act is not required.	N/A
Water Management Act 2000 (WM Act)	Whilst the WM Act does not contain any provisions for Planning Proposals, it is prudent to consider the objectives of the Act when preparing a Planning Proposal. A first order water course traverses the northern boundary of the study area and is located in the land to be dedicated to Council. There are also two sediment basins located in northern part of the land to be rezoned. At the DA stage a Controlled Activity Approval under the WM Act is required for development that impacts on waterfront land, which is defined as land within 40 m of the highest bank of a watercourse or waterbody.	N/A

Name	Relevance to the project	Section in this report
	Planning Instruments	
State Environmental Planning Policy (Koala Habitat Protection) 2021 (Koala SEPP)	The Koala SEPP aim is to help reverse the decline of koala populations by ensuring koala habitat is properly considered during the development assessment process. The Koala SEPP only applies to development applications and is not relevant to planning proposal. It will be relevant to future Development Applications.	Section 5.4
Gosford Local Environmental Plan 2014	The Study area contains land zoned as zoned IN1 – General Industrial and DM - Deferred Matter (in force 7(a) – Conservation and Scenic Protection (Conservation) under the Interim Development Order No. 122). The Proposal is seeking to amend the location of these zones. The LEP planning controls do not direct any further ecological assessment in regard to a planning proposal.	N/A

3. Methodology

3.1 Literature review and database search

A review of readily available databases pertaining to the ecology and environmental features of the study area and surrounding area, and existing vegetation mapping was conducted to identify records of threatened species, populations and communities and their potential habitat. Databases and vegetation mapping that were reviewed included:

- BioNet (Atlas of NSW Wildlife) database search (5 km) threatened species, populations and ecological communities listed under the BC Act (accessed March 2021).
- EPBC Act Protected Matters Search Tool (5 km) for threatened and migratory species, populations and ecological communities listed under the Commonwealth EPBC Act (Department of Agriculture, Water and the Environment (DAWE) 2021).
- Aerial mapping and vegetation mapping (Bell, 2013) to assess the extent of vegetation including mapped threatened ecological communities (TECs) listed under the BC Act and / or EPBC Act.
- Aerial photography (Bing Maps and Google Earth) of the study area and surrounds were also used to investigate the extent of vegetation cover and landscape features. In addition, relevant GIS datasets (soil, geology, drainage) were reviewed.
- Previous studies
    - Flora and Fauna Assessment Report – Proposed Rezoning Lot 6 DP 3944 No. 34 Dell Road West Gosford (Conacher Travers, 2004), and
    - Ecological Assessment for the Proposed Rezoning at 39 Dell Road, West Gosford NSW, (Clarke, Dowdle and Associates, 2017).

Species from both the Wildlife Atlas and DAWE online search were combined to produce a list of threatened species, populations and communities that may occur within the study area. The likelihood of occurrences for threatened species, populations and communities in the study area was then determined based on location of database records, the likely presence or absence of suitable habitat in the study area, and knowledge of the species' ecology. This information informed the subsequent field surveys.

After the field inspections were completed the likelihood of occurrence of each species, population and communities was determined again. This was based on the increase in knowledge about the extent and type of habitats and about which species were present on the study area. The likelihood of occurrence of species, populations and communities based on the field surveys is presented within the likelihood table in Appendix A**.**

3.2 Field Surveys

3.2.1 Preliminary Field Survey

The field survey was conducted by ELA ecologist Diane Campbell on 10 May 2021. The study area was traversed using the random meander method (Cropper 1993) to verify the presence of native vegetation, threatened ecological communities, and threatened species and / or their habitat. Where

the boundaries of vegetation communities differed from existing vegetation mapping, these were recorded on phone-based maps (Avenza).

Vegetation validation was undertaken to confirm the composition and quality of vegetation communities present. Biodiversity Assessment Method (BAM) plots were not undertaken.

Bird species and other fauna were recorded opportunistically. Targeted surveys were not undertaken for any threatened species.

Weather during the survey is recorded in Table 3 based on the Gosford Australian Weather Station (station 061425).

Table 3: Weather conditions

Weather Station	Maximum Temperature Degrees Celsius	Minimum Temperature Degrees Celsius	Rainfall mm	Maximum Wind Gust km/hr
Gosford	24.6	12.2	0.2	24

3.3 Survey Limitations

This assessment was not intended to provide an inventory of all species present across the study area but instead an overall assessment of the ecological values of the study area with particular emphasis on threatened species, endangered ecological communities and key fauna habitat features. It is important to note that some species may not have been detected on the study area during the inspection as they may be cryptic or seasonal and only detectable during flowering or during breeding. In this case the likelihood of their occurrence on site has been assessed based on the presence of potential habitat.

4. Results

4.1 Literature review

A review of previous vegetation mapping within the study area (Conacher Travers, 2004) found three native vegetation communities:

- Disturbed land including land subject to previous quarrying,
- Open Forest, most similar to Map unit 7 Sheltered Rough Barked Apple Forest (NPWS, 2003)
- Closed Forest, most similar to a combination of Map Unit 5 Alluvial Tall Moist Forest and Map Unit 6 Coastal Narrabeen Moist Forest (NPWS, 2003).

A review of previous vegetation mapping within the study area (Bell, 2013, in Clarke Dowdle and Associates, 2017) found five native vegetation communities:

- Coastal Warm Temperate Rainforest (Map Unit E1ai)
- Coastal Narrabeen Moist Forest (Map unit 6ai),
- Narrabeen Coastal Blackbutt Forest (Map Unit E22ai),
- Hawkesbury Peppermint-Apple Forest (Map Unit E25),
- Exposed Hawkesbury Woodland (Map Unit E26);

and one disturbed community being Disturbed - Regrowth (Map Unit Xs).

A review of more recent vegetation mapping within the study area (Clarke, Dowdle and Associates, 2017) found two native vegetation communities:

- Open Forest
- Cabbage Palm / Riparian Closed Forest

and one disturbed community being Disturbed Grasslands. It noted that the Cabbage Palm / Riparian Closed Forest community was a combination of Alluvial Bluegum-Paperbark Forest (E5a), Coastal Narrabeen Ironbark Forest, (E6ai) (Bell, 2013). The study identified that it conformed to the EEC known as Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions (LR) under the NSW BC Act.

The current desktop literature review identified a total of 89 threatened species listed under the BC Act, EPBC Act, or FM Acts, which may have the potential to occur within a 5 km radius of the study area.

An assessment of the likelihood of occurrence of threatened flora species within the study area is provided in Appendix A. The threatened flora and fauna species that were identified within the desktop assessment as having a potential, likely or known occurrence within the study area include:

- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Calyptorhynchus lathami* (Glossy Black-Cockatoo)
- *Cercartetus nanus* (Eastern Pygmy-possum)
- *Dasyurus maculatus* (Spotted-tailed Quoll)
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)

- *Glossopsitta pusilla* (Little Lorikeet)
- *Heleioporus australiacus* (Giant Burrowing Frog)
- *Hieraaetus morphnoides* (Little Eagle)
- *Litoria aurea* (Green and Golden Bell Frog)
- *Litoria brevipalmata* (Green-thighed Frog)
- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
- *Miniopterus australis* (Little Bentwing-bat)
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
- *Mixophyes iteratus* (Giant Barred Frog)
- *Myotis macropus* (Southern Myotis)
- *Neophema pulchella* (Turquoise Parrot)
- *Lathamus discolor* (Swift Parrot)
- *Ninox connivens* (Barking Owl)
- *Ninox strenua* (Powerful Owl)
- *Petaurus australis* (Yellow-bellied Glider)
- *Petaurus norfolcensis* (Squirrel Glider)
- *Pseudophryne australis* (Red-crowned Toadlet)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Saccolaimus flaviventris* (Yellow-bellied Sheath-tail Bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Tyto novaehollandiae* (Masked Owl)
- *Tyto tenebricosa* (Sooty Owl)
- *Grevillea shiressii*
- *Melaleuca biconvexa* (Biconvex Paperbark)
- *Prostanthera askania* (Tranquility Mintbush)
- *Rhizanthella slateri* (Eastern Australian Underground Orchid)
- *Rhodamnia rubescens* (Scrub Turpentine)
- *Syzygium paniculatum* (Magenta Lilly Pilly)

4.2 Geology, Soils and Topography

The geology of the subject site is Terrigal Formation of the Narrabeen Group—comprised of lithic and quartz sandstone and siltstone, minor sedimentary breccia, claystone and conglomerate, with some sandstones are highly weathered and friable. The upper parts of the site are massive and cross-bedded lenticular beds of quartz -lithic sandstone, siltstone and claystone, with massive sandstone units.

The subject site is located entirely located on Erina (er) soil landscape, with the remainder of the study area located on Watagan (wn) soil landscape, according to *the Soil Landscapes of the Gosford-Lake Macquarie 1:100,000 Sheets*. Erina soils occur on undulating to rolling rises and low hills on the Terrigal Formation. Local relief <60 m; slope gradients <25% Rounded narrow crests with moderately inclined slopes. The underlying geology of the Erina and Watagan soil landscapes consist of the Terrigal — lithic and quartz sandstone and siltstone, minor sedimentary breccia, claystone and conglomerate. Some sandstones are highly weathered and friable. Watagan soils occur on rolling to very steep hills on fi ne-

grained Narrabeen Group sediments. Local relief 50 – 220 m. Slopes >25%. Narrow convex crests and ridges, steep colluvial sideslopes, occasional sandstone boulders and benches.

The topography of the study area is a predominant fall of approximately 100 m from the west to the east of approx. The subject site is located on the most level portion of the site that sits at the bottom of the rising topography to the west. The subject site sits at approximately 6-10 m above sea level.

4.3 Waterways

A first order water course (Strahler system) is mapped along the northern boundary of the study area. Surface runoff from the site generally flows to this water course. The subject site generally falls from west to east with surface runoff at the base of the upward slope collected via an existing diversion drain and directed to the north of the disturbed area to an existing sediment basin. The subject site generally falls from west to east with surface runoff at the base of the upward slope collected via an existing diversion drain and directed to the north of the disturbed lands.

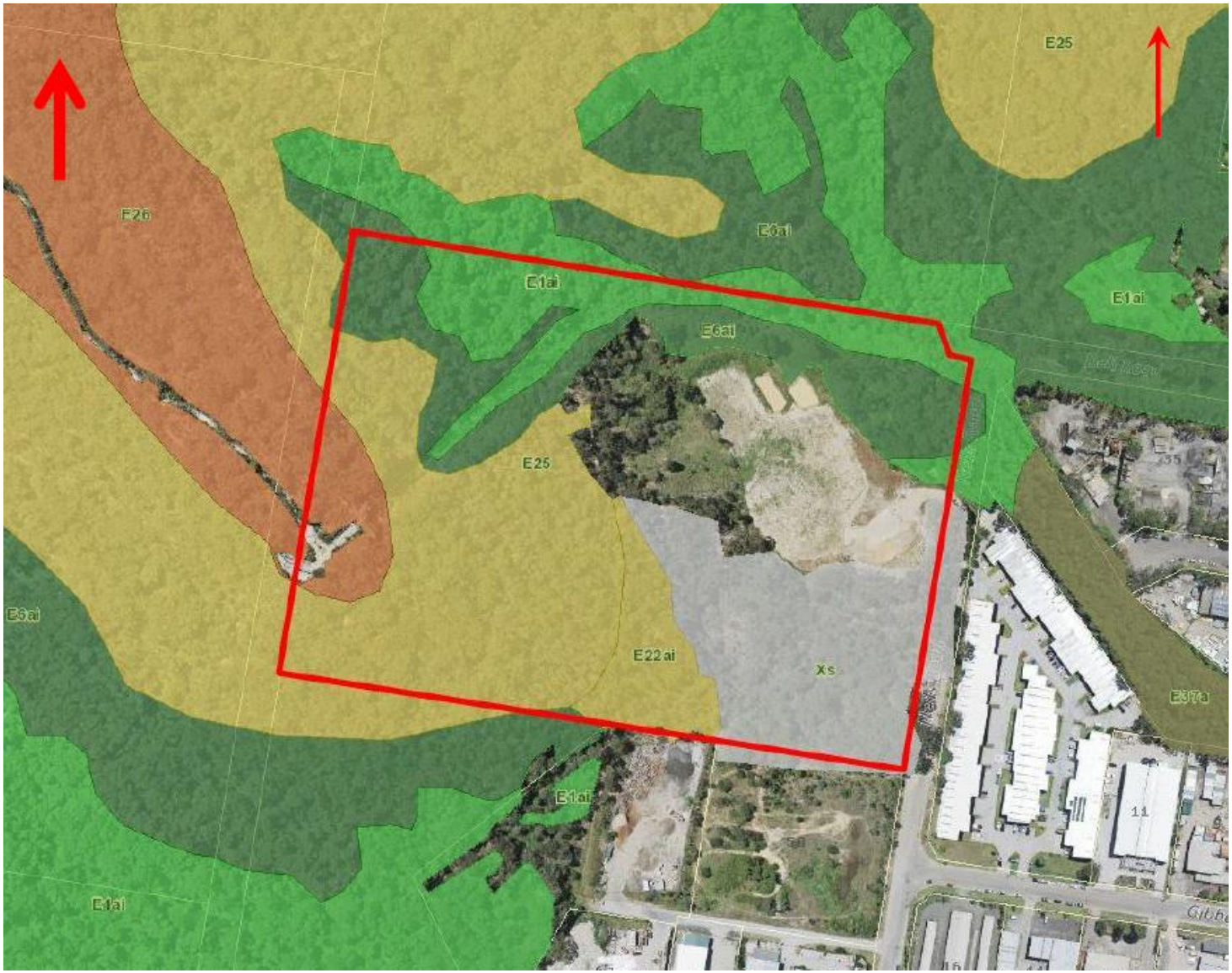

Figure 4: Previous vegetation mapping Bell 2013, source Central Coast Council in Clarke, Dowdle and Associates 2017

Figure 5: Previous vegetation mapping Clarke, Dowdle and Associates 2017

4.4 Field Survey Results

4.4.1 Vegetation Communities

The field survey confirmed the presence of two native vegetation communities as previously mapped within the study area:

- Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest of the Central Coast,
- Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast

The study area was also composed of a large area of disturbed grassland.

Table 4: Vegetation zone descriptions

Vegetation Zone	Vegetation Community	Plant Community Type	Condition	Conservation Status (NSW BC Act)	Conservation Status (Commonwealth EPBC Act)	Area (ha)
1	Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest of the Central Coast	1723: Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest of the Central Coast	Low - Moderate	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Part) Endangered Ecological Community.	NA	0.97
2	Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast	1579: Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast	Low-Moderate	NA	NA	7.13
3	Disturbed grassland	NA	Disturbed	NA	NA	1.64

Figure 6: ELA Vegetation validation 2021

VEGETATION ZONE ONE

This vegetation consisted of forested wetland and was present in the north eastern corner of the subject site. The majority of vegetation within this zone was in low- moderate condition with weeds present along the creekline (Figure 7). The canopy was composed of *Livistona australis* (Cabbage Tree Palm), *Melaleuca biconvexa* (Biconvex Paperbark) and *Eucalyptus robusta* (Swamp Mahogany). *Eucalyptus saligna* (Sydney Blue Gum), *Acmena smithii* (Lilly Pilly) and *Syncarpia glomulifera* (Turpentine) were present. The mid-storey consisted of exotic species *Ligustrum sinense* (Small-leaved Privet), *Lantana camara* (Lantana) and *Senna pendula* var. *glabrata* (Cassia). Ferns were present in the shrub layer including *Pteridium esculentum* (Common Bracken), *Calochlaena dubia* (Rainbow Fern), as well as the native shrub *Goodenia ovata* (Hop Goodenia) and juvenile *Synoum glandulosum* (Scentless Rosewood). The ground cover was disturbed and composed of a mixture of native grasses and weeds. The groundcover was dominated by small *Ligustrum sinense* (Small-leaved Privet) and *Ageratina adenophora* (Crofton Weed). Small areas of native grasses included *Entolasia marginata* (Bordered Panic) and *Oplisemus aemulus* (Australian Basket Grass), juvenile *Livistona* australis (Cabbage Tree Palm) and the native vine *Cissus hypoglauca* (Water Vine).

Figure 7: Vegetation Zone One Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest within the study area

VEGETATION ZONE TWO

This vegetation consisted of open forest in the south and west, and regrowth canopy in the east and south east of the subject site. The canopy species included *Eucalyptus pilularis* (Blackbutt), *Syncarpia glomulifera* (Turpentine), *Eucalyptus saligna* (Sydney Blue Gum), *Eucalyptus deanei* (Mountain Blue Gum), *Eucalyptus piperita* (Sydney Peppermint), *Allocasuarina torulosa* (Forest Oak) and *Glochidion ferdinandi* (Cheese Tree); understorey included *Acacia longifolia* var*. longifoia* (Sydney Golden Wattle), *Pteridium esculentum* (Common Bracken); and ground covers included *Lomandra longifolia* (Spiny-headed Mat-rush), *Imperata cylindrica* (Blady Grass), *Oplismenus aemulus* (Australia Basket Grass), *Geranium homeanum*. In the east and south east the regrowth canopy vegetation was present on disturbed and uneven ground with concrete and waste present with the understorey dominated by weeds consisting of *Senna pendula* var. *glabrata* (Cassia), *Ipomoea indica* (Morning Glory), *Lantana camara* (Lantana), *Lonicera japonica* (Japanese Honeysuckle), *Thunbergia alata* (Black-eyed Susan) and *Arundo donax* (Spanish Reed). This part of the study area is already zoned IN1 General Industrial therefore in-depth investigations into this area were not undertaken.

Figure 8: Vegetation Zone Two (open forest) within the subject site

VEGETATION ZONE THREE

This vegetation was dominated by exotic grasses and weeds in the central part of the site. These included *Paspalum urvillei* (Giant Paspalum), *Andropogon virginicus* (Whisky grass), *Sporobolus africanus* (Parramatta Grass), *Cynodon dactylon* (Couch), *Tagetes minuta* (Stinking Roger), *Verbena bonariensis* (Purpletop), *Bidens pilosa* (Cobbler's pegs*), Ricinus communis* (Castor oil plant) and *Senna pendula* var. *glabrata* (Cassia). Occasional native species included *Typha orientalis* (Broadleaf Cumbungi), *Imperata cylindrica* (Blady Grass), *Pteridium esculentum* (Common Bracken). Several sediment basins were located on the northern edge of the zone.

Figure 9: Vegetation Zone Three (disturbed grassland) within the subject site, with sediment basin

4.4.2 Threatened Ecological Communities

One Threatened Ecological Community (TEC), Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, listed as an Endangered Ecological Community (EEC) under the BC Act was found within part of the study area, which was assigned to Plant Community Type (PCT) 1723: *Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest of the Central Coast*. This community occurred in the north eastern corner of the study area and was in low to moderate condition with exotic species in the mid-storey and groundcover.

4.5 Flora Species

A total of 70 flora species were identified within the study area. One species of threatened flora, *Melaleuca biconvexa* (Biconvex Paperbark) was recorded during the field survey. The central and south eastern parts of the study area is unlikely to provide suitable habitat for any threatened flora species due to the high level of disturbance and weed incursion.

Exotic flora species were high in diversity and abundance, particularly within the understorey. 30 exotic species were identified within the study area (Appendix B) including 16 declared as priority weeds under the *Biosecurity Act 2015* in Greater Sydney Regional Strategic Weed Management Plan 2017-2022 (Table 5). Three of these weeds are also listed as *Weeds of National Significance* (WoNS).

Table 5: NSW Priority Weeds and WoNS species recorded within the study area

Scientific Name	Common Name	WoNS	Priority Weed Objective/ Asset Value at Risk
State Priority Weeds			
Lantana camara	Lantana	Yes	Prohibition on dealing[1]
Rubus fruticosus	Blackberry	Yes	Prohibition on dealing[1]
Senecio madagascariensis	Fireweed	Yes	Prohibition on dealings[1]
Regional Priority Weeds			
Arundo donax	Giant Reed	No	Asset Protection
Other weeds of regional concern			
Ageratina adenophora	Crofton Weed	No	Environment, Agriculture
Andrpopogon virginicus	Whisky Grass	No	Environment
Chloris gayana	Rhodes Grass	No	Environment
Erythrina x sykesii	Coral Tree	No	Environment
Ipomoea indica	Morning Glory	NO	Environment, Human Health
Ligustrum sinense	Small-leaved privet	No	Environment, Human Health
Lonicera japonica	Japanese Honeysuckle	No	Environment
Nephrolepis cordifolia	Fishbone Fern	No	Environment
Pennisetum clandestinum	Kikuyy	No	Environment
Phoenix canariensis	Phoenix Palm	No	Environment
Phyllostachys aurea	Bamboo	No	Environment
Senna pendula var. *glabrata*	Cassia	No	Environment

[1]***PROHIBITION ON DEALINGS:*** MUST NOT BE IMPORTED INTO THE STATE OR SOLD

[2]***REGIONAL RECOMMENDED MEASURE:*** AN EXCLUSION ZONE IS ESTABLISHED FOR ALL LANDS IN BLUE MOUNTAINS CITY COUNCIL AND CENTRAL COAST LOCAL GOVERNMENT AREAS. THE REMAINDER OF THE REGION IS CLASSIFIED AS THE CORE INFESTATION AREA. WHOLE REGION: THE PLANT OR PARTS OF THE PLANT ARE NOT TRADED, CARRIED, GROWN OR RELEASED INTO THE ENVIRONMENT. EXCLUSION ZONE: THE PLANT IS ERADICATED FROM THE LAND AND THE LAND KEPT FREE OF THE PLANT. CORE INFESTATION AREA: LAND MANAGERS PREVENT SPREAD FROM THEIR LAND WHERE FEASIBLE

[3]***GENERAL BIOSECURITY DUTY:*** ALL PLANTS ARE REGULATED WITH A GENERAL BIOSECURITY DUTY TO PREVENT, ELIMINATE OR MINIMISE ANY BIOSECURITY RISK THEY MAY POSE. ANY PERSON WHO DEALS WITH ANY PLANT, WHO KNOWS (OR OUGHT TO KNOW) OF ANY BIOSECURITY RISK, HAS A DUTY TO ENSURE THE RISK IS PREVENTED, ELIMINATED OR MINIMISED, SO FAR AS IS REASONABLY PRACTICABLE.

4.5.1 Threatened Flora Species

Candidate species credit species predicted to occur within the open forest is provided in Appendix C. These species need to be surveyed as part of a BDAR if a future DA triggers the Biodiversity Offsets Scheme.

No targeted surveys for threatened species were undertaken. *Melaleuca biconvexa* was identified during the survey.

4.6 Fauna and Fauna Habitat

Five fauna species were recorded during the field survey most of which were common urban birds. All fauna species recorded were native. A full list of fauna species recorded during the field survey is shown in Appendix B.

Of note was the *Manorina melanophrys* (Bell Miner) located within the study area. Bell Miner Associated Dieback (BMAD) is a condition in which trees progressively die, from the top downward. Bell miners feed on the psyllids and their lerps, and may even 'farm' them, possibly selecting large lerps and preferentially feeding on the lerp rather than the insect itself. Bell miners are aggressive and extremely effective at excluding other bird species from their territories. Bell miners are a natural part of eucalypt forests, and they normally have a minor (and positive) impact on forests. However, bell miner populations have increased in size, and the birds have become more widely distributed. They can contribute to dieback when combined with other factors such as tree stress, psyllid infestation, dense forest understories, weed invasion, drought, logging, road construction, pasture improvement, loss of biodiversity (both plants and animals), soil nutrient changes, changing fire patterns, and changing grazing regimes (DPIE, 2021).

An assessment of the habitat features was used to determine the suitability of the study area to support native fauna species, including threatened species. A likelihood of occurrence table is provided in Appendix A.

No targeted surveys for the following threatened fauna species were undertaken. Species credit species predicted to occur within the open forest part of the study area currently zoned industrial (i.e. candidate species) that would be required to be surveyed as part of a BDAR if this was triggered by the clearing area in a future DA (provided in Appendix C).

The ecological assessment prepared by Clarke Dowdle and Associates, 2017 was found to be valid within the study area. It is important to note that there has been some additional regeneration of the canopy trees within the previously disturbed open forest area in the south east of the study area.

The Clarke Dowdle and Associates report summarised the habitat feature of the site as such:

> *The cleared areas within the site where the majority of the proposed industrial development will occur are completely cleared with little to no habitat present for fauna species. It is noted that some waste and other dumped materials onsite may provide some habitat for small mammals and reptiles. In addition the man made ponds on the site provide some habitat for amphibian species also.*

The south-eastern portions of the site contain a vegetation community under regeneration. This is evident by the immature trees present within this area. This is further supported by the Conacher Travers (2004) whom identified these areas as 'Disturbed Land'. These areas have a large proportion of the understorey dominated by weeds, however native species do exist. This native vegetation along with the weeds present, provides a number of habitat features including potential sheltering, nesting, roosting and foraging resources provided by the vegetation and the connectivity of the subject site to the surrounding lands, particularly to the west. Due to the immature nature of the trees within the south-eastern portions, no hollow bearing trees were present.

The north-eastern portions along with the larger western portion of the site, of which will not be disturbed (E2 zoning), contain the optimal habitat resources within the site. These include but are not limited to;

- *Significant tree layer which provides large areas of suitable feeding, roosting, nesting and habitat resources for arboreal mammals, birds, owls and flying-foxes*
- *Fallen timber and forms a dense ground cover in parts of which provides suitable feeding, roosting, nesting and habitat resources for a number of amphibians, avian and terrestrial species*
- *Sandstone crevices/boulders-however these habitat features were found to occur on the higher slopes further to west and will not be impacted by the proposal.*
- *The Forest She-Oaks, Allocasuarina torulosa are feeding trees for the Glossy Black Cockatoo*
- *The vegetated areas surrounding the development site provides potential habitat for the listed threatened species the Squirrel Glider Petarus norfolcensis and the Yellow bellied Glider, Petaurus australis (recorded).*
- *The north-eastern portions of the site contain the numerous Eucalyptus robusta of which is a listed feed tree for the Koala*
- *A large number of hollow bearing trees on the north-eastern and western portions of the property of which provide important habitat features for arboreal mammals, birds, owls and microbats.*

The north-eastern portions of the site are deemed to be a potential faunal corridor for fauna movement from the vegetated areas to the west, through the site, to the adjoining narrow vegetated areas to the east. The vegetation occurring to the east contains the important winter flowering species (e.g. Eucalyptus robusta). Fauna species may utilise the habitat corridor to travel through to these areas to forage for food in the winter months. Shown in figure 10

In summary the study area provides a large variety of habitat to fauna in the area although the subject site proposed for rezone has limited habitat qualities mainly associated to alien objects such as dumped rubbish or invasive vegetation.

Figure 10: Potential corridor shown by Clarke, Dowdle and Associates

5. Ecological Assessment

5.1 Potential Impacts

Whilst the rezoning of land itself does not result in impacts to biodiversity, the rezoning is proposed to allow for future use of the site for industrial and associated infrastructure. Direct impacts to Swamp Sclerophyll Forest TEC and the undisturbed north western parts of the open forest have been avoided. Where impacts cannot be avoided to the disturbed area of open forest in the south east, development may trigger the Biodiversity Offset Scheme as described below in Section 5.2.

When assessing impacts, the proponent at the DA stage will need to consider direct impacts such as removal of vegetation as well as indirect impacts such as:

- Changes to hydrology through run off, sedimentation and erosion from construction works.
- Spread of priority weeds to the site or from the site – if not managed accordingly.
- Noise, vibration and light impacts of industrial activity in close proximity to fauna habitat.
- Weed management to minimise the edge effect.

5.2 Biodiversity Conservation Act 2016

The BC Act came into effect in August 2017 replacing the *Threatened Species Conservation Act 1995* (TSC Act). Impacts to threatened species and threatened ecological communities listed under the BC Act are required to be assessed in accordance with Section 7.3 of the BC Act, known as 'test(s) of significance'.

For a development under Part 4 of the EPA Act, the Biodiversity Offsets Scheme (BOS) and BAM may be triggered by the following means:

- Area Criteria - exceeding the clearing area threshold (Table 6)
- Impacting an Area of outstanding Biodiversity Value.
- Development likely to have a significant impact on a threatened species or ecological community

As determined in Section 5.2.1 and 5.2.2, the BOS may be triggered as a result of any future development under the Area Criteria and/or the Biodiversity Value Map.

5.2.1 Biodiversity Offsets Scheme – Area Threshold

The area threshold is triggered when an area of native vegetation* to be cleared reaches the thresholds for the relevant lot size is reached (see Table 6).

There is no minimum lot size for the study area under the Gosford LEP 2014. In accordance with the *Area Clearing Threshold Technical Explanation* (DPIE, 2019), in instances where the study area does not have a minimum lot size, the actual size of the lot is used. Lot 6 DP 3944 is approximately 9.835 ha. Therefore, if future development impacts 0.5 ha or more of native vegetation, the BOS will be triggered and a BDAR will be required.

There is approximately 8.1 ha of native vegetation within the study area. If more than 0.5 ha of this is cleared for a subsequent development, a BDAR will be required.

Table 6: Area clearing threshold

Minimum lot size associated with the property	Threshold for clearing native vegetation, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

* Note: native vegetation is defined in Section 1.6 of the BC Act (and has the same meaning as in Part 5A of the *Local Land Services Act 2013*); essentially encompasses any species native to NSW and does not necessarily conform to a PCT.

5.2.2 Offset Scheme Thresholds – Biodiversity Values Land Map

The BV Map identifies land considered to have high biodiversity value as defined by the BC Regulation. The study area currently contains areas of high biodiversity value as mapped on the BV Map (when accessed 13/05/2021) (Figure 11). If any of the mapped areas are impacted by development, the BOS is triggered and a BDAR is required to be lodged with the DA.

5.2.3 State Significant Development Application

In accordance with Section 7.9 of the BC Act, all State Significant DAs must be accompanied by a BDAR unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values through a BDAR Waiver application.

5.2.4 Test of Significance (BC Act)

If either the area threshold criteria is exceeded, or development is proposed within areas mapped on the Biodiversity Values Map, Tests of Significance are not required. However, if this is not the case, Tests of Significance will need to be undertaken on threatened species likely to occur within the study area.

5.2.5 Serious and Irreversible Impacts (SAII)

A consent authority cannot approve a DA that has a SAII to biodiversity values. The BC Act imposes various obligations on decision-makers in relation to impacts on biodiversity values that are at risk of a SAII. These obligations generally require a decision-maker to determine whether or not any of the residual impacts of a proposed development on biodiversity values are serious and irreversible.

To assist a decision-maker with this task, the BC Act provides a framework to make this determination. The framework consists of a series of principles defined in the BC Regulation and supporting guidance, provided for under section 6.5 of the BC Act, to interpret these principles.

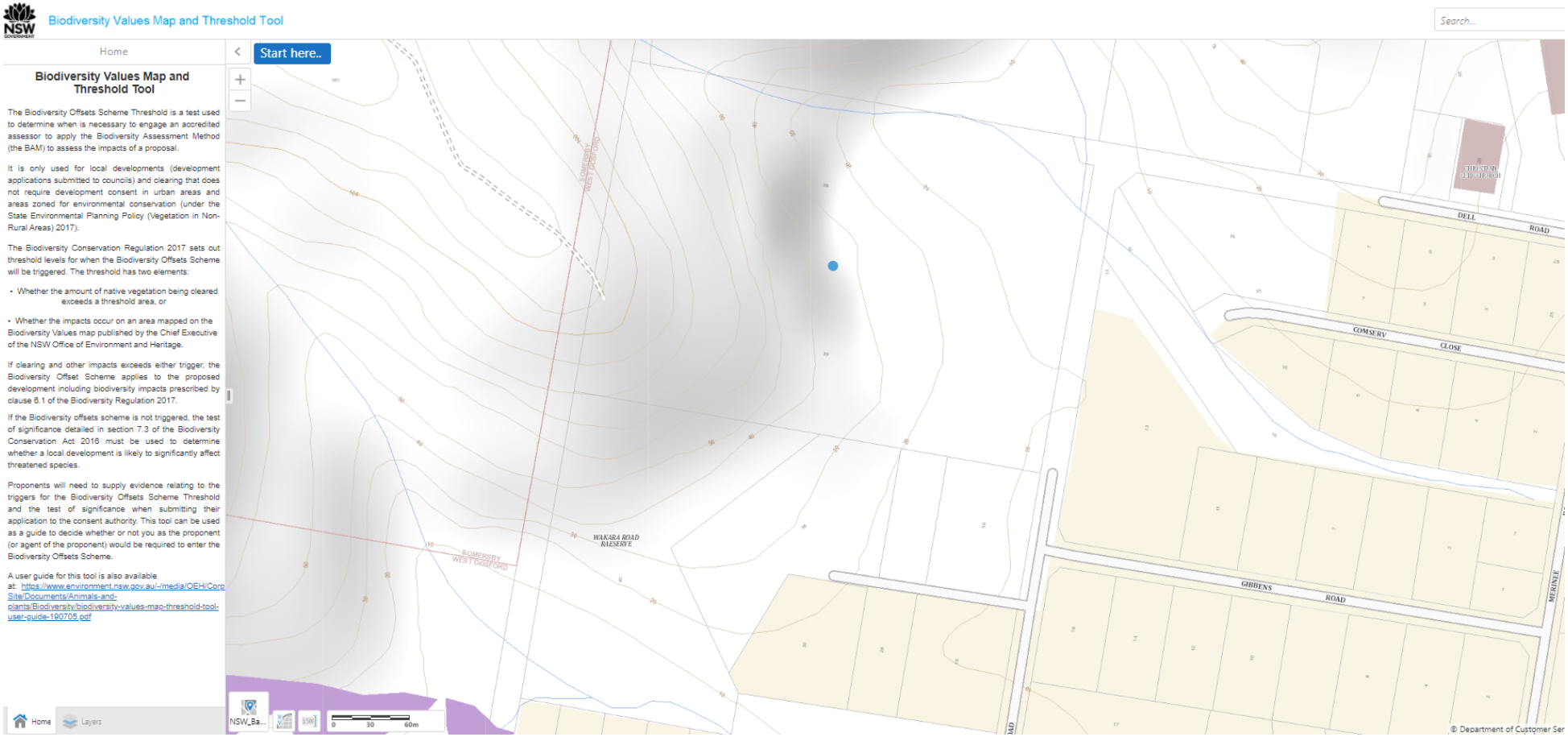

Figure 11: Biodiversity Values Map (Accessed 13/051/2021)

5.3 Significance Assessment (EPBC Act)

A number of threatened species listed under the EPBC Act have potential habitat in the study area listed in Appendix A:

- *Dasyurus maculatus maculatus* Spotted-tailed Quoll
- *Lathamus discolor* Swift Parrot
- *Litoria aurea* Green and Golden Bell Frog
- *Mixophyes iteratus* Giant Barred Frog
- *Pteropus poliocephalus* Grey-headed Flying-fox

These species will require a more in-depth assessment during the DA stage to assess the potential for a significant impact. However, it must be noted that these species are highly mobile and unlikely to be reliant on the disturbed habitat present in the open forest within the land zoned industrial study area.

5.4 State Environmental Planning Policy (SEPP) (Koala Habitat Protection) 2021

The Koala Habitat Protection SEPP commenced on 17 March 2021. The SEPP aims to *encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline*.

The proposed development is located within an LGA which is listed in the Koala Habitat Protection SEPP, and there are a number of koala feed trees listed in Schedule 2 in the SEPP, however the SEPP does not apply to planning proposals. Future DAs will need to undertake an assessment under the SEPP, if the open forest currently zoned industrial is proposed to be cleared.

There have been 7 records of Koala within 10 km of the study area, with most records occurring approximately 2-4 km south and south west of the study area during the 1990s. The closest record to the study area is within 3 km south east of the site in 2018.

6. Conclusion

The Planning Proposal itself will not have an impact on biodiversity values, as rezoning of land is not approval for development. However, the Planning Proposal is to enable development of the site as an expanded industrial land.

The preliminary Planning Proposal rezoning area has been located in order to 'avoid and minimise' biodiversity impacts in accordance with requirements of the BAM, by avoiding the Swamp Sclerophyll Forest on Coastal Floodplains EEC and the undisturbed section of the Smooth-barked Apple - Turpentine - Blackbutt open forest within the study area. The total area of disturbed grassland within the rezoning area is 1.6 ha.

Section 5 outlines certain factors that need to be considered during the DA stage, which may trigger the BOS leading to the requirement of a BDAR at the DA stage. Among other things, the BDAR will provide a comprehensive impact assessment of the biodiversity values within the study area including measures the landowner has taken to minimise or avoid biodiversity impacts as well as feasible mitigation measures. In accordance with the BC Act, the landowner will be required to offset their biodiversity impacts through the BOS.

7. References

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Appendix A Likelihood of Occurrence

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

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

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

Note, that assessments for the likelihood of occurrence were made both prior to site inspection and following site inspection. The pre-survey assessments were performed to determine which species were "affected species", and hence determine which sorts of habitat to look for during site inspection. The post-survey assessments to determine "final affected species" were made after observing the available habitat in the site and are depicted in the table below.

The records column refers to the number of records occurring within 5 km of the study area, as provided by the NSW Wildlife Atlas (BioNet) database search.

Information provided in the habitat associations' column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database (DotEE 2017b) and the NSW Threatened Species Profiles (OEH 2017a).

Scientific Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
ECOLOGICAL COMMUNITIES				
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland	E	E	The structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees. It has a dense to sparse tree layer in which Casuarina glauca (swamp oak) is the dominant species northwards from Bermagui. Other trees including *Acmena smithii* (lilly pilly), *Glochidion* spp. (cheese trees) and *Melaleuca* spp. (paperbarks) may be present as subordinate species and are found most frequently in stands of the community northwards from Gosford. *Melaleuca ericifolia* is the only abundant tree in this community south of Bermagui. The understorey is characterised by frequent occurrences of vines, *Parsonsia straminea*, *Geitonoplesium cymosum* and *Stephania japonica var. discolor*, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter. The composition of the ground stratum varies depending on levels of salinity in the groundwater.	No - this community was not identified within the study area during field survey.
Coastal Upland Swamps in the Sydney Basin Bioregion	E	E	Endemic to NSW and confined to the Sydney Basin Bioregion. It occurs in the eastern Sydney Basin from the Somersby district in the north (Somersby-Hornsby plateaux) to the Robertson district in the south (n the Woronora plateau). Occur primarily on impermeable sandstone plateaux with shallow groundwater aquifers in the headwaters and impeded drainage lines of streams, and on sandstone benches with abundant seepage moisture. Generally associated with acidic soils.	No - this community was not identified within the study area during field survey.
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion		E	The ecological community occurs mostly within the sheltered environments of permanently open estuaries along the warm temperate New South Wales coastline, from Wallis Lake (32°S) to Port Hacking (34°S). Posidonia australis dominated seagrass meadows occurring around islands within the geographic range are also included within the ecological community. The ecological community typically occurs in subtidal waters at depths ranging less than 1m to 10 m on sand and silty mud substrate. In these waters, salinity is close to marine levels, dropping only for short periods following rainfall. The ecological community is absent from brackish water (i.e. hyposaline) conditions such as intermittently open lagoons.	No - this community was not identified within the study area during field survey.

Scientific Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	CE	The structure of the community may vary from tall open forests (>40m) to woodlands. The most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). *Eucalyptus baueriana* (blue box), *E. botryoides* (bangalay) and *E. elata* (river peppermint) may be common south from Sydney. *E. ovata* (swamp gum) occurs on the far south coast, *E. saligna* (Sydney blue gum) and *E. grandis* (flooded gum) may occur north of Sydney, *while E. benthamii* is restricted to the Hawkesbury floodplain.	No - this community was not identified within the study area during field survey.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
FAUNA					
Anthochaera phrygia	Regent Honeyeater	E4A	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of Casuarina cunninghamiana (River Oak).	Unlikely – only two records made within 5 km of the study area, the closest of which being from 1995.
Botaurus poiciloptilus	Australasian Bittern	E1	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly Typha spp. (bullrushes) and Eleocharis spp. (spikerushes).	Unlikely – lack of suitable habitat within the study area.
Burhinus grallarius	Bush Stone-curlew	E1		In NSW, found sporadically in coastal areas, and west of the divide throughout the sheep-wheat belt. In NSW, it occurs in lowland grassy woodland and open forest.	Unlikely – lack of suitable habitat within the study area.
Calidris canutus	Red Knot		E, M	Summer migrant to Australia. In NSW, widespread in suitable habitat along the coast. Occasionally recorded inland in all regions. Intertidal mudflats, sandflats sheltered sandy beaches, estuaries, bays, inlets, lagoons, harbours, sandy ocean beaches, rock platforms, coral reefs,	No – lack of habitat within the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
				terrestrial saline wetlands near the coast, sewage ponds and saltworks. Rarely inland lakes or swamps.	
Callocephalon fimbriatum	Gang-gang Cockatoo	V		In NSW, distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. Isolated records known from as far north as Coffs Harbour and as far west as Mudgee. Tall mountain forests and woodlands in summer; in winter, may occur at lower altitudes in open eucalypt forests and woodlands, and urban areas.	Potential – woodland vegetation is of a moderate condition. The closest records that have been made were recorded in 2013. This area could act as foraging habitat during the winter.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		In NSW, widespread along coast and inland to the southern tablelands and central western plains, with a small population in the Riverina. Open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur.	Potential – numerous records have been made within a 5 km radius of the study area however the vegetation onsite does not provide any foraging habitat and thus is unlikely to provide regular habitat for this species.
Cercartetus nanus	Eastern Pygmy-possum	V		In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Rainforest, sclerophyll forest (including Box-Ironbark), woodland and heath.	Potential – numerous records have been made within 5 km of the study area.
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	Unlikely – lack of habitat present within the study area.
Daphoenositta chrysoptera	Varied Sittella	V		Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, mallee and Acacia woodland.	
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Potential – numerous records have been made within 5 km of the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Dasyurus maculatus maculatus (SE mainland population)	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	No – study area too far from known population distribution.
Falco hypoleucos	Grey Falcon	E1		Arid and semi-arid zones. In NSW, found chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Shrubland, grassland and wooded watercourses, occasionally in open woodlands near the coast, and near wetlands.	Unlikely – marginal habitat present within the study area but no records have been made within a 5 km radius.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		South-east coast and ranges of Australia, from southern Qld to Victoria and Tasmania. In NSW, records extend to the western slopes of the Great Dividing Range. Tall (greater than 20m) moist habitats.	Potential – suitable habitat identified within the study area.
Gallinago hardwickii	Latham's Snipe		M	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	Unlikely – suitable habitat not identified within the study area.
Glossopsitta pusilla	Little Lorikeet	V		In NSW, found from the coast westward as far as Dubbo and Albury. Dry, open eucalypt forests and woodlands, including remnant woodland patches and roadside vegetation.	Potential – marginal habitat located within the study area.
Grantiella picta	Painted Honeyeater	V	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	Unlikely – marginal foraging habitat located within the study area.
Heleioporus australiacus	Giant Burrowing Frog	V	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	Potential – marginal habitat present within the study area.
Hieraaetus morphnoides	Little Eagle	V		Throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment. Open eucalypt forest, woodland or open woodland, including sheoak or Acacia woodlands and riparian woodlands of interior NSW.	Potential – marginal foraging habitat located within the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Hoplocephalus bungaroides	Broad-headed Snake	E1	V	Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney. Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands.	Unlikely – a single record has been made within 5 km of the study area.
Ixobrychus flavicollis	Black Bittern	V		In NSW, records are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland. Terrestrial and estuarine wetlands. Also flooded grassland, forest, woodland, rainforest and mangroves where permanent water is present.	Unlikely – lack of suitable habitat within the study area
Lathamus discolor	Swift Parrot	E1	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.	Potential – close proximity to important areas map.
Litoria aurea	Green and Golden Bell Frog	E1	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region. Marshes, dams and stream-sides, particularly those containing Typha spp. (bullrushes) or Eleocharis spp. (spikerushes). Some populations occur in highly disturbed areas.	Potential – two manmade dams have fringing reeds within the study area.
Litoria brevipalmata	Green-thighed Frog	V		Isolated localities along the coast and ranges from just north of Wollongong to south-east Qld. Rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain.	Potential – suitable habitat within the study area.
Litoria littlejohni	Littlejohn's Tree Frog	V	V	Plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest south to Buchan in Victoria. The species has not been recorded in southern NSW within the last decade. Breeding habitat is the upper reaches of permanent streams and perched swamps. Non-breeding habitat is heath-based forests and woodlands	Unlikely – lack of suitable habitat within the study area.
Lophoictinia isura	Square-tailed Kite	V		In NSW, it is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast. Timbered habitats	Unlikely – lack of suitable habitat within the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
				including dry woodlands and open forests, particularly timbered watercourses.	
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V		The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost maily in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.	Potential – hollow bearing trees within the study area. Vegetation within the study area could act as foraging habitat.
Miniopterus australis	Little Bentwing-bat	V		East coast and ranges south to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub.	Potential –hollow bearing trees within the study area. Vegetation within the study area could act as foraging habitat.
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes.	Potential – hollow bearing trees within the study area. Vegetation within the study area could act as foraging habitat.
Mixophyes balbus	Stuttering Frog	E1	V	Along the east coast of Australia from southern Qld to north-eastern Victoria. Rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.	Unlikely – marginal habitat located within the study site. Two records have been made, those being in 1992 and 1996. These are located to the north in Strickland SF.
Mixophyes iteratus	Giant Barred Frog	E1	E	Coast and ranges from Eumundi in south-east Qld to Warrimoo in the Blue Mountains. Freshwater permanent/semi-permanent streams, generally at lower elevation. Riparian rainforest or wet sclerophyll forest is favoured.	Potential – marginal habitat located within the study site. A single record was made in 1996 to the north in Strickland SF.
Motacilla flava	Yellow Wagtail		M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA.	Unlikely – marginal habitat located within the study area. No records

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
				Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	have been made within 5 km of the study area.
Myiagra cyanoleuca	Satin Flycatcher		M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily vegetated gullies.	Unlikely – marginal habitat located within the study area. No records have been made within 5 km of the study area.
Myotis macropus	Southern Myotis	V		In NSW, found in the coastal band. It is rarely found more than 100 km inland, except along major rivers. Foraging habitat is waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetation up to 20m.	Potential – hollow bearing trees within the study area. Vegetation within the study area could act as foraging habitat.
Neophema pulchella	Turquoise Parrot	V		Occurs along the length of NSW from the coastal plains to the western slopes of the Great Dividing Range. Eucalypt and cypress pine open forests and woodlands, ecotones between woodland and grassland, or coastal forest and heath.	Potential – marginal foraging habitat located within the study area.
Ninox connivens	Barking Owl	V		Wide but sparse distribution in NSW, avoiding the most central arid regions. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Woodland and open forest, including fragmented remnants and partly cleared farmland, wetland and riverine forest.	Potential – hollow bearing trees within the study area. Marginal foraging habitat located within the study area.
Ninox strenua	Powerful Owl	V		In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. Woodland, open sclerophyll forest, tall open wet forest and rainforest.	Potential – hollows present and foraging habitat located within the study area.
Pandion cristatus	Eastern Osprey	V		Common around the northern NSW coast, and uncommon to rare from coast further south. Some records from inland areas. Rocky shorelines, islands, reefs, mouths of large rivers, lagoons and lakes.	Unlikely – marginal foraging habitat located within the study area.
Petaurus australis	Yellow-bellied Glider	V		Along the eastern coast to the western slopes of the Great Dividing Range, from southern Qld to Victoria. Tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	Potential –foraging habitat located within the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Petaurus norfolcensis	Squirrel Glider	V		Widely though sparsely distributed on both sides of the Great Dividing Range in eastern Australia, from northern Qld to western Victoria. Mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.	Potential – habitat within the study area.
Petrogale penicillata	Brush-tailed Rock-wallaby	E1	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	Unlikely – habitat within the study area is marginal.
Phascolarctos cinereus	Koala	V	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. Eucalypt woodlands and forests.	Unlikely – no records have been made within close proximity to the study area. Unlikely that Koalas would disperse from the north to this area.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V		In NSW, occurs on the western slopes of the Great Dividing Range, and as far as Louth and Balranald on the western plains. Also occurs in woodlands in the Hunter Valley and in some locations on the north coast Open woodland habitats; favours Box-gum woodlands on the slopes and Box-cypress and open Box woodlands on alluvial plains.	Unlikely – two records have been made within a 5 km radius.
Potorous tridactylus	Long-nosed Potoroo	V	V	In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Coastal heaths and dry and wet sclerophyll forests.	Unlikely – a single record made in 2000 exists to the west of the study area.
Prototroctes maraena	Australian Grayling		V	Streams and rivers on the eastern and southern flanks of the Great Dividing Range; in NSW, it occurs south from the Shoalhaven River. Coastal rivers and streams, fresh and brackish coastal lagoons.	No – no habitat within the study area.
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	V		In NSW, it mainly occurs north from the Hawkesbury River area along the coast and eastern edge of the Great Dividing Range. There are however isolated records in the Jervis bay area. In NSW mostly found in dense, wet heathland and swamps.	Unlikely – lack of suitable habitat within the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Pseudomys novaehollandiae	New Holland Mouse		V	Fragmented distribution across eastern NSW. Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	Unlikely – lack of suitable habitat within the study area.
Pseudophryne australis	Red-crowned Toadlet	V		Confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains. Open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings.	Potential – suitable habitat within the study area. Numerous records within a 5 km radius of the study area.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Potential – study area could act as foraging habitat.
Rostratula australis	Australian Painted Snipe	E1	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas.	Unlikely – study area lacking suitable habitat.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		There are scattered records of this species across the New England Tablelands and North West Slopes. Rare visitor in late summer and autumn to south-western NSW. Almost all habitats, including wet and dry sclerophyll forest, open woodland, open country, mallee, rainforests, heathland and waterbodies.	Potential – hollow bearing trees within the study area. Vegetation within the study area could act as foraging habitat.
Scoteanax rueppellii	Greater Broad-nosed Bat	V		Both sides of the great divide, from the Atherton Tableland in Qld to north-eastern Victoria, mainly along river systems and gullies. In NSW it is widespread on the New England Tablelands. Woodland, moist and dry eucalypt forest and rainforest.	Potential – hollow bearing trees within the study area. Vegetation within the study area could act as foraging habitat.
Turnix maculosus	Red-backed Button-quail	V		Recorded infrequently in central-eastern and north-eastern NSW, with most records from the North Coast Bioregion; there are historical records south as far as Sydney and three outlying records from western NSW. In NSW, uses grasslands, heath and crops. Elsewhere also found in open and savannah woodlands.	Unlikely – study area lacking suitable habitat.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Tyto novaehollandiae	Masked Owl	V		Recorded over approximately 90% of NSW, excluding the most arid north-western corner. Most abundant on the coast but extends to the western plains. Dry eucalypt forests and woodlands from sea level to 1100 m.	Potential –foraging habitat located within the study area.
Tyto tenebricosa	Sooty Owl	V		Occupies the easternmost one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands. Dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	Potential –foraging habitat located within the study area.
Varanus rosenbergi	Rosenberg's Goanna	V		In NSW, found on the Sydney Sandstone in Wollemi National Park, in the Goulburn and ACT regions and near Cooma in the south. Also recorded from the South West Slopes near Khancoban and Tooma River. Heath, open forest and woodland.	Unlikely – lack of suitable habitat. One record has been made within a 5 km radius, this was in 2004.
Vespadelus troughtoni	Eastern Cave Bat	V		Found in a broad band on both sides of the Great Dividing Range south to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. Dry open forest and woodland, near cliffs or rocky overhangs, cliff-lines in wet eucalypt forest and rainforest.	Unlikely – no culverts or caves within the study area. Vegetation within the study area could act as foraging habitat.
FLORA					
Acacia bynoeana	Bynoe's Wattle	E1	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils.	Unlikely – no records have been made previously within the study area nor were any specimens identified during the field survey.
Asterolasia elegans		E1	E	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Also, likely to occur in the western part of Gosford local government area. Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys.	Unlikely – habitat within the study area lacks the likely formation that this species would occur in.
Baloskion longipes	Dense Cord-rush	V	V	From the Kanangra-Boyd area to the Southern Tablelands, in the Blue Mountains National Park, Kanangra-Boyd National Park, Penrose State Forest, Morton National Park, the Clyde Mountain area and Ballalaba	Unlikely – Lack of suitable habitat within the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
				(south of Braidwood). Swamps or depressions in sandy alluvium, swales within tall forest, and in *Eucalyptus aggregata* (Black Gum) Woodland. Currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Grassy sclerophyll woodland on clay loam or sandy soils, or low woodland with stony soil.	
Caladenia tessellata	Thick Lip Spider Orchid	E1	V	Currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Grassy sclerophyll woodland on clay loam or sandy soils, or low woodland with stony soil.	Unlikely – no records have been made previously within the study area nor were any specimens identified during the field survey.
Callistemon linearifolius	Netted Bottle Brush	V		Georges River to Hawkesbury River in the Sydney area (limited to the Hornsby Plateau area), and north to the Nelson Bay area of NSW. Also, Coalcliff in the northern Illawarra. Dry sclerophyll forest.	Unlikely – study are lacks suitable habitat.
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	In NSW, recorded mainly on coastal and near coastal ranges north from Victoria to near Forster, with two isolated occurrences inland north-west of Grafton. Coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest.	Unlikely – marginal habitat within the study area. One record has been made within a 5 km radius of the study area.
Cynanchum elegans	White-flowered Wax Plant	E1	E	Restricted to eastern NSW, from Brunswick Heads on the north coast to Gerroa in the Illawarra region, and as far west as Merriwa in the upper Hunter River valley. Dry rainforest; littoral rainforest; Leptospermum laevigatum-Banksia integrifolia subsp. integrifolia (Coastal Tea-tree– Coastal Banksia) coastal scrub; Eucalyptus tereticornis (Forest Red Gum) or Corymbia maculata (Spotted Gum) open forest and woodland; and Melaleuca armillaris (Bracelet Honeymyrtle) scrub.	Unlikely – habitat within the study area
Darwinia biflora		V	V	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas, in an area bounded by Maroota, North Ryde, Cowan and Kellyville. Woodland, open forest or scrub-heath on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone.	Unlikely – lack of habitat within the study area. No records within a 5 km radius of the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Darwinia glaucophylla		V		Occurs between Gosford and the Hawkesbury River around Calga, Kariong and Mt Kariong. Occurs in sandy heath, scrub and woodlands, often associated with sandstone rock platforms or near hanging swamps.	Unlikely – habitat on site is marginal.
Diuris bracteata		E1	X	Only known from north-west of Gosford. Sclerophyll woodland and forest with a predominantly grassy understorey.	Unlikely – habitat within the study area is marginal. A single record has been made within a 5 km radius of the study area. This record was made in 1996.
Epacris purpurascens var. purpurascens		V		Recorded from Gosford in the north, to Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. Sclerophyll forest, scrubs and swamps. Most habitats have a strong shale soil influence.	Unlikely – marginal habitat within the study area.
Eucalyptus camfieldii	Camfield's Stringybark	V	V	Narrow band from the Raymond Terrace area south to Waterfall. Coastal heath on shallow sandy soils overlying Hawkesbury sandstone, mostly on exposed sandy ridges.	Unlikely – suitable habitat not identified within the study area.
Genoplesium baueri	Bauer's Midge Orchid	E1	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Dry sclerophyll forest and moss gardens over sandstone.	Unlikely – marginal habitat within the study area. No records within a 5 km radius of the study area.
Grevillea shiressii		V	V	Known from two populations near Gosford, at Mooney Mooney Creek and Mullet Creek. There is also a naturalised population at Newcastle. Creek banks in wet sclerophyll forest with a moist understorey in alluvial sandy or loamy soils.	Potential – marginal habitat identified within the study area.
Haloragis exalata subsp. exalata	Square Raspwort	V	V	Disjunct distribution in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Protected and shaded damp situations in riparian habitats.	Unlikely – suitable habitat not identified within the study area.
Hibbertia procumbens	Spreading Guinea Flower	E1		Within NSW, known from several locations only on the Central Coast in the Gosford and Wyong local government areas. *Banksia ericifolia–Angophora hispida–Allocasuarina distyla* scrub/heath on skeletal sandy soils, or 'hanging swamp' vegetation on sandy deposits.	Unlikely – unsuitable habitat within the study area however there are large numbers of recording within a 5 km radius of the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Hibbertia puberula		E1		Wollemi National Park south to Morton National Park and the south coast near Nowra. Low heath, dry sclerophyll woodland, upland swamps, on sandy soils or clay.	Unlikely – lack of habitat within the study area.
Lasiopetalum joyceae		V	V	Restricted to the Hornsby Plateau south of the Hawkesbury River, between Berrilee and Duffys Forest. Heath on lateritic to shaley ridgetops over sandstone.	Unlikely – suitable habitat not identified within the study area.
Melaleuca biconvexa	Biconvex Paperbark	V	V	Only found in NSW, populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Damp places, often near streams or low-lying areas on alluvial soils.	Likely – numerous records within a 5 km radius of the study area. Correct habitat within the study area for this species
Melaleuca deanei	Deane's Paperbark	V	V	Ku-ring-gai/Berowra area, Holsworthy/Wedderburn area, Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Heath on sandstone.	Unlikely – numerous records within a 5 km radius of the study area. Unsuitable habitat within the study area for this species
Persicaria elatior	Tall Knotweed	V	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). Beside streams and lakes, swamp forest or disturbed areas.	Unlikely – lack of habitat within the study area.
Persoonia hirsuta	Hairy Geebung	E1	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Unlikely – lack of habitat within the study area. No records have been made within a 5 km radius of the study area.
Pimelea curviflora var. curviflora		V	V	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south. Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	Unlikely – lack of habitat within the study area. No records have been made within a 5 km radius of the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
Prostanthera askania	Tranquility Mintbush	E1	E	Upper reaches of creeks that flow into Tuggerah Lake or Brisbane Water within the Wyong and Gosford local government areas. Moist sclerophyll forest and warm temperate rainforest on Narrabeen sandstone and derived alluvial soils.	Potential – marginal habitat located within the study area. Many records to the north of the site.
Prostanthera junonis	Somersby Mintbush	E1	E	Restricted to the Somersby Plateau in the Gosford and Wyong local government areas. Open forest, low woodland and open scrub on gently undulating country over weathered Hawkesbury sandstone.	Unlikely – suitable habitat not located within the study area. Many records to the west of the site.
Rhizanthella slateri	Rhizanthella slateri (Rupp) M.A. Clem. & Cribb in the Great Lakes local government area	E2,V	E	The population occurs near Bulahdelah (within the Great Lakes LGA). Sclerophyll forest in shallow to deep loams.	Unlikely – no records have been made previously within the study area nor were any specimens identified during the field survey.
Rhizanthella slateri	Eastern Australian Underground Orchid	V	E	In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Sclerophyll forest in shallow to deep loams.	Potential – marginal habitat within the study area. No records have been made within a 5 km radius of the study area.
Rhodamnia rubescens	Scrub Turpentine	CE		Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of R. rubescens typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Potential – numerous records within a 5 km radius of the study area. Suitable habitat within the study area for this species.
Rhodomyrtus psidioides	Native Guava	CE		Grows in warmer rainforest and on rainforest margins; coastal districts north from Gosford district.	Unlikely – no records have been made previously within the study

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence
					area nor were any specimens identified during the field survey.
Rutidosis heterogama	Heath Wrinklewort	V	V	Between Cessnock and Kurri Kurri, in Howes Valley, and north from Wyong to Newcastle on the Central Coast. Also, on the north coast between Wooli and Evans Head in Yuraygir and Bundjalung National Parks. Also occurs on the New England Tablelands from Torrington and Ashford south to Wandsworth south-west of Glen Innes. Heath on sandy soils, moist areas in open forest, and along disturbed roadsides.	Unlikely – lack of habitat within the study area. No records have been made within a 5 km radius of the study area.
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Subtropical and littoral rainforest on gravels, sands, silts and clays.	Potential – marginal vegetation within the study is not suitable for this species.
Tetratheca glandulosa		V		Found from Sampons Pass (Yengo NP) in the north to West Pymble (Lane Cove NP) in the south. The eastern limit is at Ingleside (Pittwater LGA) and the western limit is at East Kurrajong (Wollemi NP). Heath, scrub, woodlands and open forest on upper-slopes and mid-slope sandstone benches. Soils generally shallow, consisting of a yellow, clayey/sandy loam.	Unlikely – lack of habitat within the study area.
Thesium australe	Austral Toadflax	V	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. Grassland on coastal headlands or grassland and grassy woodland away from the coast.	Unlikely – lack of habitat within the study area.

Appendix B Species Lists

Table 7: Flora species recorded within the study area

Family	Species Name	Common Name	Exotic (*)	Priority Weed/WoNS
Acanthaceae	*Thunbergia alata*	Black-eyed Susan	*	
Apiaceae	*Centella asiatica*	Indian Pennywort		
Araliaceae	*Hydrocotyle bonariensis*	Beach Pennywort	*	
Arecaceae	*Livistona australis*	Cabbage Tree Palm		
Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	*	PW
Asparagaceae	*Cordyline stricta*			
Asparagaceae	*Lomandra longifolia*	Spiny-headed Mat-rush		
Asteraceae	*Bidens pilosa*	Cobbler's Pegs	*	
Asteraceae	*Cirsium vulgare*	Spear-thistle	*	
Asteraceae	*Conyza bonariensis*	Flax-leaf Fleabane	*	
Asteraceae	*Hypochaeris radicata*	Flatweed	*	
Asteraceae	*Ozothamnus diosmifolius*	White Dogwood		
Asteraceae	*Senecio madagascariensis*	Fireweed	*	PW, WoNS
Asteraceae	*Tagetes minuta*	Stinking Roger	*	
Caprifoliaceae	*Lonicera japonica*	Japanese Honeysuckle	*	PW
Casuarinaceae	*Allocasuarina torulosa*	Forest Oak		
Commelinaceae	*Commelina cyanea*	Scurvy Weed		
Convolvulaceae	*Ipomoea indica*	Morning Glory	*	PW
Cyperaceae	*Cyperus eragrostis*	Umbrella Sedge	*	
Cyperaceae	*Gahnia clarkei*			
Cyperaceae	*Schoenoplectus validus*			
Cyperaceae	*Lepidosperma laterale*			
Cyperaceae	*Ptilotrix deusta*			
Dennstaedtiaceae	*Pteridium esculentum*	Common Bracken		
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern		
Fabaceae (Faboideae)	*Erythina x sykesii*	Coral Tree	*	
Fabaceae (faboideae)	*Senna pendula var. glabrata*		*	
Fabaceae (faboideae)	*Trifolium repens*	White Clover	*	
Fabaceae (Mimosoideae)	*Acacia irrorata* subsp. *irrorata*	Black Wattle		

Family	Species Name	Common Name	Exotic (*)	Priority Weed/WoNS
Fabaceae (Mimosoideae)	*Acacia longifolia* var. *longifolia*	Sydney Golden Wattle		
Fabaceae (Mimosoideae)	*Acacia prominens*	Gosford Wattle		
Geraniaceae	*Geranium homeanum*			
Juncaceae	*Juncus usitatus*			
Lauraceae	*Cassytha glabella*			
Lauraceae	*Cryptocaria microneura*			
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush		
Lomariopsidaceae	*Nephrolepis cordifolia*	Fishbone Fern	*	PW
Malvaceae	*Hibiscus sp.*		*	
Meliaceae	*Synoum glandulosum*	Scentless Rosewood		
Menispermiaceae	*Sarcopetalum harveyanum*	Pearl Vine		
Myrtaceae	*Eucalyptus deanei*	Mountain Gum		
Myrtaceae	*Eucalyptus pilularis*	Blackbutt		
Myrtaceae	*Eucalyptus piperita*	Sydney Peppermint		
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany		
Myrtaceae	*Eucalyptus saligna*	Sydney Blue um		
Myrtaceae	*Eucalyptus moluccana*	Grey Box		
Myrtaceae	*Melaleuca biconexa*	Biconvex Melaleuca		
Myrtaceae	*Syncarpia glomulifera*	Turpentine		
Oleaceae	*Ligustrum sinense*	Small-leaf Privet	*	
Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree		
Plantaginaceae	*Plantago lanceolata*	Plantain	*	
Poaceae	*Arundo donax*	Giant Reed	*	PW
Poaceae	*Cenchrus clandestinus*	Kikuyu	*	
Poaceae	*Chloris gayana*	Rhodes Grass	*	PW
Poaceae	*Cynodon dactylon*	Common Couch	*	
Poaceae	*Entolasia marginata*	Bordered Panic		
Poaceae	*Imperata cylindrica*	Blady Grass		
Poaceae	*Microlaena stipoides*	Weeping Grass		
Poaceae	*Oplismenus aemulus*	Australian Basket Grass		
Poaceae	*Paspalum urvillei*	Giant Paspalum	*	
Poaceae	*Phyllostachys aurea*	Bamboo	*	PW
Poaceae	*Setaria sp.*	Pigeon Grass	*	
Poaceae	*Sporobolus africanus*	Parramatta Grass	*	

Family	Species Name	Common Name	Exotic (*)	Priority Weed/WoNS
Poaceae	*Stenotaphrum secundatum*	Buffalo Grass	*	
Polygonaceae	*Persicaria decipiens*	Slender Knotweed		
Rosaceae	*Rubus fruticosus*	Blackberry	*	PW, WoNS
Typhaceae	*Typha orientalis*	Broadleaf Cumbungi		
Verbenaceae	*Lantana camara*	Lantana	*	PW, WoNS
Verbenaceae	*Verbena bonariensis*	Purpletop	*	
Vitaceae	*Cissus hypoglauca*	Water Vine		

Table 8: Fauna species recorded within the study area

Class	Family	Scientific Name	Common Name	Observation Type
Aves	Acanthizidae	*Sericornis frontalis*	White-browed Scrubwren	Observed
	Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra	Observed
	Campephagidae	*Edilosoma tenuirostre*	Common Cicadabird	Observed
	Maluridae	*Malurus cyaneus*	Superb Fairy-wren	Heard
	Psittaculidae	*Trichoglossus moluccanus*	Rainbow Lorikeet	Observed
Mammalia	Macropodidae	*Wallabia bicolor*	Swamp Wallaby	Scats

Appendix C Candidate Species Credit Species

A list of candidate species credit species has been prepared based on those associated with PCT 1579 present within the land currently zoned industrial on the site. This will guide future survey requirements at Development Application stage.

Table 8: Candidate species credit species associated with PCTs

Scientific Name	Type	BC Act Status	EPBC Act Status
Angophora inopina	Trees	Vulnerable	Vulnerable
Asperula asthenes	Herbs and Forbs	Vulnerable	Vulnerable
Astrotricha crassifolia	Shrubs	Vulnerable	Vulnerable
Burhinus grallarius	Birds	Endangered	
Caladenia tessellata	Orchids	Endangered	Vulnerable
Callistemon linearifolius	Shrubs	Vulnerable	
Callocephalon fimbriatum	Birds	Vulnerable	
Calyptorhynchus lathami	Birds	Vulnerable	
Cercartetus nanus	Marsupials	Vulnerable	
Chalinolobus dwyeri	Bats	Vulnerable	Vulnerable
Chiloglottis platyptera	Orchids	Vulnerable	
Cryptostylis hunteriana	Orchids	Vulnerable	Vulnerable
Cynanchum elegans	Epiphytes and Climbers	Endangered	Endangered
Darwinia glaucophylla	Shrubs	Vulnerable	
Diuris flavescens	Orchids	Critically Endangered	Critically Endangered
Diuris pedunculata	Orchids	Endangered	Endangered
Diuris praecox	Orchids	Vulnerable	Vulnerable
Eucalyptus camfieldii	Mallees	Vulnerable	Vulnerable
Heleioporus australiacus	Amphibians	Vulnerable	Vulnerable
Hibbertia procumbens	Shrubs	Endangered	
Hieraaetus morphnoides	Birds	Vulnerable	
Hoplocephalus bungaroides	Reptiles	Endangered	Vulnerable
Hoplocephalus stephensii	Reptiles	Vulnerable	
Lathamus discolor	Birds	Endangered	Critically Endangered
Litoria aurea	Amphibians	Endangered	Vulnerable
Litoria brevipalmata	Amphibians	Vulnerable	
Litoria littlejohni	Amphibians	Vulnerable	Vulnerable
Lophoictinia isura	Birds	Vulnerable	
Macropus parma	Marsupials	Vulnerable	
Melaleuca groveana	Shrubs	Vulnerable	
Miniopterus australis	Bats	Vulnerable	
Miniopterus orianae oceanensis	Bats	Vulnerable	
Mixophyes balbus	Amphibians	Endangered	Vulnerable
Mixophyes iteratus	Amphibians	Endangered	Endangered
Myotis macropus	Bats	Vulnerable	
Ninox connivens	Birds	Vulnerable	

Scientific Name	Type	BC Act Status	EPBC Act Status
Ninox strenua	Birds	Vulnerable	
Olearia cordata	Shrubs	Vulnerable	Vulnerable
Petauroides volans	Marsupials		Vulnerable
Petaurus norfolcensis	Marsupials	Vulnerable	
Petrogale penicillata	Marsupials	Endangered	Vulnerable
Phascogale tapoatafa	Marsupials	Vulnerable	
Phascolarctos cinereus	Marsupials	Vulnerable	Vulnerable
Planigale maculata	Marsupials	Vulnerable	
Potorous tridactylus	Marsupials	Vulnerable	Vulnerable
Prostanthera askania	Shrubs	Endangered	Endangered
Prostanthera cineolifera	Shrubs	Vulnerable	Vulnerable
Prostanthera densa	Shrubs	Vulnerable	Vulnerable
Prostanthera junonis	Shrubs	Endangered	Endangered
Pseudophryne australis	Amphibians	Vulnerable	
Pteropus poliocephalus	Bats	Vulnerable	Vulnerable
Senna acclinis	Shrubs	Endangered	
Tetratheca glandulosa	Shrubs	Vulnerable	
Tetratheca juncea	Shrubs	Vulnerable	Vulnerable
Thesium australe	Herbs and Forbs	Vulnerable	Vulnerable
Tyto novaehollandiae	Birds	Vulnerable	

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