



Flora and Fauna Assessment Report

27 and 41 Park Road Mulgrave NSW 2756

Report prepared by First Field Environmental

13 April 2018

Revision history		
Version	Date	Author
Draft	21 February 2018	Michelle Evans
Amended	13 April 2018	Michelle Evans

Cover image: Characteristic vegetation along the south-western boundary of the site.

This report has been prepared by First Field Environmental. The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report.

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Summary

First Field Environmental has been commissioned to prepare an Environmental Assessment Report in support of a development application at Lot 340 DP 752061 and Lot 215 DP 752061, 27 Park Road Vineyard NSW 2765 and 41 Park Road Mulgrave NSW 2756.

The development application relates to the proposed rezoning of the site from RU4 – Primary Production to IN1 – General Industrial in line with current IN1 zoning to the north of Park Road.

The site and surrounding areas are mapped by Hawkesbury Local Government as containing Significant Vegetation corresponding with Cooks River /Castlereagh Ironbark Forest.

Cooks River /Castlereagh Ironbark Forest is listed as an Endangered Ecological Community in NSW (under the *Biodiversity Conservation Act 2016*) and as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Vegetation structure within the site consists of scattered canopy trees and shrubs over grazed pasture. Although a number of native tree and shrub species occur on the site the overall vegetative composition is no longer representative of the native vegetation community that was once present.

Fauna habitat within the study area lacks structural complexity and is likely to be utilised by generalist species. It is likely that native species preferentially utilise native vegetation and habitat resources immediately adjacent to the site.

The proposed rezoning is not likely to have a significant impact on a Matter of National Environmental Significance listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, nor is it likely to have a significant impact on threatened species, populations or endangered communities (and their habitats) listed under the NSW *Biodiversity Conservation Act 2016*. No *Species Impact Statements* are required and referral to the Minister is not necessary.

Certification

The results presented in this report are a true and accurate record. Survey work has been carried out in accordance with the *Threatened Species and Regional Biodiversity Survey and Assessment Guidelines* (DECC, 2007). Flora and fauna investigations have been prepared in consideration of the schedules and requirements of the NSW *Biodiversity Conservation Act 2016* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The results of this survey report are available to the public for future use and have been supplied to The NSW Office of Environment and Heritage for inclusion on the *Atlas of NSW Wildlife Database*.

Survey and assessment of threatened biodiversity have been undertaken by experienced and qualified environmental scientists. Michelle Evans has extensive experience with flora and fauna surveys and the interpretation of conservation significance in NSW.

Relevant qualifications, experience and insurance details are provided in Appendix A.

Definitions

Action	A project, development, undertaking, activity or series of activities, or an alteration of any of these things.
AHD	Australian height datum
BC Act	<i>Biodiversity Conservation Act 2016</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GDA	Geocentric datum of Australia
Habitat	An area occupied, whether periodically or constantly by a species, population or ecological community
km	Kilometre
m	Metre
MGA	Map grid of Australia
mm	Millimetre
SEPP	<i>State Environmental Planning Policy No 44—Koala Habitat Protection [NSW]</i>
Study site	The property known as Lots 32 and 33 in DP 230019 and Lot 159 in DP 234300, 29 – 31 Grose Vale Road and 8 Enfield Avenue North Richmond NSW 2754
Threatened biodiversity	Species, populations, ecological communities or their habitats
Vegetation community	An assemblage of native flora species known to occur in association as a result of topography, soil landscape and rainfall

1. Introduction

First Field Environmental has been commissioned to prepare an *Environmental Assessment Report* in support of a development application at Lot 340 DP 752061 and Lot 215 DP 752061, 27 Park Road Vineyard NSW 2765 and 41 Park Road Mulgrave NSW 2756. The subject site is located at GDA-MGA56 299729E, 6276307N (shown in red on Figure 1) and is within the Hawkesbury Local Government Area.

The development application relates to the proposed rezoning of the site from RU4 – Primary Production to IN1 – General Industrial in line with current IN1 zoning to the north of Park Road.

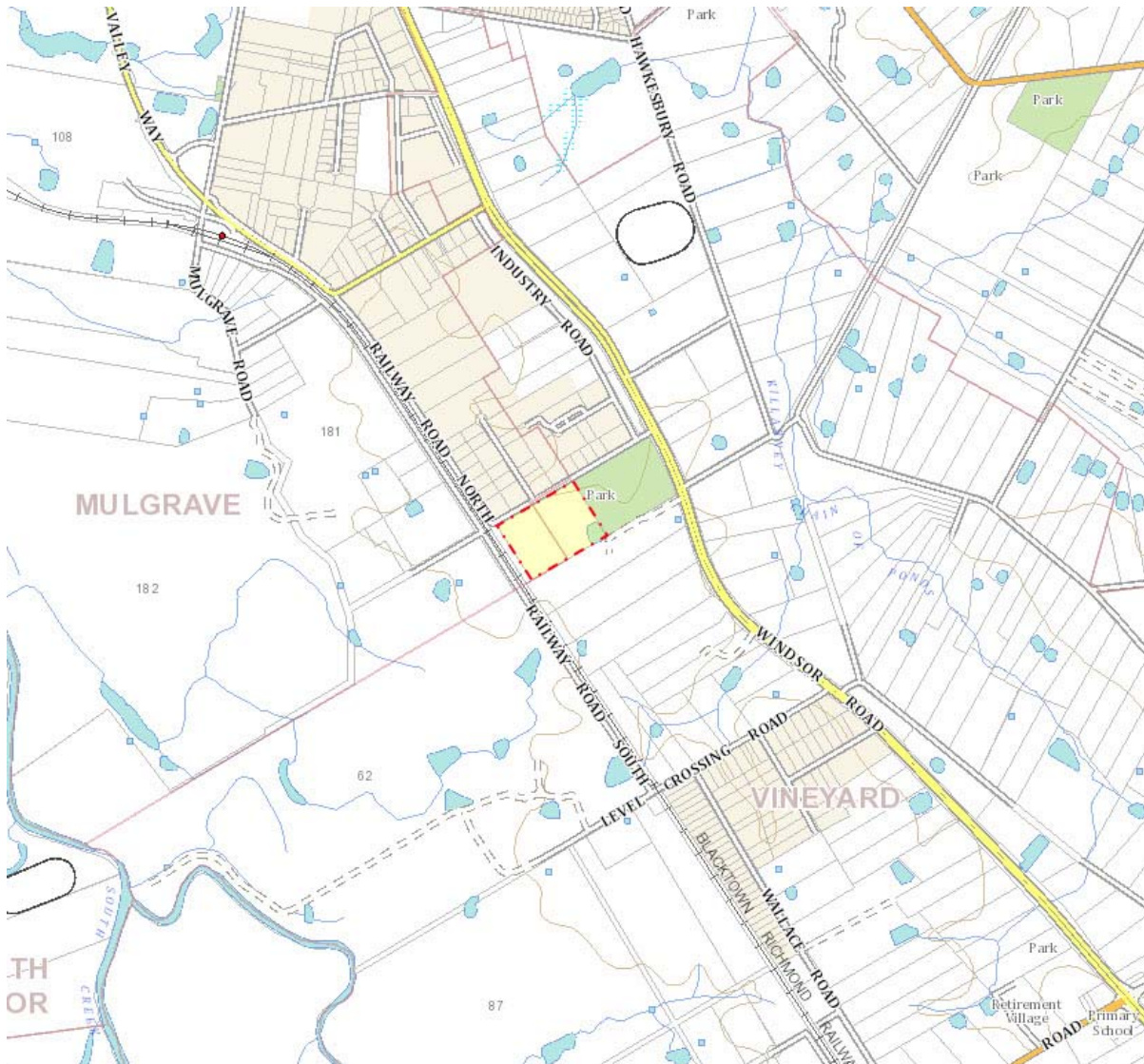


Figure 1 Location of the subject site

Source: SIX Maps, NSW Office of Environment and Heritage, 2018

2. Context

The study site refers to the area within and extending to the boundaries of Lot 340 DP 752061 and Lot 215 DP 752061, shown in red on Figure 2. The area potentially affected by the proposed development comprises the accumulated extent of the lots and covers approximately 46,754.57 m².



Figure 2 Study area and setting

Source: SIX Maps, NSW Office of Environment and Heritage, 2018

2.1 Location

The study site is situated within the suburbs of Vineyard and Mulgrave. Development to the north of the site is dominated by industrial landuse. Landuse to the east, south and west is characterised as low intensity agriculture. The site is bordered by Park Road to the north and the Blacktown Richmond Rail Line to the west.

2.2 Landform and soils

The study site is within in an area of gently undulating rises and is situated approximately 20 m above sea level. The site is located on the *Berkshire Park Soil Landscape Unit* (eSpade 2017). Berkshire Park soils are weakly pedal heavy clays and clayey sands. Soils display localised hardsetting, have low available water capacity and are very acidic.

2.3 Hydrology

The study area is located within the Hawkesbury River subcatchment and is part of the greater Hawkesbury-Nepean catchment. The site is approximately 1.5 km north-east of South Creek Wianamatta and 3.7 km south-east of Hawkesbury River. The river flows from the confluence with South Creek Wianamatta in a generally north-easterly direction, eventually discharging into the Tasman Sea at Barrenjoey Head.

2.4 Land use

The site is zoned for RU4 – Primary Production land use under the *Hawkesbury Local Environmental Plan 2012* and currently contains a residential dwelling and shed on each lot with an additional shed located on Lot 340. An electricity easement traverses the site parallel to the south-eastern boundary and a high voltage tower is located in the southern corner of Lot 215.

The eastern corner of Lot 340 contains a dam with surface area of approximately 1,500 m². The entire site is dominated by exotic pasture consistent with low intensity agricultural landuse. Exotic plantings occur in proximity to the dwelling on Lot 340.

Native trees and shrubs occur along the north-eastern boundary of the site, adjacent to an area of natural vegetation on an adjoining Lot. Patches of native trees and shrubs also occur along the south-eastern and south-western boundaries of Lot 215, both of which are located immediately adjacent to native vegetation on adjacent Lots. Native trees extend from the south-western boundary of Lot 215 along each side of the electricity transmission easement.

3. Report structure

This Ecological Assessment Report is structured in accordance with the *Working Draft Threatened Species Survey and Assessment Guidelines* (Department of Environment and Conservation, 2004) and includes:

- **Legislative requirements** – Identifying legislative requirements relevant to the proposed development, including environmental planning instruments, legislative provisions, approvals, consents and licenses.
- **Methods** – Describing the desktop and field survey techniques involved in the preparation of this report.
- **Results** – Presenting the findings of desktop and field surveys.
- **Impacts** – Describing potential impacts of the proposed development and identifies appropriate mitigation and amelioration measures.

- **Significance assessments** – Assessing the likelihood of the proposed development having a significant impact on threatened biodiversity known or with the potential to occur in the study area.
- **Conclusion** – Providing a summary of results, potential impacts and limitations related to the proposed development.

4. Aims and objectives

Preparation of this Report has been undertaken to ensure compliance with *Clause 6.4. Terrestrial Biodiversity* of the *Hawkesbury Local Environmental Plan 2012*.

The objective of this clause is to maintain terrestrial biodiversity by:

- a) protecting native fauna and flora, and
- b) protecting the ecological processes necessary for their continued existence, and
- c) encouraging the conservation and recovery of native fauna and flora and their habitats.

Furthermore, the aim of this report is to meet the legislative requirements of an assessment of significance under s5A of the *Environmental Planning and Assessment Act 1979* and s94 of the *Biodiversity Conservation Act 2016*. The objectives of the flora and fauna survey and assessments of significance are to determine the potential impacts of the proposed residential development on threatened species, populations and ecological communities and their habitats, as listed under State and Commonwealth legalisation.

4.1 Constraints

This report is constrained by the following factors:

- **Timing of surveys** – The report was commissioned in February 2018 for completion by March 2018. This timeframe has not enabled the development and implementation of rigorous survey as recommended by scientific guidelines. Surveys undertaken during the project period have been developed to take advantage of study opportunities and do not reflect optimum best practise.
- **Seasonality** – It is acknowledged that a number of species may visit the site sporadically or in response to seasonal triggers, such as flowering or fruiting times. Habitat utilisation may also depend on the life stage of the species and the resources available in the study area. Given the timeframe of this project it has not been possible to conduct surveys at times more appropriate to life cycle or foraging behaviour.
- **Survey effort** – The study area is considered to be small and does not accommodate the employment of transect and quadrat survey techniques. Surveys have been opportunistic and have generally followed random meanders.

5. Legislative requirements

Table 1 identifies legislative requirements relevant to the proposed development and includes environmental planning instruments, legislative provisions, approvals, consents and licences.

Table 1 Legislative requirements

Name	Relevance to the proposal	Relevance to proposed development
<i>Commonwealth</i>		
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Aims to provide protection of the environment, especially to matters of national environmental significance.	It is considered possible that the site may support a number of vulnerable or endangered species, ecological communities and their habitats.
<i>State</i>		
<i>Environmental Planning and Assessment Act 1979</i>	Encourages the protection and conservation of native animals and plants. Requires the determination of whether the proposed activity is likely to have a significant effect on threatened species, populations or ecological communities or their habitats.	In accordance with the requirements of section 5A of the Act, an Assessment of Significance has been undertaken for all threatened entities listed under the <i>Biodiversity Conservation Act 2016</i> known or likely to occur in the study area.
<i>Biodiversity Conservation Act 2016</i>	The Act sets out specific objects relating to the conservation of biological diversity and the promotion of ecologically sustainable development.	A number of threatened species, populations and ecological communities listed under the Act have been recorded within the study area.
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	The Act provides for the constitution of local, regional and state Aboriginal Land Councils and a mechanism for Councils to claim Crown Land.	There are no known granted claims over Crown Land within the study area.
<i>Heritage Act 1977</i>	The State's historical archaeological relics, buildings, structures, archaeological deposits and features are protected under the Act.	No items or places of historical significance have been recorded or observed on the site.
<i>Rural Fires Act 1997</i>	The Act requires that areas of bushfire prone land be mapped.	The site is within land mapped as bushfire prone.
<i>State Environmental Planning Policy No. 19 – Bushland in Urban Areas</i>	The Policy aims to protect and preserve bushland within urban areas by taking into account any matters relevant to the protection and preservation of bushland zoned or reserved for public open space purposes.	The site is adjacent to land zoned for Public Recreation.
<i>State Regional Environmental Plan No 20 – Hawkesbury-Nepean River</i>	The Policy aims to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.	The site is within an area mapped under the Policy.
<i>State Environmental Planning Policy No 44 – Koala Habitat Protection</i>	The Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.	The Policy does not apply to the site as trees of the types listed in Schedule 2 of the Policy do not constitute at least 15% of the total number of trees in the upper or

Name	Relevance to the proposal	Relevance to proposed development
		lower strata of the tree component.
<i>Local</i>		
<i>Hawkesbury Local Environmental Plan 2012</i>	The principal planning instrument affecting land use in the Hawkesbury LGA prepared under Part 3 of the EP&A Act 1979.	The proposed development must comply with land uses set out in zoning provisions of the LEP.

6. Preliminary investigation

Preliminary investigations have made use of species, population, community and habitat records held by the Australian Government Department for the Environment and Energy and the NSW Office of Environment and Heritage. The results of surveys undertaken for this report will be made available to the NSW Office of Environment and Heritage for inclusion on the Atlas of NSW Wildlife Database.

A search of the *Atlas of NSW Wildlife Database* (NSW OEH 2018) was undertaken on 5 February 2018. The search produced a list of threatened, vulnerable and endangered species and communities listed under the *BC Act 2016* recorded within but not limited to a 10km radius of the subject site. These include:

- 3 amphibians;
- 31 birds;
- 5 endangered ecological communities;
- 27 plants;
- 2 gastropods; and
- 14 mammals.

Threatened species and ecological communities listed under the EPBC Act have been identified through interrogation of the *Protected Matters Search Tool* (DoE 2018) on 5 February 2018 for an area of 5km radius from the subject site.

The likelihood of these species, populations, ecological communities or their habitats occurring in the study area has been determined in accordance with descriptions published by the Australian Government Department of the Environment and the NSW Government Office of Environment and Heritage and is presented in Appendix B and summarised in Section 6.

6.1 Vegetation surveys

Vegetation surveys were conducted during daylight hours from 0800 – 1300 hours on 6 February 2018 and included the identification of native and exotic species in the study area and observation of vegetation on adjoining land. The surveys were conducted as a random meander across the entirety of the study area. Vegetation surveys targeted the identification of native and threatened biodiversity.

6.2 Habitat assessment

Habitat assessment was conducted in conjunction with random meanders. Preliminary assessment of threatened biodiversity likely to occur in the study area provided details of required habitat. Habitat identification and assessment targeted:

- Tree hollows;
- Loose bark;
- Roosting trees;
- Nesting sites;
- Fruiting and flowering plants;
- Bare branches;
- Dead trees and logs;
- Termite mounds;
- Rocks;
- Exposed bedrock;
- Scats;
- Tree Scratching;
- Scrapes or diggings;
- Hair;
- Burrows;
- Waterbodies;
- Aquatic Vegetation; and
- Long grass and leaf litter.

6.3 Weather conditions

The survey was conducted on a clear day, with a maximum temperature of 31.5°. East-south-easterly winds were recorded at 9 km/hr (at 9am) (BOM 2018).

7. Results

7.1 Threatened species, populations, endangered ecological communities and their habitats

Species listed under the *BC Act* 2016 and /or identified as *Matters of National Environmental Significance* under the *EPBC Act* 1999 and which have been previously recorded in the area are identified in Appendix B. Threatened species known or considered likely to occur within the study area are summarised in Table 2.

Table 2 Listed species with potential to occur on subject site

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²	Likelihood
Amphibia				
<i>Litoria aurea</i> Green and Golden Bell Frog	Endangered	Vulnerable	Inhabits marshes, dams and stream-sides, particularly those containing Typha spp. or Eleocharis spp. Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as <i>Gambusia holbrooki</i> , have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	Possible. Associated habitat including dams and grassy areas occur on the site.
<i>Litoria littlejohni</i> Littlejohn's Tree Frog	Vulnerable	Vulnerable	Found in perched swamps, upper reaches of permanent streams, dams, ditches, isolated pools, flooded hollows, creeks, streams and lagoons. Utilises heath based forest and woodland areas during non-breeding periods. Leaf litter and low vegetation provides shelter.	Possible. Associated habitat including dams and woodland areas occur on and adjacent to the site.
Aves				
<i>Artamus cyanopterus cyanopterus</i> Dusky Woodswallow	Vulnerable	-	Found in open woodlands and forests, including dry open sclerophyll forests dominated by Eucalypts, mallee associations, shrublands, heathlands and modified habitats including regenerating forests. Sometimes found in rainforest or moist forests, golf courses and along roadsides. Recorded in habitat with open understorey, with sparse Acacias, other shrubs and heath, and sparse Eucalypt saplings. Groundcover may include sedges, grasses, or open areas with woody debris. Also observed in farmland, at the edge of woodland and forest. Uses tree hollows, tree forks and behind bark for nesting sites.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Falco subniger</i> Black Falcon	Vulnerable	-	Occurs widely across NSW, but the population is sparsely distributed. Mostly occurs in arid inland areas, near isolated woodlands and tree lined watercourses. Roosts in trees during the night.	Possible. Associated vegetation occurs on and adjacent to the site.

¹ NSW Office of Environment & Heritage, Threatened Species, <<http://www.environment.nsw.gov.au/threatenedSpeciesApp/>>

² Australian Government Department of the Environment, Species Profile and Threats Database, <<http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>>

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²	Likelihood
<i>Glossopsitta pusilla</i> Little Lorikeet	Vulnerable	-	Forages primarily in the canopy of open Eucalyptus forest and woodland, but also utilises Angophora, Melaleuca and other tree species. Riparian areas are also commonly used, and nests in proximity to feeding areas within hollows of smooth-barked Eucalypts.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Grantiella picta</i> Painted Honeyeater	Vulnerable	Vulnerable	Occurs in Box-Ironbark Forests and Boree, Brigalow and Box-Gum Woodlands. Nests in outer canopy of drooping She-oak, eucalypts, paperbark or mistletoe branches.	Possible. Associated vegetation occurs adjacent to the site.
<i>Hieraaetus morphnoides</i> Little Eagle	Vulnerable	-	Occupies open Eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Possible. Associated vegetation occurs adjacent to the site.
<i>Lathamus discolor</i> Swift Parrot	Endangered	Critically Endangered	Found in south-east mainland between March and October, in areas with flowering Eucalypts or abundant lerp.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Lophochroa leadbeateri</i> Major Mitchell's Cockatoo	Vulnerable	-	Found in a variety of treed or treeless habitats near watercourses, with nesting occurring in tree hollows. Feeds on seeds of saltbush, cypress pines and wattles, and particularly seeds of native and exotic melons.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Lophoictinia isura</i> Square-tailed Kite	Vulnerable	-	Occurs in timbered habitats including open forest and dry woodland, especially timbered watercourses.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Melithreptus gularis gularis</i> Black-chinned Honeyeater (eastern subspecies)	Vulnerable	-	Found in mostly upper levels of drier open forests or woodlands, dominated by box and ironbark Eucalypts, especially <i>Eucalyptus sideroxylon</i> , <i>E. albens</i> , <i>E. microcarpa</i> , <i>E. melliodora</i> , <i>E. blakelyi</i> and <i>E. tereticornis</i> . Also occurs open forests of stringybarks, ironbarks, smooth-barked gums, river sheoaks and tea-trees.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Ninox connivens</i> Barking Owl	Vulnerable	-	Found in woodland and open forest, including partially cleared farmland and fragmented remnants. May hunt in closed forest to more open areas. Uses shaded portions of trees for roosting, including tall midstorey trees, such as Acacia and Casuarina species with dense foliage. Uses hollows for nests.	Possible. Associated vegetation occurs on and adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²	Likelihood
<i>Ninox strenua</i> Powerful Owl	Vulnerable	-	Occurs in variety of areas, including woodland, open sclerophyll forest, tall wet forest and rainforest. Found in large expanses of forest and woodland, but can also live in a fragmented landscape. Breeds and hunts in open or closed sclerophyll forest or woodlands. Roosts during the day in a variety of species including Eucalypts, Acacia, Angophora, Exocarpus and She-Oak species. Nests in old large eucalypts.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Petroica boodang</i> Scarlet Robin	Vulnerable	-	Found in forests and woodlands. Habitat usually contains abundant logs and fallen timber. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. Nest is an open cup made of plant fibres and cobwebs and is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Rostratula australis</i> Australian Painted Snipe	Endangered	Endangered	Usually occurs on the fringes of dams and swamps, as well as, marshy areas with some grass, lignum, low scrub or open timber cover. Nests within tall vegetation on the ground, including reeds, tussocks or grasses.	Possible. Associated vegetation occurs on and adjacent to the site.
Endangered Ecological Communities				
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Endangered	Critically Endangered	An open forest to low woodland community, usually dominated by <i>Eucalyptus fibrosa</i> and <i>Melaleuca decora</i> , with <i>E. longifolia</i> often present. Found on clay rich soils derived from Wianamatta Shale and Tertiary alluvium. If derived from Tertiary alluvium, the soils are less fertile gravelly clay loams. Grows below 100m, in areas with annual rainfall of 800-1000mm. Other canopy species include <i>E. racemosa</i> , <i>Angophora costata</i> and <i>A. bakeri</i> on sandier soils, <i>E. longifolia</i> near creeks, and <i>E. parramattensis</i> in areas with less well drained soil, and <i>E. moluccana</i> and <i>E. eugenioides</i> on less gravelly clay soils. Often, the shrub layer is dense, with species including <i>Acacia falcata</i> , <i>Bursaria spinosa</i> , <i>Daviesia ulicifolia</i> , <i>Dillwynia tenuifolia</i> , <i>Lissanthe strigosa</i> , <i>Melaleuca nodosa</i> , <i>M. decora</i> , <i>Ozothamnus diosmifolius</i> and <i>Pultenaea villosa</i> , depending on the site and location. Relatively sparse ground layer.	Known. Vegetation on the site is not consistent with the determination of this community under the EPBC Act 1999. Species indicative of this community do occur on the site and are consistent with the listing under the BC Act 2016.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²	Likelihood
Flora				
<i>Acacia pubescens</i> Downy Wattle	Vulnerable	Vulnerable	Occurs in dry open sclerophyll forest and woodland, as well as Melaleuca scrub. Grows on shales, alluviums, and also intergrading areas between shale and sandstone. Soils are typically gravelly, with ironstone content, and nutrient poor and well drained. Found in Cumberland Plain Woodland, Cooks River/Castlereagh Ironbark Forest and Shale/Gravel Transition Forest.	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Allocasuarina glareicola</i>	Endangered	Endangered	Occurs in open woodland on tertiary alluvial gravels, with lateritic soil and yellow clayey subsoil, which are nutrient poor and acidic. Associated with <i>Eucalyptus parramattensis</i> , <i>Eucalyptus fibrosa</i> , <i>Angophora bakeri</i> , <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i> .	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Dillwynia tenuifolia</i>	Endangered	-	Found in scrubby/dry heath habitat, within Shale Gravel Transitional Forest and Castlereagh Ironbark Forest on laterised clay or tertiary alluvium. May also be present where these communities meet Castlereagh Scribbly Gum Woodland in transitional areas. Usually, <i>Eucalyptus fibrosa</i> is the dominant canopy species, but <i>Eucalyptus globoidea</i> , <i>E. longifolia</i> , <i>E. parramattensis</i> , <i>E. sclerophylla</i> and <i>E. sideroxylon</i> may also be present.	Possible. Associated species occur on and adjacent to the site.
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> Juniper-leaved Grevillea	Vulnerable	-	Grows on sandy soils and reddish clay soils derived from Wianamatta Shale and Tertiary alluvium, commonly with lateritic gravels. Recorded from Castlereagh Ironbark Woodland, Castlereagh Scribbly Gum Woodland, Cumberland Plain Woodland and Shale/Gravel Transition Forest.	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Micromyrtus minutiflora</i>	Endangered	Vulnerable	Grows in Ironbark Forest, Shale/Gravel Transition Forest, Castlereagh Scribbly Gum Woodland, open forest on tertiary alluvium and consolidated river sediments.	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Persoonia nutans</i> Nodding Geebung	Endangered	Endangered	Found on aeolian and alluvial sediments in northern populations, in a range of sclerophyll forest and woodland habitats, including Agnes Banks Woodland, Castlereagh Scribbly Gum and Cooks River/Castlereagh Ironbark Forest. Also, grows on tertiary alluvium in southern populations, which may also extent into shale sandstone transitional communities and Cooks River/Castlereagh Ironbark Forest.	Possible. Associated species and vegetation communities occur on and adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²	Likelihood
<i>Pimelea spicata</i> Spiked Rice-flower	Endangered	Endangered	Found growing on well-structured clay soils, associated with Grey Box communities (including Cumberland Plain Woodland variants or Moist Shale Woodland) and Ironbark areas. Associated species include <i>Eucalyptus moluccana</i> , <i>E. tereticornis</i> and <i>E. crebra</i> .	Possible. Associated species occur on and adjacent to the site.
<i>Pterostylis gibbosa</i> Illawarra Greenhood	Endangered	Endangered	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. The species grows in woodland dominated by <i>Eucalyptus tereticornis</i> , <i>E. longifolia</i> and <i>Melaleuca decora</i> . Near Nowra, the species grows in an open forest of <i>Corymbia maculata</i> , and <i>E. paniculata</i> . In the Hunter region, the species grows in open woodland dominated by <i>E. crebra</i> and <i>Callitris endlicheri</i> .	Possible. Associated species occur on and adjacent to the site.
<i>Pultenaea parviflora</i>	Endangered	Vulnerable	Found in scrubby/dry heath in Castlereagh Shale Gravel Transition Forest and Ironbark Forest on laterised clays or tertiary alluvium. May also be found in transitional areas adjacent these communities.	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Rhizanthella slateria</i> Eastern Underground Orchid	Vulnerable	Endangered	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	Possible.
Gastropods				
<i>Pommerhelix duralensis</i> Dural Land Snail	Endangered	Endangered	Occurs in forested habitats with woody debris and good native cover, with strong association with communities on the interface between shale derived and sandstone-derived soils. May be found resting on leaf litter or exposed rocks. Shelters under rocks, in curled up bark debris, leaf litter or light woody debris. Occurs in forested habitats with good native cover.	Possible. Associated habitat occurs on and adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²	Likelihood
Mammalia				
<i>Dasyurus maculatus maculatus</i> (SE mainland population) Spot-tailed Quoll (southeastern mainland population)	Vulnerable	Endangered	Found in a variety of areas including open forest, rainforest, woodland, coastal heath and inland riparian forest. Uses tree hollows, logs, rock outcrops, small caves and rocky cliff faces as dens. Uses flat rocks amongst boulder sites, rocky stream beds or banks, and rocky cliff faces as latrine sites.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Miniopterus australis</i> Little Bentwing-bat	Vulnerable	-	Found in eucalypt forest, vine thicket, rainforest, wet and dry sclerophyll forest, dense coastal forests, Melaleuca swamps and banksia scrub. Roosts in caves, tree hollows, tunnels, abandoned mines, bridges, stormwater drains and sometimes buildings.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Miniopterus schreibersii oceanensis</i> Eastern Bentwing-bat	Vulnerable	-	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. Hunt in forested areas, catching moths and other flying insects above the tree tops.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Mormopterus norfolkensis</i> Eastern Freetail-bat	Vulnerable	-	Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Myotis macropus</i> Southern Myotis	Vulnerable	-	Generally roosts in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Petauroides volans</i> Greater Glider	-	Vulnerable	Found in Eucalypt woodland and forest, particularly with large old trees with large hollows. Shelters in tree hollows during the day.	Possible. Associated vegetation occurs adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²	Likelihood
<i>Petaurus australis</i> Yellow-bellied Glider	Vulnerable	-	Found in tall mature Eucalypt forest, usually in areas with nutrient rich soil and high rainfall. Inhabits a variety of Eucalypt forest, with preferences changing with latitude and elevation, including mixed coastal and dry escarpment forest in the north, and creek flats to tall montane forest and moist coastal gullies in the south. Uses tree hollows for dens.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Pseudomys novaehollandiae</i> New Holland Mouse	-	Vulnerable	Occurs in woodlands, forest with heathy understorey, open heathlands and vegetation sand dunes. Deeper soils, with soft substrate, are preferred habitat to dig burrows.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	Vulnerable	Vulnerable	Found in a variety of areas including tall sclerophyll forests and woodlands, heaths and swamps, subtropical and temperate rainforests, and urban gardens and fruit crops. Normally, roosts are found in habitat with dense vegetation, close to water, and in gullies.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	Vulnerable	-	Utilises a variety of habitats from woodland through to moist and dry Eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Females congregate at maternity sites located in suitable trees.	Possible. Associated habitat occurs on and adjacent to the site.

7.2 Vegetation

The study area is located within the Sydney Basin Bioregion. The site and surrounding areas are mapped by Hawkesbury Local Government as containing Significant Vegetation (shaded dark green) and Connectivity (shaded light green, Figure 1). The area of Significant Vegetation corresponds with National Parks and Wildlife Service mapping of Cooks River /Castlereagh Ironbark Forest (Figure 2).

Cooks River /Castlereagh Ironbark Forest is listed as an Endangered Ecological Community in NSW (under the *Threatened Species Conservation Act 1995*) and as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.



Figure 3 Terrestrial Biodiversity layer

Source: NSW Planning Portal (NSW Planning and Environment)

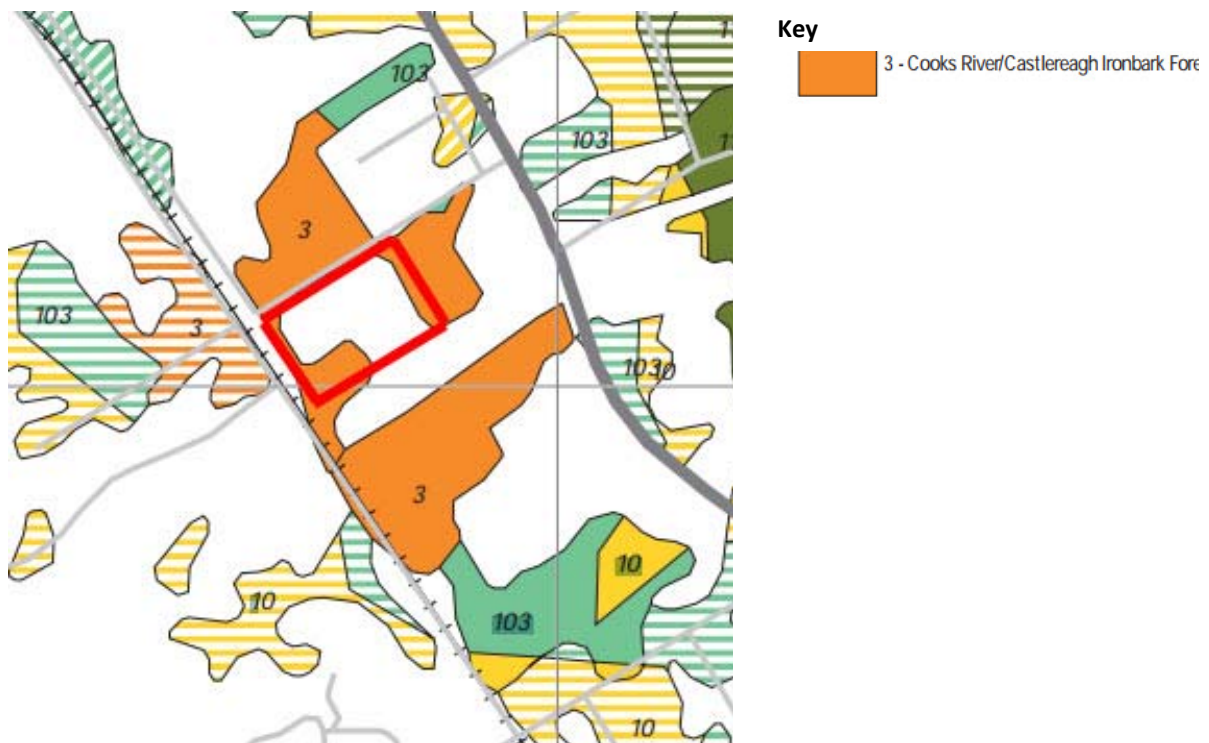


Figure 4 Vegetation communities

Source: National Parks and Wildlife Service (2002)



Figure 5 Aerial view of the site

Source: Six Maps

Aerial imagery (Figure 3) indicates that the site is disturbed and supports sparse areas of vegetation consistent with rural landuse.

Note that land to the north-west of the site which is also mapped as containing significant vegetation is zoned IN1 – General Industrial and B5 – Business Development.

The Lot to the immediate north-east of the site is zoned RE1 – Public Recreation. The aerial image shows vegetation within the Lot and appears to be consistent with the vegetation mapping (NPWS 2002).

The following native and exotic species were identified during site surveys:

- *Eucalyptus fibrosa*;
- *Eucalyptus moluccana*;
- *Eucalyptus oblonga*;
- *Lomandra* sp.;
- *Melaleuca decora*;
- *Grevillea robusta*;
- *Typha* sp.;
- *Acacia parramattensis*;
- *Bursaria spinosa*;
- *Agave* sp.;
- *Geranium* sp.;

- *Solanum* sp.;
- *Juncus* sp.;
- *Harrissia* sp.;
- *Persicaria* sp.;
- *Hibiscus* sp.; and
- *Hedera helix*.

Priority weeds and species of regional concern identified within the study site during the field survey include:

- *Bryophyllum* sp.



Figure 6 Location of native vegetation patches

Patches of native vegetation on site are dominated by isolated trees with a canopy height to ~30, including *Eucalyptus fibrosa* and *Melaleuca decora*.

Shrub and groundcover strata are absent. The south-western boundary of the site supports moderately dense areas of *Bursaria spinosa* to a height of ~2.8 m.

Ground cover is dominated by exotic pasture species.

Patches of native vegetation are generally located in the following areas (see Figure 6):

Northern boundary – A mix of mature *Eucalyptus* sp., *Melaleuca decora* and *Grevillea robusta* occurring with exotic plantings including *Hibiscus* sp..

Eastern corner – The dam contains *Typha* sp. and mixed exotic aquatic species.

South-eastern boundary – A mix of mature trees dominated by *Eucalyptus* sp. and *Melaleuca decora*.

South-western boundary – Dominated by mature *Eucalyptus* sp. with *Acacia parramattensis* over a moderate to dense *Bursaria spinosa* shrub layer.

North-western boundary – Mature native trees dominated by *Eucalyptus* sp.

Patches of *Melaleuca decora* dominated vegetation are located throughout the south-western portion of the site.

Cooks River /Castlereagh Ironbark Forest critically endangered ecological community

The Environment Protection and Biodiversity Conservation Act 1999 - Vegetation on the site does not meet the condition threshold for listing as a Cooks River /Castlereagh Ironbark Forest endangered ecological community. The Act includes an area equal to or larger than 0.5 ha with more than 30% of the perennial understorey comprising native species that is contiguous with a native vegetation remnant of more than 1 ha or contains at least one tree hollow or at least one locally indigenous tree >80cm dbh.

The patches of natural vegetation on the site are less than 0.5 ha and are not contiguous with any natural vegetation remnant. The understorey is sparse and does not contain 30% native species and no tree hollows were identified during surveys.

Biodiversity Conservation Act 2016 - Cooks River /Castlereagh Ironbark Forest may be listed as an endangered ecological community under the *Biodiversity Conservation Act 2016* in the following circumstances:

- The patch is located in an area of 800-960 mm rainfall per year;
- Is growing on clay soils on Tertiary alluvium;
- Generally occurs <60 m above sea level;
- Is dominated by a tree canopy of *Eucalyptus fibrosa* and *Melaleuca decora*;
- Has a relatively dense shrub stratum over mixed native groundcover.

Vegetation on the site is consistent with rainfall and soil requirements. The site located below 60 m ADH. The canopy is dominated by *E. fibrosa* and *Melaleuca decora*. The shrub and groundcover strata are largely absent from the site.

The presence of some indicative species on the site is consistent with the State definition of the Cooks River /Castlereagh Ironbark Forest Endangered Ecological Community.

No vulnerable, endangered or critically endangered native flora were identified within the site during the survey.

7.3 Fauna

The subject site is highly disturbed and has low structural complexity. Trees on the site represent varied age classes, with individual *Eucalyptus fibrosa* and *E. moluccana* trees reaching >70 cm diameter at breast height. These species are also represented on the site as younger trees, although recruitment and juveniles were not observed during the survey. New growth of trees and shrubs is dominated by *Bursaria spinosa*.

The vegetation within the study site would provide a source of pollen, nectar and fruit for local fauna, as well as nesting opportunities.

No termite mounds were observed during the survey. No nests, burrows, scrapes or depressions (active or inactive) were observed.

Fallen timber is present across the site. Some dead branches were observed within living trees however no tree hollows were evident.

No vulnerable, endangered or critically endangered native fauna were identified within the site during the survey.

The National Flying-fox Monitoring Viewer (DoE 2018) identified the nearest known Grey-headed Flying-fox camp to be located approximately 15 km to the west of the study area on the banks of the Nepean River. This camp was estimated to contain 500 – 2,499 individuals in the November 2015 monitoring survey. The vegetation within the site may provide seasonal foraging resources for the species.

7.4 Connectivity

The property covers an area of approximately 46,754.57 m². The north-eastern boundary of the site is adjacent to Vineyard Park, zoned RE1 – Public Recreation. Vineyard Park supports approximately 2.2 ha of natural vegetation consistent with Cooks River /Castlereagh Ironbark Forest. Agricultural land use to the south-east supports approximately 11 ha of Cooks River /Castlereagh Ironbark Forest.

Community condition within Vineyard Park is considered to be good, displaying structural complexity and a mix of native vegetation consistent with the EEC. Community condition within the site and the remainder of the EEC to the south-east is poor. Structural complexity is low with much of the shrub and groundcover species absent.

Connectivity between the south-western portion of the site and Vineyard Park is disrupted by grazed agricultural land and is consistent in disturbance and lack of structural complexity with native vegetation to the south-east.

7.5 Bushfire hazard

The site is located within land mapped as being bushfire prone (Figure 7). Note that areas of existing native vegetation within Vineyard Park and to the south-east of the site are mapped at a higher hazard level (shown in red). This may indicate that the native vegetation within the site has not been considered consistent with the structure and complexity of the adjoining vegetation.

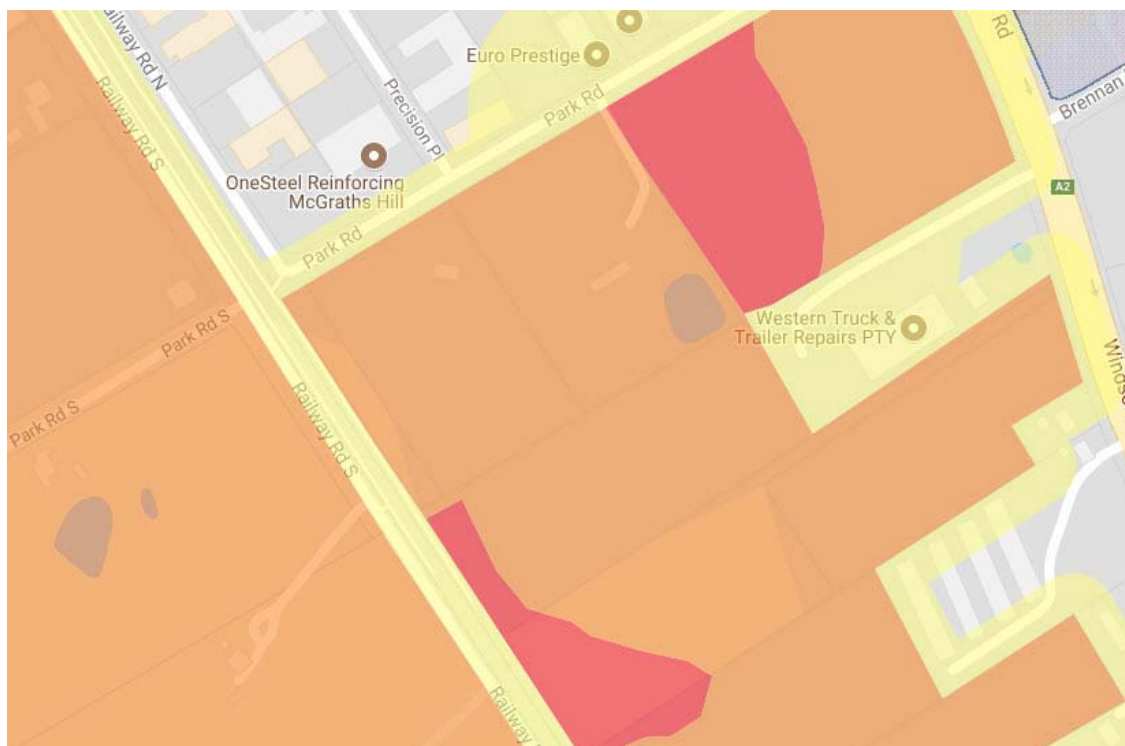


Figure 7 Bushfire prone land

Source: NSW Planning Portal 2018

8. Assessment of potential impact

Rezoning the site from RU4 – Primary Production to IN1 – General Industrial land use is likely to result in the removal of existing vegetation. This would include a line of trees immediately adjacent to vegetation of Vineyard Park, the south-eastern and south-western boundaries and along the site boundary with Park Road. Patches of native vegetation within the site would also be removed. The combined area of native trees and shrubs on the site is approximately 1.2 ha.

8.1 Assessment of Significance

Determination of the likelihood of threatened species, populations or ecological communities or their habitats, as listed under State legislation occurring in the study area indicates that the proposed development may impact those species and communities listed in Table 2.

In accordance with the requirements of s5A of the *EP&A Act 1979*, an assessment of significance has been prepared for these species listed under the *BC Act 2016*.

Part 7.3 of the *Biodiversity Conservation Act 2016* has been used to determine whether the proposed development is likely to significantly affect threatened species or ecological communities, or their habitats.

Assessment of significance for each of these species is provided in Appendix C and summarised in the following tables:

Table 3 Summary of assessment of significance - amphibians

Significant impact criteria	Amphibians
(a) life cycle	Not likely to be affected
(b) endangered population	N/A
(c) ecological community	N/A
(d) habitat	The site area is relatively small compared to the surrounding vegetation. Vegetation and habitat adjacent to the site will not be affected by the proposed rezoning and no area of habitat is likely to become fragmented. The site is not considered important to the long-term survival of species.
(e) critical habitat	No critical habitat has been identified in or in the vicinity of the study area.
(f) recovery or threat abatement plan	Recovery or threat abatement plans have not been prepared for these species.
(g) key threatening process	The proposed action will not increase the impact of any key threatening process as listed in Schedule 4 of the <i>BC Act 2016</i> .

Table 4 Summary of assessment of significance - birds

Significant impact criteria	Birds
(a) life cycle	Not likely to be affected
(b) endangered population	N/A
(c) ecological community	N/A
(d) habitat	The site area is relatively small compared to the surrounding vegetation. Vegetation and habitat adjacent to the site will not be affected by the proposed activity and no area of habitat is likely to become fragmented. The site is not considered important to the long-term survival of species.
(e) critical habitat	No critical habitat has been identified in or in the vicinity of the study area.
(f) recovery or threat abatement plan	A Recovery Plan has been produced for Large Forest Owls.
(g) key threatening process	The proposed action will not increase the impact of any key threatening process as listed in Schedule 4 of the <i>BC Act 2016</i> .

Table 5 Summary of assessment of significance - flora

Significant impact criteria	Flora
(a) life cycle	Not likely to be affected
(b) endangered population	N/A
(c) ecological community	N/A
(d) habitat	The site area is relatively small compared to the surrounding vegetation. Vegetation and habitat adjacent to the site will not be affected by the proposed rezoning and no area of habitat is likely to become fragmented. The site is not considered important to the long-term survival of species.
(e) critical habitat	No critical habitat has been identified in or in the vicinity of the study area.
(f) recovery or threat abatement plan	Recovery Plans have been made for the following species: <i>Persoonia nutans</i> ; <i>Acacia pubescens</i> ; and <i>Pterostylis gibbosa</i> .
(g) key threatening process	The proposed action will not increase the impact of any key threatening process as listed in Schedule 4 of the <i>BC Act 2016</i> .

Table 6 Summary of assessment of significance - endangered ecological communities

Significant impact criteria	Endangered Ecological Communities – Cooks River /Castlereagh Ironbark Forest
(a) life cycle	Not likely to be affected
(b) endangered population	N/A
(c) ecological community	The proposed action is not likely to have an adverse effect on the extent or adversely modify the composition of an endangered ecological community such that its local occurrence is placed at risk of extinction.
(d) habitat	The site area is relatively small compared to the surrounding vegetation. Vegetation adjacent to the site will not be affected by the proposed rezoning and the community is not likely to become fragmented. The site is not considered important to the long-term survival of the endangered ecological community.
(e) critical habitat	No critical habitat has been identified in or in the vicinity of the study area.
(f) recovery or threat abatement plan	A Recovery Plan has been made for Cumberland Plain vegetation communities.
(g) key threatening process	The proposed action will not increase the impact of any key threatening process as listed in Schedule 4 of the BC Act 2016.

Table 7 Summary of assessment of significance - mammalia

Significant impact criteria	Mammalia
(a) life cycle	Not likely to be affected
(b) endangered population	The proposed action is not likely to have an adverse effect on an endangered population such that its local occurrence is placed at risk of extinction.
(c) ecological community	N/A
(d) habitat	The site area is relatively small compared to the surrounding vegetation. Vegetation and habitat adjacent to the site will not be affected by the proposed activity and no area of habitat is likely to become fragmented. The site is not considered important to the long-term survival of species.
(e) critical habitat	No critical habitat has been identified in or in the vicinity of the study area.
(f) recovery or threat abatement plan	A Recovery Plan has been drafted for the Grey-headed Flying-fox and made for <i>Petaurus australis</i> .
(g) key threatening process	The proposed action will not increase the impact of any key threatening process as listed in Schedule 4 of the BC Act 2016.

8.2 Matters of National Environmental Significance

An EPBC Act Protected Matters Report for the region is provided in Appendix D. The report identifies matters listed within a 5km radius of the subject site and includes:

- 5 listed threatened ecological communities; and
- 70 listed threatened species.

Of these, it is considered that the following species have the potential to occur within the study area:

- *Litoria aurea* - Green and Golden Bell Frog;
- *Litoria littlejohni* - Littlejohn's Tree Frog;
- *Grantiella picta* - Painted Honeyeater;
- *Lathamus discolor* - Swift Parrot;
- *Rostratula australis* - Australian Painted Snipe;
- *Acacia pubescens* - Downy Wattle;
- *Allocasuarina glareicola*;
- *Micromyrtus minutiflora*;
- *Persoonia nutans* - Nodding Geebung;
- *Pimelea spicata* - Spiked Rice-flower;
- *Pterostylis gibbosa* - Illawarra Greenhood;
- *Pultenaea parviflora*;
- *Rhizanthella slateria* - Eastern Underground Orchid;
- *Pommerhelix duralensis* - Dural Land Snail;
- *Dasyurus maculatus maculatus* (SE mainland population) - Spot-tailed Quoll (southeastern mainland population);
- *Petauroides Volans* - Greater Glider;
- *Pseudomys novaehollandiae* - New Holland Mouse
- *Pteropus poliocephalus* - Grey-headed Flying-fox; and
- *Cooks River /Castlereagh Ironbark Forest of the Sydney Basin Bioregion.*

Under the precautionary principle, an assessment of the likelihood that the proposed development will have a significant impact on this species has been undertaken in accordance with the *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (Australian Government Department of the Environment, 2013) and is provided in Appendix E.

In summary, the proposed action is not likely to have a significant impact on these species for the following reasons:

- The loss of habitat is unlikely to lead to a long-term decrease in the size of an important population of a species.
- The proposed action will not impact any known or important populations of these species.
- The site does not provide habitat that is critical to the survival of these species.
- It is unlikely that the proposal will disrupt the breeding cycle of an important species.
- The removal of foraging and breeding habitat is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species are likely to decline.
- The proposed action would not result in an increase in invasive species, including weeds that would be detrimental to any of these species.
- It is unlikely that the proposal will introduce disease that may cause the species to decline.
- The proposed action is unlikely to interfere substantially with the recovery of the species. No critical foraging or breeding habitat has been identified within the subject site.

9. Recommendations

Approximately 1.2 ha of native vegetation would be removed during the proposed development. Revegetation should occur along the northern and eastern boundaries of the property to enhance connectivity between vegetation patches adjacent to the property. Figures Figure 8 and Figure 9 indicate the location and extent of proposed revegetation on the site. The area of revegetation should be at least consistent with the area of vegetation proposed to be removed.



Figure 8 Recommended revegetation area

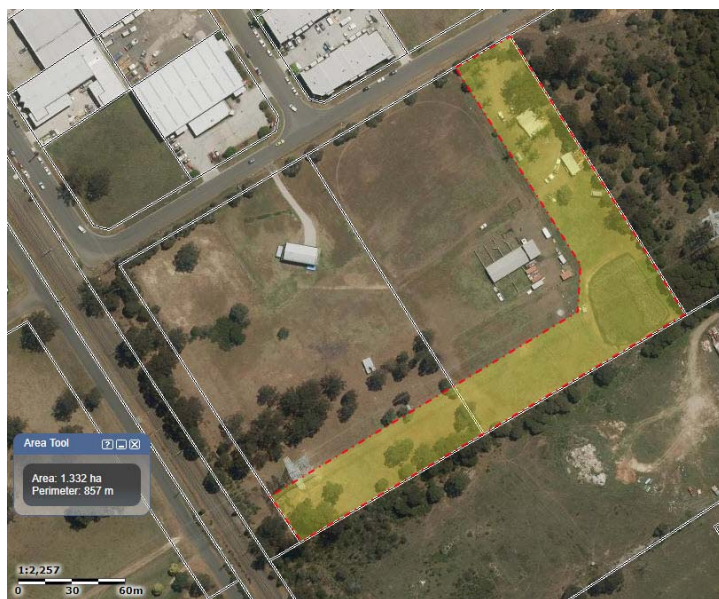


Figure 9 Aerial view of recommended revegetation area

Note that replanting would occur within the transmission easement. Some vegetation maintenance would be required in accordance with easement management practices however this area is considered to provide the best opportunity to retain connectivity between existing areas of native vegetation adjacent to the property.

A Vegetation Management Plan should be prepared and should address the selection of native plant species consistent with the vegetation communities currently found on the property and in the immediate study area. The Plan should also address the provision and enhancement of habitat for local fauna.

10. Conclusion

Rezoning the site from RU4 – Primary Production to IN1 – General Industrial landuse is likely to result in the removal of existing vegetation.

The site is currently mapped as supporting connectivity values and contains native vegetation mapped as Cooks River /Castlereagh Ironbark Forest. The treed vegetation areas are consistent with the State listed Endangered Ecological Community.

The condition of native vegetation on the site is poor and lacks structural complexity and species diversity. While these patches of vegetation are connected to better quality vegetation in the study area, it is likely that fauna species would preferentially utilise vegetation and habitat resources outside of the site.

Removal of native vegetation patches on the site would decrease the overall area of Cooks River /Castlereagh Ironbark Forest in the region, however it would not lead to fragmentation of existing habitat or vegetation communities outside of the site.

Past and present agricultural landuse on the site has led to the degradation of the original native vegetation community and continued agricultural use would not encourage regeneration or rehabilitation.

No vulnerable, endangered or critically endangered native flora, populations or fauna were identified within the site during the survey.

The proposed rezoning is not likely to have a significant impact on a Matter of National Environmental Significance listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, nor is it likely to have a significant impact on threatened species, populations or endangered communities (and their habitats) listed under the NSW *Biodiversity Conservation Act 2016*. No *Species Impact Statements* are required and referral to the Minister is not necessary.

11. References

- Australian Government Department of the Environment and Energy (2018) *Protected Matters Search Tool*, www.environment.gov.au/epbc/protected-matters-search-tool
- Australian Government Department of the Environment and Energy (2018) *Species profile and threats database*, <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>
- BoM (2017) *Observatory Hill 066062*, Climate Statistics, Bureau of Meteorology, <http://www.bom.gov.au/climate/data/>
- Department of the Environment (2018). *Australian Heritage Database*, <http://www.environment.gov.au/cgi-bin/ahdb/search.pl>.
- National Native Title Tribunal (2018) *National Native Title Register*, <http://www.nntt.gov.au/searchRegApps/NativeTitleRegisters/Pages/Search-National-Native-Title-Register.aspx>
- National Native Title Tribunal (2018) *Register of Native Title Claims*, <http://www.nntt.gov.au/searchRegApps/NativeTitleRegisters/Pages/Search-Register-of-Native-Title-Claims.aspx>
- NSW Department of Environment and Conservation (2004) *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities, Working Draft*, November 2004
- NSW Office of Environment and Heritage (2018) *Aboriginal Heritage Information Management System*, <http://www.environment.nsw.gov.au/licences/AboriginalHeritageInformationManagementSystem.htm>
- NSW Office of Environment and Heritage (2018) *NSW BioNet – the website for the Atlas of NSW Wildlife*, <http://www.bionet.nsw.gov.au/>
- NSW Office of Environment and Heritage (2018) *eSpade – NSW soil and land information*, <http://www.environment.nsw.gov.au/eSpadeWebapp/>
- NSW Office of Environment and Heritage (2018) *Six Maps*, <http://maps.six.nsw.gov.au/>
- NSW Office of Environment and Heritage (2018) *Threatened species profiles*, <http://www.environment.nsw.gov.au/threatenedSpeciesApp/>
- Legislation**
- Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
- Biodiversity Conservation Act 2016*
- Environment Protection and Biodiversity Act 1999*
- Environmental Planning and Assessment Act 1979*
- Heritage Act 1977*
- Hawkesbury Local Environmental Plan 2012*
- National Parks and Wildlife Act 1974*
- Native Vegetation Act 2003*
- Rural Fires Act 1997*

Appendix A

Qualifications and experience



firstfield
ENVIRONMENTAL

NAME

Michelle Evans

POSITION

Environmental consultant

CORE SPECIALITIES

Field surveys

Environmental assessments

Bushfire management planning

PROFILE

Michelle is an Environmental Scientist with extensive practical experience in ecological and land capability assessments coupled with an in-depth understanding of soils, ecosystem interactions and botanical identification.

Michelle has completed a number of large-scale plans, incorporating ecological surveys to identify vegetation communities and species interactions associated with fire management. She is experienced providing environmental and legislative advice to public and private clients who operate across a range of industries, including Defence, building, power generation and coal mining industries.

EDUCATION

- Graduate Certificate in Bushfire Protection - University of Western Sydney
- Bushfire Planning and Management; Bushfire and Biodiversity; and Forests and Water - University of Melbourne
- Bachelor of Land Management - University of Sydney

PROJECT EXPERIENCE

Field Surveys

- Botanical and Butterfly Survey (EnergyAustralia) – Bathurst Copper Butterfly Monitoring to address Ministers Conditions of Approval for Stage 2 Extension of Pine Dale Coal Mine.
- Ecological Assessment for Upstream Coal Seam Gas Project (Origin Energy) – Pre-clearance flora surveys and environmental scouting at Talooka and on properties near Reedy Creek, Spring Gully and Chinchilla. Vegetation community identification, mapping and botanical identification.

Environmental Assessment

- Risk Management Assessment of planned discharge water relocation (EnergyAustralia NSW) – Preparation of risk assessment report. Site survey and identification of potential discharge pathways.
- Review of Environmental Factors, Gas Distribution Infrastructure Upgrade (Jemena Asset Management) – Assessment of six sites in Central NSW. Identification of potential impacts of the construction phase on surrounding land use and amenity. Recommendation of mitigation measures to support the preparation of a Construction Environmental Management Plan.

Bushfire Management Planning

- Western Region Bushfire Management Plan, Mount Piper and Wallerawang Power Stations (EnergyAustralia) – Preparation and delivery of 5 year Bush Fire Management Plan. Liaison with EnergyAustralia NSW personnel and NSW Rural Fire Service.
- Review of Bushfire Management Plan, Vales Point and Munmorah Power Stations (Delta Electricity) – Independent review of Bush Fire Management Plan. Liaison with NSW Rural Fire Service and preparation of Hazard Reduction Certificates.
- Marangaroo Bush Fire Management Plan (Department of Defence) – Preparation and delivery of Bush Fire Management Plan. Liaison with NSW Rural Fire Service and property custodian.
- Sydney Central Bushfire Management Plans (Department of Defence) – Consultation with Defence and civilian stakeholders across six Defence properties in the Sydney Central region. Site survey of each property, determination of fire and evacuation management strategies and the development of map based plans. Presentation of the plan to Defence stakeholders.
- Department of Defence, Singleton Military Area (Department of Defence) – Field surveys of topography, vegetation and threatened species to inform the determination of ecological burn intervals across the property. Stakeholder liaison to identify the operational requirements of the property and location of sensitive assets. Development of a mitigation schedule for required works.

Appendix B Threatened biodiversity

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
Amphibia				
<i>Heleioporus australiacus</i> Giant Burrowing Frog	Vulnerable	Vulnerable	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Whilst in non-breeding habitat it burrows below the soil surface or in the leaf litter. Breeding habitat of this species is generally soaks or pools within first or second order streams.	Unlikely. Soils are clay based.
<i>Litoria aurea</i> Green and Golden Bell Frog	Endangered	Vulnerable	Inhabits marshes, dams and stream-sides, particularly those containing <i>Typha</i> spp. or <i>Eleocharis</i> spp. Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as <i>Gambusia holbrooki</i> , have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	Possible. Associated habitat including dams and grassy areas occur on the site.
<i>Litoria littlejohni</i> Littlejohn's Tree Frog	Vulnerable	Vulnerable	Found in perched swamps, upper reaches of permanent streams, dams, ditches, isolated pools, flooded hollows, creeks, streams and lagoons. Utilises heath based forest and woodland areas during non-breeding periods. Leaf litter and low vegetation provides shelter.	Possible. Associated habitat including dams and woodland areas occur on and adjacent to the site.
Aves				
<i>Anthochaera phrygia</i> Regent Honeyeater	Endangered	Critically Endangered	Mainly occurs on inland slopes of south-east Australia, in open forests and temperate woodlands. Prefers woodland with high canopy cover, large number of mature trees, and abundant mistletoes. Will utilise habitat with lerp and honeydew. Uses branches or forks of mature Eucalypts and Sheoaks and mistletoe haustoria for nests.	Unlikely. Associated habitat does not occur on or adjacent to the site.

³ NSW Office of Environment & Heritage, Threatened Species, <<http://www.environment.nsw.gov.au/threatenedSpeciesApp/>>

⁴ Australian Government Department of the Environment, Species Profile and Threats Database, <<http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>>

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Artamus cyanopterus cyanopterus</i> Dusky Woodswallow	Vulnerable	-	Found in open woodlands and forests, including dry open sclerophyll forests dominated by Eucalypts, mallee associations, shrublands, heathlands and modified habitats including regenerating forests. Sometimes found in rainforest or moist forests, golf courses and along roadsides. Recorded in habitat with open understorey, with sparse Acacias, other shrubs and heath, and sparse Eucalypt saplings. Groundcover may include sedges, grasses, or open areas with woody debris. Also observed in farmland, at the edge of woodland and forest. Uses tree hollows, tree forks and behind bark for nesting sites.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Botaurus poiciloptilus</i> Australasian Bittern	Endangered	Endangered	Found in permanent freshwater wetlands where it forages in tall, dense vegetation, especially bulrushes and spikerushes. Favours areas dominated by sedges, rushes, and/or reeds, growing over peaty or muddy substrate, located in permanent and seasonal freshwater habitats. Hides in dense reeds and rushes during the day.	Unlikely. Associated wetland habitat does not occur on or adjacent to the site.
<i>Calidris ferruginea</i> Curlew Sandpiper	Endangered	Critically Endangered	General found in intertidal mudflats or sheltered coasts. Can also occur in non-tidal lakes, lagoons and swamps, sometimes at inland locations. Forages in shallow water, and sometimes on exposed algae mats or water weed. Roosts on beaches and wetlands, and sometimes on rocky shores and salt marshes.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	Vulnerable	-	Occurs in variety of woodland and forest habitats. Found in tall mountain forests and woodlands in spring and summer – especially mature wet sclerophyll forests. Prefers more open Eucalypt forest at lower altitudes during autumn and winter, especially Box-gum and Box-Ironbark assemblages. Also occurs in coastal dry forest or urban areas during the cooler months. Old growth forest and woodland are preferred areas for nesting and roosting. Uses hollows at least 9m from the ground with a diameter of at least 10cm.	Unlikely. Associated habitat does not occur on the site.
<i>Calyptorhynchus lathamii</i> Glossy Black-Cockatoo	Vulnerable	-	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. <i>Allocasuarina littoralis</i> and <i>A. torulosa</i> are important foods. Inland populations feed on a wide range of sheoaks, including <i>A. diminuta</i> , and <i>A. gymnothera</i> . Belah is also utilised and may be a critical food source for some populations. Dependent on large hollow-bearing eucalypts for nest sites.	Unlikely. Associated vegetation does not occur on or adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Chthonicola sagittata</i> Speckled Warbler	Vulnerable	-	Occurs in a variety of Eucalyptus dominated communities, with a grassy understory, often in gullies or on rocky ridges. Requires large remnants of vegetation that are undisturbed to maintain a population in the area. Does well in open canopy habitat, with some Eucalypt regrowth, and tussock grass and sparse shrub coverage. Nests in slight hollow in the ground or base of low dense plant, commonly amongst fallen branches or other vegetative debris.	Unlikely. Large remnant vegetation communities not occur on or adjacent to the site.
<i>Circus assimilis</i> Spotted Harrier	Vulnerable	-	Found in open woodland with grassy groundcover, such as Acacia or mallee remnants, grassland, inland riparian woodland and shrub steep. Not found in coastal, escarpment and range areas with densely forested or wooded habitats.	Unlikely. Associated grassy habitat does not occur on the site.
<i>Climacteris picumnus victoriae</i> Brown Treecreeper (eastern subspecies)	Endangered	-	Found in Eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Dividing Range; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging. Hollows in standing dead or live trees and tree stumps are essential for nesting.	Unlikely. Associated habitat does not occur on the site.
<i>Daphoenositta chrysoptera</i> Varied Sittella	Vulnerable	-	Inhabits Eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	Unlikely. Associated habitat does not occur on the site.
<i>Dasyornis brachypterus</i> Eastern Bristlebird	Endangered	Endangered	Occurs in dense and low vegetation, including open woodland with a heathy understory, heath, sedgeland, swamps, shrubland, sclerophyll forest and rainforest.	Unlikely. Associated habitat does not occur on the site.
<i>Ephippiorhynchus asiaticus</i> Black-necked Stork	Endangered	-	Occurs in floodplain wetlands, billabongs, watercourses and dams of the major coastal rivers. Secondary areas may include minor floodplains, estuaries and sandplain wetlands. Nests high in tall trees near water bodies	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Falco subniger</i> Black Falcon	Vulnerable	-	Occurs widely across NSW, but the population is sparsely distributed. Mostly occurs in arid inland areas, near isolated woodlands and tree lined watercourses. Roosts in trees during the night.	Possible. Associated vegetation occurs on and adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Glossopsitta pusilla</i> Little Lorikeet	Vulnerable	-	Forages primarily in the canopy of open Eucalyptus forest and woodland, but also utilises Angophora, Melaleuca and other tree species. Riparian areas are also commonly used, and nests in proximity to feeding areas within hollows of smooth-barked Eucalypts.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Grantiella picta</i> Painted Honeyeater	Vulnerable	Vulnerable	Occurs in Box-Ironbark Forests and Boree, Brigalow and Box-Gum Woodlands. Nests in outer canopy of drooping She-oak, eucalypts, paperbark or mistletoe branches.	Possible. Associated vegetation occurs adjacent to the site.
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	Vulnerable	-	Occurs at sites near the sea or sea-shore and in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Hieraaetus morphnoides</i> Little Eagle	Vulnerable	-	Occupies open Eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Possible. Associated vegetation occurs adjacent to the site.
<i>Ixobrychus flavicollis</i> Black Bittern	Vulnerable	-	Generally found in areas with dense vegetation and permanent water, both estuarine and terrestrial wetlands. If permanent water is present, may occur in flooded forest, grassland, woodland, rainforest and mangroves. Roosts in trees during the day on amongst dense reeds on the ground.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Lathamus discolor</i> Swift Parrot	Endangered	Critically Endangered	Found in south-east mainland between March and October, in areas with flowering Eucalypts or abundant lerp.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Limosa limosa</i> Black-tailed Godwit	Vulnerable	-	Usually occurs in coastal areas, within sheltered bays, lagoons and estuaries with large expanses of intertidal sandflats or mudflats. May utilise inland wetlands, mudflats, muddy lakes and swamps with water that is less than 10cm deep.	Unlikely. Associated habitat does not occur on or adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Lophochroa leadbeateri</i> Major Mitchell's Cockatoo	Vulnerable	-	Found in a variety of treed or treeless habitats near watercourses, with nesting occurring in tree hollows. Feeds on seeds of saltbush, cypress pines and wattles, and particularly seeds of native and exotic melons.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Lophoictinia isura</i> Square-tailed Kite	Vulnerable	-	Occurs in timbered habitats including open forest and dry woodland, especially timbered watercourses.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Melithreptus gularis gularis</i> Black-chinned Honeyeater (eastern subspecies)	Vulnerable	-	Found in mostly upper levels of drier open forests or woodlands, dominated by box and ironbark Eucalypts, especially <i>Eucalyptus sideroxylon</i> , <i>E. albens</i> , <i>E. microcarpa</i> , <i>E. melliodora</i> , <i>E. blakelyi</i> and <i>E. tereticornis</i> . Also occurs open forests of stringybarks, ironbarks, smooth-barked gums, river sheoaks and tea-trees.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Ninox connivens</i> Barking Owl	Vulnerable	-	Found in woodland and open forest, including partially cleared farmland and fragmented remnants. May hunt in closed forest to more open areas. Uses shaded portions of trees for roosting, including tall midstorey trees, such as Acacia and Casuarina species with dense foliage. Uses hollows for nests.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Ninox strenua</i> Powerful Owl	Vulnerable	-	Occurs in variety of areas, including woodland, open sclerophyll forest, tall wet forest and rainforest. Found in large expanses of forest and woodland, but can also live in a fragmented landscape. Breeds and hunts in open or closed sclerophyll forest or woodlands. Roosts during the day in a variety of species including Eucalypts, Acacia, Angophora, Exocarpus and She-Oak species. Nests in old large eucalypts.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Numenius madagascariensis</i> Eastern Curlew	-	Critically endangered	Found predominantly in coastal areas, within sheltered coasts, including estuaries, bays harbours, and lagoons with large areas of intertidal sandflats or mudflats, commonly with seagrass beds.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Oxyura australis</i> Blue-billed Duck	Vulnerable	-	Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. Blue-billed Ducks will feed by day far from the shore, particularly if dense cover is available in the central parts of the wetland.	Unlikely. Associated habitat does not occur on or adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Petroica boodang</i> Scarlet Robin	Vulnerable	-	Found in forests and woodlands. Habitat usually contains abundant logs and fallen timber. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. Nest is an open cup made of plant fibres and cobwebs and is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Polytelis swainsonii</i> Superb Parrot	Vulnerable	Vulnerable	Found in River Red Gum Forest or Box-Gum, Box-Cypress-pine and Boree Woodlands. Nests in large tree hollows in forest, woodland and paddocks. Known to use Apple Box, Red Box, Yellow Box and Blakely's Red Gum.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Rostratula australis</i> Australian Painted Snipe	Endangered	Endangered	Usually occurs on the fringes of dams and swamps, as well as, marshy areas with some grass, lignum, low scrub or open timber cover. Nests within tall vegetation on the ground, including reeds, tussocks or grasses.	Possible. Associated vegetation occurs on and adjacent to the site.
<i>Stictonetta naevosa</i> Freckled Duck	Vulnerable	-	Usually found in permanent creeks and freshwater swamps with heavy growth of Tea-tree, Cumbungi or Lignum species. Migrate to permanent waters, including farm dams, lakes and reservoirs during drier times. Rests during the day in dense cover, mostly in deep water. Usually nests at or near water level in dense vegetation.	Unlikely. Associated habitat does not occur on or adjacent to the site.
Endangered Ecological Communities				
<i>Castlereagh Scribbly Gum</i> and <i>Agnes Banks</i> <i>Woodlands of the Sydney</i> <i>Basin Bioregion</i>	Vulnerable	Endangered	Usually a low woodland, with a mid-layer of sclerophyll shrubs, and patchy sedge and grass ground cover. Occurs mostly on Tertiary sands and gravels of the Hawkesbury-Nepean river systems. May also occur on aeolian (wind-blown) sands on Tertiary alluvium. Grows on elevations up to 80m, which receive between 700-900mm annual rainfall. The canopy (10-20m) is often dominated by <i>Angophora bakeri</i> , <i>Eucalyptus racemosa</i> , and <i>E. parramattensis</i> subsp. <i>parramattensis</i> . The shrub layer (approximately 2m) often includes various banksia and melaleuca species, and <i>Conospermum taxifolium</i> , <i>Leptospermum trinervium</i> , <i>Dillwynia sericea</i> , <i>Monotoca scoparia</i> , <i>Platysace ericoides</i> , <i>Persoonia nutans</i> , <i>Pimelea linifolia</i> subsp. <i>linifolia</i> and <i>Hakea sericea</i> . The ground layer consists of diverse forbs and graminoids including <i>Themeda triandra</i> , <i>Entolasia stricta</i> , <i>Cyathochaeta diandra</i> and <i>Dianella revoluta</i> subsp. <i>revoluta</i> .	Not observed.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Endangered	Critically Endangered	An open forest to low woodland community, usually dominated by <i>Eucalyptus fibrosa</i> and <i>Melaleuca decora</i> , with <i>E. longifolia</i> often present. Found on clay rich soils derived from Wianamatta Shale and Tertiary alluvium. If derived from Tertiary alluvium, the soils are less fertile gravelly clay loams. Grows below 100m, in areas with annual rainfall of 800-1000mm. Other canopy species include <i>E. racemosa</i> , <i>Angophora costata</i> and <i>A. bakeri</i> on sandier soils, <i>E. longifolia</i> near creeks, and <i>E. parramattensis</i> in areas with less well drained soil, and <i>E. moluccana</i> and <i>E. eugenioides</i> on less gravelly clay soils. Often, the shrub layer is dense, with species including <i>Acacia falcata</i> , <i>Bursaria spinosa</i> , <i>Daviesia ulicifolia</i> , <i>Dillwynia tenuifolia</i> , <i>Lissanthe strigosa</i> , <i>Melaleuca nodosa</i> , <i>M. decora</i> , <i>Ozothamnus diosmifolius</i> and <i>Pultenaea villosa</i> , depending on the site and location. Relatively sparse ground layer.	Known. Vegetation on the site is not consistent with the determination of this community under the EPBC Act 1999. Species indicative of this community do occur on the site and are consistent with the listing under the BC Act 2016.
Cumberland Plain Shale Woodlands and Shale-Sandstone Transition Forest		Critically Endangered	Occurs at the edges of the Cumberland Plain, where clay soils from the shale rock intergrade with earthy and sandy soils from sandstone, or where shale caps overlay sandstone. The main tree species include <i>Eucalyptus tereticornis</i> , <i>E. punctata</i> , <i>E. globoidea</i> , <i>E. eugenioides</i> , <i>E. fibrosa</i> and <i>E. crebra</i> . Areas of low sandstone influence (more clay-loam soil texture) have an understorey that is closer to Cumberland Plain Woodland. High-shale-influence sites often have a diverse and moderately dense groundcover stratum, with grasses a prominent and diverse component. Shrubs are usually less abundant and less diverse in shale sites.	Not observed.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Shale Sandstone Transition Forest of the Sydney Basin Bioregion</i>	Endangered	Critically Endangered	Generally a tall to open forest or woodland with a canopy dominated by various Eucalypt species, with a sclerophyllous shrub understory, and grasses and herb ground cover. This transitional community is found between Hawkesbury Sandstone and Wianamatta shale geology, and species present will depend on level of shale influence. Soils tend to be clayey, but also have influence from weathered sandstone. Grows to elevations of up to 350m in Lower Blue Mountains and western Woronora Plateau, and up to 600m in the Southern Highlands. The canopy (10-30m) typically includes two or more of the following species: <i>Angophora bakeri</i> , <i>Eucalyptus crebra</i> , <i>E. punctata</i> , <i>E. fibrosa</i> subsp. <i>fibrosa</i> , <i>E. tereticornis</i> subsp. <i>tereticornis</i> , <i>E. resinifera</i> subsp. <i>resinifera</i> , <i>E. eugenioides</i> or <i>E. globoidea</i> , depending on local conditions. A small tree layer may be present (10.9m) including <i>Allocasuarina littoralis</i> , and less commonly, <i>Syncarpia glomulifera</i> . A well developed shrub layer may be present, and include <i>Bursaria spinosa</i> , <i>Hibbertia aspera</i> , <i>Kunzea ambigua</i> , <i>Ozothamnus diosmifolius</i> , <i>Leucopogon juniperinus</i> , <i>Persoonia linearis</i> and <i>Pultenaea villosa</i> . The grass and herb layer is often dominated by <i>Aristida vagans</i> , <i>Austrostipa pubescens</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Dichondra repens</i> , <i>Echinopogon ovatus</i> , <i>Entolasia marginata</i> , <i>Entolasia stricta</i> , <i>Lepidosperma laterale</i> , <i>Lomandra multiflora</i> , <i>Microlaena stipoides</i> var. <i>stipoides</i> , <i>Oxalis perennans</i> and <i>Pimelea linifolia</i> .	Not observed.
<i>Western Sydney Dry Rainforest and Moist Woodland on Shale</i>	Endangered	Critically Endangered	This community consists of two vegetation units, being Western Sydney Dry Rainforest and Moist Shale Woodland described by Tozer. A low closed rainforest, typically in gullies or lower slopes, to more open moist woodland on upper slopes and disturbed sites. Emergent trees can grow up to 25m. Almost grows exclusively on clay soils derived from Wianamatta Group shales. Lower slopes and gullies are dominated by <i>Melaleuca styphelioides</i> . Other common tree species include <i>Acacia implexa</i> , <i>Alectryon ucinereus</i> , <i>Brachychiton populneus</i> , <i>Corymbia maculata</i> , <i>Melicope micrococci</i> and <i>Streblus Brunonianus</i> . Eucalyptus species are present as emergent in rainforest forms, and in moist woodlands, grade into a canopy. Dominant species include <i>E. tereticornis</i> , <i>E. moluccana</i> and/or <i>E. crebra</i> . The shrub layer commonly includes mesic and prickly species, and may include <i>Breynia oblongifolia</i> , <i>Clerodendrum tomentosum</i> and <i>Notelaea longifolia</i> f. <i>longifolia</i> . Vines are common, including <i>Aphanopetalum resinosum</i> and <i>Cayratia clematidea</i> .	Not observed.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
Flora				
<i>Acacia bynoeana</i> Bynoe's Wattle	Endangered	Vulnerable	Occurs on sandy soils, in heath or dry sclerophyll forest. Appears to have preference for open sites, sometimes disturbed, such as recently burnt areas, and roadside spoil mounds and trail margins. Grows with overstorey species including Scribbly Gum, Red Bloodwood, Narrow-leaved Apple, Saw Banksia and Parramatta Red Gum.	Unlikely. Associated species do not occur on the site.
<i>Acacia gordonii</i>	Endangered	Endangered	Found in healthlands, woodland and dry sclerophyll forest, within or amongst rock platforms on sandstone outcropping. Grows on Hawkesbury Sandstone substrate, with some laterite and residual clay influence, which is nutrient poor and well drained. Overstorey species include <i>Eucalyptus eximia</i> , <i>E. gummifera</i> , <i>E. squamea</i> and <i>E. piperita</i> .	Unlikely. Associated species do not occur on the site.
<i>Acacia pubescens</i> Downy Wattle	Vulnerable	Vulnerable	Occurs in dry open sclerophyll forest and woodland, as well as Melaleuca scrub. Grows on shales, alluviums, and also intergrading areas between shale and sandstone. Soils are typically gravelly, with ironstone content, and nutrient poor and well drained. Found in Cumberland Plain Woodland, Cooks River/Castlereagh Ironbark Forest and Shale/Gravel Transition Forest.	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Allocasuarina glareicola</i>	Endangered	Endangered	Occurs in open woodland on tertiary alluvial gravels, with lateritic soil and yellow clayey subsoil, which are nutrient poor and acidic. Associated with <i>Eucalyptus parramattensis</i> , <i>Eucalyptus fibrosa</i> , <i>Angophora bakeri</i> , <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i> .	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Asterolasia elegans</i>	Endangered	Endangered	Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes <i>Syncarpia glomulifera</i> , <i>Angophora costata</i> , <i>Eucalyptus piperita</i> , <i>Allocasuarina torulosa</i> and <i>Ceratopetalum gummiferum</i> .	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Cryptostylis hunteriana</i> Leafless Tongue-orchid	Vulnerable	Vulnerable	Found in a range of habitats, including woodland, sedgelands, forest, wetlands and swamp heath. Large populations occur in woodland dominated by <i>Eucalyptus sclerophylla</i> , <i>E. sieberi</i> , <i>Corymbia gummifera</i> and <i>Allocasuarina littoralis</i> . Occurs on moist and sandy soils, dry soils, and peaty soils.	Unlikely. Associated species do not occur on the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Cynanchum elegans</i> White-flowered Wax Plant	Endangered	Endangered	Usually occurs on the edge of dry rainforest vegetation. Flowering occurs between August and May, with a peak in November.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Dillwynia tenuifolia</i>	Endangered	-	Found in scrubby/dry heath habitat, within Shale Gravel Transitional Forest and Castlereagh Ironbark Forest on laterised clay or tertiary alluvium. May also be present where these communities meet Castlereagh Scribbly Gum Woodland in transitional areas. Usually, <i>Eucalyptus fibrosa</i> is the dominant canopy species, but <i>Eucalyptus globoidea</i> , <i>E. longifolia</i> , <i>E. parramattensis</i> , <i>E. sclerophylla</i> and <i>E. sideroxylon</i> may also be present.	Possible. Associated species occur on and adjacent to the site.
<i>Genoplesium baueri</i> Yellow Gnat-orchid	Endangered	Endangered	Found in open, shrubby and heathy forest, heathland to shrubby woodland. Also, grows in moss gardens on sandstone. Associated soils are sands or sandy loams.	Unlikely. Associated habitat does not occur on the site.
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> Juniper-leaved Grevillea	Vulnerable	-	Grows on sandy soils and reddish clay soils derived from Wianamatta Shale and Tertiary alluvium, commonly with lateritic gravels. Recorded from Castlereagh Ironbark Woodland, Castlereagh Scribbly Gum Woodland, Cumberland Plain Woodland and Shale/Gravel Transition Forest.	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Haloragis exalata</i> subsp. <i>exalata</i> Wingless Raspwort	Vulnerable	Vulnerable	Appears to require protected and shaded damp situations in riparian habitats. Flowering specimens in NSW are recorded from November to January.	Unlikely. Associated habitat does not occur on the site.
<i>Melaleuca deanei</i> Deane's Paperbark	Vulnerable	Vulnerable	Occurs in sandy soils, woodlands and wet heath on sandstone. Found in mostly ridgetop woodland, with fewer sites (approximately 5%) in heath on sandstone.	Unlikely. Associated habitat does not occur on the site.
<i>Micromyrtus minutiflora</i>	Endangered	Vulnerable	Grows in Ironbark Forest, Shale/Gravel Transition Forest, Castlereagh Scribbly Gum Woodland, open forest on tertiary alluvium and consolidated river sediments.	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Olearia cordata</i>	Vulnerable	Vulnerable	Found in open shrubland and dry open sclerophyll forest on sandstone ridges.	Unlikely. Associated habitat does not occur on the site.
<i>Pelargonium</i> sp. <i>Striatellum</i> Omeo Stork's-bill	-	Endangered	Usually found at irregularly inundated or ephemeral lakes, just above the high-water level. May cover exposed lake beds during dry periods.	Unlikely. Associated habitat does not occur on or adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Persoonia hirsuta</i> Hairy Geebung	Endangered	Endangered	Found in dry sclerophyll open forest woodland, with a shrubby understorey present. Also grows in heath, sandstone scrubs and shrubby thickets. Often found on mid slopes of hills and rises, and ridge tops. Mostly grows on sandy to stony soils on sandstone, and rarely on shale. May be present in disturbed areas, such as track margins. Associated with Sydney Sandstone Ridge-top Woodland and Sydney Sandstone Open Forest.	Unlikely. Associated habitat does not occur on the site.
<i>Persoonia nutans</i> Nodding Geebung	Endangered	Endangered	Found on aeolian and alluvial sediments in northern populations, in a range of sclerophyll forest and woodland habitats, including Agnes Banks Woodland, Castlereagh Scribbly Gum and Cooks River/Castlereagh Ironbark Forest. Also, grows on tertiary alluvium in southern populations, which may also extent into shale sandstone transitional communities and Cooks River/Castlereagh Ironbark Forest.	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Pimelea curviflora</i> var. <i>curviflora</i>	Vulnerable	Vulnerable	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Flowers October to May. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Pimelea spicata</i> Spiked Rice-flower	Endangered	Endangered	Found growing on well-structured clay soils, associated with Grey Box communities (including Cumberland Plain Woodland variants or Moist Shale Woodland) and Ironbark areas. Associated species include <i>Eucalyptus moluccana</i> , <i>E. tereticornis</i> and <i>E. crebra</i> .	Possible. Associated species occur on and adjacent to the site.
<i>Pterostylis gibbosa</i> Illawarra Greenhood	Endangered	Endangered	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. The species grows in woodland dominated by <i>Eucalyptus tereticornis</i> , <i>E. longifolia</i> and <i>Melaleuca decora</i> . Near Nowra, the species grows in an open forest of <i>Corymbia maculata</i> , and <i>E. paniculata</i> . In the Hunter region, the species grows in open woodland dominated by <i>E. crebra</i> and <i>Callitris endlicheri</i> .	Possible. Associated species occur on and adjacent to the site.
<i>Pterostylis pulchella</i> Pretty Greenhood	Vulnerable	Vulnerable	Found on cliff faces close to waterfalls and creek banks and mossy rocks alongside running water. Flowers appear from February to May.	Unlikely. Associated habitat does not occur on or adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Pterostylis saxicola</i> Sydney Plains Greenhood	Endangered	Endangered	Occurs in shallow soil depressions above cliff lines on sandstone rock shelves. Associated with sclerophyll forest or woodland and in heathy forest, supported by shale or shale/sandstone transitional soils (including sandy soils). Also found in sandstone boulder crevices, often near streams. Grows at altitudes between 10 and 60m, in small groups, loose colonies or as scattered individuals.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Pultenaea parviflora</i>	Endangered	Vulnerable	Found in scrubby/dry heath in Castlereagh Shale Gravel Transition Forest and Ironbark Forest on laterised clays or tertiary alluvium. May also be found in transitional areas adjacent these communities.	Possible. Associated species and vegetation communities occur on and adjacent to the site.
<i>Rhizanthella slateria</i> Eastern Underground Orchid	Vulnerable	Endangered	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	Possible.
<i>Syzygium paniculatum</i> Magenta Lilly Pilly	Endangered	Vulnerable	Found in Littoral Rainforest on grey soils over sandstone in the south coast. Also, found in Riverside Galley Rainforest and Littoral Rainforest communities on gravels, sands, silts and clays in the central coast.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Thesium australe</i> Austral Toadflax	Vulnerable	Vulnerable	Found in grassland on coastal headlands, and grassy woodland, shrubland or grassland at inland locations. Commonly found with <i>Themeda australis</i> . Occurs on soils derived from sedimentary, igneous and metamorphic geology, including peaty loams and black clay loams to yellow podzolics. Commonly present at damp sites.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Zieria involucrata</i>	Endangered	Vulnerable	Found on Hawkesbury Sandstone, and Quaternary alluvium and Narrabeen Group sandstone. Mostly found lower on lower to mid slopes and valleys in sheltered forests but may also be found in drier vegetation. The canopy typically includes <i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i> , <i>Angophora costata</i> , <i>Eucalyptus agglomerata</i> and <i>Allocasuarina torulosa</i> .	Unlikely. Associated species do not occur on or adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
Gastropods				
<i>Meridolum corneovirens</i> Cumberland Plain Land Snail	Endangered	-	Mostly found in Cumberland Plain Woodland. Also, occurs in Shale Gravel Transition Forest, margins of River-Flat Forest and Castlereagh Swamp Woodlands. Lives under logs, leaf and bark litter. May also shelter in loose soil around grass and under rubbish.	Unlikely. Associated vegetation communities do not occur on or adjacent to the site.
<i>Pommerhelix duralensis</i> Dural Land Snail	Endangered	Endangered	Occurs in forested habitats with woody debris and good native cover, with strong association with communities on the interface between shale derived and sandstone-derived soils. May be found resting on leaf litter or exposed rocks. Shelters under rocks, in curled up bark debris, leaf litter or light woody debris. Occurs in forested habitats with good native cover.	Possible. Associated habitat occurs on and adjacent to the site.
Mammalia				
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	Vulnerable	Vulnerable	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to these features.	Unlikely. Associated habitat does not occur on or adjacent to the site.
<i>Dasyurus maculatus maculatus</i> (SE mainland population) Spot-tailed Quoll (southeastern mainland population)	Vulnerable	Endangered	Found in a variety of areas including open forest, rainforest, woodland, coastal heath and inland riparian forest. Uses tree hollows, logs, rock outcrops, small caves and rocky cliff faces as dens. Uses flat rocks amongst boulder sites, rocky stream beds or banks, and rocky cliff faces as latrine sites.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	Vulnerable	-	Occurs in moist habitat with trees over 20m in height. Uses eucalypt hollows, under loose bark or buildings for roost sites.	Unlikely. Associated habitat does not occur on the site.
<i>Miniopterus australis</i> Little Bentwing-bat	Vulnerable	-	Found in eucalypt forest, vine thicket, rainforest, wet and dry sclerophyll forest, dense coastal forests, Melaleuca swamps and banksia scrub. Roosts in caves, tree hollows, tunnels, abandoned mines, bridges, stormwater drains and sometimes buildings.	Possible. Associated vegetation occurs on and adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Miniopterus schreibersii oceanensis</i> Eastern Bentwing-bat	Vulnerable	-	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. Hunt in forested areas, catching moths and other flying insects above the tree tops.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Mormopterus norfolkensis</i> Eastern Freetail-bat	Vulnerable	-	Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Myotis macropus</i> Southern Myotis	Vulnerable	-	Generally roosts in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Petauroides volans</i> Greater Glider	-	Vulnerable	Found in Eucalypt woodland and forest, particularly with large old trees with large hollows. Shelters in tree hollows during the day.	Possible. Associated vegetation occurs adjacent to the site.
<i>Petaurus australis</i> Yellow-bellied Glider	Vulnerable	-	Found in tall mature Eucalypt forest, usually in areas with nutrient rich soil and high rainfall. Inhabits a variety of Eucalypt forest, with preferences changing with latitude and elevation, including mixed coastal and dry escarpment forest in the north, and creek flats to tall montane forest and moist coastal gullies in the south. Uses tree hollows for dens.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Petrogale penicillata</i> Brush-tailed Rock-wallaby	Endangered	Vulnerable	Occurs at rock escarpments, outcrops and cliffs, although, has preference for complex structures, such as caves, fissures and ledges. Browses at surrounding areas on vegetation, including dense rainforest, dry sclerophyll forest, vine thicket and open forest.	Unlikely. Associated habitat does not occur on or in the vicinity of the site. No individuals were observed during field survey
<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	Vulnerable	Vulnerable	Occurs in Eucalypt woodlands and forests, spending most of their time in trees. Travels on the ground between trees.	Unlikely. Associated habitat does not occur on or adjacent to the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Pseudomys novaehollandiae</i> New Holland Mouse	-	Vulnerable	Occurs in woodlands, forest with heathy understorey, open heathlands and vegetation sand dunes. Deeper soils, with soft substrate, are preferred habitat to dig burrows.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	Vulnerable	Vulnerable	Found in a variety of areas including tall sclerophyll forests and woodlands, heaths and swamps, subtropical and temperate rainforests, and urban gardens and fruit crops. Normally, roosts are found in habitat with dense vegetation, close to water, and in gullies.	Possible. Associated habitat occurs on and adjacent to the site.
<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	Vulnerable	-	Utilises a variety of habitats from woodland through to moist and dry Eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Females congregate at maternity sites located in suitable trees.	Possible. Associated habitat occurs on and adjacent to the site.

Appendix C Assessment of significance

To comply with State legislative requirements, an Assessment of Significance under 5A of the *Environmental Planning and Assessment Act 1979* and 7.3 of the *Biodiversity Conservation Act 2016* has been undertaken for the following species:

- *Litoria aurea* - Green and Golden Bell Frog;
- *Litoria littlejohni* - Littlejohn's Tree Frog;
- *Artamus cyanopterus cyanopterus* - Dusky Woodswallow;
- *Falco subniger* - Black Falcon;
- *Glossopsitta pusilla* - Little Lorikeet;
- *Grantiella picta* - Painted Honeyeater;
- *Hieraaetus morphnoides* - Little Eagle;
- *Lathamus discolor* - Swift Parrot;
- *Lophochroa leadbeateri* - Major Mitchell's Cockatoo;
- *Lophoictinia isura* - Square-tailed Kite;
- *Melithreptus gularis gularis* - Black-chinned Honeyeater (eastern subspecies);
- *Ninox connivens* - Barking Owl;
- *Ninox strenua* - Powerful Owl;
- *Petroica boodang* - Scarlet Robin;
- *Rostratula australis* - Australian Painted Snipe;
- *Cooks River /Castlereagh Ironbark Forest*;
- *Acacia pubescens* - Downy Wattle;
- *Allocasuarina glareicola*;
- *Dillwynia tenuifolia*;
- *Grevillea juniperina subsp. juniperina* - Juniper-leaved Grevillea;
- *Micromyrtus minutiflora*;
- *Persoonia nutans* - Nodding Geebung;
- *Pimelea spicata* - Spiked Rice-flower;
- *Pterostylis gibbosa* - Illawarra Greenhood;
- *Pultenaea parviflora*;
- *Rhizanthella slateria* - Eastern Underground Orchid;
- *Pommerhelix duralensis* - Dural Land Snail;
- *Dasyurus maculatus maculatus (SE mainland population)* - Spot-tailed Quoll (southeastern mainland population);
- *Miniopterus australis* - Little Bentwing-bat;
- *Miniopterus schreibersii oceanensis* - Eastern Bentwing-bat;
- *Mormopterus norfolkensis* - Eastern Freetail-bat;
- *Myotis macropus* - Southern Myotis;
- *Petauroides Volans* - Greater Glider;
- *Pteropus poliocephalus* - Grey-headed Flying-fox; and
- *Scoteanax rueppellii* - Greater Broad-nosed Bat.

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

The proposed development is unlikely to impact the life cycle of a threatened species such that a viable local population is likely to be at risk of extinction.

The **Green and Golden Bell Frog** and **Littlejohn's Tree Frog** may utilise habitat resources within the site. These species are mobile and are likely to utilise habitat resources available in the areas of native vegetation adjacent to the site and as such the proposed action is not likely to have an adverse effect on the life cycle of the species.

Avian species are highly mobile and are likely to utilise habitat and resources within and adjacent to the site. While the proposed development would decrease the amount of habitat and resources available, the action is not considered to constitute a risk of extinction to any avian population.

The proposed activity is not considered likely to place any **threatened flora** at risk of extinction. No threatened flora species were observed during field survey. The site is disturbed and adversely affected by exotic pasture and grazing activities.

The proposed action is not likely to have an adverse effect on the life cycle of any threatened **mammalian species**. No threatened mammalian species were observed during field survey. Mammals may utilise habitat resources within the site. Each of the species listed in Table 2 are considered to be highly mobile and is likely to utilise habitat resources available in the areas of native vegetation adjacent to the site.

No suitable roosting or breeding habitat for the **Grey-headed Flying-fox** occurs on the subject site, and no known roosting camps will be affected by the proposed action. The vegetation within the study area may act as a potential food resource when in flower or fruiting. However, considering the large areas of native vegetation adjacent to the site and within the region, the removal of these potential food resources would not impact on the long-term survival of this species. Furthermore, this species is highly mobile and the proposed action will not result in the erection of any barriers to the dispersal, foraging or interbreeding needs of this species.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction

The proposed activity is unlikely to have an adverse effect on the life cycle of *Dasyurus maculatus maculatus* (**SE mainland population**) - **Spot-tailed Quoll (southeastern mainland population)** such that a viable local population is likely to be placed at risk of extinction. The species was not observed during site survey. The species is highly mobile and the proposed action will not result in the erection of any barriers to the dispersal, foraging or interbreeding needs of this species.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

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

The proposed action is not likely to have an adverse effect on the **Cooks River /Castlereagh Ironbark Forest Endangered Ecological Community** such that its local occurrence is likely to be placed at risk of extinction. The Cooks River /Castlereagh Ironbark Forest occurs throughout the study region as small, isolated pockets. The

proposed activity is not likely to adversely modify the composition of the EEC such that it would place it at risk of localised extinction.

(d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality**

Habitat for **threatened species, populations and ecological communities** may occur on the site however, the site area is small in relation to the surrounding landscape and natural vegetation communities in the study region.

The proposed action is not likely to result in any habitat becoming fragmented or isolated. **Avian and mammalian species** are highly mobile and are considered likely to utilise areas of habitat within the broader study area. Any potential **threatened flora** habitat occurring on the site is considered to be well-represented in the surrounding study area and the proposed action is not likely to result in fragmentation or isolation.

The habitat that would be removed or modified by the proposed action is not considered to be of importance to the long-term survival of any species, population or ecological community. No threatened species or population was observed on the site during survey. Potential habitat on the site is well represented in the broader study area.

No roosting or breeding habitat for the **Grey-headed Flying-fox** occurs on the subject site, and no known camps will be impacted by the proposal. This species is highly mobile and may travel long distances (up to 50 km) in search of food. Given the availability of potential resources in the study region it is not considered that the removal of a small number of canopy trees from within the site is likely to affect this species such that there would be an impact on long-term survival.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)

No critical habitat as determined by the *EPBC Act* 1999 or *BC Act* 2016 has been recommended or declared within the study area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan

An Approved Recovery Plan for **Large Forest Owls** has been produced by the NSW Department of Environment and Conservation (2006). The objectives of the Plan are to:

- Assess the distribution and amount of high quality habitat for each owl species across public and private lands to get an estimate of the number and proportion of occupied territories of each species that are, and are not, protected.
- Monitor trends in population parameters (numbers, distribution, territory fidelity and breeding success) across the range of the three species and across different land tenures and disturbance histories.
- Assess the implementation and effectiveness of forest management prescriptions designed to mitigate the impact of timber-harvesting operations on the owl species and, (if necessary), to use this information to refine the prescriptions so that forestry activities on state forests are not resulting in adverse changes in species abundance and breeding success.
- Ensure the impacts on large forest owls and their habitats are adequately assessed during planning and environmental assessment processes.

- Minimise further loss and fragmentation of habitat by protection and more informed management of significant owl habitat (including protection of individual nest sites).
- Improve the recovery and management of the three large forest owls based on an improved understanding of key areas of their biology and ecology.
- Raise awareness of the conservation requirements of the three large forest owls amongst the broader community, to involve the community in owl conservation efforts and in so doing increase the information base about owl habitats and biology.
- Coordinate the implementation of the recovery plan and continually seek to integrate actions in this plan with actions in other recovery plans or conservation initiatives.

The proposal does not intervene with the above objectives as no critical foraging or roosting habitat for large forest owls has been identified in the study area.

A Draft National Recovery Plan for the **Grey-headed Flying-fox** was produced by the Department of Environment, Climate Change and Water, NSW (2010). The objectives of this plan include:

- To protect and increase the extent of key winter and spring foraging habitat of Grey-headed Flying-foxes.
- To identify roosting habitat critical to the survival of Grey-headed Flying-foxes.
- To protect and enhance roosting habitat critical to the survival of Grey-headed Flying-foxes.
- To substantially reduce deliberate destruction of Grey-headed Flying-foxes in fruit crops.
- To reduce negative public attitudes toward Grey-headed Flying-foxes and reduce conflict with humans.
- To increase public awareness and understanding of Grey-headed Flying-foxes and the recovery program, and to involve the community in recovery actions, where appropriate, to reduce the threat of negative public attitudes and conflict with humans.
- To monitor population trends in Grey-headed Flying-foxes so as to monitor the species' national distribution and status.
- To assess and reduce the impact on Grey-headed Flying-foxes of electrocution on powerlines and entanglement in netting and on barbed-wire.
- To improve knowledge of the demographics and population structure of Grey-headed Flying-foxes in order to increase understanding of the ecological requirements of the species.
- To increase the effectiveness and efficiency of recovery initiatives for Grey-headed Flying-foxes by working cooperatively with conservation and management programs with overlapping objectives to remove or reduce the impact of threatening processes on the species.
- To maintain an effective Grey-headed Flying-fox National Recovery Team to oversee the implementation of the Grey-headed Flying-fox National Recovery Plan to remove or reduce the impact of threatening processes on the species.
- To provide long-term economic benefits associated with the protection of ecosystem services, promotion of sustainable forest management, improved crop protection regimes, promotion of sustainable agricultural practices and increased viability of some commercial fruit industries.

The proposal does not intervene with the above objectives as no critical foraging or roosting habitat for the Grey-headed Flying-fox has been identified in the study area.

No Threat Abatement Plans or Recovery Plans, drafts or advices relating to the remaining species or the proposed activity have been prepared.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

The proposed action does not constitute a key threatening process as listed in Schedule 3 of the *BC Act 2016* to the survival or evolutionary development of any species, population or ecological community in the study area.

Native vegetation clearing - Defined as “the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of stand or stands”. The proposed development would lead to the loss or long-term modification of the structure, composition or ecological function of the vegetation on site.

Invasion and establishment of exotic vines and scramblers - The proposed development would not include the introduction of exotic vines or scramblers.

Invasion of native plant communities by exotic perennial grasses – The proposed development may introduce exotic grasses to the site.

Invasion, establishment and spread of Lantana (*Lantana camara* L. sens. Lat) – The proposed development would include ongoing weed management and would not result in the introduction of *Lantana camara* to the site.

Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants - The proposed development would include ongoing weed management and would not result in the introduction or spread of exotic species to the site.

Loss of Hollow-bearing Trees – No hollow-bearing trees have been observed on the site.

Removal of dead wood and dead trees –The proposed development would result in the removal of dead wood and trees but is not considered to have a significant impact on habitat or resources in the study area.

Appendix D Matters of national environmental significance



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 02/02/18 18:00:06

[Summary](#)

[Details](#)

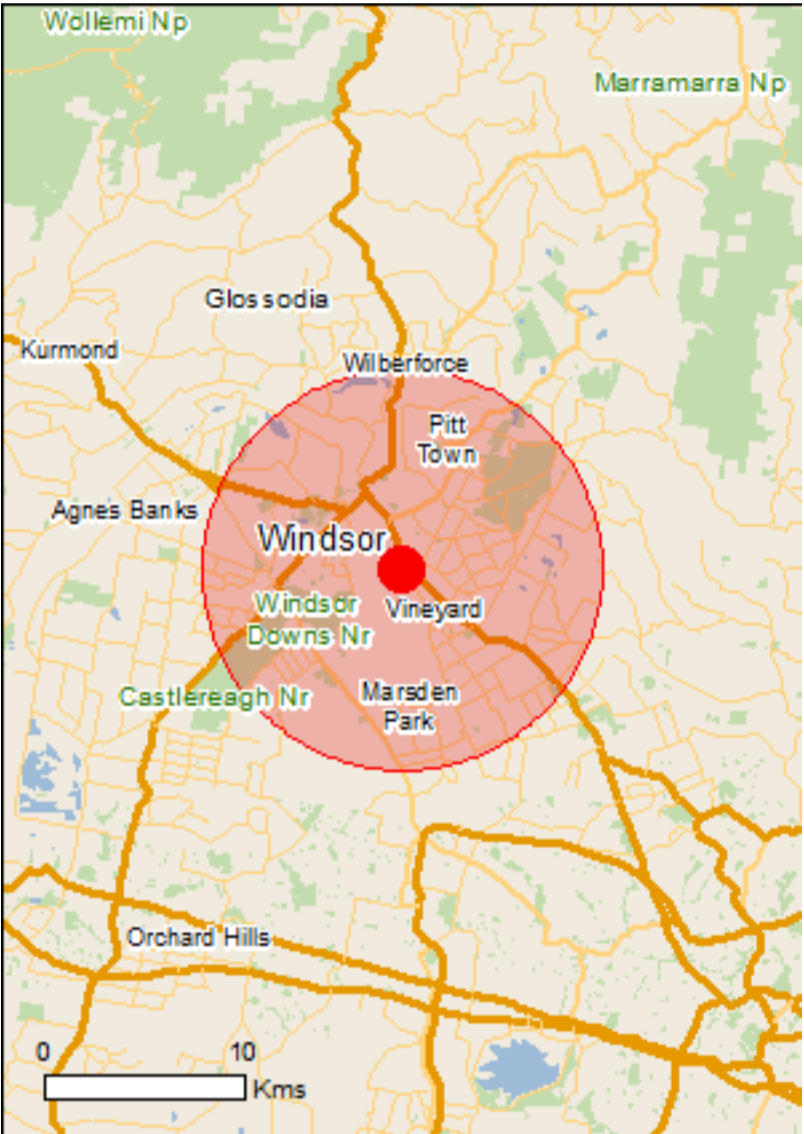
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

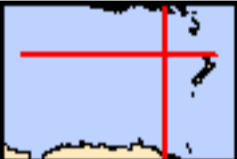
[Acknowledgements](#)



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[Coordinates](#)

[Buffer: 10.0Km](#)



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	70
Listed Migratory Species:	31

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	11
Commonwealth Heritage Places:	3
Listed Marine Species:	44
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	6
Regional Forest Agreements:	None
Invasive Species:	52
Nationally Important Wetlands:	2
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

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

Name	Status	Type of Presence
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community likely to occur within area

Listed Threatened Species

[Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Other		
Pommerhelix duralensis Dural Land Snail [85268]	Endangered	Species or species habitat known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area
Acacia gordonii [5031]	Endangered	Species or species habitat likely to occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina glareicola [21932]	Endangered	Migration route known to occur within area

Name	Status	Type of Presence
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat may occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat likely to occur within area
Micromyrtus minutiflora [11485]	Vulnerable	Species or species habitat likely to occur within area
Olearia cordata [6710]	Vulnerable	Species or species habitat likely to occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat may occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat known to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis pulchella Pretty Greenhood [6448]	Vulnerable	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat known to occur within area
Pultenaea parviflora [19380]	Vulnerable	Species or species habitat known to occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Zieria involucrata [3087]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		

Name	Threatened	Type of Presence
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur

Name	Threatened	Type of Presence
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		within area Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

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

Name
Commonwealth Land - Commonwealth Land - Airservices Australia Commonwealth Land - Australian Postal Corporation Commonwealth Land - Australian Telecommunications Commission Commonwealth Land - Defence Housing Authority Commonwealth Land - Telstra Corporation Limited Defence - HMAS NIRIMBA Defence - RICHMOND - FUEL FARM, DENTAL, MEDICAL Defence - RICHMOND - MIDDLE MARKER Defence - RICHMOND - OUTER MARKER Defence - RICHMOND RAAF BASE

Commonwealth Heritage Places	[Resource Information]
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Name	State	Status
Natural		
Shale Woodland Llandilo	NSW	Listed place
Historic		
North Base Trig Station	NSW	Listed place
RAAF Base Richmond	NSW	Listed place

Listed Marine Species	[Resource Information]
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* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Castlereagh	NSW
Cattai	NSW
Pitt Town	NSW
Rouse Hill	NSW
Scheyville	NSW
Windsor Downs	NSW

Invasive Species	[Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.	

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species

Name	Status	Type of Presence
Pinus radiata		habitat likely to occur within area
Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus densiflorus		
Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Protasparagus plumosus		
Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla		
Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus		
Gorse, Furze [7693]		Species or species habitat likely to occur within area

Reptiles
Hemidactylus frenatus
Asian House Gecko [1708]
Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Longneck Lagoon	NSW
Pitt Town Lagoon	NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-33.63455 150.83958

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact Us](#) page.

Appendix E Federal legislative considerations for threatened species

The *Significant Impact Guidelines 1.1* provide guidelines on determining whether a proposed action is likely to have a significant impact on a matter of national significance.

The assessment has been undertaken considering the impacts of the proposed development on the following species, listed on Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999*:

- *Litoria aurea* - Green and Golden Bell Frog;
- *Litoria littlejohni* - Littlejohn's Tree Frog;
- *Grantiella picta* - Painted Honeyeater;
- *Lathamus discolor* - Swift Parrot;
- *Rostratula australis* - Australian Painted Snipe;
- *Acacia pubescens* - Downy Wattle;
- *Allocasuarina glareicola*;
- *Micromyrtus minutiflora*;
- *Persoonia nutans* - Nodding Geebung;
- *Pimelea spicata* - Spiked Rice-flower;
- *Pterostylis gibbosa* - Illawarra Greenhood;
- *Pultenaea parviflora*;
- *Rhizanthella slateria* - Eastern Underground Orchid;
- *Pommerhelix duralensis* - Dural Land Snail;
- *Dasyurus maculatus maculatus* (SE mainland population) - Spot-tailed Quoll (southeastern mainland population);
- *Petauroides Volans* - Greater Glider;
- *Pseudomys novaehollandiae* - New Holland Mouse
- *Pteropus poliocephalus* - Grey-headed Flying-fox; and
- Cooks River /Castlereagh Ironbark Forest of the Sydney Basin Bioregion.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

...lead to a long-term decrease in the size of an important population of a species

The proposed action would not have a significant impact on any known important amphibian, avian, flora or mammalian population within the study area and is unlikely to lead to a long-term decrease in the size of an important population of these species.

...reduce the area of occupancy of an important population

The site is adjacent to areas of potential habitat and the proposed action is unlikely to reduce the area of occupancy for these populations.

...fragment an existing important population into two or more populations

The proposed action would not fragment any known important amphibian, avian, flora or mammalian population.

...adversely affect habitat critical to the survival of a species

No critical habitat would be adversely affected by the proposed activity.

...disrupt the breeding cycle of an important population

The site does not constitute significant breeding habitat. The proposed action is unlikely to significantly disrupt the breeding cycle of an important population of any species.

...modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The removal of a relatively small amount of habitat resulting from the proposed action is unlikely to result in a decline of any species.

...result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

The proposed action would include the management of weeds and invasive species and would not result in an increase in invasive species, including weeds that would be detrimental to any listed species.

...introduce disease that may cause the species to decline, or;

The proposed action would be conducted in such a way as to prevent the introduction or spread of disease that may cause the decline of any listed species.

...interfere substantially with the recovery of the species.

The proposed action would be limited to the site and would not interfere substantially with the recovery of any listed species.