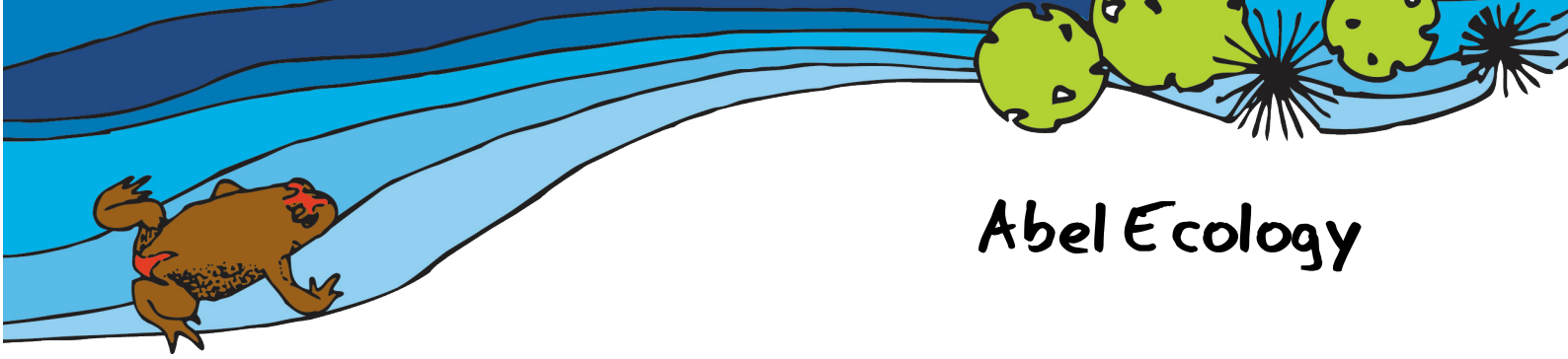

Abel Ecology

Prescribed Ecological Actions Report (PEAR)

for

Lot 36 DP 239502
100 Explorers Way, St Clair

Proposed aged care residential development

Prepared for:	**Principal Healthcare Finance Pty Limited**
Report No:	**AE20-2195-REP-DR-A**
Prepared by:	**Abel Ecology**
Date:	**10 June 2021**

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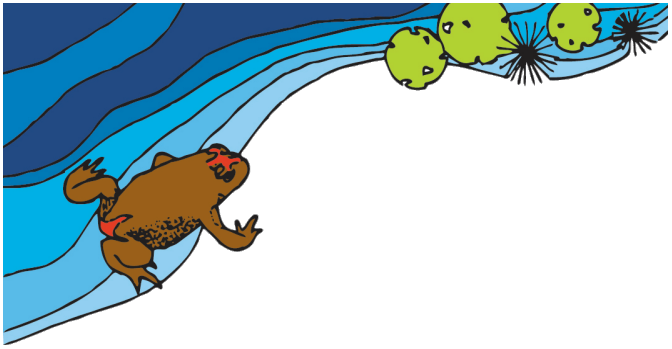

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I confirm that I have read the NSW Land and Environment Court Practice Note commencing on 14 May 2007, Division 2, Part 31 of the Uniform Civil Procedure Rules 2005 and the Expert Witness Code of Conduct in Schedule 7 to the Uniform Civil Procedure Rules 2005. I have prepared this advice in accordance with the requirements of the Practice Note and Code of Conduct and believe this report is consistent with the requirements of the Practice Note and the Code of Conduct. I agree to be bound by the Practice Note and Code of Conduct.

Document History

Report	Version	Prepared by	Technical Review by	Proofread by	Submission	
					Method	Date
Report	Draft A	Dr Danny Wotherspoon		Steven Smith	Dropbox	18 Dec20
Report	Issue 1	Dr Danny Wotherspoon		Jane Bonwick	Dropbox	18 Jun21

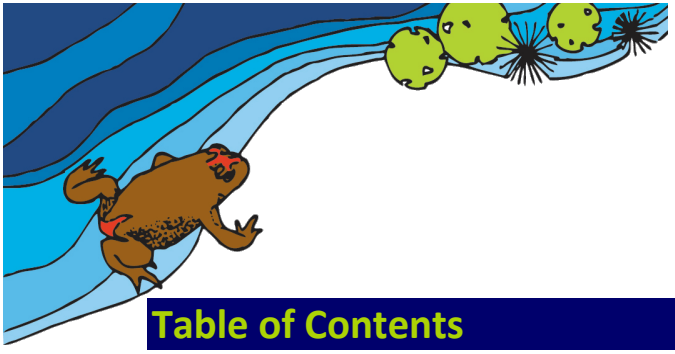
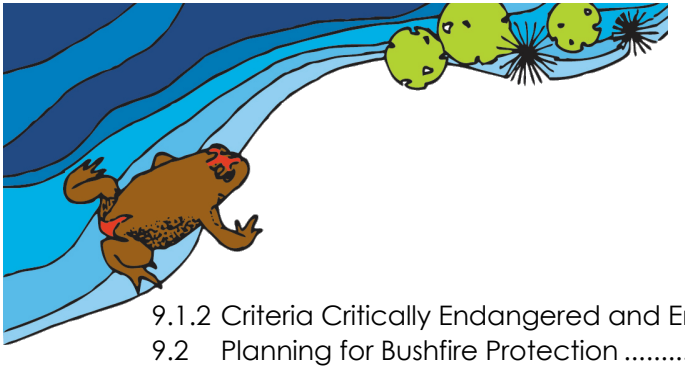


Table of Contents



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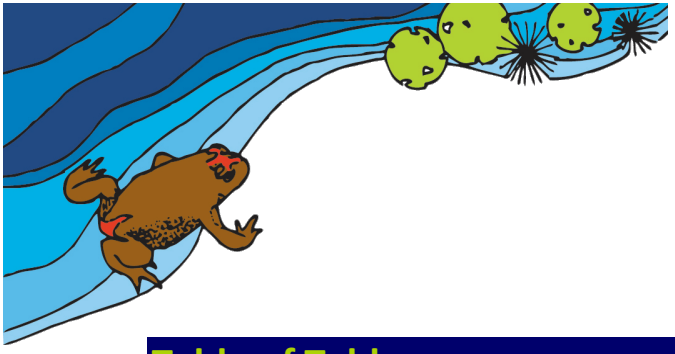


Table of Tables

List of Abbreviations

ALS	Actual Lot Size
BAM	Biodiversity Assessment Method
BC Act	Biodiversity Conservation Act 2016
BCR	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
EEC	Endangered Ecological Community
MLS	Minimum Lot size

Note regarding maps in this report

The diagrams/site maps used in this report have been supplied by and are used with the permission of the client.

With regard to maps provided by the Land Information Centre, Topographic maps used with the permission of © Land and Property Information, NSW.

Executive summary

The proposal is to demolish existing buildings, remove planted landscapes, clear remnant and regrowth native trees and construct an aged care residential complex.

A biodiversity survey was carried out at 100 Explorers Way St Clair to assess the likely impacts of the proposal on species and ecological communities present on the site, and whether the proposal requires a Biodiversity Development Assessment Report (BDAR) because it is a likely trigger to entry into the Biodiversity Offsets Scheme identified in s. 7.4 of the *Biodiversity Conservation Act 2016*.

This report also describes whether there is likely to be any significant effect on any endangered ecological community, endangered population, threatened species or their habitats, as per the listings in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) (Commonwealth legislation).

The areas to be affected are remnant and regrowth trees and mown herb layer vegetation.

The following three considerations are triggers for entry into the Biodiversity Assessment Method.

1. Threshold 1: The proposal does not exceed the clearing threshold area as described in clause 7.2 of the BC Regulation 2017.

2. Threshold 2: The proposal does not undertake clearing of native vegetation or any prescribed activities (clause 6.1 of the BC Regulation 2017) on land shaded in the Biodiversity Values Land Map

3. Threshold 3: The proposal is not likely to significantly affect any threatened species or Endangered or Critically Endangered Species.

There is no impediment to this proposal in the scope of this report. None of the three thresholds for entry into the Biodiversity Offsets Scheme are triggered by the proposal.
A report prepared using the Biodiversity Assessment Method is not recommended.

The provisions of the EPBC Act 1999 do not apply to this proposal and it does not require referral to the Commonwealth.

Recommendation:
A Biodiversity Development Assessment Report (BDAR) is not required.

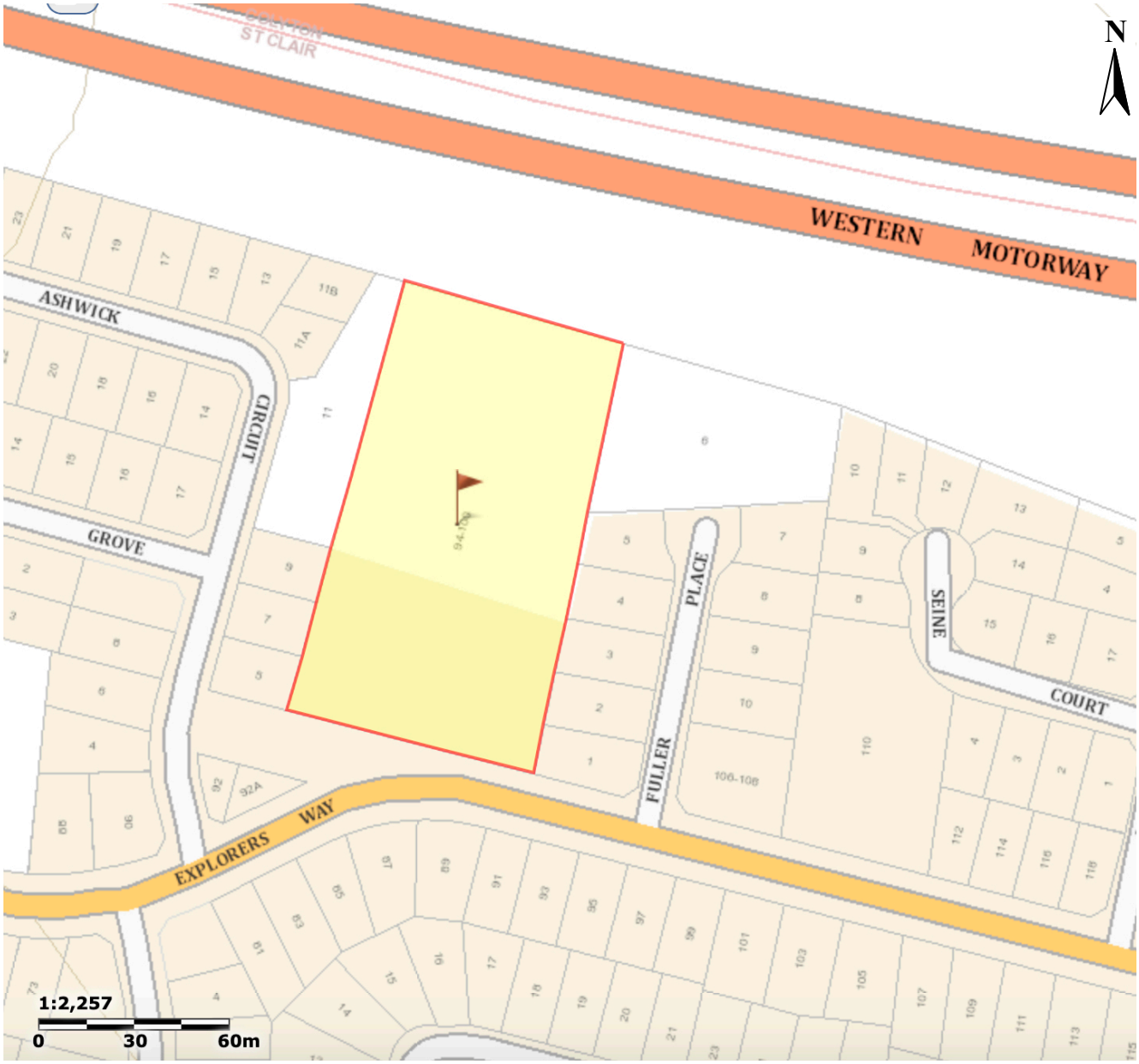


Figure 1. Locality map for 100 Explorers Way, St Clair.

Site location

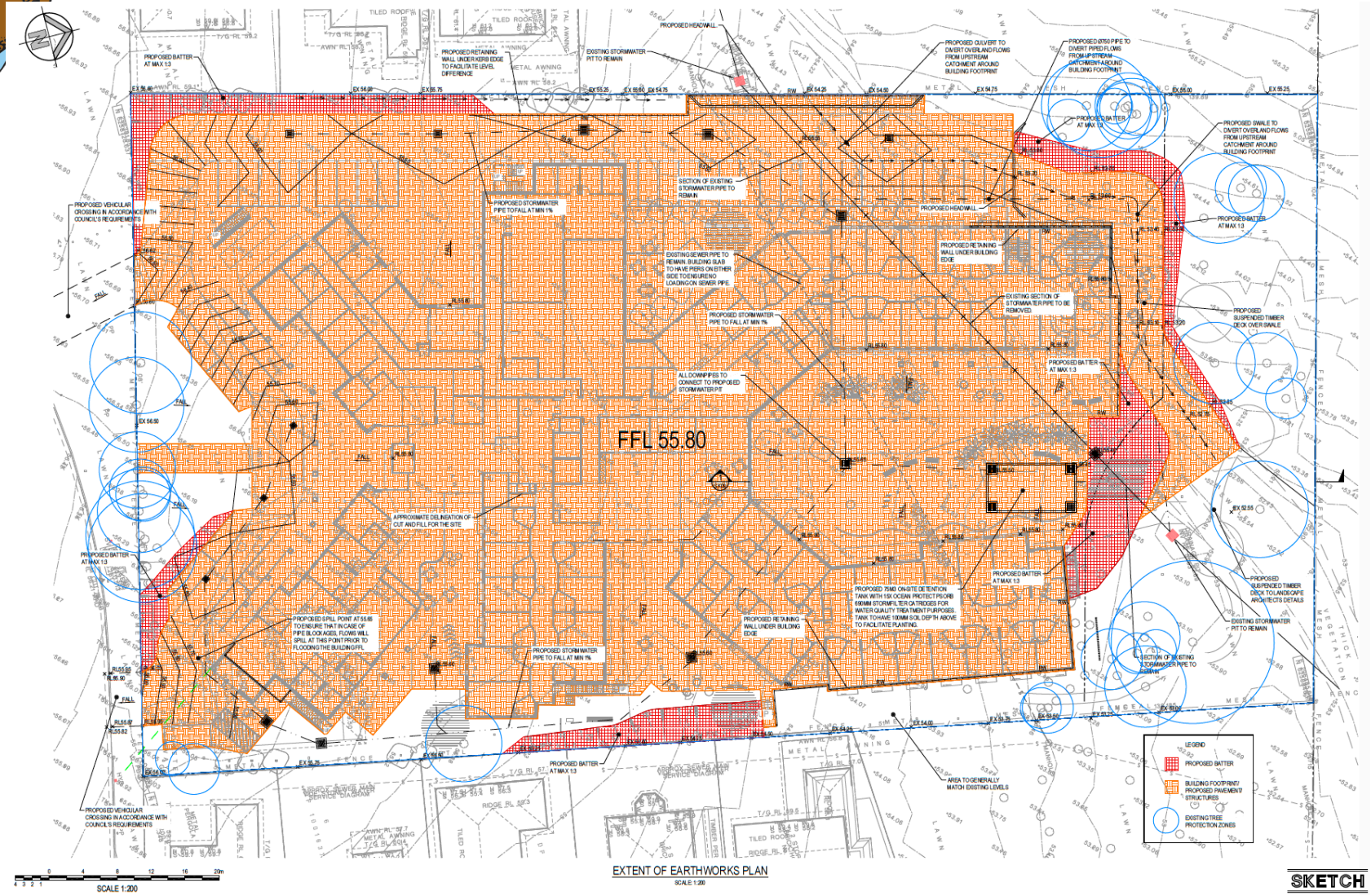


Figure 2. Area within site to be affected.

Figure 3. Aerial photo of the site and local area.

Key

Site location

N

Figure 4. Biodiversity values map.

Development site

https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

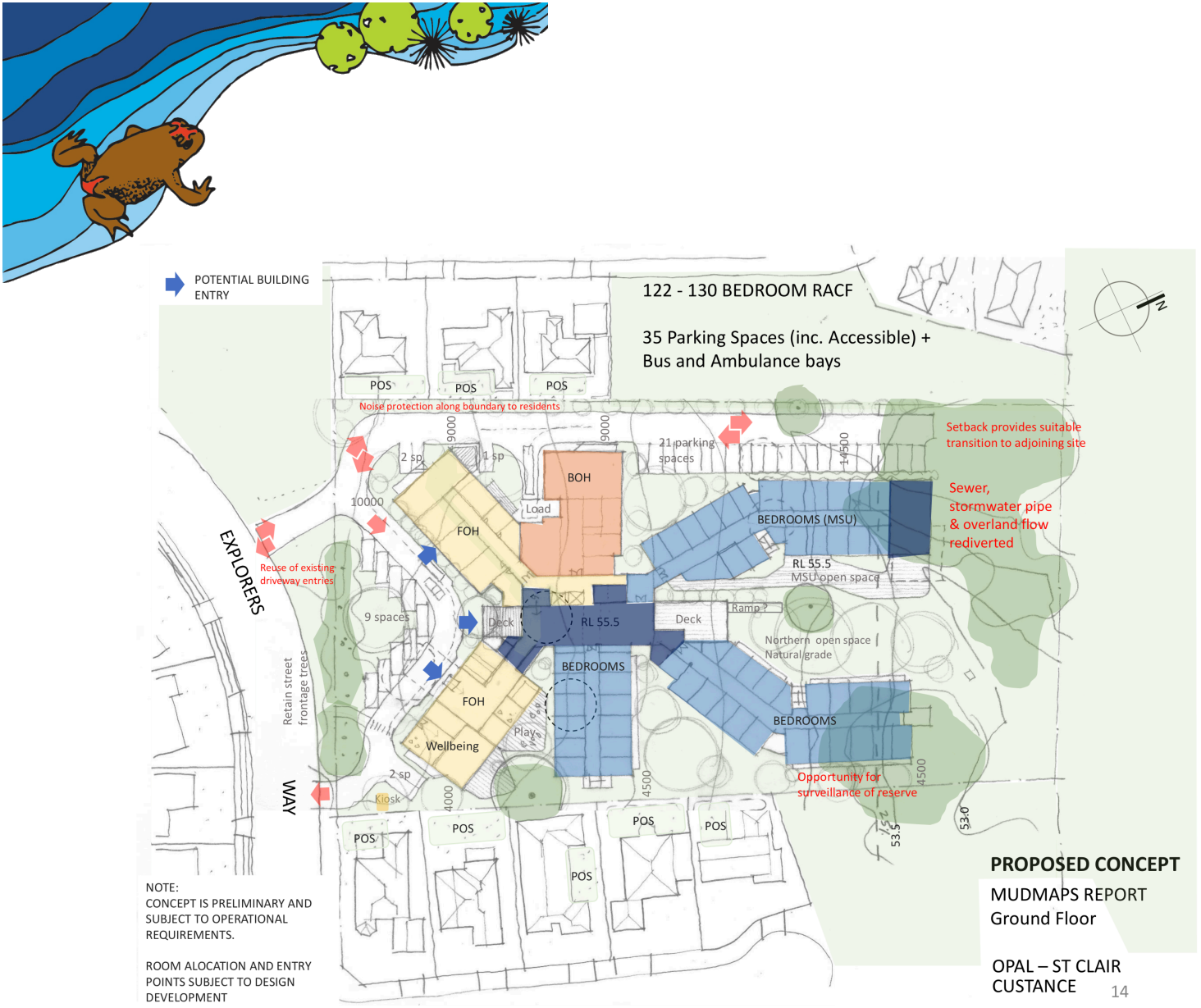


Figure 5. Proposal diagram.

Figure 6. Final Plan Diagram.

Figure 7. Site

1961 air photo.

Approximate site boundary

Source:
https://portal.spatial.nsw.gov.au/portal/apps/webappviewer/index.html?id=f7c215b873864d44bccddda8075238cb
27Jun1961.

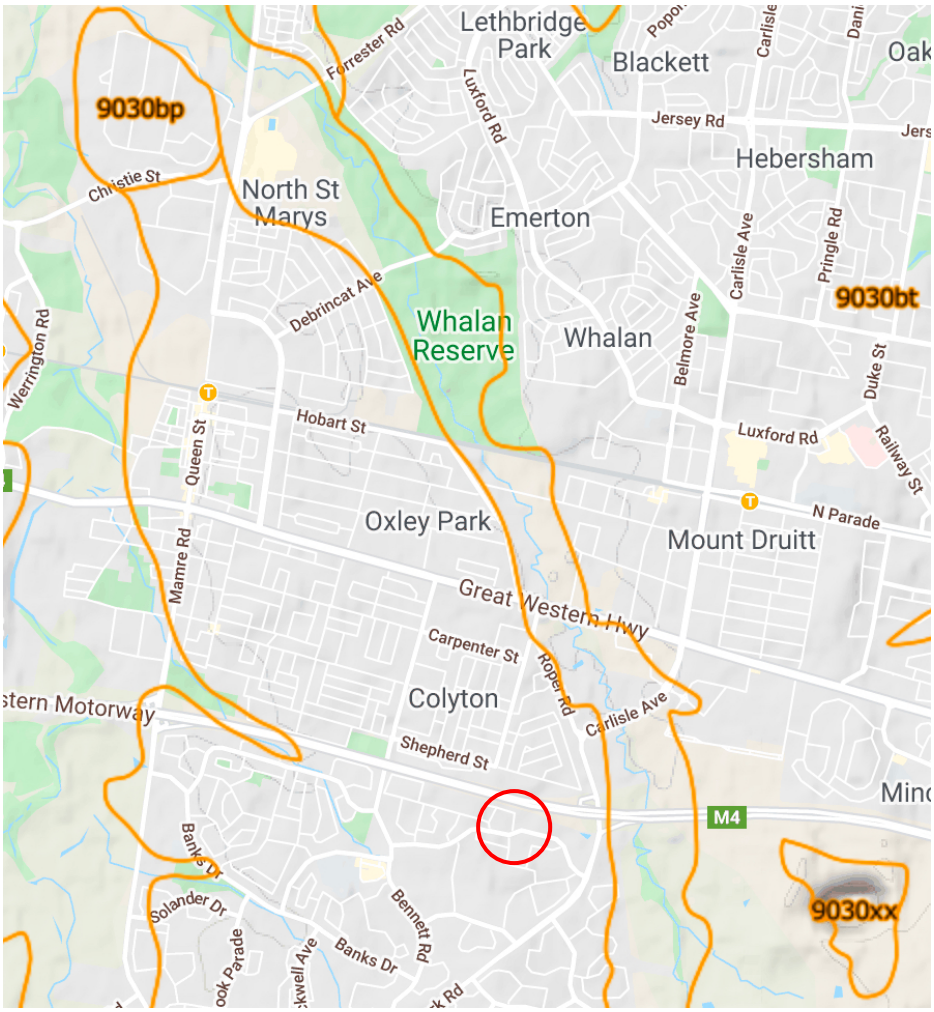


Figure 8. Soil Landscapes of site and surrounding area.

Map extract from the eSpade website: https://www.environment.nsw.gov.au/eSpade2WebApp

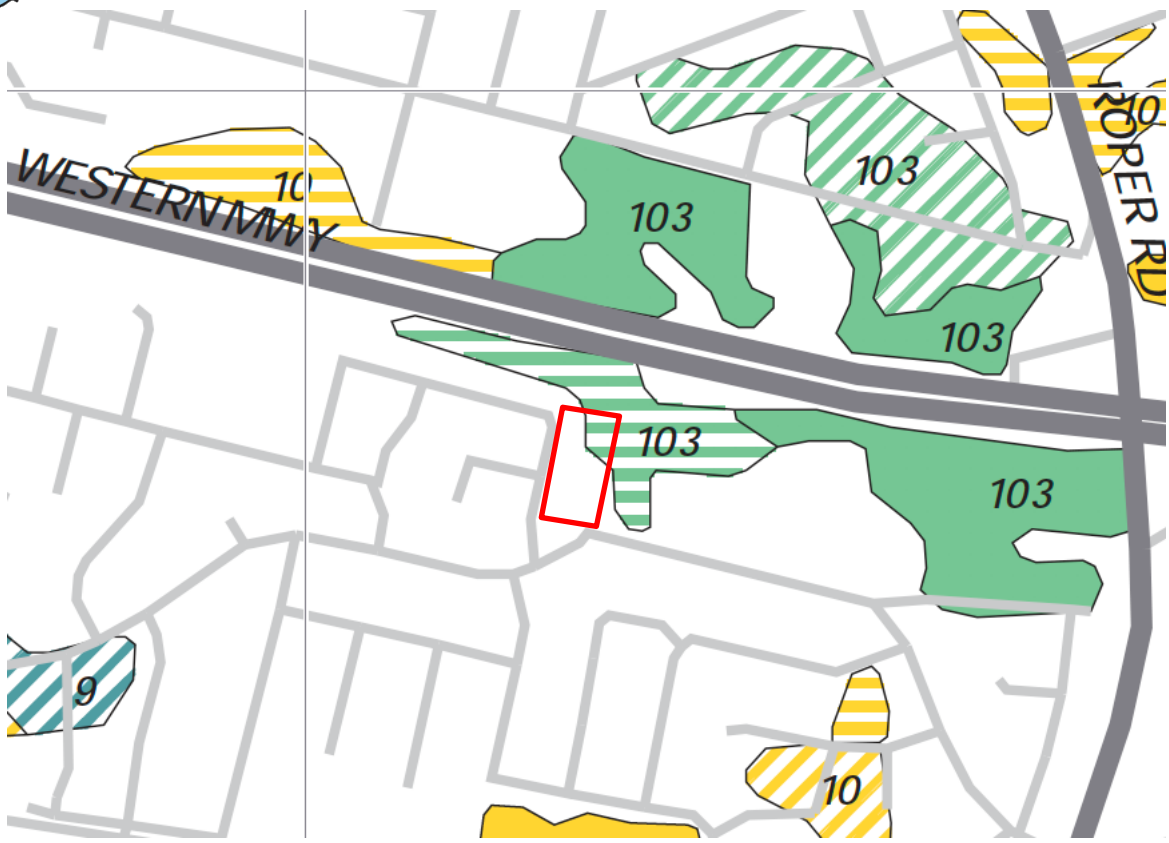
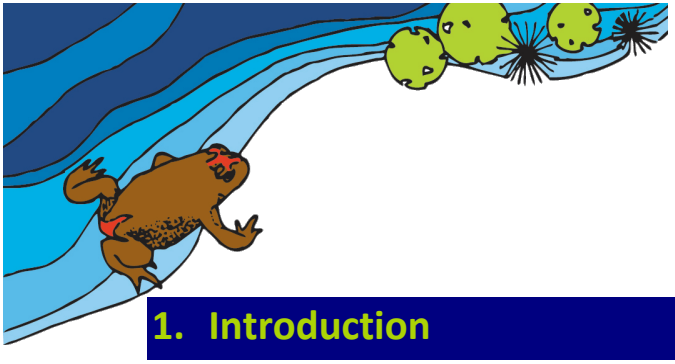


Figure 9. Vegetation map for the site.

Source: Native Vegetation of the Cumberland Plain. Map 12 of 16. Blacktown LGA. (NPWS 2002).



1. Introduction

1.1 Legislative context

This Prescribed Ecology Actions Report meets the requirements of the *Biodiversity Conservation Act 2016* to enable a Council or other consent authority to assess a proposed development under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The authority must consider the following three Biodiversity Offset Scheme Development Thresholds:

Threshold Trigger 1: Exceeding the clearing threshold on an area of native vegetation

Threshold Trigger 2: Development or a prescribed activity is carried out on land included in the Biodiversity Values Land Map.

Threshold Trigger 3: A "significant effect" on threatened species or ecological communities

A biodiversity survey of the proposed development site at 100 Explorers Way St Clair ('the site' – Figure 1) was undertaken on 20 October 2020. A previous survey of the site on 17th and 24th April 2015 provided additional data used in this report. This Prescribed Ecology Actions Report investigates whether the impacts of proposal to construct an aged care residential development will trigger any of the three thresholds to entry into the Biodiversity Offsets Scheme, thereby requiring a Biodiversity Development Assessment Report.

This assessment addresses both 'endangered' and 'vulnerable', as required by the Biodiversity Conservation Act 2016 (BCA 2016). Throughout this report 'threatened' refers to those species and communities listed as 'endangered' or 'vulnerable' in Schedules 1 & 2 of the BC Act 2016.

If any of the three thresholds are triggered, then a Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor for the Authority to issue a consent or an approval and a calculation of offsetting required.

1.2 The proposal

The proposal (Figure 2) is to clear the site and construct buildings and consists of:

a) buildings
b) driveways
c) outdoor living and landscape areas
d) link up to sewage system
e) clearing native vegetation 1,500 m^2
f) bushfire asset protection zones
g) utilities within the lot.

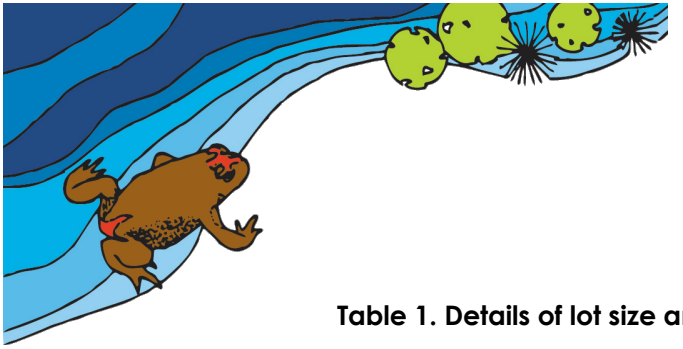


Table 1. Details of lot size and size of proposed native vegetation clearing.

Component of site	Area m²	Proportion of the site %
Whole site	10,000	100
Extent of proposed native vegetation clearing	1,507 m²	15

OPAL ST CLAIR- TREE CANOPIES CALCULATION

	Tree Canopy	Area(m2)
TREE REMOVE		
	T109	35.35
	T108	74.79
	T107, T106 Co-joined Canopy	54.29
	T29, T30, T31, T32, T33 Co-joined Canopy	62.39
	T11, T12 Co-joined Canopy	10.45
	T113, T76, T75 Co-joined Canopy	39.05
	T72	4.49
	T77, T78, T93, T94, T95, T96, T97, T98, T99, T100,T101, T102, T103, T104, T105 Co-joined Canopy	422.13
	T83, T84 Co-joined Canopy	2.17
	T27, T28 Co-joined Canopy	78.33
	T25	122.47
	T23, T24 Co-joined Canopy	28.75
	T7- T16, T20, T21, T22 Co-joined Canopy	239.81
	T34, T35, T36, T37, T40, T41, T42, T43, T44, T45, T46, T47, T48, T50, T58, T62, T63, T64, T65, T66, T67, T68, T69 Co-joined Canopy	332.65
	Total:	1507.12
TREE RETAINED		
	T1, T2 Co-joined Canopy	38.95
	T3, T4, T5, T6 Co-joined Canopy	70.1
	T17, T18, T114 Co-joined Canopy	27.14
	T26	30.33
	T38, T39 Co-joined Canopy	17.42
	T49, T51, T52, T54, T55, T56, T57 Co-joined Canopy	169.39
	T70	37.69
	T71, T73, T74 Co-joined Canopy	102.94
	T79, T80, T81, T82, T85, T86, T87, T88, T89, T90, T91, T92 Co-joined Canopy	282.45
	ToTal:	776.41
TOTAL OF EXISTING TREE CANOPIES		2283.53

Note: TREE CANOPIES CALCULATED UPON ACTUAL CANOPY SHAPE+ AREA WITHIN SITE BOUNDARY, EXCLUDES WHERE CANOPY REMOVED IS UNDER CO-JOINED WITH CANOPY OF TREE RETAINED THAT WILL REMAIN

1.3 Sources of information used in this assessment

Literature reviewed in order to assess possible issues relating to this site include:
Air photo (SIX maps, NearMap)
Survey map (Henry & Hymas)
Vegetation map (Blue Mountains Council, Cumberland Plain/Tozer et al., 2010/Benson) etc
Schedules to the BC Act 2016
Schedules to the EPBC Act 1999

OEH Atlas of NSW Wildlife.

Other biodiversity survey reports in the local area, including:

Wotherspoon, A. D. (2004). SULE Report for 80-82 Newton Road, Blacktown, Proposed Townhouses. Faulconbridge, Blue Mountain Wilderness Services Pty. Ltd.

Abel Ecology (2008) *Site tree inspection report for cnr St Mary's and Richmond Roads, Berkshire Park*, Abel Ecology, Faulconbridge.

Abel Ecology (2009). Vegetation Management Plan for Light Horse Business Centre, Archbold Road, Eastern Creek, for Proposed Resource Recovery and Landfill Facility. Faulconbridge, Abel Ecology.

Abel Ecology (2009). Statement of Environmental Effects for Glenwood Reserve, Blacktown, Proposed playing field construction. Faulconbridge, Abel Ecology.

Abel Ecology (2010). Flora and Fauna constraints report for Blacktown Hospital. Faulconbridge, Abel Ecology.

Abel Ecology (2011). Seven-part test for Cumberland Plain Woodland at Blacktown Hospital. Faulconbridge, Abel Ecology.

Abel Ecology (2012). Safe Useful Life Expectancy tree report for proposed new clinical building at Blacktown Hospital. Springwood, Abel Ecology.

Abel Ecology (2012). Flora and fauna assessment report for Tregear Reserve, Blacktown, Proposed drainage line installation. Springwood, Abel Ecology.

Abel Ecology (2015). Flora and fauna assessment report for 94-100 Explorers Way, St Clair. Lot 36 DP 239502. Proposed residential subdivision, Abel Ecology Pty Ltd, Springwood, NSW.

2. Biodiversity offsets scheme thresholds 1 and 2

2.1 Threshold One: Biodiversity Conservation Regulation 2017 Development area assessment thresholds

Clearing of native vegetation is declared by clause 7.2(1) to exceed the biodiversity offsets scheme threshold if the area proposed to be cleared is the area set out in Column 2 of the Table to that clause (Table 2 below) opposite the minimum lot size applicable to the land to be cleared in Column 1 of that Table.

Clearing of native vegetation will trigger entry into the offsets scheme if clearing is greater than the assessment threshold. To determine the correct threshold from Table 2 below, the appropriate minimum lot size of land must be selected. The minimum lot size of land can be found on the NSW planning portal https://www.planningportal.nsw.gov.au/find-a-property/property/.

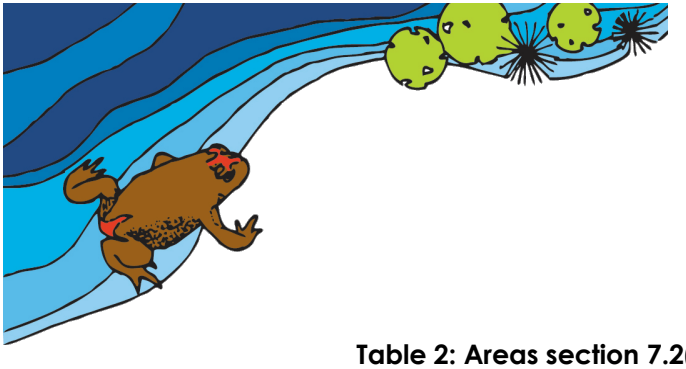


Table 2: Areas section 7.2(4) Biodiversity Conservation Regulation 2017.

	Land to be considered	Assessment threshold
	Minimum lot size of land	**Area of clearing**
A	Less than 1 hectare	0.25 hectare or more
B	Less than 40 hectares but not less than 1 hectare	0.5 hectare or more
C	Less than 1,000 hectares but not less than 40 hectares	1 hectare or more
D	1,000 hectares or more	2 hectares or more

The size of the lot is approximately 10,569.5 m^2, with minimum lot size 550 m^2, and row A is appropriate for this proposal. The area of clearing, being 1,507 m^2, is less than the threshold of 0.25 hectares.
The parcel of land is zoned R2 and the minimum lot size for this lot is 550 m^2.

Conclusion
The proposed clearing does not exceed the threshold and entry into the BC Act offset scheme is not required as a result of clearing.

2.2 Threshold Two: Clearing or prescribed activities as listed in the Biodiversity Conservation Regulation 2017 on land included on the Biodiversity Values Map

No part of the site is included on the Biodiversity Values Map (Figure 4). Threshold two is not breached.

3. Landscape features of the site and the locality

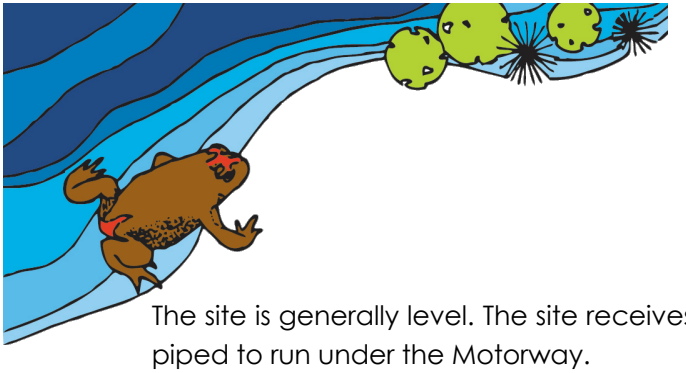
3.1 Site description

For the purpose of this report the site is defined as Lot 36, DP 239502, 94-100 Explorers Way, St Clair (Figure 1). It is approximately 1.06ha in size and the elevation is approximately 60m above sea level.

https://www.planningportal.nsw.gov.au/find-a-property/

Domestic garden plantings include various edible fruit bearing trees, being pomegranate, citrus, stone fruit trees. Lawns are composed of a mix of low-growing herbaceous local natives, common couch, and kikuyu.

The Western Motorway (M4) is immediately north of the site, and residential properties occur west, east and south.



The site is generally level. The site receives water runoff from the Western Motorway. Local drainage is piped to run under the Motorway.

Stormwater on site runs across the site to the northeast corner and then under the Motorway. Part of the drainage line becomes waterlogged and holds water in times of high rainfall.

Adjacent land to the east is zoned RE1 Public Recreation and to the north SP2, being the motorway.

The vegetation is described in detail in Section 5 below.

3.2 History of the site

The site is an old subdivision that has been cleared of understory vegetation. Exotic grasses such as Common Couch have spread across the site and the former herbaceous layer has been maintained as a mown lawn.

3.3 Geology

The geology on the site consists of Triassic deposits, in the Wianamatta Group, of sandstone and shale (Brunker *et al*., 1967).

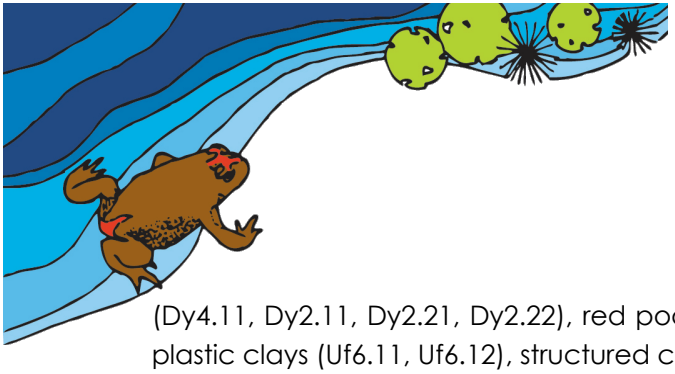
The soils of this landscape (Figure 8) are the result of three depositional phases of Tertiary alluvial/colluvial origin. The lowest deposit is the St Marys formation.
This is overlain by the Rickabys Creek gravel formation which is of varying thickness and, in turn, is topped by the Londonderry Clay formation. All of these formations are derived from sandstone and clay. Erosion of the surface has led to exposure of all three formations in different locations.

Topography
Flat terrace tops dissected by present day small drainage channels and narrow drainage lines. Small remnant surfaces occurring to the east and south are at a slightly higher elevation (approximately 20 m).

https://www.environment.nsw.gov.au/eSpade2WebApp

3.4 Soils

9030bp Berkshire Park (Figure 8)
Soils—weakly pedal orange heavy clays and clayey sands, often mottled. Ironstone nodules common. Large (up to 20 cm) silcrete boulders occur in sand/clay matrix. Solods (Dy3.41), yellow podzolic soils



(Dy4.11, Dy2.11, Dy2.21, Dy2.22), red podzolic soils (Dr4.11), chocolate soils (Dr4.11, Dr4.61), structured plastic clays (Uf6.11, Uf6.12), structured clays (Uf5.23, Gn4.11 and Gn3.11).

The site has been largely cleared since before 1961 (Figure 7) and graded so most of the site has disturbed soil. https://www.environment.nsw.gov.au/eSpade2WebApp

3.5 Landscape features

3.5.1 Site landscape features

The following landscape features are present on the site (Table 3).

Table 3. Site landscape features.

Vegetation	The entire site has been mown, cleared or disturbed since at least 1961. There are remnant local native trees and some landscape and garden planting.
Non-native vegetation	The landscape has potential for foraging habitat for threatened species of bats and birds.
Human structures	Buildings to be demolished have / some/ very little potential as bat roosts.
Wetlands/dams/watercourse	There is no watercourse on the site. Drainage is by overland flow, with impeded drainage forming a pond on the northern boundary.
Karst, caves, crevices and other geological features of significance	None present
Roads	Vehicle traffic and road mortality - No road kill was observed on the site.

4. Field survey methods

4.1 BioNet Atlas of NSW Wildlife website search

Records from the BioNet Atlas of NSW Wildlife website were accessed using the following search criteria:

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -33.74 West: 150.75 East: 150.85 South: -33.84] recorded since 01 Jan 2010 until 21 Oct 2020 returned a total of 771 records of 31 species.

These species (Table 4) were considered in designing field survey targets and methods. Unsuitable candidates were eliminated on the basis of habitat requirements (Appendix 4 and Appendix 5).

Threatened species recorded in the locality, being within a 5km radius of the site, include both flora (Table 4) and fauna (Table 5).

Table 4: Locally occurring threated species flora.

Scientific Name	Common Name	NSW status	Comm. status
Marsdenia viridiflora subsp. viridiflora	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	E2	
Dillwynia tenuifolia		V,P	
Pultenaea parviflora		E1,P	V
Acacia pubescens	Downy Wattle	V,P	V
Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	V,P	
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V,P	V
Persoonia nutans	Nodding Geebung	E1,P	E
Pimelea spicata	Spiked Rice-flower	E1,P	E

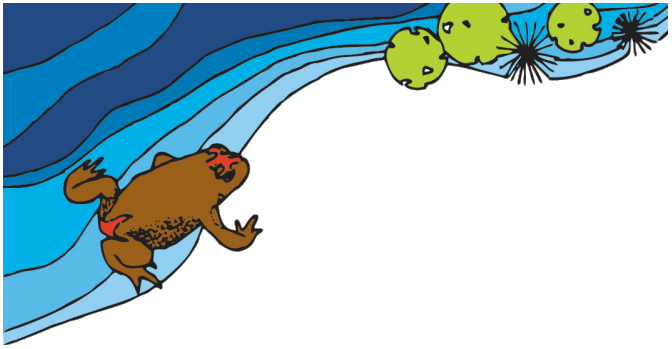
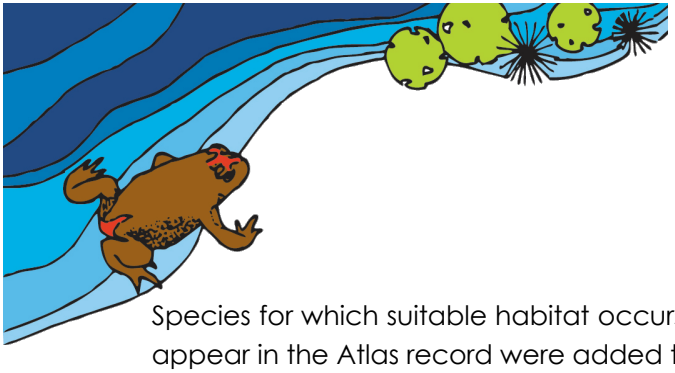


Table 5: Locally occurring threatened species fauna.

Scientific Name	Common Name	NSW status	Comm. status
Litoria aurea	Green and Golden Bell Frog	E1,P	V
Ixobrychus flavicollis	Black Bittern	V,P	
Lophoictinia isura	Square-tailed Kite	V,P,3	
Rostratula australis	Australian Painted Snipe	E1,P	E
Glossopsitta pusilla	Little Lorikeet	V,P	
Lathamus discolor	Swift Parrot	E1,P,3	CE
Ninox strenua	Powerful Owl	V,P,3	
Tyto novaehollandiae	Masked Owl	V,P,3	
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P	
Phascolarctos cinereus	Koala	V,P	V
Petaurus australis	Yellow-bellied Glider	V,P	
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P	
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P	
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P	
Myotis macropus	Southern Myotis	V,P	
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P	
Miniopterus australis	Little Bent-winged Bat	V,P	
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P	
Meridolum corneovirens	Cumberland Plain Land Snail	E1	



Species for which suitable habitat occurs on the site within the range of the species but which did not appear in the Atlas record were added to Appendix 4 and Appendix 5.
Targeted surveys were not made for threatened species (Table 4, Table 5) due to lack of habitat.

4.2 Field work effort

In 2015, over the 2 days of fieldwork, a total of 19.33 hours were spent undertaking survey work on the site and surrounding habitat areas.

Table 6. Survey dates and weather conditions.

Date	Times	Weather (˚C)	Task	Hours (hrs x no. people)
17 Apr 15	9:00 – 16:15, 10:00 – 16:15	19˚C, overcast, raining	Tree survey Flora and Fauna	(7.25 + 6.25) = 13.5
24 Apr 15	9:20 – 13:40 10:30 – 12:00	24˚C, still, fine, sunny	Tree survey Flora and Fauna	(4.33 + 1.5) = 5.83
			Total	**19.33 hours**

Over the one day of fieldwork a total of two hours in 2020 were spent undertaking survey work on the site and surrounding habitat areas.

Table 7. Survey dates and weather conditions.

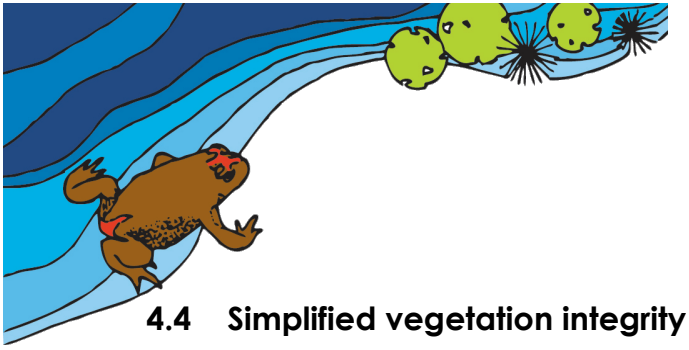
Date	Time	Temperature (°C)	Task	Hours (hrs x no. people)
20 Oct 20	1200- 1400	18 overcast, raining	Vegetation and fauna survey	2 x 1 = 2

Survey effort was concentrated within the site boundaries, although adjacent surrounding vegetation was noted (Figure 3).

4.3 Flora survey method, vegetation community and habitat classification

Vegetation quality is assessed as described below (Section 4.4). The plant community/communities on site were classified according to the NSW VIS.

A flora survey was conducted to compile vegetation descriptions and species lists for the site. A random walk was conducted over the site to compile a plant species list (Cropper 1993). As the site is predominantly mown lawn. Additionally, three ground level quadrats of 1m x 1m (Table 11) were sampled in 2015 to include information to indicate the vegetation community for the plant herb layer. No threatened flora species were recorded on site.



4.4 Simplified vegetation integrity assessment

On-site vegetation may be described according to a simplified vegetation integrity classification for each vegetation zone / habitat type. The simplified vegetation integrity assessment is based upon a modified version of the vegetation integrity assessment described in the NSW Biodiversity Assessment Method (BAM) 2017. This simplified assessment is based upon a qualitative assessment; no quantitative assessment was undertaken and no vegetation integrity score is calculated.
The assessment requires the assessor to compare the observed vegetation with the vegetation type presumed to be present prior to 1750 (high quality native vegetation). Vegetation with good or moderate integrity usually provide higher quality habitat for a diverse range of indigenous species.

Four main qualitative classes of vegetation integrity are recognised. There is variation within each class, and in addition the class boundaries are somewhat fluid where one grades into the other.

Good integrity vegetation
Characteristics: Relatively high indigenous species diversity, diversity of flora species growth form (mix of trees, shrubs and groundcovers etc), diversity of tree size, canopy layer regeneration observed, fallen logs present on the ground, dead vegetative litter (leaves, twigs etc) cover present, weed invasion absent or minimal

Moderate integrity vegetation
Characteristics: Remnants and regenerating areas that have experienced disturbance but appear to retain the capability of recovery. Weed invasion may be moderate.

Poor integrity vegetation
Characteristics: The vegetation is highly disturbed. It typically consists of scattered trees/shrubs or clumps of trees and shrubs. Tree size diversity significantly reduced. The groundcover layer is comprised of a mix of indigenous species and exotic species. Fallen logs rare to absent, ground vegetative litter lacking.

Cleared class
Characteristics: Indigenous canopy species are absent and the indigenous understorey (shrubs/climbers/scramblers/groundcovers) are approximately less than 50%.

Note: some vegetation types naturally lack some of the characteristics. For example, trees are rare to absent in saltmarshes, sedge swamps, alpine herbfields and arid shrublands. However, providing the other characteristics are consistent with a natural undisturbed area of the same vegetation type then these vegetation types are classified as having "good integrity".

4.5 Fauna survey method

The methods of survey undertaken to detect the various faunal groups or their habitat are outlined below. Locations for specific survey methods are shown in Figure 6. Targeted surveys were made for threatened species based on records of sightings from the BioNet Atlas website, and the Ecologist's knowledge.

The condition and location of the site are such that no targeted fauna survey was required for most species in the wider locality. However, a hand search for Cumberland Plain Land Snail was made.

Dates, weather and temperatures of all fieldwork were recorded and are tabulated in Table 7 above.

4.5.1 Diurnal fauna searches

Searching, opportunistic observations and call recording provides an indication of types of species using a site. These methods are used to identify and record live animals, or record indirect evidence of animal presence on the site. On occasions, specific surveys may be conducted for a targeted group or species, such as searching the margins of a dam for frogs. Generally though, birds, reptiles, frogs and mammals, or evidence of them, may all be present in the same habitat at the time of survey, therefore searching for these faunal groups is generally run concurrently. This involved:

a) Searching shelter sites, basking sites, opportunistic observation, and assessment of shelter site diversity suitability for reptiles.
b) Searching shelter sites, calling sites, egg deposition sites, spotlighting and triangulation on calling males for frogs.
c) Opportunistic observations and identification of calls of species, and search for indirect evidence such as nests, feathers, scratchings and feeding signs for birds.
d) Searching for indirect evidence, such as diggings, droppings, runways and burrows, and opportunistic observations for mammals.
e) Searching for Cumberland Plain Land Snail by combing leaf litter with a metal rake, and turning building materials lying on the ground (2015).

While rigorous surveys are likely to find more species, high species richness for birds can be recorded in a relatively short amount of time. Bird surveys are used as a simple indicator of other parameters, such as biodiversity and the functioning of the ecosystem.

4.6 Species likely to occur

Species to be listed as 'likely to occur' or 'expected' (see Appendix 3), are common species generally found in the region, which are likely to occur on site if suitable habitat is present.

Native flora may include species local to the area (occurring in local remnants). Structure and species composition will depend upon locally occurring communities.

Expected species are common and, by definition, are not threatened species.

4.7 Limitations of the survey

This survey was conducted in the spring season. This was not suitable for winter migrants or species of winter-flowering orchids that lose their aerial stems after fruiting.

The weather conditions were cool, overcast and rainy.

This was not suitable for reptiles.
Species that may use the site were not detected during the survey for the following reasons:

a) The species was present during the survey but was not detected due to dormancy, inactivity or cryptic habits.
b) The species use the site at other times of the year, but was not present during the survey due to being nomadic or migratory.

4.8 Staff associated with the field work

Table 8. Staff associated with field work and analysis of field work 2020.

Name	Field work	Analysis of field work
Dr Danny Wotherspoon	Vegetation and fauna survey	Dr Danny Wotherspoon

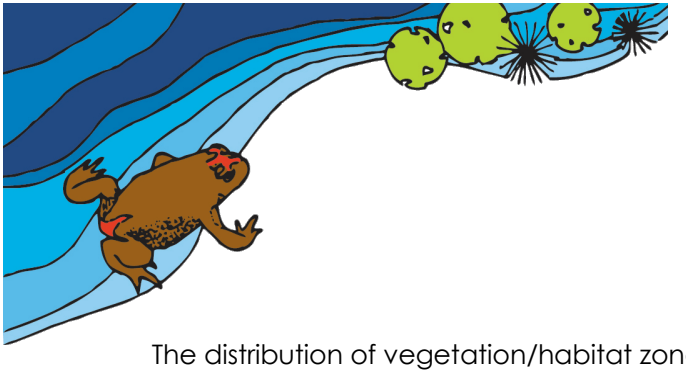
5. Survey Results: Vegetation and habitat description

5.1 Site vegetation and habitat

The site was originally cleared of understory vegetation for residential use. Some indigenous trees have been retained and the ground has been maintained as a mown lawn. Native creepers and some low herbaceous species continue to grow on the site, however the majority of native species have been removed.

Dense stands of Melaleuca trees and several eucalypts exist on the northern half of the site. The site is fenced, however the canopy loosely connects with planted native vegetation adjacent to the motorway.

The southern half of the site was used for sheds, a house, gravel driveways and on site effluent disposal.



The distribution of vegetation/habitat zones on the site and surrounding areas is shown in Figure 9.

No potential habitat trees of were observed on the site.

There is generally a lack of fallen logs and dead wood or coarse woody debris.

Other site habitat characteristics are described below.

Appendix 1 shows the list of flora found on the site.

Important habitat features that have significance for fauna occupation of the site are discussed below (Table 3). These include both site disturbance and natural features.
Important habitat features that have significance for fauna occupation of the site are discussed below (Table 3). These include both site disturbance and natural features.

Table 9. Significant features and observations for the site.

Significant features	Observations
Frequency of large trees (approx. > 80 cm DBH)	Rare
Tree regeneration and Tree stem-size diversity	Tree regeneration appears absent.
Logs, woody debris and litter cover	Logs, woody debris and leaf litter – absent.
Food resources	Eucalyptus and Melaleuca provide food resources of blossoms and seeds. Shrub layer is absent and herb layer is mostly exotics.

The vegetation community is: Shale Gravel Transition Forest, as tree canopy species, with no shrub layer. The herb layer is more than 95% weeds.

The vegetation is classified as poor integrity vegetation.

No threatened species were observed.

The site contains a mix of remnant native trees, endemic herb species, exotic and native weeds, and exotic trees (Appendix 1). Of the 49 herb species on site there are 17 local native species (35%) and 32 weed species (65%). There is a total of 24 native species on site of which ten species are indicators of Shale Gravel Transition Forest (Tozer *et al.* 2010, page 623). For the purpose of this report, common couch *Cynodon dactylon* is regarded as a local native species as per the NSW Royal Botanic Gardens Herbarium.

http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&search=yes&namesearch=cynodon+dactylon&dist=

The composition of the herb layer is less than 50% native species by cover and by composition, with three species of 13 recorded (13%) in three 1m^2 quadrats (Table 10).

Table 10: Herb layer quadrat species list.

Species	Quadrat A	Quadrat B	Quadrat C
Conyza bonariensis*			X
Cynodon dactylon	X		
Cyperus gracilis		X	
Digitaria sanguinalis*			X
Ehrharta erecta*		X	X
Einadia trigonos		X	
Paspalum dilatatum*	X		
Pennisetum clandestinum*	X		
Sida rhombifolia*		X	X
Soliva sp.*	X		
Taraxacum officinale*	X		X
Verbena bonariensis*	X		
Veronica sp.*	X		

The majority of trees on the site occur in stands on the north side of the site. These trees are predominantly *Melaleuca decora*. The overall condition and vitality of these close-growing trees is adversely affected by the canopy competition that occurs between them. Little or no recruitment of new trees within the *Melaleuca* stands has occurred due to understory clearing. The trees that were not originally cleared along with the shrub layer have grown tall and thin, typically without branches in the lower canopy.

The vegetation community on site is disturbed but appears to best match the ecological community Shale Gravel Transition Forest in the Sydney Basin Bioregion. The patch of Shale Gravel Transition Forest on site is of "poor" vegetation quality, mapped as TX or TXR (Figure 9).

Appendix 1 shows the list of flora found on the site.

The site contains a mix of remnant native trees, endemic herb species, exotic and native weeds, and exotic trees. Of the 49 herb species on site there are 17 local native species (35%) and 32 weed species (65%). There is a total of 24 native species on site of which ten species are indicators of Shale Gravel Transition Forest (Tozer *et al.* 2010, page 623). For the purpose of this report common couch *Cynodon dactylon* is regarded as a local native species as per the NSW Royal Botanic Gardens Herbarium.

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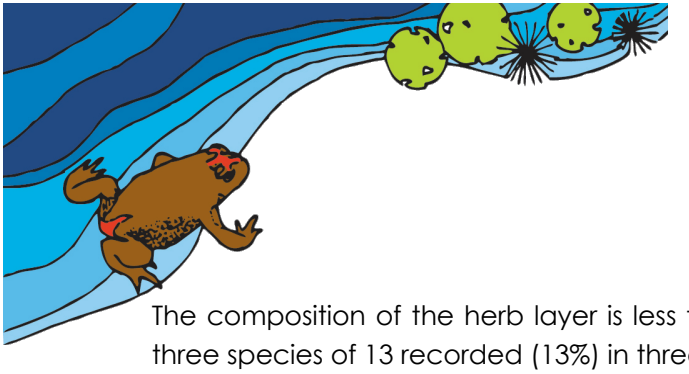


The composition of the herb layer is less than 50% native species by cover and by composition, with three species of 13 recorded (13%) in three 1m^2 quadrats (Table 10).

Table 11: Herb layer quadrat species list (2015 survey).

Species	Quadrat A	Quadrat B	Quadrat C
Conyza bonariensis*			X
Cynodon dactylon	X		
Cyperus gracilis		X	
Digitaria sanguinalis*			X
Ehrharta erecta*		X	X
Einadia trigonos		X	
Paspalum dilatatum*	X		
Pennisetum clandestinum*	X		
Sida rhombifolia*		X	X
Soliva sp.*	X		
Taraxacum officinale*	X		X
Verbena bonariensis*	X		
Veronica sp.*	X		

The majority of trees on the site occur in stands on the north side of the site. These trees are predominantly *Melaleuca decora*. The overall condition and vitality of these close-growing trees is adversely affected by the canopy competition that occurs between them. Little or no recruitment of new trees within the *Melaluca* stands has occurred due to understory clearing by mowing. The trees that were not originally cleared along with the shrub layer have grown tall and thin, typically without branches in the lower canopy.

The vegetation community on site is disturbed, not an intact community, but appears to best match the ecological community Shale Gravel Transition Forest in the Sydney Basin Bioregion. The patches of Shale Gravel Transition Forest on site are of Class 3 vegetation quality, or "poor".

Appendix 1 shows the list of flora found on the site.

5.2 Off-site habitat

Off-site habitat is poor or lacking. East, south, and west of the site are residential properties which offer minimal habitat. North of the site is a mix of planted natives adjacent to the motorway. A Council reserve on the north east of the site is managed land and consists of remnant trees over a mown lawn.

5.3 Species and Communities of conservation concern

Shale Gravel Transition Forest Critically Endangered Ecological Community occurs as canopy species with a low number of indicator herb species.

5.4 Weeds

The NSW Noxious Weeds Act 1993 has been repealed and the *Biosecurity Act 2015* has replaced it. The *Biosecurity Act 2015* requires each landholder and/or occupier to control biosecurity matter (weeds) on their property. The landholder and/or occupier is to develop an effective control strategy and plan to ensure they meet their General Biosecurity Duty.

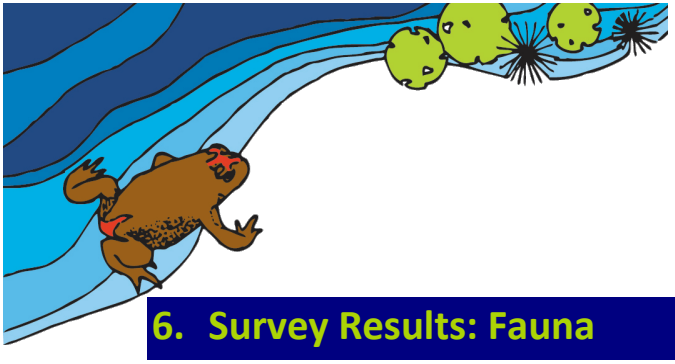
The General Biosecurity Duty (GBD) is imposed on any person who deals with biosecurity matter (weeds), and who knows (or ought reasonably to know) of the biosecurity risk posed (or likely to be posed), has a biosecurity duty to ensure that the risk associated with those weeds is prevented, eliminated or minimised - so far as is reasonably practicable. A requirement is that all public and private land owners or managers and all other people who deal with weed species (biosecurity matter) must use the most appropriate approach to prevent, eliminate or minimise the negative impact (biosecurity risk) of those weeds.

Council may issue a Biosecurity Direction when any owner/occupier fails in their biosecurity duty to control weeds on their land. The owner/occupier must comply with this biosecurity direction. A penalty notice or prosecution may follow if the owner/occupier fails to comply with the Biosecurity Direction.

Weeds Of National Significance (WONS) and Priority Weeds (PW) present on the site

Bridal creeper *Asparagus asparagoides* WONS

https://weeds.dpi.nsw.gov.au/Weeds/Details/22



6. Survey Results: Fauna

6.1 Species of conservation concern

The condition and location of the site are such that no targeted fauna survey was required for species occurring in the wider locality.

6.2 Fauna results

A total of ten (10) bird species were detected. Species listed as 'likely to occur' in the area are presented in Appendix 3. Note that the majority of the 'Expected Species' would not occur on the site due to the lack of habitat, but do occur in the area. All the species listed as 'likely to occur' are common throughout the locality and the region. It is unlikely that protected species will be affected at a local, regional or state-wide scale by the proposal.

The habitats for threatened species that occur in the area are tabulated in Appendix 5.

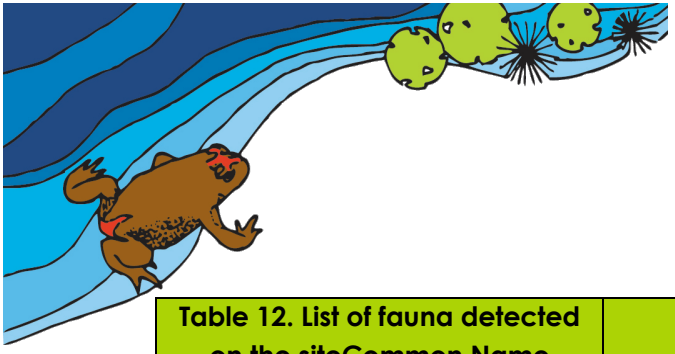


Table 12. List of fauna detected on the siteCommon Name	Scientific Name	Conservation Status	Recorded AE
Birds			
Australian White Ibis	*1. Threskiornis molucca*		O
Common Myna*	*1. Sturnus tristis*		O
Australian Magpie	*1. Cracticus tibicen*		O
Rock Dove*	*Columba livia*		O
Rainbow Lorikeet	*Trichoglossus haematodus*		O
Noisy Miner	*Manorina melanocephala*		O
Golden Whistler	*Pachycephala pectoralis*		O
Silvereye	*Zosterops lateralis*		O
Common Starling*	*Sturnus vulgaris*		W
Peregrine Falcon	*Falco peregrinus*		O

Common Name	Scientific Name	Conservation Status	Recorded AE
Mammals			

Common Name	Scientific Name	Conservation Status	Recorded AE
Reptiles			
Dark-flecked Garden Sunskink	*Lampropholis delicata*		O

Common Name	Scientific Name	Conservation Status	Recorded AE
Frogs			
Common Eastern Froglet	*Crinia signifera*		W

Key

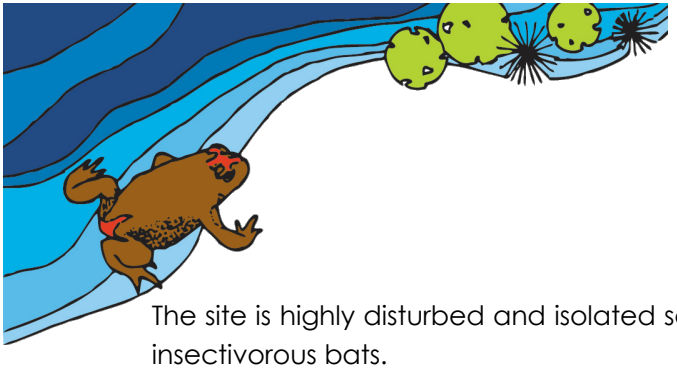
* = Introduced fauna
O = Observed
W = Calls

6.3 Fauna Summary

The number of species from each faunal group, listed as 'likely to occur' can be seen in Appendix 3.

Mammals

No mammal species were detected on the site.



The site is highly disturbed and isolated so native fauna are likely to be highly mobile vagrants such as insectivorous bats.

Species not recorded during the survey but likely to occur on the site include domestic pets.

Reptiles

One reptile species was detected on the site.

There is little ground level structural habitat ("faunature") that will support a reptile population. Small skinks may occur in the M4 Motorway reserve and enter the site.

Species not recorded during the survey but likely to occur on the site include garden skinks.

Frogs

One frog species was detected on the site.

The site is mown lawn with a drainage swale that has no permanent breeding habitat. Species not recorded during the survey but likely to occur on the site include striped marsh frog that may migrate upstream through the drain under the M4.

Birds

Bird species detected on the site totalled ten (10).
The birds likely to occur are common urban species.
Species not recorded during the survey but likely to occur on the site include currawong and corella.

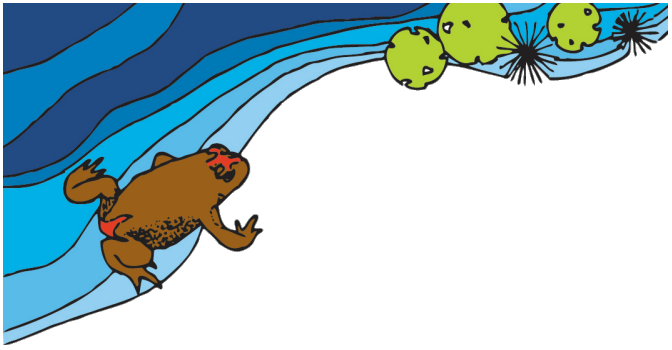
6.4 Microbats

This site provides potentially suitable foraging habitat for six of eight possible threatened species in the form of a dense tree canopy. *Myotis macropus* (syn. *Myotis adversus*) has no suitable foraging habitat in the form of open water bodies.

No suitable roosting habitat occurs on the site.

6.5 Feral fauna

No evidence of feral fauna was detected on the site.



7. Discussion of results

The site has a history of disturbance in the form of understory clearing and mowing throughout the site. The site was most likely cleared in the 1970s when the housing development that is now known as St Clair was established. Excavation has occurred on the site to install a storm water pipe that runs from the west boundary to the northeast corner, and then toward Ropes Creek, as well as a sewer line across the site.

Remnant trees occur predominantly on the northern half of the site. Understory vegetation is lacking, however some native herb species continue to grow in this area with less than 5% native herb component. The site vegetation would have originally been what is now regarded as Shale Gravel transition Forest (SGTF) but is now not properly regarded as such. The species composition does not permit the vegetation to be described as the community. The Canopy trees *Eucalyptus fibrosa* and *Melaleuca decora* are indicators of SGTF but other native canopy species are present that are not part of that community. In a less disturbed condition it will have been some form of Cumberland Plain vegetation community. Even so the SGTF community is applied for the purpose of performing an assessment of significance (five part test) under Section 7.3 of the *Biodiversity Conservation Act*.

Weed indicator species are present, indicating a high disturbance regime on the site. The site is in poor condition with weed infestation and exotic lawn present. The species diversity is dominated by weed species with one Weed of National Significance (WONS) species present.

No habitat trees occur on the site. Two large eucalypts may provide hollows as they continue to age, however they do not currently offer hollows or potential hollows. The canopy cover is dense on some parts of the site and supports a variety of insect species. Mistletoes occur on many of the site's Melaleuca trees. Common bird species such as the Noisy Miner use the site for foraging.

8. Impact on biodiversity: Threshold 3

8.1 Threshold 3: Five-part test summary

Habitat requirements for locally occurring threatened faunal species, and the presence or absence of such habitat on the site, is tabulated in Appendix 4. Threatened plant species, listed in the BC Act and the EPBC Act, are shown in Appendix 5.

Under Section 7.3 of the *Biodiversity Conservation Act* several factors (listed in Appendix 1) need to be considered in deciding whether there is likely to be a Significant effect on threatened species, populations or ecological communities, or their habitats. If there is likely to be a significant effect on

threatened species, etc., the proposal must be accompanied by a Biodiversity Development Assessment Report.

While the overall proposal incorporates mitigating considerations and offsets, these are not taken into account in determining the outcome of the five-part tests.

Table 13. Summary of the five-part tests shown in full in Appendix 1.

Scientific Name	Common Name	NSW status	Comm. status	Recorded on site	Result
Lophoictinia isura	Square-tailed Kite	V			No significant effect
Glossopsitta pusilla	Little Lorikeet	V			No significant effect
Lathamus discolor	Swift Parrot	E1	CE		No significant effect
Ninox strenua	Powerful Owl	V			No significant effect
Pteropus poliocephalus	Grey-headed Flying-fox	V	V		No significant effect
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V			No significant effect
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V			No significant effect
Scoteanax rueppellii	Greater Broad-nosed Bat	V			No significant effect
Miniopterus australis	Little Bent-winged Bat	V			No significant effect
Miniopterus orianae oceanensis	Large Bent-winged Bat	V			No significant effect
Shale Gravel Transition Forest	Shale Gravel Transition Forest	CE	CE		No significant effect

There is no significant effect, so a Biodiversity Development Assessment Report is not required.

9. Planning Instruments

9.1 Environment Protection and Biodiversity Conservation Act 1999

9.1.1 Protected matters

The Protected Matters Search Tool was used to find relevant Matters of National Environmental Significance (MNES) on or near the site.

Shale Gravel Transition Forest is protected under Commonwealth legislation by the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999) and is listed as Critically Endangered. The provisions of the EPBC Act apply to this proposal. The outcome is not significant, however, and does not require referral to the Commonwealth.

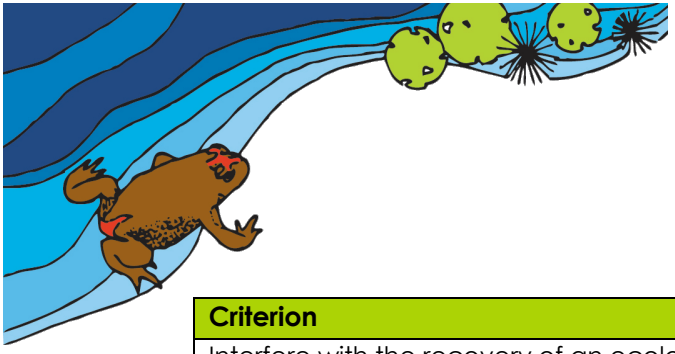
9.1.2 Criteria Critically Endangered and Endangered Ecological Communities

The provisions of the EPBC Act apply to this proposal. Shale Gravel Transition Forest in the Sydney Basin Bioregion, which is a critically endangered ecological community, is present on this site.

An action has, will have, or is likely to have a significant impact on a critically endangered or endangered ecological community if it does, will, or is likely to have specific outcomes (Table 14).

Table 14: EPBC Act Impact assessment criteria.

Criterion	Response
Lead to a long-term adverse effect on an ecological community, or	No. this is an isolated and degraded fragment. The area of the patch is less than 2ha so not triggering the EPBC threshold.
Reduce the extent of a community, or	Yes, a small area will be removed, reducing the local occurrence.
Fragment an occurrence of the community, or	No. The area is isolated by the M4 and urban development.
Adversely affect habitat critical to the survival of an ecological community, or	The habitat is already disturbed and unlikely to sustain the community in the long term.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for the community's survival, or	Yes. The area will be residential development.
Result in invasive species that are harmful to the critically endangered or endangered community becoming established in an occurrence of the community*, or	No. The adjacent public recreation reserve is mown so weeds are not likely to invade.



Criterion	Response
Interfere with the recovery of an ecological community.	No. This site has no potential to contribute to recovery of this ecological community

The overall outcome will be to reduce the occurrence of both intact vegetation and TX/TXR of 6 ha by less than 0.5 ha, being by 8%, being of a very small degraded fragment that has no prospect of recovery.

There will be no significant impact on the community resulting from the proposal, and does not require referral to the Commonwealth.

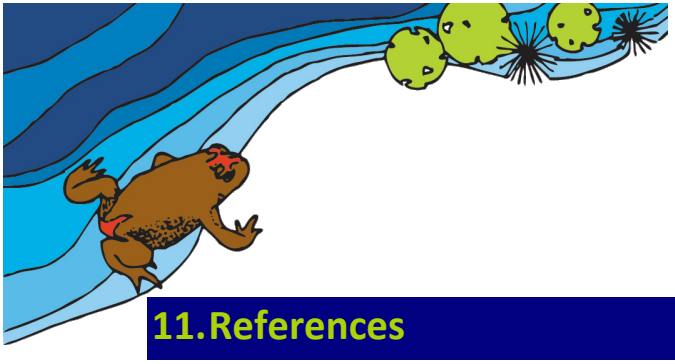
9.2 Planning for Bushfire Protection

The asset protection zone requirement is for a maximum of 15% canopy cover with canopy separations of 2-5 metres.

10. Conclusion and Recommendations

None of the three thresholds are triggered as follows:
1. Area of clearing
2. Biodiversity Land Map – clearing or prescribed biodiversity impacts
3. Five Part Tests

Therefore, a Biodiversity Development Assessment Report (BDAR) is not required.



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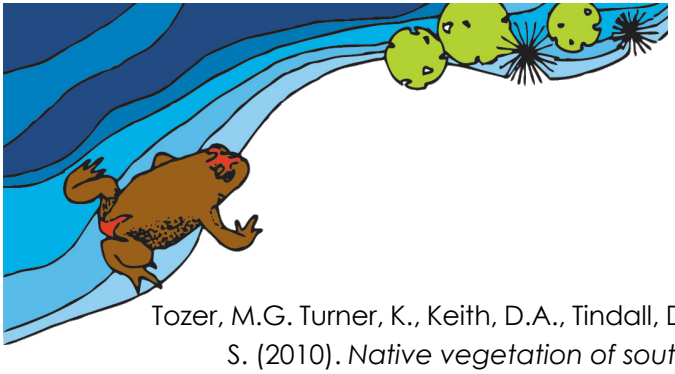

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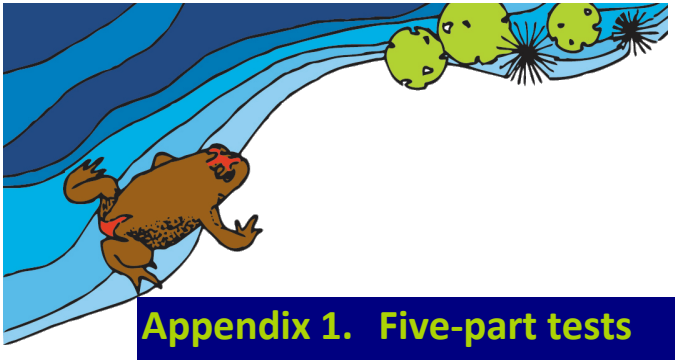


Appendix 1. Five-part tests

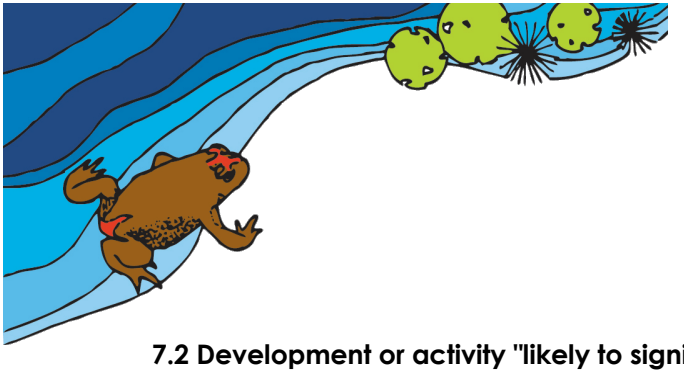
While the overall proposal incorporates mitigating considerations and offsets, these are not taken into account in determining the outcome of the **five-part** tests.

The Assessment of Significance (Office of Environment and Heritage (OEH)) states that "*Proposed measures that mitigate, improve or compensate for the action, development or activity should not be considered in determining the degree of the effect on threatened species, populations or ecological communities, unless the measure has been used successfully for that species in a similar situation.*"

Species addressed are as follows.

Where applicable threatened populations are considered as threatened species in the following five part tests.

Scientific Name	Common Name	NSW status	Comm. status	Recorded on site	Result
Lophoictinia isura	Square-tailed Kite	V			No significant effect
Glossopsitta pusilla	Little Lorikeet	V			No significant effect
Lathamus discolor	Swift Parrot	E1	CE		No significant effect
Ninox strenua	Powerful Owl	V			No significant effect
Pteropus poliocephalus	Grey-headed Flying-fox	V	V		No significant effect
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V			No significant effect
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V			No significant effect
Scoteanax rueppellii	Greater Broad-nosed Bat	V			No significant effect
Miniopterus australis	Little Bent-winged Bat	V			No significant effect
Miniopterus orianae oceanensis	Large Bent-winged Bat	V			No significant effect
Shale Gravel Transition Forest	Shale Gravel Transition Forest	CE	CE		No significant effect



7.2 Development or activity "likely to significantly affect threatened species"

(1) For the purposes of this Part, development or an activity is **"likely to significantly affect threatened species"** if:

(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or

(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or

(c) it is carried out in a declared area of outstanding biodiversity value.

(2) To avoid doubt, subsection (1) (b) does not apply to development that is an activity subject to environmental impact assessment under Part 5 of the *Environmental Planning and Assessment Act 1979*.

7.3 Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

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

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

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

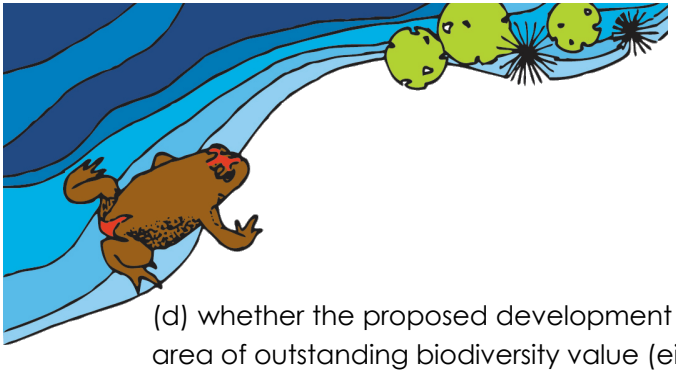
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

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

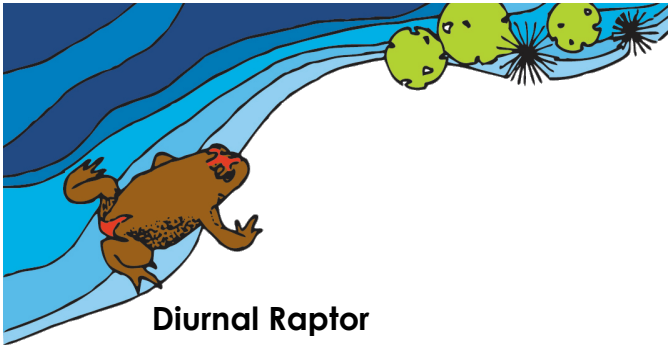
(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

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

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



(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),
(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.



Diurnal Raptor

Key
V = Vulnerable
P = Protected

Scientific name	Common name	NSW status	Comm. status
Lophoictinia isura	Square-tailed Kite	V,P	-

Square-tailed Kite *Lophoictinia isura*
http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10495

- Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.
- In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland.
- Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage.
- Appears to occupy large hunting ranges of more than 100km2.
- Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.

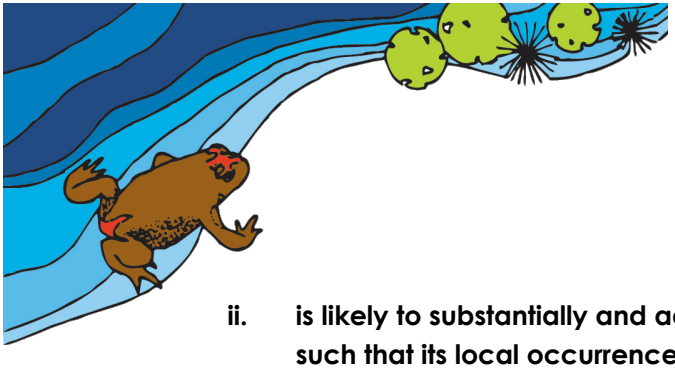
a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No.
There is a single record in 2016, 1.2km south west of the site on a watercourse, recorded as a wildlife rescue.
This species is highly mobile and has a very large home range. The preferred habitat of riparian forest and open woodland/ agricultural land is available elsewhere within the district, but not on this site. Therefore, it is highly unlikely to have an adverse effect such that a local population of any of these species will be placed at risk of extinction.

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

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

Not applicable. This test is for a threatened species.



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

Not applicable. This test is for a threatened species.

c. 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 proposed development or activity, and

The site is approximately one hectare in size. The whole or the majority of the site will be modified to construct the facility. Any marginal habitat within the site will also be modified or removed.

Up to one hectare of natural vegetation containing suitable foraging habitat for prey of this species will be removed for the proposal.

Habitat of approximately 1,500 m^2 will be modified or removed to satisfy the conditions of an Asset Protection Zone (APZ) around the proposed development as well as providing an area for associated infrastructure. The ground level will be mown lawn and trees will be reduced to <15% canopy cover.

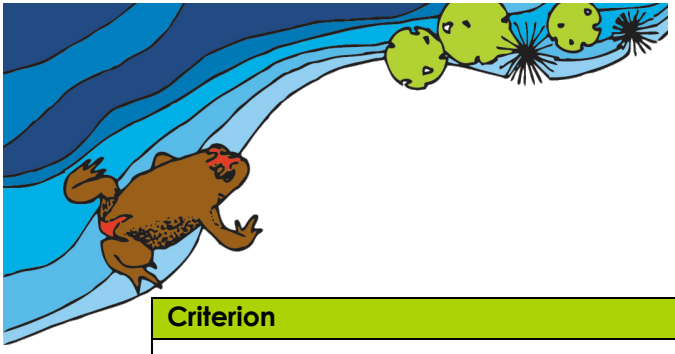
ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

No. This species is highly mobile and normally uses riparian corridors. The proposal is unlikely to cause significant fragmentation or isolation of habitat.

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,

Negligible. Higher quality habitat is available approximately 800m east of the site. It is highly unlikely that the long-term survival of locally occurring populations will be adversely affected by the proposed works.

Criterion	Comment
Area and quality of habitat within the locality	The locality is a suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on drainage lines.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available along Ropes Creek. The feeding resource is moderate.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Site habitat provides minimal connectivity to fragmented vegetation to the east or west. A strip of trees along the southern verge of the



Criterion	Comment
	motorway maintains connectivity to the east and west for some mobile species.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain and herbaceous species remain suppressed as a mown herb layer. Canopy trees provide ecological value for the. The majority of site vegetation will be removed. A selection of canopy trees may remain for the bushfire Asset Protection Zone. The majority of the vegetation will be removed / Ecological integrity on the site will remain in the locality as natural vegetation will be retained on the site and in the nearby riparian zone of Ropes Creek.

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

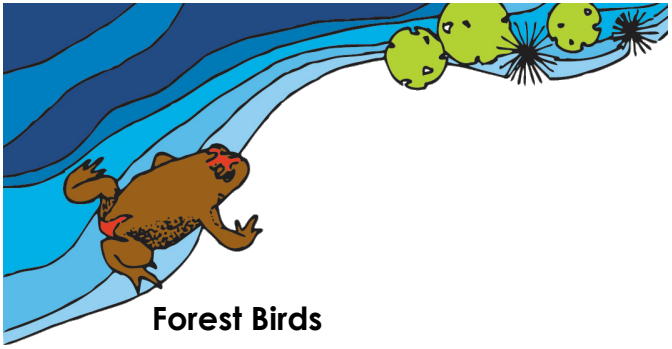
No. Critical habitat has not been declared for this species.

e. whether the proposed development or activity 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.

Yes. The proposed development will require the "Clearing of native vegetation", which is a key threatening process relevant to these species. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is minimal.

Conclusion

The proposed activity is unlikely to have a significant effect on Square-tailed Kite. Therefore, a BDAR is not recommended



Forest Birds

Key

CE = Critically Endangered
E = Endangered
V = Vulnerable
P = Protected

Scientific name	Common name	NSW status	Comm. status
Glossopsitta pusilla	Little Lorikeet	V,P	-
Lathamus discolor	Swift Parrot	E,P	CE

Little Lorikeet *Glossopsitta pusilla*

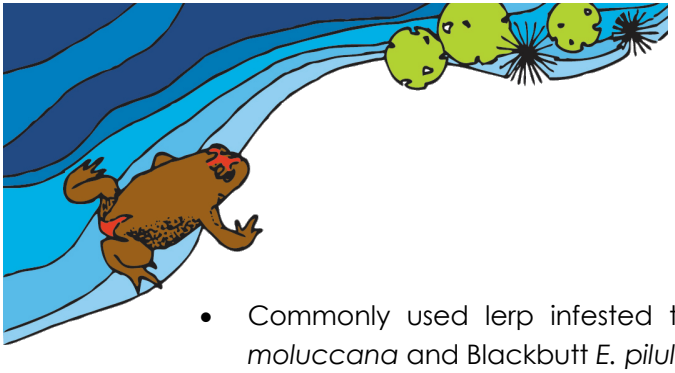
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20111

- Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.
- Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.
- Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards
- Gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries.
- Roosts in treetops, often distant from feeding areas.
- Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like *Allocasuarina*.
- Nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt. However, the survival rate of fledglings is unknown.

Swift Parrot *Lathamus discolor*

http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10455

- Migrates to the Australian south-east mainland between March and October.
- On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.
- Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*.



- Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*.
- Return to some foraging sites on a cyclic basis depending on food availability.
- Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum *Eucalyptus globulus*.

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

No. While the proposal will modify an area of foraging habitat for these species, the extent of habitat modification is minor considering the disturbed nature of the proposal area, and compared to the bushland area available in the vicinity. Birds will continue to forage within and around the APZs. The proposal is unlikely to effect the life cycles of these species such that a viable local population will be placed at risk of extinction.

Any local viable population of threatened birds will use a wide area for foraging including the large extent of natural vegetation east of the site. Loss or modification of suitable habitat for the proposed APZ or other associated infrastructure is unlikely to have an adverse effect on the life cycle of any threatened bird such that a local viable population will be placed at risk of extinction. There are no large hollow-bearing trees that are potential nest sites.

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

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

Not applicable. This test is for a group of threatened species.

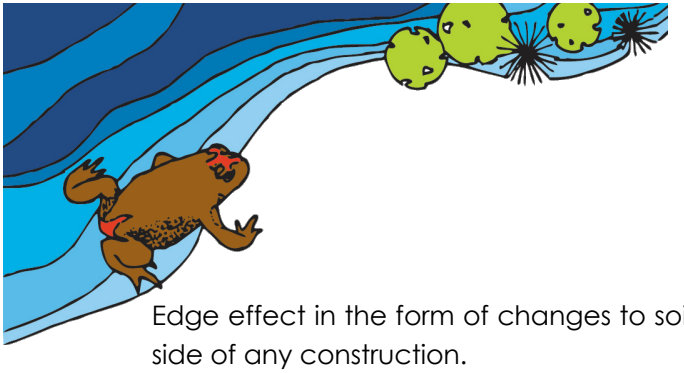
ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable. This test is for a group of threatened species.

c. 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 proposed development or activity, and

Up to 1,500 m^2 will be removed.



Edge effect in the form of changes to soil hydrology and nutrient status may occur on the downslope side of any construction.

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

No. Similar habitat is available in the locality and these species are mobile and can easily travel to other areas of habitat.

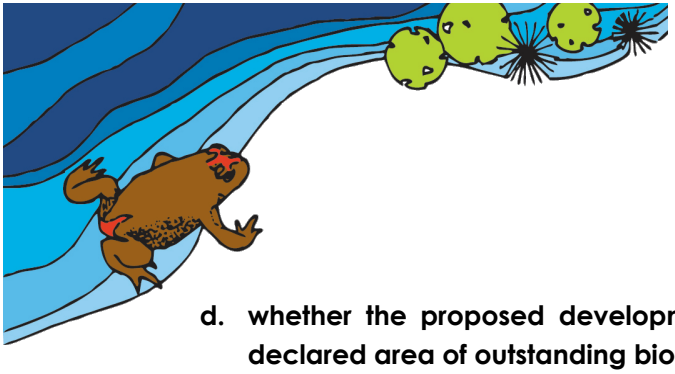
The majority of local habitat is already fragmented. An area of degraded continuous habitat exists across north and east of the site, however no impact is expected for this area. Mowing prevents establishment of new plants through the site.

Continuous habitat will remain across the north, east and west of the site.
Beyond the APZ the existing habitat connectivity within the site will be retained.

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,

Negligible.

Criterion	Comment
Area and quality of habitat within the locality	The locality is a suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on drainage lines.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available along Ropes Creek. The feeding resource is moderate.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Site habitat provides minimal connectivity to fragmented vegetation to the east or west. A strip of trees along the southern verge of the motorway maintains connectivity to the east and west for some mobile species.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain and herbaceous species remain suppressed as a mown herb layer. Canopy trees provide ecological value for the. The majority of site vegetation will be removed. A selection of canopy trees may remain for the bushfire Asset Protection Zone. The majority of the vegetation will be removed. Ecological integrity on the site will remain in the locality as natural vegetation will be retained on the site and in the nearby riparian zone of Ropes Creek.



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

No. Critical habitat has not been declared for these species.

e. whether the proposed development or activity 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.

Yes. The proposed development will require the "Clearing of native vegetation", which is a key threatening process relevant to these species. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is minimal and scattered across the site.

Conclusion

The proposed activity is unlikely to have a significant effect on Little Lorikeet or Swift Parrot.

Therefore, a BDAR is not required.

Large Forest Owls

Key
V = Vulnerable
P = Protected

Common name	Scientific name	NSW status	Comm. status
Powerful Owl	*Ninox strenua*	V,P	-

Powerful Owl *Ninox strenua*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10562
The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.

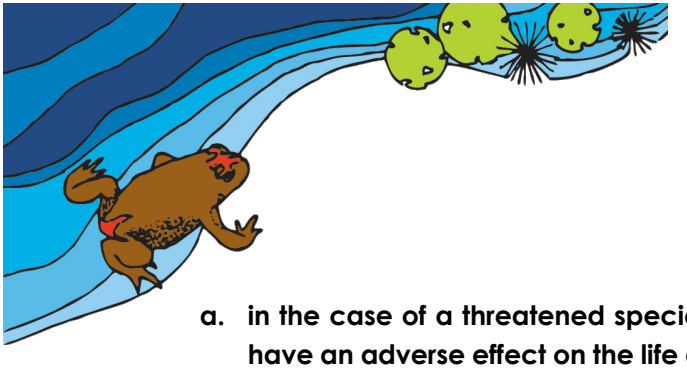
The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine Syncarpia glomulifera, Black She-oak Allocasuarina littoralis, Blackwood Acacia melanoxylon, Rough-barked Apple Angophora floribunda, Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species.

The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example, in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Flying foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl.

Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 can support a pair; where hollow trees and prey have been depleted the owls need up to 4000 ha.

Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him.

Powerful Owls are monogamous and mate for life. Nesting occurs from late autumn to mid-winter, but is slightly earlier in north-eastern NSW (late summer - mid autumn). Clutches consist of two dull white eggs and incubation lasts approximately 38 days.



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

No. While the proposal will modify an area of foraging habitat for this species, the extent of habitat modification is minor considering the disturbed nature of the proposal area, and compared to the bushland area available along Ropes Creek. Powerful Owl will continue to forage within and around the APZ. The proposal is unlikely to effect the life cycle of Powerful Owl such that a viable local population will be placed at risk of extinction.

Any local viable population of Powerful Owl will use a wide area for foraging including the large extent of natural vegetation east of the site. Loss or modification of suitable habitat for the proposed APZ or other associated infrastructure is unlikely to have an adverse effect on the life cycle of Powerful Owl such that a local viable population will be placed at risk of extinction.

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

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

Not applicable. This test is for a threatened species.

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

Not applicable. This test is for a threatened species.

c. 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 proposed development or activity, and

Up to 1,500 m^2 of native trees and native shrubs will be removed for the development.

The ground level will be mown lawn and trees will be reduced to <15% canopy cover.

Edge effect in the form of changes to soil hydrology and nutrient status may occur on the downslope side of any construction.

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

No. Similar habitat is available in the locality and Powerful Owls are mobile and can easily travel to other areas of habitat.

The majority of local habitat is already fragmented.

Continuous habitat will remain across the north, east and west of the site.

Beyond the APZ the existing habitat connectivity east of the site will be retained.

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,

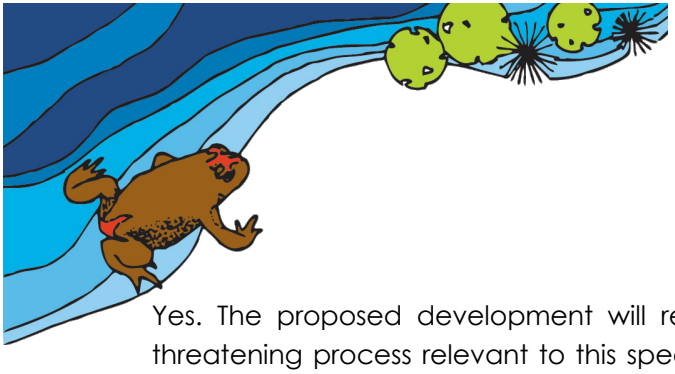
Negligible.

Criterion	Comment
Area and quality of habitat within the locality	The locality is a suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on drainage lines.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available along Ropes Creek. The feeding resource is moderate.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Site habitat provides minimal connectivity to fragmented vegetation to the east or west. A strip of trees along the southern verge of the motorway maintains connectivity to the east and west for this mobile species.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain and herbaceous species remain suppressed as a mown herb layer. Canopy trees provide ecological value for the. The majority of site vegetation will be removed. A selection of canopy trees may remain for the bushfire Asset Protection Zone. The majority of the vegetation will be removed. Ecological integrity on the site will remain in the locality as natural vegetation will be retained on the site and in the nearby riparian zone of Ropes Creek.

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

No. Critical habitat has not been declared for this species.

d. whether the proposed development or activity 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.



Yes. The proposed development will require the "Clearing of native vegetation", which is a key threatening process relevant to this species. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is minimal and scattered across the site.

Conclusion

The proposed activity is unlikely to have a significant effect on Powerful Owl. Therefore, a BDAR is not recommended.

Grey-headed Flying-fox

Scientific name	Common name	NSW status	Comm. status
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V

Key
V = Vulnerable
P = Protected

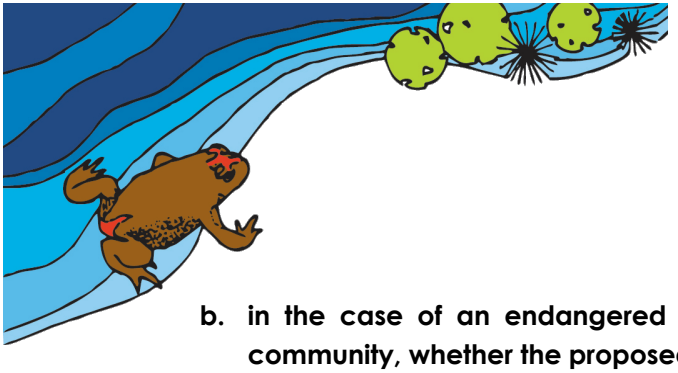
Habitat and ecology
http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10697

- Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.
- Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.
- Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young.
- Annual mating commences in January and conception occurs in April or May; a single young is born in October or November.
- Site fidelity to camps is high; some camps have been used for over a century.
- Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km.
- Feed on the nectar and pollen of native trees, in particular *Eucalyptus, Melaleuca* and *Banksia*, and fruits of rainforest trees and vines.
- Also forage in cultivated gardens and fruit crops.

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

No. While the proposal will modify an area of foraging habitat for this species, the extent of habitat modification is minor considering the disturbed nature of the proposal area, and compared to the bushland area available to the east. Grey-headed Flying-fox will continue to forage within and around the APZ. The proposal is unlikely to effect the life cycle of Grey-headed Flying-fox such that a viable local population will be placed at risk of extinction.

Any local viable population of Grey-headed Flying-fox will use a wide area for foraging including the large extent of natural vegetation east of the site. Loss or modification of suitable habitat for the proposed APZ or other associated infrastructure is unlikely to have an adverse effect on the life cycle of Grey-headed Flying-fox such that a local viable population will be placed at risk of extinction.



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

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

Not applicable. This test is for a threatened species.

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

Not applicable. This test is for a threatened species.

c. 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 proposed development or activity, and

Up to 1,500 m^2 of native trees and native shrubs will be removed for the development.

Edge effect in the form of changes to soil hydrology and nutrient status may occur on the downslope side of any construction.

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

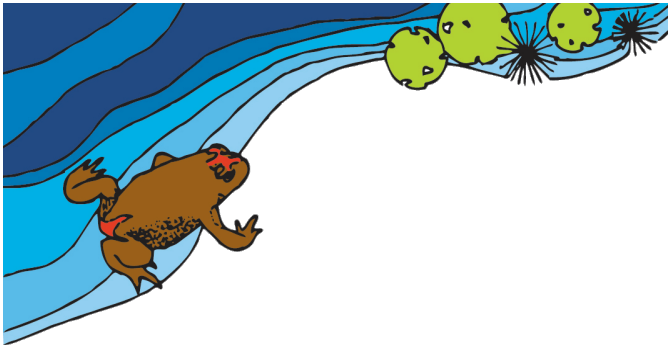
No. Similar habitat is common across the site and in the locality and Grey-headed Flying-fox are mobile and can easily travel to other areas of habitat.

The majority of site habitat is already fragmented. An area of degraded continuous habitat exists across the site, however no impact is expected for this area. Grazing prevents establishment of new plants through the site.

Continuous habitat will remain across the north, east and west of the site.
Beyond the APZ the existing habitat connectivity within the site will be retained.

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,

Negligible.



Criterion	Comment
Area and quality of habitat within the locality	The locality is a suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on drainage lines.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available along Ropes Creek. The feeding resource is moderate.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Site habitat provides minimal connectivity to fragmented vegetation to the east or west. A strip of trees along the southern verge of the motorway maintains connectivity to the east and west for this mobile species.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain and herbaceous species remain suppressed as a mown herb layer. Canopy trees provide ecological value for the. The majority of site vegetation will be removed. A selection of canopy trees may remain for the bushfire Asset Protection Zone. The majority of the vegetation will be removed. Ecological integrity on the site will remain in the locality as natural vegetation will be retained on the site and in the nearby riparian zone of Ropes Creek.

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

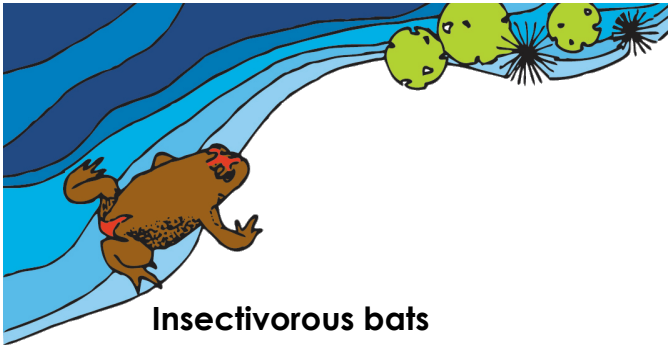
No. Critical habitat has not been declared for this species.

e. whether the proposed development or activity 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.

Yes. The proposed development will require the "Clearing of native vegetation", which is a key threatening process relevant to these species. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is minimal and scattered across the site.

Conclusion

The proposed activity is unlikely to have a significant effect on Grey-headed Flying-fox. Therefore, a BDAR is not recommended.



Insectivorous bats

Scientific name	Common name	NSW status	Comm. status
Mormopterus norfolkensis	Eastern Freetail-bat	V,P	-
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P	-
Miniopterus australis	Little Bentwing-bat	V,P	-
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V,P	-
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P	Near Threatened

Key
V = Vulnerable
P = Protected

Eastern Freetail-bat *Mormopterus norfolkensis*
http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10544
Eastern Freetail-bat occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost maily in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.

Eastern False Pipistrelle *Falsistrellus tasmaniensis*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10331
Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer.

Little Bentwing-bat *Miniopterus australis*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533
Little Bentwing-bat prefers moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Eastern Bentwing-bats (Miniopterus schreibersii) and appears to depend on the large colony to provide the high temperatures needed to rear its young. Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites /maternity colonies are known in Australia.

Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*

http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534

Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.

Greater Broad-nosed Bat *Scoteanax rueppellii*

http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10748

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. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. Little is known of its reproductive cycle, however a single young is born in January; prior to birth, females congregate at maternity sites located in suitable trees, where they appear to exclude males during the birth and raising of the single young.

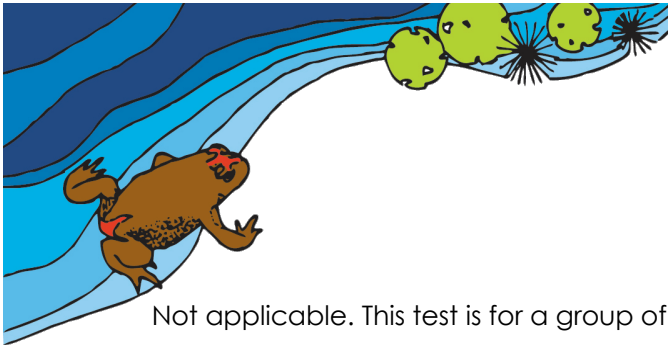
a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No. While the proposal will modify an area of foraging habitat for these species, the extent of habitat modification is minor considering the disturbed nature of the proposal area, and compared to the local bushland area. Bats will continue to forage within and around the APZs. The proposal is unlikely to effect the life cycles of these species such that a viable local population will be placed at risk of extinction.

Any local viable population of threatened bats will use a wide area for foraging including the large extent of natural vegetation north of the site. Loss or modification of suitable habitat for the proposed APZ or other associated infrastructure is unlikely to have an adverse effect on the life cycle of any threatened bat such that a local viable population will be placed at risk of extinction. There are no hollow-bearing trees that are potential roost sites for these species.

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

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



Not applicable. This test is for a group of threatened species.

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

Not applicable. This test is for a group of threatened species.

c. 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 proposed development or activity, and

Up to 1,500 m^2 of native trees and native shrubs will be removed for roads to service the development.

Edge effect in the form of changes to soil hydrology and nutrient status may occur on the downslope side of any construction. Any edge effect will impact on areas previously degraded by clearing and weeds so is unlikely to have any discernable change to the local habitat.

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

No. Similar habitat is common in the locality and all these species are mobile and can easily travel to other areas of habitat.

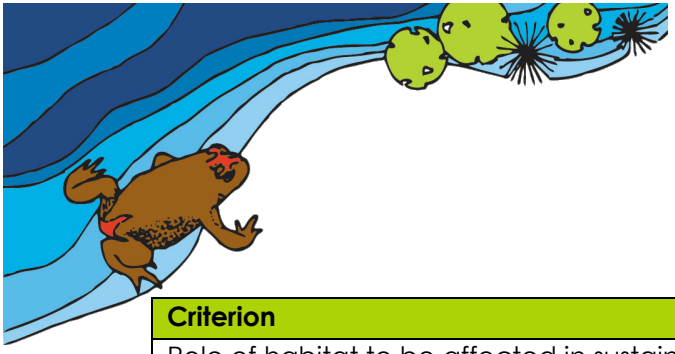
The majority of site habitat is already fragmented. An area of degraded continuous habitat exists east of the site, however no impact is expected for this area.

Continuous habitat will remain across the north, east and west of the site.
Beyond the APZ existing habitat connectivity will be retained.

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,

Negligible.

Criterion	Comment
Area and quality of habitat within the locality	The locality is a suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on drainage lines.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available along Ropes Creek. The feeding resource is moderate.



Criterion	Comment
Role of habitat to be affected in sustaining habitat connectivity in the locality	Site habitat provides minimal connectivity to fragmented vegetation to the east or west. A strip of trees along the southern verge of the motorway maintains connectivity to the east and west for some mobile species.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain and herbaceous species remain suppressed as a mown herb layer. Canopy trees provide ecological value for the. The majority of site vegetation will be removed. A selection of canopy trees may remain for the bushfire Asset Protection Zone. The majority of the vegetation will be removed. Ecological integrity on the site will remain in the locality as natural vegetation will be retained on the site and in the nearby riparian zone of Ropes Creek.

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

No. Critical habitat has not been declared for these species.

b. whether the proposed development or activity 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.

Yes. The proposed development will require the "Clearing of native vegetation", which is a key threatening process relevant to these species. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is minimal and scattered across the site.

Conclusion

The proposed activity is unlikely to have a significant effect on Eastern Freetail-bat, Large-eared Pied Bat, Eastern False Pipistrelle, Little Bentwing-bat, Eastern Bentwing-bat, or Greater Broad-nosed Bat. Therefore, a BDAR is not recommended.

THREATENED ECOLOGICAL COMMUNITY

Scientific name	NSW status	Comm. status
Shale Gravel Transition Forest in the Sydney Basin Bioregion	CE	CE

Key
CE = Critically Endangered

Habitat and ecology
Shale Gravel Transition Forest has an open forest structure with a canopy dominated by Broad-leaved Ironbark *Eucalyptus fibrosa*, with Grey Box *E. moluccana* and Forest Red Gum *E. tereticornis* occurring less frequently. Paperbark *Melaleuca decora* is common in the small tree layer. A sparse shrub layer is usually present which includes Blackthorn *Bursaria spinosa*, *Daviesia ulicifolia* and Peach Heath *Lissanthe strigosa*. Contains many more species and other references should be consulted to identify these.

- Occurs primarily where shallow deposits from ancient river systems overlay shale soils, but also associated with localised concentrations of iron-hardened gravel.
- A transitional plant community which grades into Cumberland Plain Woodland where the influence of gravel soil declines, and grades into Cooks River/Castlereagh Ironbark Forest or Castlereagh Scribbly Gum Woodland where gravel deposits are thick.
- The shrub understorey includes a number of listed threatened species in the 'pea' flower group. The plants in this group rely on nitrogen fixing root nodules and soil/root fungi to extract nutrients form the poor soils.

The community on site has inadequate species diversity or structure to be confidently identified as Shale Gravel Transition Forest. However, for the purpose of this test it is regarded as Shale Gravel Transition Forest. The vegetation on site is mapped as TX or TXR condition (Figure 9). The Recovery Plan (DECCW 2010) does not regard this condition as meeting the definition for the community.

> "Only a small proportion of TX and TXR areas are likely meet the definition of a TSC Act listed community as defined in the NSW Scientific Committee determination (NSW Scientific Committee 2009). To be considered part of the EPBC Act listed Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest community, patches must be in an A, B or C condition class and meet other condition thresholds relating to patch size, understorey integrity and the presence of tree hollows." Cumberland Plain Recovery Plan page 5.

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,

Not applicable. This five-part test is for a critically endangered ecological community.

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

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

There is currently (Final Determination 2011) 2,520 ha of this community. None of the local occurrence (approximately 4.3 ha) of this critically endangered ecological community will be either removed or modified on the site.
Shale Gravel Transition Forest occupies a total estimated extent of 2,520 ha which is estimated to be a 64% decline in area since European settlement (Tozer *et al*. 2010).

Area extant in total = 2,520ha
Area of occupancy = > 3,800 km^2.
Local occurrence (near the site) = 230 ha. (Figure 9)

This critically endangered ecological community mostly occurs in the road reserve of the motorway so its local occurrence is unlikely to be placed at risk of extinction by the proposal.

The entire site has been disturbed. Original vegetation remains as canopy trees and a pasture of predominantly weedy species with very few natives. No recruitment is possible with the current grazing regime. The extent of canopy trees will be reduced by two trees and some patches of shrubs for roads, therefore the extent of the community will be reduced.

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

No.
The composition of this critically endangered ecological community will be retained on the site. This critically endangered ecological community within the site will not be substantially and adversely modified by the proposal. It also occurs east in the locality as intact community and the local occurrence will not be placed at risk of extinction. The species individuals of *Melaleuca decora* that are proposed to be removed are common on the site and on adjacent council reserve land.

c. 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 proposed development or activity,

Less than 2,500m^2 of trees (actual is 1,500 m^2)will be removed for the development.

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

No.
The habitat for this critically endangered ecological community occurs on the east of the site. Continuous habitat will remain off-site in the locality to the east of the site.

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,

Negligible.
Paperbark trees *Melaleuca decora*, part of SGTF, and some other species such as *Eucalyptus globoidea* that are not indicator species for the CEEC will be removed, with 15% canopy cover retained as SGTF indicator species.

Criterion	Comment
Area and quality of habitat within the locality	The locality is a suburban matrix with areas of often-degraded natural vegetation remaining on/around typically cleared or disturbed land on drainage lines.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available along Ropes Creek. The feeding resource is moderate.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Site habitat provides minimal connectivity to fragmented vegetation to the east or west. A strip of trees along the southern verge of the motorway maintains connectivity to the east and west for some mobile species.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain and herbaceous species remain suppressed as a mown herb layer. Canopy trees provide ecological value for the. The majority of site vegetation will be removed. A selection of canopy trees may remain for the bushfire Asset Protection Zone. The majority of the vegetation will be removed. Ecological integrity on the site will remain in the locality as natural vegetation will be retained on the site and in the nearby riparian zone of Ropes Creek.

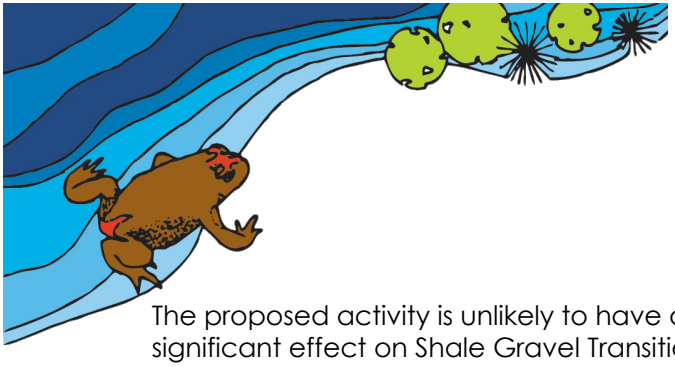
d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No. Critical habitat has not been declared for this critically endangered ecological community.

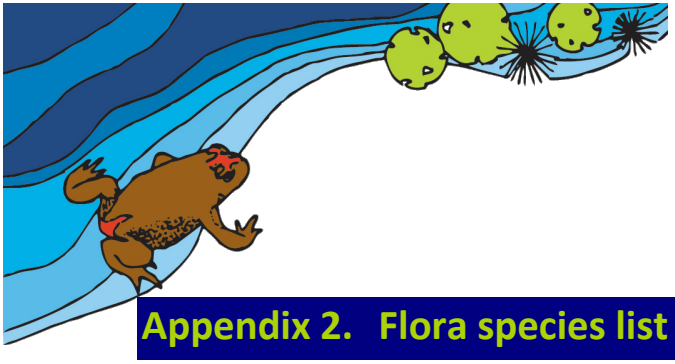
e. whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. The proposed development will require the "Clearing of native vegetation", which is a key threatening process relevant to these species. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999. However the extent of clearing is minimal and scattered across the site.

Conclusion



The proposed activity is unlikely to have a significant effect on Shale Gravel Transition Forest. Therefore, a BDAR is not recommended.



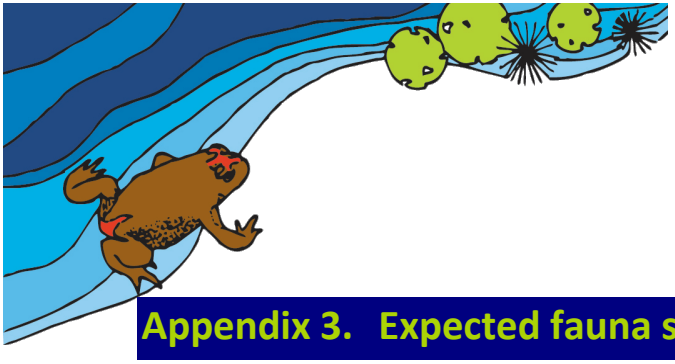
Appendix 2. Flora species list

The grid reference for this locality is 296430 East, 6258810 North (Geographic GDA94 MGA56)

Acacia parvipinnula
 # Acacia podalyriifolia
** Alternanthera pungens*
Amyema gaudichaudii
** Asparagus aethiopicus*
** Asparagus asparagoides* WONS
** Aster subulatus*
** Bidens pilosa*
** Bidens subalternans*
Bursaria spinosa
Centella asiatica
** Chamaecyparis pisifera*
** Chloris gayana*
Commelina cyanea
** Conyza bonariensis*
Cynodon dactylon
** Cyperus eragrostis*
Cyperus gracilis
Desmodium varians
Dianella caerulea
Dichondra repens
** Digitaria sanguinalis*
Einadia nutans
Einadia trigonos
** Eragrostis curvula*
** Ehrharta erecta*
Eucalyptus fibrosa
Eucalyptus globoidea
Eucalyptus longifolia
** Euphorbia peplus*
** Gamochaeta americana*
** Pelargonium domesticum*
Glycine clandestina
Glycine tabacina
** Ligustrum sinense*
** Lotus sp.*
Melaleuca decora
#Melia azedarach
Microlaena stipoides
** Murraya paniculata*
** Olea europaea subsp. cuspidata*
** Oxalis sp.* (yellow flower group)
** Panicum maximum*
** Paronychia brasiliana*
Paspalidium distans
** Paspalum dilatatum*
** Paspalum urvillei*
** Pennisetum clandestinum*
** Pinus contorta*
** Plantago lanceolata*
Poranthera microphylla
Portulaca oleracea
** Prunus sp. (Nectarine?)*
** Richardia brasiliensis*
** Rumex crispus*
** Sida rhombifolia*
** Solanum nigrum*
** Soliva sp.*
** Stellaria media*
** Taraxacum officinale*
Tetragonia tetragonioides
** Trifolium repens*
** Verbena bonariensis*
Veronica plebeia
** Vicia sativa*

Key

* introduced species
# native species not endemic to the remnant plant community
WONS – Weeds Of National significance
Indicator species for Shale Gravel Transition Forest



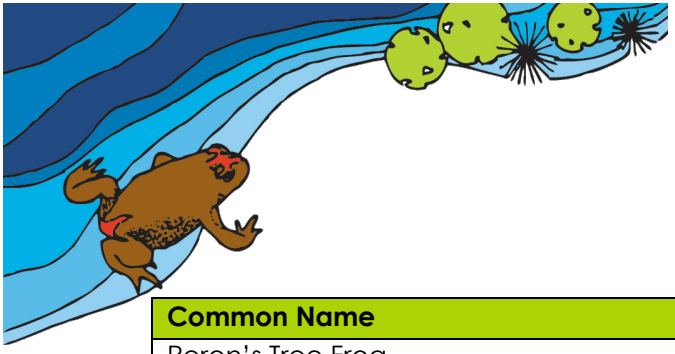
Appendix 3. Expected fauna species in the Sydney Basin

Mammals

Common name	Scientific name
White-striped Freetail-bat	*Austronomus australis*
Gould's Wattled Bat	*Chalinolobus gouldii*
Chocolate Wattled Bat	*Chalinolobus morio*
Lesser Long-eared Bat	*Nyctophilus geoffroyi*
Gould's Long-eared Bat	*Nyctophilus gouldi*
Bush Rat	*Rattus fuscipes*
Swamp Rat	*Rattus lutreolus*
Long-nosed Bandicoot	*Perameles nasuta*
Brown Antechinus	*Antechinus stuartii*
Dusky Antechinus	*Antechinus swainsonii*
Yellow-footed Antechinus	*Antechinus flavipes*
Common Wombat	*Vombatus ursinus*
Common Ringtail Possum	*Pseudocheirus peregrinus*
Sugar Glider	*Petaurus breviceps*
Feathertail Glider	*Acrobates pygmaeus*
Eastern Grey Kangaroo	*Macropus giganteus*
Large Forest Bat	*Vespadelus darlingtoni*
Little Forest Bat	*Vespadelus vulturnus*
Common Wallaroo	*Macropus robustus*
Red-necked Wallaby	*Macropus rufogriseus*
Swamp Wallaby	*Wallabia bicolor*
Common Brushtail Possum	*Trichosurus vulpecula*
Greater Glider	*Petauroides volans*
Short-beaked Echidna	*Tachyglossus aculeatus*
Fox	*Vulpes vulpes*
Black Rat	*Rattus rattus*
Rabbit	*Oryctolagus cuniculus*

Frogs

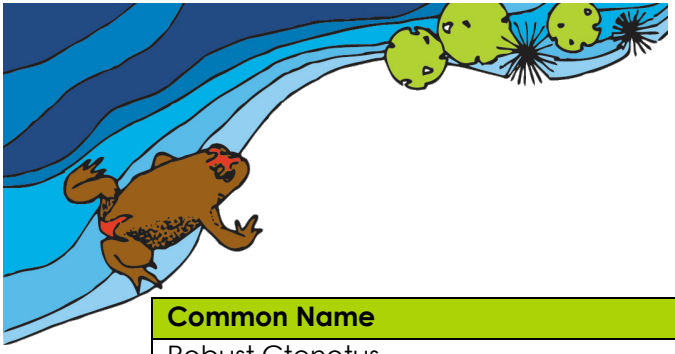
Common Name	Scientific Name
Green Tree Frog	*Litoria caerulea*
Blue Mountains Tree Frog	*Litoria citropa*
Bleating Tree Frog	*Litoria dentata*
Eastern Dwarf Tree Frog	*Litoria fallax*
Jervis Bay Tree Frog	*Litoria jervisiensis*
Broad-palmed Frog	*Litoria latopalmata*



Common Name	Scientific Name
Peron's Tree Frog	*Litoria peronii*
Leaf-green Tree Frog	*Litoria phyllochroa*
Tyler's Tree Frog	*Litoria tyleri*
Verreaux's Frog	*Litoria verreauxii*
Common Eastern Froglet	*Crinia signifera*
Eastern Banjo Frog	*Limnodynastes dumerilii*
Ornate Burrowing Frog	*Limnodynastes ornatus*
Brown-striped Frog	*Limnodynastes peronii*
Spotted Grass Frog	*Limnodynastes tasmaniensis*
Haswell's Froglet	*Paracrinia haswelli*
Smooth Toadlet	*Uperoleia laevigata*
Tyler's Toadlet	*Uperoleia tyleri*

Reptiles

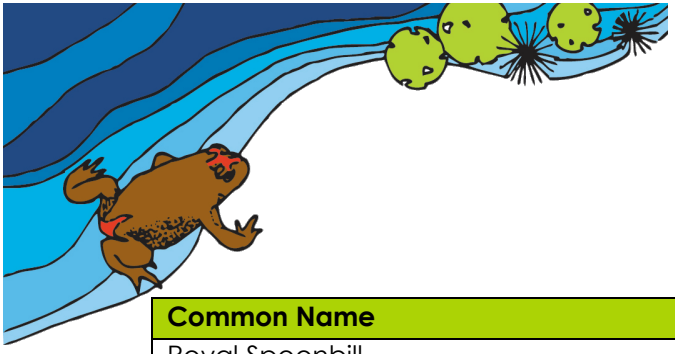
Common Name	Scientific Name
Diamond Python	*Morelia spilota spilota*
Common Death Adder	*Acanthophis antarcticus*
Yellow-faced Whip Snake	*Demansia psammophis*
Common Tree Snake	*Dendrelaphis punctulatus*
Golden-crowned Snake	*Cacophis squamulosus*
Eastern Small-eyed Snake	*Cryptophis nigrescens*
Red-naped Snake	*Furina diadema*
Black-bellied Swamp Snake	*Hemiaspis signata*
Tiger Snake	*Notechis scutatus*
Red-bellied Black Snake	*Pseudechis porphyriacus*
Eastern Brown Snake	*Pseudonaja textilis*
Dwyer's Snake	*Parasuta dwyeri*
Bandy Bandy	*Vermicella annulata*
Blackish Blind Snake	*Ramphotyphlops nigrescens*
Wood Gecko	*Diplodactylus vittatus*
Lesueur's Velvet Gecko	*Oedura lesueurii*
Broad-tailed Gecko	*Phyllurus platurus*
Thick-tailed Gecko	*Underwoodisaurus milii*
Burton's Snake-lizard	*Lialis burtonis*
Common Scaly-foot	*Pygopus lepidopodus*
Jacky Lizard	*Amphibolurus muricatus*
Bearded Dragon	*Pogona barbata*
Punctate Worm-skink	*Anomalopus swansoni*
Eastern Blue-tongue	*Tiliqua scincoides*
Southern Rainbow-skink	*Carlia tetradactyla*
Cream-striped Shinning-skink	*Cryptoblepharus virgatus*



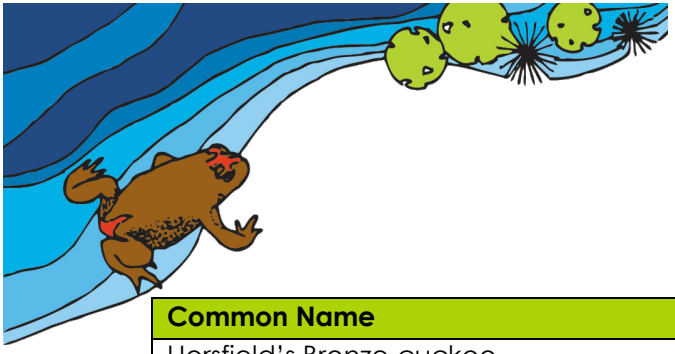
Common Name	Scientific Name
Robust Ctenotus	*Ctenotus robustus*
Copper-tailed Skink	*Ctenotus taeniolatus*
Mainland She-oak Skink	*Cyclodomorphus michaeli*
Pink-tongued Skink	*Cyclodomorphus gerrardii*
Cunningham's Skink	*Egernia cunninghami*
Black Rock Skink	*Egernia saxatilis*
White's Skink	*Liopholis whitii*
Eastern Water-skink	*Eulamprus quoyii*
Barred-sided Skink	*Eulamprus tenuis*
Dark-flecked Garden Sunskink	*Lampropholis delicata*
Pale-flecked Garden Sunskink	*Lampropholis guichenoti*
Weasel Skink	*Saproscincus mustelinus*
Red-throated Skink	*Acritoscincus platynota*
Three-toed Skink	*Saiphos equalis*
Lace Monitor	*Varanus varius*
Eastern Snake-necked Turtle	*Chelodina longicollis*

Birds

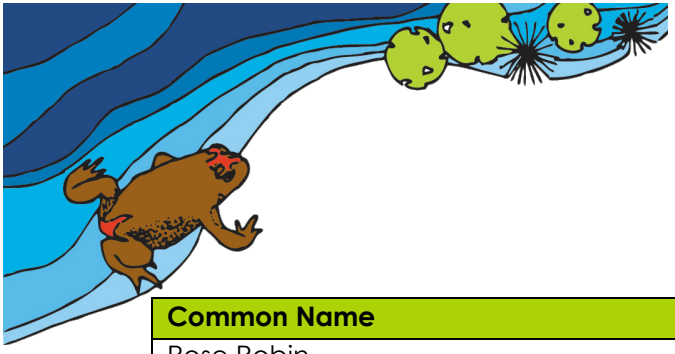
Common Name	Scientific Name
Brown Quail	*Coturnix ypsilophora*
Black Swan	*Cygnus atratus*
Australian Wood Duck	*Chenonetta jubata*
Mallard	*Anas platyrhynchos*
Pacific Black Duck	*Anas superciliosa*
Grey Teal	*Anas gracilis*
Chestnut Teal	*Anas castanea*
Australasian Grebe	*Tachybaptus novaehollandiae*
Great Crested Grebe	*Podiceps cristatus*
Hoary-headed Grebe	*Poliocephalus poliocephalus*
Little Pied Cormorant	*Microcarbo melanoleucos*
Little Black Cormorant	*Phalacrocorax sulcirostris*
Great Cormorant	*Phalacrocorax carbo*
Australian Pelican	*Pelecanus conspicillatus*
White-faced Heron	*Egretta novaehollandiae*
Little Egret	*Egretta garzetta*
White-necked Heron	*Ardea pacifica*
Great Egret	*Ardea alba*
Cattle Egret	*Ardea ibis*
Intermediate Egret	*Ardea intermedia*
Australian White Ibis	*Threskiornis molucca*
Straw-necked Ibis	*Threskiornis spinicollis*



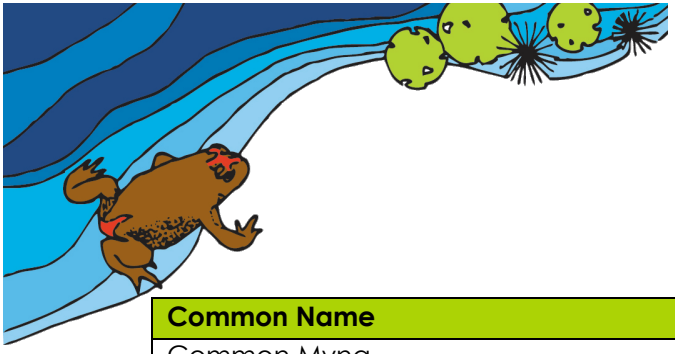
Common Name	Scientific Name
Royal Spoonbill	*Platalea regia*
Black-shouldered Kite	*Elanus axillaris*
Whistling Kite	*Haliastur sphenurus*
Wedge-tailed Eagle	*Aquila audax*
White-bellied Sea-eagle	*Haliaeetus leucogaster*
Swamp Harrier	*Circus approximans*
Brown Goshawk	*Accipiter fasciatus*
Collared Sparrowhawk	*Accipiter cirrocephalus*
Brown Falcon	*Falco berigora*
Australian Hobby	*Falco longipennis*
Nankeen Kestrel	*Falco cenchroides*
Buff-banded Rail	*Gallirallus philippensis*
Purple Swamphen	*Porphyrio porphyrio*
Dusky Moorhen	*Gallinula tenebrosa*
Eurasian Coot	*Fulica atra*
Latham's Snipe	*Gallinago hardwickii*
Black-winged Stilt	*Himantopus himantopus*
Black-fronted Dotterel	*Elseyornis melanops*
Masked Lapwing	*Vanellus miles*
Silver Gull	*Chroicocephalus novaehollandiae*
Rock Dove	*Columba livia*
White-headed Pigeon	*Columba leucomela*
Spotted Turtle-dove	*Streptopelia chinensis*
Brown Cuckoo-dove	*Macropygia amboinensis*
Emerald Dove	*Chalcophaps indica*
Common Bronzewing	*Phaps chalcoptera*
Crested Pigeon	*Ocyphaps lophotes*
Bar-shouldered Dove	*Geopelia humeralis*
Wonga Pigeon	*Leucosarcia picata*
Topknot Pigeon	*Lopholaimus antarcticus*
Yellow-tailed Black-cockatoo	*Calyptorhynchus funereus*
Galah	*Eolophus roseicapilla*
Long-billed Corella	*Cacatua tenuirostris*
Little Corella	*Cacatua sanguinea*
Sulphur-crested Cockatoo	*Cacatua galerita*
Rainbow Lorikeet	*Trichoglossus haematodus*
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*
Musk Lorikeet	*Glossopsitta concinna*
Australian King-parrot	*Alisterus scapularis*
Crimson Rosella	*Platycercus elegans*
Eastern Rosella	*Platycercus eximius*
Fan-tailed Cuckoo	*Cacomantis flabelliformis*



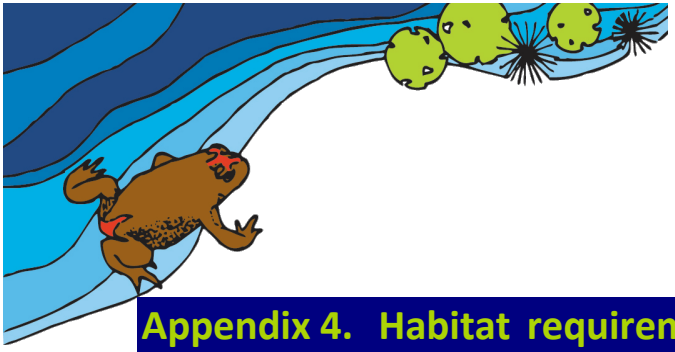
Common Name	Scientific Name
Horsfield's Bronze-cuckoo	*Chalcites basalis*
Channel-billed Cuckoo	*Scythrops novaehollandiae*
Asian Koel	*Eudynamys scolopaceus*
Southern Boobook	*Ninox novaeseelandiae*
Barn Owl	*Tyto alba*
Tawny Frogmouth	*Podargus strigoides*
White-throated Nightjar	*Eurostopodus mystacalis*
Australian Owlet-nightjar	*Aegotheles cristatus*
White-throated Needletail	*Hirundapus caudacutus*
Laughing Kookaburra	*Dacelo novaeguineae*
Sacred Kingfisher	*Todiramphus sanctus*
Rainbow Bee-eater	*Merops ornatus*
Dollarbird	*Eurystomus orientalis*
Superb Lyrebird	*Menura novaehollandiae*
Satin Bowerbird	*Ptilonorhynchus violaceus*
Superb Fairy-wren	*Malurus cyaneus*
Variegated Fairy-wren	*Malurus lamberti*
Spotted Pardalote	*Pardalotus punctatus*
White-browed Scrubwren	*Sericornis frontalis*
Large-billed Scrubwren	*Sericornis magnirostra*
Brown Gerygone	*Gerygone mouki*
White-throated Gerygone	*Gerygone albogularis*
White-throated Treecreeper	*Cormobates leucophaea*
Brown Thornbill	*Acanthiza pusilla*
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Yellow Thornbill	*Acanthiza nana*
Striated Thornbill	*Acanthiza lineata*
Buff-rumped Thornbill	*Acanthiza reguloides*
Red Wattlebird	*Anthochaera carunculata*
Little Wattlebird	*Anthochaera chrysoptera*
Noisy Friarbird	*Philemon corniculatus*
Bell Miner	*Manorina melanophrys*
Noisy Miner	*Manorina melanocephala*
Lewin's Honeyeater	*Meliphaga lewinii*
Yellow-faced Honeyeater	*Lichenostomus chrysops*
White-plumed Honeyeater	*Lichenostomus penicillatus*
Brown-headed Honeyeater	*Melithreptus brevirostris*
White-naped Honeyeater	*Melithreptus lunatus*
New Holland Honeyeater	*Phylidonyris novaehollandiae*
Eastern Spinebill	*Acanthorhynchus tenuirostris*
Scarlet Honeyeater	*Myzomela sanguinolenta*
Jacky Winter	*Microeca fascinans*



Common Name	Scientific Name
Rose Robin	*Petroica rosea*
Eastern Yellow Robin	*Eopsaltria australis*
Eastern Whipbird	*Psophodes olivaceus*
Crested Shrike-tit	*Falcunculus frontatus*
Golden Whistler	*Pachycephala pectoralis*
Rufous Whistler	*Pachycephala rufiventris*
Grey Shrike-thrush	*Colluricincla harmonica*
Black-faced Monarch	*Monarcha melanopsis*
Leaden Flycatcher	*Myiagra rubecula*
Restless Flycatcher	*Myiagra inquieta*
Magpie-lark	*Grallina cyanoleuca*
Rufous Fantail	*Rhipidura rufifrons*
New Zealand Fantail	*Rhipidura fuliginosa*
Willie Wagtail	*Rhipidura leucophrys*
Spangled Drongo	*Dicrurus bracteatus*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
White-bellied Cuckoo-shrike	*Coracina papuensis*
Olive-backed Oriole	*Oriolus sagittatus*
Dusky Woodswallow	*Artamus cyanopterus*
Grey Butcherbird	*Cracticus torquatus*
Australian Magpie	*Cracticus tibicen*
Pied Currawong	*Strepera graculina*
Australian Raven	*Corvus coronoides*
White-winged Chough	*Corcorax melanorhamphos*
Apostlebird	*Struthidea cinerea*
Eurasian Skylark	*Alauda arvensis*
Australasian Pipit	*Anthus novaeseelandiae rogersi*
House Sparrow	*Passer domesticus*
Red-browed Finch	*Neochmia temporalis*
Double-barred Finch	*Taeniopygia bichenovii*
Mistletoebird	*Dicaeum hirundinaceum*
Welcome Swallow	*Hirundo neoxena*
Tree Martin	*Petrochelidon nigricans*
Fairy Martin	*Petrochelidon ariel*
Cicadabird	*Coracina tenuirostris*
Red-whiskered Bulbul	*Pycnonotus jocosus*
Australian Reed-warbler	*Acrocephalus australis*
Little Grassbird	*Megalurus gramineus*
Golden-headed Cisticola	*Cisticola exilis*
Silvereye	*Zosterops lateralis*
Eurasian Blackbird	*Turdus merula*
Common Starling	*Sturnus vulgaris*



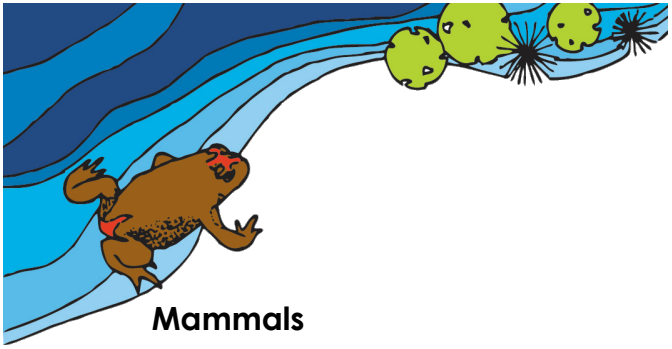
Common Name	Scientific Name
Common Myna	*Sturnus tristis*



Appendix 4. Habitat requirements for locally-occurring threatened fauna species

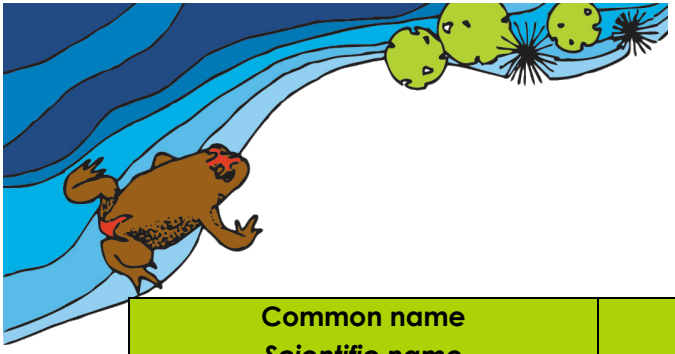
Birds

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Black bittern Ixobrychus flavicollis BC Act, Sch. 2, Vul.	Both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation.	No suitable natural habitat occurs on the site.
Square-tailed Kite *Lophoictinia isura* BC Act, Sch. 2, Vul.	Inhabits coastal forest and woodlands. Most commonly associated with ridge and gully forests dominated by Woollybutt, Spotted Gum or Peppermint Gum.	Suitable natural habitat occurs on the site.
Australian Painted Snipe Rostratula australis BC Act, Sch. 1, End. EPBC Act, End.	Inhabits shallow freshwater wetlands, particularly where there is a cover of vegetation. Tends to prefer areas that have a mixture of grass tussocks (nest sites) and open mud areas (feeding sites).	No suitable natural habitat occurs on the site.
Little Lorikeet *Glossopsitta pusilla* BC Act, Sch. 2, Vul.	Inhabits the open forests and dead timber alongside watercourses. Also occurs in eucalypt forest in mountainous regions.	Suitable foraging habitat occurs on the site.
Swift Parrot *Lathamus discolor* BC Act, Sch. 2, Vul. EPBC Act, End.	Occurs in a variety of Eucalypt forests. Migrates from Tasmania to the mainland during the winter/autumn months to feed mostly on winter flowering Eucalypts	No suitable foraging habitat occurs on the site.
Powerful Owl *Ninox strenua* BC Act, Sch. 2, Vul.	Pairs occupy permanent territories in mountain forests, gullies and forest margins, sparser hilly woodlands, coastal forests, woodlands and scrubs.	Suitable natural habitat occurs on the site.
Masked Owl *Tyto novaehollandiae* BC Act, Sch. 2, Vul.	Forests, open woodlands and farms with large trees, e.g. river red gums adjacent to cleared country.	No suitable natural habitat occurs on the site.
Dusky Woodswallow *Artamus cyanopterus cyanopterus* BC Act Sch. 2, Vul.	Often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests.	No suitable natural habitat occurs on the site.



Mammals

Common name ***Scientific name*** Schedule listing	**Preferred habitat**	**Comment**
Koala *Phascolarctos cinereus* BC Act, Sch. 2, Vul.	Eucalypt forests rich in Swamp Mahogany (E. robusta), Forest Red Gum (E. tereticornis), and Grey Gum (E. punctata).	No suitable natural habitat occurs on the site.
Yellow-bellied Glider *Petaurus australis* BC Act, Sch. 2, Vul.	Restricted to tall, mature sclerophyll forests in regions of high rainfall. Requires nesting hollows and a year-round supply of flowering trees.	No suitable natural habitat occurs on the site.
Grey-headed Flying-fox *Pteropus poliocephalus* BC Act, Sch. 2, Vul. EPBC Act, Vul.	Found in rainforest, wet and dry sclerophyll forest and mangroves. Camps are usually in gullies, close to water and in vegetation with a dense canopy. Feeds on a wide variety of flowering and fruiting plants.	Suitable foraging habitat occurs on the site.
Eastern Coastal Free-tail Bat *Micronomus norfolkensis* BC Act, Sch. 2, Vul.	Dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures.	Suitable foraging habitat occurs on the site.
Eastern False Pipistrelle *Falsistrellus tasmaniensis* BC Act, Sch. 2, Vul.	Little known of habitat. Has been found roosting in stem holes of living Eucalypts	Suitable foraging habitat occurs on the site.
Little Bent-winged Bat *Miniopterus australis* BC Act, Sch. 2, Vul.	Well-timbered habitats incl. rainforest, Melaleuca swamps and dry sclerophyll forests. Roosts in caves and storm-water channels and similar structures. Does not roost in tree hollows.	Suitable foraging habitat occurs on the site.
Large Bent-winged Bat *Miniopterus orianae oceanensis* BC Act, Sch. 2, Vul.	Well-timbered valleys. Roosts in caves and storm-water channels and similar structures. Does not roost in tree hollows.	Suitable foraging habitat occurs on the site.
Southern Myotis *Myotis macropus* BC Act, Sch. 2, Vul.	Requires open areas of water over which it hunts. Roosts in caves, under bridges and buildings and sometimes in dense foliage in rainforests. May roost in tree hollows.	No suitable natural habitat occurs on the site.



Common name ***Scientific name*** Schedule listing	Preferred habitat	Comment
Greater Broad-nosed Bat *Scoteanax rueppellii* BC Act, Sch. 2, Vul. EPBC Act, Lower risk (near threatened)	Found in woodlands, moist and dry sclerophyll forests and rainforests. Prefers gullies. Roosts in tree hollows only.	Suitable foraging habitat occurs on the site.

Frogs

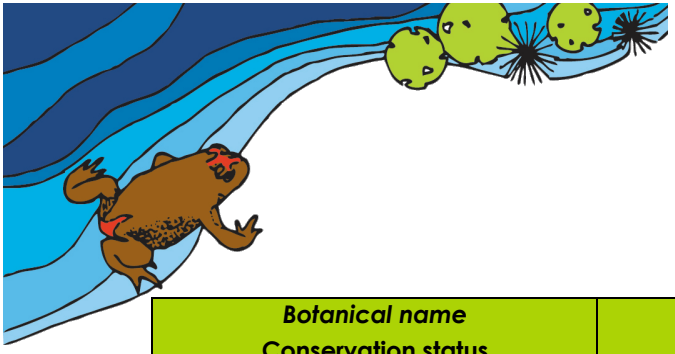
Common name ***Scientific name*** Schedule listing	Preferred habitat	Comment
Green and Golden Bell Frog *Litoria aurea* TSC Act, Sch. 1, End. EPBC Act, Vul.	Permanent water sources with vegetated margins in dams, lagoons, streams, swamps or ornamental ponds.	No suitable natural habitat occurs on the site. Poor connectivity.

Invertebrates

Common name ***Scientific name*** Schedule listing	Preferred habitat	Comment
Cumberland Plain Land Snail *Meridolum corneovirens* BC Act, Sch. 1, End. EPBC Act, Vul.	Found amongst logs and debris in Cumberland Plain and Castlereagh woodlands.	No suitable natural habitat occurs on the site.

Appendix 5. Habitat requirements for locally-occurring threatened plant species

Botanical name **Conservation status**	**Habitat description**	**Suitable habitat on site**
Acacia pubescens ROTAP, 3VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Usually grows in dry sclerophyll forest and woodland in clay soils. Often in roadside and railside bushland remnants.	No
Allocasuarina glareicola ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, End.	Grows in open forest on lateritic soil; restricted to a few small populations in or near Castlereagh S.F., NE of Penrith.	No
Callistemon linearifolius ROTAP, 2RCi BC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest on the coast and adjacent ranges, chiefly from Georges R. to the Hawkesbury R.	No
Dillwynia tenuifolia ROTAP, 2RCa BC Act, Sch. 2, Vul.	Grows in dry sclerophyll woodland on sandstone, shale or laterite; from Cumberland Plain, Blue Mtns to Howes Valley area.	No
Grevillea juniperina subsp. juniperina BC Act, Sch. 2, Vul.	Grows in open dry sclerophyll (eucalypt-dominated) forest or woodland, at altitudes of less than about 50 m, in sandy to clay-loam soils and red pseudolateritic gravels.	No
Grevillea parviflora subsp. parviflora BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heathy associations or shrubby woodland, in sandy or light clay soils usually over shale substrates.	No
Marsdenia viridiflora subsp. viridiflora BC Act, Sch. 1, End. Pop.	Grows in woodland and scrub; north from the Razorback Ra. (Bankstn, Blacktn, Camden, Campbelltn, Fairfield, Holroyd, Liverpool & Penrith LGAs)	No
Persoonia nutans ROTAP, 2ECi BC Act, Sch. 1, End. EPBC Act, End.	Grows in woodland to dry sclerophyll forest on laterite and alluvial sand; confined to the Cumberland Plain.	No
Pimelea spicata ROTAP, 3ECi BC Act, Sch. 1, End. EPBC Act, End.	Grows on the coast from Lansdowne to Shellharbour and inland to Penrith; rare.	No
Platysace clelandii ROTAP, 2RCa	Grows among sandstone boulders in dry sclerophyll forest, from Glen Davis to Berowra.	No
Pomaderris brunnea ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	In open forest, confined to the Colo R. and upper Nepean R.	No



Botanical name Conservation status	Habitat description	Suitable habitat on site
Prostanthera cryptandroides BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows chiefly in the Lithgow to Sandy Hollow districts.	No
Prostanthera marifolia BC Act, Sch. 4, Ext A. EPBC Act, CE.	Occurs in sandy soils with clay-loam and ironstone on ridge tops.	No
Pseudanthus divaricatissimus ROTAP, 3RCa	Mostly from Muswellbrook to Bega, with outlying populations near Urbenville and Dubbo (Goonoo State Forest).	No
Pterostylis gibbosa ROTAP, 2E (X-WSyd) BC Act, Sch. 1, End. EPBC Act, End.	Grows among grass in sclerophyll forest; rare, chiefly in the southern parts of the central coast, with a disjunct population in the Hunter Valley.	No
Pterostylis saxicola ROTAP, (2E) BC Act, Sch. 1, End. EPBC Act, End.	Grows in shallow soil over sandstone sheets, often near streams; rare, from Picnic Point to Picton area.	No
Pultenaea sp. 'Genowlan Point' (NSW 417813) BC Act, Sch. 1, Crit. End. EPBC Act, Crit. End.	It is endemic to New South Wales and is only found at Genowlan Point in the Capertee Valley. At Genowlan Point, Pultenaea sp. 'Genowlan Point' (Allen s.n., 29 Nov. 1997) is restricted to well drained stoney soils.	No
Pultenaea glabra EPBC Act, Vul.	Grows in dry sclerophyll forest on sandstone; higher Blue Mtns and Glen Davis area.	No
Pultenaea parviflora ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, Vul.	Grows in dry sclerophyll forest on Wianamatta Shale, laterite or alluvium, Cumberland Plain.	No

Key

BC Act 2016:

Sch1 = Schedule 1: Endangered species
Part 1: endangered species
Part 2: endangered populations
Part 3: endangered ecological communities
Part 4: species presumed extinct
Sch2 = Schedule 2: Vulnerable species

EPBC Act 1999:

CE = Critically Endangered
E = Endangered
V = Vulnerable
EP = Endangered Population

ROTAP Codes

1 Known by one collection only
2 Geographic range in Australia < 100Km
3 Geographic range in Australia > 100Km
E Endangered
V Vulnerable
R Rare
X Extinct
K Poorly known
C Reserved
a > or = 1000 plants reserved
i < 1000 plants reserved
t Total known population reserved
- Reserved population size unknown
+ Overseas occurrence

Appendix 6. Matters of National Environmental Significance

The Protected Matters Search Tool was used to find relevant Matters of National Environmental Significance (MNES) on or near the site.

Five Listed Threatened Ecological Communities are recorded in the area: 1. Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion; 2. Cooks River/ Castlereagh Ironbark Forest of the Sydney Basin Bioregion; 3. Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest; 4. Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland; and 5. Western Sydney Dry Rainforest and Moist Woodland on Shale. These ecological communities are protected under Commonwealth legislation by the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999) and are listed as Endangered and Critically Endangered.

No Commonwealth Heritage Places, Critical Habitats or Commonwealth Marine or Terrestrial Reserves were reported.

Australian Government
Department of Agriculture, Water and the Environment

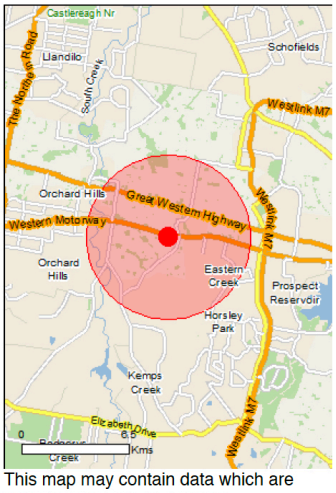
EPBC Act Protected Matters Report

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.

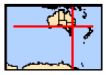
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 20/10/20 17:36:54



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates
Buffer: 5.0Km



Appendix 7. Company Profile

Abel Ecology has been in the biodiversity consulting business since 1991, starting in the Sydney Region, and progressively more state wide in New South Wales since 1998, and now also in Victoria. During this time extensive expertise has been gained with regard to Master Planning, Environmental Impact assessments including flora and fauna, bushfire reports, Vegetation Management Plans, Management of threatened species, Review of Environmental Factors, Species Impact Statements, Biodiversity Development Assessment Reports and as Expert Witness in the Land and Environment Court. We have done consultancy work for industrial and commercial developments, golf courses, civil engineering projects, tourist developments as well as residential and rural projects. This process has also generated many connections with relevant government departments and city councils in NSW. Our team consists of four scientists and two administrative staff, plus casual assistants as required.

Licences

NPWS s132C Scientific licence number is SL100780 expires 31 July 2021
NPWS GIS data licence number is CON95034
DG NSW Dept of Primary Industries Animal Care and Ethics Committee Approval expires 8 November 2021
DG NSW Dept of Primary Industries Animal Research Authority expires 8 November 2021

The Consultancy Team

Dr Danny Wotherspoon

Grad Dip Bushfire Protection (University of Western Sydney 2012)
PhD (researching Cumberland Plain vegetation and fauna habitat, at Centre for Integrated Catchment Management, University of Western Sydney, 2008)
Planning for Bushfire Protection Certificate course (University of Technology, 2006)
Consulting Planners Bushfire Training Course (Planning Institute of Australia, 2003)
MA (Macquarie University, 1991)
Wildlife Photography Certificate (Sydney Technical College, 1987)
Herpetological Techniques Certificate (Sydney Technical College, 1986)
Applied Herpetology Certificate (Sydney Technical College, 1980)
Dip Ed (University of New England, 1978)
BSc (Zoology, Ecology) University of New England 1974)

Dr Daniel McDonald

B. Ag Sc; M. Agr; PhD (The University of Sydney)
Cert IV – GIS (Riverina TAFE)
Daniel is an accredited Biobanking Assessor (0075) and an accredited BAM assessor (BAAS17056)
Quantified Tree Risk Assessment (QTRA) and Visual Tree Assessment (VTA), White Card

Daniel is an experienced ecologist with expertise in fauna, plant species identification, vegetation assessment, agriculture, arboriculture, conservation genetics and seed collection and preservation. He is accredited both for BAM assessments, BioBanking assessments and Biodiversity Certification. His present research interest is in Eastern Suburbs Banksia Scrub and fragmented endangered ecological communities.

Mark Mackinnon

Qualifications: B Env. Sci. (Hons),

MEIANZ, White Card

Accredited Practitioner Level 2 - Bushfire Planning & Design (BPAD), Accreditation number 36395.

Mark is a passionate and enthusiastic scientist who thrives in the field of natural resource management. In the last 6 years, Mark has worked for a number of inter-state government agencies and environmental consultancies. He has experience in threatened species, fire ecology, bushfire management, pest plant and animals, and landscape restoration. In particular he specializes in ornithology and bushfire management. Mark has a number of specialized field-based skills including: simple and complex tree climbing, working at heights, general firefighter departmental fire accreditation, venomous snake and reptile handling, immunization to handle bat species, and an A - class bird banding licence with mist-net endorsement. Mark is also skilled in ArcGIS mapping, first-aid, four -wheel-driving.

Dr Alison Hewitt
B. Sc. (Hons), PhD.
MESA, MAPS, MASBS, Snr 1st Aid cert, White card.
Alison has researched and published on the reproductive biology and ecology of Australian Melaleuca species, native plant responses to fire and the vegetation of western Sydney. Alison's interests include plant ecology and flora survey methodology, bush regeneration, plant identification and gardening. Alison teaches Botany and Ecology sessionally with Western Sydney University.

Dr Stephanie A Clark
BAppSc (Biochemistry), MSc, PhD

Member of the IUCN SSC Mollusc Specialist Group. Research Associate at both the Field Museum of Natural History, Chicago, IL, USA and The Australian Museum, Sydney, NSW.

Stephanie has been interested in the taxonomy, systematics and conservation of invertebrates particularly molluscs since the late 1970's when she first started volunteering at the Australian Museum.

She has been an ecological consultant specialising in invertebrates since 1997. She has worked for private developers, mining companies, local community groups and local, state and federal government agencies in three countries (Australia, USA and Canada) and has been an expert witness for the NSW Land and Environment Court.
Stephanie's PhD researched the taxonomy, systematics and conservation of the NSW listed snail Meridolum corneovirens (Cumberland Plain Land Snail). She has given presentations to local, national and international conferences in Australia, Germany and USA. She field experience in 16 countries, all states of Australia and 40 US states. Stephanie's has published more than 30 scientific papers in national and international journals and described more than 155 species and 10 genera.

Mark Sherring
BM, MAABR, Cert. Hort., Cert. Bush Regen, Cert. Rural Ops, White Card.

Member of the Australian Association of Bush Regenerators

Mark has extensive knowledge and experience of plant species in New South Wales. He has built up his expert knowledge on NSW native plant species over the many years that he has practised as a Botanist. He is regularly asked to contribute to the extensive (ongoing) flora surveys of the Sydney Basin and Blue Mountains carried out by the Royal Botanic Gardens, Sydney. Mark has extensive field survey experience, having worked for over ten years in various plant-related roles. His role in Abel Ecology is to provide expert advice on flora and on the full range of flora management issues encountered and in the design and management of environmental monitoring projects.