APPENDIX B Ecological assessment, emergency storage tank, Cattai Creek carrier, Mile End Road, Rouse Hill (Ecological, 2014)

NWGC1 EMERGENCY STORAGE TANK FLORA AND FAUNA ASSESSMENT

Flora and Fauna Assessment

For:

Sydney Water

March 2014

Final

PO Box 2474
Carlingford Court 2118

Report No. 14004RP1

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

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Table of Contents

1 INTRODUCTION

1.1 Purpose *1.1*

1.2 Background *1.1*

1.3 Terminology *1.2*

2 METHODOLOGY

2.1 Database Searches and Literature Review *2.1*

2.2 Flora Survey *2.1*

2.3 Fauna Survey *2.4*

2.3.1 Fauna Habitat Assessment *2.4*

2.4 Limitations *2.4*

2.4.1 Flora *2.4*

2.4.2 Fauna *2.4*

3 RESULTS

3.1 Introduction *3.1*

3.2 Vegetation Communities *3.1*

3.2.1 Shale-Sandstone Transition Forest *3.1*

3.3 Flora Species *3.3*

3.4 Fauna Habitat Assessment *3.3*

3.5 Fauna Species *3.4*

3.5.1 Birds *3.5*

3.5.2 Mammals *3.6*

3.5.3 Reptiles *3.7*

3.5.4 Amphibians *3.7*

4 IMPACT ASSESSMENT

5 CONCLUSION AND RECOMMENDATIONS

6 REFERENCES

Table of Appendices

A. FLORA SPECIES LIST

B. LIKELIHOOD OF OCCURANCE OF THREATENED FLORA

C. LIKELIHOOD OF OCCURANCE OF THREATENED FAUNA

D. SECTION 5A ASSESSMENT (7 PART TESTS)

D.1	Shale/Sandstone Transition Forest	*D.1*
D.2	Grey-headed Flying-fox (Pteropus poliocephalus)	*D.2*
D.3	Microchiropteran Bats	*D.4*
D.4	Powerful Owl (Ninox strenua)	*D.6*

List of Tables

3.1	Threatened Bird Species Recorded within 10km of the Subject Site	3.5
3.2	Threatened Mammal records within 10km of the subject site	3.6
A.1	Flora Species Encountered during the Meander Survey in the Subject Site	A.1
A.2	Quadrat Species Relative Abundance Data	A.2
B.1	Assessment of the Likelihood of Occurrence of Threatened Flora Species within the Subject Site	B.1
C.1	Likelihood of Occurrence for Threatened Fauna within the Subject Site	C.1

List of Figures

1.1	Location of the Subject Site	1.3
2.1	Vegetation Communities at the Subject Site	2.3

List of Photographs

3.1	Regenerating portion of Shale-Sandstone Transition Forest along the cycleway	3.2
3.2	Intact portion of Shale-Sandstone Transition Forest	3.2

Chapter 1

introduction

1.1 Purpose

Cumberland Ecology has been requested by Sydney Water to undertake a flora and fauna assessment of the proposed Emergency Storage Tank adjacent to SPS1107 at the end of Mile End Road, Rouse Hill.

The proposed Emergency Storage Tank area, hereon referred to as "the subject site" currently supports predominately hard standing in the form of roads, pavements and a pump station with scattered planted trees within the hard standing and surrounding vegetation. **Figure 1.1** shows the location of the subject site.

The objectives of this report are to:

- Describe the vegetation communities on the subject site;
- Describe the fauna habitat characteristics of the subject site;
- Assess the likelihood of occurrence of threatened species, populations or ecological communities on the subject site (as listed under the schedules of the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- Assess the potential impacts of the proposed emergency storage tank on threatened flora, fauna and vegetation communities; and
- Where relevant, to recommend avoidance and mitigation measures to reduce the impacts of the development on flora and fauna.

1.2 Background

The subject land is located within The Hills Shire Local Government Area (LGA) and the subject site forms an area of an existing pump station with associated hard standing and vegetated areas totalling an area approximately 0.32 ha in size (see **Figure 1.1**). The proposed development entails the clearing of approximately 0.19 ha of vegetation to facilitate to construction of an emergency storage tank.

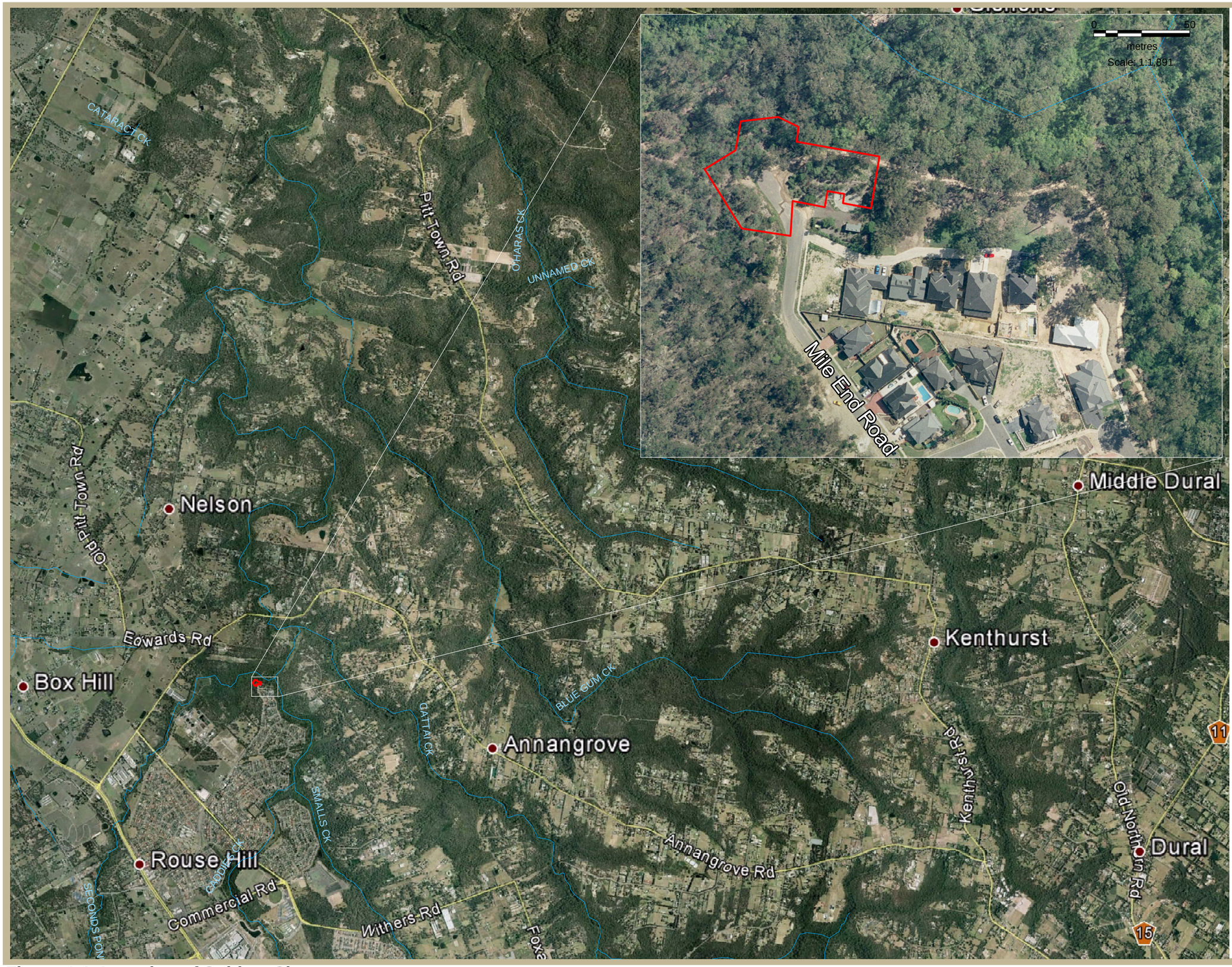
The emergency storage tank would be located just north-west of the North Kellyville Precinct boundary and outside the land subject to the Sydney Growth Centre's SEPP. The Biodiversity Certification which has been granted for the Growth Centre's SEPP under Section 126 of the *Threatened Species Conservation Act 1995* does therefore not apply to the proposal.

1.3 Terminology

This report uses the following terminology:

- Subject site means the proposed area required to construct the Emergency Storage Tank (Red line boundary on **Figure 2**);
- Locality is the area within 10km of the the subject site;
- LGA abbreviates Local Government Area;
- EPBC Act abbreviates the Commonwealth Environment Protection and Biodiversity Conservation Act 1999;
- TSC Act abbreviates the NSW Threatened Species Conservation Act 1995; and
- OEH abbreviates the NSW Department of Office of Environment and Heritage.

Coordinate System: MGA Zone 56 (GDA 94)



Legend

- Waterway
- Subject Site

Grid North

Main Image Source:

GooglePro © Google ©SKM 1Jan09
(Captured 20140310)

Inset Image Source:

Sydney Water

CUMBERLAND ECOLOGY

I:\...\14004\Figures\14004RP1_20140310\Figure 1_Location_20140324

Figure 1.1. Location of Subject Site

1 0 1 2 3 4

Kilometers

Chapter 2

Methodology

2.1 Database Searches and Literature Review

Prior to surveys, databases were reviewed to determine the likely occurrence of threatened flora and fauna species. Particular emphasis was given to determining the likely occurrence of any of the threatened flora and fauna known to occur in the wider locality. Searches were conducted for a radius of 10km from the subject site from the following databases:

- Office of Environment and Heritage (OEH) Atlas of NSW Wildlife; and
- Commonwealth Department of the Environment (DOE) EPBC Protected Matters Search Tool.

In addition, relevant literature was reviewed to further ascertain the likelihood of occurrence of species, particularly threatened species, in the locality of the subject site.

2.2 Flora Survey

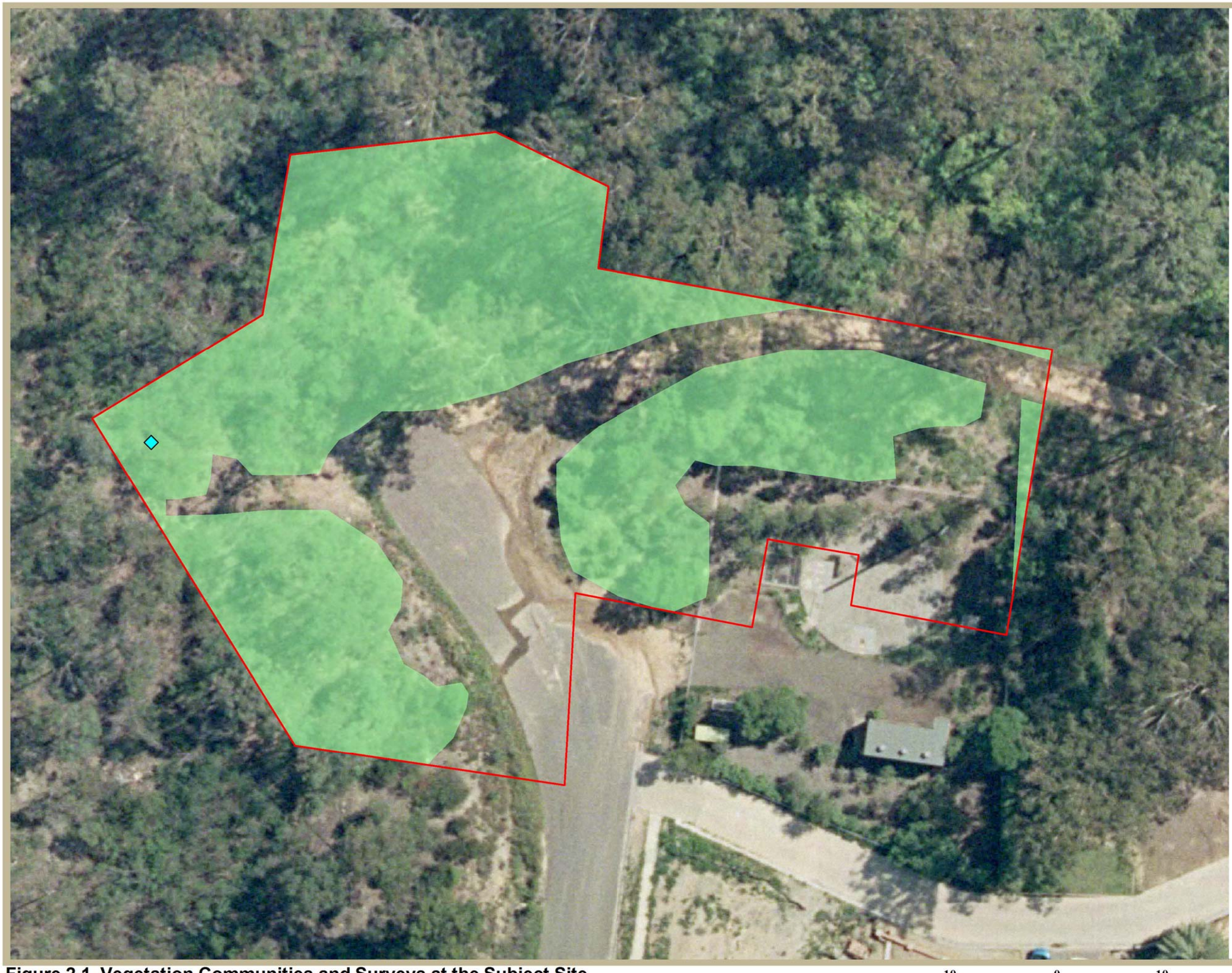
A flora survey was undertaken on the 17th February and 12th March 2014. The purpose of the survey was to ground truth the vegetation, determine the vegetation communities to be impacted and to survey the flora species present. The survey involved the following:

- Random meander surveys to detect flora species across the subject site and to ground-truth existing vegetation mapping;
- One flora quadrat recording all species and abundance within a 20m x 20m area to confirm vegetation community;
- Targeted searches for threatened flora known or considered likely to occur within the subject site; and
- Targeted searches for endangered ecological communities (EECs) known or considered likely to occur within the subject site.

The relative abundance of flora species within the vegetation community was approximated using a relative abundance scale. This scale defines species as rare to common, based on their relative abundance to other species in the vegetation community. The entire disturbance footprint was surveyed. The results of this are shown in **Figure 2.1**.

Within the meander survey and quadrat, all vascular flora species present were identified to species level where possible, and recorded. All vascular plants recorded or collected were identified using keys and nomenclature provided in Harden (Harden 1990-1993).

Coordinate System: MGA Zone 56 (GDA 94)



Legend

Subject Site

Surveys

Quadrat

Vegetation Communities

Shale Sandstone Transition Forest

Grid North

Image Source:

Sydney Water

CUMBERLAND ECOLOGY

I:\...\14004\Figures\14004RP1_20140310\Figure 2_Vegetation Communities_20140324

Figure 2.1. Vegetation Communities and Surveys at the Subject Site

10 0 10 20 30 40

Meters

2.3 Fauna Survey

2.3.1 Fauna Habitat Assessment

Fauna habitat assessments were conducted on 17th February and 12th March 2014. Fauna habitat assessments were undertaken in conjunction with flora surveys during the field survey. Fauna habitat assessments included consideration of important indicators of habitat condition and complexity including the occurrence of microhabitats such as tree hollows, fallen logs, bush rock and wetland areas such as creeks and soaks. An assessment of the structural complexity of vegetation, the age structure of the forest and the nature and extent of human disturbance throughout the subject land was also undertaken and considered. Structural features considered included the nature and extent of the understorey and ground stratum, extent of canopy and flowering characteristics.

Hollows were used as a general indication of habitat quality for arboreal fauna, and hollow dwelling birds and bats. Hollows observed during surveys were noted and details of the size and type were recorded, if present. Additionally, artificial habitat for hollow dwelling fauna (such as cracks in building roofs and old sheds) were recorded, if present, and considered in terms of potential fauna habitat.

Indirect indicators of fauna use of the site such as droppings, diggings, footprints, scratches, nests, burrows, paths and runways were recorded. The field surveys included targeted searches for owl pellets in likely roosting habitats. An incidental list of fauna detected was maintained throughout the survey.

2.4 Limitations

2.4.1 Flora

Owing to the survey relying on a two short inspections of the subject site, it was impossible to identify all species present within the entire community. Some threatened species only flower at particular times of the year, and are difficult to notice when they are not flowering. The flora survey was undertaken over a single month (February to March), and therefore, despite targeted threatened flora species searches being undertaken, some threatened species may be present that were not recorded. Accordingly, an assessment of the likelihood of occurrence of all threatened flora species recorded in the locality was undertaken to supplement the flora survey.

Despite these limitations, it is likely that the majority of flora species have been recorded during this survey, and therefore it is considered that issues including conservation significance of the flora, condition and viability of the vegetation and likely impact on native vegetation have been satisfactorily assessed.

2.4.2 Fauna

Fauna surveys relied on literature review, database analysis, and fauna habitat assessment. In common with the flora surveys, the fauna surveys were undertaken in a short period of

time and therefore the fauna species recorded are a “snapshot” only, of species that were active at the time. It is likely that additional species would be recorded with more survey effort. An assessment of the likelihood of occurrence of all threatened fauna species recorded in the locality was undertaken to supplement the fauna habitat assessment. Taking into consideration all the ecological survey effort that has been spent on the subject land, it is considered that the fauna surveys were adequate, and that all threatened species with potential to occur are known and have been satisfactorily assessed.

Chapter 3

Results

3.1 Introduction

The vegetation and habitats within the subject site vary in condition as a result of previous land clearing and land uses within the immediate vicinity. Previously cleared land occurs largely in the eastern portion of the subject site and native vegetation occurs within the western portion and along the northern boundary. Hard standing occurs to the centre and south of the subject site in the form of a road and existing pump station.

3.2 Vegetation Communities

Shale-Sandstone Transition Forest was the only vegetation community identified on the subject site. This community is mapped in **Figure 3.1** and described in further detail below.

3.2.1 Shale-Sandstone Transition Forest

TSC Act: EEC - Shale/Sandstone Transition Forest (NSW Scientific Committee 1998).

EPBC Act: EEC - Shale/Sandstone Transition Forest (SEWPaC 2011).

Shale/Sandstone Transition Forest occurs in the western portion and along northern boundary of the subject site. In addition, a regrowth portion of this community also occurs to the east of the subject site. Within the intact portion of this community *Eucalyptus teretricornis* (Forest Red Gum) dominates with occurances of *Eucalyptus crebra* (Narrow-leaved Ironbark), *Eucalyptus punctata* (Grey Gum) and *Corymbia gumminifera* (Red Bloodwood) in the canopy layer. The midstorey included *Acacia implexa* (Lightwood), *Acacia parramattensis* (Parramatta Wattle) and regenerating canopy species. The shrub layer was dominated by *Acacia parramattensis*, *Leucopogon juniperinus* (Bearded Heath) and the exotic species Small-leaved Privet (*Ligustrum sirense*). The ground flora was dominated by the grasses *Paspalidium digitans*, *Microlaena stipoides* and *Eragrostis brownii*. The regenerating area of this community has a canopy dominated by *E. Teretricornis* was a sparse shrub layer and ground flora pf a similar composition as the intact area. This community is shown in **Photographs 3.1** and **3.2** and the quadrat abundance data is given in **Table A.2** in **Appendix A**.

Photograph 3.1 Regenerating portion of Shale-Sandstone Transition Forest along the cycleway

Photograph 3.2 Intact portion of Shale-Sandstone Transition Forest

3.3 Flora Species

A list of flora species detected during the random meander survey and quadrat plot is provided in **Table A.1** and **A.2** in **Appendix A**.

The problematic weed Small-leaved Privet (*Ligustrum sinense*) was recorded within the subject site. This is a weed that requires removal as it is declared in NSW under the *Noxious Weeds Act 1993.* This species was recorded along the northern boundary of the subject site. Appropriate management by the landowner will need to be undertaken to target these exotic species.

The subject site provides potential habitat for a number of threatened flora species, however no threatened flora species were detected on the subject site. The negative impacts from surrounding land uses are likely to have occurred for an extended period of time, which is anticipated to reduce the potential for these species to persist. An analysis of the likelihood of occurrence on the subject site for each threatened flora species recorded within the locality is provided in **Table B.1** in **Appendix B**. No threatened flora species are likely to occur due to the lack of suitable habitat from past land use and previous clearing. None of the listed species threatened flora species were recorded within the subject site during both surveys and therefore no Assessments of Significance were considered necessary for threatened flora species.

3.4 Fauna Habitat Assessment

Vegetation within and adjacent to the subject site provides potential habitat for a range of native vertebrate fauna species, including birds, terrestrial and arboreal mammals, bats and reptiles. Fauna habitat values of the subject site are generally associated with the areas of native vegetation in the western portion of the subject site. Vegetated areas with a greater complexity in structure are likely to support a wider range of species than the communities with simple structure.

A range of fauna habitats are present throughout the broader subject land, and include:

- Fruit, nectar and seed producing trees and shrubs;
- Drainage lines with associated aquatic habitats;
- Moderately dense understorey;
- Moderately dense groundcover;
- Leaf litter and fallen logs; and
- Cleared mown areas.

The subject land supports a wide variety of habitat types ranging from highly disturbed areas of low quality habitat to areas of relatively low disturbance with high quality habitat. The flower, nectar and seed producing tree and shrub species provide a seasonal foraging

resource for a range of arboreal mammal and bird species. The drainage lines with their associated aquatic habitats provide habitat for a number of bird, mammal, reptile and amphibian species. The cleared areas to the east of the subject site provide habitat for mostly exotic bird and mammal species. However; no hollow bearing trees were located during the survey.

No creeks or water bodies are located within the site; however one ephemeral drainage line does occur through the eastern section of the subject site. The drainage line feeds from a storm-water pipe, and may provide habitat for urban-adapted amphibian species previously detected within the subject land, such as the Striped Marsh Frog (*Limnodynastes peronii*) or Common Eastern Froglet (*Crinia signifera*). Second Ponds Creek is located approximately 200m for the propoed Emergency Storage Tank.

3.5 Fauna Species

The fauna survey recorded the following species:

- Common Eastern Froglet (*Crinia signifera*)
- Dark-flecked Garden Sunskink (*Lampropholis delicata*);
- Bar-shouldered Dove (*Geopelia humeralis*);
- Bell Miner (*Manorina melanophrys*); and
- Eastern Whipbird (*Psophodes olivaceus*).

These species are common in the locality.

No threatened fauna species listed under the TSC Act and EPBC Act were recorded from the subject site.

Although not recorded during the site visit, several threatened species have been recorded within a 10km radius of the subject site and potential habitat for some of these species is present in and near the subject site. An analysis of the likelihood of occurrence on the subject site for each threatened fauna species recorded within the locality is provided in **Table C.1** in **Appendix C.** This indicates that some species may potentially occur in the subject site, however are more likely to occur in the riparian zone outside the subject site. These species are Grey-headed Flying-fox (*Pteropus poliocephalus*), Powerful Owl (*Ninox strenua*) and several microchiropteran bats; Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Little Bentwing-bat (*Miniopterus australis*), Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), Southern Myotis (*Myotis macropus*), and Greater Broad-nosed Bat (*Scoteanax rueppellii*).

The Grey-headed flying fox is likely to occur in the riparian area outside of the subject site. The Grey-headed Flying-fox may forage in the riparian zone, however no breeding or

roosting habitat is present. This species roosts in large “camps” but no roosts occur on or near the subject site.

Powerful Owls usually occur where there are large areas of forest or woodland and they can also be found in fragmented landscapes. It is possible that this species may utilise the riparian vegetation and Shale/Sandstone Transition Forest, however it is only likely to utilise it occasionally as part of a very large home range. No suitable large hollows are present in or near the subject site and therefore breeding habitat is not present.

Microchiropteran bats may potentially occur in vegetation on and adjacent to the subject site. They may forage within the riparian habitat and Shale/Sandstone Transition Forest and potentially use some of the hollow-bearing trees as roosting habitat. The Eastern Bentwing-bat mainly roosts in caves (and occasionally man-made structures) so would only occur to forage. These are highly mobile species however that access resources from a large area. They are known to overfly disturbed areas while foraging and are not likely to be dependent on the habitat present in the study area.

3.5.1 Birds

Bar-shouldered Dove, Bell Miner and Eastern Whipbird were all observed during the site visit. The types of species recorded are those which commonly occur in and are well adapted to urban areas. Species such as the Bell Miner (*Manorina melanophrys*) are well adapted to urban areas, being opportunistic in both their nesting and feeding requirements. These species often compete for resources with other, less adaptable species, and are therefore considered overabundant in some areas (Parsons, Major et al. 2006).

Although not recorded from the subject site, the following threatened birds species have been recorded from the locality and based on the fauna habitat assessment are considered to have potential to utilise foraging habitat within the subject site:

Table 3.1 Threatened Bird Species Recorded within 10km of the Subject Site

Common Name	Scientific Name
Blue-billed Duck	*Oxyura australis*
Australasian Bittern	*Botaurus poiciloptilus*
Little Eagle	*Hieraaetus morphnoides*
Square-tailed Kite	*Lophoictinia isura*
Gang-gang Cockatoo	*Callocephalon fimbriatum*
Glossy Black-Cockatoo	*Calyptorhynchus lathami*
Little Lorikeet	*Glossopsitta pusilla*
Swift Parrot	*Lathamus discolor*
Turquoise Parrot	*Neophema pulchella*
Powerful Owl	*Ninox strenua*
Masked Owl	*Tyto novaehollandiae*

Table 3.1 Threatened Bird Species Recorded within 10km of the Subject Site

Common Name	Scientific Name
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*
Regent Honeyeater	*Anthochaera phrygia*
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*
Varied Sittella	*Daphoenositta chrysoptera*
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*
Scarlet Robin	*Petroica boodang*

These are considered in **Appendix C** in more detail.

3.5.2 Mammals

No threatened mammal species have been detected within the subject lands during the survey. However, based on the fauna habitat assessment, the following threatened mammal species are considered to have potential to utilise foraging habitat within the subject site:

Table 3.2 Threatened Mammal records within 10km of the subject site

Common Name	Species Name
Grey-headed Flying-fox	*Pteropus poliocephalus*
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*
Eastern Freetail-bat	*Mormopterus norfolkensis*
Large-eared Pied Bat	*Chalinolobus dwyeri*
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*
Little Bentwing-bat	*Miniopterus australis*
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*
Southern Myotis	*Myotis macropus*
Greater Broad-nosed Bat	*Scoteanax rueppellii*

No known tree hollows exist on the subject site, thus the site has limited potential for roosting bats; however, some suitable foraging habitat is present on the subject site. Further consideration of each potentially occurring species is given in **Appendix C**.

3.5.3 Reptiles

Dark-flecked Garden Sunskink was recorded from the subject land and no threatened species are known to occur in the wider locality. Potential reptile habitat exists in the form of logs and stick mounds.

3.5.4 Amphibians

Common Eastern Froglet was recorded during the survey of the subject land and no threatened amphibian species have been recorded.

Two threatened amphibian species are known to occur in the locality, the Green and Golden Bell Frog (*Litoria aurea*), listed as Endangered under the TSC Act (1995) and Vulnerable under the EPBC Act (1999) and the Red-crowned Toadlet (*Pseudophryne australis*), listed as Vulnerable under the TSC Act (1995). A habitat assessment has been undertaken for these two species which determined that there was no suitable habitat for either of these species on the subject site. No habitat for the Green and Golden Bell Frog is present, as there are no permanent water bodies on the subject site. One ephemeral drainage line does occur on the western area of the subject site. The drainage line feeds from a storm-water pipe, and is not considered to constitute suitable habitat for Red-crowned Toadlet (*Pseudophryne australis*). The species has not been recorded breeding in waters that are even mildly polluted, and are restricted to the immediate vicinity of their breeding habitat (DEC (NSW) 2005), thus the site is not considered to constitute suitable habitat for threatened frog species.

Chapter 4

Impact Assessment

The proposed development will include the removal of approximately 0.19 ha of disturbed Shale/Sandstone Transition Forest. An assessment of significance is provided for this community in **Appendix E**, as required under Section 5a of the *Environmental Planning and Assessment Act 1979*. This assessment indicates that owing to the disturbed state of this community at the site, no significant impact on this community is likely as a result of the proposed development of the subject site. The patch of Shale/Sandstone Transition Forest within the subject site is unviable in the long term owing to the high number of weed species in the subject land. The LGA contains much larger portions of the EEC adjacent to riparian areas along Smalls Creek, Cattai Creek and Second Ponds Creek.

No threatened flora species listed under the TSC or EPBC Act occur within the subject land and there is little suitable habitat present due to past land use and previous clearing.

There is potential for several threatened fauna species to occur within surrounding vegetation of the subject site: several microchiropteran bat species, Grey-headed Flying fox and the Powerful Owl. These species may forage near the subject site from time to time as part of a much larger range, but no breeding habitat is present and they would be unlikely to be dependent on the vegetation in the subject site.

Assessments of significance have been prepared for these species and they are presented in **Appendix E**. These assessments indicate that no significant impacts are likely to occur upon any threatened flora or fauna species.

Shale/Sandstone Transition Forest in the adjacent property to the north of the subject site may potentially be affected from indirect impacts, including sedimentation and weed invasion.

Sedimentation and erosion during construction can move soil, pollutants and weed propagules into the surrounding vegetation. Weed establishment can potentially be prolific after soil disturbance events during construction. If they are not managed during and post construction, they can potentially spread into the adjacent Shale/Sandstone Transition Forest.

However, with appropriate controls in place, potential indirect impacts on surrounding vegetation can be mitigated. Recommended mitigation measures are provided in **Chapter 5**. With the implementation of the recommended measures, the proposed development is unlikely to have a significant impact on Shale/Sandstone Transition Forest.

Chapter 5

Conclusion and Recommendations

The proposed development of the subject site is unlikely to have a significant impact on threatened ecological communities or threatened flora and fauna listed under the TSC Act or EPBC Act. Only a small area (0.19 ha) of disturbed Shale/Sandstone Transition Forest will be removed, and the wider, higher quality portion of this vegetation community will be retained.

No threatened flora species have been recorded and none are considered likely to occur. Some threatened fauna species have potential to occur periodically, however they are all highly mobile species that would only utilise the subject site periodically as part of a much larger range.

The proposed development has potential to have indirect impacts on adjacent Shale/Sandstone Transition Forest to the north and west of the subject site. However, with appropriate controls in place, potential indirect impacts can be mitigated. It is recommended that construction and disturbance protocols include consideration of measures to ensure that construction is limited to the designated footprints. This includes the implementation of appropriate sedimentation and erosion controls during construction to limit movement of soil, pollutants and weed propagules into surrounding vegetation.

Shale/Sandstone Transition Forest within the riparian zone north of the boundary of the subject site will be retained. There is some good fauna habitat in this area due to the presence of hollow-bearing trees. The quality of vegetation should be improved at the western end of the subject site through the removal of the problematic weed Small-leaved Privet (as discussed in **Section 3.3**) should be managed by the landowner.

In addition to the above, the North West Growth Centre Flora and Fauna Management Plan will be implemented for this project. This includes the requirement to provide pre-clearance assessments and clearance supervision from a suitably qualified ecologist to facilitate the removal of vegetation within the subject site.

No further site specific mitigation measures are considered necessary for the proposed development of the subject site.

Chapter 6

References

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Appendix A

Flora Species List

Table A.1 Flora Species Encountered during the Meander Survey in the Subject Site

	Family	Scientific Name	Common Name
Trees	Myrtaceae	Eucalyptus teretricornis	Forest Red Gum
	Myrtaceae	Eucalyptus punctata	Grey Gum
Small Trees	Myrtaceae	Eucalytpus crebra	Narrow-leaved Ironbark
	Mimosaceae	Acacia implexa	
	Mimosaceae	Acacia parramattensis	Parramatta Wattle
Herbs - Climbers	Apocynaceae	Araujia sericifera*	Moth Vine
	Asparagaceae	Asparagus asparagoides*	Bridal Creeper
	Fabaceae	Glycine tabacina	Twining Glycine
	Dilleniaceae	Hibbertia scandens	Snake vine
Shrubs	Mimosaceae	Acacia implexa	
	Mimosaceae	Acacia parramattensis	Parramatta Wattle
	Myrtaceae	Callistemon citrinus	Red Bottlebrush
	Myrtaceae	Melaluca decora	White Feather Honeymyrtle
	Myrtaceae	Syzygium oleosum	Blue Lilly-pilly
	Oleaceae	Ligustrum sinense*	Small-leaved Privet
	Oleaceae	Olea europaea*	European Olive
	Sapindaceae	Dodonaea viscosa	Sticky Hop Bush
Herbs- Dicots	Asteraceae	Bidens pilosa*	
	Asteraceae	Senecio hispidilus	Hill Fireweed
Herbs - Monocots (Grasses)	Poaceae	Echinocloa sp.	Barnyard Grass
	Poaceae	Imperata cylindrica	Blady Grass
	Poaceae	Oplismenus aemulus	
Herbs - Monocots (Other)	Cyperaceae	Gahnia aspera	Rough Saw-sedge
	Lomandraceae	Lomandra longifolia	Spiky-headed Mat-rush

Table A.2 Quadrat Species Relative Abundance Data

Scientific name	Common name	Relative abundance
TREES		
Eucalyptus teretricornis	Forest Red Gum	5
Coryumbia gumminifera	Red Bloodwood	1
Eucalyptus crebra	Narrow-leaved Ironbark	1
SMALL TREES		
Eucalyptus teretricornis	Forest Red Gum	5
SHRUBS		
Persoonia linearis		3
Ozothamus diosmifolius	Rice Flower	5
Ligustrum sinense	Small-leaved Privet	5
Breymia oblongifolia	Coffee Bush	4
Kunzea ambigua	Tick Bush	3
Acacia parramattensis	Parramatta Wattle	6
Leucopogon juniperinus	Bearded Heath	5
Olea europaea	European Olive	2
Notelaea longifolia	Large-leaved Olive	1
FERNS & ALLIES		
Chielanthes sieberi	Poison Rock Fern	4
VINES		
Clematis glycinoides	Headache Vine	2
Glycine clandestina	Twining Glycine	3
HERBS - DICOTS		
Pratia purpurascens	White Root	4
Oxalis perennans	Grassland Wood-sorrel	2
Epaltes australis	Speading Nut-heads	3
Ligustrum sinense	Small-leaved Privet	4
GRASSES - MONOCOTS		
Paspalidium digitans		5
Microlaena stipoides		6
Eragrostis brownii		4
Echinopogon caespitosus	Tufted Hedgehog Grass	4

Table A.2 Quadrat Species Relative Abundance Data

Scientific name	Common name	Relative abundance
Digitaria diffusa		4
Oplismenus aemulus	Basket Grass	3
HERBS - MONOCOTS		
Gahnia aspera	Rough Saw-sedge	4
Lomandra longifolia	Spiky-headed Mat-rush	2
Commelina cyanea	Scurvey Weed	3

** Exotic*

Relative Abundance – 1 – Very Rare (1 or 2 Plants), 2 – Uncommon (<5%), 3 – Common (<5%), 4 – Very common (<5%), 5 – 5-25% coverage, 6 – 25-50% coverage

Appendix B

Likelihood of Occurance of Threatened Flora

Table B.1 Assessment of the Likelihood of Occurrence of Threatened Flora Species within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
Acacia bynoeana	Bynoe's Wattle	E1,P	V	3	Found in heath and woodland on sandy soils. Prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches.	Suitable habitat available. Not detected during surveys.
Acacia pubescens	Downy Wattle	V,P	V	4	Occurs on alluviums, shales and at the intergrade between shales and sandstones. Occur in open woodland and forest, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland.	Suitable habitat available. Not detected during surveys.
Darwinia biflora		V,P	V	186	*Darwinia biflora* occurs in Sandstone Ridgetop woodlands where the weathered shale-capped ridges intergrade with Hawkesbury Sandstone	No suitable habitat available. Not detected during surveys. Unlikely to occur.
Dillwynia tenuifolia		V,P		7	In western Sydney, may be locally abundant particularly within	No suitable habitat available. Not detected during surveys. Unlikely

Table B.1 Assessment of the Likelihood of Occurrence of Threatened Flora Species within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
					scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.	to occur.
Epacris purpurascens var. purpurascens		V,P		29	Found in various habitat types, mainly containing strong shale influence.	Some suitable habitat available on the subject land. Not detected during surveys.
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V,P	V	1	Found in dry grassy woodland on shallow infertile soils, derived from granite or metasedimentary rock.	No suitable habitat available. Not detected during surveys. Unlikely to occur.
	Eucalyptus sp. Cattai	E1,P		29	Found in scrub, heath and low woodland on sandy soils.	No suitable habitat available. Not detected during surveys. Unlikely to occur.
Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	V,P		9	Found where reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium soils occur. Often at disturbed sites such	Some suitable habitat available on the subject land. Not detected during surveys..

Table B.1 Assessment of the Likelihood of Occurrence of Threatened Flora Species within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
					as roadsides.	
Hibbertia superans		E1,P		39	Found in open woodland and heathland, on sandstone ridgetops.	No suitable habitat available. Not detected during surveys. Unlikely to occur.
Lasiopetalum joyceae		V,P	V	1	Grows in heath on sandstone.	No suitable habitat available. Not detected during surveys. Unlikely to occur.
Leucopogon fletcheri subsp. fletcheri		E1,P		5	Found in dry eucalypt woodland or shrubland on clayey lateritic soils.	No suitable habitat available. Not detected during surveys. Unlikely to occur.
Persoonia hirsuta	Hairy Geebung	E1,P,3	E	8	Found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	No suitable habitat available. Not detected during surveys.
Pimelea curviflora var. curviflora		V,P	V	11	Occurs in open forest on sandy soil derived from sandstone and on lateritic soils.	Suitable habitat available on the subject land. Not detected during surveys.
Pimelea spicata		E1,P	E	5	Occurs in remnant bushland on Wiannamatta shales.	No suitable habitat available. Soil has sandstone influence. Not detected during surveys. Unlikely to occur.

Table B.1 Assessment of the Likelihood of Occurrence of Threatened Flora Species within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
Tetratheca glandulosa		V,P	V	33	Occur in areas of shale-sandstone transition habitat.	Suitable habitat available on the subject land. Not detected during surveys.

Appendix C

Likelihood of Occurance of Threatened Fauna

Table C.1 Likelihood of Occurrence for Threatened Fauna within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
Amphibia						
Heleioporus australiacus	Giant Burrowing Frog	V,P	V	1	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	Unlikely to occur due to lack of suitable habitat and recent records.
Pseudophryne australis	Red-crowned Toadlet	V,P		2	Occurs in open forests, at periodically wet drainage lines below sandstone ridges. Mainly found on Hawkesbury and Narrabeen Sandstones.	Unlikely to occur due to lack of suitable habitat and recent records.
Litoria aurea	Green and Golden Bell Frog	E1,P	V	6	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.).	Unlikely to occur due to lack of suitable habitat and recent records.
Aves						
Oxyura australis	Blue Billed Duck	V,P		2	Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation.	No suitable habitat available. Unlikely to occur
Botaurus poiciloptilus	Australasian Bittern	E1,P	E	2	Permanent freshwater wetlands,	No suitable habitat available.

Table C.1 Likelihood of Occurrence for Threatened Fauna within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
					where hides in dense reeds and rushes.	Unlikely to occur
Hieraaetus morphnoides	Little Eagle				Occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used	No suitable habitat available. Unlikely to occur
^^*Lophoictinia isura*	Square-tailed Kite	V,P,3		1	Occurs in timbered habitats such as dry woodlands and open forests, prefers timbered watercourses.	Unlikely to occur due to low number of records.
^^*Callocephalon fimbriatum*	Gang-gang Cockatoo	V,P,3		1	Occurs in tall mountain forests and woodlands during summer. In winter, found at lower altitude open eucalypt forests and woodlands.	Unlikely to occur due to lack of habitat.
^*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		8	Occurs in open forest and woodlands, where sheoaks occur (namely *Allocasuarina littoralis* and *A.torulsa*).	Unlikely to occur due to lack of habitat. Only a few small *A. littoralis* trees occur.
Glossopsitta pusilla	Little Lorikeet	V,P		4	Found in open Eucalyptus forest	Some potential foraging

Table C.1 Likelihood of Occurrence for Threatened Fauna within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
					and woodland, and isolated flowering trees in open country. Riparian habitats often used.	habitat in the riparian zone, but unlikely to occur owing to low number of records.
Lathamus discolor	Swift Parrot	E1,P,3	E	4	Occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.	No suitable habitat available. Unlikely to occur.
Neophema pulchella	Turquoise Parrot	V,P,3		1	Found at edges of eucalypt woodland adjoining clearings, timbered ridges, creeks and farmland.	Unlikely to occur due to low number of records.
Ninox connivens	Barking Owl	V,P,3		2	Found in open forest and woodland, including fragmented remnants.	Unlikely to occur due to low number of records. Could possibly occur within the LGA at more vegetated areas.
Ninox strenua	Powerful Owl	V,P,3		15	Found in various vegetation types, ranging from woodland to tall open wet forest and rainforest.	Could possibly occur near the riparian corridor.
Tyto novaehollandiae	Masked Owl	V,P,3		1	Found in dry eucalypt forest and woodlands.	Unlikely to occur due to low number of records.
Climacteris picumnus victoriae	Brown Treecreeper (eastern	V,P		1	Eucalypt woodlands and dry open	Unlikely to occur due to low

Table C.1 Likelihood of Occurrence for Threatened Fauna within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
	subspecies)				forests, often dominated by stringybarks and rough-barked eucalypts.	number of records and lack of appropriate habitat.
Anthochaera phrygia	Regent Honeyeater	E4A,P	E	1	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	Unlikely to occur due to low number of records and lack of appropriate habitat.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P		1	Occurs in drier open forests or woodlands dominated by box and ironbark eucalypts.	Unlikely to occur due to low number of records and lack of appropriate habitat.
Daphoenositta chrysoptera	Varied Sittella	V,P		16	Occurs in eucalypt forests and woodlands, mainly those containing rough-barked species	Unlikely to occur due to lack of favourable habitat.

Table C.1 Likelihood of Occurrence for Threatened Fauna within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
					and mature smooth-barked gums, mallee and Acacia woodland.	
Melanodryas cucullata cucullata	Hooded Robin	V,P		1	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.	Unlikely to occur due to low number of records.
Petroica boodang	Scarlet Robin	V,P		3	Occurs in dry eucalypt forest and woodlands, with a grassy understorey.	Unlikely to occur due to low number of records.
Mammalia						
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	9	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	No potential roosting habitat. Suboptimal foraging habitat available along the riparian zone . Could potentially occur outside of the subject site in riparian vegetation.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		4	Found in most habitats.	May possibly forage in riparian habitat and Shale/Sandstone Transition Forest outside the subject site.

Table C.1 Likelihood of Occurrence for Threatened Fauna within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
Mormopterus norfolkensis	Eastern Freetail-bat	V,P		12	Occurs in a variety of habitats, roosting in tree hollows.	May possibly forage in riparian habitat and Shale/Sandstone Transition Forest outside the subject site.
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	2	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs.	May possibly forage in riparian habitat and Shale/Sandstone Transition Forest outside the subject site.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		11	Roosts in Eucalypt hollows, foraging on a variety of food sources.	May possibly forage in riparian habitat and Shale/Sandstone Transition

Table C.1 Likelihood of Occurrence for Threatened Fauna within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
						Forest outside the subject site.
Miniopterus australis	Little Bentwing-bat	V,P		2	Found in various habitat including moist eucalypt forest, rainforest, wet and dry sclerophyll forest.	May possibly forage in riparian habitat and Shale/Sandstone Transition Forest outside the subject site.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V,P		11	Roosts primarily in caves and man-made crevices.	May possibly forage in riparian habitat and Shale/Sandstone Transition Forest outside the subject site.
Myotis macropus	Southern Myotis	V,P		13	Forages over streams and pools.	May possibly forage in riparian habitat and Shale/Sandstone Transition Forest outside the subject site.
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		8	Utilises a variety of habitats, roosting in hollow trees.	May possibly forage in riparian habitat and Shale/Sandstone Transition Forest outside the subject

Table C.1 Likelihood of Occurrence for Threatened Fauna within the Subject Site

Scientific Name	Common Name	NSW status	EPBC Act Status	10 km radius count	Habitat Requirements^	Likelihood of occurrence
						site.
Gastropoda						
Meridolum corneovirens	Cumberland Plain Land Snail	E1		47	Largely limited to Cumberland Plain Woodland Communties. Found under leaf-litter and fallen bark.	Unlikely to occur due to lack of habitat, as the Subject Site is weed infested.

Appendix D

Section 5a Assessment (7 Part Tests)

D.1 Shale/Sandstone Transition Forest

Shale/Sandstone Transition Forest is listed as Endangered under the TSC and EPBC Act. The community is found at the margin of Cumberland Plain and marks the transition from the communities on the Cumberland Plain that grow on purely shale derived soils and the surrounding communities that develop on sandstone derived soils (Tozer 2003). Dominating tree species found within this community include Grey Gum (*Eucalyptus punctata*), and Forest Red Gum (*Eucalyptus tereticornis*).

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.

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

Not applicable.

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

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

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

The proposed development will not have an adverse effect on the extent of the ecological community. Only a small disturbed portion will be removed. The composition of the ecological community will not be further modified as a result of the proposed development. The portion of the community within the subject site is already degraded due to the infestation of weeds, namely Small-leaved Privet.

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

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

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

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

The portion to be removed within the subject is minor. Better quality Shale/Sandstone Transition Forest located in the adjacent property will be retained. The proposed development will not fragment or isolate the community. The vegetation to be removed is not important to the long-term survival of the community.

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

No critical habitat for this endangered ecological community has currently been listed in the critical habitat registry by the Director-General of the DEC.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plans,

No recovery plan has been prepared for Shale/Sandstone Transition Forest.

No threat abatement plans are relevant to this community.

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

The proposed development will include some clearing of native vegetation, which is a key threatening process listed under the TSC Act. However, the clearing involved is minimal and will occur in highly degraded, weed infested Shale/Sandstone Transition Forest.

Other potential threats include:

- Weed invasion
- Inappropriate water run-off

Conclusion

The proposed development of the subject site is not likely to have an adverse effect on this community. Only a very small portion of highly degraded vegetation will be removed, with a much larger area being retained in the property north of the subject site. No species impact statement is required.

D.2 Grey-headed Flying-fox (Pteropus poliocephalus)

The Grey-headed Flying-fox is the largest bat in Australia, distributed along the east coast from Bundaberg in Queensland to Melbourne, Victoria. It occurs as far west as the western slopes of the Great Dividing Range in northern NSW. It occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Grey-headed Flying-foxes migrate according to the availability of native fruits, nectar and pollen. They roost in large “camps” (in exposed branches of the canopy) which are generally within 20km of a food source. The Grey-headed Flying-fox is listed as Vulnerable on Schedule 2 of the TSC Act and Vulnerable under the EPBC Act.

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

The Grey-headed Flying-fox may use the area within and surrounding the subject site for foraging. The proposed development should not impact the species as only a small portion of disturbed vegetation will be removed which would not likely be currently utilised by the species.

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

There are no endangered populations of the Grey-headed Flying-fox listed under the TSC Act.

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

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

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

Not applicable.

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

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

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

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

No habitat important to the species will be removed. Optimal habitat is retained within the riparian buffer and in the adjacent property to the north of the subject site.

The proposal will not further fragment or isolate the potential habitat within the subject site.

The habitat that will be removed as a result of the proposal cannot be considered important for this species, due to its isolated nature and the mobility of this species.

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

No critical habitat for this species has currently been identified by the Director-General of the DECC.

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

A recovery plan has been drafted (2009) for the species, but the proposed development does not compromise the objectives of this plan.

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

The proposed development does not constitute the key threatening process of clearing of native vegetation. Only a few scattered tress and exotic grassland will be removed.

Conclusion

The subject site will not involve the removal of potential foraging habitat, and no roosting "camps" are in the vicinity. No significant impact is likely on this species and no Species Impact Statement is required.

D.3 Microchiropteran Bats

The following microchiropteran bats may potentially occur within the subject land: Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*) Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Little Bentwing-bat (*Miniopterus australis*), Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), Southern Myotis (*Myotis macropus*), and Greater Broad-nosed Bat (*Scoteanax rueppellii*).

Microchiropteran bats are a diverse group of bats ranging in size from 3-40 grams, but which have in common several aspects of their ecology. These bat species can be addressed collectively, due to their common potential use of the study area as roosting habitat or as a flyover site. Additionally, most of these species prefer roosting trees associated with water, for example streams and ponds, near which these species forage. The Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) differs from the other bats in this group in that it does not usually use tree hollows as roosting habitat. These species are listed as Vulnerable in Part 1 of Schedule 2 of the TSC Act.

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,

No hollow-bearing trees containing potential nesting sites for microchiropteran bats will be removed for the proposed development within the subject site. Some suitable foraging habitat may be impacted as a result of the proposed development; however, the portion will only be small and foraging habitat of greater suitability occurs adjacent to the site.

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

There are no populations of these microchiropteran bat species listed as endangered under the TSC Act.

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

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

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

Not applicable.

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

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

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

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

Some potential sub-optimal foraging habitat for this species will be removed as part of the proposed action. Favourable habitat occurs in the riparian habitat and the Shale/Sandstone Transition Forest in the adjacent property.

The proposal will not further fragment or isolate potential habitat for these species.

The proposed action will not remove, modify, fragment or isolate important habitat.

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

No critical habitat for these species has currently been identified by the Director-General of the DECC.

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

Recovery plans have not been prepared for these species.

No threat abatement plans are relevant to these species.

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

This species has been included in a recovery plan for the Saving Our Species Program. The proposed development will not conflict with the objectives of this recovery plan..

Conclusion

Some sub-optimal foraging habitat will be removed within the subject site; however, higher quality habitat for foraging and roosting for this species group is present adjacent to the site and will not be impacted. No significant impact is likely on this species and subsequently no Species Impact Statement is required.

D.4 Powerful Owl (Ninox strenua)

The Powerful Owl is the largest owl species found in Australia, reaching up to 60cm in length. It is found throughout eastern and south-eastern Australia in various habitats, from open sclerophyll forest to rainforest. Normally large tracts of habitat are required but the species can utilise fragmented landscapes as well. The Powerful Owl feeds mainly on arboreal marsupials including the Common Ringtail Possum and the Greater Glider. This species is listed as Vulnerable under the TSC Act.

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

The proposed development will not impact the life cycle of the species as no roosting habitat will be removed. However, a small area of sub-optimal foraging habitat will be removed to facilitate this development. Due to the presence of high quality habitat for Powerful Owl adjacent to the site it is unlikely that the subject site is utilised by this species.

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

There are no endangered populations of this species listed as endangered under the TSC Act.

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

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

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

Not applicable.

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

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

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

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

The proposed development will not impact the life cycle of the species as no roosting habitat will be removed. However, a small area of sub-optimal foraging habitat will be removed to facilitate this development. Due to the presence of favourable habitat that occurs in the riparian habitat and the Shale/Sandstone Transition Forest in the adjacent property. it is unlikely that the subject site is utilised by this species.

The proposal will not further fragment or isolate the potential habitat for these species.

The proposed action will not remove, modify, fragment or isolate important habitat.

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

No critical habitat for these species has currently been identified by the Director-General of the DECC.

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

This species has been included in a recovery plan for Large Forest Owls (2006). The proposed development will not conflict with the objectives of this recovery plan.

No threat abatement plan has been prepared for this species.

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

The proposed development does not constitute a key threatening process as no optimal habitat containing hollow-bearing trees will be removed. Optimum habitat is retained within the riparian corridor and Shale/Sandstone Transition Forest in the property north of the subject site.

Conclusion

Some sub-optimal foraging habitat will be removed within the subject site; however, higher quality habitat for foraging and roosting for this species group is present adjacent to the site and will not be impacted. No significant impact is likely on this species and subsequently no Species Impact Statement is required.