

**MEDOWIE CHRISTIAN SCHOOL**

**Ecological Services**

For:

**Medowie Christian School**

February 2016

**Final Report**



**PO Box 2474  
Carlingford Court 2118**

**Report No. 15121RP1**

---

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.

---

Version	Date Issued	Amended by	Details
Final	18/02/2016	BF	Address Council Comments

---

Approved by: Dr David Robertson

Position: Director

Signed: 

Date: 18 February, 2016

---

# Table of Contents

---

<b>1</b>	<b>INTRODUCTION</b>	
1.1	Purpose	1.1
1.2	Background	1.1
1.3	Proposed Development	1.2
<b>2</b>	<b>METHODOLOGY</b>	
2.1	Database Analyses	2.1
2.2	Field Surveys	2.1
2.2.1	Flora Survey	2.1
2.2.2	Fauna Survey	2.2
2.3	Limitations	2.3
<b>3</b>	<b>RESULTS</b>	
3.1	Vegetation Communities	3.1
3.1.1	Forest Red Gum/Red Mahogany Forest	3.1
3.1.2	Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest	3.3
3.1.3	Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest – Canopy Only	3.4
3.1.4	Garden Vegetation	3.7
3.1.5	Exotic Grassland	3.8
3.2	Flora	3.9
3.2.1	General Species	3.9
3.2.2	Threatened Flora Species	3.9
3.3	Fauna	3.10
3.3.1	Fauna Habitat	3.10
3.3.2	General Species	3.11
3.3.3	Threatened Species	3.11
<b>4</b>	<b>IMPACT ASSESSMENT</b>	
4.1	Vegetation Communities	4.1

---

## Table of Contents *(Cont'd)*

4.2	Flora	4.2
4.3	Fauna	4.2
<b>5</b>	<b>RECOMMENDED MITIGATION MEASURES</b>	
<b>6</b>	<b>CONCLUSION</b>	
<b>REFERENCES</b>		

## List of Appendices

<b>A.</b>	<b>FLORA SPECIES LIST</b>	
<b>B.</b>	<b>THREATENED FLORA LIKELIHOOD OF OCCURRENCE</b>	
<b>C.</b>	<b>FAUNA SPECIES LIST</b>	
<b>D.</b>	<b>THREATENED FAUNA LIKELIHOOD OF OCCURRENCE</b>	
<b>E.</b>	<b>ASSESSMENT OF SIGNIFICANCE - TSC ACT</b>	
<b>F.</b>	<b>ASSESSMENT OF SIGNIFICANCE - EPBC ACT</b>	
<b>G.</b>	<b>CKPOM – ASSESSMENT AGAINST PERFORMANCE CRITERIA</b>	

## List of Tables

3.1	Vegetation communities within the subject site	3.1
3.2	Threatened fauna species potentially occurring within the development footprint	3.12
4.1	Areas of vegetation communities within the subject site and development footprint	4.1
A.1	Flora species recorded within the subject site	A.2
B.1	Likelihood of occurrence of threatened flora species	B.1



## List of Tables

C.1	Fauna Species Recorded within the Subject Site	C.2
D.1	Likelihood of occurrence of threatened fauna species	D.1

## List of Figures

1.1	Location of the subject site (Lot 22), adjoining property and proposed APZs (separate DA)	1.4
2.1	Flora Survey Locations	2.4
2.2	Fauna Survey Locations	2.5
3.1	Vegetation Communities within the Subject Site	3.15
3.2	Fauna Habitat and Indicators within the Subject Site	3.16
3.3	Threatened flora records within the locality (5km radius)	3.17
3.4	Threatened fauna records within the locality (5km radius)	3.18
3.5	Koala habitat mapping of subject site and adjacent property (Land Use Planning 2007)	3.19
4.1	Development footprint of the Proposed Development	4.4

## List of Photographs

3.1	Forest Red Gum/Red Mahogany Forest in the north-east corner of the subject site	3.2
3.2	Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest in the south-east corner of the site	3.4
3.3	Remnant canopy trees over garden	3.5
3.4	Remnant canopy trees along the eastern boundary of the grounds	3.6
3.5	Remnant trees within the development footprint	3.6
3.6	Planted natives along the northern boundary of the grounds and exotic grassland	3.7
3.7	Exotic grassland and remnant canopy trees in the west of the subject site near the entrance to the school	3.8

## Glossary of Terms

---

- **Development footprint** means the area of the subject site on which the proposal will take place;
- **EEC** means Endangered Ecological Community;
- **EPBC Act** abbreviates the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
- **EP&A Act** abbreviates *Environmental Planning and Assessment Act 1979*;
- **LGA** abbreviates Local Government Area;
- **Locality** means the area within a 10km radius of the subject site;
- **OEH** abbreviates the NSW Office of Environment and Heritage;
- **Proposed development** is the development, activity or action proposed;
- **DOE** refers to the Department of Environment;
- **Subject site** means land contained within Lot 22 in DP1036306); and
- **TSC Act** abbreviates the NSW Threatened Species Conservation Act 1995.

## Introduction

# Introduction

---

## 1.1 Purpose

Cumberland Ecology has been engaged by Medowie Christian School to undertake a Flora and Fauna Assessment of 6B Waropara Road, Medowie, NSW. The property assessed within this Flora and Fauna Assessment consists of Lot 22 in DP1036306, and is hereafter referred to as “the subject site” (**Figure 1.1**). The subject site occurs adjacent to a further two lots which are to be part of a larger DA submission. These lots are Lot 1 in DP 868525 and Lot 23 in DP 1036306, which occur at 6 and 6A Waropara Road respectively (**Figure 1.1**). These two lots have not been assessed as part of this Flora and Fauna Assessment (**see Section 1.3**).

This report considers the potential ecological impacts of the construction of an administration building across the subject site and areas immediately surrounding the proposed development.

The objectives of this report include:

- To document the results of a site survey of flora species and to describe the vegetation communities occurring on the subject site;
- To describe fauna habitats on the subject site and present the results of opportunistic fauna observations;
- To assess the likelihood that threatened species of flora and fauna could occur on the subject site;
- To consider the potential impacts of the proposed development on threatened flora, fauna, and vegetation communities; and
- Where relevant to recommend mitigation measures to reduce the impacts of the development of flora and fauna.

## 1.2 Background

The subject site is located within the Port Stephens Local Government Area (LGA) and is zoned as R5 – Large Lot Residential under the *Port Stephens Local Environment Plan 2013*. The site is bordered along the western boundary by Waropara Road, shares a boundary with

Medowie Baptist Community Church to the south, adjoins cleared farmland to the east, and is bordered along the north by an adjacent, vacant bushland block. Buildings associated with the school, sporting fields, and car parks occur in the western half of the subject site within the school grounds, while the eastern half consists of remnant bushland. Vegetation within the developed half of the site consists of patches of trees, gardens, and mown grassland areas. The land within the subject site slopes gently from the south west to the north east corner, with the north eastern area subject to periodic inundation after extended periods of rain.

The school has existed on the subject site for twenty years, existing initially as a small number of demountable buildings at the time of its inception in 1995.

### 1.3 Proposed Development

Medowie Christian School is planning to make a number of upgrades to the school grounds, including new teaching and administration facilities, with the target of increasing the school's capacity to meet anticipated growing demands for education in the area. This report has been prepared as part of the Concept Proposal and Stage 1 Development Application (DA) for upgrades to the school grounds which will consist of construction of a new administration building, and associated pedestrian pathways, in the general location of the current administration facilities.

The proposed development is largely within cleared and highly modified land and will retain the remnant vegetation to the north east of the subject site. The proposed administration building will be located near the southern border of the site, adjacent to an existing car park, to the west of the other buildings currently within the school grounds. Stage 1 works will occur within an area defined as the development footprint and shown in **Figure 1.1**. This stage of development does not require an APZ be established as the construction of the administration building is within the existing building footprint and considered 'infill' development in accordance with *Planning for Bushfire Protection 2006*.

The adjoining property and APZs displayed in **Figure 1.1** are not part of this Stage 1 development and will be assessed in a separate DA. This Flora and Fauna Assessment has been written with regard to and in conjunction with:

- Eco Logical Australia (ELA) (2015). "Medowie Christian School and Baptist Community Church – Ecological Constraints and Impact Assessment", Prepared for EPM Projects Pty Ltd;
- EPM (2015). "Medowie Christian School - Concept Proposal & Stage 1 Administration Building DA - Request for Consultant Proposal Ecological", EPM, St Leonards;
- Kingdom, R. (2015). "Arboricultural Impact Assessment - Medowie Christian School 6B Waropara Road Medowie NSW 2318". Advanced Treescape Consulting, Kariong;

- Land Use Planning, Sustainable Planning Group (2007). Koala Habitat Planning Map - Medowie/Tilligerry Aug06, Port Stephens LGA
- Local Land Services (Hunter) (2015). "Draft - Property Vegetation Plan 6A Waropara Road Medowie NSW 2318", NSW Government;
- Port Stephens Council (2002). "Port Stephens Council Comprehensive Koala Plan of Management (CKPoM) – June 2002". Prepared by Port Stephens Council with the Australian Koala Foundation; and
- Smith & Tracey Architects (2015). "Draft - Medowie Christian School Landscape Plan Stage 1 C", Smith & Tracey Architects, Surry Hills.





# Legend

- Subject Site
- Proposed Development Footprint (Impact Area)
- Adjoining property (Baptist Community Church)
- Asset Protection Zone (separate DA)
- Conservation Zone
- DA Submission Area

Image Source:  
Image © SIX Maps  
(dated 23-04-2013)



Figure 1.1. Location of the Subject Site (Lot 22), adjoining property and proposed APZ's (separate DA)



## Methodology

## Methodology

---

### 2.1 Database Analyses

Database analysis was conducted for the locality using both the NSW Office of Environment and Heritage (OEH) Atlas of NSW Wildlife Database (OEH, 2015) and the Commonwealth Department of the Environment (DoE) EPBC Act Protected Matters Search Tool (DoE, 2015). The Atlas of NSW Wildlife was examined for post-1980 records of threatened species listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) within 10 x 10km (approximately 5km radius) from the centre of the subject site. The EPBC Act Protected Matters Search tool was used to retrieve a list of Matters of National Environmental Significance listed under the EPBC Act that are predicted to occur within a 10km radius of the subject site.

### 2.2 Field Surveys

#### 2.2.1 Flora Survey

A flora survey was conducted by a botanist on the 3<sup>rd</sup> September 2015. The flora survey consisted of:

- Vegetation community mapping;
- Random meander transects across the entire site to compile a species list;
- Targeted searches for threatened flora species recorded as occurring within 10km of the site;
- Three 20 x 20 m quadrats, one within each vegetation community containing remnant native vegetation to record species composition and structural data; and
- Photographs taken of vegetation within the subject site to provide a visual documentation of communities occurring.

Flora survey locations within the subject site are shown in **Figure 2.1**.

### **2.2.2 Fauna Survey**

Fauna surveys within the subject site consisted of a fauna habitat assessment, Koala activity surveys and general observations. These methods are described in detail below. Fauna survey locations within the subject site are shown in **Figure 2.2**.

#### *i. Fauna Habitat Assessment*

A fauna habitat assessment was conducted by an ecologist on the 3<sup>rd</sup> September 2015. The site was assessed for groundcover, shrub/understory cover, canopy cover, and tree hollows, as well as other habitat features such as bush rock and fallen trees. Assessment also included a search for signs of fauna use such as scats, scratches and scrapings.

The nature and extent of fauna habitats in the subject site were assessed and areas where fauna species could reside or forage were identified. This 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 vegetation and the nature and extent of human disturbance throughout the subject site was also undertaken and considered. Tree hollows were used as a general indication of habitat quality for arboreal fauna and hollow-dwelling birds and bats. Any hollows observed during surveys were recorded and the general vegetation condition and tree maturity was used to predict whether trees on site were likely to contain hollows.

#### *ii. Koala SAT Surveys*

According to the Comprehensive Koala Plan of Management (CKPoM) Koala habitats of varying quality have been mapped on or around the subject site (Port Stephens Council 2002). The vegetation to the west is mapped as a combination of 'cleared land' and marginal Koala habitat', having secondary feed trees. That to the east, including remnant forest vegetation on the eastern portion of the subject site, is mapped as 'preferred habitat', meaning that it contains primary feed trees (**Figure 3.5**) (Land Use Planning 2007).

The mapping within the CKPoM is at an LGA scale and needs to be checked for DA-scale developments. Consequently, the Spot Assessment Technique (SAT)(Phillips and Callaghan, 2011) was used to detect the presence of Koalas at the subject site, due to the Port Stephens LGA being a known area of high occurrences of the species.

SAT surveys involve inspecting a tree with diameter at breast height (dbh) > 10 cm for a period of two minutes for koala pock marks on the trunk, and scats within 1 m radius of the base of the tree. The leaf litter is raked to inspect for Koala scats. The nearest 29 trees with dbh>10 cm are then also searched by the same method, to compile a total survey effort of 30 trees and one hour search time per site. SAT sites were predetermined with one occurring in the western half of the subject site, centred within the development footprint, and one within the remnant bushland in the east.



*iii. Incidental Observations*

Any incidental vertebrate fauna species that was observed, heard calling, or otherwise detected on the basis of tracks or signs were recorded and listed in the total species list for the subject site.

## **2.3 Limitations**

The flora survey was conducted during one site visit in September 2015. Growing conditions in the vicinity of the subject site had been suitable to enable adequate production of features to enable the identification of most plants to species level at the time of the survey and accurate assessment of the subject site's conservation significance. It is unlikely that all species present have been recorded. As the impacts of the proposed development are confined to the western, developed half of the subject site, surveys were focused on this area. Assessments in the eastern area of the site consisted of a quadrat in each vegetation community, and random meander transects to specifically target threatened species known to occur in the locality, but not to compile detailed species lists of non-threatened flora species present,

Despite this, it is probable that the vast majority of species have been recorded within the school grounds and that issues including conservation significance of the flora, condition and viability of bushland and likely impact on native vegetation have been satisfactorily assessed.

Some threatened flora species occurring within Port Stephens LGA, such as certain orchid species are cryptic, and may occur on the subject site but were not detected during the survey. An assessment of the likelihood of occurrence of all threatened flora species recorded or likely to occur within a 10km radius of the subject site was undertaken to supplement the flora survey.

Limited targeted fauna surveys were undertaken for this assessment, which mainly relied on database analysis, and fauna habitat. The data produced by the database analysis and fauna habitat assessment is intended to be indicative of the types of species that could occur on the subject site. Additional fauna surveys were considered unwarranted due to the small size and degraded nature of the habitat within the development footprint, and the retention of the entirety of the intact, remnant native vegetation within the subject site, which is not to be impacted by the proposed development.



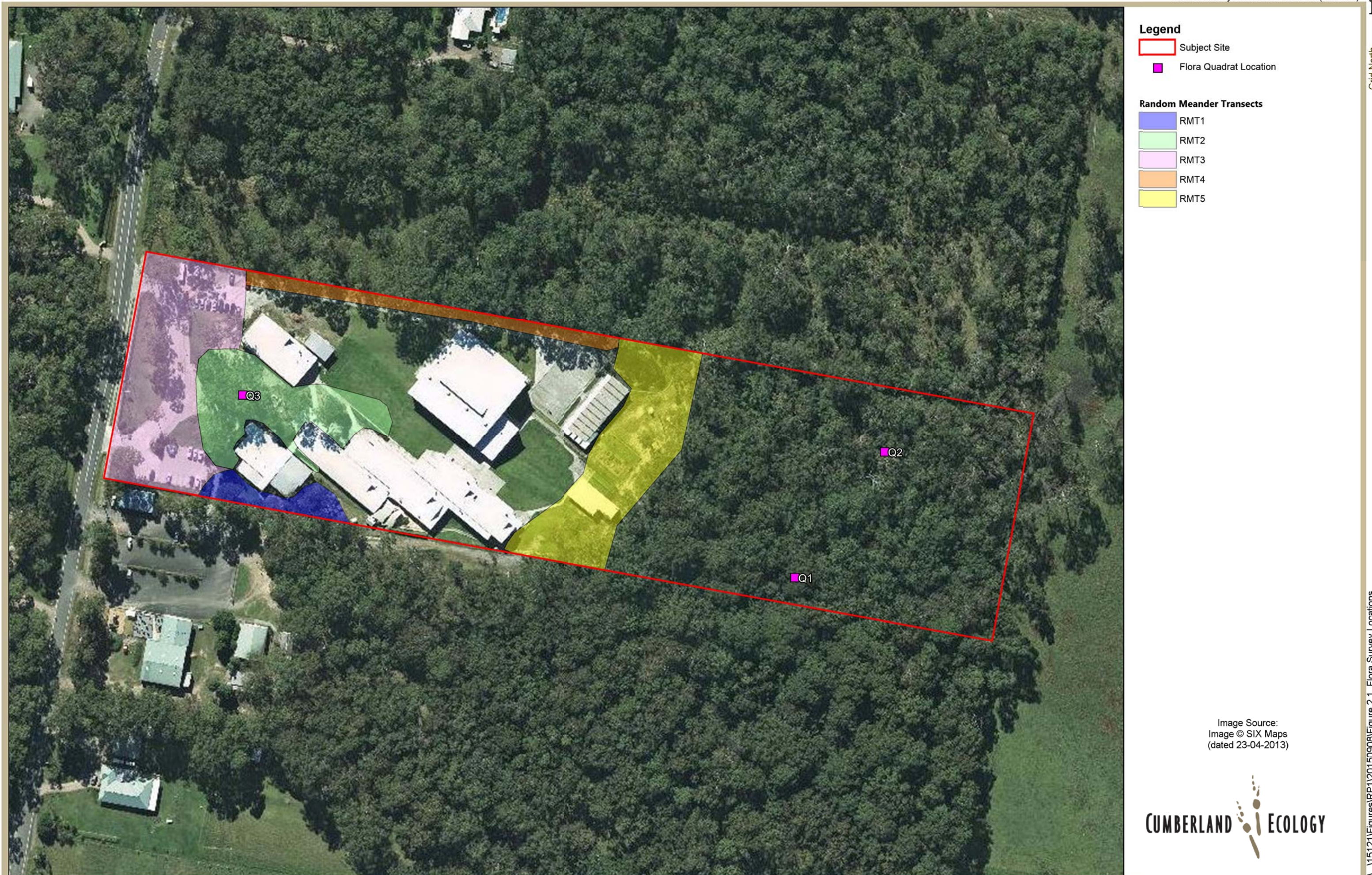


Figure 2.1. Flora Survey Locations







**Legend**

 Subject Site

**Fauna Survey Locations**

 Habitat Assessment

 Koala SAT#1

 Koala SAT#2

 Additional Koala search

 Photo Point

Image Source:  
Image © SIX Maps  
(dated 23-04-2013)



Figure 2.2. Fauna Survey Locations



## Results

# Results

## 3.1 Vegetation Communities

Cumberland Ecology undertook vegetation mapping within the subject site and identified a number of vegetation communities as shown in **Table 3.1**. Vegetation mapping of the subject site is shown in **Figure 3.1**. Native vegetation communities were defined and named using community dominants recorded by undertaking quadrats and random meander transects during the site survey. A description of each of the vegetation communities identified within the subject site is provided below.

**Table 3.1**      **Vegetation communities within the subject site**

Vegetation Community	TSC Act Status	EPBC Act Status	Subject Site (ha)
Forest Red Gum/Red Mahogany Forest	EEC	-	0.58
Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest	-	-	1.05
Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest – Canopy Only	-	-	0.40
Garden Vegetation	-	-	0.17
Exotic Grassland	-	-	0.90
<b>Total</b>			<b>3.11</b>

### 3.1.1 Forest Red Gum/Red Mahogany Forest

**TSC Act Status:** EEC (Swamp Sclerophyll Forest)

**EPBC Act Status:** not listed

This community occurs in the north eastern corner of the subject site and conforms to the TSC Act listing for the endangered ecological community (EEC) Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (Swamp Sclerophyll Forest). It is associated with the lowest elevations present on the subject site, and is periodically inundated during the wetter months of the year.

The community within the subject site is dominated by an open canopy of *Eucalyptus resinifera* subsp. *resinifera* (Red Mahogany) and *Eucalyptus tereticornis* (Forest Red Gum) (**Photograph 3.1**). A dense mid-storey is present, consisting of *Melaleuca* species such as *Melaleuca decora* and *Melaleuca nodosa* (Prickly-leaved Paperbark). The shrub layer includes *Melaleuca* species occurring along with *Pittosporum undulatum* (Sweet Pittosporum), and sparse occurrences of exotic weeds such as *Lantana camara* (Lantana) and *Cinnamomum camphora* (Camphor Laurel).

The dense ground layer is dominated by the native sedges *Chorizandra cymbaria* and *Lepidosperma quadrangulatum*, with *Gahnia clarkei* (Tall Saw-sedge) occurring less frequently. Grasses in the ground layer include *Oplismenus aemulus* (Basket Grass) and *Hemarthria uncinata* var. *uncinata* (Matgrass), and the exotic *Paspalum dilatatum*. The native herbs *Pratia purpurascens*, *Hydrocotyle peduncularis*, *Dichondra repens* (Kidney Weed), and *Goodenia paniculata* (Branched Goodenia) are also present within this layer.

Also recorded within the community within the subject site was the vine *Parsonsia straminea* (Monkey Rope), and the exotic vine *Lonicera japonica* (Japanese Honeysuckle).



**Photograph 3.1 Forest Red Gum/Red Mahogany Forest in the north-east corner of the subject site**

### 3.1.2 ***Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest***

**TSC Act Status:** not listed

**EPBC Act Status:** not listed

This community occurs in the south-east of the subject site, and is an open forest dominated variously by *Eucalyptus signata* (Scribbly Gum), *Angophora costata* (Smooth-barked Apple), *Eucalyptus pilularis* (Blackbutt), *Eucalyptus resinifera* subsp. *resinifera* (Red Mahogany) and *Corymbia gummifera* (Red Bloodwood) (**Photograph 3.2**). The mid-storey consists of juveniles of the canopy species along with *Allocasuarina littoralis* (Black She-Oak), *Pittosporum undulatum* (Sweet Pittosporum), and scattered occurrences of other species such as *Melaleuca styphelioides* (Prickly-leaved Paperbark).

The shrub layer varies from relatively sparse, to somewhat dense, and includes species such as *Pittosporum undulatum* (Sweet Pittosporum), *Acacia longifolia* subsp. *longifolia* (Sydney Golden Wattle), *Hibbertia empetrifolia* subsp. *empetrifolia*, *Hibbertia vestita* (Hairy Guinea Flower), *Pultenaea villosa* (Hairy Bush-pea), and *Leucopogon juniperinus* (Prickly Beard-heath). The exotic shrub *Lantana camara* (Lantana) occurs sporadically throughout the patch.

The ground layer is co-dominated by the grasses *Imperata cylindrica* (Blady Grass) and *Microlaena stipoides* (Weeping Grass), the fern *Pteridium esculentum* (Bracken Fern), and the sedge *Lepidosperma laterale*. Herbs present include *Pratia purpurascens*, *Brunoniella australis* (Blue Trumpet Flower), *Lomandra multiflora* subsp. *multiflora* (Many-flowered Mat-rush), and the orchids *Caladenia catenata* (White Caladenia), *Pterostylis baptistii* (King Greenhood), and *Pterostylis longifolia* (Tall Greenhood).

Twiningers are common in the ground-layer and on shrubs, and include *Cassytha glabella*, *Hardenbergia violacea* (False Sarsparilla), and *Desmodium rhytidophyllum*.





**Photograph 3.2 Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest in the south-east corner of the site**

### **3.1.3 Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest – Canopy Only**

**TSC Act Status:** not listed

**EPBC Act Status:** not listed

This community occurs within the school grounds in the west of the site and consists of canopy remnants only of the dry sclerophyll community *Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest* which occurs in an intact form in the east of the site, due to historical clearing of the site.

Remnant canopy trees within the school grounds consist of the species *Eucalyptus signata* (Scribbly Gum), *Eucalyptus pilularis* (Blackbutt), *Corymbia gummifera* (Red Bloodwood), *Eucalyptus resinifera* subsp. *resinifera* (Red Mahogany), *Angophora costata* (Smooth-barked Apple) and *Eucalyptus globoidea* (White Stringybark). In some areas there are juvenile regrowth individuals of these canopy trees growing beneath larger, parent trees, predominately of a small tree size.

Canopy trees occur either over exotic lawn areas, or gardens (**Photograph 3.3**) as described below with the exception of two areas where remnant trees were growing over predominately exotic weed species. These areas are along the southern boundary of the site where some remnant native grasses such as *Microlaena stipoides* were relatively common among exotic species, and along the eastern boundary of the school grounds adjoining the

bushland areas. In the eastern boundary of the grounds, several individuals of native shrubs were regrowing in an area with a ground layer comprised predominately of exotic species. Regrowth shrubs included including the species *Dodonaea triquetra* (Hop Bush), *Pultenaea myrtoides*, and *Daviesia ulicifolia* subsp. *ulicifolia* (Gorse Bitter Pea) (**Photograph3.4**).

Underneath remnant canopy trees within the development footprint, in which the ground layer is predominately comprised of the exotic lawn grass *Stenotaphrum secundatum* (Buffalo Grass), several remnant native plants persist growing near to the base of trees as scattered individuals where they are somewhat protected from mowing. These species were all common and widespread native species including *Lomandra longifolia*, *Pteridium esculentum*, and *Brunoniella australis* (**Photograph 3.5**). Single juvenile individuals of the native shrubs *Bursaria spinosa* and *Pultenaea myrtoides* were also present at the base of the trees at the time of the site survey.



**Photograph 3.3 Remnant canopy trees over garden**





**Photograph 3.4 Remnant canopy trees along the eastern boundary of the grounds**



**Photograph 3.5 Remnant trees within the development footprint**



### 3.1.4 Garden Vegetation

**TSC Act Status:** not listed

**EPBC Act Status:** not listed

Garden areas within the school grounds have a combination of planted exotic species, and planted native species, including local natives, non-endemic natives, and native cultivars. A high proportion of the gardens are comprised of planted native species. Exotic species present include *Buxus microphylla* (Japanese Box), and *Rhaphiolepis indica* (Indian Hawthorn), while native species include *Banksia ericifolia* (Heath Banksia), *Acacia floribunda* (White Sally), and *Leptospermum petersonii* (Lemon-scented Tea Tree).

A garden area along the northern boundary of the site is planted entirely with endemic native species including *Callistemon citrinus* (Crimson Bottlebrush), *Callistemon rigidus*, *Melaleuca linariifolia* (Flax-leaved Melaleuca), and *Eucalyptus robusta* (Swamp Mahogany) (Photograph 3.6)



**Photograph 3.6 Planted natives along the northern boundary of the grounds and exotic grassland**

### 3.1.5 Exotic Grassland

**TSC Act Status:** not listed

**EPBC Act Status:** not listed

Vegetated areas outside of gardens within the school grounds consist of exotic grassland, including lawns and sporting fields (**Photograph 3.7**. These are predominately comprised of *Stenotaphrum secundatum* (Buffalo Grass), with *Pennisetum clandestinum* (Kikuyu), and *Cynodon dactylon* (Couch) present in some areas. Common exotic weed species are present in these areas including *Trifolium repens* (White Clover), *Veronica arvensis* (Wall Speedwell), *Plantago lanceolata* (Lamb's Tongues), *Richardia stellaris* (Lawn Madder), and *Hypochaeris radicata* (Flatweed).



**Photograph 3.7 Exotic grassland and remnant canopy trees in the west of the subject site near the entrance to the school**

## 3.2 Flora

### 3.2.1 General Species

A total of 144 plant species were recorded within the subject site during the site survey. Of these approximately 64 were endemic native species, 3 were native species that occurred both naturally within the site, and planted in gardens, 22 were planted natives including cultivars, and the remaining 55 were exotic species, either weeds or garden plants. A list of flora species recorded during surveys is provided in **Appendix A**.

### 3.2.2 Threatened Flora Species

Six threatened flora species have previously been recorded within the locality of the subject site, although it is understood that some threatened species may not yet have been recorded. Some of the records within the locality are displayed in **Figure 3.3**.

Due to the highly modified nature of the soils and vegetation within the school grounds, threatened flora species are unlikely to persist in this area, and none were located during targeted searches for species known to occur in the locality. An analysis of the likelihood of occurrence within the subject site for each threatened flora species recorded or predicted to occur within the locality is provided in **Appendix B**. This assessment determined that the following species have some likelihood of occurrence within bushland habitat in the east of the subject site:

- *Tetradlea juncea* (Black-eyed Susan);
- *Maundia triglochinosides*;
- *Commersonia prostrata* (Dwarf Kerrawang);
- *Callistemon linearifolius* (Netted Bottle Brush);
- *Pterostylis chaetophora*; and
- *Cryptostylis hunteriana* (Leafless Tongue Orchid).

These species were not located during targeted searches of the subject site, however some species, particularly cryptic orchids may have escaped detection within bushland in the east of the site. Although the bushland area in the east of the site was searched for threatened species, the focus of searches for threatened flora was within the school grounds and the development footprint, as bushland on the site is to be retained. Due to the degraded and modified nature of vegetation within the development footprint, no threatened flora species were located, or are expected to occur in this area.



### 3.3 Fauna

#### 3.3.1 Fauna Habitat

Habitat for endemic fauna species is limited within the school grounds due to past land uses and the degraded nature of remnant, native vegetation, persisting only as remnant canopy trees. The remnant bushland in the east of the site provides higher habitat values than within the school grounds.

Key habitat features recorded within the subject site include:

- Hollow bearing trees;
- Terrestrial habitat including logs, shrubs and trees, leaf litter and coarse woody debris; and
- Koala feed trees.

Figure 3.2 shows fauna habitat and indicators recorded within the subject site.

##### i. Hollow-bearing Trees

No hollows were recorded in trees within the school grounds, and most native trees, although remnant, are young trees that have not matured to the extent of producing hollows. No large hollows were recorded within the bushland area, though a medium sized hollow was present, suitable for nesting by birds such as the Rainbow Lorikeet, and Crimson Rosella (*Platycercus elegans*). Some trees within the bushland area also had small hollows suitable for utilisation by smaller birds and microchiropteran bat species.

##### ii. Terrestrial Habitat Features

An array of planted native vegetation within gardens, along with remnant trees, provides some foraging habitat for common, nectivorous, urbanisation tolerant bird species such as the Noisy Miner (*Manorina melanocephala*) and Rainbow Lorikeet (*Trichoglossus moluccanus*). Exotic grassland areas within the school ground are likely to provide foraging habitat other common birds such as the Australian Magpie (*Cracticus tibicen*). Foraging habitat in the form of trees, and shrubs is present for a diverse array of bird species in the bushland in the east of the site.

Leaf litter in gardens is likely to provide some habitat values to small, common reptile species such as the Common Garden Skink (*Lampropholis guichenoti*). Some foraging habitat may also exist for common, nocturnal endemic mammals such as the Common Brushtail Possum (*Trichosurus vulpecula*) in remnant trees on the site, though a lack of hollows means these species are unlikely to nest on the site. Leaf litter present within the bushland is also suitable habitat for small, common reptile species, and invertebrates.

No logs were present within the school grounds; however logs, some containing hollows are present in the bushland area in the east of the subject site. Hollow bearing logs provide

habitat for ground dwelling mammals such as the Short-beaked Echidna (*Tachyglossus aculeatus*), and reptiles including snake species.

### iii. Koala Feed Trees

Two secondary feed tree species were recorded within the subject site. These species are *Eucalyptus resinifera* subsp. *resinifera* (Red Mahogany) and *Eucalyptus globoidea* (White Stringybark). Two primary feed tree species for Koalas (OEH, 2014e) were recorded within the subject site. *Eucalyptus tereticornis* (Forest Red Gum) was recorded in the north-east corner of the site within the Forest Red Gum/Red Mahogany Forest community, and *Eucalyptus robusta* (Swamp Mahogany) was recorded as planted individuals in a native garden along the northern boundary of the school grounds.

No scats, tree puncture wounds or scratches, or other indicators of the presence of koalas were located during an inspection of 60 trees during Koala SAT surveys.

No primary tree species are located within the development footprint although both secondary species are present. Due to the lack of primary feed species within the development footprint, the isolated nature of the vegetation, and fencing surrounding the school grounds which inhibits movement of large animals, Koala individuals are unlikely to utilise this area of the subject site.

### 3.3.2 General Species

A list of fauna species recorded during surveys is provided in **Appendix C**. Several common bird species were recorded, including the Little Wattlebird (*Anthochaera chrysoptera*). Birds were observed foraging in trees around the periphery of the school grounds. Within the bushland area Common Wombat (*Vombatus ursinus*) droppings were located during Koala SAT surveys, through no wombat burrows, indicating wombats utilise the bushland for foraging. Rabbit burrows were also recorded within the bushland area, indicating the presence within the subject site of the exotic mammalian pest, the European Rabbit (*Oryctolagus cuniculus*).

### 3.3.3 Threatened Species

Twenty-eight (28) threatened fauna species have previously been recorded within 10km of the subject site, although it is understood that some threatened species may not yet have been recorded. Some of the species records within the locality are displayed in **Figure 3.4**. No threatened fauna species were located during the site survey. An analysis of the likelihood of occurrence within the subject site for each threatened fauna species recorded or predicted to occur within the locality is provided in **Appendix D. Table 3.1** lists the threatened fauna species that are considered to have the potential to utilise the habitat within the development footprint. These species are discussed further below. For the majority of the species with potential to utilise the subject site, habitat is largely confined to the bushland habitat in the east.

**Table 3.2 Threatened fauna species potentially occurring within the development footprint**

Scientific Name	Common Name	TSC Act Status	EPBC Act Status
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-
<i>Ninox strenua</i>	Powerful Owl	V	-
<i>Tyto novaehollandiae</i>	Masked Owl	V	-
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	-
<i>Phascolarctos cinereus</i>	Koala	V	V
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox	V	V
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V	-
<i>Miniopterus australis</i>	Little Bentwing-bat	V	-
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V	-

TSC Act / EPBC Act Status: V = Vulnerable

#### i. Threatened Birds

The following species have some potential to utilise trees, or open areas, within the development footprint:

- *Lophoictinia isura*- Square-tailed Kite(Vulnerable - TSC Act);
- *Glossopsitta pusilla* – Little Lorikeet (Vulnerable – TSC Act);
- *Ninox strenua* - Powerful Owl(Vulnerable - TSC Act); and
- *Tyto novaehollandiae* - Masked Owl (Vulnerable - TSC Act).

All of these species have some potential to forage on the subject site, although no nesting/breeding habitat is present for the Masked Owl or Powerful Owl due to the lack of suitably large hollows, and the lack of watercourses, which the Square-tailed Kite nests adjacent to. The Square-tailed Kite, Little Lorikeet, and the two owls if present may forage across the school grounds on occasion. These species would only utilise the subject site as part of a much larger foraging range. The core foraging habitat for these species within the subject site is located within the bushland in the east.

ii. *Grey-headed Flying Fox*

The Grey-headed Flying Fox (*Pteropus poliocephalus*) has potential to utilise garden plants, and remnant native trees within the development footprint for foraging. However most of the habitat within the subject site for this species is located within the bushland in the east. This species is listed as vulnerable under both the TSC Act and the EPBC Act. It commonly forages in degraded areas, including urban gardens, feeding on the nectar of flowering plants. No roosting/breeding camps were present within the subject site during the site survey, and individuals in the locality would only utilise the development footprint as part of a much larger foraging range.

iii. *Microchiropteran Bat Species*

Four microchiropteran bat species known to occur in the locality have potential to utilise the development footprint, though only as part of a larger foraging range. No roosting or breeding habitat is present within the development footprint due to the lack of decorticated bark on trees, and the lack of tree hollows. Species that may utilise the development footprint are:

- *Mormopterus norfolkensis* (Eastern Freetail-bat);
- *Miniopterus australis* (Little Bentwing-bat);
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle); and
- *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat).

Foraging habitat for all of these species is in much better condition within the bushland in the east of the subject site, outside of the development footprint, and roosting habitat is present in the form of small and medium sized tree hollows in this area.

iv. *Squirrel Glider*

The Sugar Glider has the potential to utilise trees within the development footprint for foraging, though only as part of a larger foraging range. The species requires areas with large trees with abundant hollows, within vegetation patches with abundant hollows for nesting. There are no suitable large trees with abundant hollows on the subject site for nesting, and hollows are scarce. This species is likely to use the subject site and possibly the development footprint only as foraging habitat as part of a much larger foraging range. It is a mobile species that accesses resources from across areas of 3 – 9 ha in size and would not depend upon resources contained on the subject site for survival.

Foraging habitat for this species is in much better condition within the bushland in the east of the subject site, outside of the development footprint.



v. *Koala*

This species is likely to use the subject site, which contains primary feed tree species, and possibly the development footprint, which only contains secondary feed species. The development footprint would only be used as foraging habitat as part of a larger foraging range. Individuals in the area are unlikely to be able to readily access secondary feed species within the school grounds including the development footprint due to high fencing surrounding the area. Koalas are large mammals that need to descend and move between trees by traversing open ground.

Foraging habitat for this species is in much better condition within the bushland in the east of the subject site, containing primary feed species, outside of the development footprint.





**Legend**

Subject Site

**Vegetation Community**

- Forest Red Gum/ Red Mahogany Swamp
- Sclerophyll Forest
- Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest
- Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest - Canopy Only
- Garden Vegetation
- Exotic Grassland

Image Source:  
Image © SIX Maps  
(dated 23-04-2013)



Figure 3.1. Vegetation Communities within the Subject Site





**Legend**

Subject Site

**Fauna Habitat**

- Tree with medium hollow
- Tree with small hollows
- Stag with hollows
- Log

**Native Fauna Indicators**

- ▲ Wombat scat

**Exotic Fauna Indicators**

- ▼ Rabbit burrow

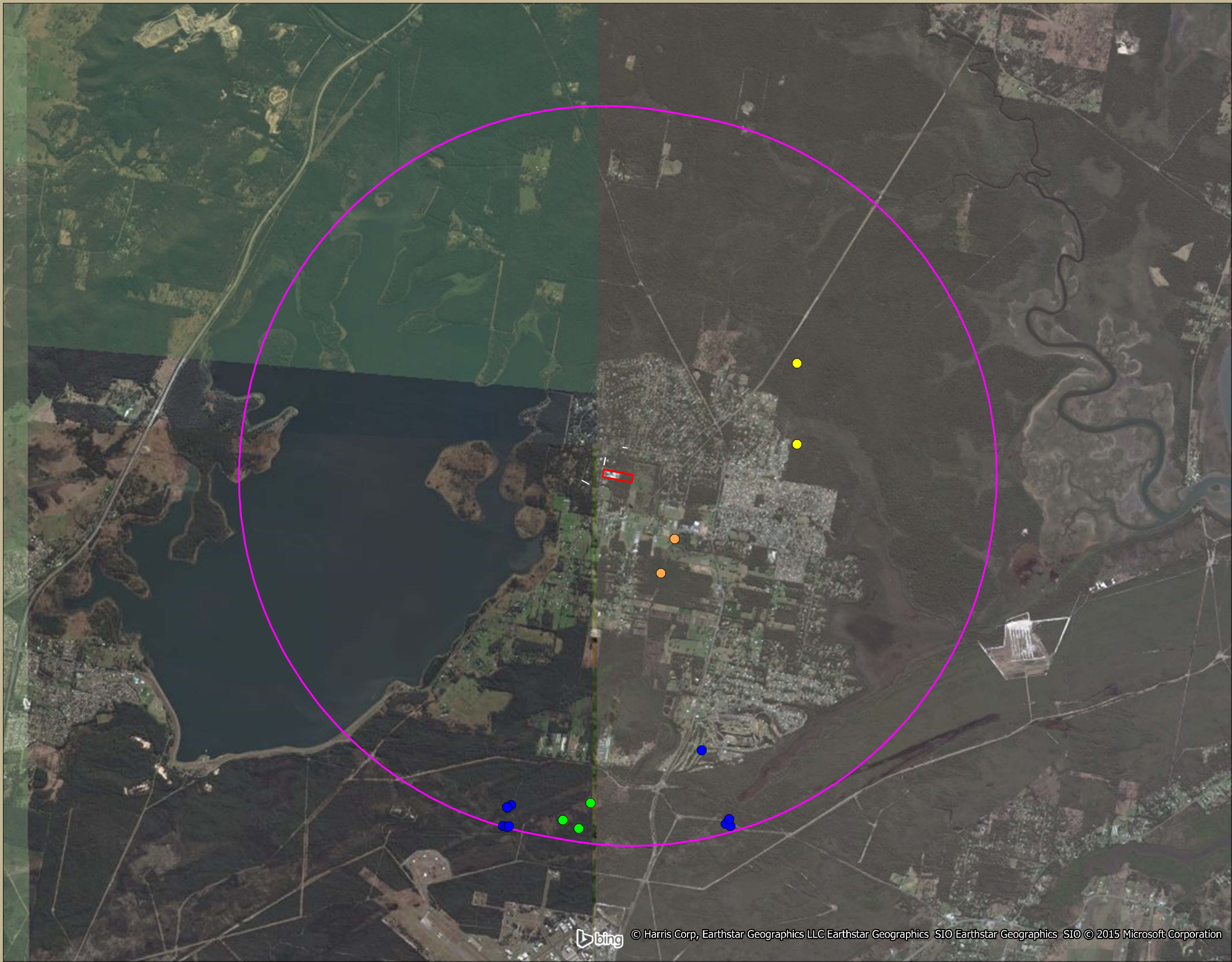
Image Source:  
Image © SIX Maps  
(dated 23-04-2013)



Figure 3.2. Fauna Habitat and Indicators within the Subject Site







**Legend**



Subject Site



Locality (5km radius)

**Threatened Flora**



*Callistemon linearifolius*



*Commersonia prostrata*



*Eucalyptus parramattensis*  
*subsp. decadens*



*Maundia triglochinoides*

Image Source:  
BingAerial: © 2015 Microsoft Corporation

Data Source:  
Atlas of NSW Wildlife  
(Public Download 30/09/2015)

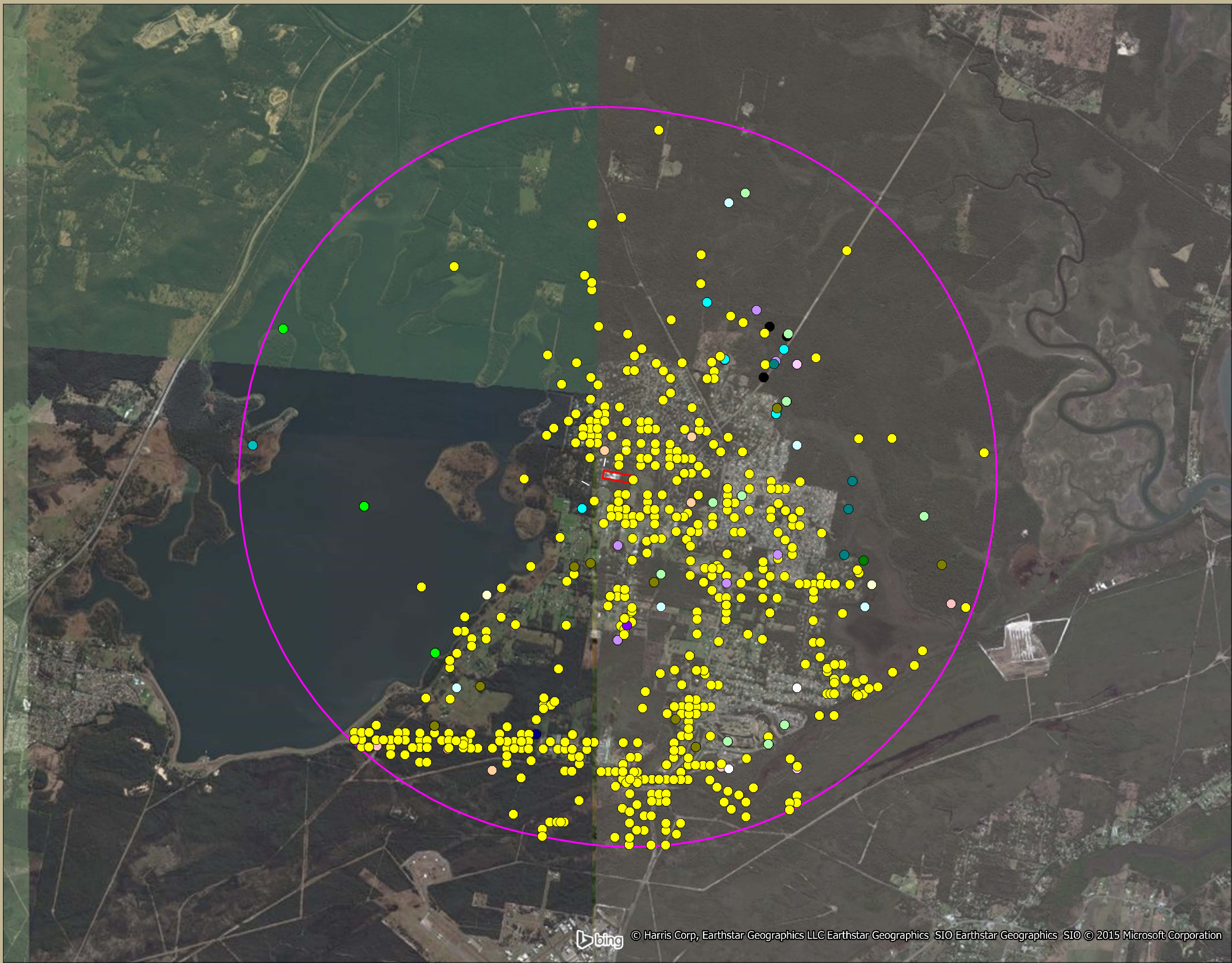


© Harris Corp, Earthstar Geographics LLC Earthstar Geographics SIO Earthstar Geographics SIO © 2015 Microsoft Corporation

Figure 3.3. Threatened Flora records within the Locality (5km radius)







**Legend**



Subject Site



Locality (5km radius)

**Threatened Fauna**

- Black Bittern
- Black-necked Stork
- Blue-billed Duck
- Brown Treecreeper (eastern subspecies)
- Brush-tailed Phascogale
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Eastern Freetail-bat
- Emu population in the NSW North Coast Bioregion and Port Stephens LGA
- Freckled Duck
- Greater Broad-nosed Bat
- Grey-headed Flying-fox
- Koala
- Little Bentwing-bat
- Little Lorikeet
- Masked Owl
- New Holland Mouse
- Powerful Owl
- Regent Honeyeater
- Spotted-tailed Quoll
- Squirrel Glider
- Turquoise Parrot
- Varied Sittella
- Wallum Froglet

Image Source:  
BingAerial: © 2015 Microsoft Corporation

Data Source:  
Atlas of NSW Wildlife  
(Public Download 30/09/2015)



© Harris Corp, Earthstar Geographics LLC Earthstar Geographics SIO Earthstar Geographics SIO © 2015 Microsoft Corporation

Figure 3.4. Threatened Fauna records within the Locality (5km radius)







Figure 3.5. Koala habitat mapping of the Subject Site and adjacent property (Land Use Planning 2007)

## Impact Assessment

# Impact Assessment

## 4.1 Vegetation Communities

Small areas of three vegetation communities are present within the development footprint and will be removed as a result of the proposed development (**Figure 4.1** and **Table 4.1**).

Two of the communities within the development footprint, Garden Vegetation and Exotic Grassland, are artificial communities not containing remnant native species. The third community is a degraded form of the Blackbutt/Red Bloodwood/Scribbly Gum/Smooth-barked Apple Open Forest occurring in the east of the subject site, consisting of canopy trees growing over Exotic Grassland and Garden Vegetation. These trees are likely to be regrowth individuals from seed following historical clearing of the school grounds due to former land uses, and are remnants of the community which occurs in an intact form in bushland in the east of the subject site, and as other scattered remnant canopy tree individuals outside of the development footprint within the school grounds.

Approximately 0.08 ha of these trees will be removed. In addition to the 0.08 ha of trees and planted/exotic vegetation beneath to be removed, approximately 0.01 ha of planted garden vegetation, and 0.01 ha of exotic grassland without a canopy of native trees will be removed. No vegetation community within the development footprint comprises an occurrence of a threatened ecological community listed under the TSC Act or EPBC Act.

**Table 4.1 Areas of vegetation communities within the subject site and development footprint**

Vegetation Community	Subject Site (ha)	Development Footprint(ha)
Forest Red Gum/ Red Mahogany Swamp Sclerophyll Forest	0.58	-
Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest	1.05	-
Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest - Canopy Only	0.40	0.08
Garden Vegetation	0.17	0.01
Exotic Grassland	0.90	0.01
<b>Total</b>	<b>3.11</b>	<b>0.10</b>



## 4.2 Flora

Vegetation within the development footprint (see **Figure 4.1**) consists of remnant native trees of the species *Angophora costata*, *Corymbia gummifera*, *Eucalyptus resinifera* subsp. *resinifera*, *Eucalyptus signata*, and *Eucalyptus globoidea*, and some juvenile individuals of these species. No old growth trees are present in the development footprint, and no trees are mature enough to have developed hollows. Vegetation under these trees consists predominately of the exotic lawn grass *Stenotaphrum secundatum*, and a small amount of planted garden vegetation consisting of exotic and planted native shrubs. Several individuals of common native species such as *Pteridium esculentum* and *Lomandra longifolia* are present at the base of some trees, and are regrowing after being cut back during lawn mowing. No individuals of any threatened flora species were located within the development footprint, and none are expected to occur due to the degraded nature of the vegetation.

## 4.3 Fauna

No threatened fauna species were recorded within the development footprint. As a result of the proposed 0.1 ha of vegetation clearance on the site, particularly removal of native trees, some foraging habitat will be removed for common, native fauna species, such as birds like the Rainbow Lorikeet, mammals such as the Brush-tailed Possum, and potentially for some threatened fauna species which may utilise the site as part of a larger foraging range.

Threatened fauna species that may forage within the development footprint as part of a larger foraging range are the Powerful owl, the Little Lorikeet, the Square-tailed Kite, the Masked Owl, the Grey-headed Flying Fox, the Squirrel Glider, the Koala, and four microchiropteran bat species. No roosting, or nesting habitat for any of these species is present within the development footprint, due to a lack of hollows, and other features such as decorticated bark on and within trees to be removed.

In general the development footprint contains degraded vegetation, with remnant native vegetation consisting only of a small patch of isolated trees, with 0.08 ha to be removed. Much larger areas of bushland will remain in the locality that provide more suitable habitat for threatened fauna species. Within the subject site alone, intact native vegetation to remain following the proposed development, providing far greater habitat values than the development footprint, consists of 0.58 ha of Forest Red Gum/ Red Mahogany Forest, an EEC, and 1.05 ha of Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest. Approximately 0.32 ha of remnant canopy trees of the same species as those within the development footprint, and *Eucalyptus pilularis*, will remain, with the largest area of these canopy trees contiguous with the bushland in the east, and thus more likely to be utilised for foraging by threatened and non-threatened fauna species.

The proposed development does not remove any preferred habitat for Koalas and is aligned with the aims and objectives of the LGA Management Plan to protect koala habitat areas (Port Stephens Council 2002). The proposed development has been assessed against the CKPoM (**Appendix G**).



An Assessment of Significance under the *TSC Act* has been prepared for each threatened fauna species listed in NSW (**Appendix D**) that has potential to utilise the development footprint. An Assessment of Significance has been prepared under the significant impact guidelines for matters of national environmental significance under the *EPBC Act* for each federally listed threatened species with potential to utilise the development footprint (**Appendix F**). These indicate the development footprint is unlikely to form core habitat for any threatened fauna species likely to occur, and a significant impact is not expected to occur to any species in the locality as a result of the proposed development.



**Legend**

- Subject Site
- Proposed Development Footprint (Impact Area)

**Vegetation Community**

- Forest Red Gum/ Red Mahogany Swamp Sclerophyll Forest
- Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest
- Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest - Canopy Only
- Garden Vegetation
- Exotic Grassland

**Fauna Habitat**

- Tree with medium hollow
- Tree with small hollow/s
- Stag with hollows
- Log

**Native Fauna Indicators**

- ▲ Wombat scat

**Exotic Fauna Indicators**

- ▼ Rabbit burrow

Image Source:  
Image © SIX Maps  
(dated 23-04-2013)



20 0 20 40 60 80 m

Figure 4.1. Impact Area of the Proposed Development



## Recommended Mitigation Measures

# Recommended Mitigation Measures

---

The impacts to flora and fauna values within the subject site are considered minimal given the degraded and modified nature of the vegetation within the development footprint. The development footprint does not encroach on the remnant vegetation to the north east of the site, which provides better quality resources for threatened and non-threatened species.

Despite this, it is recommended that a number of measures are implemented to minimise impacts to flora and fauna values, including:

- Use of suitable runoff, sedimentation, erosion and pollution controls during construction;
- Clear demarcation of trees to be removed to avoid any unnecessary vegetation removal;
- Use of locally occurring native species within landscape design, which may provide potential habitat for native fauna species such as birds and reptiles;
- Targeted fauna surveys prior to demolition of buildings using ultrasonic bat detection units to determine whether any microchiropteran bats area using the buildings as roosting habitat; and
- Supervision of tree removal by appropriately qualified personnel to rescue any resident fauna present.

It is recommended that flora species to be planted in landscaped areas of the site, should represent species removed from the development footprint, in order to restore the small area of fauna habitat to be removed within the development footprint. Species should be selected that offer some foraging resources for local fauna species, such as nectivorous birds.

## Conclusion

# Conclusion

---

Past and current use of the subject site has entailed clearing and modification of the pre-existing native vegetation within the development footprint. The proposed development is largely contained within cleared and highly modified land. Approximately 0.08 ha of Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest - Canopy Only will be removed by the proposed development. A further 0.01 ha of Garden Vegetation and 0.01 ha of Exotic Grassland will also be removed.

No vegetation community within the development footprint comprises an occurrence of a threatened ecological community listed under the TSC Act or EPBC Act. The remnant vegetation to the north east of the site will be retained. By retaining this high quality habitat, it will act as a corridor providing connectivity between vegetation and resources for threatened and non-threatened species, including Koalas.

Despite the impacts of previous disturbance, the proposed development will require the clearing on native vegetation that forms suitable habitat for some threatened fauna species.

The mitigation measures recommended to be implemented included:

- Erosion, sedimentation and pollution control;
- Vegetation protection;
- Incorporation of locally occurring native species within landscape design; and
- Pre-clearing and clearing surveys.

No significant impact is predicted to occur to threatened species, populations or communities as a result of the proposed development. Therefore, the preparation of a Species Impact Statement (SIS) is not warranted. A referral to DoE, under the EPBC Act is also not required.

As this FFA has been prepared for the works to be undertaken under the Stage 1 DA only, further assessment of ecological impacts will be required for development under subsequent DAs proposed within the Concept Proposal.



## References

---

- DEC (NSW) (2005a). *Masked Owl - profile*. Department of Environment and Conservation (NSW), Hurstville, NSW.
- DEC (NSW) (2005b). *Powerful Owl - profile*. Department of Environment and Conservation (NSW), Hurstville.
- DEC (NSW) (2006). *Recovery Plan for the Large Forest Owls: Powerful Owl *Ninox strenua*; Sooty Owl *Tyto tenebricosa*; Masked Owl *Tyto novaehollandiae**. Department of Environment and Conservation (NSW), Hurstville.
- DECCW (2009). *Draft National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus**. Department of Environment, Climate Change and Water, Sydney, NSW.
- DoE (2015). "EPBC Protected Matters Search Tool." Retrieved 2015, from <http://www.environment.gov.au/arcgis-framework/apps/pmst/pmst-coordinate.jsf>.
- Eco Logical Australia (ELA) (2015). "Medowie Christian School and Baptist Community Church – Ecological Constraints and Impact Assessment", Prepared for EPM Projects Pty Ltd.
- EPM (2015). "Medowie Christian School - Concept Proposal & Stage 1 Administration Building DA - Request for Consultant Proposal Ecological", EPM, St Leonards.
- Kingdom, R. (2015). "Arboricultural Impact Assessment - Medowie Christian School 6B Waropara Road Medowie NSW 2318". Advanced Treescape Consulting, Karing.
- Land Use Planning, Sustainable Planning Group (2007). *Koala Habitat Planning Map - Medowie/Tilligerry Aug06*, Port Stephens LGA
- Local Land Services (Hunter) (2015). "Draft - Property Vegetation Plan 6A Waropara Road Medowie NSW 2318", NSW Government
- OEH (2014a). "Bionet."
- OEH (2014b). *Eastern Bentwing-bat - profile*. Office of Environment and Heritage, Hurstville.
- OEH (2014c). "Eastern False Pipistrelle - profile." from <http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10331>.
- OEH (2014d). *Eastern Freetail-bat - profile*. Office of Environment and Heritage, Hurstville.
- OEH (2014e). *Koala habitat and feed trees*. NSW Office of Environment and Heritage, Hurstville.
- OEH (2014f). *Square-tailed Kite - profile*. Office of Environment and Heritage, Hurstville.
- OEH (2014g). *Yellow-bellied Sheath-tail-bat - profile*. Office of Environment and Heritage, Hurstville.
- OEH (2015). "BioNet Atlas of NSW Wildlife." from [http://www.environment.nsw.gov.au/atlaspublicapp/UI\\_Modules/ATLAS\\_atlasreport.aspx](http://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_atlasreport.aspx).
- Phillips, S. and Callaghan, J. (2011). "The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas *Phascolarctos cinereus*." *Australian Zoologist* **35**(3): 774-780.
- Port Stephens Council (2002). "Port Stephens Council Comprehensive Koala Plan of Management (CKPoM) – June 2002". Prepared by Port Stephens Council with the Australian Koala Foundation.
- Smith & Tracey Architects (2015). "Draft - Medowie Christian School Landscape Plan Stage 1 C", Smith & Tracey Architects, Surry Hills

---

*Appendix A*

Flora Species List

# Flora Species List

---

**Table A.1** lists flora species recorded within the subject site during surveys.

RMT in the table refers to Random Meander Transect survey methodology (X = presence within RMT), and Q refers to a 20 x 20 m vegetation quadrat (refer to **Figure 2.1** for locations). Vegetation quadrat numbers refer to a modified braun-blauquet cover/abundance scale for each species within the plot, adj. refers to a species noted adjacent to the quadrat. The modified scale is as follows:

- 1: <5% coverage - Rare (usually just 1 plant in the plot);
- 2: <5% coverage - uncommon (a couple of plants in the plot);
- 3: <5% coverage- Common;
- 4: <5% coverage - Very Common (lots of plants but not cracking the 5% coverage);
- 5: 5-25% coverage;
- 6: 26-50% coverage;
- 7: 51-75% coverage; and
- 8: 76-100% coverage

Status of plants in the table is as follows:

- \* = Exotic Species;
- p = Planted native species; and
- p/np = Planted within school grounds, but occurs naturally within bushland areas

**Table A.1** Flora species recorded within the subject site

Form	Family	Status	Scientific Name	Common Name	RMT	RMT	RMT	RMT	RMT	Q1	Q2	Q3
					1	2	3	4	5			
Canopy	Myrtaceae		<i>Angophora costata</i>	Sydney Red Gum	X	X	X		X			6
	Myrtaceae		<i>Corymbia gummifera</i>	Red Bloodwood		X	X			5		
	Myrtaceae		<i>Eucalyptus globoidea</i>	White Stringybark			X					
	Myrtaceae		<i>Eucalyptus pilularis</i>	Blackbutt					X	6		
	Myrtaceae		<i>Eucalyptus resinifera</i> subsp. <i>resinifera</i>	Red Mahogany	X	X	X		X		5	5
	Myrtaceae		<i>Eucalyptus robusta</i>	Swamp Mahogany							adj	
	Myrtaceae		<i>Eucalyptus signata</i>	Scribbly Gum	X	X	X			5		
	Myrtaceae		<i>Eucalyptus tereticornis</i>	Forest Red Gum							5	
Sub-canopy	Casuarinaceae		<i>Allocasuarina littoralis</i>	Black She-oak						5		
	Myrtaceae		<i>Angophora costata</i>	Sydney Red Gum	X	X				2		5
	Myrtaceae		<i>Corymbia gummifera</i>	Spotted Gum	X							
	Myrtaceae		<i>Eucalyptus globoidea</i>	White Stringybark		X						
	Myrtaceae	p	<i>Eucalyptus robusta</i>	Swamp Mahogany				X				
	Myrtaceae		<i>Eucalyptus signata</i>	Scribbly Gum						2		1
	Myrtaceae		<i>Melaleuca decora</i>								5	
	Myrtaceae		<i>Melaleuca nodosa</i>	Prickly-leaved Paperbark							6	
	Myrtaceae		<i>Melaleuca styphelioides</i>	Prickly-leaved Tea Tree						1		



**Table A.1** Flora species recorded within the subject site

Form	Family	Status	Scientific Name	Common Name	RMT	RMT	RMT	RMT	RMT	Q1	Q2	Q3
					1	2	3	4	5			
<b>Ferns and Allies</b>	Dennstaedtiaceae		<i>Pteridium esculentum</i>	Common Bracken	X			X	X	5		1
<b>Climbers/Vines</b>	Apocynaceae		<i>Parsonsia straminea</i>	Common Silkpod	X	X				2	4	
	Apocynaceae	*	<i>Trachelospermum jasminoides</i>	Star Jasmine		X						
	Caprifoliaceae	*	<i>Lonicera japonica</i>	Japanese Honeysuckle							2	
	Convolvulaceae		<i>Polymeria calycina</i>							1		
	Fabaceae (Faboideae)		<i>Desmodium rhytidophyllum</i>							2		
	Fabaceae (Faboideae)		<i>Glycine clandestina</i>							1		
	Fabaceae (Faboideae)		<i>Hardenbergia violacea</i>	Purple Coral Pea					X	2		1
	Lauraceae		<i>Cassytha glabella</i>							3		
	Lauraceae		<i>Cassytha pubescens</i>				X			2		
	Pittosporaceae		<i>Billardiera scandens</i>	Hairy Apple Berry						3		
<b>Shrubs</b>	Buxaceae	*	<i>Buxus microphylla</i>			X	X					
	Casuarinaceae		<i>Allocasuarina littoralis</i>	Black She-oak			X					
	Cupressaceae	*	<i>Cupressus sp.</i>			X						
	Dilleniaceae		<i>Hibbertia empetrifolia</i>							5		

**Table A.1** Flora species recorded within the subject site

Form	Family	Status	Scientific Name	Common Name	RMT	RMT	RMT	RMT	RMT	Q1	Q2	Q3
					1	2	3	4	5			
	Dilleniaceae		<i>Hibbertia vestita</i>	Hairy Guinea Flower						4		
	Elaeocarpaceae	p	<i>Elaeocarpus reticulatus</i>	Blueberry Ash		X						
	Ericaceae (Styphelioideae)		<i>Leucopogon juniperinus</i>	Prickly Beard-heath					X	adj		
	Lamiaceae	p	<i>Westringia fruticosa</i>	Coastal Rosemary	X	X						
	Lamiaceae	p	<i>BLUE GEM Westringia fruticosa</i>	Coastal Rosemary	X	X						
	Fabaceae (Faboideae)		<i>Daviesia ulicifolia</i>	Gorse Bitter Pea					X			
	Fabaceae (Faboideae)	p	<i>Pultenaea myrtoides</i>			X			X			1
	Fabaceae (Faboideae)		<i>Pultenaea villosa</i>							adj		
	Fabaceae (Mimosoideae)		<i>Acacia falcata</i>	Hickory wattle					X			
	Fabaceae (Mimosoideae)	p	<i>Acacia floribunda</i>	White Sally Wattle		X						
	Fabaceae (Mimosoideae)	p/np	<i>Acacia longifolia subsp. longifolia</i>	Sydney Golden Wattle		X				4		
	Fabaceae (Mimosoideae)	p	<i>Acacia saligna</i>	Golden Wreath Wattle		X						
	Lauraceae	*	<i>Cinnamomum camphora</i>	Camphor Laurel							2	
	Magnoliaceae	*	<i>Magnolia sp.</i>		X		X					
	Malaceae	*	<i>Rhaphiolepis indica</i>	Indian Hawthorn		X						
	Melastomataceae	*	<i>Tibouchina sp.</i>			X						
	Myrtaceae	p	<i>Callistemon citrinus</i>	Crimson Bottlebrush				X				
	Myrtaceae	p	<i>Callistemon rigidus</i>	Stiff Bottlebrush				X				
	Myrtaceae		<i>Callistemon salignus</i>	Willow Bottlebrush						1		

**Table A.1** Flora species recorded within the subject site

Form	Family	Status	Scientific Name	Common Name	RMT	RMT	RMT	RMT	RMT	Q1	Q2	Q3
					1	2	3	4	5			
	Myrtaceae	p	<i>Leptospermum polygalifolium</i>	Tantoon		X				2		
	Myrtaceae	p	<i>Leptospermum petersonii</i>	Lemon-scented Teatree	X					1		
	Myrtaceae		<i>Melaleuca decora</i>						X		2	
	Myrtaceae	p/np	<i>Melaleuca linariifolia</i>	Flax-leaved Paperbark				X			1	
	Myrtaceae		<i>Melaleuca nodosa</i>	Prickly-leaved Paperbark					X		5	
	Myrtaceae		<i>Melaleuca sieberi</i>								5	
	Myrtaceae	p	<i>Melaleuca thymifolia</i>	Thyme Honey-myrtle		X						
	Myrtaceae		<i>Syzygium australe</i>	Brush Cherry						1		
	Myrtaceae	p	<i>Syzygium sp.</i>			X						
	Myrtaceae	p	<i>Tristaniopsis laurina</i>	Water Gum		X						
	Phyllanthaceae		<i>Glochidion ferdinandi</i>	Cheese Tree			X					
	Phyllanthaceae		<i>Phyllanthus hirtellus</i>	Thyme Spurge						2		
	Pinaceae	*	<i>Pinus sp.</i>				X					
	Pittosporaceae		<i>Bursaria spinosa</i>	Blackthorn		X						1
	Pittosporaceae		<i>Pittosporum undulatum</i>	Native Daphne			X			6	5	
	Proteaceae	p	<i>Banksia ericifolia</i>	Heath-leaved Banksia	X							
	Proteaceae		<i>Banksia integrifolia</i>	Coast banksia			X					
	Proteaceae		<i>Banksia marginata</i>	Silver Banksia						2		
	Proteaceae	p	<i>Banksia serrata</i>	Old-man Banksia			X					



**Table A.1** Flora species recorded within the subject site

Form	Family	Status	Scientific Name	Common Name	RMT	RMT	RMT	RMT	RMT	Q1	Q2	Q3
					1	2	3	4	5			
	Proteaceae	p	<i>Banksia spinulosa</i>	Hairpin Banksia			X					
	Proteaceae	p	<i>Hakea salicifolia</i>	Willow-leaved Hakea	X							
	Proteaceae	p	<i>Grevillea juniperina</i> (cultivar)			X						
	Unknown	*	<i>Deciduous sp. (no foliage)</i>		X	X						
	Unknown	*	<i>Exotic shrub sp.</i>			X						
	Rhamnaceae	p	<i>Alphitonia excelsa</i>	Red Ash		X						
	Rutaceae	*	<i>Citrus x limon</i>			X						
	Sapindaceae		<i>Dodonaea triquetra</i>	Large-leaf Hop-bush					X			
	Verbenaceae	*	<i>Lantana camara</i>	Lantana					X		1	
<b>Dicots</b>	Acanthaceae		<i>Brunoniella australis</i>	Blue Trumpet						3		1
	Apiaceae		<i>Centella asiatica</i>	Indian Pennywort					X			
	Apiaceae	*	<i>Cyclospermum leptophyllum</i>	Slender Celery	X							
	Apiaceae		<i>Hydrocotyle peduncularis</i>								3	
	Apiaceae	*	<i>Petroselinum crispum</i>	Parsley		X						
	Asteraceae	*	<i>Bidens pilosa</i>	Cobblers Pegs				X				
	Asteraceae	*	<i>Cirsium vulgare</i>	Spear Thistle		X		X	X			
	Asteraceae	*	<i>Conyza sumatrensis</i>	Tall Fleabane	X	X	X		X			
	Asteraceae	*	<i>Erigeron karvinskianus</i>	Bony-tip Fleabane		X						

**Table A.1** Flora species recorded within the subject site

Form	Family	Status	Scientific Name	Common Name	RMT	RMT	RMT	RMT	RMT	Q1	Q2	Q3
					1	2	3	4	5			
	Asteraceae	*	<i>Gamochaeta americana</i>	Cudweed			X					
	Asteraceae	*	<i>Hypochaeris radicata</i>	Catsear		X	X		X			3
	Asteraceae	*	<i>Senecio madagascariensis</i>	Fireweed			X		X			2
	Asteraceae	*	<i>Sonchus oleraceus</i>	Common Sowthistle	X							
	Asteraceae	*	<i>Soliva sessilis</i>	Bindyi	X	X						3
	Asteraceae	*	<i>Taraxacum officinale</i>	Dandelion		X						
	Balsaminaceae	*	<i>Impatiens sp.</i>			X						
	Brassicaceae	*	<i>Cardamine hirsuta</i>	Common Bittercress	X							
	Caryophyllaceae	*	<i>Cerastium glomeratum</i>	Mouse-ear Chickweed		X			X			2
	Caryophyllaceae	*	<i>Stellaria media</i>	Common Chickweed	X	X			X			2
	Convolvulaceae		<i>Dichondra repens</i>	Kidney Weed							3	
	Euphorbiaceae	*	<i>Euphorbia peplus</i>	Petty Spurge		X						
	Fabaceae (Faboideae)	*	<i>Medicago polymorpha</i>	Burr Medic								2
	Fabaceae (Faboideae)	*	<i>Trifolium repens</i>	White Clover	X		X					4
	Fabaceae (Faboideae)	*	<i>Vicia sativa</i>					X				
	Goodeniaceae		<i>Goodenia paniculata</i>	Branched Goodenia							2	
	Lauraceae	*	<i>Cinnamomum camphora</i>	Camphor Laurel		X						
	Lobeliaceae		<i>Pratia purpurascens</i>	Whiteroot		X		X	X	4	4	2
	Malvaceae	*	<i>Sida rhombifolia</i>	Paddy's Lucerne								2

**Table A.1** Flora species recorded within the subject site

Form	Family	Status	Scientific Name	Common Name	RMT	RMT	RMT	RMT	RMT	Q1	Q2	Q3
					1	2	3	4	5			
	Myrsinaceae	*	<i>Anagallis arvensis</i>	Scarlet Pimpernel			X		X			4
	Plantaginaceae	*	<i>Plantago lanceolata</i>	Lamb's Tongues					X			
	Plantaginaceae	*	<i>Veronica arvensis</i>	Wall Speedwell					X			3
	Polygonaceae		<i>Rumex brownii</i>	Swamp Dock		X						
	Ranunculaceae		<i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>			X						
	Rubiaceae	*	<i>Richardia stellaris</i>				X		X			
	Verbenaceae	*	<i>Verbena bonariensis</i>	Purpletop					X			
<b>Monocots (Grasses)</b>	Poaceae	*	<i>Andropogon virginicus</i>	Whisky Grass					X			
	Poaceae		<i>Aristida vagans</i>	Threeawn Speargrass						2		
	Poaceae	*	<i>Axonopus fissifolius</i>	Narrow-leafed Carpet Grass			X					
	Poaceae	*	<i>Cynodon dactylon</i>	Couch	X	?			X			3
	Poaceae	*	<i>Briza maxima</i>	Quaking Grass		X						
	Poaceae	*	<i>Bromus catharticus</i>	Prairie Grass		X						
	Poaceae	*	<i>Ehrharta erecta</i>	Panic Veldtgrass		X						
	Poaceae		<i>Entolasia marginata</i>	Bordered Panic							4	
	Poaceae		<i>Entolasia stricta</i>	Wiry Panic		X				3		3
	Poaceae		<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass							3	
	Poaceae		<i>Imperata cylindrica</i>	Blady Grass		X		X		5		



**Table A.1** Flora species recorded within the subject site

Form	Family	Status	Scientific Name	Common Name	RMT	RMT	RMT	RMT	RMT	Q1	Q2	Q3
					1	2	3	4	5			
	Poaceae		<i>Microlaena stipoides</i>	Weeping Grass						5		3
	Poaceae		<i>Oplismenus aemulus</i>	Australian Basket Grass		X					3	
	Poaceae		<i>Panicum simile</i>	Two-colour Panic		X						
	Poaceae		<i>Paspalidium distans</i>						X		3	
	Poaceae	*	<i>Paspalum dilatatum</i>	Paspalum		X			X		2	3
	Poaceae	*	<i>Pennisetum clandestinum</i>	Kikuyu Grass					X			
	Poaceae	*	<i>Poa annua</i>	Winter Grass	X	X						4
	Poaceae	*	<i>Sporobolus africanus</i>	Parramatta Grass								3
	Poaceae	*	<i>Stenotaphrum secundatum</i>	Buffalo Grass	X	X	X					6
	Poaceae		<i>Themeda triandra</i>	Kangaroo Grass		X			X			
<b>Monocots (Other)</b>	Anthericaceae	*	<i>Chlorophytum comosum</i>	Spider Plant			X					
	Araceae	*	<i>Zantedeschia aethiopica</i>	Arum Lily		X						
	Cyperaceae		<i>Chorizandra cymbaria</i>								6	
	Cyperaceae	p	<i>Gahnia clarkei</i>	Tall Saw-sedge	X						4	
	Cyperaceae		<i>Lepidosperma laterale</i>							5		
	Cyperaceae		<i>Lepidosperma quadrangulatum</i>								6	
	Doryanthaceae		<i>Doryanthes excelsa</i>	Giant Lily			X					
	Haemodoraceae	p	<i>Anigozanthos sp.</i>			X						

**Table A.1** Flora species recorded within the subject site

Form	Family	Status	Scientific Name	Common Name	RMT	RMT	RMT	RMT	RMT	Q1	Q2	Q3
					1	2	3	4	5			
	Iridaceae	*	<i>Dietes bicolor</i>	African Iris	X	X						
	Iridaceae	*	<i>Romulea rosea</i>	Onion Grass		X						4
	Lomandraceae		<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		X				3		3
	Lomandraceae		<i>Lomandra multiflora</i>	Many-flowered Mat-rush						3	2	
	Orchidaceae		<i>Caladenia catenata</i>	White Caladenia						2		
	Orchidaceae		<i>Pterostylis baptistii</i>	King Greenhood						2		
	Orchidaceae		<i>Pterostylis longifolia</i>	Tall Greenhood						2		
	Phormiaceae		<i>Dianella caerulea</i>						X			
	Phormiaceae	p/np	<i>Dianella caerulea</i> var. <i>producta</i>		X					2		
	Typhaceae		<i>Typha orientalis</i>	Broadleaf Cumbungi					X			
	Xanthorrhoeaceae		<i>Xanthorrhoea latifolia</i>							3		

---

*Appendix B*

Threatened Flora Likelihood of Occurrence

# Threatened Flora Likelihood of Occurrence

---



**Table B.1** Likelihood of occurrence of threatened flora species

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
Casuarinaceae	<i>Allocasuarina defungens</i>	Dwarf Heath Casuarina	E	E	0	Occurs mainly in tall heath on sand, but can also occur on clay soils and sandstone.	Unlikely as no suitable habitat available. No heathlands are present on the subject site.
Elaeocarpaceae	<i>Tetraloche juncea</i>	Black-eyed Susan	V	V	0	Usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest.	Unlikely to occur within the development footprint due to the highly modified nature of the soil and vegetation due to current land use. Species has not been recorded previously in the locality, though some potential habitat is present within the bushland in the west of the subject site.
Juncaginaceae	<i>Maundia triglochinosides</i>		V		3	Grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients.	Unlikely to occur within the development footprint due to the highly modified nature of the soil and vegetation due to current land use. Species has potential to occur in Swamp Sclerophyll Forest within the east of the subject site.
Malvaceae	<i>Commersonia prostrata</i>	Dwarf Kerrawang	E	E	0	Occurs on sandy, sometimes peaty soils in a wide variety of habitats: Snow Gum (Eucalyptus pauciflora) Woodland and Ephemeral Wetland floor at Rowes Lagoon; Blue leaved Stringybark (E.	Unlikely to occur within the development footprint due to the highly modified nature of the soil and vegetation due to current land use. Species has never been recorded in the locality, however

**Table B.1 Likelihood of occurrence of threatened flora species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
						agglomerata) Open Forest at Tallong; and in Brittle Gum ( <i>E. mannifera</i> ) Low Open Woodland at Penrose; Scribbly Gum ( <i>E. haemastoma</i> )/ Swamp Mahogany ( <i>E. robusta</i> ) Ecotonal Forest at Tomago.	some potential habitat is present on the subject site in Swamp Sclerophyll Forest, outside of the proposed development footprint.
Myrtaceae	<i>Callistemon linearifolius</i>	Netted Bottle Brush	V		3	Grows in dry sclerophyll forest on the coast and adjacent ranges.	Unlikely to occur within the development footprint due to the highly modified nature of the soil and vegetation due to current land use. Species is a conspicuous shrub that was not present in the development footprint during site surveys. Some potential habitat is present in the bushland areas within the eastern side of the site.
Myrtaceae	<i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>		V	V	1	Generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant.	Unlikely as no suitable habitat available. Deep sands are not present on the subject site.
Myrtaceae	<i>Angophora inopina</i>	Charmhaven Apple	V	V	0	Occurs most frequently in four main	Unlikely as no suitable habitat available.

**Table B.1 Likelihood of occurrence of threatened flora species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
						vegetation communities: (i) Eucalyptus haemastoma–Corymbia gummifera–Angophora inopina woodland/forest; (ii) Hakea teretifolia–Banksia oblongifolia wet heath; (iii) Eucalyptus resinifera–Melaleuca sieberi–Angophora inopina sedge woodland; (iv) Eucalyptus capitellata–Corymbia gummifera–Angophora inopina woodland/forest.	Species is a core component of communities it is associated with and is a conspicuous small tree which was not located during site surveys. It has never been recorded in the locality.
Myrtaceae	<i>Eucalyptus camfieldii</i>	Camfield's Stringybark	V	V	0	Grows in poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges.	Unlikely as no suitable habitat available. No ridge areas overlying sandstone are present on the site. Soils on the site are low lying and deep.
Myrtaceae	<i>Melaleuca biconvexa</i>	Biconvex Paperbark	V	V	0	Occurs in damp areas, often near watercourses, on alluvium soils over shale. Vegetation communities associated with the species include 'Eucalypt open-forest' with Sydney Blue Gum ( <i>Eucalyptus saligna</i> ), Swamp Mahogany ( <i>Eucalyptus robusta</i> ) and Mountain Cedar Wattle ( <i>Acacia elata</i> ) and in 'Paperbark scrub' with Prickly-leaved Paperbark ( <i>Melaleuca styphelioides</i> ), Snow-in-summer ( <i>Melaleuca linariifolia</i> ), White Feather	Unlikely. Some potential habitat is present, but site is outside of the species known range.



**Table B.1 Likelihood of occurrence of threatened flora species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
						Honey Myrtle ( <i>Melaleuca decora</i> ), Sieber's Paperbark ( <i>Melaleuca sieberi</i> ) and <i>Melaleuca nodosa</i> .	
Orchidaceae	<i>Corybas dowlingii</i>	Red Helmet Orchid	E		1	Occurs in sheltered areas such as gullies and southerly slopes in tall open forest on well-drained gravelly soil at elevations of 10-200 m	Unlikely as no suitable habitat available. No gravel soils present on the site, and no sheltered areas such as gullies.
Orchidaceae	<i>Pterostylis chaetophora</i>		V		1	Grows in sclerophyll forest among grasses and shrubs	Unlikely to occur within the development footprint due to the highly modified nature of the soil and vegetation due to current land use. Potential habitat is present within eastern bushland areas of the subject site.
Orchidaceae	<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	V	0	Occur in a wide variety of habitats including heathlands, heathy woodlands, sedgelands, <i>Xanthorrhoea</i> spp. plains, dry sclerophyll forests (shrub/grass sub-formation and shrubby sub-formation), forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests. Soils are generally considered to be moist and sandy, however, this species is also known	Unlikely to occur within the development footprint due to the highly modified nature of the soil and vegetation due to current land use. Species has never been recorded in the locality, however some potential habitat is present on the subject site in bushland areas in the east.

**Table B.1** Likelihood of occurrence of threatened flora species

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
						to grow in dry or peaty soils. Is associated with the community Bloodwood / Scribbly Gum / Silver-top Ash Forest on the South Coast. Species is known to have occurrence associated with other <i>Cryptostylis</i> species.	
Orchidaceae	<i>Phaius australis</i>	Lesser Swamp-orchid	E	E	0	Commonly associated with coastal wet heath/sedgeland wetlands swampy grassland or swampy forest (and often where Broad-leaved Paperbark or Swamp Mahogany are found).	Unlikely as the site is outside of the species known range.
Polygonaceae	<i>Persicaria elatior</i>	Knotweed	V	V	0	Grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Unlikely to occur within the development footprint due to the highly modified nature of the soil and vegetation due to current land use. Species has some potential to occur in Swamp Sclerophyll Forest in the east of the subject site, however has never been recorded in the locality.
Proteaceae	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	V	V	6	Grows in light sandy or clay soils over thin shales, often with lateritic ironstone gravels and nodules. Is known to occur in Shale/Sandstone Transition Forest.	Unlikely as no suitable habitat available. Shale/Sandstone soils not present.

**Table B.1** Likelihood of occurrence of threatened flora species

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
Rubiaceae	<i>Asperula asthenes</i>	Trailing Woodruff	V	V	0	Occurs in damp sites, often along river banks.	Unlikely as no suitable habitat available. No rivers are present on the site and the species has never been recorded in the locality.
Rutaceae	<i>Asterolasia elegans</i>		E	E	0	Occurs on Hawkesbury sandstone growing between sandstone boulders and rocky outcrops found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. It is currently only known from 7 populations occurring in the hills north of Maroota within a 22 km <sup>2</sup> extent of occurrence.	Unlikely as no suitable habitat available. Site is outside of the species known range.

TSC Act /EPBC Act Status: E = Endangered; V = Vulnerable



---

*Appendix C*

Fauna Species List

# Fauna Species List

---

**Table C.1 Fauna Species Recorded within the Subject Site**

Family	Scientific Name	Common Name
Artamidae	<i>Strepera graculina</i>	Pied Currawong
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing
Columbidae	<i>Geopelia striata</i>	Peaceful Dove
Columbidae	<i>Ocyphaps lophotes</i>	Crested pigeon
Halcyonidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird
Meliphagidae	<i>Anthochaera chrysoptera</i>	Little wattle bird
Meliphagidae	<i>Manorina melanocephala</i>	Noisy Miner
Meliphagidae	<i>Philemon citreogularis</i>	Little Friarbird
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird
Monarchidae	<i>Myiagra inquieta</i>	Restless Flycatcher
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler
Psittaculidae	<i>Alisterus scapularis</i>	Australian King Parrot
Psittaculidae	<i>Platycercus eximius</i>	Eastern Rosella
Psittaculidae	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail

---

*Appendix D*

Threatened Fauna Likelihood of Occurrence

# Threatened Fauna Likelihood of Occurrence

---



**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
<b>Amphibia</b>							
Hylidae	<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	0	Marshes, dams, stream sides, particularly those containing bullrushes or spikerushes; unshaded water bodies free of <i>Gambusia</i> form optimum habitat; vegetation and/or rocks are needed for sheltering.	Unlikely as no suitable habitat available within the subject site.
Myobatrachidae	<i>Crinia tinnula</i>	Wallum Froglet	V		5	Found in many habitat types, usually associated with acidic swamps on coastal sand plains. Most often occur in sedgeland, wet heathlands and can also occur along drainage lines in other vegetation types and disturbed areas, and occasionally in swamp sclerophyll forests.	Unlikely as no suitable habitat within the development footprint. Potential habitat is present within the subject site within Swamp Sclerophyll Forest in the east.
Myobatrachidae	<i>Mixophyes balbus</i>	Stuttering Frog	E	V	0	Found in rainforest and wet, open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Occurs in deep leaf litter and thick understorey vegetation, and breeds in streams after heavy rain.	Unlikely as no suitable habitat available on the subject site. No rainforest present.
<b>Aves</b>							
Accipitridae	<i>Lophoictinia isura</i>	Square-tailed Kite	V		2	Found in a variety of timbered habitats	Potential foraging habitat within the

**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
						including dry woodlands and open forests. It is a specialist hunter preying on passerine birds, especially honeyeaters and targets predominately nestlings and insects occurring in the tree canopy. It nests in tree forks or on large horizontal tree limbs located mostly along or near watercourses.	subject site and may pass through the development footprint on occasion. No nesting habitat on the site due to lack of watercourses.
Anatidae	<i>Oxyura australis</i>	Blue-billed Duck	V		1	Occurs where there is deep water in large permanent wetlands and swamps with dense aquatic vegetation.	Unlikely as no permanent water bodies present.
Anatidae	<i>Stictonetta naevosa</i>	Freckled Duck	V		1	The species prefers permanent freshwater swamps and creeks heavy with shrub, sedge, and rush growth. It rests in dense cover during the day, usually in deep water and feeds at dusk and dawn on algae, seeds, and vegetative parts of aquatic sedges and grasses.	Unlikely as no permanent water present.
Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	0	Occurs in freshwater wetlands, and more rarely, estuarine wetlands. It favours wetlands with tall, dense vegetation, and forages in shallow water up to a depth of 0.3m. It nests in deep vegetative cover	Unlikely as no permanent water present.

**Table D.1** Likelihood of occurrence of threatened fauna species

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern	V		1	over shallow pools. Inhabits terrestrial and estuarine wetlands, generally in areas containing permanent water and dense vegetation. The species can occur in flooded grassland, woodland, rainforest, and mangroves. It feeds on frogs, reptiles, fish, and invertebrates such as snails, dragonflies, shrimp and crayfish. It roosts during the day on the ground amongst dense reeds or within trees. It nests in branches overhanging water.	Unlikely as no permanent water present.
Cacatuidae	<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V		9	Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m ASL in which stands of she-oak species, particularly Black She-oak ( <i>Allocasuarina littoralis</i> ), Forest She-oak ( <i>A. torulosa</i> ) or Drooping She-oak ( <i>A. verticillata</i> ) occur.	Unlikely to utilise the development footprint due to lack of Casuarinaceae species. Possible foraging habitat within the subject site due to presence of <i>Allocasuarina littoralis</i> .
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu population in the New South Wales North Coast Bioregion and Port Stephens	EP		2	On the NSW north coast, Emus occur in a range of predominantly open lowland habitats, including grasslands, heathland, shrubland, open and shrubby woodlands,	Unlikely. Species is conspicuous and was not observed during site surveys, and fencing inhibits access to the development footprint. Potential to utilise



**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
		local government area				forest, and swamp and sedgeland communities, as well as the ecotones between these habitats. They also occur in plantations of tea-tree and open farmland, and occasionally in littoral rainforest.	bushland areas in the east of the subject site.
Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E		6	Occurs at floodplain wetlands (swamps, billabongs, watercourses and dams), as well as minor floodplains, coastal sandplain wetlands and estuaries.	Unlikely, no floodplain wetlands with permanent water present on the subject site.
Climacteridae	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V		1	Eucalypt woodland (particularly box-gum) and dry open forest without a dense shrub layer. Occasionally inhabits forest bordering wetlands with an open understorey. Hollows in standing trees and stumps are required for nesting.	Unlikely to utilise the development footprint due to lack of open shrub layer. Species may utilise bushland in the east of the subject site.
Dasyornithidae	<i>Dasyornis brachypterus</i>	Eastern Bristlebird	E	E	0	Inhabits low dense vegetation in: sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland, and rainforest. Found near the coast, on tablelands and in ranges.	Unlikely as no dense shrub layer present within the development footprint. Shrub layer is generally open within bushland areas in the east, and species may utilise this area.
Meliphagidae	<i>Grantiella picta</i>	Painted Honeyeater	V	V	0	Occurs in Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests,	Unlikely as no Box-Gum Woodland, or Box-Gum Ironbark Forest present within

**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
						feeding on mistletoe fruits. Nests in outer canopy.	the subject site.
Meliphagidae	<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	E	1	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	Unlikely as no suitable habitat available. Bushland present in the east of the site does not have a high canopy cover, or abundance of mistletoes.
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		6	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Unlikely to occur within the as species does not cross cleared areas such as those surrounding the development footprint. Species may utilise bushland within the east of the subject site.
Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	E	E	0	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.	Unlikely to occur utilise the development footprint due to lack of large Eucalypts, and cleared nature of surroundings. Species has potential to forage within bushland in the east of the subject site, through lack of large trees would deter the species.
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	V		3	Forages mostly in the canopy of open Eucalyptus forest and woodland, on Eucalypt species, and species of	Species has potential to utilise trees within the development footprint for foraging on occasion.

**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
						Angophora, Melaleuca, and other trees. Riparian habitats are ideal for the species due to higher productivity of flowering feed species. Isolated trees in paddocks and roadside remnants, along with urban trees can help sustain populations of the species. The species roosts in tree tops, often some distance from food trees, though prefers to nest in close proximity to feed areas. The species nests in hollows with a small entrance (3 cm) and at a height of between two and fifteen metres. Often nest trees are in riparian areas, and include trees of species like Allocasuarina spp.	
Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	E	E	0	Inhabits fringes of shallow inland wetlands, swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	Unlikely as no suitable habitat present within the subject site. No permanent water is present.
Scolopacidae	<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE, M	0	Generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts, and also found at non-	Unlikely as no suitable habitat available. No permanent water present within the subject site.



**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
Scolopacidae	<i>Numenius madagascariensis</i>	Eastern Curlew		CE, M	0	tidal swamps, lakes and lagoons on the coast and sometimes inland. Found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons.	Unlikely as no estuarine/coastal habitat present within the subject site.
Strigidae	<i>Ninox strenua</i>	Powerful Owl	V		7	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.	Possible. This species will utilise fragmented habitats and may pass through the subject site, including the development footprint, as part of a larger foraging area. No breeding habitat is present as no large hollows are located in the development footprint or study area.
Tytonidae	<i>Tyto novaehollandiae</i>	Masked Owl	V		7	Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats.	Possible. This species may pass through the area as part of a larger foraging area. No breeding habitat is present as no large hollows are located in the development footprint or study area.

**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
<b>Mammalia</b>							
Burramyidae	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V		1	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred.	Unlikely as no suitable habitat available. Species is unlikely to utilise trees in development footprint due to lack of hollows and understorey vegetation.
Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	6	Occurs in wide variety of habitats; rainforest, open forest, woodland, coastal heath and riparian forest. Uses hollows in trees, logs and rock crevasses as den sites.	Unlikely to utilise the development footprint due to lack of understorey/ground cover. This species may pass through the bushland in the east of the subject site as part of a larger foraging area. Potential breeding habitat is present in the subject site in the form of fallen logs.
Dasyuridae	<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	V		7	Occurs in dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabits heath, swamps, rainforest and wet sclerophyll forest. Nests in tree hollows.	Unlikely to utilise the development footprint due to lack of ground cover, leaf litter, and hollows. This species may utilise the bushland in the east of the subject site as part of a larger foraging range.
Macropodidae	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	0	Occupies rock outcrops, escarpments and cliffs with features such as caves, fissures and ledges. Browses on adjacent	Unlikely as no suitable habitat available. No caves, fissures, or ledges.

**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
						vegetation. Has a home range of about 15 ha and shelters in caves.	
Molossidae	<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V		5	Occur in dry sclerophyll forest and woodland east of the Great Dividing Range. Roosts in tree hollows but will also roost under bark or in man-made structures.	Possible. This species may utilise the development footprint and subject site as part of a larger foraging range. Roosting habitat present in the form of hollows in the bushland in the east of the subject site.
Muridae	<i>Pseudomys novaehollandiae</i>	New Holland Mouse		V	4	Occurs in open habitats (heathland, woodland and forest) with a heath understorey and vegetated sand dunes. The species prefers deep soft top soils in order to burrow.	Unlikely as no suitable habitat available. No heath or sand dunes present within the subject site.
Petauridae	<i>Petaurus australis</i>	Yellow-bellied Glider	V		1	Occurs in tall, mature eucalypt forest, mostly in areas with high rainfall and soil nutrients. Forest types include mixed coastal forests, dry escarpment forests, moist coastal gullies and creek flats, to tall montane forests. Feeds primarily on plant and insect exudates, including nectar, sap, honeydew, and manna, supplemented with insects to provide protein. The species dens in family	Unlikely as no tall, mature eucalypt forest present within the subject site.



**Table D.1** Likelihood of occurrence of threatened fauna species

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider	V		30	groups, in hollows in large trees. Inhabits mature or old growth Box, Box- Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Large trees with abundant hollows are critical for the species for nesting, and only areas with abundant hollows are utilised as refuge and nesting sites.	The subject site does not contain the abundance of hollows or size of hollow trees suitable for the species to utilise the bushland area as a refuge or nesting site. The intact forest containing blackbutt and bloodwood does not have a heathy understorey. There is some small potential for the species to utilise the development footprint and bushland in the east of the site as part of a larger foraging range if contiguous bushland contains suitable nesting/refuge areas.
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	V	V	612	Inhabits eucalypt woodlands and forests, feeding on the leaves of Eucalyptus species. They feed on the foliage of more than 70 Eucalypt species and 30 non- eucalypt species.	This species may utilise the subject site as part of a larger foraging range. Primary feed trees Eucalyptus tereticornis and Eucalyptus robusta present in bushland in the east. Secondary feed trees (E. resinifera) and stringybarks (E. globoidea) present within the school grounds. No evidence of species located during SAT surveys, and species presence likely to have been noticed if utilising school grounds. Large number of OEH records

**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
							in the locality indicate there is some small potential for the species to utilise the secondary feed trees within the development footprint if individuals are able to penetrate fences (unlikely as the species needs to descend to ground to move between trees) and are not deterred by school yard noises.
Potoroidae	<i>Potorous tridactylus</i>	Long-nosed Potoroo	V	V	0	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat. Hides in dense vegetation during the day.	Unlikely as no dense understorey present.
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	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. Commonly found in gullies, close to water, in vegetation with a dense canopy.	Possible foraging habitat within the subject site so may pass through and browse on trees within the development footprint, and adjacent garden vegetation.
Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V		3	Occurs in moist habitat with trees over 20m in height, hunting insects above or just below the tree canopy. Roosts in	Possible. This species may utilise the subject site and development footprint as part of a larger foraging range. Roosting

**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
						eucalypt hollows, under bark and in buildings.	habitat present in the form of hollows in the bushland area in the east of the subject site.
Vespertilionidae	<i>Miniopterus australis</i>	Little Bentwing-bat	V		36	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. Roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings.	Possible. This species may utilise the subject site and development footprint as part of a larger foraging range. Roosting habitat present in the form of hollows in the bushland in the east of the subject site.
Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V		12	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the tree tops.	Possible. This species may utilise the subject site and development footprint as part of a larger foraging range. No roosting habitat present.
Vespertilionidae	<i>Myotis macropus</i>	Southern Myotis	V		3	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking	Unlikely, no water bodies for foraging present within the development footprint.



**Table D.1 Likelihood of occurrence of threatened fauna species**

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Locality Records	Habitat Requirements	Likelihood of Occurrence
Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V		12	their feet across the water surface. 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.	Unlikely as no gullies or river systems present within or nearby the subject site.
Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	0	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin. Found in well-timbered areas containing gullies.	Unlikely. No roosting habitat present within the subject site, and no well timbered areas with gullies present.
<b>Reptilia</b>							
Elapidae	<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	E	V	0	Found in rocky outcrops and adjacent sclerophyll forest and woodland. The most suitable sites occur on sandstone ridgetops. During autumn, winter, and spring the species shelters in rock crevices and under flat exposed sandstone rocks on cliff edges. In Summer it shelters in the hollows of large trees, within 200 m of escarpments.	Unlikely as no suitable habitat available within the subject site. No rocky outcrops occur on or near the subject site.



*TSC Act /EPBC Act Status: CE = Critically Endangered; E = Endangered; EP = Endangered Population; V = Vulnerable; M = Migratory*

---

*Appendix E*

Assessment of Significance - TSC Act

# Assessment of Significance - TSC Act

---



## E.1 Swamp Sclerophyll Forest

Swamp Sclerophyll Forest occurs in coastal floodplain areas associated with humic clay loams and sandy loams, in areas that are waterlogged and periodically inundated. The community is typically open forest, although sometimes due to clearing the canopy is reduced to scattered trees. The canopy and sub-canopy is generally comprised of *Eucalyptus* and *Melaleuca* species and the ground layer ranges from sedgelands to fernland. The community is listed as an EEC 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.*

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 is not likely to have an adverse effect on the extent of the community or adversely modify the composition of the community to the extent that a local occurrence is likely to be placed at risk of extinction. The community is not to be directly impacted and the majority of the works regarding the proposed development is to take place approximately 200 m from the community occurrence on the subject site. However, upgrades to an existing drainage basin are to occur in an area within 50 m of the occurrence of the community.

There is a small risk that nutrient enrichment may occur exacerbating invasion of exotic weed species, due to soil runoff if adequate erosion control measures are not used during earthworks as the community occupies the lowest elevation on the subject site. Soil runoff if not mitigated for also has the potential to impact the micro-environment for ground layer species occurring within the community via sedimentation.

(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 is to be removed or modified as a result of the proposed action. The area within the development footprint is not suitable habitat for the community due to elevation and drainage.

The habitat is not to become fragmented or isolated from other areas of habitat as a result of the proposed action.

The habitat to be removed is not suitable, and is therefore not important to the long term survival of the community in the locality.

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

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

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

A recovery plan has not been prepared for this community. No threat abatement plans are relevant to the proposed development.

(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 may potentially impact Swamp Sclerophyll Forest through the following process:

- **Clearing of native vegetation** as this removes a small number of individual trees of a species that occurs in the community (*Eucalyptus resinifera*) and may reduce some genetic variation for this species in the locality which is a component of the community.

## Conclusion

The proposed development is highly unlikely to place the occurrence of Swamp Sclerophyll Forest at risk of extinction in the locality as this community is not to be impacted at all, provided adequate erosion control works are used during earthworks within the development footprint.

## E.2 Large Forest Owls

The following species have been determined as having some likelihood of utilising the development footprint as a small part of a larger foraging range and have been assessed together.

- Masked Owl (*Tyto novaehollandiae*); and
- Powerful Owl (*Ninox strenua*).

Masked owl is distributed across much of Victoria and New South Wales and occurs with Queensland and South Australia. The species occupies dry sclerophyll forests and woodlands from sea level to an elevation of 1100 m. The species resides within forests but often hunts along the edges of forests, including along roadsides. It roosts and breeds in moist eucalypt forests using large tree hollows, and on occasion, caves (DEC (NSW), 2005a). The species is listed as Vulnerable under the TSC Act.

Powerful Owl is distributed from Mackay to south western Victoria, mainly on the coastal side of the Great Dividing Range. This species occurs in many vegetation types from woodland and open sclerophyll to tall open wet forest and rainforest. It requires large tracts of native vegetation but can survive in fragmented landscapes. It roosts in dense vegetation and nests in large tree hollows (DEC (NSW), 2005b). The Powerful Owl 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.*

These species are large owls, generally requires a dense canopy and shrub layer for foraging and roosting, and large tree hollows for nesting. There are no suitable hollow-bearing trees on the subject site. These species is likely to use the subject site and possibly the development footprint only as foraging habitat as part of a much larger foraging range. They are highly mobile species that accesses resources from across a wide area and would not depend upon resources contained on the subject site for survival. Therefore the proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging and no breeding habitat present.

- (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.*

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.*

Approximately 0.10 ha of potential foraging habitat within the subject site is proposed to be removed with the development footprint. Approximately 3.01 ha of potential habitat will remain within the subject site, including intact remnant bushland in the east.

As the habitat within the development footprint consists of a small patch of isolated trees, it is therefore fragmented and somewhat isolated from other habitat, and it is not anticipated that further fragmentation or isolation will occur as a result of the proposed development.

Habitat on the subject site is not important for either owl in the locality as it a small area of suboptimal habitat within a disturbed context. Much larger areas of potential habitat occur within the subject site and within the locality.

(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 OEH.

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

A recovery plan has been prepared for large forest owls, including the Powerful Owl and Masked Owl. The ultimate aim of the recovery plan is to ensure that the species it covers persist in the wild in NSW in each region where they presently occur (DEC (NSW), 2006). The proposed development is not considered to threaten the objectives of that Recovery Plan. No Threat Abatement Plan is 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*

The proposed development may potentially impact the Powerful Owl and Masked Owl through the following processes:

- **Clearing of native vegetation** as this directly reduces the abundance of foraging and possible future nesting habitat.

Clearing of native vegetation will result in removal of a very small area of potential foraging habitat for the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

## Conclusion

Approximately 0.10 ha of potential foraging habitat within the subject site is proposed to be removed under the proposed development. Approximately 3.01 ha of potential habitat will remain around the boundary of the proposed development. The proposed development is not likely to place a viable local population of either species at risk of extinction because there is limited foraging and no breeding habitat within the development footprint. While the proposed development may potentially impact these species through clearing of native vegetation, this will not have a significant impact on the viability of either species or population in the locality.

## E.3 Square-tailed Kite

Square-tailed Kite is distributed from south-western to northern Australia. The species occupies a wide range of timbered habitats including dry forests and open woodlands. The species shows a strong preference for timbered watercourses. It occupies large hunting ranges of more than 100 km<sup>2</sup> (OEH, 2014f). The Square-tailed Kite 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.*

This species is a raptor that specialises in hunting smaller birds, particularly nestlings, from the outer foliage of the tree canopy. It generally requires large trees close to water courses for nesting. There are no suitable large trees on the subject site for nesting. This species is likely to use the subject site and possibly the development footprint only as foraging habitat.

as part of a much larger foraging range. It is a highly mobile species that accesses resources from across a wide area and would not depend upon resources contained on the subject site for survival. Therefore the proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging and no breeding habitat present.

- (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.*

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.*

Approximately 0.08 ha of potential foraging habitat within the subject site is proposed to be removed with the development footprint. Approximately 1.95 ha of potential habitat will remain within the subject site, including intact remnant bushland in the east.

As the habitat within the development footprint consists of a small patch of isolated trees, it is therefore fragmented and somewhat isolated from other habitat, and it is not anticipated that further fragmentation or isolation will occur as a result of the proposed development.



Habitat on the subject site is not important the species in the locality as it a small area of suboptimal habitat within a disturbed context. Much larger areas of potential habitat occur within the subject site and within the locality.

- (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 OEH.

- (f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

A recovery plan has not 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 may potentially impact the Square-tailed Kite through the following processes:

- **Clearing of native vegetation** as this directly reduces the abundance of foraging and possible future nesting habitat.

Clearing of native vegetation will result in removal of a very small area of potential foraging habitat for the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

## Conclusion

Approximately 0.08 ha of potential foraging habitat within the subject site is proposed to be removed with the development footprint. Approximately 1.95 ha of potential habitat will remain around the boundary of the subject site. The proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging and no breeding habitat within the development footprint. While the proposed development may potentially impact the species through clearing of native vegetation, this will not have a significant impact on the viability of the species or population in the locality.

## E.4 Grey-headed Flying-fox

The Grey-headed Flying-fox is listed as Vulnerable under the TSC Act (NSW Scientific Committee, 2004c) and the EPBC Act. The Grey-headed Flying-fox is 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” which are generally within 20km of a food source (NSW NPWS, 2001b).

A small area of suitable foraging habitat is present within the development footprint which would be utilised as part of a much larger foraging range. The development footprint does not comprise a breeding camp.

- (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 development footprint does not contain a Grey-headed Flying-fox camp and so only consists of foraging habitat for the species. The species is likely to use the development footprint as part as foraging habitat as part of a much larger foraging range. Therefore the proposed development is not likely to place a viable local population of the species at risk of extinction because there is very limited foraging and no breeding habitat present.

- (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:*

- (iii) *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*
- (iv) *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:*

- (iv) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
- (v) *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*
- (vi) *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.*

Approximately 0.10 ha of potential foraging habitat within the development footprint is proposed to be removed. Approximately 2.21 ha of potential habitat will remain within the subject site.

Habitat within the development footprint is not important for the Grey-headed Flying-fox in the locality as it a small area of habitat, and much larger areas will remain on the subject site and within the locality.

- (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 OEH.

- (f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

No state recovery plan or threat abatement plan has been prepared for this species.

The National Draft Recovery Plan for the Grey-headed Flying-fox (DECCW, 2009) is applicable. The proposed development is not considered to threaten the objectives of that Recovery Plan. No Threat Abatement Plan exists 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 may potentially impact the Grey-headed Flying-fox through the following processes:

- **Clearing of native vegetation** as this reduces the abundance of foraging habitat.

Clearing of native vegetation will result in removal of a very small area of potential foraging habitat for the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

## Conclusion

Approximately 0.10 ha of potential foraging habitat within the subject site is proposed to be removed with the proposed development. Approximately 2.21 ha of potential habitat will remain within the subject site. The proposed development is not likely to place a viable local population of these species at risk of extinction because there is limited foraging and no breeding camp within the development footprint. While the proposed development may potentially impact this species through clearing of native vegetation, this will not have a significant impact on the viability of this species or the population in the locality.



## E.5 Microchiropteran Bats

The following species have been identified as having the potential to occur within the development footprint and will be addressed collectively in this assessment of significance:

- Eastern Freetail-bat (*Mormopterus norfolkensis*);
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*);
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*); and
- Little Bentwing-bat (*Miniopterus australis*)

The Eastern Freetail-bat (*Mormopterus norfolkensis*) occurs from southern Queensland to southern NSW, in dry sclerophyll forest and woodland. It roosts in tree hollows and sometimes under bark or in man-made structures (OEH, 2014d). There are 3 records within a 10km radius of the project boundary (OEH, 2014a). It is listed as Vulnerable on Schedule 2 of the TSC Act (OEH, 2014d).

The Eastern False Pipestrelle (*Falsistrellus tasmaniensis*) occurs on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. The species prefers moist habitats with tall trees and roosts in tree hollows, loose bark on trees or in buildings. There are 5 records within a 10km radius of the subject site (OEH, 2014a). It is listed as Vulnerable on Schedule 2 of the TSC Act(OEH, 2014c).

The Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) occurs along the east and north-west coast of Australia. It roosts in caves, derelict mines, stormwater tunnels, buildings and other man-made structures. It forages above the canopy in forested areas (OEH, 2014b). There are 12 records within a 10km radius of the subject site(OEH, 2014a). It is listed as Vulnerable on Schedule 2 of the TSC Act (OEH, 2014b).

The Little Bentwing-bat (*Miniopterus australis*) occurs the east coast and ranges of Australia. The species roosts in caves, tunnels, and sometimes tree hollows during the day. It forages for insects, beneath the canopy of densely vegetated habitats. There is 36 records within a 10km radius of the subject site (OEH, 2014a). It is listed as Vulnerable on Schedule 2 of the TSC Act(OEH, 2014g).

- (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 action proposed is not likely to have an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction. The above listed species all have known occurrences within the locality and have the potential to utilise the site for foraging purposes, but only as part of a larger foraging range.

- (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 these microchiropteran bat species listed under the TSC Act.

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

(v) *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*

(vi) *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:*

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

(viii) *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*

(ix) *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.*

It is assumed that all vegetation will be removed within the development footprint and this includes 0.08 ha of remnant native trees, and 0.02 ha of exotic grassland and garden vegetation, which could provide some foraging habitat.

The habitat within the development footprint has been highly modified and forms a small patch of remnant trees with no remnant native ground or shrub layer. The vegetation within the subject site is currently isolated from the vegetation within the regional park, thus, the proposed action will not further fragment or isolate the vegetation of the subject site.

As aforementioned, the habitat on the subject site has been highly modified and is suboptimal foraging habitat for these species. Much larger areas of more suitable habitat will remain in the east of the subject site within the remnant bushland area. The removal of the vegetation within the development footprint is not likely to have an adverse effect on the long-term survival of these species.

(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 OEH.

- (f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

No recovery plan has been prepared for these species.

No threat abatement plans are relevant to these species.

- (h) *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 may potentially impact these species through the following process:

- **Clearing of native vegetation** as this reduces the abundance of foraging habitat.

## Conclusion

The development footprint provides a small area of potential foraging habitat with no roosting or breeding habitat. Areas within the locality, including within vegetation to be retained within the subject site containing more suitable foraging and roosting habitat will remain intact. Therefore, the development footprint is unlikely to be important site for their persistence in the local area. No significant impact is expected to occur from the proposed development on these species.

## E.6 Little Lorikeet

Little Lorikeet is distributed widely across coastal areas and within the Great Divide in eastern Australia over a region stretching from Cape York to South Australia. The species forages in the canopy of *Eucalyptus* forest and woodland {OEH, 2014 #4910}. The Little Lorikeet 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.*

This species feeds on nectar and pollen, and less frequently on native fruits such as mistletoe, and very rarely in orchards. It nests in close proximity to feeding trees if possible, utilising small hollows. There are a small number of trees on the subject site suitable for nesting. This species if present is likely to use the subject site and possibly the development footprint as foraging habitat as part of a larger foraging range. There is limited foraging habitat present within the development footprint and much higher quality foraging habitat within the bushland in the east of the subject site and in bushland and farmland areas surrounding the subject site. Therefore the proposed development is not likely to place a



viable local population of the species at risk of extinction because there is only limited foraging habitat to be removed.

- (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:*

- (vii) *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*
- (viii) *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:*

- (x) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
- (xi) *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*
- (xii) *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.*

Approximately 0.08 ha of potential foraging habitat within the subject site is proposed to be removed with the development footprint. Approximately 1.95 ha of potential habitat will remain within the subject site, including intact remnant bushland in the east.

As the habitat within the development footprint consists of a small patch of isolated trees, it is therefore fragmented and somewhat isolated from other habitat, and it is not anticipated that further fragmentation or isolation will occur as a result of the proposed development.

Habitat on the subject site is not important the species in the locality as it a small area of suboptimal habitat within a disturbed context. Much larger areas of potential habitat occur within the subject site and within the locality.

- (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 OEH.

- (f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

A recovery plan has not been prepared for this species

- (h) *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 may potentially impact the Little Lorikeet through the following processes:

- **Clearing of native vegetation** as this directly reduces the abundance of foraging and possible future nesting habitat.

Clearing of native vegetation will result in removal of a very small area of potential foraging habitat for the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

## Conclusion

Approximately 0.08 ha of potential foraging habitat within the subject site is proposed to be removed with the development footprint. Approximately 1.95 ha of potential habitat will remain around the boundary of the subject site. The proposed development is not likely to place a viable local population of either species at risk of extinction because there is limited foraging and no breeding habitat within the development footprint. While the proposed development may potentially impact the species through clearing of native vegetation, this will not have a significant impact on the viability of the species or population in the locality.

## E.7 Squirrel Glider

The Squirrel Glider is distributed from north Queensland to western Victoria. The species occupies a *Eucalyptus* open forests and woodlands with a *Banksia* or *Acacia* shrub layer and requires large trees with abundant hollows {DEC (NSW), 2005 #2661}. The Squirrel Glider 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.*

This species feeds on nectar, pollen, plant exudates, honeydew, and on occasion small vertebrates such as nestling birds. It requires areas with large trees with abundant hollows

for nesting. There are no suitable large trees on the subject site for nesting. This species is likely to use the subject site and possibly the development footprint only as foraging habitat as part of a much larger foraging range. It is a mobile species that accesses resources from across areas of 3 – 9 ha in size and would not depend upon resources contained on the subject site for survival. Therefore the proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging and no breeding habitat present.

- (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:*

- (ix) *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*
- (x) *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:*

- (xiii) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
- (xiv) *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*
- (xv) *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.*

Approximately 0.08 ha of potential foraging habitat within the subject site is proposed to be removed within the development footprint. Approximately 1.95 ha of potential habitat will remain within the subject site, including intact remnant bushland in the east.

As the habitat within the development footprint consists of a small patch of isolated trees, it is therefore fragmented and somewhat isolated from other habitat, and it is not anticipated that further fragmentation or isolation will occur as a result of the proposed development.



Habitat on the subject site is not important the species in the locality as it a small area of suboptimal habitat within a disturbed context. Much larger areas of potential habitat occur within the subject site and within the locality.

- (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 OEH.

- (f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

A recovery plan has not been prepared for this species

- (i) *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 may potentially impact the Squirrel Glider through the following processes:

- **Clearing of native vegetation** as this directly reduces the abundance of foraging and possible future nesting habitat.

Clearing of native vegetation will result in removal of a very small area of potential foraging habitat for the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

## Conclusion

Approximately 0.08 ha of potential foraging habitat within the subject site is proposed to be removed with the development footprint. Approximately 1.95 ha of potential habitat will remain around the boundary of the subject site. The proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging and no breeding habitat within the development footprint. While the proposed development may potentially impact the species through clearing of native vegetation, this will not have a significant impact on the viability of species or population in the locality.

## E.8 Koala

The Koala has a fragmented distribution throughout eastern Australia to North-Queensland to the Eyre Peninsula in South Australia. The species occupies a *Eucalyptus* forests and woodlands. The species feeds on Eucalypt trees though in any one area will only select preferred species, preferentially primary feed species, though on occasion utilising secondary feed species {OEH, 2014 #4}. The Koala 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.*

This species feeds on select *Eucalyptus* species. This species is likely to use the subject site, which contains primary feed tree species, and possibly the development footprint, which only contains secondary feed species, only as foraging habitat as part of a larger foraging range. Individuals in the area are unlikely to be able to readily access secondary feed species within the school grounds including the development footprint due to high mesh fencing surrounding the area. Koalas are large mammals that need to descend and move between trees by traversing open ground. Therefore the proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited, sub-par foraging habitat present.

- (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:*

- (xi) *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*
- (xii) *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:*

- (xvi) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
- (xvii) *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*
- (xviii) *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.*

Approximately 0.08 ha of vegetation containing some trees of secondary feed species within the subject site is proposed to be removed in the development footprint. Approximately 1.95

ha of potential habitat will remain within the subject site, including intact remnant bushland in the east.

As the habitat within the development footprint consists of a small patch of isolated trees, it is therefore fragmented and isolated by tall fencing from other habitat, it is not anticipated that further fragmentation or isolation will occur as a result of the proposed development.

Habitat on the subject site is not important the species in the locality as it a small area of suboptimal habitat within a disturbed context. Much larger areas of potential habitat occur within the subject site and within the locality.

(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 OEH.

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

A recovery plan has not been prepared for this species

(j) *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 may potentially impact the Koala through the following processes:

- **Clearing of native vegetation** as this directly reduces the abundance of foraging and possible future nesting habitat.

Clearing of native vegetation will result in removal of a very small area of potential foraging habitat for the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

## Conclusion

Approximately 0.08 ha of vegetation containing some trees of secondary feed species within the subject site is proposed to be removed in the development footprint. Approximately 1.95 ha of potential habitat will remain around the boundary of the subject site. The proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging habitat within the development footprint, consisting of only a small number of trees of secondary feed species among non-feed species. While the proposed development may potentially impact the species through clearing of native vegetation, this will not have a significant impact on the viability of the species or population in the locality.

---

*Appendix F*

Assessment of Significance - EPBC Act

**Assessment of Significance - EPBC Act**

---



The significant impact criteria for an action on a species listed as a vulnerable under the *EPBC Act* is as follows:

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

- i. lead to a long-term decrease in the size of an important population of a species
- ii. reduce the area of occupancy of an important population
- iii. fragment an existing important population into two or more populations
- iv. adversely affect habitat critical to the survival of a species
- v. disrupt the breeding cycle of an important population
- vi. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- vii. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- viii. introduce disease that may cause the species to decline, or
- ix. interfere substantially with the recovery of the species.

## **F.1 Flying Fox**

The Flying Fox (*Pteropus poliocephalus*) is listed as Vulnerable under the *EPBC Act*. As a result of the proposed action approximately 0.08 ha of potential foraging habitat will be removed.

Is the proposed action likely to:

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

No. No roosting camps are present on the subject site, and removal of 0.08 ha of potential foraging habitat of a highly mobile species with a large foraging range is unlikely to lead to a long term decrease in the size of any population present in the locality.

- ii. reduce the area of occupancy of an important population*

No. A small amount of potential foraging habitat is to be removed. The area of occupancy of the species will not be reduced.

- iii. fragment an existing important population into two or more populations*

No. The species is highly mobile and the 0.08 ha of vegetation to be removed is not necessary for individuals within any local population to move within the landscape.

- iv. adversely affect habitat critical to the survival of a species*

No. No habitat critical to the survival of the species is present within the subject site.

- v. disrupt the breeding cycle of an important population*

No. The removal of 0.08 ha of foraging impact will not impact the breeding cycle of any population occurring within the locality.

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

No. 0.08 ha of foraging is proposed to be removed. Individuals of the species will travel up to 50 km from roosting sites within a night to forage. The removal of a small area of foraging habitat is unlikely to decrease the availability or quality of habitat within the locality to the extent the species will decline.

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

No. The proposed removal of 0.08 ha of vegetation is not likely to result in the establishment of any invasive species within the subject site. No exotic fauna species are to be introduced to the subject site. Replanting within the subject site will be of non-invasive endemic native species.

- viii. introduce disease that may cause the species to decline, or*

No. The removal of 0.08 ha of foraging habitat and construction of an administration within the subject site is unlikely to result in the introduction of any biological organisms capable of causing disease within individuals of the species.

- ix. interfere substantially with the recovery of the species.*

No. The proposed removal of 0.08 ha of foraging habitat is unlikely to interfere with the recovery of a species with a 50 km foraging range. Replanting within the site will restore foraging habitat for the species within the subject within the long term.

### **Conclusion:**

Only a small area of potential, non-essential foraging habitat for the species is proposed to be removed. No significant impact to any Matter of National Environmental Significance is expected to occur as a result of the proposed development. A referral to the minister is not required under the *EPBC Act*.

## **F.2 Koala**

The Koala (*Phascolarctos cinereus*) is listed as Vulnerable under the *EPBC Act*. As a result of the proposed action approximately 0.08 ha of potential foraging habitat will be removed.

Is the proposed action likely to:

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

No. The removal of 0.08 ha of vegetation containing a small number of trees of secondary feed species is not likely to lead to a decrease in the size of any local population of the species. At present the vegetation is isolated from other areas of habitat within the locality by tall fencing. Koalas are large mammals which must traverse at ground level to move between areas of habitat.

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

No. The removal of vegetation within the development footprint will not reduce the area of occupancy of an important population. At present the small patch of trees to be removed is not occupied by individuals of an important population.

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

No. At present the development footprint is surrounded by fencing. A wildlife corridor is present in the form of bushland in the east of the subject site connecting vegetation in a north-south direction within the vicinity of the subject site. This vegetation is not to be removed.

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

No. The vegetation to be removed consists of 0.08 ha of trees, only some of which are individuals of secondary feed species for the Koala. At present individuals are unable to access this vegetation due to fencing.

*v. disrupt the breeding cycle of an important population*

No. The 0.08 ha of vegetation proposed to be removed does not consist of breeding habitat for the species.

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

The vegetation to be removed consists of a small area of trees, only some of which the species is likely to browse on. At present this vegetation is unlikely to be utilised by the species due to restriction by fencing, and the presence of much larger, intact areas of foraging habitat containing primary feed species in the east of the subject site.

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

No. The removal of a small area of vegetation and construction of an administration building is unlikely to result in the introduction of invasive species within the subject site.

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

No. The removal of 0.08 ha of foraging habitat and construction of an administration within the subject site is unlikely to result in the introduction of any biological organisms capable of causing disease within individuals of the species.

- ix. *interfere substantially with the recovery of the species.*

The proposed removal of 0.08 ha of vegetation containing some individuals of trees of secondary feed species is unlikely to interfere substantially with the recovery of the species. At present this vegetation is unlikely to be utilised by individuals due to fencing.

**Conclusion:**

Only a small area of potential, non-essential foraging habitat for the species is proposed to be removed, which is unlikely to currently be utilised by any individuals of the species. No significant impact to any Matter of National Environmental Significance is expected to occur as a result of the proposed development. A referral to the minister is not required under the *EPBC Act*.



---

*Appendix G*

CKPoM – Assessment Against Performance Criteria

# CKPoM – Assessment Against Performance Criteria

---

The following is an assessment of the proposed development against the Port Stephens Council's Comprehensive Koala Plan of Management Performance Criteria for non-agricultural development.

The Performance Criteria are as follows:

Proposed development (other than agricultural activities) must:

*a) Minimise the removal or degradation of native vegetation within Preferred Koala Habitat or Habitat Buffers;*

The proposed development is not to take place within Preferred Koala Habitat or Habitat Buffers (**Figure 3.5**). No vegetation is to be removed within these areas.

*b) Maximise retention and minimise degradation of native vegetation within Supplementary Koala Habitat and Habitat Linking Areas;*

The proposed development will take place within areas mapped as Preferred Link Over Cleared Land and Preferred Link Over Marginal Habitat (**Figure 3.5**). As a result of the proposed development approximately 0.08 ha of native vegetation consisting of trees will be removed. Due to current site constraints required for normal functioning of the site as a school, consisting of car parks, buildings, and sporting fields, the proposed administration building is unable to be located elsewhere within the school grounds. As such the proposed location should be considered to be minimising degradation and maximising retention of native vegetation, as the only other potential locations for the administration building within the school grounds would require removal of denser, less degraded native vegetation areas, also mapped as Preferred Link Over Marginal Habitat, in the east of the school grounds, in areas adjacent to Habitat Buffers.

*c) Minimise the removal of any individuals of preferred koala food trees, where ever they occur on a development site. In the Port Stephens LGA these tree species are Swamp Mahogany (*Eucalyptus robusta*), Parramatta Red Gum (*Eucalyptus parramattensis*), and Forest Red Gum (*Eucalyptus tereticornis*), and hybrids of any of these species. An additional list of tree species that may be important to koalas based on anecdotal evidence is included in Appendix 8*

No individuals of preferred koala food trees are to be removed as a result of the proposed development.

*d) Make provision, where appropriate, for restoration or rehabilitation of areas identified as Koala Habitat including Habitat Buffers and Habitat Linking Areas over Mainly Cleared Land. In instances where Council approves the removal of koala habitat (in accordance with dot points 1-4 of the above waive clause), and where circumstances permit, this is to include measures which result in a "net gain" of koala habitat on the site and/or adjacent land;*

Due to the current use of the site as a school, and required associated infrastructure, the school grounds do not contain large areas in which restoration or rehabilitation can be

undertaken. Replanting of native trees is to be undertaken where possible however under the landscape plan for the site.

*e) Make provision for long term management and protection of koala habitat including both existing and restored habitat;*

Remnant native vegetation, including areas of the EEC Swamp Sclerophyll Forest containing preferred koala feed species, is to be retained in the east of the subject site.

*f) Not compromise the potential for safe movement of koalas across the site. This should include maximising tree retention generally and minimising the likelihood that the proposal would result in the creation of barriers to koala movement, such as would be imposed by certain types of fencing. The preferred option for minimising restrictions to safe koala movement is that there be no fencing (of a sort that would preclude koalas) associated with dog free developments within or adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers or Habitat Linking Areas. Suitable fencing for such areas could include:*

*i) fences where the bottom of the fence is a minimum of 200 mm above ground level that would allow koalas to move underneath;*

*ii) fences that facilitate easy climbing by koalas; for example, sturdy chain mesh fences, or solid style fences with timber posts on both sides at regular intervals of approximately 20m;*

*or*

*iii) open post and rail or post and wire (definitely not barbed wire on the bottom strand). However, where the keeping of domestic dogs has been permitted within or adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers or Habitat Linking Areas, fencing of a type that would be required to contain dogs (and which may also preclude koalas) should be restricted to the designated building envelope.*

*Fences which are intended to preclude koalas should be located away from any trees which now or in the future could allow koalas to cross the fence.*

No additional fencing is proposed to be constructed under the proposed development. An isolated patch of vegetation 0.08 ha in size consisting of trees will be removed under the proposed development. The retention of vegetation on the site has been maximised, given the current constraints on the site for retaining infrastructure associated with the operation of the site as a school. Tree will be planted under the landscape plan for the site to replace trees proposed to be removed where possible.

*g) Be restricted to identified envelopes which contain all buildings and infrastructure and fire fuel reduction zone. Generally there will be no clearing on the site outside these envelopes. In the case of applications for subdivision, such envelopes should be registered as a restriction on the title, pursuant to the Conveyancing Act 1919; and*

The building to be constructed on the site under the proposed development will be restricted to the area identified in the Development Application.

*h) Include measures to effectively minimise the threat posed to koalas by dogs, motor vehicles and swimming pools by adopting the following minimum standards.*

*i) The development must include measures that effectively abate the threat posed to koalas by dogs through prohibitions or restrictions on dog ownership. Restrictions on title may be appropriate.*

*ii) The development must include measures that effectively minimise the threat posed to koalas from traffic by restricting motor vehicle speeds, where appropriate, to 40 kph or less.*

*iii) The development must reduce the risk of koala mortality by drowning in backyard swimming pools. Appropriate measures could include: trailing a length of stout rope (minimum diameter of 50mm), which is secured to a stable poolside fixture, in the swimming pool at all times; designing the pool in such a way that koalas can readily escape; or enclosing the pool with a fence that precludes koalas. This last option should include locating the fence away from any trees which koalas could use to cross the fence.*

As the subject site is currently utilised as a school, dogs are not kept, and will not be kept on the property. Traffic entering the site will necessarily be slow in order to safely enter the school car park, and during school hours, traffic is slowed to 40km per hour within the school zone on Waropara Road. The school grounds do not contain swimming pools, and none are proposed to be constructed.



# Attachment 4

## Memorandum

<b>To</b>	EPM Projects Pty Ltd		
<b>From</b>	Michael Gawn	<b>Date</b>	29 Feb 2016
<b>Subject</b>	Medowie Christian School	<b>Project No.</b>	81808.00

Following receipt of correspondence from Port Stephens Council dated 11 February 2016 and receipt of the latest plans for Stage 1 of the development at the Medowie Christian School, the following comments are made:

- DP was engaged to carry out a geotechnical investigation and preliminary site assessment (contamination). The results of these investigations are contained within our reports Project 81808 Documents 1 and 2;
- Reference to the Council letter indicates that comment is required as to whether the areas of environmental concern identified in our investigation are within the Stage 1 development. Reference to Drawing 1 of our preliminary site assessment should be made and indicates the following:
  - o Surficial filling was identified in the area of the proposed administration building;
  - o Filling associated with the pond embankments and proposed enlargement of the existing detention basin was also identified; and
  - o Both of these areas appear to be within the area of Stage 1 development.
- Therefore, it can be concluded that there are identified areas of environmental concern within the proposed Stage 1 development footprint.
- As discussed in Section 9 of our report (Document 2), the presence or absence of contamination in these areas can only be confirmed by further investigation including environmental sampling and chemical testing. In DP's experience, this would be best addressed with a targeted intrusive contamination assessment with samples retrieved from the areas of environmental concern within the Stage 1 development area, for laboratory analysis for the contaminants of concern. It may be practical to carry out the Stage 2 targeted intrusive investigation during construction works.
- It is noted, as further stated in our report, the potential areas of environmental concern were generally localised and associated with near surface impacts, which would be readily addressed through appropriate investigation, and remediation (where required). Should contamination be identified during the Stage 2 investigation, DP could provide comment on suitable methods of remediation, if required.

In relation to the SEPP 55 requirements, contaminated site management and assessment in NSW is classified by the NSW EPA into the following stages:

- Stage 1 – Preliminary Site Investigation



## Integrated Practical Solutions

Brisbane • Cairns • Canberra • Central Coast • Coffs Harbour • Darwin • Geelong • Gold Coast • Macarthur  
Melbourne • Newcastle • Perth • Port Macquarie • Sunshine Coast • Sydney • Townsville • Wollongong

- Stage 2 – Detailed Site Investigation
- Stage 3 – Site Remedial Action Plan
- Stage 4 – Site Validation and Ongoing Monitoring.

A Stage 1 investigation was completed and identified a number of areas of potential contamination. The report concluded that the areas of potential contamination identified, once assessed and remediated, if necessary, will be suitable for the proposed land use.

We trust this meets your current requirements.

**Douglas Partners Pty Ltd**

Reviewed by

Michael Gawn  
**Principal**

Stephen Jones  
**Principal**

# Attachment 5





# MEDOWIE CHRISTIAN SCHOOL

6B WAROPARA ROAD, MEDOWIE NSW 2318

PH: 49817177 FAX: 49817188

EMAIL: [mail@medowiecs.nsw.edu.au](mailto:mail@medowiecs.nsw.edu.au)

A MINISTRY OF MEDOWIE BAPTIST COMMUNITY CHURCH

Port Stephens Council  
PO Box 42  
Raymond Terrace 2324  
Attention: Priscilla Emmett

23<sup>rd</sup> February 2016

Dear Priscilla

Further to our meeting this morning this letter is provided as an explanation to accompany our request to slightly amend our current Development Application.

Our DA project concerns the construction of a new administration building to replace the three existing old demountable administration buildings. When the DA was submitted in December it was our intention to demolish the largest and smallest old admin buildings and to use the middle sized one to temporarily rehouse the school's administration staff – other admin functions were to be located in various existing facilities on the school site. Under our December plan the school's Uniform Shop was to be relocated to admin space M24. In January, however, the school sustained rain damage (causing severe mould issues) in the large and middle-sized old admin buildings. The consequence of this was that in January we determined that we needed to vacate the two larger old buildings immediately. A new plan for rehousing the admin functions was developed at short notice. The Uniform Shop has remained in the smaller old admin building so far this year because it became necessary to use M24 as the school's interim reception space.

Once this decision was made in January we notified council that our demolition plan was to be amended such that all three old admin buildings would now be demolished upfront (rather than the two advised in December).

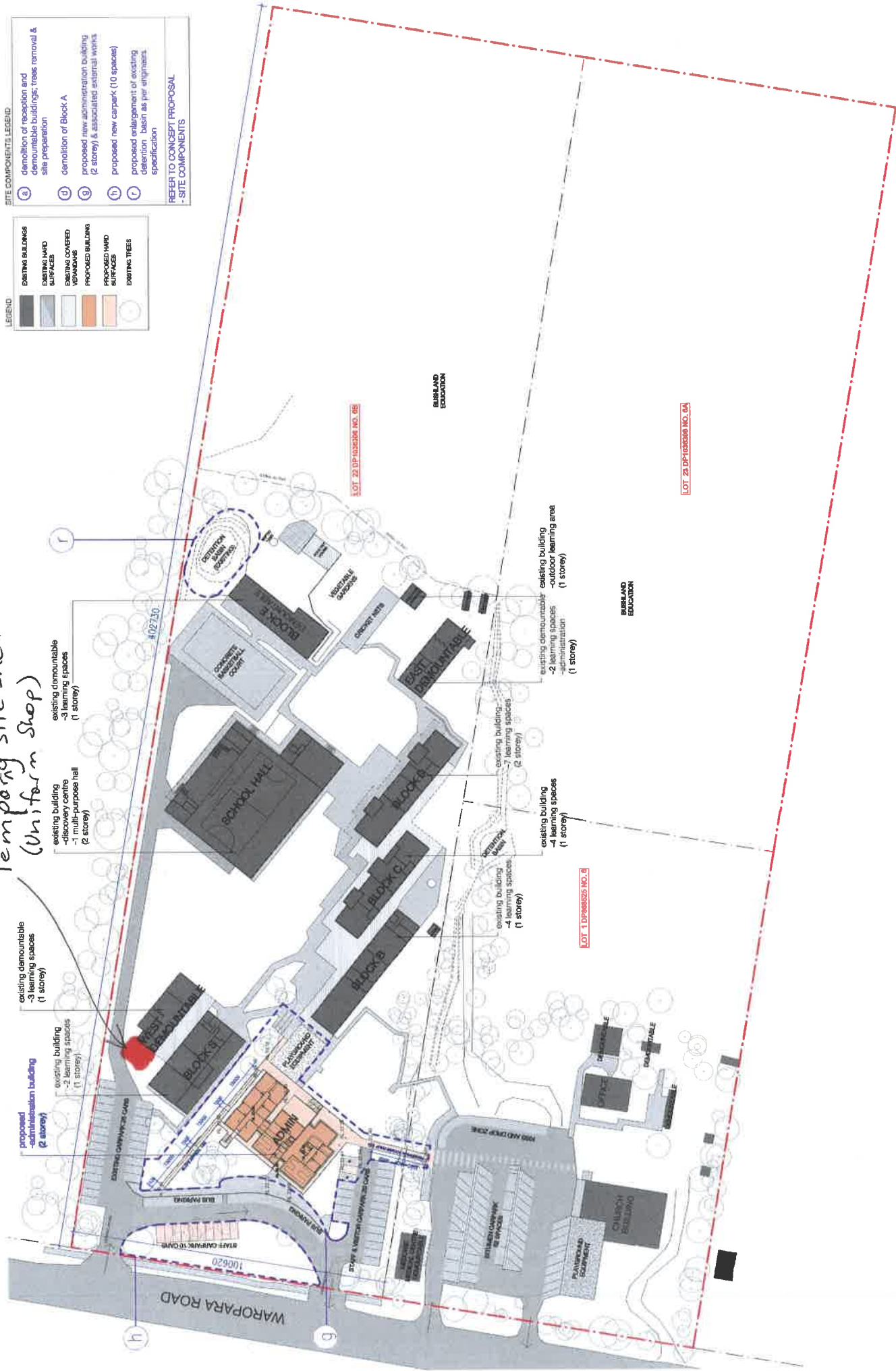
With M24 needed as an interim reception space and available accommodation squeezed because of the unexpected removal of the middle sized admin building from our equation a problem resulted for the interim location of a Uniform Shop. After consideration of all possibilities the addition of a site shed on the vacant land next to M24 became our preferred solution. Upon investigation it became apparent that it would be necessary to amend our DA in order to achieve this, hence this letter of explanation.

Please note that at this stage we haven't selected a specific site shed but anticipate something in the order of 30 m<sup>2</sup> (eg. 7.5m x 4m or thereabouts). An amended drawing DA0103\_F is attached to support this application.

Simon Herd (Principal)

Garry Couper (Project Officer)

temporary site shed  
(Uniform Shop)



LEGEND

EXISTING BUILDINGS	demolition of reception and demountable buildings; trees removal & site preparation
EXISTING HARD SURFACES	demolition of Block A
EXISTING COVERED VERANDAS	proposed new administration building (2 storey) & associated external works
PROPOSED BUILDING	proposed new carpark (10 spaces)
PROPOSED HARD SURFACES	proposed enlargement of existing detention basin as per engineers specification
EXISTING TREES	REFER TO CONCEPT PROPOSAL - SITE COMPONENTS

SITE COMPONENTS LEGEND

1	demolition of reception and demountable buildings; trees removal & site preparation
2	demolition of Block A
3	proposed new administration building (2 storey) & associated external works
4	proposed new carpark (10 spaces)
5	proposed enlargement of existing detention basin as per engineers specification
6	REFER TO CONCEPT PROPOSAL - SITE COMPONENTS

smith+tracey architects

PROPOSED SITE PLAN - STAGE 1 DA

MEDOWIE CHRISTIAN SCHOOL

Lot 1 DP868525 Lot 22 & 23 DP1036306 No. 6, 6A and 6B Waropara Road, Medowie

SCALE: 1:550 A1  
1:1100 A3  
JOB NO: 15012  
DATE: 2015.11.13  
DWG NO: DA0103 /F

# Attachment 6





## Bushfire Assessment

### Medowie Christian School Uniform Shop

Prepared for  
**EPM Projects Pty Ltd**

10 March 2016



**BPAD**  
Bushfire  
Planning & Design  
Accredited Practitioner  
Level 3



## DOCUMENT TRACKING

Item	Detail
Project Name	Bushfire Protection Assessment: Medowie Christian School Uniform shop
Project Number	16GOS_3803
Prepared by	Mark Hawkins
Reviewed by	Daniel Copland
Status	Final
Version Number	1
Last saved on	10 March 2016

## ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd. Assistance with project understanding was kindly provided by EPM.

---

### Disclaimer

*This document may only be used for the purpose for which it was commissioned and in accordance with the contract between Eco Logical Australia Pty Ltd and EPM. The scope of services was defined in consultation with the EPM, by time and budgetary constraints imposed by the client, and the availability of reports and other data on the subject area. Changes to available information, legislation and schedules are made on an ongoing basis and readers should obtain up to date information.*

*Eco Logical Australia Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report and its supporting material by any third party. Information provided is not intended to be a substitute for site specific assessment or legal advice in relation to any matter. Unauthorised use of this report in any form is prohibited.*

---

# Contents

<b>1</b>	Property and Proposal .....	1
1.1	Background.....	1
1.2	Location and description of subject land .....	1
1.3	Description of Proposal .....	1
<b>2</b>	Assessment requirements .....	7
<b>3</b>	Bushfire Hazard .....	8
3.1	Vegetation types .....	8
3.2	Effective slope .....	8
<b>4</b>	Asset Protection Zones (APZ) .....	9
4.1.1	Specific Objectives .....	9
4.1.2	APZ maintenance plan .....	10
<b>5</b>	Construction standard .....	11
<b>6</b>	Water supply.....	11
<b>7</b>	Gas and electrical supplies.....	11
<b>8</b>	Access .....	11
<b>9</b>	Assessment of environmental issues .....	12
<b>10</b>	Bushfire maintenance plans and fire emergency procedures .....	13
<b>11</b>	Recommendations & conclusion .....	13
	References .....	15
	Appendix 1.....	16

# List of Figures

Figure 1: Aerial photograph depicting the subject land .....2

Figure 2: Aerial photograph depicting the vegetation and slope relating to the proposed development ...3

Figure 3: Proposed Uniform Shop and Stage 1 building layout .....4

Figure 4: Proposed Concept Plan building APZ.....5

# List of Tables

Table 1: Threat assessment, APZ and bushfire attack level - Uniform Shop .....9

# 1 Property and Proposal

<b>Name:</b>	EPM Project Pty Ltd		
<b>Street or property name:</b>	Medowie Christian School		
<b>Suburb or locality:</b>	Medowie	<b>Postcode:</b>	2318
<b>Lot/DP no:</b>	Lot 1 DP 1036306		
<b>Local Government Area:</b>	Port Stephens Council		
<b>Type of development:</b>	Medowie Christian School Uniform Shop		

## 1.1 Background

EPM Projects Pty Ltd commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire assessment (BPA) for the proposed Uniform Shop at Medowie Christian School (hereafter referred to as the subject land).

This assessment has been prepared by ELA Senior Bushfire Consultant, Mark Hawkins (FPAA BPAD Level 2 Certified Practitioner No. BPD-L2-30419) and quality reviewed by ELA Senior Bushfire Consultant Daniel Copland (FPAA BPAD Level 3 Certified Practitioner No. BPD-L3-28853). Daniel is recognised by the NSW Rural Fire Service as a qualified consultant in bushfire risk assessment.

## 1.2 Location and description of subject land

The subject land is located in the Port Stephens suburb of Medowie, approximately 8.7 kilometres southwest of Raymond Terrace. **Figure 1** shows the subject land in a local context. **Figure 2** shows the Uniform Shop in relation to the overall proposed development and the nearest bushfire prone vegetation. **Figure 3** shows the proposed layout and relevant BALs and **Figure 4** shows the proposed demountable building layout.

The Port Stephens LGA has a fire danger index (FDI) of 100.

## 1.3 Description of Proposal

This report is provided in support of the construction of a temporary Uniform Shop adjacent to a proposed classroom which is known as the West Demountable. This report is proposed to accompany the suite of information contained within the previous submission of reports produced for the Stage 1 DA and Concept Proposal.

The report will provide an assessment for the proposed Uniform Shop in line with Special Fire Protection Purpose (SFPP) infill development however the proposed development is neither a classroom or facility that will be actively used for students to take refuge in so could technically be assessed under 79BA of the *Environment Planning & Assessment Act 1979*.



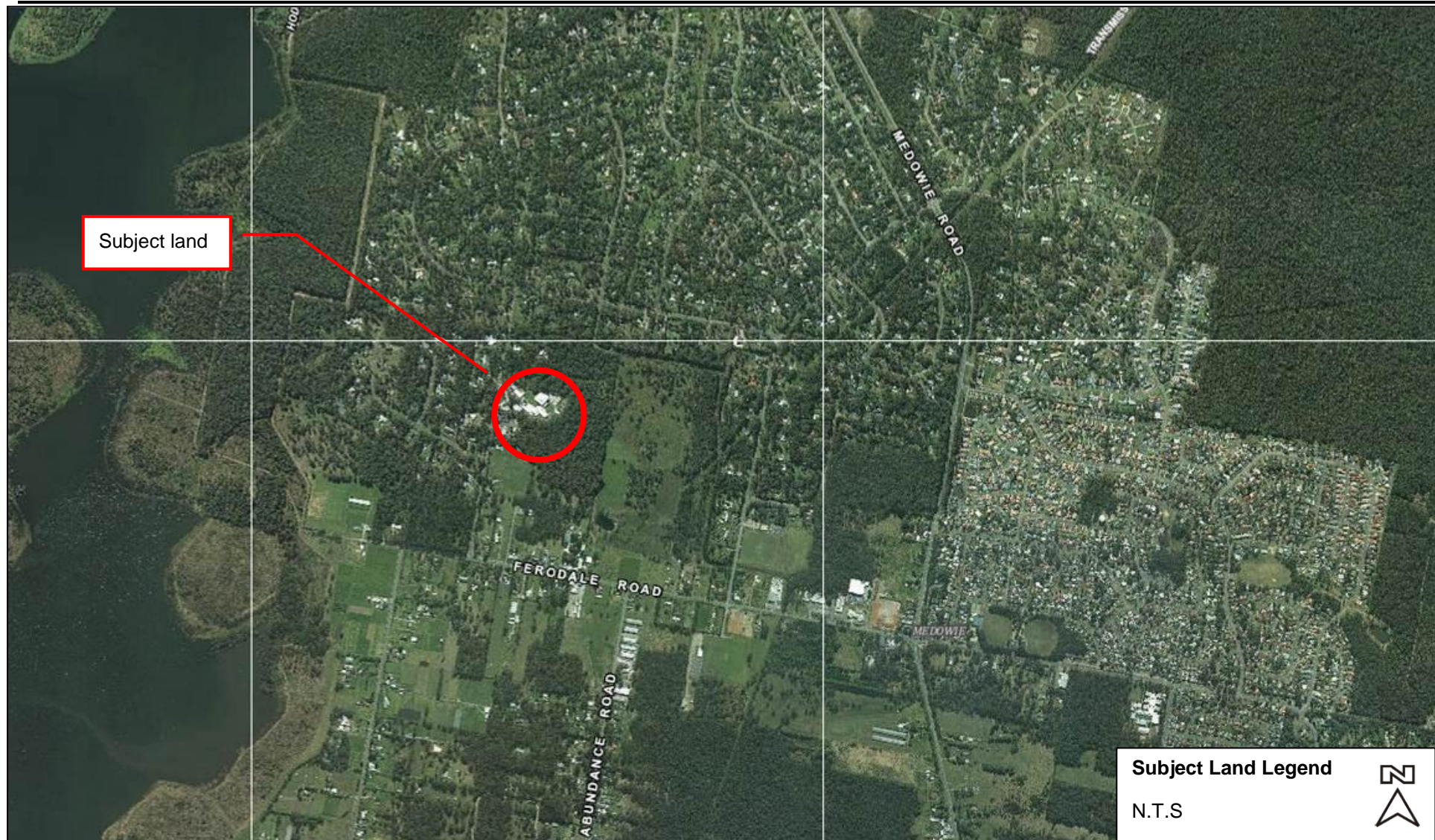


Figure 1: Aerial photograph depicting the subject land





Figure 2: Aerial photograph depicting the vegetation and slope relating to the proposed development

© ECO LOGICAL AUSTRALIA PTY LTD



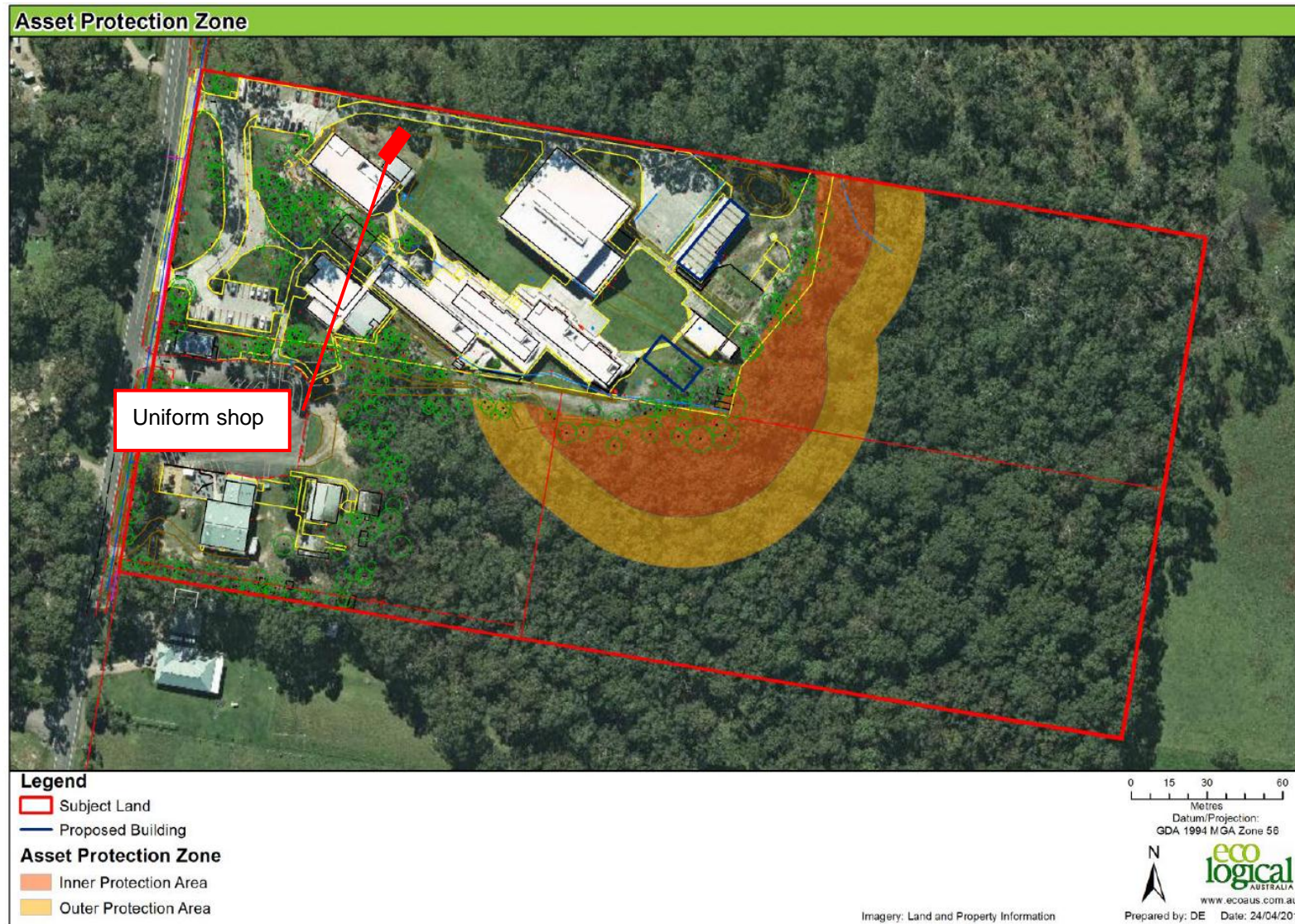


Figure 4: Proposed Concept Plan building APZ



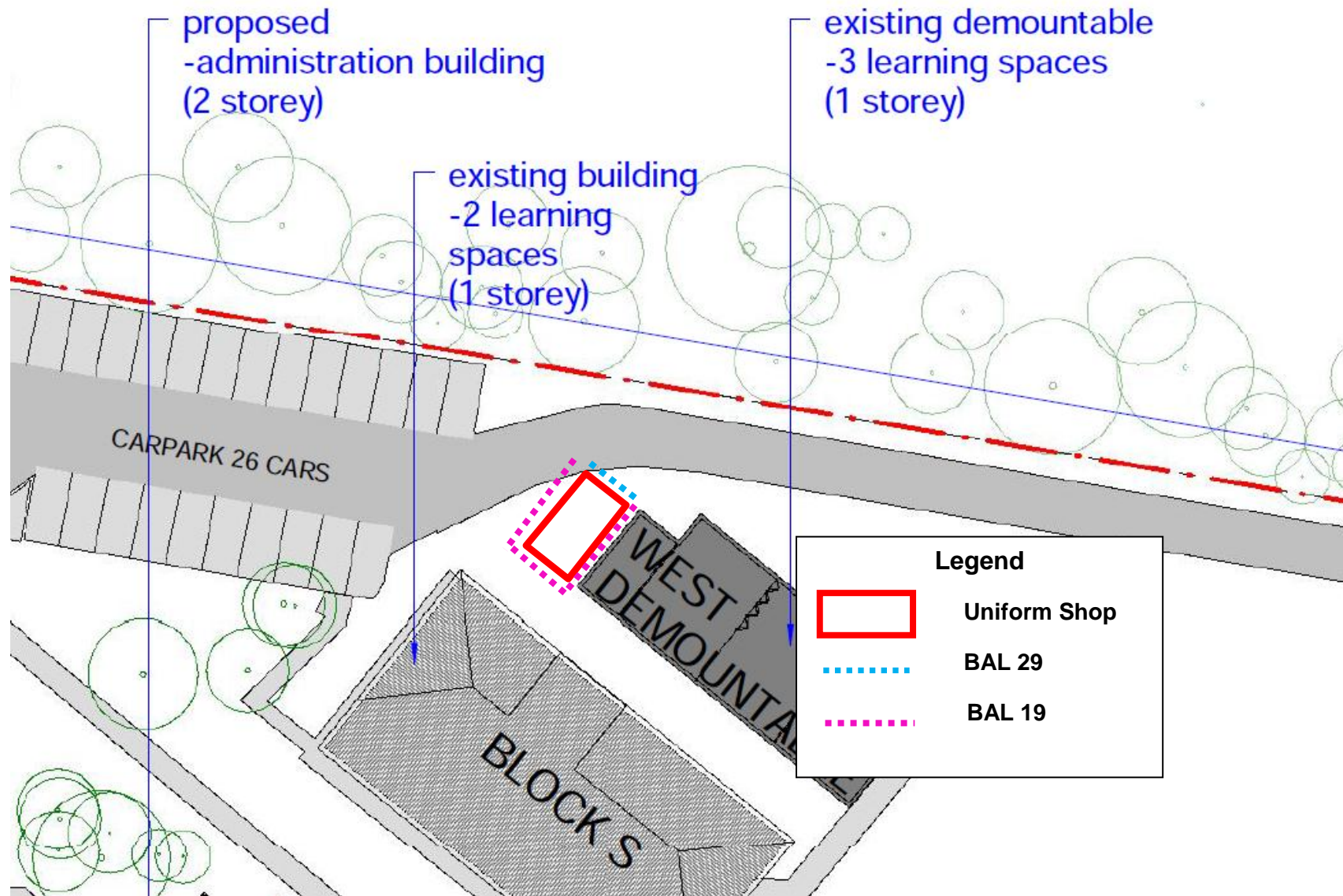


Figure 5. Bushfire Attack Level (BAL) construction standards

## 2 Assessment requirements

It is proposed for the development to be approved under the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP). The purpose of ISEPP is to provide opportunities for a streamlined development process for critical infrastructure projects that may otherwise be delayed by the usual planning processes through the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Clause 16(f) of the ISEPP requires consultation with public authorities, in this case the RFS should be consulted:

*(f) development for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act)—the NSW Rural Fire Service.*

*Note. The Act defines bush fire prone land, in relation to an area, as land recorded for the time being as bush fire prone land on a map certified as referred to in section 146 (2) of the Act.*

*Note. When carrying out development of a kind referred to in paragraph (f), consideration should be given to the publication of the NSW Rural Fire Service Planning for Bush Fire Protection 2006.*

The above clause provides a consultation process that may highlight various risks, concerns and recommendations of the other parties, and also highlights the relevant legislative documents that should be 'considered', however, there is no legal requirement within the SEPP itself to implement their comments and recommendations.

The most significant consideration in adopting this pathway within a bushfire prone area is the inherent risk and liabilities that rest with the school in terms of their ongoing responsibilities and duty of care to staff, parents and particularly students (who are considered as vulnerable occupants).

A bushfire assessment must consider the requirements of '*Planning for Bush Fire Protection 2006*' (NSW Rural Fire Service 2006). Section 4.2 of '*Planning for Bush Fire Protection 2006*' (PBP) addresses the assessment and bushfire protection requirements for development involving schools. The proposal constitutes an infill Special Fire Protection Purpose (SFPP) development as per PBP Section 4.2.5. As such the specific objectives for infill development (PBP Section 4.3.2) have been relied upon.

SFPP developments are treated and assessed differently to other developments, and they require a higher standard of bushfire protection due to one or more of the following reasons:

- Occupants may not originate from the area and therefore may be less educated in relation to bushfire impacts;
- They may have a reduced capacity to evaluate risk and respond adequately to the bushfire threat;
- They may be more vulnerable to stress arising from bushfire threat; and
- They may present logistical difficulties for evacuation, due to reduced mobility, larger numbers of people, communication barriers and the requirement for increased supervision.

The PBP specific objectives for SFPP development are to:

- *Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to withstand the fire event, enabling occupants and firefighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated.*
- *Provide for safe emergency evacuation procedures. SFPP developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bushfire threats. During emergencies, the risk to firefighters and other emergency services personnel can be high through prolonged exposure, where door-to-door warnings are being given and exposure to the bushfire is imminent.*

### 3 Bushfire Hazard

The hazard assessment provides the basis for the calculation for asset protection zones and building construction standards. These are defined in the following sections.

For the purposes of PBP, bushfire hazard is the combination of vegetation type and slope. PBP requires the assumption that a worst-case scenario bushfire can occur within all vegetation types of a significant size regardless of direction, aspect, fire history and the general risk of fire.

#### 3.1 Vegetation types

There is land that is consistent with managed land to the northwest, east and south of the subject land. The area to the south is managed through extensive grazing which restricts the fuel loads in the ground and mid-storey providing for limited fuel loads.

To the northeast is vegetation that is consistent with the RFS category of a "Grassy Woodland"

To the east is an area of vegetation dominated by Melaleuca species and consistent with a forested wetland which is assessed by PBP as having the same fuel loads and bushfire characteristics of a "Forest". To the east, southeast and south are areas of vegetation that are grouped under the PBP category of "Forest".

#### 3.2 Effective slope

There are gentle slopes to the northeast, east and southeast in the PBP slope class of "Downslope 0-5 degrees".

## 4 Asset Protection Zones (APZ)

PBP has been used to determine the width of Asset Protection Zones (APZ) using the vegetation and slope data identified in Section 2.1. **Table 1** shows the proposed APZ for the proposed Uniform Shop.

The Uniform Shop component of the school is not classified the same as those buildings which house school children and therefore does not technically require assessment as a standard SFPP building. Regardless, for consistency the required APZ for a SFPP development against Woodland vegetation on a 'Downslope 0-5 degrees' is 50 metres according to Table A2.6 in PBP.

There is an existing separation distance of 25 metres between the proposed development and the hazard (boundary). The separation distances consist of managed grounds and hard surfaces. The proposed Uniform Shop location cannot achieve the required APZ, and therefore the development needs to be assessed under the infill development provisions of PBP (refer to Section 4.1).

**Table 1: Threat assessment, APZ and bushfire attack level - Uniform Shop**

Direction from envelope	Slope <sup>1</sup>	Vegetation <sup>2</sup>	PBP required APZ <sup>3</sup>	Proposed APZ	AS3959 Construction Standard <sup>4</sup>	Comment
North-east	Downslope 0-5 <sup>0</sup>	Woodland	50 m	25 m	BAL-29 & BAL-19	PBP APZ setback for SFPP infill development is achievable
All other directions	All other directions					

<sup>1</sup> Effective slope assessed over 100 m from proposed development where the bushfire hazard occurs.

<sup>2</sup> Predominant vegetation classification over 140 m from proposed development.

<sup>3</sup> Minimum APZ required by PBP acceptable solution for SFPP.

<sup>4</sup> Bushfire Attack Level (BAL) corresponding to construction requirements under AS 3959-2009 'Construction of Buildings in Bushfire Prone Areas'.

### 4.1.1 Specific Objectives

While the proposed development does not meet the minimum APZ for SFPP development, it complies with the aim and objectives of PBP for infill development. The Specific Objectives for infill development and a comment as to how they are achieved by the proposed development is provided below:

Specific Objective 1 for infill developments is to "ensure that the bushfire risk to adjoining lands is not increased". The development would not increase the bushfire risk to adjoining lands and will be constructed to minimise material ignition including BCA requirements. This objective is satisfied.



Specific Objective 2 for infill developments is to “*provide a minimum defensible space*”. The land between the proposed Uniform Shop and the property boundary consists of existing managed lands and roads. This will provide an adequate defensible space between it and the hazard. This objective is satisfied.

Specific Objective 3 for infill developments is to “*provide a better bushfire protection, on a re-development site, than the existing situation. This should not result in new works being exposed to greater risk than the existing building*”. The proposal involves a new building rather than a redevelopment. The building will not be closer to the hazard than the existing building lines. This objective is satisfied.

Specific Objective 4 for infill developments is to “*ensure that the footprint of the proposed building does not extend towards the hazard beyond existing building lines on neighbouring land*”. The proposed development does not extend beyond the footprint of the school buildings in the subject land. This objective is satisfied.

Specific Objective 5 for infill developments is to “*not result in an increased bushfire management and maintenance responsibility on adjoining land owners unless they have agreed to the development*”. The development does not increase or offset bushfire management onto neighbouring lands. This objective is satisfied.

Specific Objective 6 for infill developments is to “*ensure building design and construction enhances the chances of occupant and building survival*”. Section 5 outlines the requirement to comply with construction standards for bushfire protection. The proposed building will be constructed to comply with the relevant BAL under AS 3959. This objective is satisfied.

#### **4.1.2 APZ maintenance plan**

The proposed APZ area involving a minimum of 25 metres from the proposed Uniform Shop development is to be managed as follows:

- No tree or tree canopy is to occur within 2 m of future building rooflines;
- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
  - are well spread out and do not form a continuous canopy;
  - are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
  - are located far enough away from future buildings so that they will not ignite the buildings by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species;
- A minimal ground fuel is to be maintained to include less than 4 tonnes per hectare of fine fuel (fine fuel means ANY dead or living vegetation of <6 mm in diameter e.g. twigs less than a pencil in thickness. 4 t/ha is equivalent to a 1 cm thick layer of leaf litter); and
- Any structures storing combustible materials such as firewood (e.g. sheds) must be sealed to prevent entry of burning debris.

## 5 Construction standard

The building construction standard is based on the determination of the Bushfire Attack Level (BAL) in accordance with Method 1 of AS 3959-2009 '*Construction of Buildings in Bushfire Prone Areas*' (Standards Australia 2009). The BAL is based on known vegetation type, effective slope and managed separation distance between the development and the bushfire hazard.

In response to the predicted bushfire attack, the Uniform Shop is to be constructed to comply with BAL-29 and BAL-19 under Australian Standard AS 3959-2009 '*Construction of buildings in bushfire-prone areas*'. It is important that the most recent and current version of AS 3959 is consulted. Additionally, the NSW variation to AS 3959 as outlined in PBP 2010 Appendix 3 Addendum is to be applied as applicable to the proposed development. These measures are included in Appendix 1.

## 6 Water supply

There are hydrants located throughout the school and along Waropara Road which supply reticulated water. The furthest point from the proposed development to a hydrant will be less than 90 m easily allowing for a firefighting tanker to be within 20 metres of the hydrant and all parts of the proposed development being within 70 metres of the tanker.

## 7 Gas and electrical supplies

Where new powerlines are proposed they are to be in accordance with PBP, where electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies; and
- No part of a tree should be closer to a powerline than the distance specified in "*Guideline for managing vegetation near power lines*" issued by Department of Energy, Utilities and Sustainability (ISSC 3, December 2005).

Any gas services are to be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia, 2008).

## 8 Access

The property is directly accessible from Waropara Road to the west, which is a sealed two-way public road which can be utilised to attend an incident on the subject land. Waropara Road also offers several alternate routes into Medowie and to the north, south and west. Additional access provisions in regards to bushfire protection are not required for this proposal.

## 9 Assessment of environmental issues

An Ecological Constraints Assessment (Eco Logical Australia 2014) was prepared for the subject land and it was found that the most significant ecological values on the site are contained in the north east corner. This area contains Swamp Sclerophyll Forest EEC, habitat for threatened plants, breeding and foraging habitat for some threatened fauna and forms part of a buffer to preferred Koala habitat mapped within the CKPoM.

The remainder of the site is divided into disturbed or cleared land and forest vegetation. The forest vegetation provides foraging habitat for a wide range of threatened fauna. However, the threatened fauna that are predicted to occur would only expected to use the site on occasion and no species were recorded on the site.

## 10 Bushfire maintenance plans and fire emergency procedures

Any existing bushfire maintenance plans and fire emergency procedures will need to be amended to incorporate the new development prior to occupation.

## 11 Recommendations & conclusion

The proposal consists of the relocation and construction of buildings over two stages. The Uniform Shop can comply with the PBP specific objectives for infill development of an existing SFPP facility.

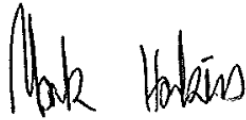
This assessment has been prepared by the ELA Senior Bushfire Consultant, Mark Hawkins (FPAA BPAD Level 2 Certified Practitioner No. BPD-L2-30419) and quality reviewed by ELA Senior Bushfire Consultant Daniel Copland (FPAA BPAD Level 3 Certified Practitioner No. BPD-L3-28853).

The following recommendations apply:

- a. The northern elevation of the proposed Uniform Shop is to be constructed to comply with BAL-29 and the remaining elevations are to comply with BAL-19 under Australian Standard AS 3959-2009 '*Construction of buildings in bushfire-prone areas*' (Standards Australia 2009).
- b. The NSW variation to AS 3959 as outlined in PBP (within the 2010 Appendix 3 Addendum) are to be implemented as applicable to the proposed developments (refer to Appendix 1 of this report).
- c. An APZ of minimum 25m is to be established around the proposed Uniform Shop consistent with the maintenance plan in Section 4.1.2 of this report.
- d. Electricity should be under ground where practicable. Otherwise, lines are to be installed with short pole spacing, unless crossing gullies and no part of a tree should be closer to a powerline than the distance specified in "*Guideline for managing vegetation near power lines*" issued by Department of Energy, Utilities and Sustainability (ISSC 3, December 2005).
- e. Any gas services are to be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia, 2008).
- f. Any existing bushfire maintenance plans and fire emergency procedures will need to be amended to incorporate the new development prior to occupation.



In the author's professional opinion the proposed development can comply with '*Planning for Bush Fire Protection*' (NSWRFS 2006) for infill SFPP development.



Mark Hawkins  
**Senior Bushfire Consultant**



Daniel Copland  
**Senior Bushfire Consultant**  
**FPAA BPAD Certified Practitioner No. BPD-L3-28853**

*Eco Logical Australia (ELA) is recognised by the NSW Rural Fire Service and the NSW Department of Planning as a suitably qualified consultant as the company is listed as a Certified Business (BPD-BA-1940) under the Fire Protection Association of Australia's BPAD program.*

# References

Department of Energy, Utilities and Sustainability (ISSC 3, December 2005) *Guideline for managing vegetation near power lines*.

Eco Logical Australia 2014. *Meadowie Christian School and Baptist Community Church Ecological Constraints Assessment*. Prepared for EPM Projects Pty Ltd.

NSW Rural Fire Service (RFS). 2006. *Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*. Australian Government Publishing Service, Canberra.

Standards Australia. 2005. *Fire hydrant installations - System design, installation and commissioning*, AS2419.1, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2008. *The storage and handling of LP Gas*, AS/NZS 1596-2008, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2009 (Amendment 3). *Construction of buildings in bushfire-prone areas*, AS 3959, Third edition 2009, Standards Australia International Ltd, Sydney.

# Appendix 1

# Appendices

Table A3.5.1 – Conversion of vegetation classification from David Keith's *Ocean Shores to Desert Dunes* (used in PBP) to the AUSLIG Pictorial Analysis in AS3959-2009. This conversion is based on what is considered the best representation of similar bush fire behavior potential.

David Keith's <i>Ocean Shores to Desert Dunes</i>	AUSLIG (1990) Pictorial Analysis (AS3959-2009)
Forests (Wet & Dry Sclerophyll)	Forest
Pine Plantations	
Forested Wetlands	
Woodlands (Grassy, Semi-Arid)	Woodland
Tall Heath (Scrub)	Scrub
Freshwater Wetlands	
Short Heath (Open Scrub)	Shrubland
Arid Shrubland	Mallee/Mulga
Alpine Complex (Sedgeland)	Tussock Moorland
Rainforest	Rainforest
Grassland	Grassland

For the purposes of Table A2.6 in Appendix 2, the requirements for Alpine Resorts should be developed using Table 2.4.4 of AS3959-2009. Generally, most development applications within the Alpine Resorts consist of alterations and additions to existing buildings and therefore would be treated as infill development. Developments involving new leases or new alpine resorts must contact the RFS to determine the APZ requirements.

## A3.6 Construction Considerations within the Flame Zone

There is potential for flames to ignite the external facade of a building which can continue to burn after the passage of the fire front. Therefore some degree of conservatism in relation to the exposure period is appropriate.

In NSW there are no recognized deemed-to-satisfy arrangements for construction of buildings within the Flame Zone. Where sustained flame contact is likely, the radiant heat and convective heat exposures are considerable and overwhelms most materials.

While AS3959 can be used as a guide to improve building safety, this is subject to additional control measures not included in this document. The design and construction of a building is just one means of mitigating the bush fire risk and will normally require supplementation by a range of other mitigation measures to the satisfaction of the authority having jurisdiction. The extent of additional measures required will be dependent upon the bush fire hazard and its proximity to the buildings. In addition to the construction requirement of AS3959, applicants should also address the Performance Requirements of the BCA and consider the siting and the design principles in Section 4.3.5 of PBP.

Where new testing regimes are developed and deemed appropriate by the NSW Rural Fire Service, these may be incorporated as part of

the process of developing alternative solutions. Alternative solutions will be considered on their merits.

## A3.7 Additional Construction Requirements

Planning for Bush Fire Protection is designed to provide for improved bush fire protection outcomes through the planning system, whereas the construction requirements are established through the operation of the BCA. However, based on a review of AS3959-2009 and recent developments through the interim findings from the Victorian Royal Commission, the RFS has concerns over the levels of safety for ember protection at lower BAL levels (BALs 12.5 and 19) provided by AS3959-2009. The RFS is concerned that by adopting the new Standard there would be a reduction in safety created from that afforded by the previous NSW application of AS3959-1999 in relation to ember protection. In this regard, the RFS will aim to maintain the safety levels previously provided by AS3959-1999. In particular, the areas of concern arise from requirements for:

- Sarking
- Sub floor screening
- Floors
- Verandas, Decks, Steps, Ramps And Landings

In addition, in order to provide a suitable combination of bush fire protection measures the NSW Rural Fire Service will, as part of the planning assessment process, recommend / require additional construction requirements beyond those prescribed in AS3959-2009 as deemed appropriate.

Planning requirements for grasslands are contained within the main body of PBP.

As part of the planning requirements, the following will create part of the suite of protection



measures required to form compliance with *Planning for Bush Fire Protection*.

## SARKING

Any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall be:

- a. Non-combustible; or
- b. Breather-type sarking complying with AS/NZS 4200.1 and with a flammability index of not more than 5 (see AS1530.2) and sarked on the outside of the frame; or
- c. An insulation material conforming to the appropriate Australian Standard for that material.

## SUBFLOOR SUPPORTS

For BAL-12.5 and BAL-19, Clause 5.2 and 6.2 shall be replaced by the provisions of Clause 7.2. In this regard, Clause 7.2 states:

### “7.2 SUBFLOOR SUPPORTS

*This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with—*

- a. *a wall that complies with ..... (Clause 5.4 or 6.4 as appropriate); or*
- b. *a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; or*
- c. *a combination of Items (a) and (b) above.*

*Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be—*

- (i) *of non-combustible material; or*
- (ii) *of bushfire-resisting timber (see Appendix F); or*
- (iii) *a combination of Items (i) and (ii) above.*

**NOTE:** *This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 7.7)."*

## ELEVATED FLOORS

For BAL-12.5 and BAL-19, Clause 5.3 and 6.3 shall be replaced by the provisions of clause 7.3. In this regard, clause 7.3.2 states:

### “7.3.2 Elevated floors

#### 7.3.2.1 Enclosed subfloor space

*This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with—*

- a. *a wall that complies with ..... (Clause 5.4 or 6.4 as appropriate); or*
- b. *a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; or*
- c. *a combination of Items (a) and (b) above.*

#### 7.3.2.2 Unenclosed subfloor space

*Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400 mm above finished ground level, shall be one of the following:*

- a. *Materials that comply with the following:*

- (i) *Bearers and joists shall be—*

- A. *non-combustible; or*
- B. *bushfire-resisting timber (see Appendix F); or*
- C. *a combination of Items (A) and (B) above.*

- (ii) *Flooring shall be—*

- A. *non-combustible; or*
- B. *bushfire-resisting timber (see Appendix F); or*
- C. *timber (other than bushfire-resisting timber), particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; or*
- D. *a combination of any of Items (A), (B) or (C) above. or*

- b. *A system complying with AS 1530.8.1*

*This Standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400 mm or more above finished ground level."*

## VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

For BAL-12.5 and BAL-19, Clause 5.7 and 6.7 shall be replaced by the provisions of clause 7.7. In this regard, clause 7.7 states:

### "7.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

#### 7.7.1 General

*Decking may be spaced.*

*There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.*

#### 7.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

##### 7.7.2.1 Materials to enclose a subfloor space

*The subfloor spaces of verandas, decks, steps, ramps and landings are considered to be 'enclosed' when —*

- the material used to enclose the subfloor space complies with .... **(Clause 5.4 or 6.4 as appropriate)**; and*
- all openings greater than 3 mm are screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.*

##### 7.7.2.2 Supports

*This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.*

##### 7.7.2.3 Framing

*This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).*

##### 7.7.2.4 Decking, stair treads and the trafficable surfaces of ramps and landings

*Decking, stair treads and the trafficable surfaces of ramps and landings shall be—*

- of non-combustible material; or*
- of bushfire-resisting timber (see Appendix F); or*
- a combination of Items (a) and (b) above.*

##### 7.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

##### 7.7.3.1 Supports

*Support posts, columns, stumps, stringers, piers and poles shall be—*

- of non-combustible material; or*
- of bushfire-resisting timber (see Appendix F); or*
- a combination of Items (a) and (b) above.*

##### 7.7.3.2 Framing

*Framing of verandas, decks, ramps or landings (i.e., bearers and joists) shall be—*

- of non-combustible material; or*
- of bushfire-resisting timber (see Appendix F); or*
- a combination of Items (a) and (b) above.*

##### 7.7.3.3 Decking, stair treads and the trafficable surfaces of ramps and landings

*Decking, stair treads and the trafficable surfaces of ramps and landings shall be—*

- of non-combustible material; or*
- of bushfire-resisting timber (see Appendix F); or*
- a combination of Items (a) and (b) above.*

##### 7.7.4 Balustrades, handrails or other barriers

*Those parts of the handrails and balustrades less than 125 mm from any glazing or any combustible wall shall be—*

- of non-combustible material; or*
- bushfire-resisting timber (see Appendix F); or*
- a combination of Items (i) and (ii) above.*

*Those parts of the handrails and balustrades that are 125 mm or more from the building have no requirements."*



#### HEAD OFFICE

Suite 2, Level 3  
668-672 Old Princes Highway  
Sutherland NSW 2232  
T 02 8536 8600  
F 02 9542 5622

#### CANBERRA

Level 2  
11 London Circuit  
Canberra ACT 2601  
T 02 6103 0145  
F 02 6103 0148

#### COFFS HARBOUR

35 Orlando Street  
Coffs Harbour Jetty NSW 2450  
T 02 6651 5484  
F 02 6651 6890

#### PERTH

Suite 1 & 2  
49 Ord Street  
West Perth WA 6005  
T 08 9227 1070  
F 08 9322 1358

#### DARWIN

16/56 Marina Boulevard  
Cullen Bay NT 0820  
T 08 8989 5601  
F 08 8941 1220

#### SYDNEY

Level 6  
299 Sussex Street  
Sydney NSW 2000  
T 02 8536 8650  
F 02 9264 0717

#### NEWCASTLE

Suites 28 & 29, Level 7  
19 Bolton Street  
Newcastle NSW 2300  
T 02 4910 0125  
F 02 4910 0126

#### ARMIDALE

92 Taylor Street  
Armidale NSW 2350  
T 02 8081 2681  
F 02 6772 1279

#### WOLLONGONG

Suite 204, Level 2  
62 Moore Street  
Austinmer NSW 2515  
T 02 4201 2200  
F 02 4268 4361

#### BRISBANE

Suite 1 Level 3  
471 Adelaide Street  
Brisbane QLD 4000  
T 07 3503 7191  
F 07 3854 0310

#### HUSKISSON

Unit 1 51 Owen Street  
Huskisson NSW 2540  
T 02 4201 2264  
F 02 4443 6655

#### NAROOMA

5/20 Canty Street  
Narooma NSW 2546  
T 02 4476 1151  
F 02 4476 1161

#### MUDGEES

Unit 1, Level 1  
79 Market Street  
Mudgee NSW 2850  
T 02 4302 1230  
F 02 6372 9230

#### GOSFORD

Suite 5, Baker One  
1-5 Baker Street  
Gosford NSW 2250  
T 02 4302 1220  
F 02 4322 2897

1300 646 131  
[www.ecoaus.com.au](http://www.ecoaus.com.au)