

ABOUT TREES

URBAN TREE & BUSHLAND MANAGEMENT

FLORA & FAUNA ASSESSMENT

AND

5 PART TEST OF SIGNIFICANCE

AT

96 -& 98 LETHBRIDGE ST & 40 - 46 EVAN ST

PENRITH

FOR

MATTHEW FREEBURN

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ABOUT TREES

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24/09/2021
Ref. # 2209

1.0 INTRODUCTION

A Development Application has been lodged with Penrith City Council (PCC) for consent to construct a new development at 96 & 98 Lethbridge St & 40 - 46 Evan St Penrith.

1.1 Brief:

This report has been commissioned by Matthew Freeman, and its purpose is to prepare a Flora & Fauna Report in accordance with Guidelines provided by Penrith City Council, and the Working Draft Guidelines (2004) provided by New South Wales Department of Environment and Conservation.

1.2 Summary of Report

1.2.1 Threatened Ecological Communities

The four (4) canopy trees within the site that are components of the Cumberland Plains Woodland are remnant trees over an area cleared for urban development. As there is no indigenous ground stratum remaining within the site, the vegetation does not meet the legal definition of the Cumberland Plains Woodland.

The Five Part Test in Appendices 6.1 has determined that the proposed activity is unlikely to have a significant impact upon the remnant of Cumberland Plains Woodland within the site

1.2.2 Threatened Flora Species

A total of 105 flora species were detected within the study area (12 locally indigenous and 93 introduced ornamental and native species), and a list of these is included as Appendices 10.3.1.

Eleven (11) threatened flora species have been recorded within 5-kilometers of the site and a list of these is provided in Appendices 9.4.2

These species were not detected within the site, and they are considered unlikely to occur due to past clearing activities and current land use. The Threatened Species Assessment in Appendices 5.1 of this report determined that the proposed activity is unlikely to have a significant impact upon these species. As such, no further assessment is considered necessary

1.2.3 Threatened Fauna Species

Thirteen fauna species were detected in the study area (9 indigenous and 2 introduced) and a list of these is included as Appendices 10.3.2.

Thirty-four (34) threatened fauna species have been recorded within a 5km radius of the site, and potential habitat is available for eleven (11) of these in the Study Area. These are recorded in Appendices 9.4.2

The Threatened Species Assessment in Appendices 5.2 of this report determined that the proposed activity is unlikely to have a significant impact upon these species. As such, no further assessment is considered necessary

2.0 METHODOLOGY AND OTHER INFORMATION

2.1 Methodology

This survey and report follows the ‘Threatened Species Survey and Assessment: Guidelines for developments and activities (working draft)’ DEC 2004, New South Wales Department of Environment and Conservation, Hurstville, NSW.

2.2 Limitation of Report

The flora survey may be an underestimate of the actual species present in the study area as it was undertaken in the winter and spring of 2021. Inherent limitations to a survey undertaken at this time of the year may include seasonal variability, and this could inhibit the capacity to detect some cryptic species. For example, spring flowering annuals and plants with underground storage mechanisms that only produce above ground material at certain times of the year (i.e. orchids) are not likely to be evident. A general absence of floral and fruiting characteristics presents difficulties in making a correct identification to species level, particularly with grass and sedge species. Other plants may only be represented by seed in the soil seed bank. For these reasons, a more comprehensive survey over an extended period of time, taking seasonal variability into account, may result in additional species being detected.

2.3 Background

The author was provided copy of the Proposed Site Plan, and a request from the owners to prepare a Flora & Fauna Report

2.4 Literature and Database Review

Prior to the field survey, a literature and database review were conducted. This involved the following.

- Bannerman S. & Hazelton, P. (1989) ‘Soil Landscapes of the Penrith 1; 100,000 Sheet’ Soil Conservation Services NSW
- Benson, D. H, 1992, ‘The Natural Vegetation of the Penrith Map Sheet’, 1:100,000 Map Sheet, *Cunninghamia*, Vol. 2 [4] 1992, National Herbarium of NSW
- Commonwealth EPBC Act, Protected Matters Report, (2021)
- Land and Property Management Authority (2021) Spatial Information Exchange <http://imagery.maps.nsw.gov.au/>
- NSW NPWS Wildlife Atlas Report (2021)
- Penrith City Council’s Local Environment Plan (2010)
- Tozer, M. (2003) ‘The Native Vegetation of the Cumberland Plain, Western Sydney: Systemic classification and field identification of communities’ *Cunninghamia*, Vol. 8 [1] 2003 1 -155. Royal Botanic Gardens, Sydney. NSW

2.5 Review of Relevant Legislation

The survey and report has considered the likely impacts of the proposed action on threatened species, populations or endangered ecological communities, or their habitats, that are known to occur in the local area. The criteria used to assess these impacts vary between the Commonwealth, State and Local government agencies. This report considers these issues in accordance with the following legislative requirements. It also provides a conclusion on whether a referral is required to the Federal Minister for the Environment, and whether a Species Impact Statement is necessary.

2.5.1 Commonwealth Environmental Protection and Biodiversity Conservation Act (1999)

The EPBC Act is a nationally applicable Act administered by the Commonwealth Department of Environment and Heritage. This Act requires the approval for actions that are likely to have a significant impact on matters of National Environmental Significance.

There are seven matters that may require a Commonwealth assessment and approval. These include;

- World Heritage Properties;
- National Heritage Places;
- Wetlands of International Significance (Ramsar Sites);
- Nationally Threatened Species and Communities
- Migratory species
- Nuclear actions
- Commonwealth Marine Environments.

‘Under the EPBC Act, a person must not take an action that has, will have or is likely to have a significant impact on any of these matters of NES without approval from the Commonwealth Environment Minister. There are penalties for taking such an action without approval.

In general, an action that may need under the Act will involve some physical interaction with the environment, such as the clearing of native vegetation, building a new road, discharging pollutants into the

environment, or offshore seismic survey.

If it is determined that an action is not likely to have a significant impact, then the action is not a controlled action. Approval under the EPBA Act is not required and the action may proceed, subject to obtaining any other necessary permits or approvals'

2.5.2 Biodiversity Conservation Act 2016

The key legislation that identifies and protects threatened species populations and ecological communities in NSW is the Biodiversity Conservation Act 2016 and its regulations. The new legislation began on 25 August 2017 and replaces the *Threatened Species Conservation Act 1995*.

In the case of an application for development under Part 4 of the EP&A Act, applicants should first determine whether the development exceeds the biodiversity offsets scheme threshold. More information on the biodiversity offsets scheme threshold, including the Scheme Entry Tool, is available on the OEH website

A development application that is likely to significantly affect a threatened species must be accompanied by a biodiversity development assessment report (BDAR).

In the case of an activity under Part 5 of the EP&A Act, the biodiversity offsets scheme threshold does not apply. The test of significance must be undertaken to determine whether the proposed activity is likely to significantly affect a threatened species.

For an activity under Part 5, an assessment of an activity that is likely to significantly affect a threatened species must be accompanied by a species impact statement or, if the proponent elects to participate in the biodiversity offsets scheme, a BDAR.

2.5.2.1 Biodiversity Offsets Scheme Threshold

The Biodiversity Offsets Scheme Threshold is a test used to determine when is necessary to engage an accredited assessor to apply the Biodiversity Assessment Method (the BAM) to assess the impacts of a proposal.

It is used for local developments (development applications submitted to councils) and clearing that does not require development consent in urban areas and areas zoned for environmental conservation (under the *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017*).

The Biodiversity Conservation Regulation 2017 sets out threshold levels for when the Biodiversity Offsets Scheme will be triggered. The threshold has two elements:

- whether the amount of native vegetation being cleared exceeds a threshold area set out below
- whether the impacts occur on an area mapped on the Biodiversity Values map published by the Minister for the Environment.

If clearing and other impacts exceeds either trigger, the Biodiversity Offset Scheme applies to the proposed development including biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017.

2.5.2.2 Area clearing threshold.

The area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

The area threshold applies to all proposed native vegetation clearing associated with a proposal, regardless of whether this clearing is across multiple lots. In the case of a subdivision, the proposed clearing must include all future clearing likely to be required for the intended use of the land after it is subdivided.

2.5.2.3 Is the Threshold Exceeded?

The site has an area of 6,893m², and 535m² of Cumberland Plains Woodland canopy is proposed to be cleared. One hectare (1ha) represents 10,000m², and 0.5ha represents 5,000m² (see Table 1). As the proposed clearing is less than .5ha (5,000m²) in area, the threshold is not exceeded.

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

Table 1 – Thresholds that Trigger the Biodiversity Offset Scheme

2.5.2.4 Impacts below the Biodiversity Offset Scheme Threshold and ‘test of significance’.

The environmental impact of development proposals that do not exceed the Biodiversity Offset Scheme Threshold and will not otherwise have a significant impact on biodiversity values as assessed by the ‘test of significance’ will continue to be assessed under s 79C of the *Environmental Planning and Assessment Act 1979*.

Clearing of land in urban areas, RU5 and E2 – E4 zones that does not require development consent and does not exceed the Biodiversity Offset Scheme Threshold will continue to be regulated by Councils under Development Control Plans pursuant to provisions in the *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017* similar to clause 5.9 of the Standard Instrument Local Environmental Plan.

2.5.2.5 Threatened species ‘test of significance’

Proponents are also required to carry out a ‘test of significance’ for all local development proposals that do not exceed the Biodiversity Offset Scheme Threshold. The test of significance is intended to provide standardized and transparent consideration of threatened species, ecological communities, and their habitats, through the development assessment process.

In the context of a Part 4 development (not including major projects) if the ‘test of significance’ assessment indicates that there will be a significant impact, the proponent must carry out a BAM assessment. The ‘test of significance’ is also required to be applied for Part 5 activities.

2.5.3 Penrith LEP 2010

The site is zoned Zone RU4 Primary Production Small Lots under Penrith under LEP 2010 (See Section 3.5).

2.6 Uniform Civil Procedures Rules (2005)

In order to ensure the reliability of evidence provided by experts, the Courts have provided the Uniform Civil Procedures Rules 2005 (UCPR) and Land & Environment Court Rules 2007 (LECR).

The author of this report has read and understands the Expert Witness Code of Conduct in Schedule 7 to UCPR, and agrees to be bound by it in accordance with UCPR 31.23.

An expert is permitted to provide evidence before a Court in order to assist the Court draw inferences. The primary overriding duty of an expert is to assist the Court impartially on matters relevant to the expert witness’s expertise. Any opinions expressed must be based on the persons training, study or expertise.

2.7 Curriculum Vitae of Author

The authors Curriculum Vitae is attached as Appendices 10.1 of this report which provides the qualifications, experience and additional training on which any stated opinions and conclusions are based.

2.8 Copyright

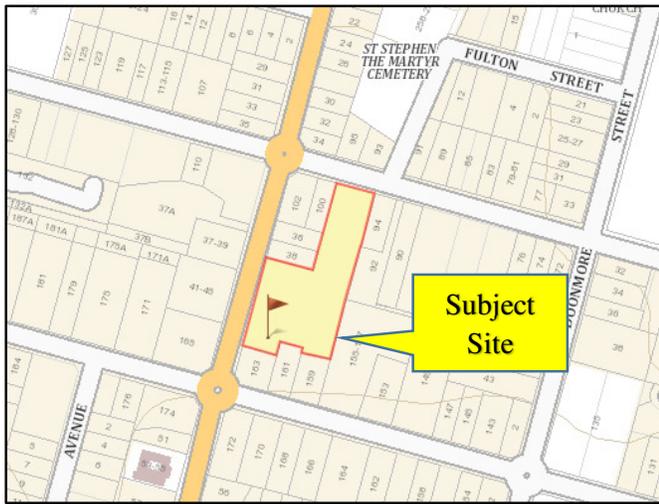
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3.0 SITE DETAILS

3.1 Description of the Subject Site and Study Area

The sites are known as 40 – 46 Evan Street & 96 – 98 Lethbridge Street Penrith and the surrounding areas are mainly comprised of urban residential development (see Map 1). It has a total area of,6,893m².



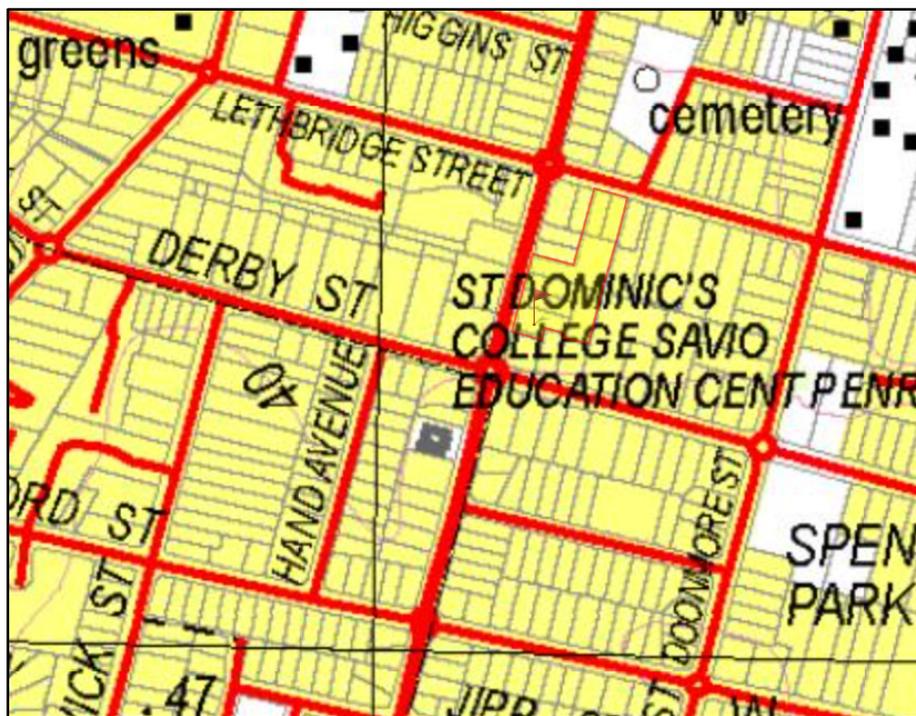
Map 1 – showing location of subject site (Dept Lands 2021)



Map 2 – showing subject trees (Dept Lands 2021)

3.2 Landform & Aspect

The site has an open aspect located is an undulating crest of Wianamatta Group shales. The local topography falls towards the west by 10m over 915m. This represents a gradient of about 1: 90, or a downslope of 1.1°, draining into a 1st order tributary of Peach Tree Creek (see Map 3 & Diagram 1).



Map 3 – showing topographic details of the subject site and study area)

3.3 Soil Landscape

The soil of the general area has been described by Bannerman & Hazelton (1990), as ‘Luddenham Soil Landscape’. On crests, up to 10 cm of friable dark brown loam (**lu1**) overlies <40 cm sandy clay (**lu5**) which usually directly overlies deeply weathering shale bedrock. The topsoil usually becomes hard setting when dry or compacted (**lu1**), especially when exposed at the surface (**lu2**).

Where subsoil exits, >50cm of medium to heavy clay (**lu3**) over overlies <90cm of grey mottled clay (**lu4**). Soil is generally shallow on crests (<100cm), moderately deep on upper slopes (70 – 150cm) and moderately deep on lower slopes and drainage lines (<150cm). Subsoils have high clay content and are moderately reactive.

Reactive soils can cause surface movement as they shrink or swell in response to changes of their soil moisture content. This can cause extensive damage to pathways, paving, underground services and buildings with inappropriately designed footings.

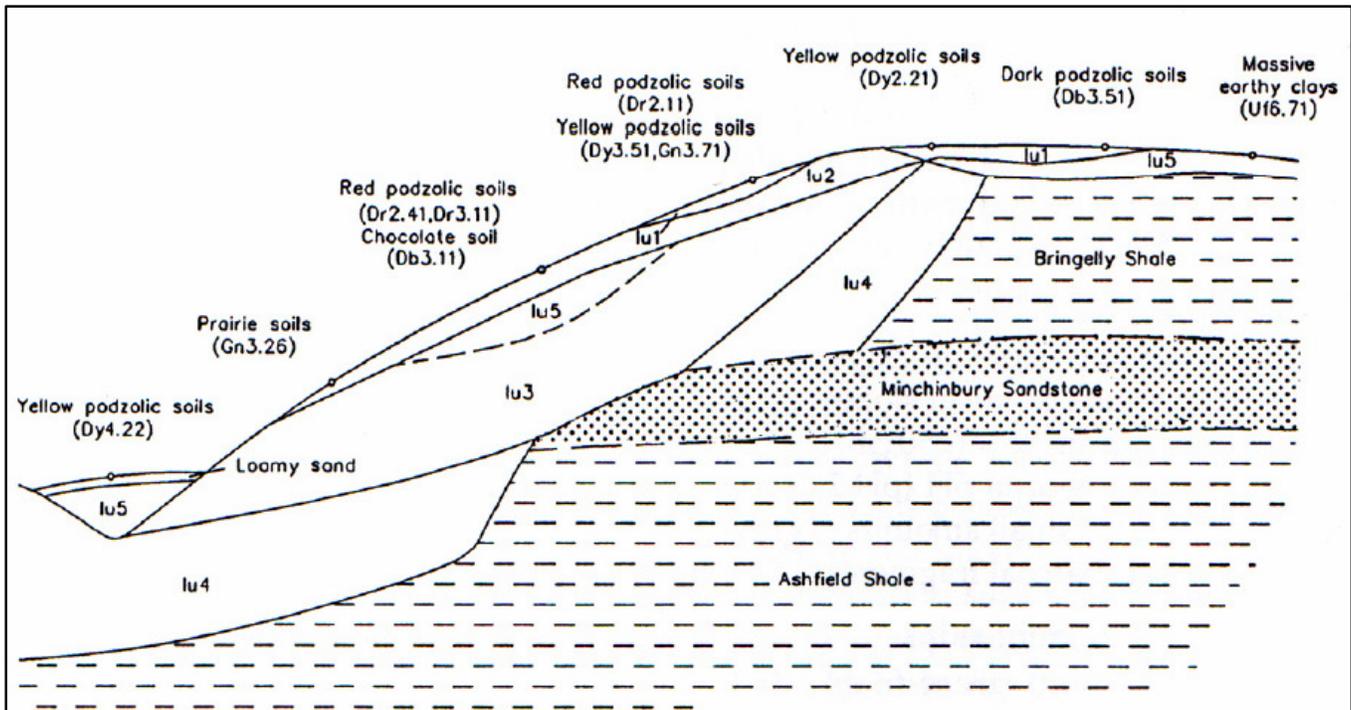
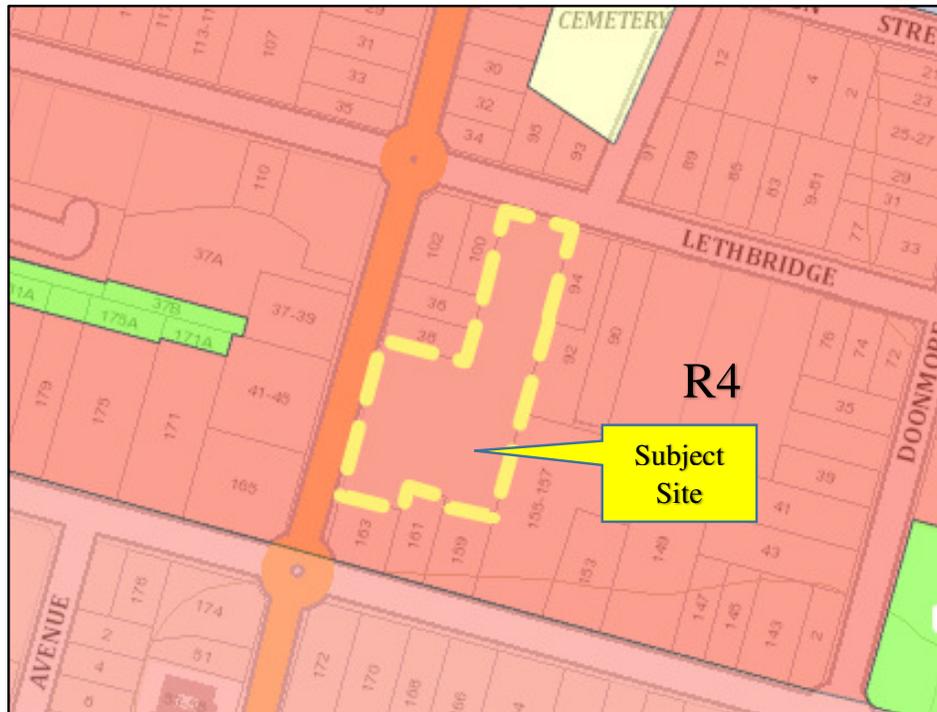


Diagram 1 – Distribution of the Luddenham soil landscape showing the occurrence and relationship of dominant soil materials.

3.4 LEP Zoning

The site is Zoned R4 – High Density Residential under Penrith LEP 2010)



Map 4 – showing Zoning of subject site (PLEP 2010)

3.4.1 R4 Zone Objectives

1. Objectives of zone

- To provide for the housing needs of the community within a high-density residential environment.
- To provide a variety of housing types within a high-density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To ensure that a high level of residential amenity is achieved and maintained.
- To encourage the provision of affordable housing.
- To ensure that development reflects the desired future character and dwelling densities of the area.

2. Permitted without consent

Home occupations

3. Permitted with consent

Boarding houses; Building identification signs; Business identification signs; Car parks; Centre-based child care facilities; Community facilities; Emergency services facilities; Environmental protection works; Exhibition homes; Exhibition villages; Flood mitigation works; Home-based child care; Home businesses; Information and education facilities; Neighbourhood shops; Oyster aquaculture; Places of public worship; Recreation areas; Recreation facilities (indoor); Residential accommodation; Respite day care centres; Roads; Shop top housing

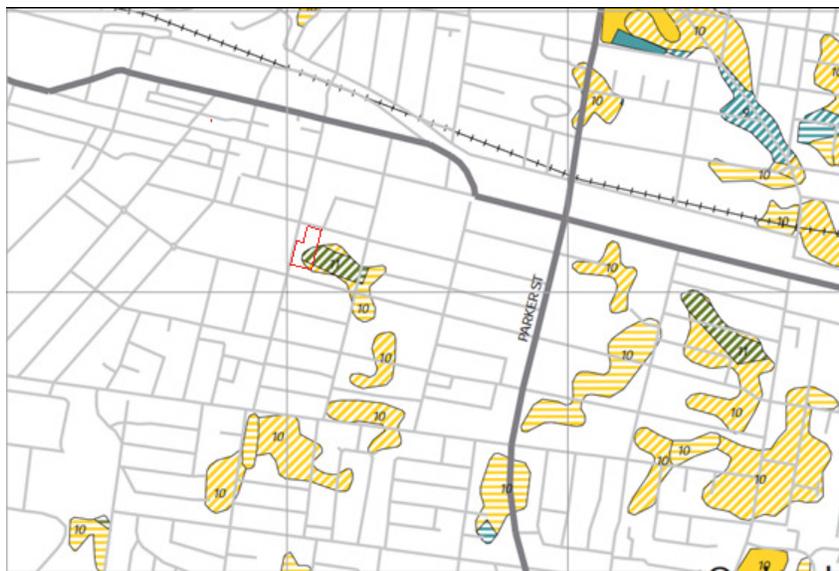
4. Prohibited

Pond-based aquaculture; Rural workers' dwellings; Tank-based aquaculture; Any other development not specified in Item 2 or 3

4.0 ECOLOGICAL COMMUNITY ASSESSMENT

4.1 Vegetation Mapping of the Local Area

Vegetation mapping by NSW National Parks and Wildlife in 2002 has recorded occurrences of the Shale Plain Woodland and Alluvial Woodland within the local area (see Map 5). These are both components of the Cumberland Plain Woodland which is listed as a Critically Endangered Ecological Community under the Schedules of the NSW Biodiversity Act (2016) and the Commonwealth EPBC Act (1999)



Map 5 – Significant Vegetation Areas (NPWS 202)



4.2 Description of the Ecological Communities

4.2.1 Cumberland Plain Woodland

The Cumberland Plain Woodland sites are characteristically of woodland structure, but may include both more open and denser areas, and the canopy is dominated by species including one or more of the following: Eucalyptus moluccana, Eucalyptus tereticornis, Eucalyptus crebra, Eucalyptus eugenioides and Eucalyptus maculata.

The understory is generally grassy to herbaceous with patches of shrubs, or if disturbed, contains components of indigenous native species sufficient to re-establish the characteristic native understory.

The Cumberland Plain Woodland includes regrowth which is likely to achieve a near natural structure or a seral stage towards that structure' (NSW Scientific Committee (2009)

4.2.2 Alluvial Woodland

The scientific name of this community has recently been changed to *'River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and Southeast Corner Bioregions*

This EEC is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include Eucalyptus tereticornis (Forest Red Gum), E. amplifolia (Cabbage Gum), Angophora floribunda (Rough-barked Apple) and A. subvelutina (Broad-leave Apple), Eucalyptus baueriana (Blue Box), E. botryoides (Bangalay) and E. elata (River Peppermint) may be common south from Sydney, E. ovata (Swamp Gum) occurs on the far south coast, E. saligna (Sydney Blue Gum) and E. grandis (Flooded Gum) may occur north of Sydney, while E. benthamii is restricted to the Hawkesbury floodplain.

A layer of small trees may be present, including *Melaleuca decora*, *M. styphelioides* (Prickly-leaved Teatree), *Backhousia myrtifolia* (Grey Myrtle), *Melia azaderach* (White Cedar), *Casuarina cunninghamiana* (River Oak) and *C. glauca* (Swamp Oak).

4.3 Condition of the Site Vegetation

Tree Stratum: Ground truthing the site vegetation found it to be represented by a codominant stand of introduced exotic and native species. It also contained three (3) *Eucalyptus moluccana* (Grey Box) and one (1) *Melaleuca decora* (Cloud Tree) which are diagnostic species of the Cumberland Plains Woodland (CPW) Ecological Community.

The mature *Casuarina cunninghamii* (River She-oaks) within the site, while being a diagnostic species of the 'River-Flat Eucalypt Forest' appear to have originated from ornamental plantings.

Shrub and Ground Stratum: These have been historically cleared and managed as an urban garden. Ongoing gardening activities and ongoing mowing has encouraged an understory dominated by introduced species and weeds. The ground stratum is dominated by introduced species, with only minor occurrences of four (4) diagnostic species of the CPW being present.

The existing vegetation within the subject site is highly modified and dominated by introduced ornamental trees and shrubs with a ground stratum dominated by introduced weeds. Only vestiges of the original CPW remain on the site. As such, it would not comply with the definition of the community provided under the *EPBC Act* (1999).

To define a plant community as *Shale Plains Woodland*, a 20m x 20m (400m²) survey plot would require at least 22 positive diagnostic species of the CPW, provided the total number of native species in the plot is 30 or greater (Tozer (2003)).

One hundred and five (105) flora species were recorded within the 2,794m² in the study area. Two (2) of these are diagnostic species of the CPW (Two being components of the tree stratum and four being components of the ground stratum). There is an insufficient quantity of diagnostic species present to positively identify the community as being Shale Plains Woodland, and due to the site vegetation failing to comply with the definitions of the community under the NSW Biodiversity Act (2016). (See Section 4.2.1 of this report)

4.4 Conservation Significance Assessment

The site is dominated by a combination of exotic and Cumberland Plains Woodland canopy trees over an area that has been historically cleared for urban development. The structure of the shrub and ground stratum have been significantly altered and are represented by introduced species and weeds.

The remnant CPW within the site has a very low potential of regeneration, and it has a moderate potential of providing habitat for threatened flora and fauna species (See Appendices 2.0)

4.5 Potential Impacts on the Threatened Ecological Communities

The *Cumberland Plain Woodland* is listed as a Critically Endangered Ecological Community under the Schedules of the NSW Biodiversity (2016) and Commonwealth EPBC Act (1999).

As the size of the remnant is less than 5ha in area and is represented by remnant trees over highly modified ground stratum dominated by introduced species, it fails to comply with the definitions of the CPW under the EPBC Act (1999), and with the definitions of the community under the NSW Biodiversity Act (2016).

The Five Part Test on the CPW in Appendices 6.1 determined that the proposed activity is unlikely to have a significant impact on the remnant trees or place the community in the local area at risk of extinction.

4.6 Ecological Communities Conclusions

No biodiversity development assessment report or referral to the Commonwealth Environment Minister is required.

5.0 FLORA SURVEY

5.1 Methodology

- The flora survey is based upon a check list of local indigenous plants known to occur in the local area.
- The survey was undertaken by walking through the site, identifying flora species in various garden beds and borders, and a meander back and forth across grassed areas. Plant species were recorded as they were encountered.
- A total of 105 flora species were detected in the study area (12 locally indigenous and 93 introduced ornamental and native species), and a list of these is included as Appendices 10.3.1.

5.2 Limitations

The flora survey may be an underestimate of the actual species present in the study area as it was undertaken in the winter and spring of 2021. Inherent limitations to a survey undertaken at this time of the year may include seasonal variability, and this could inhibit the capacity to detect some cryptic species. For example, spring flowering annuals and plants with underground storage mechanisms that only produce above ground material at certain times of the year (i.e. orchids) are not likely to be evident. A general absence of floral and fruiting characteristics presents difficulties in making a correct identification to species level, particularly with grass and sedge species. Other plants may only be represented by seed in the soil seed bank. For these reasons, a more comprehensive survey over an extended period of time, taking seasonal variability into account, may result in additional species being detected.

Where these limitations cannot be overcome, this survey has adopted the precautionary principle. This involves assuming that threatened flora which is likely to occur in the study area (based on the presence of suitable habitat and recent records) is also likely to inhabit the study area. The Assessment of Significance on threatened flora species has been conducted on this basis.

5.3 Flora Habitat Analysis

The site vegetation is dominated by a mixed stand of introduced ornamental species and Australian natives, and five 5) local indigenous species. A small tree and shrub stratum is comprised of introduced, ornamental plants and the ground stratum is represented by introduced species, with minor vestiges of indigenous species,

A total of 105 flora species were detected in the study area (12 indigenous and 93 introduced), and a list of these is included as Appendices 10.3.1.

Six species are positive diagnostic species of the Shale Plains Woodland (Tozer 2004) but at least 22 are required in a 20m x 20m sample plot for a confident identification of the community, provided that at least 30 native plants are present.

No threatened flora species were detected during the survey.

5.4 Potential Threats to Threatened Flora Species

A search was undertaken on the 18/09/2021 of the NSW NSW Atlas of NSW Wildlife for the threatened flora species that are known to occur within a 5-kilometre radius of the site. A list of these species is contained in Appendices 10.4.1. Additional species which have the potential to occur have also been added. An assessment was undertaken of the potential for these species to occur in the study area. This assessment is included in Appendices 10.5.1.

5.5 Flora Species Conclusions

No threatened flora species were observed during the survey, and it is unlikely that the proposed development will have a significant impact upon threatened flora species, populations or their habitats.

No Species Impact Statement or referral to the Commonwealth Environment Minister is required.

6.0 FAUNA SURVEY

This survey was conducted for mammals, diurnal and nocturnal birds, reptiles and insects on the dates and times of the following table.

DATE	TIME	TEMP	CLOUD	WIND	HUMID	COND
20/09/2021	10.00.am – 4.00pm	26°		30km/h N/W	22%	Fine

6.1 Limitations to the Fauna Survey

The fauna survey may be an underestimate of the actual species present in the study area as it was undertaken in the winter and spring of 2021. Inherent limitations to a survey undertaken at this time of the year may include seasonal variability and this could inhibit the capacity to detect some cryptic species. It is acknowledged by the author that a more comprehensive survey over an extended period of time, taking seasonal variability into account, may result in addition species being detected.

For example, many species of migratory birds are only present at certain seasons, others are always present but can only be detected in certain seasons (eg. breeding season for certain frogs) while others are inactive in cooler weather (e.g. micro-bats, reptiles and frogs), or inclement weather (e.g. birds in wet and windy conditions). Some species are nomads or have very large home ranges and may utilise seasonal variability food resources in the area (e.g. flowers and fruits)

Where these limitations cannot be overcome, this survey has adopted the precautionary principle. This involves assuming that threatened fauna which is likely to occur in the study area (based on the presence of suitable habitat and recent records) is also likely to inhabit the study area (see Fauna Habitat Assessment in Section 4.2). The Assessment of Significance on threatened fauna species has been conducted on this basis.

6.2 Methodology

This fauna survey has been undertaken in accordance with DEC Draft Guidelines (2004) to determine if threatened species are likely to inhabit or utilise habitat provided in the study area. It may be an under- estimate of the actual species present, as it was undertaken in August and September 2021. Some migratory fauna species are not present at this time of year while other will be less active and less likely to be detected. A more comprehensive survey over an extended period of time, which takes seasonal variability into account may result in addition species being detected.

Mammals

- An initial habitat assessment took into account the different types of habitat and vegetation in the study area, as well as its condition. If present, the key habitat features of threatened and endangered mammal species were noted.
- The mammal survey included visual sightings, observations of scratch marks on tree trunks, examinations of tree hollows (if present) , evidence of feeding sites and the presence of scats and spotlighting
- Opportunistic observations were made while undertaking all other surveys in the study area.
- No mammal species were detected in the study area during the survey.
- No threatened/endangered mammal species were detected, but the tree canopies and flowering shrubs could provide foraging habitat for some highly mobile species.

Birds

- An initial habitat assessment took into account the different types of habitat and vegetation in the study area, as well as its condition. If present, the key habitat features of threatened and endangered bird species were noted.
- A survey for diurnal birds in the study area was undertaken in the following manner
 - Two thirty minute area searches as the observer walked around the study area at variable speeds, stopping when necessary. The Atlas of Australian Birds recommends that a 20 minute area search be allocated to every 2ha (400m x 500m) being surveyed.
 - Three point counts based on ten minute observation periods at predetermined locations throughout the study area.
 - Opportunistic observations while focused on other survey activities included additional sightings of birds, nests, remains of eggshells, feathers, feeding activity, pellets and scats, and calls heard while undertaking all other surveys on the site.

- In addition, opportunistic observations made while undertaking all other surveys on the site were also recorded. These include sightings, calls, nests, remains of eggshells, feathers, feeding activity, pellets and scats.
- Eleven (11) bird species were detected during the survey, nine (9) indigenous species and two (2) introduced). these are recorded in Appendices 10.4.2
- No direct observations were made of threatened nocturnal bird species and their key habitat features were not observed in the study area. Due to the small size of the site and the lack of any key habitat features required by the Powerful, Masked and Sooty Owls, no call playbacks and/or spotlighting for these species was considered necessary.
- No threatened/endangered bird species or key habitat requirements were detected during the survey, and they are considered unlikely to occur in the study area

Reptiles

- The initial habitat assessment took into account the different types of habitat and vegetation in the study area, as well as their condition. General habitat requirements for reptiles are sandstone outcrops, boulders, logs, leaf litter, termite mounds and sunny basking sites near dense low vegetation.
- The reptile survey consisted of an area count and four time counts. The area count included a systematic search in areas of suitable habitat within the study area. Searches for cryptic species were made beneath bushrocks and fallen logs, decorticating and fallen bark, leaf litter, rock outcrops and other suitable habitat (e.g. roofing iron and other rubbish).
- Numerous sandstone pathways, garden borders and features within the site provide ideal basking sites for reptile species (see Plates 1 – 5). No threatened amphibian species have been recorded in the local area.
- Two x 30 minute diurnal area searches targeting threatened species were undertaken on two separate days, before reptiles reached their optimum body temperature.
- Opportunistic observations were also made while undertaking all other surveys in the study area.
- Two skink species were detected during the survey and these are recorded in Appendices 10.4.2
- No threatened/endangered reptile species or key habitat requirements were detected during the survey, and they are unlikely to occur in the study area

Amphibians

- The initial habitat assessment took into account the different types of habitat and vegetation in the study area, as well as its condition. If present, the key habitat features of threatened and endangered amphibian species were noted.
- A survey for the known the amphibian species in the local area was undertaken in areas of suitable on two evenings. Opportunistic observations while undertaking all other surveys were also recorded.
- The two (2) swimming pools within the site could provide breeding habitat for *Litoria aurea* (Green & Gold Bell Frog) and this species has been recorded in the local area (see Plates 3, 5 & 6)
- A targeted survey for *Litoria aurea* was undertaken in areas of suitable habitat and recorded calls were broadcast in an attempt to stimulate responses. No responses were received from this species.
- No amphibian species were detected during the survey.
- No threatened amphibian species or key habitat requirements were detected in the study area, and they are unlikely to occur in the study area

Molluscs

- The initial habitat assessment took into account the different types of habitats and vegetation in the study area, as well as its condition. If present, the key habitat features of threatened and endangered mollusc species were noted.
- The three (3) *Eucalyptus moluccana* (Grey Box) within the site could provide habitat for the Cumberland Plain Land Snail, and this species has been in the local area
- A targeted survey for *Meridolum corneovirens* (Cumberland Plain Land Snail) was undertaken in areas of suitable habitat but no mollusc species were detected

6.3 FAUNA HABITAT ASSESSMENT

Food Resources

Tree Stratum – Large mature trees provide more food & nesting resources than young trees (Recher 1991). Healthy mature trees direct a large amount of their energy into the production of nectar, foliage and fruits, whereas younger trees use most of their energy on growth and height (Robinson 1992).

- The site contains a stand of codominant and suppressed trees which could provide roosting, nesting and foraging habitat for various faunal species.
- Many have formed significantly asymmetrical canopies due to their close proximity to larger trees with more dominant canopies. Other are located within the driplines of more dominant trees and are in various stages of decline.
- As there are large areas of similar habitat in the local area and the proposed activity is unlikely to represent a significant impact on the habitat of any threatened species at a local, regional or national level.

Shrub Stratum – Many bird species are strongly associated with the shrub and tall grass understory (Fisher and Gouldney 1997), and remnants with a shrub/tussock understory will usually contain more bird species than those that don't (Barrett & Davidson 1999). A diverse understory can provide nesting sites, food resources and shelter for birds, mammals, frogs, reptiles and many different species of invertebrate. For example, spider distribution is often related to vegetation structure and the plant species present. In addition, flowering shrubs are another important resource for spider populations as their flowers can attract prey species (Martin & Green 2004).

- The shrub stratum throughout the site is well represented by introduced ornamental species typically found in urban areas.
- It does not provide important habitat features for any threatened species at a local, regional or national level.

Ground Stratum and Litter – A variety of herbs, forbs and grasses in the ground stratum can provide similar faunal habitat to that of the shrub stratum, providing food resources and shelter for ground foraging mammals and birds. However, the ground litter is also an important habitat component for fauna and a functioning ecosystem (Lyon 1987). Decomposition by micro-organisms provides a continual input of nutrients into the eco-system and is the beginning of a large food chain (Martin & Green 2004). Many ground dwelling invertebrates rely on a diverse litter layer for shelter and survival. It also provides food resources and shelter for many species of birds, mammals, frogs, reptiles, and invertebrates (Recher & Lim 1990)

- The ground stratum throughout the site is represented by species typically found in urban areas
- It does not represent important habitat for any threatened species at a local, regional or national level

Hollow Trees and Logs

The 'Loss of Hollow-bearing trees' is listed as a key threatening process in Schedule 3 of the NSW TSC Act. In NSW, terrestrial vertebrate species that are reliant on tree hollows for shelter and nests include at least 46 mammals, 81 birds, 31 reptiles and 16 frogs (Gibbons and Lindenmayer 2002). Of these, 40 species are listed as threatened under the NSW TSC Act. On average, it takes about 100 years for a useful hollow to form in Eucalypts and 200 years or more for the formation of a hollow large enough for use by a cockatoo or possum (Martin & Green 2002)

- The trees located on the site are not of an appropriate size or age class to have developed suitable hollows for faunal species.
- No cavities considered suitable for hollow dependent fauna were detected.

Standing and Fallen Dead Timber

Dead timber is an important resource for numerous faunal species and often contains more hollows and refuge than live timber (Bennet 1994). Fallen timber provides refuge for every major group of vertebrate fauna, as well as invertebrates, in woodland (Abensperg-Traun and Smith 1993). It provides foraging habitat for predators, perches for birds and reptiles (Robinson 1992) and feeding, breeding and sheltering habitat for small lizards and invertebrates (Abensperg-Traun and Smith 1993).

- One (1) *Eucalyptus moluccana* (Grey Box) is in advanced decline but it is not of a suitable age class to provide cavities for hollow dependent faunal species.

- Minor deadwood was detected throughout the tree stratum and was mainly comprised of twig and branch dieback in the upper canopies and suppressed 3rd and 4th order branches which typically occur in the middle and lower canopies.
- No significant standing or fallen deadwood habitat was detected in the study area.

Bushrocks, Exposed Rock Outcrops & Overhangs

The presence of rocky outcrops in areas of remnant vegetation can provide important habitat for many species of reptiles, especially if they are associated with tree hollows, fallen deadwood and exfoliating sandstone surface rocks. The density of tree plantings and regrowth vegetation around rock outcrops need to be considered so that thermal environments are not modified in ways that are detrimental to reptile species. (Lindenmayer, D & others 2010) The way rocky outcrops are managed can make a substantial difference to their habitat value and negative impacts on their integrity should be avoided. Bushrocks should be left undisturbed; regrowth vegetation protected and invasive weeds controlled (Michael & Lindenmayer 2010) Bush rock removal has been listed as a key threatening process under Schedule 3 NSW TSC Act. Numerous threatened fauna species are associated with bush rock habitat and have been identified as being adversely affected by its disturbance and/or removal. As bush rock is habitat for these species, the impact of any development activity that is likely to disturb it must be individually assessed where these species are known or likely to occur

- Sandstone and bush rock features could provide basking areas for various faunal species

Drainage Lines and Water Bodies

- No drainage lines occur within the site, but two (2) old swimming pools could provide habitat for various faunal species

6.4 Threatened Fauna Survey

A search was undertaken on the 18/09/2021 of the NSW NSWS Atlas of NSW Wildlife for the threatened fauna species that are known to occur within a 5-kilometre radius of the site. A list of these species is contained in Appendices 10.4.2. Additional species which have the potential to occur have also been added. An assessment was undertaken of the potential for these species to occur in the study area. This is included in Appendices 10.5.2.

6.5 Potential Threats to Threatened Fauna Species

No other threatened fauna species were detected during the survey and no important habitat features are provided in the Study Area.

The tree and shrub canopies could provide intermittent foraging habitat for some threatened bats and birds and there are large areas of similar habitat in the local area

As these threatened species are highly mobile and known to range over large areas, the proposed activity is unlikely to have a significant impact on their local occurrences

6.6 Fauna Species Conclusions

As is unlikely that the proposed development will have a significant impact upon threatened fauna species, populations or their habitats.

As such, no Species Impact Statement or referral to the Commonwealth Environment Minister is required.

7.0 CONCLUSION & RECOMMENDATIONS

7.1 Threatened Ecological Communities

The four (4) canopy trees within the site that are components of the Cumberland Plains Woodland are remnant trees over an area cleared for urban development. As there is no indigenous ground stratum remaining within the site, the vegetation does not meet the legal definition of the Cumberland Plains Woodland.

The Five Part Test in Appendices 6.1 has determined that the proposed activity is unlikely to have a significant impact upon the remnant of Cumberland Plains Woodland within the site

7.2 Threatened Flora Species

A total of 105 flora species were detected within the study area (12 locally indigenous and 93 introduced ornamental and native species), and a list of these is included as Appendices 10.3.1.

Eleven (11) threatened flora species have been recorded within 5-kilometers of the site and a list of these is provided in Appendices 9.4.2

These species were not detected within the site, and they are considered unlikely to occur due to past clearing activities and current land use. The Threatened Species Assessment in Appendices 5.1 of this report determined that the proposed activity is unlikely to have a significant impact upon these species. As such, no further assessment is considered necessary

7.3 Threatened Fauna Species

Thirteen fauna species were detected in the study area (9 indigenous and 2 introduced) and a list of these is included as Appendices 10.3.2.

Thirty-four (34) threatened fauna species have been recorded within a 5km radius of the site, and potential habitat is available for eleven (11) of these in the Study Area. These are recorded in Appendices 9.4.2

The Threatened Species Assessment in Appendices 5.2 of this report determined that the proposed activity is unlikely to have a significant impact upon these species. As such, no further assessment is considered necessary

If you require any further information, please feel free to contact me on 02 4757 1641.

Lawrie Smith,
Ecological Consultant

8.0 SITE PHOTOS



Plate 1 – showing tree on No. No. 40 Evans Street, viewed from the west



Plate 2 – showing tree on No. No. 40 Evans Street, viewed from the east



Plate 3 – showing old swimming pool, viewed from the north



Plate 4 – showing ornamental garden borders, viewed from the north



Plate 5 – showing swimming pool, viewed from the north



Plate 6 – showing swimming pool, viewed from the east



Plate 7 – showing example of sandstone paving and features



Plate 8 – showing leaf litter and bark in tennis court

9.0 REFERENCES

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10.0 APPENDICES

Appendices 1: Qualifications & Experience of Author

QUALIFICATIONS

- Diploma in Conservation & Land Management, 2005.
- Advanced Diploma in Arboriculture 2002
- Certificate in Horticulture, 1987.

WORK EXPERIENCE

- Flora & fauna surveys of the Blue Mountains
- Flora & fauna surveys of the Cumberland Plain in Western Sydney
- Flora & fauna surveys of the Blue Gum High Forest in Northern Sydney
- Flora & fauna surveys in Ku-ring-gai National Park
- Flora surveys of the Illawarra Escarpment
- Flora surveys of Alpine Herbfields in the Australian Alps

ADDITIONAL TRAINING

- Ecological Consultants Association (ECA) Conference, Bowral 2016
- Niche Wildlife School Frog & Bat, Identification & Management, 2015
- ECA (Ecological Consultants Association) Conference Leura 2013
- ECA Conference, W'gong 2012
- Micro Bat Survey Workshop, Jenolan Caves 2012
- ECA Conference, Gosford 2011
- ECE Reptile Survey Workshop, Bundeena 2011
- ECA Frog & Tadpole Survey Workshop, Smiths Lake 2010
- ECA Conference, Mt Annan 2010
- ECA Eucalyptus Identification Workshop (2010)
- ECA Tree Hollow Workshop, Kioloa 2010.
- ECA Conference, Newcastle 2009
- ECA Fauna Survey Workshop, Smiths Lake 2008
- ECA Conference, Manly 2008
- BMCC Swampcare Workshop – Monitoring Techniques for B/M Water Skink & Giant Dragon-fly in Upland Swamps 2007
- BMCC Swampcare Workshop – Soft Engineering Techniques to Rehabilitate Upland Swamps 2007
- BMCC Swampcare Workshop – Swamp Vegetation of the Blue Mountains Swamps 2007
- BMCC Swampcare Workshop – Identification of Sedges in Upland Swamps 2007
- Sedges of the Sydney Region Identification Workshop, Katoomba 2004
- Grasses of the Blue Mountains Identification Workshop, Katoomba 2003
- Bushland Regeneration, Wentworth Falls TAFE 1998
- Grass & Sedge Identification Workshop, Wentworth Falls 1998
- Frogs of the Sydney Region Identification Workshop, Blackheath 1997

PROFESSIONAL ASSOCIATIONS

- International Society of Arboriculture (#152238)

Appendices 2: Conservation Significance Assessment

Remnants of endangered ecological communities listed under the NSW Biodiversity (2016) vary greatly in canopy condition, understorey condition, recovery potential, size and connectivity to other remnants.

To address this variability Perkins (2002) and Eco Logical Australia (2002) developed methods to empirically determine these factors and consequently the degree of ecological constraint represented by remnant vegetation. These methods have been used in the following five-step analysis with the assigned category for the site highlighted in red.

Step 1: Determine the Recovery Potential of the vegetation by reference to Table 1. The result of this is that the site vegetation has a very low recovery potential.

Current condition and land use	Past land use and disturbance	Soil Condition	Vegetation	Recovery Potential
Cleared (no woodland canopy). Includes <i>Bursaria</i> thickets in grassland	Recently cleared (<2 years)	Unmodified, largely natural or uncultivated.	Native dominated	High
			Exotic dominated	Moderate
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Either	Low
	Historically cleared (>2 years) and consistently managed as cleared.	Unmodified, largely natural or uncultivated.	Native dominated	Moderate
			Exotic dominated	Low
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Either	Very Low
Native Canopy present or regenerating	No recent clearing of understorey	Unmodified, largely natural or uncultivated.	Native understorey relatively intact or in advanced state of regeneration. Native dominated.	High
			Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive.	Moderate
				Exotic dominated
		Moderately modified by long term grazing or mowing.	Native dominated	Low
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive.	Very Low
			Native understorey present. Heavily weed invaded.	Low
	Understorey patchily intact	Disturbed	Native dominated	Moderate
			Exotic dominated	Low
	Recent clearing of understorey, and/or native understorey significantly structurally modified due to existing land use (eg. mowing & grazing)	Unmodified, largely natural or uncultivated.	Native dominated. If no vegetation present, assume native dominated.	High
			Exotic dominated	Moderate
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Native dominated	Low
			Exotic dominated	Very Low

Table 1: Recovery Potential (Source; Eco Logical Australia 2002)

Step 2: Determine the Canopy and Condition Code by reference to Table 2. The result of this is that the site contains ‘Scattered tree over Urban Development’.

Code	Canopy Density	Description
A	>10%	Canopy and understorey in good condition
B	<10%	Canopy thinner, some understorey
C		Not used
TX	<10%	Scattered tree overstorey over agriculture
TXr	<10%	Scattered tree overstorey over rural residential
Txu	<10%	Scattered trees over urban development.

Table 2: Canopy and Condition Code (Source Eco Logical 2002)

Step 3: The recovery potential is combined with the degree of connectivity to other remnants to determine the conservation significance by reference to Table 3. The result of this is that the Cumberland Plains Woodland within the site has a conservation significance rating of ‘Urban Remnant Trees’.

Community	Condition	Patch Size*	Connectivity*	Code	Significance rating
Critically endangered	ABC, Tx or Txr	Any	Any	C3	Core
	Txu	Any	Any	URT	Urban Remnant Trees (Critically Endangered Communities)
Not Critically Endangered	ABC	> 10 ha	Any	C1	Core
		< 10 ha	Adjacent to C3	C2	Core
			Adjacent to S1	S2	Support for Core
			None	O	Other remnant vegetation
	Tx or Txr	Any	Adjacent to any Core	S1	Support for Core
			None	O	Other remnant vegetation
	Txu	Any	Any	O	Other remnant vegetation
Native grasslands in good condition	Any	Adjacent to Core or Support for Core	S3	Support for Core	

Table 4: Conservation Significance Matrix (Source; Eco Logical Australia 2002).

Step 4: The Recovery Potential is combined with the Conservation Significance Assessment in Table 4 to determine the ecological constraint of the vegetation. The result of this is that the site has a ‘Low Ecological Constraint’.

		Recovery Potential			
		High	Moderate	Low	Very Low
Conservation Significance Assessment	Core	High	High	High	High
	Support for Core	High	Moderate	Moderate	Low
	Other	Moderate	Moderate	Low	Low

Table 5: Ecological Constraint Matrix Part 1 (Source; Eco Logical Australia 2002)

Step 5: This combines the Ecological Constraint of the site vegetation in Table 5 with the potential for Threatened Species to utilise the site. This found that threatened species have a moderate potential to utilise habitat provided on the site.

		Combined Recovery Potential & Local Conservation Significance		
		High	Moderate	Low
Threatened Species Assessment	Known to occur	High	High	High
	Likely to occur	High	Moderate	Moderate
	Unlikely to occur	High	Moderate	Low

Table 6: Ecological Constraints Matrix Part 2 (Source; Eco Logical Australia, 2002)

Appendices 3.0: Fauna & Fauna Survey

Appendices 3.1 Flora Survey

KEY; Black text – denotes a local indigenous specie
 * – denotes a diagnostic species of the CPW
 Red text – denotes an introduced species

TREE STRATUM

<i>Acer saccharinum</i>	Sugar Maple
<i>Acmena smithii</i>	Lilly Pilly
<i>Casaurina cunninghamiana</i>	River She-oak
<i>Cinnamomum camphora</i>	Camphor Laurel
<i>Corymbia citriodora</i>	Lemon -scented Gum
<i>Cupressus sempervirens</i>	Italian Cypress
<i>Cupressocyparis leylandii</i>	Leyland Cypress
<i>Eucalyptus moluccana</i> *	Grey Box
<i>Eucalyptus sideroxylon</i>	Red Ironbark
<i>Gleditsia triacanthos</i>	Honey Locust
<i>Grevilia robusta</i>	Silky Oak
<i>Jacaranda mimosifolia</i>	Jacaranda
<i>Liquidambar styraciflua</i>	Liquidamber
<i>Lophostemon conferta</i>	Brushbox
<i>Macadamia integrifolia</i>	Macadamia
<i>Melaleuca decora</i> *	Cloud Tree
<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark

SMALL TREE STRATUM

<i>Acer palmatum</i>	Willow Myrtle
<i>Agonis flexuosa</i>	Irish Strawberry Tree
<i>Arbutus unedo</i>	Alexander Palm
<i>Archontophoenix alexandrae</i>	Butterfly Tree
<i>Bauhinia variegata</i>	Churnwood
<i>Ehretia acuminata var. pyrifolia</i>	Crepe Myrtle
<i>Lagerstroemia indica</i>	Norfolk Island Hibiscus
<i>Lagunaria patersonia</i>	Broad-leaved Privet
<i>Ligustrum lucidum</i>	Mulberry
<i>Morus nigra</i>	Southern Magnolia
<i>Magnolia grandiflora</i>	Tulip Magnolia
<i>Magnolia soulangiana</i>	Canary Island Date Palm
<i>Phoenix canariensis</i>	Photinia
<i>Photinia robusta</i>	Queensland Umbrella Tree
<i>Schefflera actinophylla</i>	Cocos Palm
<i>Syagrus romanzoffiana</i>	

SHRUB STRATUM

<i>Agave</i>	Mistletoe
<i>Amyema miquielli</i>	Japanese Box
<i>Buxus microphylla</i>	Japanese Camelia
<i>Camellia japonica</i>	Sasanqua
<i>Camellia sasanqua</i>	Slender Palm Lily
<i>Cordyline stricta</i>	Cotoneaster
<i>Cotoneaster</i>	Euryops
<i>Euryops pectinatus</i>	

<i>Ficus pumila</i>	Creeping Fig
<i>Gardenia</i>	Gardenia
<i>Geranium sp</i>	Zonal Geranium
<i>Hibiscus hybrid</i>	Hibiscus
<i>Juniperus procumbens</i>	Garden Juniper
<i>Ligustrum sinense</i>	Small-leaved Privet
<i>Mahonia aquifolium</i>	Holly-leaved Burberry
<i>Monstera delicosous</i>	Fruit Salad Plant
<i>Murraya paniculata</i>	Mock Orange
<i>Nandina domestica</i>	Sacred Bamboo
<i>Nandina domestica Nana</i>	Dwarf Sacred Bamboo
<i>Ochna serrata</i>	Mickey Mouse Plant
<i>Pandorea pandorana</i>	Wonga Vine
<i>Passiflora edulis</i>	Passionfruit
<i>Phoenix roebelenii,</i>	Dwarf Date Palm
<i>Plumbago auriculata</i>	Blue Plumbago
<i>Plumeria rubra</i>	Frangipani
<i>Pyrostegia venusta</i>	Flame Vine
<i>Rhododendron</i>	Azalea
<i>Rosea sp</i>	Rose
<i>Strelitzia nicolai</i>	Giant Bird of Paradise
<i>Strelitzia reginea</i>	Bird of Paradise
<i>Viburnum tinus</i>	Laurestine
<i>Vitis vinifera</i>	Grape Vine
<i>Wisteria floribunda</i>	Wisteria
Unidentified Apocynaceae shrub (see Plate 9)	

GROUND STRATUM

<i>Agapanthus praecox</i>	Agapanthus
<i>Asparagus densiflorus</i>	Foxtail fern
<i>Aspidistra elatior</i>	Cast Iron Plant
<i>Asplenium nidus</i>	Birds Nest Fern
<i>Bouteloua dactyloides</i>	Buffalo Grass
<i>Bromelia sp</i>	Bromelia
<i>Calathea sp</i>	White Fusion
<i>Chlorophytum comosum</i>	Spider Plant
<i>Clivea miniata</i>	Clivea
<i>Commelina cyanea*</i>	Scurvy Weed
<i>Conyza bonariensis</i>	Flax-leaved Fleabane
<i>Dichondra repens*</i>	Kidney Weed
<i>Dietes bicolour</i>	Dietes
<i>Euphorbia peplum</i>	Petty Spurge
<i>Hedra helix</i>	English Ivy
<i>Hyacinthoides sp</i>	Blue Bells
<i>Hypochaeris radicata</i>	Catsear
<i>Modolina caroliniana</i>	Carolina Mallow
<i>Narcissus sp</i>	Daffodils
<i>Nephrolepis</i>	Fishbone Fern
<i>Ophiopogon japonicus</i>	Mondo Grass
<i>Oxalis perennans*</i>	Yellow Wood Sorrel
<i>Pennisetum clandestinum</i>	Kikuyu
<i>Plantago lanceolata</i>	Common Plantain
<i>Solivia pterosperma</i>	Bindi
<i>Sonchus oleraceus</i>	Common Sow-thistle
<i>Spirodela sp</i>	Duck Weed
<i>Spathiphyllum sp</i>	Peace Lily

Stellaria media
Trachelospermum jasminoides
Tradescantia albifolia
*Veronica plebeia**
Vinca minor
Unidentified ground cover (see Plate 10)

Chickweed
Variegated Star Jasmine
Wandering Jew
Creeping Speedwell
Periwinkle



Plate 9 – showing unidentified ornamental shrub



Plate 10 – showing unidentified ornamental ground cover

Appendices 3.2**Fauna Survey**

KEY; **Bold** – denotes an threatened or endangered species

* – denotes an introduced species

Observations S – Seen or heard within site,
 A – Seen or heard within adjacent areas
 D – Seen or heard from a distance

BIRDS

Scientific Name	Common Name	Seen	Heard	Other
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	A	S/A/D	
<i>Acridotheres tristis</i> *	Common Myna			
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	A	S/A/D	
<i>Corvus coroniodes</i>	Australian Raven			
<i>Cracticus torquatus</i>	Grey Butcherbird	S	A/D	
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	S/A	S/A/D	
<i>Gymnorhina tibicen</i>	Australian Magpie	A	A	
<i>Manorina melanocephala</i>	Noisy Miner			
<i>Strepera graculina</i>	Pied Currawong		A/D	
<i>Streptopelia senegalensis</i> *	Spotted Turtledove			
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet			

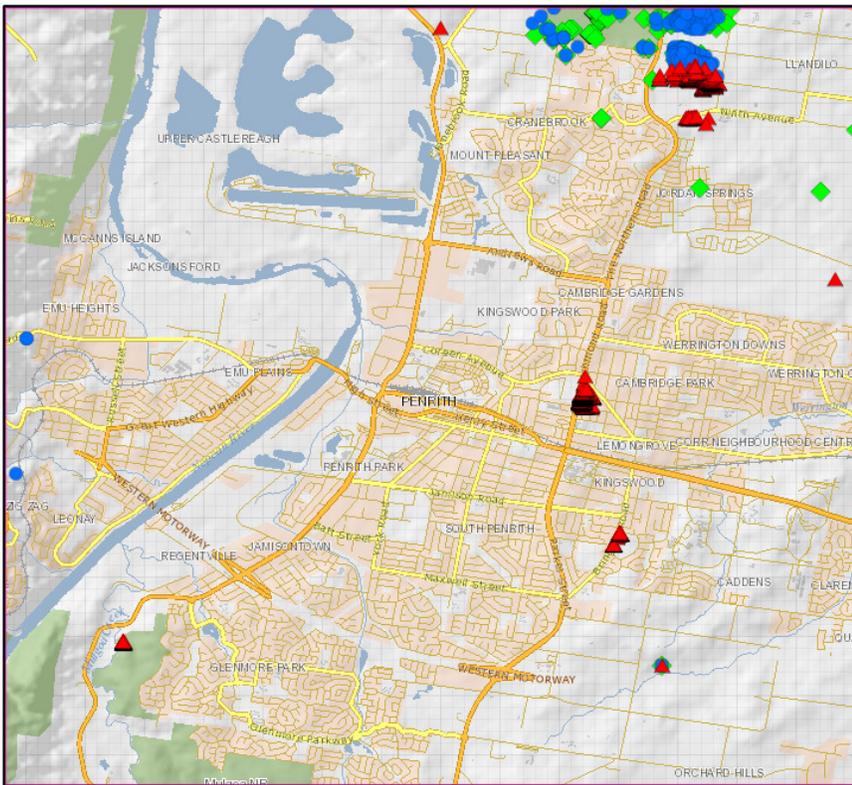
REPTILES

Scientific Name	Common Name	Seen	Heard	Other
<i>Lampropholis</i>		S		
<i>Lampropholis</i>		S		

Appendices 4.0: Threatened Biodiversity Recorded in Local Area

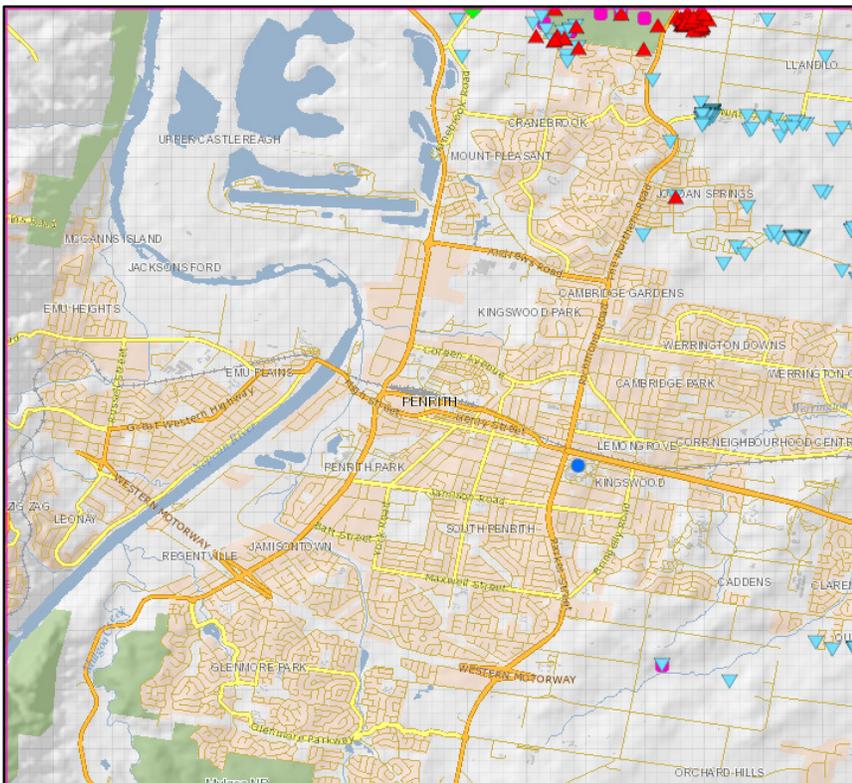
4.1 – Threatened Flora Species

Scientific Name	TSA Act	EPBC Act	Local Records	Key Habitat Requirements	Potential Habitat in Study Area	Species Observed in Study Area
<i>Acacia bynoeana</i> Bynoe's Wattle	E1	V	1	Endemic to Sydney area, recorded in small populations between Morisset, Hilltop, W'gong and W'worth Falls. It grows in sandy soils often containing ironstone gravels, in open forest and shrublands, usually on ridge tops.	No	No
<i>Acacia pubescens</i> Downey Wattle	V	V	1	This uncommon wattle is scattered throughout the Cumberland Plain, where it grows on clay and clay-shale soils. Local populations occur in the Blue Mountains near Woodford and Winmalee	No	No
<i>Dillwynia tenuifolia</i>	E2		176	The core distribution is the Cumberland Plain from Windsor and Penrith east to Dean Park near Colebee. Other populations in western Sydney are recorded from Voyager Point and Kemps Creek in the Liverpool LGA, Luddenham in the Penrith LGA and South Maroota in the Baulkham Hills Shire. Disjunct localities outside the Cumberland Plain include the Bulga Mountains at Yengo in the north, and Kurrajong Heights and Woodford in the Lower Blue Mountains	No	No
<i>Grevillea juniperina</i> spp <i>juniperina</i> Juniper-leaved Grevillea	V		191	Restricted to the Western Suburbs of Western Sydney around Rooty Hill, Plumpton Castlereagh NR and Pitt Town area, growing on clay-loams or sandy gravels. (AF 2004)	No	No
<i>Marsdenia viridiflora</i>	E2			Grows in vine thickets and open shale woodland but is very rare around Sydney. (AF 2004)	No	No
<i>Micromyrtus minutiflora</i>	E1	V	54	Restricted to Castlereagh/Richmond area where it grows on the clay-alluvial soils of Castlereagh Woodlands (AF 2004)	No	No
<i>Persoonia nutans</i> Nodding Geebung	E1	E	8	This species grows in lateric and alluvial soils and sand to the west and south-west of Sydney (AF 2004)	No	No
<i>Pimelea spicata</i> Spiked Rice-flower	E1	V	380	Endemic to the Central Coast of NSW where it is restricted to a few small populations on clay soils derived from Wianamatta Shale in Western Sydney (AF 2004).	No	No
<i>Pterostylis saxicola</i> Sydney Plains Greenhood	E1		1	Commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelved above cliff lines, usually associated with sclerophyll Forest & Woodland on shale/sandstone transitional soils or shale soils (DEC 2005)	No	No
<i>Pultenaea parvifolia</i>	E1	V	218	Endemic to Western Sydney where it grows chiefly between Penrith and Wilberforce in woodland on heavier clay soils derived from Wianamatta shale, or on tertiary alluvium. (AF 2004)	No	No
<i>Syzygium paniculatum</i> Magenta Lilly Pilly	E1	V	1	A small tree preferring moist deep sand of old sand dunes in rainforest and sandy floodplains of creeks with rainforest remnants. It is widely cultivated and planted as a street tree (Fairly 2004)	No	No

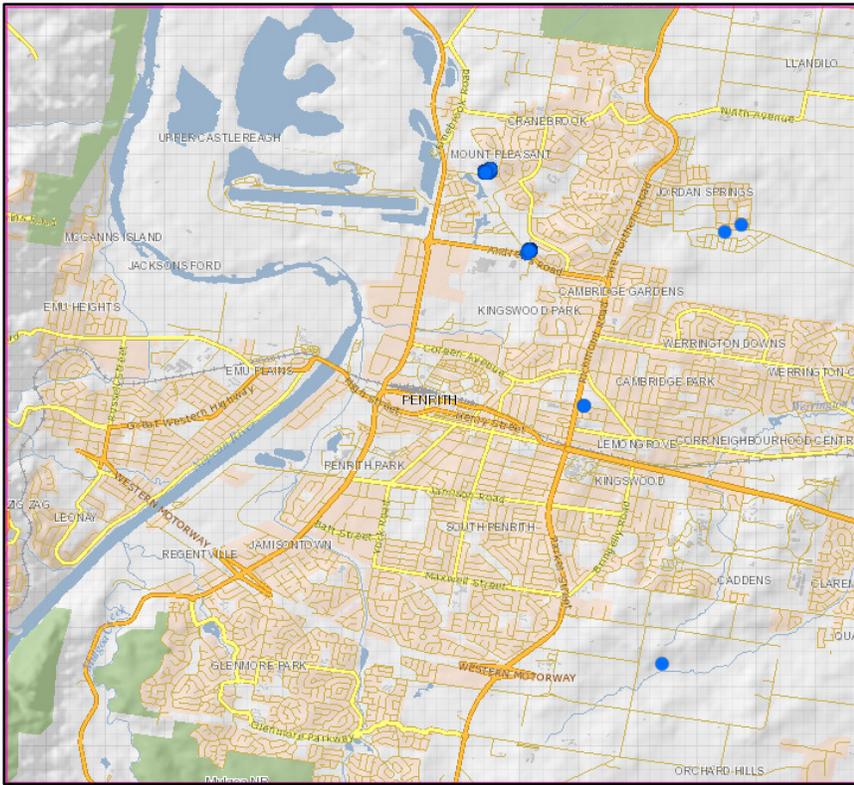


Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas

- Dillwynia tenuifolia
- Pultenaea parviflora
- Bynoe's Wattle (Acacia bynoeana)
- Downy Wattle (Acacia pubescens)



- Micromyrtus minutiflora
- Magenta Lilly Pilly (Syzygium paniculatum)
- Sydney Plains Greenhood (Pterostylis saxicola)
- Juniper-leaved Grevillea (Grevillea juniperina subsp. juniperina)
- Nodding Geebung (Persoonia nutans)



Spiked Rice-flower (*Pimelea spicata*)



4.2 – Threatened Fauna Species

Scientific Name	TSA Act	EPBC Act	Local Records	Key Habitat Requirements	Potential Habitat in Study Area	Species Observed in Study Area
<i>Artamus cyanopterus cyanopterus</i> Dusky Woodswallow	V	N/A	4	Widespread from coast to inland of NSW, including the western slopes of the Great Dividing Range and farther west. Despite records showing a wide distribution and occurrence in a variety of habitats, it is considered to be a woodland dependent bird. Due to its foraging mode, it has been classified as an aerial insectivore, primarily feeding on invertebrates, mainly insects, which are captured whilst hovering and sallying above the canopy or over water. The nest is an open shallow untidy cup frequently in an open hollow, crevice or stump. Although they have large home ranges, individuals may spend most of their time in about a 2-ha range and defend an area about 50m around the nest	No	No
<i>Botaurus poiciloptilus</i> Australian Bittern	V	E	1	Freshwater wetland habitats, with a widespread but uncommon range over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bulrushes (<i>Typha</i> spp.) and spike rushes (<i>Eleocharis</i> spp.) DEC 2005	No	No
<i>Calyptorhynchus lathami</i> Glossy Black-Cockatoo	V		3	Inhabits forests & woodlands on sites with low-soil nutrient status, reflecting the distribution of <i>Allocasuarina</i> spp. It feeds exclusively on their cones and requires tree hollows for nesting.	No	No
<i>Chthonicola sagittata</i> Speckled Warbler	V		6	A wide range of Eucalyptus dominated communities with a grassy understory, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some Eucalypt regrowth, and an open canopy. Nests located in small burrows or the base of a low, dense plant, often among fallen branches. Forages in ground litter around tussocks and under bushes and trees for seeds and insects, often accompanies mixed feeding flocks in winter, particularly thornbills (DEC 2005)	No	No
<i>Circus assimilis</i> Spotted Harrier	V	N/A	1	Occurs in grassy open woodland including Acacia and Mallee remnants, inland riparian woodland, grassland, and scrub steppe. It is und mostly in native grasslands, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Preys on small terrestrial mammals, birds and reptiles, occasionally insects and carrion. Breeds in spring & sometimes autumn, builds a stick nest in a tree.	No	No
<i>Daphoenositta chrysoptera</i> Varied Sittella	V	N/A	14	Inhabits Eucalypt forests and woodlands, especially rough barked species and mature smooth barked gums with dead branches, mallet, and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. Cup shaped nests made of plant fibres in an upright tree fork high in the living tree canopy (DEC 2009)	Marginal foraging	No
<i>Glossopsitta pusilla</i> Little Lorikeet	V		3	Distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Forages primarily in the canopy of open Eucalyptus forests and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity (OEH 2017).	Marginal foraging	No

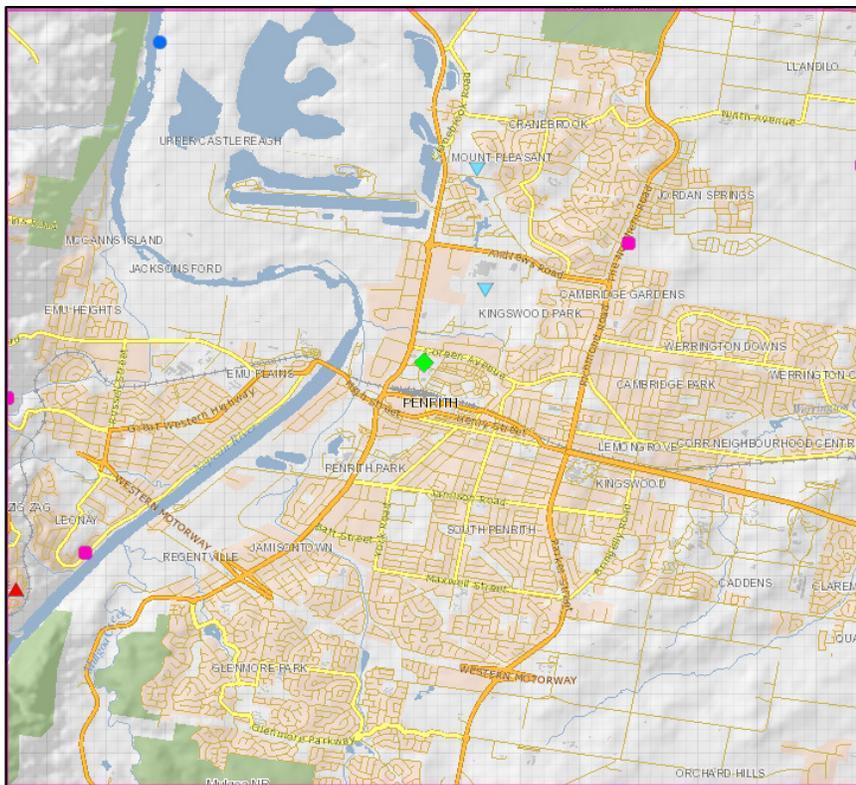
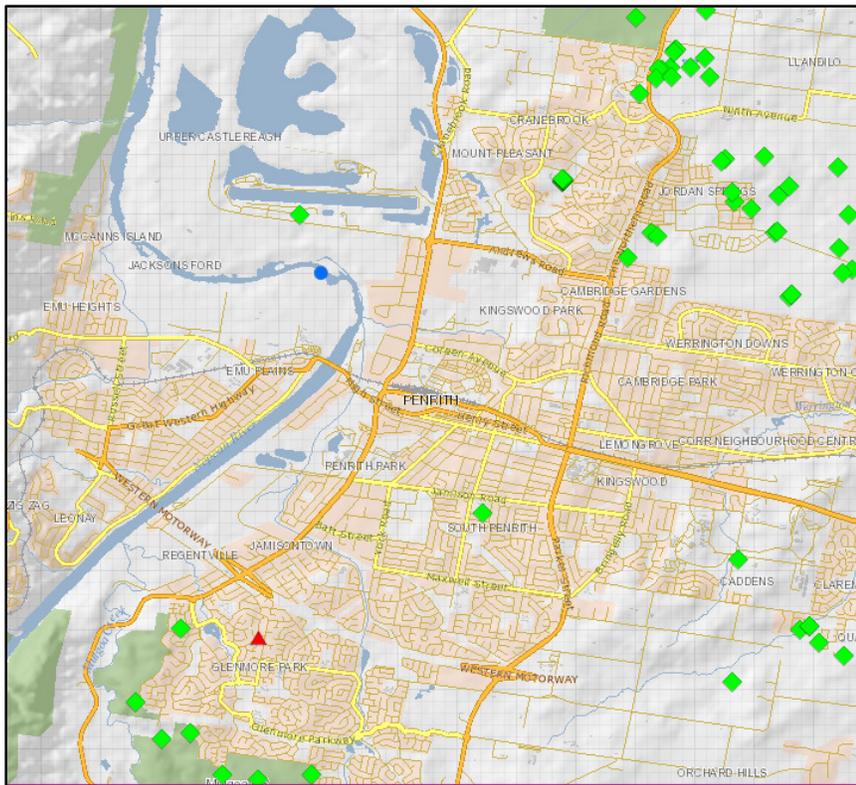
Scientific Name	TSA Act	EPBC Act	Local Records	Key Habitat Requirements	Potential Habitat in Study Area	Species Observed in Study Area
<i>Haliaeetus leucogaster</i> White-bellied Sea Eagle	E1	C, J, K	1	The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	No	No
<i>Heiraaetus morphnoides</i> Little Eagle	V		2	Occupies open forest, woodland, or open woodland. Sheoaks or Acacia woodlands and Riparian woodlands of interior NSW are also used. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion. Nests in tall living trees within a remnant patch, where pairs build a large stick nest (DEC 2005)	No	No
<i>Hirundapus caudacutus</i> White-throated Needle tail	N/A	V,C, J,K	1	Non-breeding migrants to Eastern and Northern Australia, arriving from their breeding grounds in the northern hemisphere in October each year and leaving between May and August. Almost exclusively an aerial species that range over a wide variety of habitats. Birds will roost in trees, and radio-tracking has since confirmed that this is a regular activity. Feeds on flying insects, such as termites, ants, beetles and flies. It catches the insects in flight in their wide beaks. Birds usually feed in rising thermal currents associated with storm fronts and bushfires and they are commonly seen moving with wind fronts.	No	No
<i>Lathamus discolor</i> Swift Parrot	E1	E	15	Winter migrant from Tasmania, feeding mainly on winter flowering Eucalypts in the Sydney region	No	No
<i>Lophoictinia isura</i> Square-tailed Kite	V	N/A	4	In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100km ² . Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	No	No
<i>Ninox connivens</i> Barking Owl	V	N/A	1	Occurs in forests and woodlands, usually on fertile soil, where it feeds on mammals, including large rabbits, and birds up to the size of a magpie. It is dependent on old Eucalypt trees with large hollows for roosting and nesting.	No	No
<i>Ninox strenua</i> Powerful Owl	V	N/A	10	Occurs in forests and woodlands where it feeds primarily on arboreal mammals (gliders and possums). Nests in trees with hollows at least 50cm deep	No	No
<i>Petroica phoenicea</i> Flame Robin	V	N/A	3	In NSW, this species breeds in upland areas and in winter, many birds move to the inland slopes and plains. Breeding habitat - open cuplike nests in sheltered habitat in tall open forest and grassy woodland. Forages on flying insects in forest, woodland and grassland (DEC 2005)	No	No
<i>Tyto novaehollandiae</i> Masked Owl	V	-	9	Occurs in forest and woodland and treeless areas where suitable caves are available for shelter. It ranges over an area of between 500 - 1000 ha where it feeds on small mammals, small birds, insects and young rabbits. It prefers sites with high a density of tree hollows for nesting with a grassy understorey.	No	No

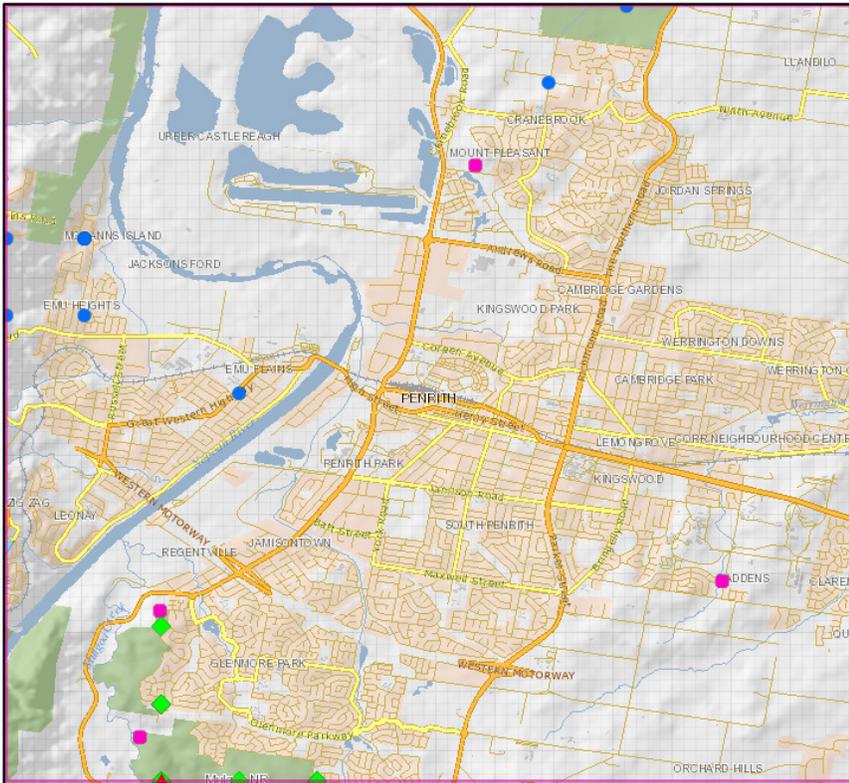
Scientific Name	TSA Act	EPBC Act	Local Records	Key Habitat Requirements	Potential Habitat in Study Area	Species Observed in Study Area
<i>Tyto tenbricosa</i> Sooty Owl	V		2	Occurs in forest and woodland and treeless areas where suitable caves are available for shelter. It ranges over an area of between 500 - 1000 ha where it feeds on small mammals, small birds, insects and young rabbits. It prefers sites with high a density of tree hollows for nesting with a grassy understorey. The only record of the species in the BM is one seen in Blue Gum Swamp, Winnalee in 1981	No	No
<i>Stagonopleura guttata</i> Diamond Firetail	V		1	Widely distributed throughout NSW, with a concentration of records from the Northern, Central & Southern Tablelands. Occurs in grassy Eucalyptus woodlands, riparian areas and sometimes lightly wooded farms. Feeds exclusively on the ground, on ripe or partially ripe grass & herb seeds, green leaves and insects. Nests are globular structures built in the shrubby understorey, or higher up, especially under hawk's or raven's nests (DEC 2005)	No	No
<i>Stictonetta naevosa</i> Freckled Duck	V		2	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds (DEC 2005).	No	No

Scientific Name	TSA Act	EPBC Act	Local Records	Key Habitat Requirements	Potential Habitat in Study Area	Species Observed in Study Area
<i>Litoria aurea</i> Green & Gold Bell Frog	E1	V	2	The Green and Golden Bell Frog inhabit marshes, dams and stream sides, particularly those containing bulrushes or spike rushes. Optimum habitat includes water bodies which are unshaded, free of predatory fish, have a grassy area nearby and diurnal sheltering sites such as vegetation and/or rocks	No	No

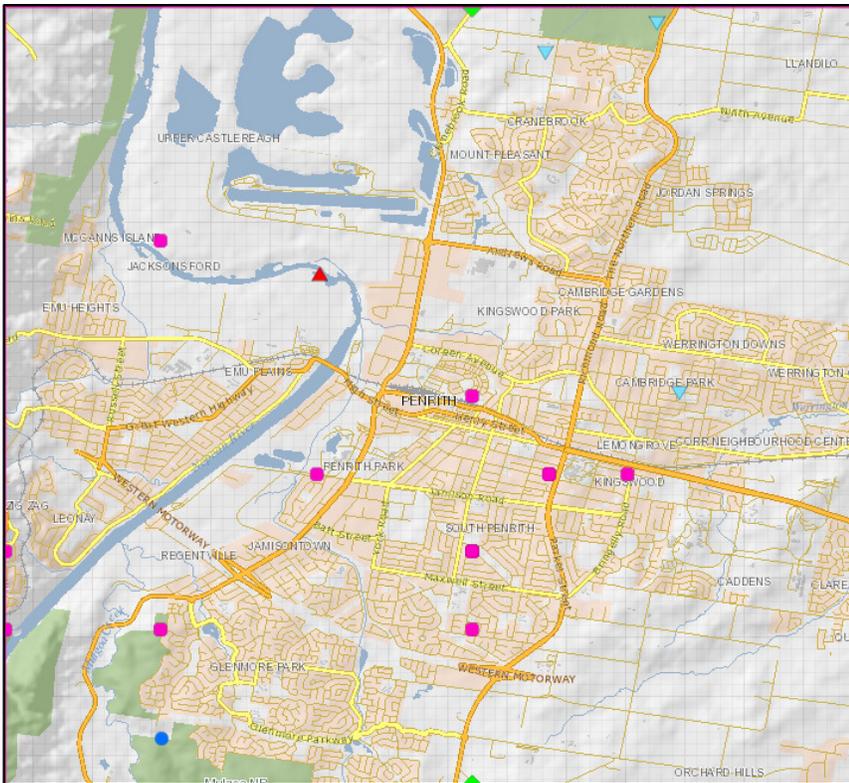
Scientific Name	5	EPBC Act	Local Records	Key Habitat Requirements	Potential Habitat in Study Area	Species Observed in Study Area
<i>Meridolum corneovirens</i> Cumberland Land Snail	E1		61	The Cumberland Land Snail occurs within the Cumberland Plain region of Western Sydney. It is restricted to the fringes of the River Flat Forest. Typically occurs under logs and other debris, amongst leaf and bark litter beneath trees and sometimes under grass clumps.	Yes	No
<i>Pommerhelix duralensis</i> Dural Land Snail	E1	E	1	The species occurs in low densities along the western and northwest fringes of the Cumberland Plain on shale-sandstone transitional landscapes. It has a strong affinity for communities in the interface region between shale-derived and sandstone-derived soils, with forested habitats that have good native cover and woody debris (OEH 2019).	No	No

Scientific Name	TSA Act	EPBC Act	Local Records	Key Habitat Requirements	Potential Habitat in Study Area	Species Observed in Study Area
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	V	V	9	Well-timbered areas with rocky outcrops and gullies. Roosts in caves (near entrances), crevices in cliffs, old mine workings and the disused mud nests of Fairy Martins. Probably forages for small, flying insects below the forest canopy.	No	No
<i>Dasyurus maculatus</i> Spotted Tiger Quoll	V	E	3	Forests, woodlands, heath and rainforests. Requires den sites in hollow logs, tree cavities, rock outcrops or caves. Large areas of relatively intact vegetation to forage for birds, small mammals, and reptiles	No	No
<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	V		6	Occurs in forests and woodlands, preferring gullies and highland areas to 1500m where it forages on insects above or just below the tree canopy. Roosts in tree hollows, caves and abandoned buildings.	Foraging	No
<i>Miniopterus australis</i> Little Bent Wing Bat	V		1	East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. 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.	Foraging	No
<i>Miniopterus schreibersii oceanensis</i> Eastern Bent Wing Bat	V		31	Primary roosting habitat is caves, but also known to use derelict mines, stormwater tunnels and building etc. Forages in forested areas, catching moths and other flying insects above treetops	Foraging	No
<i>Myotis macropus</i> Large-footed Myotis	V		18	Habitat includes forests, mangroves, paperbark swamps, woodlands and rainforest near slow flowing creeks, lakes and estuaries. Feeds on insects, aquatic insects and small fish. Roost close to fresh water in caves, tunnels, buildings, tree hollows and dense vegetation.	No	No
<i>Petaurus australis</i> Yellow-bellied Glider	V		1	Restricted to tall mature forests in areas of high rainfall. It requires winter flowering Eucalypts & other plants that provide edible sap and nectar throughout the year. Roosts and nests in suitable cavities in tall mature Eucalypts	No	No
<i>Petaurus norfolcensis</i> Squirrel Glider	V		4	Occurs in forests & woodlands on fertile soils where it feeds on nectar, pollen, Eucalypt sap & Acacia gum and insects. It roosts and nests in tree hollows.	No	No
<i>Phascolarctos cinereus</i> Koala	V		5	Eucalypt forests and woodlands where they browse on the foliage of specific Eucalyptus feed trees.	No	No
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	V	V	251	A highly mobile species that can range over an extensive area where it feeds on a various Eucalypt nectar & blossom and on native and introduced fruits.	Foraging	No
<i>Scoteanax rueppellii</i> Greater Broad Nosed Bat	V		19	Rainforests, forests, woodlands & moist gullies below 800m. Feeds on insects. Roosts in tree hollows	Foraging	No

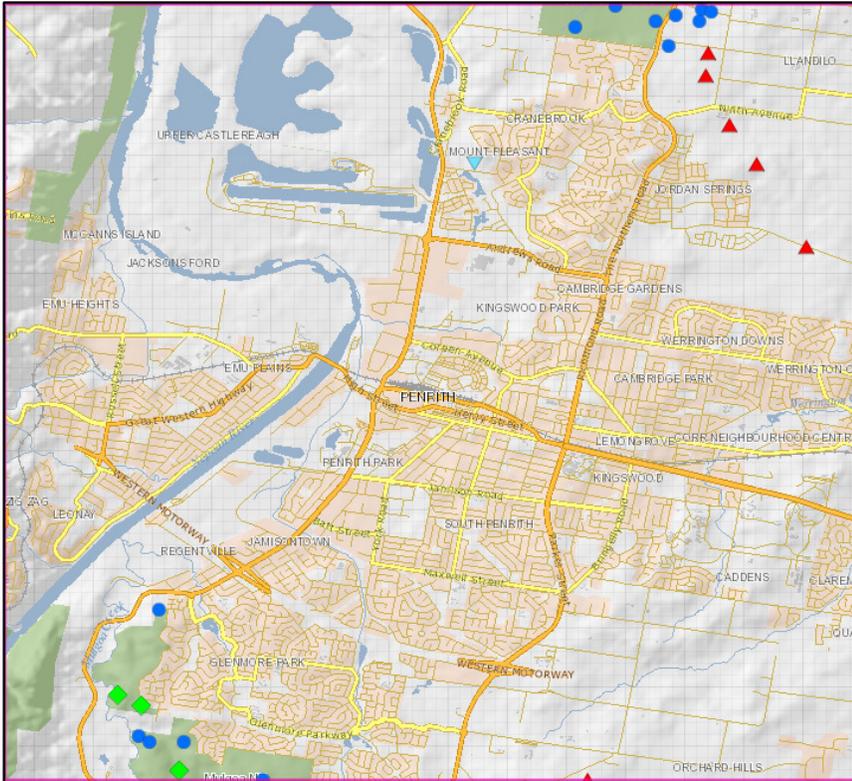




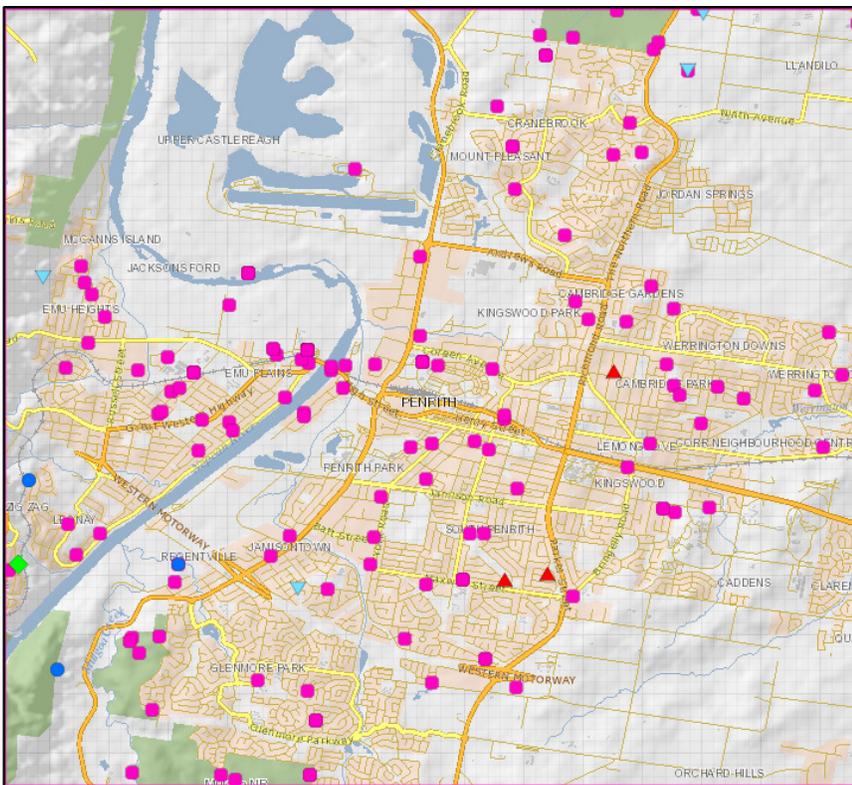
- ^^Barking Owl (*Ninox connivens*)
- ^^Powerful Owl (*Ninox strenua*)
- ^^Masked Owl (*Tyto novaehollandiae*)
- ^^Sooty Owl (*Tyto tenebricosa*)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)



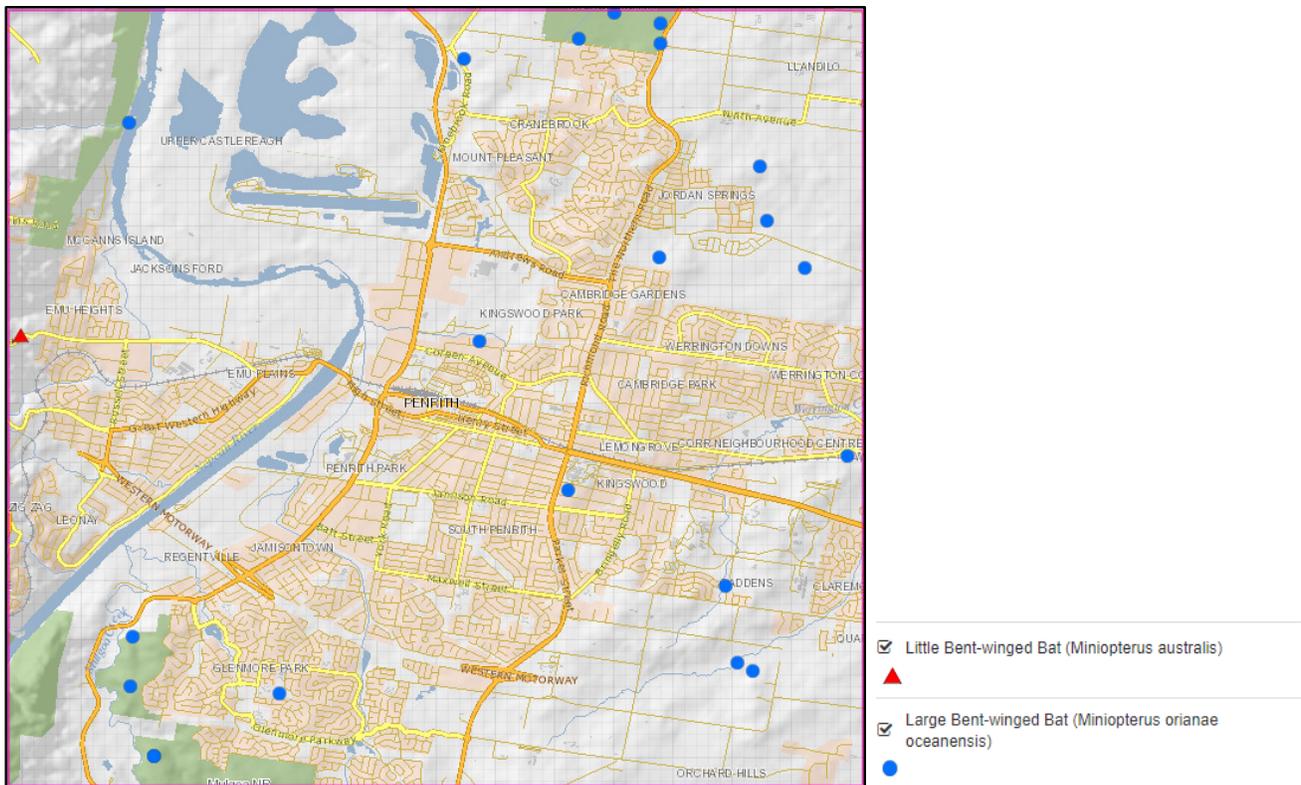
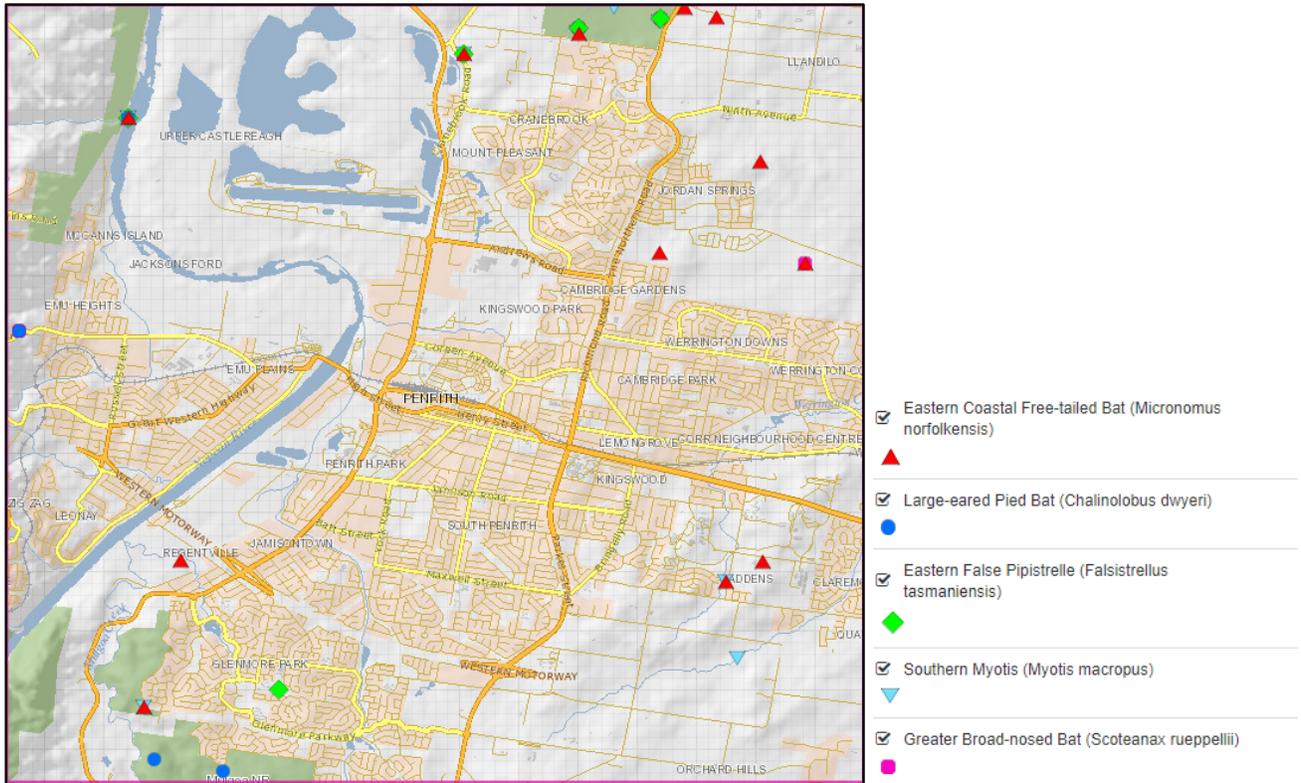
- Freckled Duck (*Stictonetta naevosa*)
- Australasian Bittern (*Botaurus poiciloptilus*)
- ^Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
- Little Lorikeet (*Glossopsitta pusilla*)
- ^^Swift Parrot (*Lathamus discolor*)



- Speckled Warbler (*Chthonicola sagittata*)
- Varied Sittella (*Daphoenositta chrysoptera*)
- Flame Robin (*Petroica phoenicea*)
- Diamond Firetail (*Stagonopleura guttata*)



- Spotted-tailed Quoll (*Dasyurus maculatus*)
- Koala (*Phascolarctos cinereus*)
- Yellow-bellied Glider (*Petaurus australis*)
- Squirrel Glider (*Petaurus norfolcensis*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)



Appendices 5.0: Threatened Biodiversity Assessment

5.1 Threatened Flora Species

Eleven (11) threatened flora species have been recorded within 5-kilometers of the site. These species were not detected within the site, and they are considered unlikely to occur due to past clearing activities and current land use.

5.2 Threatened Fauna Species

Thirty-four (34) threatened fauna species have been recorded within a 5km radius of the site, and potential habitat is available for eleven (11) of these in the Study Area.

Mammal Species: Thirteen (13) threatened mammal species have been recorded within a 5km radius of the site

- **Grey Headed Flying Fox (1):** The tree and shrub canopies within the site could provide potential foraging habitat for the Grey-headed Flying Fox. This is a highly mobile species with a very large home range extending throughout the Sydney basin and beyond. As such, the proposed tree removal would not be seen as a significant impact on this species. No further assessment is considered necessary.
- **Microbats (4):** The tree canopies could provide intermittent foraging habitat for four (4) species of microbats. These are highly mobile species and are known to forage over large areas. In addition, no important habitat features (i.e., tree cavities) were detected in the study area. As large areas of similar habitat are available in the local area, the proposed development is unlikely to represent a no significant impact on these species, and no further assessment is considered necessary

Bird Species: Nineteen (19) threatened bird species have been recorded within a 5km radius of the site

- **Woodland Species (4):** The site vegetation could provide marginal foraging habitat for *Stagonopleura guttata* (Diamond Firetail), *Petroica phoenicea* (Flame Robin), *Chthonicola sagittata* (Speckled Warbler), *Daphoenositta chrysoptera* (Varied Sittella), which have all been recorded in the local area.

However, the active colony of Noisy Miners within the study area and the lack of indigenous small trees and shrubs would discourage their presence.

- *The Noisy Miner (Manoria melanocphala) is an aggressive honeyeater which is commonly found in degraded Eucalypt woodlands. It tends to exclude almost all other medium sized and small birds. In many studies, the presence of Noisy Miners in a site was found to have a far greater impact on how many birds and how many species occur, than any other factor. This was especially the case where the vegetation had been simplified by thinning of trees and grazing. Removing Noisy Miners allows other bird species to return to a site (Grey 1998). Several studies have shown that the Noisy Miner is less likely to dominate sites where there are trees and shrubs, such as Wattles and She-Oaks, in addition to Eucalypts. (Ford 2010 How Can We Reverse the Loss of Our Woodland Birds? In Temperate Woodlands Conservation and Management)*

As such, it is unlikely that any threatened woodland bird species would utilize the study area and no further assessment is considered necessary on these species.

- **Wetland Species (2):** No wetland habitat is present in the Study Area, so the Australian Bittern and Freckled Duck are unlikely to utilise the site
- **Raptors (4):** *Heiraaetus morphnoides* (Little Eagle), *Lophoictinia isura* (Square-tailed Kite), *Haliaeetus leucogaster* (White-bellied Sea Eagle) and *Circus assimillis* (Spotted Harrier) have been recorded within 5km of the site. These species are known to forage over large home ranges and the study area is unlikely to provide important foraging habitat.

These species were not detected during the survey and no large stick nests, or other important habitat were observed in the Study Area. As such, the proposed activity is unlikely have a significant impact on these species and no further assessment is considered necessary.

- **Owls (4):** *Ninox strenua* (Powerful Owl) *Ninox connivens* (Barking Owl) and *Tyto novaehollandiae* (Masked Owl) have been reported within the local area and the site could represent marginal foraging habitat for these species.

These species were not detected during the survey, and no areas of ‘whitewash’ or other signs of their presence were observed. In addition, no large tree hollows were observed within the study area. As there are large areas of similar foraging habitat in the surrounding areas, the proposed activity is unlikely have a significant impact on these species. No further assessment is considered necessary

- **Glossy-black Cockatoo (1):** Capsules on *Casuarina cunninghamiana* is not listed as an important feed tree for this species and as no chewed capsules were detected beneath their canopies, they are not currently being used as feed trees.
 - *‘Evidence of feeding on She-oak (Allocasuarina) stands by Glossy Black-cockatoos is characterised by a litter of chewed cones under individual trees. These chewed cones usually remain on the ground for several weeks to months and are a clear indication that this stand of She-oaks is an important foraging habitat for this species.’*

This species was not detected during the survey and no feed trees or suitable cavities were observed in the study area. As such, the proposed activity is unlikely have a significant impact on these species and no further assessment is considered necessary.

- **Swift Parrot (1):** Numerous records of this bird have been reported in the local area, but it is only present on mainland Australia during the winter months and there are no winter flowering Eucalypts present in the Study Area. As such, the proposed activity is unlikely have a significant impact on this specie and no further assessment is considered necessary.
- **Little Lorikeet (1):** Isolated records of this bird have been reported in the local area, and it is known to associate and feed with groups of Rainbow Lorikeets, which are a common in Western Sydney. As there are large areas of similar foraging habitat in the surrounding areas, the proposed activity is unlikely have a significant impact on these species. No further assessment is considered necessary.

This species was not detected during the survey, but Rainbow Lorikeets were observed feeding on blossom on various trees. In addition, no breeding habitat was observed. As such, the proposed activity is unlikely have a significant impact on this specie and no further assessment is considered necessary.

- **Dusky Woodswallow (1):** Isolated records of this bird have been reported within the local area and the tree canopies could represent foraging habitat. Due to its foraging mode, it has been classified as an aerial insectivore, primarily feeding on invertebrates, mainly insects, which are captured whilst hovering and sallying above the canopy or over water. They are considered a woodland specie and although they have large home ranges, individuals may spend most of their time in about a 2-ha range and defend an area about 50m around the nest

This specie was not detected during the survey, but the tree canopies could provide foraging habitat. As such, the proposed activity is unlikely have a significant impact on this specie and no further assessment is considered necessary.

- **White-throated Needle-tail (1)** Aerial, non-breeding flocks of this species are commonly seen throughout NSW feeding in rising thermals prior to thunderstorm between October and May in NSW. Birds are know to roost in trees.

This specie was not detected during the survey, and large areas of similar habitat are provided in the local area. As such, the proposed activity is unlikely have a significant impact on this specie and no further assessment is considered necessary.

Amphibians: One (1) threatened amphibian species has been recorded within a 5km radius of the site

- **Green & Gold Bell Frog (1):** The swimming pools within the Study Area could provide potential breeding habitat for *Litoria aurea* (Green & Gold Bell Frog). The main components of any Green & Gold Bell Frog habitat are appropriate vegetation and a pond. One of the pools is empty, the other is half full (see Plates 3, 5 & 6). Vegetated habitat within the second pool is represented by Duck Weed and no 'frog friendly sedges or wetland plants are available.

A survey of the pool did not reveal any tadpoles of any species, and no Bell Frog calls were detected within the site. As such, the proposed activity is unlikely to have a significant impact on this species. No further assessment is considered necessary.

Mollusks (2): Two (2) threatened amphibian species have been recorded within a 5km radius of the site

- **Cumberland Land Snail (1):** Record of this species occurs in the local area, where it is restricted to the Cumberland Plain, Castlereagh Woodlands and along the fringes of the River Flat Forest. Typically occurs under logs and other debris, amongst leaf and bark litter beneath trees and sometimes under grass clumps.

An examination of the typical areas of habitat for this species, including the root crowns of the Grey Box trees failed to detect any live snails or empty shells. Based upon this survey, it is considered unlikely that they occur within the site, and no further assessment is considered necessary

- **Dural Land Snail (1):** This species is usually restricted to the shale/sandstone transition zones. As this habitat is not provided on the site, no further assessment is considered necessary

Appendices 6.0: Five Part Test of Significance

The test of significance should be based on the footprint and the design of the development or activity. Design features targeted at minimising impacts on threatened species can only be considered if the measure has been used successfully for the target species in similar situations. Studies or literature demonstrating the success of the measure must be referenced if proposing that the measure will minimise impacts.

Measures that offset or otherwise compensate for the development or activity should not be considered in determining the degree of the effect on threatened species or ecological communities.

In determining the nature and magnitude of an impact, it is important to consider matters such as: pre-construction, construction and occupation/maintenance phases

- all on-site and off-site impacts, including location, installation, operation and maintenance of auxiliary infrastructure and fire management zones
- all direct and indirect impacts
- the frequency and duration of each known or likely impact/action
- the total impact which can be attributed to that action over the entire geographic area affected, and over time
- the sensitivity of the receiving environment
- the degree of confidence with which the impacts of the action are known and understood

All factors should be considered as well as any other information considered relevant to the test. Sources and currency of data and information are to be documented and referenced. Limitations, uncertainties and known gaps in information are also to be documented to inform the decision-maker.

Decision-making

The decision-maker will consider the data, information and reasoning provided in the test of significance and supporting information, to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

In the case of development under Part 4 of the EP&A Act, the consent authority will be the decision-maker.

In the case of an activity under Part 5 of the EP&A Act, the determining authority will be the decision-maker.

In considering the application of the test of significance, it is recommended that the decision-maker consider:

- whether the list of threatened species, ecological communities and key threatening processes considered in the assessment were comprehensive and appropriate for the site
- whether adequate justification for excluding threatened species and ecological communities from consideration was provided
- whether the potential for indirect impacts on areas of outstanding biodiversity value has been evaluated and justified
- whether both direct and indirect impacts have been considered when applying the test of significance
- whether impacts across the full project life cycle have been considered when applying the test of significance
- whether measures proposed to minimise impacts which influence the conclusion of the test of significance have been successfully implemented in similar scenarios for the relevant threatened species or ecological community
- whether the conclusions in the application of the test of significance are supported by appropriate data, information and reasoning
- the currency, relevance and reliability of data and information relied upon
- whether data gaps and other uncertainties are clearly identified or otherwise exist
- whether the test of significance has been applied in accordance with these guidelines
- the extent to which the development or activity contributes to the cumulative impacts of existing and planned developments or activities on threatened species, ecological communities, habitats, AOBVs and key threatening processes.

Application of the precautionary principle requires that a lack of scientific certainty about the potential impacts of an action does not itself justify a decision that the action is not likely to have a significant impact. If information is not available to conclusively determine that there will not be a significant impact on a threatened species or ecological community, or its habitat, then it should be assumed that a significant impact is likely.

Where a significant effect is determined to be likely an applicant for development consent under Part 4 of the EP&A Act is required to prepare a BDAR.

6.1 Five Part Test on the Cumberland Plains Woodland

(1) Adverse effects on the life cycle of a species

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

[BC Act section 7(1)(a)]

Context

This factor refers to those species listed on Part 1, Part 2 and Part 3 of Schedule 1 to the BC Act.

Interpretation of key terms used in this factor

Life cycle: the series or stages of reproduction, growth, development, ageing and death of an organism.

Viable: the capacity to successfully complete each stage of the life cycle under normal conditions.

Local population: the population that occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area, according to the following definitions:

- The *local population* of a threatened *plant* species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.
- The *local population* of *resident fauna* species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.
- The *local population* of *migratory or nomadic fauna* species comprises those individuals that are likely to occur in the study area from time to time or return year to year.

In cases where multiple populations occur in the study area, each population should be assessed separately.

Risk of extinction: the likelihood that the local population will become extinct either in the short term *or* in the long term as a result of direct or indirect impacts on the viability of that population.

Application

The key assessment is risk of extinction of the local population. The risk of extinction will increase if any factor operates to reduce population size or reproductive success. The components of the life cycle of a species are dependent on its habitat and affected by threats to the species. The removal or modification of habitat or changes to the nature of important periodic disturbances such as fire or flood may affect the survival of that species. Therefore, it is important that the applicant/proponent not only has an understanding of the species' life cycle, but also an understanding of the way in which a species makes use of its habitat, the way this may change at particular times or in certain seasonal conditions, and whether the life cycle is dependent on a particular disturbance.

Demonstrating that a population is not viable would require considerable effort and study. Therefore, any known or presumed local population should be assumed viable unless the contrary can be conclusively demonstrated through analysis of local ecological information, records, references and knowledge of species' behaviour and habitat, or through a comprehensive on-site ecological study.

- **Response:** This question is not relevant to a threatened Ecological Community

(2) Adverse effects on ecological communities

In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity.

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

(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 [BC Act section 7(1)(b)]

Context

This factor applies to endangered ecological communities and critically endangered ecological communities listed under Part 1 and Part 2 of Schedule 2 to the BC Act. Endangered and critically endangered ecological communities are defined in determinations made by the Scientific Committee. It is important to note that the size or age of a remnant are not determining factors as to whether that remnant constitutes a listed endangered or critically endangered ecological community.

Ecological communities are usually defined by two major components – the geographical distribution and the species composition, which influences the physical structure and ecological function of the ecological community. The relative importance of the geographical distribution and the species composition varies according to the specific listed ecological community. Hence this factor provides for consideration of two criteria:

- (i) local occurrence of the ecological community
- (ii) modification of the ecological community's composition

Other features, such as geology, may also play an important role in defining a threatened ecological community. It is important to refer to the determination by the Scientific Committee and supporting guidance when identifying the local occurrence of a threatened ecological community.

Interpretation of key terms used in this factor

Local occurrence: the ecological community that occurs within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.

Risk of extinction: similar to the meaning set out in factor (a), this is the likelihood that the local occurrence of the ecological community will become extinct either in the short term *or* in the long term as a result of direct or indirect impacts on the ecological community, and includes changes to ecological function.

Composition: both the plant and animal species present, and the physical structure of the ecological community. Note that while many ecological communities are identified primarily by their vascular plant composition, an ecological community consists of all plants and animals as defined under the BC Act that occur in that ecological community.

Application

Determining the risk of extinction of an ecological community is difficult. Critical thresholds of remnant size, and species and structural composition required to maintain ecological functioning will vary from ecological community to ecological community.

When evaluating the significance of the impact, consideration must be given to whether the life cycles of the species which make up the ecological community will be disrupted in a similar manner to the consideration of individual species described in factor (a).

Disproportionate impacts may occur on certain components of the community that may cause those components to be placed at a greater risk of extinction without explicitly placing the entire ecological community at risk. Loss of individual species from a community may simplify faunal, floristic or vegetation structure and have flow-on effects to other plant and animal species. This may increase the ecological community's susceptibility to extreme events and decrease its resilience.

An assessment of ecological functioning is critical to analysing the risk the development/activity poses to the persistence of the local occurrence of the ecological community.

Response: The proposed activity is unlikely to have an adverse effect on the extent of the remnant Cumberland Plains Woodland and is unlikely to substantially or adversely modify the composition such that its local occurrence is likely to be placed at risk of extinction

(3) Adverse effects on habitats

In relation to the habitat of a threatened species or ecological community:

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

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

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality [BC Act section 7(1)(c)]

Interpretation of key terms used in this factor

Habitat: the area occupied or used, including areas periodically or occasionally occupied or used, by any threatened species or ecological community and includes all the different aspects (both biotic and abiotic) used by species during the different stages of their life cycles.

Extent: the physical area removed and/or the compositional components of the habitat and the degree to which each is affected.

Importance: related to the stages of the species' life cycles and how reproductive success may be affected.

Locality: the same meaning as ascribed to local population of a species or local occurrence of an ecological community.

Application

When applying this factor, consideration must be given to all short-term and long-term impacts (direct and indirect) on habitat which is likely to support threatened species and ecological communities regardless of whether the habitat occurs on the subject site. This applies to both occupied and unoccupied habitat because the recovery of threatened species and ecological communities relies on them having access to suitable habitat to move into as numbers increase.

The extent to which habitat is likely to be removed or modified should be determined by estimating the total area of habitat to be directly and indirectly impacted by the proposed development, activity or action. This may be an estimation of the surface area of land to be affected, and/or in some cases the number of key habitat components to be affected.

When deciding whether an area of habitat is likely to become fragmented or isolated from other areas of habitat, it is necessary to identify and assess the patterns and extent of habitat connectivity. The affected habitat may form part of a habitat corridor, cul-de-sac or an isolated area. Recent Landsat imagery, aerial photographs, vegetation maps, topographic maps, published corridor maps and data obtained from on-ground investigations are useful information sources for assessing this factor.

The dispersal and genetic exchange mechanisms of individual species should be considered. For example, will the isolation of habitat for threatened species or ecological communities that are currently connected or near to each other adversely affect the maintenance of gene flow and the ability to sustain viable populations? It should also be noted that isolation can occur through a variety of habitat modifications and is not confined to the clearing of vegetation.

When assessing the importance of the habitat likely to be removed, modified, fragmented or isolated in the locality, a quantitative and qualitative approach should be adopted as follows:

- an assessment of the area and quality of habitat of the threatened species or ecological community that occurs within the locality from recent Landsat imagery, vegetation mapping, topographic maps, air photos and in some cases data obtained from on-ground investigations
 - an estimate of the area and quality that the habitat of the study area represents in relation to the area and quality of that habitat within the locality
 - an assessment of the role of the habitat to be affected in sustaining habitat connectivity in the locality, and
 - an assessment of the ecological integrity of the habitat to be affected in the study area, in relation to the ecological integrity, tenure and security of the habitat which will remain both in the study area and in the locality.
- **Response:** The four (4) indigenous trees within the site are remnant trees that have been retained over urban development. There is no indigenous shrub and ground stratum, so the site vegetation does not meet the legal definitions of the Cumberland Plains Woodland. As such, it will not fragment or isolate the CPW from other areas of habitat.

(4) Adverse effects on areas of outstanding biodiversity value

Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly) [BC Act section 7(1)(d)]

Context

This applies to declared areas of outstanding biodiversity value (AOBVs) under Part 3 of the BC Act.

Application

This factor is aimed at assessing whether a development or activity is likely to affect any declared AOBV. When applying this factor, consideration must be given to all short-term and long-term impacts (direct and indirect) on the area of outstanding biodiversity.

When assessing whether a development or activity is likely to have an adverse effect on an AOBV, reference should be made to the declaration. Consider whether the development or activity will modify or interfere with ecological processes, biological processes, habitat integrity or other features or qualities of the environment that are fundamental to the persistence of the value the area is protecting.

- **Response:** No Areas of Outstanding Biodiversity Value have been declared for the Cumberland Plains Woodland

(5) Key threatening processes

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process [BC Act section 7(1)(e)]

Context

This factor refers only to those key threatening processes listed in Schedule 4 to the BC Act.

Application

In addition to deciding whether the proposed development or activity is or is part of a key threatening process, consideration must be given to whether the proposal is likely to exacerbate a key threatening process. It is necessary to identify the extent to which these processes are already occurring in the locality.

Consider the likely consequences of contributing to a key threatening process for the persistence of threatened species and ecological communities in the locality. Species listed in the determination as being ‘at risk’ warrant particular consideration if these species are known or likely to occur within the study area of the development or activity.

- **Response:** The proposed activity includes the removal of one dead tree and the clearing of two remnant trees, and both activities are Key Threatening Processes

7.0: Glossary

Activity Means:

- the erection of a building;
- the carrying out of a work in, on, over or under land;
- the use of land or of a building or work;
- the subdivision of land;
- any act, matter or thing prescribed in an environmental planning instrument under s26 of the EP&A Act as an activity; but does not include any act, matter or thing for which development consent under Part 4 is required or has been obtained or is prohibited under an environmental planning instrument (EP&A Act).

AEC (also known as ACEC) – Animal Ethics Committees control animal research. Their role is to advise, monitor, discipline and control animal research and approve animal supply for research. They must also ensure that all research conducted in their institution, or by the independent researchers they supervise, complies with the NSW *Animal Research Act 1985* and the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes*.

AMG – Australian Map Grid coordinates.

Animal – Means any animal, whether vertebrate or invertebrate, and at whatever stage of development, but does not include fish within the meaning of the FM Act other than amphibians or aquatic or amphibious mammals or aquatic or amphibious reptiles (TSC Act).

ARA: (Australian Research Authority) – This is a requirement for every person undertaking animal research under the NSW *Animal Research Act 1985*. The authorities are issued by either an accredited research establishment or by the Director-General of NSW Agriculture.

NSW Biosecurity Act (2016)

Biodiversity – The biological diversity of life is commonly regarded as being made up of the following three components:

- □□ Genetic diversity – the variety of genes (or units of heredity) in any population;
- Species diversity – the variety of species; and
- Ecosystem diversity – the variety of communities or ecosystems

Clearing – Under the *Native Vegetation Act 2003* clearing native vegetation means any one or more of the following:

- cutting down, felling, thinning, logging or removing native vegetation,
- killing, destroying, poisoning, ring barking, uprooting or burning native vegetation.

Consent Authority – In relation to a development application means:

- a) the council having the function to determine the application; or
- b) the Minister, public authority (other than a council) or Director General of DIPNR where specified in an environmental planning instrument (EP&A Act).

Conservation – The protection, maintenance, management, sustainable use, restoration and enhancement of the natural environment (NPWS 1997a-d)

Conservation Reserves – Consists of those areas gazetted as National Parks, Nature Reserves and State Conservation Areas under the NPW Act, and those areas designated as Plant Reserves under the *Forestry Act 1916* (NPWS 1996a).

Critical Habitat – Habitat declared to be critical habitat under Part 3 of the TSC Act. For the purposes of the TSC Act and other Acts amended by the TSC Act, critical habitat is the whole or any part or parts of an area or areas of land comprising the habitat of an endangered species, an endangered population or an endangered ecological community that is critical to the survival of the species, population or ecological community (TSC Act).

DBH – Diameter of a tree at breast height**Determining Authority** – A Minister or public authority:

- by or on whose behalf an activity is to be carried out; or
- whose approval is required in order to enable the activity to be carried out (EP&A Act)

Development – In relation to land:

- the erection of a building on that land;
- the carrying out of a work in, on, over or under land;
- the use of land or of a building or work on that land; and,
- the subdivision of that land; but does not include any development of a class or description prescribed by the EP&A Act for the purpose of this definition (EP&A Act).

Development Application – An application for consent under Division 1 of Part 4 of the EP&A Act, to carry out development (EP&A Act)

Ecological Community – An assemblage of species occupying a particular area

Endangered Ecological Community – An ecological community specified in Part 3 of Schedule 1 of the TSC Act (TSC Act)

Endangered Population – A population specified in Part 2 of Schedule 1 of the TSC Act (TSC Act).

Endangered Species – A species specified in Part 1 of Schedule 1 of the TSC Act (TSC Act).

Environmental Weed – Any plant that is not native to the local area that has invaded the native vegetation (DLWC 1999a-c)

Habitat – An area or areas occupied, or periodically or occasionally occupied by a species, population or ecological community and includes any biotic or abiotic components.

Harm – To harm an animal (including an animal of a threatened species, population or ecological community) includes hunt, shoot, poison, net, snare, spear, pursue, capture, trap, injure or kill, but does not include harm by changing the habitat of an animal (which is damage of habitat) (NPW Act 1974).

Hollow-bearing Tree – A tree where the base, trunk or limbs contain hollows, holes and cavities that have formed as a result of decay, injury or other damage. Such hollows may not be visible from the ground, however may be apparent from the presence of deformities such as burls, protuberances or broken limbs, or where it is apparent the head of the tree has been lost or broken off (NPWS 1999).

Isolated Trees – Isolated trees are individual or scattered small clumps of trees (1-5) that occur in a highly modified landscape (eg. in a wheat paddock), where there are no understorey plants and the groundcover typically comprises non-native species. As an indication, these trees or clumps are generally spaced in excess of 100 metres apart or greater (DLWC 1999a,b).

Key Threatening Process – A threatening process specified in Schedule 3 of the TSC Act. Threatening process is defined as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities (TSC Act).

Likely – Taken to be a real chance or possibility (NPWS 1996a)

Life cycle – The sequence of events from the origin as a zygote, to the death of an individual (NPWS 1996a)

Limit of its Geographic Range – The final or furthest boundary or point that a plant or animal species continues to extends to, in relation to the known geographical extent of distribution of that species (NPWS 1996a).

Local Population – The population that occurs within the study area, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary can be demonstrated (NPWS 1996a)

Native Vegetation – Any of the following types of indigenous vegetation: trees, understorey plants, groundcover and plants occurring in a wetland (DLWC 1999a & b).

Nest – Includes but is not limited to, a structure built by birds, or a tree hollow, or a site on the ground or in a cave used by birds for the purposes of the incubation and/or rearing of young. A nest also includes a site where the actual nest can not be seen or found, however there is clear evidence of breeding nearby and it is considered likely that a nest occurs nearby (ie. within 50 metres) (NPWS 1999).

Pick – To pick a native plant (including a threatened species, population or ecological community) means to gather, pluck, cut, pull up, destroy, poison, take, dig up, remove or injure the plant or any part of the plant (NPW Act 1974).

Plant – Means any plant-life that is indigenous to NSW, whether vascular or non-vascular and in any stage of biological development, and includes fungi and lichens, but does not include marine vegetation within the meaning of the FM Act.

Population – A group of organisms, all of the same species, occupying a particular area

Proponent – In relation to an activity:

- any person proposing to carry out the activity;
- State Forests of NSW in respect to forestry activities authorised by State Forests on land under the management of State Forests; or
- Any determining authority which the Minister certifies in writing to be the proponent of a particular activity or for which the regulation declares to be the proponent of an activity of the kind specified in the regulation (EP&A Act).

Protected Areas – Any reserve that fits the IUCN criteria with its function being conservation; in NSW, this includes areas gazetted as National Parks, Nature Reserves and State Conservation Areas under the NPW Act, and those areas designated as Plant Reserves under the *Forestry Act 1916* (NPWS 1996b).

Protected Species – Those species defined as protected under the NPW Act. It includes all native animals, and all native plants listed on Schedule 13 of the NPW Act.

Public Authority – Under the *Threatened Species Conservation Act 1995* **public authority** means any public or local authority constituted by or under an Act, a government department, a statutory body representing the Crown, or a State owned corporation, and includes a person exercising any function on behalf of the authority, department, body or corporation and any person prescribed by the regulations to be a public authority

Record – Where the record pertains to animal, includes an observation of a live or dead individual of a species, or any parts of an individual, or a sign that indicates the species' presence. Where the record pertains to plant, includes any part of a plant including, but not limited to, roots, stems, branches, leaves, fruits, seeds and flowers (NPWS 1999).

Recovery Plan – A plan prepared and approved under Part 4 of the TSC Act.

Region – For the purposes of the provision in which it is used, a bioregion defined in a national system of bio-regionalisation that is determined (by the Director-General by order published in the Gazette) to be appropriate for those purposes. If the bioregion occurs partly within and partly outside NSW, the region consists only of such much of the bioregion as occurs within NSW (TSC Act).

Risk of Extinction – A species is at risk of extinction if its numbers are reduced to such a critical level, or its habitats have been so drastically reduced, that it is in danger of becoming extinct (NPWS 1996a).

Rocky Outcrop – An area where rocks or exposed boulders cover more than 70% of any 0.1 hectare area (30 metres by 30 metres); and/or areas with skeletal soils (areas with shallow soils where rocks are exposed), supporting heath or scrub (sometimes with occasional emergent trees) (NPWS 1999)

Roost – Where the roost relates to a microchiropteran bat tree roost, it includes a tree, stag or rocky crevice where there is clear evidence that a microchiropteran bat has roosted, such as an accumulation of bat excreta or where a microchiropteran bat has been seen flying into or out. Where the roost relates to threatened owls, roost includes a site where an owl has been observed roosting (ie. sheltering or resting during the day); and/or a site

where there is clear evidence that an owl has roosted such as where there are owl pellets, remains of prey or owl excreta (NPWS 1999).

Sap Feed Tree – A tree, with recent ‘V-notch incisions’ or other incisions, made by Yellow-bellied Gliders or Squirrel Gliders to obtain sap. Recent incisions are less than two years old and not closed (NPWS 1999)

Scientific Committee – The Scientific Committee constituted under Part 8 of the TSC Act.

Scientific Licence – A scientific licence is required under the NPW Act to undertake an action for scientific, educational or conservation purposes that is likely to result in one of more of the following:

- Harm to any protected fauna, or to an animal that is of, or is part of, a threatened species, an endangered population or an endangered ecological community;
- the picking of any protected native plant or of any plant that is of, or is part of, a threatened species, an endangered population or an endangered ecological community;
- damage to critical habitat; or,
- damage to a habitat of a threatened species, an endangered population or an endangered ecological community. These licences are issued by the DEC.

Significant – Important, weighty or more than ordinary (NPWS 1996a)

Species – Of an animal or plant; includes any defined sub-species and taxon below a sub-species and any recognisable variant of a sub-species or taxon.

Species Impact Statement – A statement referred to in Division 2 of Part 5 of the TSC Act and includes an environmental impact statement, prepared under the EP&A Act that contains a Species Impact Statement (TSC Act).

Species Presumed Extinct – A species specified in Part 1 or 4 of Schedule 1 or in Schedule 2 of the TSC Act (TSC Act).

Stag – A standing dead and dry tree greater than 30 centimetres DBH, and greater than three metres in height (NPWS 1999)

Study Area – The subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly (NPWS 1996a)

Subject Site – The area to be directly affected by the proposal

Threat Abatement Plan – Plan prepared and approved under Part 5 of the TSC Act (TSC Act).

Threatened Biodiversity – For the purpose of this document threatened biodiversity refers to threatened species, populations or ecological communities, or their habitats.

Threatened Species – A species specified in Schedule 1 Part 1 (endangered species), Part 4 (presumed extinct) and Schedule 2 (vulnerable species) of the TSC Act (TSC Act).

Threatened Species, Populations or Ecological Communities – Means a species, population and ecological community identified in either Schedule 1 or Schedule 2 of the TSC Act (TSC Act)

Threatening Process – A process that threatens, or may have the capability to threaten, the survival or evolutionary development of the species, population or ecological community (TSC Act)

Viable Local Population – A population that has the capacity to live, develop and reproduce under normal conditions, unless the contrary can be conclusively demonstrated through analysis of records and references (NPWS 1996a).

Vulnerable Species – A species specified in Schedule 2 of the TSC Act (TSC Act).

