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# Preliminary Biodiversity Assessment Report

## Planning Proposal for Wilga Precinct, Ingleside, NSW 2101

**Prepared for: Mirvac Projects Pty Ltd**
**C/- ADW Johnson**

**5 May 2025**

**AEP Ref: 3499**

**Revision: 00**

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# Executive Summary

Anderson Environment & Planning (AEP) was commissioned by Mirvac Projects and Truslan to produce a Preliminary Biodiversity Assessment Report to inform a proposed rezoning over land comprising multiple lots in Ingleside, 2101, NSW.

The Study Area is located within the Northern Beaches Council Local Government Area (LGA) and comprises of 29 lots within the Wilga Precinct. The lands are zoned RU2 – Rural Landscape.

This report has been prepared with reference to the *Biodiversity Assessment Method 2020* (BAM) established under Section 6.7 of the NSW *Biodiversity Conservation Act 2016* (BC Act). This preliminary assessment utilises methods detailed within the BAM to identify biodiversity values inherent within the site, including known and potentially occurring threatened species and ecological communities. The report identifies areas of suitable and/or important habitat for such, and discusses potential impacts of the current Masterplan proposal upon these values. This preliminary assessment considers impact avoidance and minimisation strategies.

The Study Area covers approximately 28.81ha., with the Subject Land covering approximately 14.21ha therein. The Subject Land contains three (3) Plant Community Types (PCT) in varying conditions totalling an area of approx. 3.14ha. The remaining 11.35ha comprise planted native vegetation, exotic vegetation, dams and infrastructure. The PCTs identified are:

- PCT 3593 – *Sydney Coastal Sandstone Bloodwood Shrub Forest*;
- PCT 3595 – *Sydney Coastal Sandstone Gully Forest;* and
- PCT 3986 – *Coastal Sands Swamp Mahogany Rush Forest*.

PCT 3593 is associated and commensurate with the BC Act Listed Endangered Ecological Community *Duffys Forest Ecological Community in the Sydney Basin Bioregion.*

PCT 3986 is associated and commensurate with the BC Act listed Endangered Ecological Community (EEC) *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* and EPBC Act listed EEC *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland.*

Fauna and flora species recorded were typical of those expected in this locality and in this type of habitat. There is a substantial amount of contiguous habitat that adjoins the Subject Land, and as such connectivity to offsite vegetation occurs in various directions. The following threatened species have been recorded within the Subject Land.

- *Microtis angusii* (Angus's Onion Orchid);
- *Syzygium paniculatum* (Magenta Lily Pilly); and
- *Myotis macropus* (Southern Myotis).

In consideration of Avoid and Minimise requirements, the footprint of the proposed development has undergone multiple iterations as informed by the results of field surveys and identification of Threatened Species and Threatened Ecological Communities within the Subject Land. The Subject Land will protect important Vegetated Riparian Zones, improve corridor linkages throughout the wider area and enhance remnant native vegetation to be retained through the implementation of a Vegetation Management Plan.

Preliminary assessment of the proposal under other relevant environmental policy instruments including Chapter 4 of *State Environmental Planning Policy (Biodiversity and Conservation) 2021,* the *Water Management Act 2000*, *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act*)* and the *Pittwater LEP 2014* were undertaken.

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# Glossary

| | |
|---|---|
| **APZ** | Asset Protection Zone |
| **Assessment area** | Includes the subject land and the area of land within the 1500 m buffer zone surrounding the subject land (or 500 m buffer zone for linear proposals) that is determined as per Subsection 3.1.2 of the BAM. |
| **BAM** | *Biodiversity Assessment Method Order* (2020) that determines:<br>• Methodology applicable to quantifying biodiversity values inherent within a development site;<br>• Avoid and minimise efforts required to be employed as part of any development proposal; and<br>• Number and class of credits required to offset residual impacts of the proposal upon the biodiversity values therein. |
| **BC Act** | *Biodiversity Conservation Act 2016* |
| **Biodiversity Credit Report** | Specifies the number and type of biodiversity credits required to offset impacts of development. |
| **BAM Calculator (BAM-C)** | The online tool used to interpret site survey data and regional location information to quantify ecosystem and species credits required / generated at a development / stewardship site. |
| **Biodiversity credits** | Ecosystem or Species Credits required to offset the loss of biodiversity values on a development site. |
| **Biodiversity offsets** | Specific measures that are put in place to compensate for impacts on biodiversity values. |
| **Biodiversity values** | The composition, structure and function of ecosystems, and threatened species, populations and ecological communities, and their habitats. |
| **BCD** | The NSW DPE Biodiversity Conservation Division |
| **CEEC** | Critically Endangered Ecological Community |
| **CON** | City of Newcastle Council |
| **DAWE** | The former Commonwealth Department of Agricultural, Water and Environment |
| **NSW DCCEEW** | The NSW Department of Climate Change, Energy, the Environment and Water |
| **DCCEEW** | The Australian Government Department of Climate Change, Energy, the Environment and Water |
| **DoEE** | The former Commonwealth Department of the Environment and Energy (now DAWE) |
| **DPE** | The former NSW Department of Planning and Environment |
| **DPI** | The former NSW Department of Primary Industries |
| **DPIE** | The former NSW Department of Planning, Industry and Environment |
| **Ecosystem credit** | The class of biodiversity credits created or required for the impact on TECs and threatened species habitat for species that can be reliably predicted to occur within a vegetation type. |
| **EEC** | Endangered Ecological Community (under BC Act) |
| **EPBC Act** | The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* |
| **NBC** | Northern Beaches Council |
| **OEH** | The former NSW Office of Environment and Heritage (now DPE) |
| **PFC** | Projected Foliage Cover |
| **Species credit** | Class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted based on habitat surrogates. |
| **Study Area** | The entirety of the Wilga Precinct planned for rezoning, including land holdings in **Table 1.** The existing road reserve along the western boundary is also included as part of the Study Area. |

| | |
|---|---|
| **Subject Land** | Mirvac and Truslan owned properties where access was granted and surveys were conducted. |
| **TBDC** | Threatened Biodiversity Data Collection |
| **TEC** | Threatened Ecological Community |
| **VRZ** | Vegetated Riparian Zone |

# 1.0 Introduction

## 1.1 The Proposal

AEP have hereby produced a preliminary Biodiversity Assessment Report (pBAR) to accompany the submission of a Planning Proposal. The present pBAR documents the assessment of biodiversity values on site, and provides a preliminary impact avoidance and mitigation strategy to inform land-use capability for future development and biodiversity retention on site.

The proposal is for a rezoning of lots located within the Northern Beaches LGA, specifically lots in between Wilga Street, Powderworks Road and Wilson Avenue, Ingleside NSW, to be submitted by Mirvac Project Pty Ltd (the Client) on behalf of other land owners in the precinct.

AEP have undertaken the necessary investigations to inform the production of the pBAR addressing the future development. More specifically, the report includes a comprehensive assessment of vegetation and threatened species identified on site. AEP undertook a Stage 1 BAM assessment in accessible lands which have been termed 'Subject Lands. It is to be noted that the majority of the Subject Land has been surveyed for all species as prescribed by the BAM Calculator. The report also includes initial commentary addressing *Stage 2: Impact Assessment (Biodiversity values and prescribed impacts)* of the Biodiversity Assessment Method 2020 (BAM).

## 1.2 Site Particulars

Details of subject lots are provided in **Table 1** and site details are provided in **Table 2.** The Study Area and Subject Land locations are shown on **Figure 1**.

The proposal to rezone the lands is depicted in a Masterplan whereby lands would be zoned for development. Riparian and recreational areas would be managed under a plan of management with a Vegetation Management Plan (VMP) component incorporated.

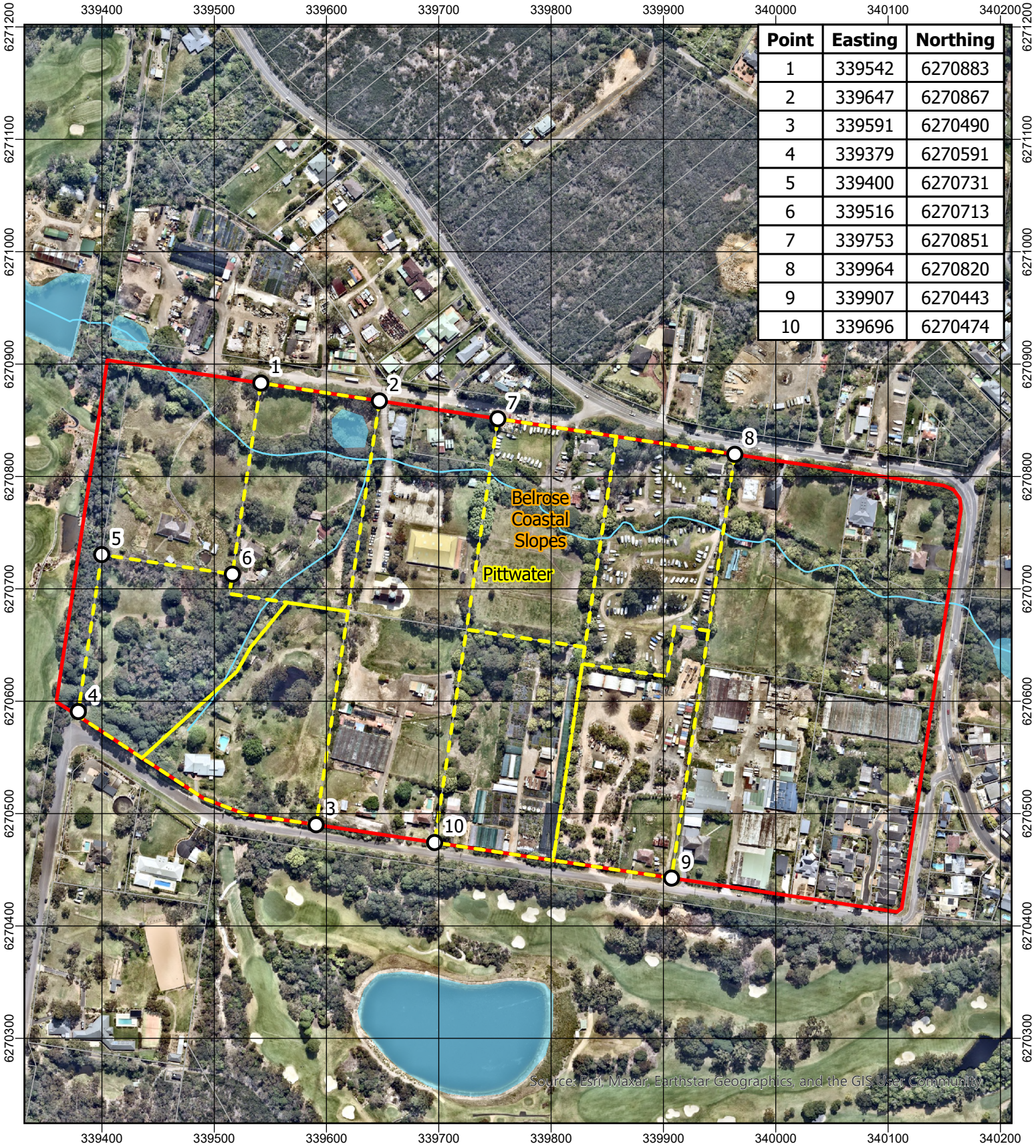
The proposal makes provisions for indicative Asset Protection Zones (APZs) which are proposed to be fully located within the proponent's land holdings and within the development lands, i.e., would not impact lands managed under a VMP and, therefore, habitat corridors.

**Table 1 – Study Area Lot and DPs**

| Street Address | Lot | Deposited Plan | Area (ha) |
|---|---|---|---|
| 1 Wilson Avenue Ingleside 2101 | 4 | 24637 | 2.02 |
| 3 Wilson Avenue Ingleside 2101 | 31 | 854925 | 0.3 |
| 5 Wilson Avenue Ingleside 2101 | 32 | 854925 | 1.72 |
| 7 Wilson Avenue Ingleside 2101 | 2 | 24637 | 2.02 |
| 9 Wilson Avenue Ingleside 2101 | 1 | 24637 | 2.02 |
| 212 Powderworks Road Ingleside 2101 | C | 394261 | 0.92 |
| 214 Powderworks Road Ingleside 2101 | B | 394261 | 1.07 |
| 216 Powderworks Road Ingleside 2101 | 2 | 525907 | 0.52 |
| 218 Powderworks Road Ingleside 2101 | A | 394261 | 0.37 |
| 220 Powderworks Road Ingleside 2101 | 12 | 25143 | 2.03 |
| 222 Powderworks Road Ingleside 2101 | 11 | 25143 | 2.04 |
| N/A | 1 | 286109 | 0.1 |
| 1 7 Wilga Street Elanora Heights 2101 | 3 | 286109 | 0.05 |
| 2 7 Wilga Street Elanora Heights 2101 | 11 | 286109 | 0.14 |
| 3 7 Wilga Street Elanora Heights 2101 | 10 | 286109 | 0.08 |
| 4 7 Wilga Street Elanora Heights 2101 | 9 | 286109 | 0.04 |
| 5 7 Wilga Street Elanora Heights 2101 | 8 | 286109 | 0.04 |
| 6 7 Wilga Street Elanora Heights 2101 | 7 | 286109 | 0.05 |
| 7 7 Wilga Street Elanora Heights 2101 | 6 | 286109 | 0.04 |
| 8 7 Wilga Street Elanora Heights 2101 | 5 | 286109 | 0.05 |
| 9 7 Wilga Street Elanora Heights 2101 | 4 | 286109 | 0.04 |
| 10 7 Wilga Street Elanora Heights 2101 | 2 | 286109 | 0.05 |
| 11 7 Wilga Street Elanora Heights 2101 | 12 | 286109 | 0.06 |
| 8 Wilga Street Ingleside 2101 | 1 | 527772 | 0.2 |
| 9 Wilga Street Ingleside 2101 | 14 | 25143 | 2.04 |
| 10 Wilga Street Ingleside 2101 | 13 | 25143 | 2.03 |
| 11 Wilga Street Ingleside 2101 | 5 | 24637 | 2.05 |
| 12 Wilga Street Ingleside 2101 | 6 | 24637 | 2.05 |
| 13 Wilga Street Ingleside 2101 | 218 | 837828 | 2.05 |
| 14 Wilga Street Ingleside 2101 | 217 | 837828 | 2.00 |
| Easement along Western Boundary | | | 0.62 |
| | | **Total Area (ha)** | **28.81** |

**Table 2 – Site Details**

| Detail | Comments |
|---|---|
| **Client** | Mirvac Projects Pty Ltd and Ingleside Wilga Developments Pty Ltd (Truslan) |
| **Address** | Wilson Avenue: 1, 3, 5, 7, 9<br>Powderworks Road: 212, 214, 216, 218, 220, 222<br>7 Wilga Street: 1–11<br>Wilga Street: 8–14 |
| **LGA** | Northern Beaches Council |
| **Subject Land Zoning** | The site is currently zoned as RU2 – Rural Landscape |
| **BV Mapped Land** | No |
| **Study Area** | The Study Area covers approx. 28.81ha and comprises titles as described in **Table 1**. |
| **Subject Land** | The Subject Land is the accessible lands as shown in **Figure 1**. It covers approx. 14.21ha. |
| **Current Land Use** | The Subject Land consists of a mix of native vegetation, exotic/weedy areas, planted vegetation, and paddock lands. The site includes multiple occupied residential dwellings, an existing aged care facility, several derelict structures, a church and commercial uses, such as boat, caravan, and trailer storage along with two nurseries. |
| **Surrounding Land Use** | The Study Area is adjacent to Monash Country Club on its western boundary and Elanora Country Club on its southern side. To the north, there is existing residential infrastructure and urban residences are situated along the southwest corner as well as the eastern boundaries. |
| **Surrounding Land Zoning** | R2 - Low Density Residential, RE2 - Private Recreation, R5 - Large Lot Residential, R2 - Low Density Residential |




| Point | Easting | Northing |
|---|---|---|
| 1 | 339542 | 6270883 |
| 2 | 339647 | 6270867 |
| 3 | 339591 | 6270490 |
| 4 | 339379 | 6270591 |
| 5 | 339400 | 6270731 |
| 6 | 339516 | 6270713 |
| 7 | 339753 | 6270851 |
| 8 | 339964 | 6270820 |
| 9 | 339907 | 6270443 |
| 10 | 339696 | 6270474 |

## Legend

- Study Area
- Subject Lands
- Boundary Point
- Cadastre
- Hydroline
- Hydroarea
- IBRA Subregion
- NSW Landscapes

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: November 2024

Imagery: NearMap
Spatial Reference: GDA2020 MGA Zone 56

0 40 80 m
Scale: 1:4,500

N
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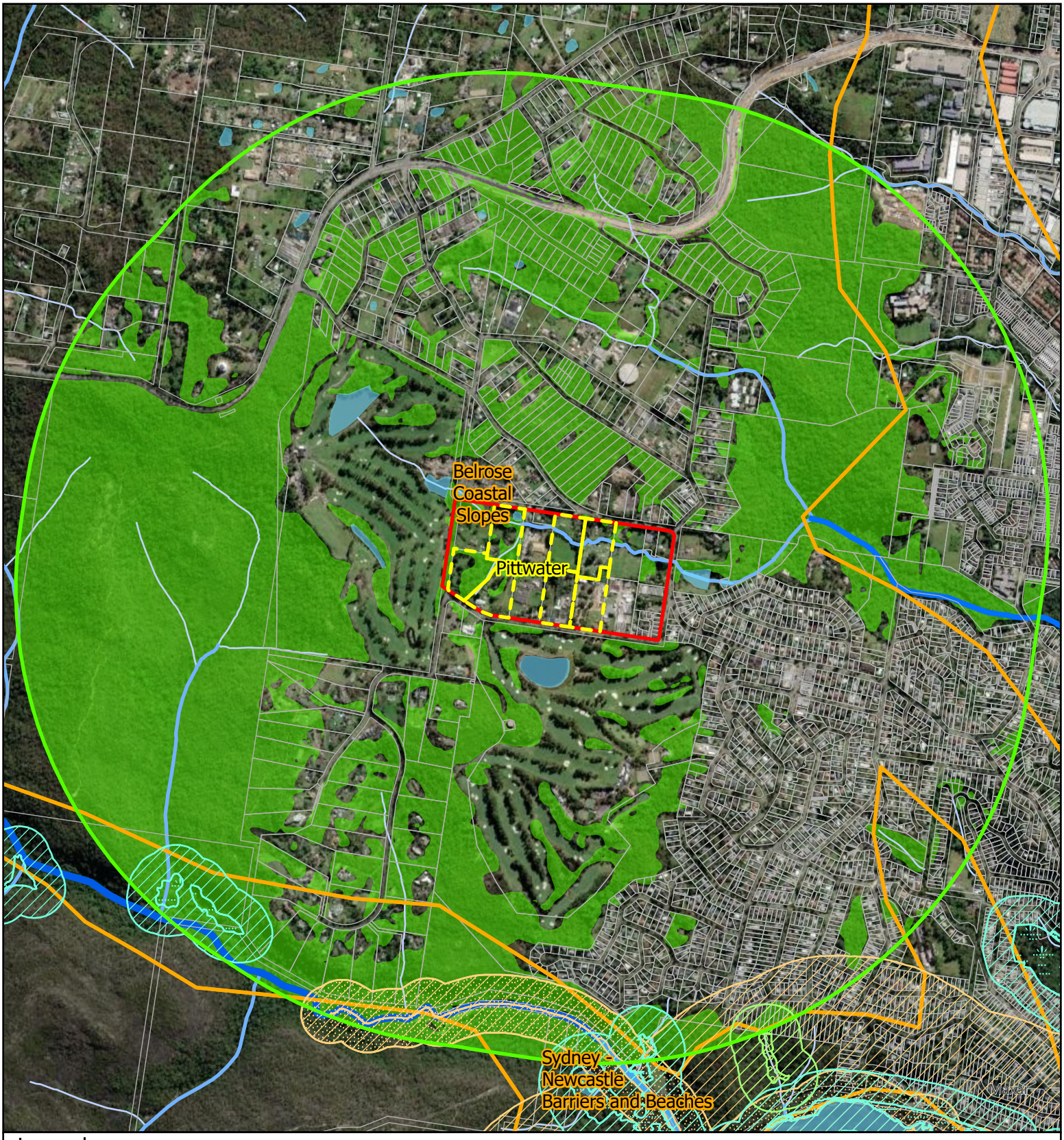
# Figure 1 - Site Map

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan




## Legend

- Study Area
- Subject Lands
- Cadastre
- 1500m Assessment Buffer
- IBRA Subregion
- NSW Landscapes
- Native Vegetation Extent
- Coastal Environment Area
- Coastal Use Area
- Littoral Rainforest
- Littoral Rainforest Proximity Area
- Coastal Wetland
- Coastal Wetland Proximity Area
- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 4th Order Stream

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: November 2024

Imagery: World Imagery
Spatial Reference: GDA2020 MGA Zone 56

0 180 360 m
Scale: 1:18,000

N W E S

# Figure 2 - Site Location

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan

## 1.3 Information Sources

Information and spatial data provided within this report has been compiled from various sources including:

- Aerial Photograph Interpretation (API) of the site and surrounding locality (Bing Hybrid 2024; NSW SIX Aerial 2024, Nearmap 2024);
- State survey guidelines (DEC 2004; DPIE 2020a; OEH 2018; DPIE 2020b; DPIE 2020c; DPE 2022a; DPE 2022b);
- Review of State Vegetation Type Mapping undertaken by DCCEEW (2024) for the area*;*
- DCCEEW Threatened Species, Populations and Ecological Communities website https://www.environment.nsw.gov.au/threatenedspeciesapp/);
- Search and review of flora and fauna sighting records in the BioNet Atlas of NSW within a 100km$^2$ area around the site (https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet);
- Protected Matters Search within a 5km radius of the site held by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW), summarising Matters of National Environmental Significance that may be impacted by development within the Study Area (https://www.environment.gov.au/epbc/protected-matters-search-tool);
- DCCEEW *Important Habitat Maps* to determine whether the site is mapped as containing *Swift Parrot Important Areas, Regent Honeyeater Important Areas* and/or *Migratory Shorebirds Important Areas;*
- Collective knowledge gained from previous ecological survey and assessment in the Northern Beaches area over the past 30 years;
- Site surveys undertaken by AEP between 2024-2025; and
- Anecdotal records.

## 1.4 Landscape Features

### 1.4.1 Regional Landscapes

The development site was identified as occurring within the following landscape areas:

- IBRA Bioregion – Sydney Basin.
- IBRA Subregion – Pittwater.
- NSW Landscape – Belrose Coastal Slopes

Delineation of *NSW Landscape* areas are shown in both **Figure 1 – Site Map** and **Figure 2 – Location Map.**

### 1.4.2 Identified Landscape Features

The BAM Calculator identifies nine (9) landscape features that require assessment for their relevance to the site. These features are:

- *Rivers and Streams*: The Study Area contains two (2) mapped first-order stream, and one (1) second-order stream
- *Wetlands*: The Study Area is not mapped as Coastal Environment Area and Coastal Use Area under *Chapter 2 Coastal Management* of *SEPP (Resilience and Hazards) 2021* and does not contain land mapped as Coastal Wetlands or Proximity Area for Coastal Wetlands.

- *Native Vegetation Extent*: The extent of native vegetation within a 1500m assessment area around the Study Area is shown in **Figure 2. Table 5** presents the PCTs identified within the Subject Land.
- *Connectivity Features*: Vegetation within the Subject Land is contiguous with other large patches of remnant vegetation to the north-west and south-east. As defined by the BAM, connected native vegetation extends as a patch over more than 100ha.
- *Karst, Caves, Crevices, Cliffs, Rock and other Geological Features of Significance*: No such features were identified on site.
- *NSW Landscapes*: The NSW Landscape located within the Study Area is Belrose Coastal Slopes.
- *Areas of geological significance and soil hazard features*: No such features were identified on site.
- *Features identified in SEARs for major projects*: No SEARs apply to the proposal.
- *Areas of Outstanding Biodiversity Value* (AOBV) under the BC Act: No declared AOBV occur within the Study Area or Assessment Area.

### 1.4.3 Landscape Native Vegetation Cover

The 1500m buffer placed around the Study Area is approximately 984ha in size (including the Subject Land). Of this, approximately 484ha comprise native vegetation as per Section 3.2 of the BAM. This equates to approximately 49.28**%** native vegetation cover. **Figure 2** depicts the extent of native vegetation within the Assessment Area.

# 2.0 Native Vegetation

## 2.1 State Vegetation Type Mapping

NSW State Vegetation Type Map (DCCEEW, 2024) shows the vegetation communities mapped within the Study Area and their extent. Details are provided in **Table 3** and **Figure 3**.

State Vegetation Mapping served as a basis for preliminary site assessment. Ground-truthing of vegetation by AEP was the prime source of data to inform Plant Community Type (PCT) determination in the present assessment.

**Table 3 – State Vegetation Type Mapping Results**

| PCT ID | PCT Name | Area (ha) |
|---|---|---|
| 3592 | Sydney Coastal Enriched Sandstone Forest | 2.32 |
| 3593 | Sydney Coastal Sandstone Bloodwood Shrub Forest | 0.92 |
| 3595 | Sydney Coastal Sandstone Gully Forest | 1.46 |
| 0 | Not classified | 24.11 |
| | **Total** | **28.81** |


## Legend

- Study Area
- Subject Lands
- Cadastre
- Hydroline

### State Vegetation Type Mapping (DCCEEW, 2024)

- Not classified
- PCT 3592 - Sydney Coastal Enriched Sandstone Forest
- PCT 3593 - Sydney Coastal Sandstone Bloodwood Shrub Forest
- PCT 3595 - Sydney Coastal Sandstone Gully Forest
- PCT 3810 - Southern Sydney Rockplate Heath
- PCT 3814 - Woronora Plateau Heath-Mallee

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: November 2024

Imagery: NearMap
Spatial Reference: GDA2020 MGA Zone 56

0 40 80 m
Scale: 1:4,500

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# Figure 3 - State Vegetation Type Mapping (DCCEEW, 2024)

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan

### 2.1.1 Plot Based Floristics Surveys

Flora surveys were undertaken by AEP between April to November 2024 and in April 2025 to produce a flora species list for the Subject Land, to search specifically for threatened flora and fauna species known to occur within the wider area, and to gather data necessary to both derive vegetation community type(s) and to meet relevant survey guidelines. Such works included:

- Ground-truthing of vegetation mapping to identify all vegetation communities present onsite as well as segregate vegetation zones according to condition and current management practices;
- Systematic coverage of the site using the Random Meander Technique (Cropper 1993);
- A total of six (6) BAM plots were undertaken by AEP within the remnant vegetation and pasture grasslands present within the Subject Land. Plots were located randomly within each vegetation zone.

A summary of the plot data is provided in **Appendix D**.

## 2.2 Vegetation Descriptions

Fieldwork was conducted to ground-truth State Vegetation Type Mapping (DCCEEW, 2024). Fieldwork revealed remnant vegetation within the Subject Land to be commensurate with the following Plant Community Types (PCT's):

- PCT 3593 – *Sydney Coastal Sandstone Bloodwood Shrub Forest;*
- PCT 3595 – *Sydney Coastal Sandstone Gully Forest;* and
- PCT 3986 – *Coastal Sands Swamp Mahogany Rush Forest.*

**Figure 4** and **Table 5** shows the extent of vegetation communities present within the Subject Land as described above.

### 2.2.1 PCT 3593 *Sydney Coastal Sandstone Bloodwood Shrub Forest*

This vegetation type is characterised by a mid to tall sclerophyll heath forest with a diverse range of species from canopy to groundcovers found prominently on Hawkesbury Sandstone coastal plateaus.

This vegetation community is primarily located on the western fringes of the Study Area with small isolated patches in varying conditions, sporadically located elsewhere in the site. Canopy trees present within the vegetation community and indicative of this PCT included *Corymbia gummifera, Angophora costata* and *Eucalyptus haemastoma*. Other canopy species identified were *Elaeocarpus reticulatus* and *Glochidion ferdinandi.* The midstorey comprised mostly of natives with *Pittosporum revolutum, Acacia longifolia, Ceratopetalum gimmiferum, Polysicas sambucifolia and Parsonsia straminea* present. Additionally, the ground stratum consisted of diagnostic natives such as, *Smilax glyciphylla, Lomandra longifolia, Dillwynia retorta, Microlaena stipoides, Dianelle caerulea, Entolasia stricta, Paspalidium distans* and *Actinotus helianthi.* Dominant non-diagnostic and exotic species in this stratum were *Hypolepis muelleri* and *Cenchrus clandestinus.*

The High Threat Exotic *Lantana camara* was scattered in patches of this PCT area, alluding to the degraded condition in some sections of the site.

PCT 3593 is associated with the BC Act listed Endangered Ecological Community (EEC) *Duffys Forest Ecological Community in the Sydney Basin Bioregion*. Further assessment is required to identify if vegetation onsite is commensurate with this EEC and is addressed below.

**Plate 1** shows PCT 3593 within the Subject Land.

**Plate 1 – PCT 3593**

### 2.2.2 PCT 3595 *Sydney Coastal Sandstone Gully Forest*

PCT 3595 is also similarly considered a tall heathy sclerophyll forest and is mostly found along gullies and formed creek lines. This community was found along a mapped hydroline in the south-western section of the site, with notable changes in the topography along the riparian corridor of this hydroline, proving the selection of this community type. The condition of this PCT was deemed Moderate with diagnostic species abundant in most areas, with others areas overcome by *Lantana camara* expansion. The canopy comprised largely of *Corymbia gummifera, Eucalyptus sieberi, Angophora costata,* while *Ceratopetalum gummiferum* and *Elaecarpus reticulatus* provided a sub-canopy layer. The mid – stratum was particularly spare as *Parsonsia straminea, Smilax glyciphylla,* and *Pittosporum undulatum* were the main species recorded. *Lantana camara, Ligustrum sinense* and *Senna sp.* were abundant in the riparian corridor reducing the area of the higher quality condition vegetation. The ground layer was found to be dominated by *Pteridium esculentum, Gleichenia dicarpa, Lomandra longifolia* and *Entolasia stricta.*

**Plate 2** shows PCT 3595 within the Subject Land.

**Plate 2 – PCT 3595**

### 2.2.3 PCT 3986 *Coastal Sands Swamp Mahogany Rush Forest*

PCT 3986 is characterised as a tall swampy sclerophyll open forest with a dense ground cover of rushes and sedges found in low-lying wetter environments.

Vegetation resembling this community type was located mostly in the north-western section of the Study Area, in close proximity to the hydrolines present within the site. The condition of this vegetation type is considered Poor, due to the high disturbance of a number of weeds found within this area, including, C*estrum parqui, Bambusa balcooa, Lantana camara, Senna pendula var. glabrata, Cinnamomum camphora* and *Tradescantia fluminensis.*

Typical canopy species of this PCT, *Eucalyptus robusta* and *Melaleuca quinquenervia* were prominent in the upper stratum, of which was a mixture of the natives listed above and planted natives and exotics. Due to the proximity to the hydrolines, it is considered these species have originated from seed transportation along the creekline. *Melaleuca linariifolia, Pittosporum undulatum, Livistona australis, Oblismenus imbecilles* and *Calochlaena dubia* covered the majority of the mid to lower stratum in a highly disturbed area of this vegetation type.

PCT 3986 is associated with the BC Act listed EEC *Swamp Sclerophyll Forest on the Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* and EPBC Act Listed EEC *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland*. Further assessment is required to identify if vegetation onsite is commensurate with these EECs and is addressed below.

**Plate 3** shows PCT 3986 canopy within the Subject Land.

**Plate 3 – PCT 3986 Canopy**

## 2.3 Threatened Ecological Communities

### 2.3.1 PCT 3593 TEC Assessment

PCT 3593 is associated with the following EEC:

- BC Act (Endangered): *Duffys Forest Ecological Community in the Sydney Basin Bioregion*.

Duffys Forest occurs on the ridgetops, plateaus, upper slopes and occasionally mid slopes on Hawkesbury sandstone geology, typically in association with laterite soils and soils derived from shale and laminate lenses. The community is highly fragmented by urban developments and has been reported from the Northern Beaches, Ku-ring-gai and Hornsby Local Government Areas, although it may occur elsewhere in the Sydney Basin Bioregion. Duffys Forest is represented on the southern edge of the Ku-ring-gai Chase National Park and the northern edge of the Garigal National Park. Occurrences of Duffys Forest within these areas are limited to a small number of fragments at the boundary of the Parks and bounded by roads.

Duffys Forest has the structural form predominantly of open-forest to woodland and shares close similarities to similar vegetation communities: Sydney Sandstone Ridgetop Woodland and Sydney Sandstone Gully Forest. It is distinguished from these similar vegetation communities by use of a diagnostic species list, comprising positive and negative indicator species (Smith & Smith 2000). Calculation of a 'Duffys Forest Index' allows for distinction between Duffys Forest and these similar vegetation communities. The vegetation community allocated the highest index is considered most representative of the vegetation community recorded within the Subject Land. **Table 4** outlines the index scores.

**Table 4 – Duffys Forest Assessment**

| Plot No. | Item | Duffys Forest | Sydney Sandstone Ridgetop Woodland | Sydney Sandstone Gully Forest |
|---|---|---|---|---|
| **Plot 1** | Positive diagnostic species | 1 | 0 | 0 |
| | Negative diagnostic species | 0 | 1 | 1 |
| | Index | **52.5** | 47.5 | 47.5 |
| **Plot 2** | Positive diagnostic species | 0 | 0 | 0 |
| | Negative diagnostic species | 1 | 0 | 0 |
| | Index | 47.5 | **50** | **50** |
| **Plot 6** | Positive diagnostic species | 0 | 0 | 0 |
| | Negative diagnostic species | 1 | 0 | 0 |
| | Index | 47.5 | **50** | **50** |

As outlined above, the vegetation found within Plot 1 is considered to be commensurate with Duffys Forest EEC due to the index score of that plot being higher than Sydney Sandstone Ridgetop Woodland & Sydney Sandstone Gully Forest. Plots 2 & 6 indicate the index score for Duffys Forest is lower than the two other vegetation communities and therefore not commensurate with the EEC.

### 2.3.2 PCT 3986 TEC Assessment

PCT 3986 is associated with the following EEC's:

- BC Act: *Swamp Sclerophyll Forest on the Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions;* and
- EPBC Act: *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland*

BC Act-listed TEC

Characteristic canopy species are present within the Subject PCT, including, *Eucalyptus robusta, Melaleuca quinquenervia,* in addition to a number of associated shrub and ground cover species. The area of this vegetation community is located along the edges of streams and creeks and therefore is subject to frequent and at times constant waterlogging which is a feature of this ecological community.

Whilst the Subject PCT has been disturbed through historic land clearance and exotic abundance, it has been assessed as commensurate with this community.

EPBC Act-listed TEC

Given that PCT 3986 is potentially associated with *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* EEC reference to *Conservation Advice for the Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* (DAWE, 2021), specifically *Table 2: Condition classes, categories, and thresholds* indicates that the following conditions are required to be met to qualify for EPBC listing.

For vegetation patches that are less than 2ha and are isolated, non- native vegetation must comprise less than 50% of the total ground layer vegetation cover to meet condition thresholds. The patch size of PCT 3986 is approx. 0.89ha. The cover of non- native vegetation was assessed in Plots 3 & 5 and resulted in the total ground layer comprising approx. 65% foliage cover for Plot 3 and 19.2% foliage cover for Plot 5. As the two plots comprise the same vegetation condition, an average across the plots was used to determine the non- native ground layer cover. This average was determined to be approx. 42%, which therefore means the non- native covers are less than 50% and this vegetation community meets the condition thresholds for a Class C2, Good Condition patch and is listed as an EPBC listed community.

Assessment of the proposed impacts to this community are provided in **Appendix G.**

**Table 5 – Plant Community Types**

| Plant Community Type | Plant Community Type Code | Associated BC Act listed TEC (if applicable) | Vegetation Zone (BAM-C Description) | Area within the Subject Land (ha) |
|---|---|---|---|---|
| *Sydney Coastal Sandstone Bloodwood Shrub Forest* | 3593 | *Duffys Forest Ecological Community in the Sydney Basin Bioregion* | Moderate | 0.06 |
| *Sydney Coastal Sandstone Bloodwood Shrub Forest* | 3593 | *Duffys Forest Ecological Community in the Sydney Basin Bioregion* | Degraded | 0.96 |
| *Sydney Coastal Sandstone Bloodwood Shrub Forest* | 3593 | *Duffys Forest Ecological Community in the Sydney Basin Bioregion* | Poor | 0.48 |
| *Sydney Coastal Sandstone Gully Forest* | 3595 | | Moderate | 0.75 |
| *Coastal Sands Swamp Mahogany Rush Forest* | 3986 | *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* | Poor | 0.89 |
| Planted Native | | | | 1.13 |
| Exotic | | | | 5.44 |
| Dams | | | | 0.07 |
| Infrastructure | | | | 4.71 |
| **Total** | | | | **14.49** |


## Legend

- Study Area
- Subject Lands
- Cadastre
- Hydroline
- Bam Plot
- BAM Direction

### Ground-Truthed Vegetation

- PCT 3593 - Moderate
- PCT 3593 - Poor
- PCT 3593 - Degraded
- PCT 3595 - Moderate
- PCT 3986 - Poor
- Planted Native
- Exotic
- Dam
- Infrastructure

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: December 2024

Imagery: NearMap
Spatial Reference: GDA2020 MGA Zone 56

0 30 60 m
Scale: 1:3,000

N
W E
S

# Figure 4 - Ground-truthed Vegetation

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan

# 3.0 Habitat Features

## 3.1 Hollow-bearing Trees

A total of four (4) hollow-bearing trees (HBTs) were identified on site and are detailed below in **Table 6**. Extra-large (XL) and large (L) hollows were present, however, these hollows did not exist above four (4) metres which is habitat restriction for some hollow dependent threatened fauna including Forest Owls, Glossy Black-Cockatoo and the Gang-gang Cockatoo.

**Table 6 – Hollow- bearing Tree Assessment**

| GPS Point ID | Scientific Name | DBH | XL | L | M | S | XS or Fissured Branches |
|---|---|---|---|---|---|---|---|
| 1 | Stag | 75 | 1 | - | - | | - |
| 2 | Stag | 20 | - | - | - | 1 | - |
| 3 | *Schinus areira* | 80 | - | 1 | 1 | 1 | - |
| 4 | Stag | 40 | - | - | - | 1 | - |
| Notes for hollow size: XS <5cm, S 5-10cm, M 10-15cm, L 15-20cm, XL >20cm, DBH - diameter at breast height measured in centimetres | | | | | | | |

## 3.2 Other Potential Habitat Features

Additional habitat features identified on-site include streams representing various Strahler-order watercourses, as well as dams. The site also contains multiple dwellings, commercial-use structures, and some derelict buildings. These features were included in targeted searches for threatened fauna, as they were considered potentially suitable habitats for threatened microbats, amphibians and insects.

# 4.0 Survey Effort

### 4.1.1 Field Survey Methods

Details of the flora and fauna survey are presented in **Table 9** and were conducted using relevant guidelines, in particular DPE survey guidelines for threatened plants (DPIE 2020a), Frogs (DPIE 2020c), Bats (OEH 2018) and Koalas (DPE 2022a). Flora Survey Effort and Fauna Survey Effort is shown in **Figures 6, 7 & 8**.

An assessment of the relative habitat values present within the Subject Land, was undertaken. This assessment focused primarily on the identification of specific habitat types and resources within the Subject Land favoured by known threatened species listed in **Tables 7 and 8.** The assessment also considered the potential value of the Subject Land (and surrounding areas) for all major guilds of native flora and fauna. The assessment was based on the specific habitat requirements of each threatened fauna species in regards to home range, feeding, roosting, breeding, movement patterns and corridor requirements.

Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages. In particular, focus was put on documenting the presence of key habitat features such as tree hollows, feed trees and connectivity.

### 4.1.2 Flora Field Survey

All required flora survey techniques were utilised for targeted survey of the species listed in **Table 8** above and guided by state guidelines (DPIE 2020a) and the BAM (DPIE 2020b).

The following survey methods were undertaken to record the presence of threatened species on site:

- Ground-truthing of vegetation mapping to identify all vegetation communities present onsite as well as segregate vegetation zones according to condition and current management practices;

- Seasonal threatened flora surveys utilising the parallel transect method;
- Identification of all vascular plant species encountered during fieldwork. Subject Land coverage was both systematic to ensure all key points of the site were checked, and therein the Random Meander Technique (Cropper 1993) was utilised to maximise species encountered;
- Targeted searches through leaf litter at the base of appropriate host trees for *Rhizanthella slateri* (Eastern Underground Orchid); and
- A total of six (6) BAM plots were undertaken in accordance with BAM 2020 by AEP.

### 4.1.3 Fauna Field Surveys

All required fauna survey techniques were utilised for targeted survey of the species listed in **Table 9** and guided by the survey guidelines for Koalas, (DPE, 2022), Microbats OEH (2018), Frogs (DPIE 2020c), Mammals (DSEWPC, 2011) and Snails (DCCEEW, 2025). Survey effort is shown in **Figure 9**.

#### 4.1.3.1 Incidental Observations

Incidental records of any fauna species observed during fieldwork were noted. This included opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of any resident or migratory species. Searches were also conducted for whitewash, regurgitation pellets and prey remain from Owls, chewed Casuarina cones from Black-Cockatoos, chewed fruit remains from frugivorous birds etc. All incidental sightings, are recorded in the observed fauna table in **Appendix C**.

**Table 7 – Field Survey Periods**

| Date | Time | Field activity | Targeted Species | No. of Persons on Site | Rainfall (mm) | Staff |
|---|---|---|---|---|---|---|
| 20/03/2024<br>21/03/2024 | 10:00 - 17:00<br>9:15 – 17:00 | • Preliminary Site Assessment<br>• Habitat Assessment<br>• BAM Plots 1 - 4<br>• Riparian Assessment<br>• Targeted Flora Transects | • Incidentals<br>• *Genoplesium baueri, Micromyrtus blakelyi, Darwinia peduncularis, Prostanthera marifolia, Grevillea caleyi, Pimelea curviflora var. curviflora, Melaleuca deanei, Melaleuca groveana, Eucalyptus camfieldii, Rhodomyrtus psidioides* and *Rhodamnia rubescens.* | 3 | 0 | DK, JB, ALR |
| 22/10/2024 | 10:15 - 17:30 | • 5m/10m Flora Transects<br>• 10m/20m Flora Transects<br>• 20m/40m Flora Transects | The following rounds of flora transects were only completed in Lot 218, 13 Wilga St:<br>• Round 1: 5m/10m Transects - *Asterolasia elagans, Microtis angusii, Prostanthera junonis, Prostanthera marifolia*, and *Pimelea curviflora var. curviflora.*<br>• Round 2: 10m/20m Transects - *Epacris purpurascens var. purpurascens, Grevillea parviflora. Subsp. suppplicans, Hibbertia spanantha, Lasiopetalum joyceae*, and *Leptospermum deanei.*<br>• Round 3: 10m/20m Transects - *Micromyrtus blakelyi, Persoonia mollis subsp.maxima, Tetratheca glandulosa, Astrotricha crassifolia,* and *Persoonia hirsuta.*<br>• Round 4: 10m/20m Transects - *Acacia bynoeana, Acacia pubescens, Callistemon linearifolius Darwinia biflora,* and *Grevillea caleyi.*<br>• Round 5: 10m/20m Transects - *Haloragodendron lucasii, Hibbertia puberula, Hibbertia superans, Pimelea curviflora var. curviflora,* and *Zieria involucrata.*<br>• Round 6: 20m/40m Transects - *Eucalyptus camfieldii, Melaleuca deanei, Melaleuca groveana, Rhodamnia rubescens,* and *Rhodomyrtus psidioides.*<br>Subsequently, this lot was not accessed for future flora surveys pertaining to species in rounds 1-6. | 3 | 0 | ALR, JC, ED |
| 25/10/2024 | 09:30 - 17:30 | • 5m/10m Flora Transects<br>• Camera Deployment<br>• Diurnal bird survey | • *Asterolasia elagans, Microtis angusii, Prostanthera junonis, Prostanthera marifolia Pimelea curviflora var. curviflora.*<br>• Gang-gang Cockatoo, Eastern Bristlebird, Little Eagle, Square-tailed Kite, White-bellied Sea Eagle | 2 | 0 | ALR, ED |
| 06/11/2024 | 09:45 - 15:45 | • 10m/20m Flora Transects<br>• Ground-truthing vegetation | • *Epacris purpurascens var. purpurascens, Grevillea parviflora. Subsp. Suppplicans, Hibbertia spanantha, Lasiopetalum joyceae, Leptospermum deanei.*<br>• *Micromyrtus blakelyi, Persoonia mollis subsp.maxima, Tetratheca glandulosa, Astrotricha crassifolia, Persoonia hirsuta.* | 4 | 0 | GT, ALR, JS, ED |
| 08/11/2024 | 10:00 - 14:30 | • Camera Collection | • Incidentals | 2 | 0 | ALR, ED |
| 11/11/2024 | 10:00- 17:30 | • 10m/20m Flora Transects<br>• BAM Plots 5-6<br>• Vegetation Mapping | • *Micromyrtus blakelyi, Persoonia mollis subsp.maxima , Tetratheca glandulosa, Astrotricha crassifolia, Persoonia hirsute*<br>• *Acacia bynoeana, Acacia pubescens, Callistemon linearifolius, Darwinia biflora, Grevillea caleyi* | 4 | 0 | ALR, JB, JS, ED |
| 19/11/2024 | 09:30 – 16:00 | • 10m/20m Flora Transects | • *Acacia bynoeana, Acacia pubescens, Callistemon linearifolius, Darwinia biflora, Grevillea caleyi*<br>• *Haloragodendron lucasii, Hibbertia puberula, Hibbertia superans, Pimelea curviflora var. curviflora, Zieria involucrata* | 2 | 0 | BJ, ED |
| 22/11/2024 | 09:00 – 15:15 | • 20m/40m Flora Transects<br>• Targeted Rhizanthella Search<br>• Diurnal Snail Searches | • *Eucalyptus camfieldii, Melaleuca deanei, Melaleuca groveana, Rhodamnia rubescens, Rhodomyrtus psidioides*<br>• *Rhizanthella slateri*<br>• Maroubra Woodland Snail, Dural Land Snail | 2 | 0 | ALR, ED |

| Date | Time | Field activity | Targeted Species | No. of Persons on Site | Rainfall (mm) | Staff |
|---|---|---|---|---|---|---|
| 27/11/2024<br>28/11/2024 | 19:00 – 22:15<br>19:30 – 21:15 | • Koala SATs (2)<br>• Nocturnal Surveys (including call playback) | • Koala, Bush Stone Curlew, Eastern Pygmy Possum, Grey-headed Flying Fox, Red-backed Button Quail, Southern Brown Bandicoot, Southern Greater Glider, Squirrel Glider | 2<br>2 | 0<br>0 | BJ, ED<br>DK, JB |
| 11/03/2025<br>12/03/2025 | 20:00 – 22:00<br>19:30 – 21:30 | • Aural visual frog surveys (including call playback)<br>• Tadpole searches | • Giant Barred Frog, Giant Burrowing Frog, Green and Golden Bell Frog, Red-crowned Toadlet | 2<br>2 | 7.8<br>9 | DK, AG<br>JB, ED |
| 30/03/2025<br>31/03/2025 | 19:30 – 20:45<br>19:30 – 21:00 | • Aural visual frog surveys (including call playback) | • Giant Barred Frog, Giant Burrowing Frog, Green and Golden Bell Frog, Red-crowned Toadlet | 2<br>1 | (35.8 on 29th)<br>16.6<br>22.4 | JB, ED<br>JB |
| 03/04/2025 | 13:00 – 17:00<br>18:30 – 19:30 | • 20m/40m Flora Transects<br>• Nocturnal Snail Searches | • *Syzygium paniculatum*<br>• Maroubra Woodland Snail, Dural Land Snail | 2 | 0 | JS, ALR |

# 5.0 Threatened Flora

The BAM-C prescribes a list of threatened flora species likely to occur within the PCTs listed in **Table 5**. All such species were actively targeted during the field program, in addition to other threatened species known to occur in the locality. **Table 8** lists the target flora species surveyed within the Subject Land and highlights those identified during surveys.

**Table 8 - Target Threatened Flora**

| Scientific name | Common name | Growth form | BioNet Atlas records within Study Area | Found within Study Area (AEP) | Present within Subject Land (AEP) |
|---|---|---|---|---|---|
| *Acacia bynoeana* | Bynoe's Wattle | Shrubs | No | No | No |
| *Acacia pubescens* | Downy Wattle | Shrubs | No | No | No |
| *Asterolasia elegans* | | Shrubs | No | No | No |
| *Astrotricha crassifolia* | Thick-leaf Star-hair | Shrubs | No | No | No |
| *Callistemon linearifolius* | Netted Bottle Brush | Shrubs | No | No | No |
| *Darwinia biflora* | | Shrubs | No | No | No |
| *Darwinia peduncularis* | | Shrubs | No | No | No |
| *Eucalyptus camfieldii* | Camfield's Stringybark | Trees | No | No | No |
| *Epacris purpurascens var. purpurascens* | | Shrubs | No | No | No |
| *Genoplesium baueri* | | Herbs | No | No | No |
| *Grevillea caleyi* | Caley's Grevillea | Shrubs | No | No | No |
| *Grevillea parviflora subsp. supplicans* | | Shrubs | No | No | No |
| *Haloragodendron lucasii* | | Shrubs | No | No | No |
| *Hibbertia puberula* | | Shrubs | No | No | No |
| *Hibbertia spanantha* | Julian's Hibbertia | Shrubs | No | No | No |
| *Hibbertia superans* | | Shrubs | No | No | No |
| *Lasiopetalum joyceae* | | Shrubs | No | No | No |
| *Leptospermum deanei* | | Shrubs | No | No | No |
| *Melaleuca deanei* | Deane's Paperbark | Shrubs | No | No | No |
| *Melaleuca groveana* | | Shrubs | No | No | No |
| *Microtis angusii* | Angus's Onion Orchid | Orchid | No | **Yes** | **Yes** |
| *Micromyrtus blakelyi* | | Shrubs | No | No | No |
| *Persoonia hirsuta* | Hairy Geebung | Shrubs | No | No | No |

| Scientific name | Common name | Growth form | BioNet Atlas records within Study Area | Found within Study Area (AEP) | Present within Subject Land (AEP) |
|---|---|---|---|---|---|
| *Persoonia mollis subsp. maxima* | | Shrubs | No | No | No |
| *Pimelea curviflora var. curviflora* | | Shrubs | No | No | No |
| *Prostanthera junonis* | Somersby Mintbush | Shrubs | No | No | No |
| *Prostanthera marifolia* | Seaforth Mintbush | Shrubs | No | No | No |
| *Rhizanthella slateri* | Eastern Australian Underground Orchid | Orchid | No | No | No |
| *Rhodamnia rubescens* | Scrub Turpentine | Shrubs | No | No | No |
| *Rhodomyrtus psidioides* | Native Guava | Shrubs/Small Tree | No | No | No |
| *Syzygium paniculatum* | Magenta Lilly Pilly | Trees | No | **Yes** | **Yes** |
| *Tetratheca glandulosa* | | Shrubs | No | No | No |
| *Zieria involucrata* | | Shrubs | No | No | No |

## 5.1 Key findings

Threatened flora survey effort is shown on **Figures 6, 7 & 8**:

*Microtis angusii* (Angus' Onion Orchid)

Specimens were identified along the northern boundary of the Subject Land (**Plate 4**). The species was not found elsewhere on site despite targeted surveys. Locations of these species have not been presented in the figures due to the highly threatened nature of this species. However, it is noted the current developable area of the masterplan does not encroach into the area the species was found; therefore, not impacting the species. Eco Logical (2016), identified over 8,000 records of *Microtis sp.* within the wider precinct, inferring that the species group's population is highly localised. With this known species information as well as the Study Area exhibiting similar habitat of the record found within the Subject Land, it is assumed that there is a high likelihood that the species could occur within lands unable to be assessed within the Study Area.

**Plate 4 – *Microtis angusii* specimen found in the Subject Land (October 2024, AEP)**

*Syzygium paniculatum* (Magenta Lilly Pilly)

A total of two (2) specimens were located along the western boundary of Lot 217 (DP837828). It is noted that the current developable area of the masterplan does not encroach into the area the species was found as the area is proposed for conservation purposes and therefore, the species will not be impacted by the proposal. Eco Logical, (2016), did not identify this species within its assessment and stated that due to no suitable habitat that the species was unlikely to occur within the wider precinct area.

**Plate 5: *Syzygium paniculatum* found on site (April 2025, AEP)**

**Plate 6: *Syzygium paniculatum* fruit found on site. (April, 2025, AEP)**

# 6.0 Threatened Fauna

The BAM-C prescribes a list of threatened fauna species likely to occur within the PCTs listed in **Table 5.** All such species were subject to targeted field surveys, in addition to other threatened species known to occur in the locality. **Table 9** lists the target fauna species surveyed within the Subject Land and highlights those identified within the Subject Land.

**Table 9 – Target Threatened Fauna**

| Family | Scientific Name | Common Name | BioNet Atlas records within Study Area | Found within Study Area (AEP) | Present within Subject Land |
|---|---|---|---|---|---|
| Amphibians | *Heleioporus australicus* | Giant Burrowing Frog | No | No | No |
| Amphibians | *Litoria aurea* | Green and Golden Bell Frog | No | No | No |
| Amphibians | *Mixophyes iteratus* | Giant Barred Frog | No | No | No |
| Amphibians | *Pseudophryne australis* | Red-crowned Toadlet | Yes | No | No |
| Aves | *Burhinus grallarius* | Bush Stone-curlew | No | No | No |
| Aves | *Callocephalon fimbriatum* | Gang-gang Cockatoo | No | No | No |
| Aves | *Dasyornic brachypterus* | Eastern Bristlebird | No | No | No |
| Aves | *Hieraaetus morphnoides* | Little Eagle | No | No | No |
| Aves | *Haliaeetus leucogaster* | White-bellied Sea-Eagle | Yes | No | No |
| Aves | *Lophoictinia isura* | Square-tailed Kite | No | No | No |
| Aves | *Nettapus coromandelianus* | Cotton Pygmy-Goose | No | No | No |
| Aves | *Pteropus poliocephalus* | Grey-headed Flying-fox | No | **Yes** | **Yes** |
| Aves | *Turnix maculosus* | Red-backed Button-quail | No | No | No |
| Invertebrates | *Meridolum maryae* | Maroubra Woodland Snail | No | No | No |
| Invertebrates | *Pommerhelix duralensis* | Dural Land Snail | No | No | No |
| Mammals | *Cercartetus nanus* | Eastern Pygmy-possum | No | No | No |
| Mammals | *Isoodon obesulus obesulus* | Southern Brown Bandicoot (eastern) | No | No | No |
| Mammals | *Macropus parma* | Parma Wallaby | No | No | No |
| Mammals | *Myotis macropus* | Southern Myotis | No | **Yes** | **Yes** |
| Mammals | *Petauroides volans* | Southern Greater Glider | No | No | No |
| Mammals | *Petaurus norfolcensis* | Squirrel Glider | No | No | No |
| Mammals | *Phascolarctos cinereus* | Koala | No | No | No |
| Mammals | *Potorous tridactylus* | Long-nosed Potoroo | No | No | No |

| Family | Scientific Name | Common Name | BioNet Atlas records within Study Area | Found within Study Area (AEP) | Present within Subject Land |
|---|---|---|---|---|---|
| Mammals | *Vespadelus troughtoni* | Eastern Cave Bat | No | No | No |

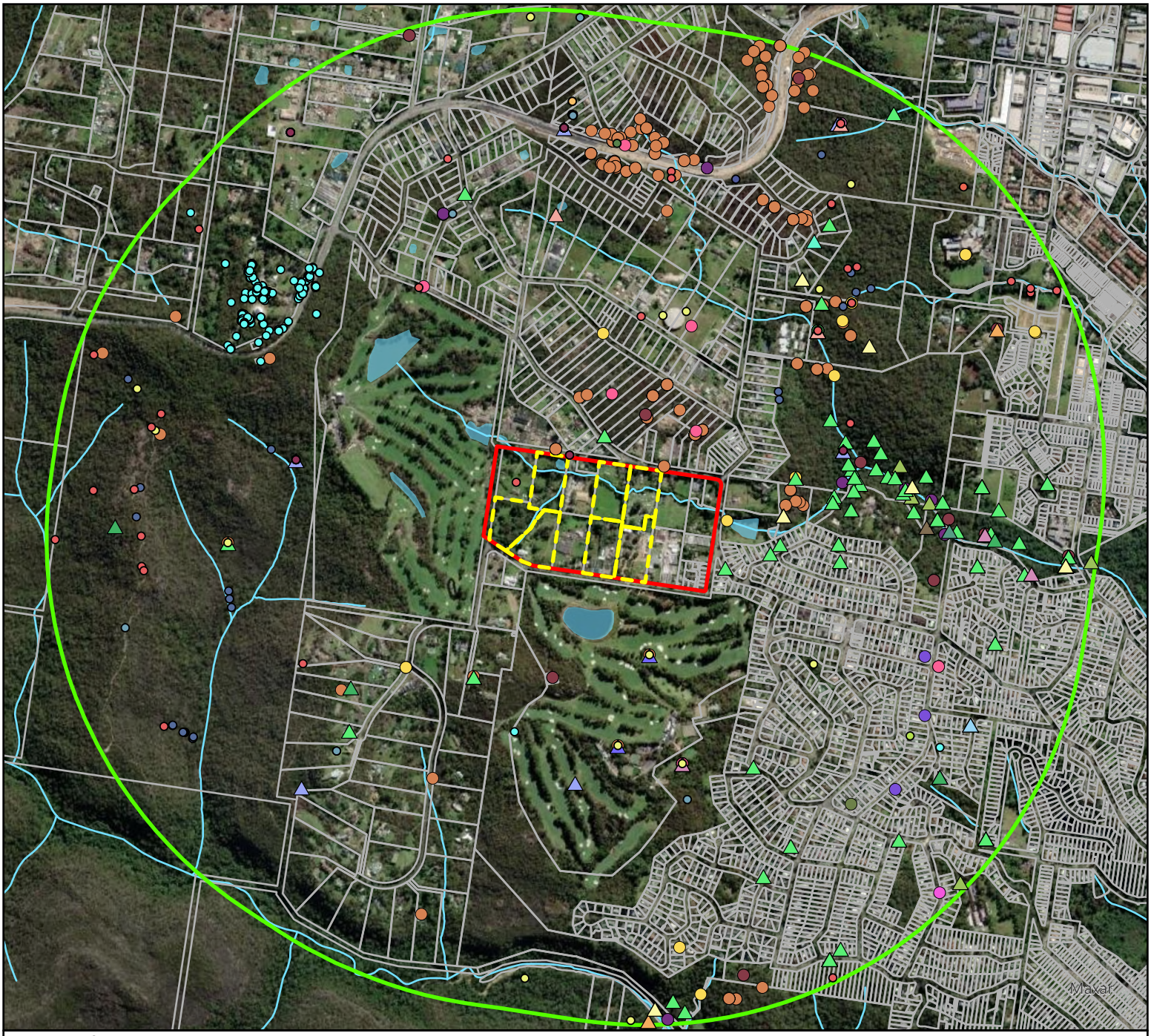
## 6.1 Key findings

- Site use resulting from species surveys:

  Southern Myotis: Identified as foraging on site and possibly detected via echolocation call detector (Anabat) as part of a *Nyctophilus/Myotis* species group. See the Anabat report provided in **Appendix H.** Eco Logical (2016) identified areas within the Study Area as potential breeding habitat for this species.,

- Other site use which does not meet the requirement for future offsetting obligations:
  - Grey-headed Flying-fox was recorded foraging on site. However, no evidence of roosting or breeding was found.

**Figure 5** displays BioNet Atlas records of threatened species in the locality whilst **Figure 9** shows the fauna survey effort.




## Legend

- Study Area
- Subject Lands
- Cadastre
- 1500m Assessment Buffer

### Amphibia

- Giant Burrowing Frog
- Green and Golden Bell Frog
- Red-crowned Toadlet

### Aves

- Barking Owl
- Black Bittern
- Bush Stone-curlew
- Eastern Osprey
- Gang-gang Cockatoo
- Little Eagle
- Little Lorikeet
- Masked Owl
- Powerful Owl
- Regent Honeyeater
- Scarlet Robin
- Sooty Oystercatcher
- South-eastern Glossy Black-Cockatoo
- Square-tailed Kite
- Superb Fruit-Dove
- Swift Parrot
- Varied Sittella
- White-bellied Sea-Eagle
- White-throated Needletail

### Flora

- Callistemon linearifolius
- Epacris purpurascens var. purpurascens
- Eucalyptus nicholii
- Grevillea caleyi
- Kunzea rupestris
- Lasiopetalum joyceae
- Microtis angusii
- Pimelea curviflora var. curviflora
- Tetratheca glandulosa

### Mammalia

- Eastern Coastal Free-tailed Bat
- Eastern False Pipistrelle
- Eastern Pygmy-possum
- Greater Broad-nosed Bat
- Grey-headed Flying-fox
- Koala
- Large Bent-winged Bat
- Large-eared Pied Bat
- Little Bent-winged Bat
- Southern Brown Bandicoot (eastern)
- Southern Myotis
- Spotted-tailed Quoll
- Squirrel Glider
- Yellow-bellied Sheathtail-bat

### Reptilia

- Rosenberg's Goanna

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: November 2024

Imagery: World Imagery
Spatial Reference: GDA2020 MGA Zone 56

0 200 400 m
Scale: 1:19,000

N W E S

# Figure 5 - BioNet Threatened Species Records

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan


## Legend

- Study Area
- Subject Lands
- Cadastre
- Hydroline
- BAM Plot
- BAM Direction

**Flora Transects (March 2024)**

- 5m Transects
- 10m Transects
- 20m Transects
- Vegetation/Habitat Assessment

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: November 2024

Imagery: NearMap
Spatial Reference: GDA2020 MGA Zone 56

0 30 60 m
Scale: 1:3,000

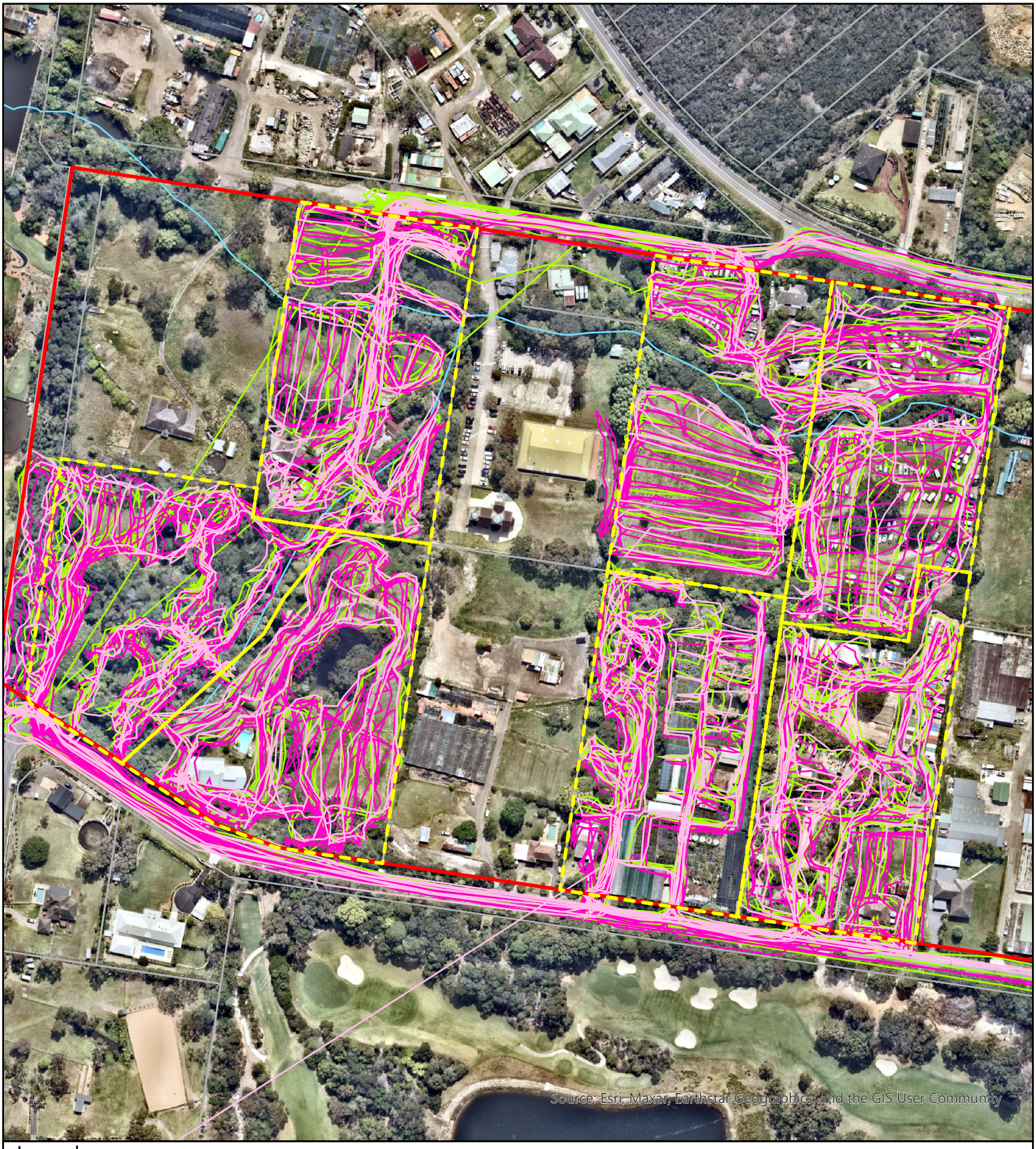
N W E S

# Figure 6 - Flora Survey Effort (March 2024)

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan




## Legend

- Study Area
- Subject Lands
- Cadastre
- Hydroline

Spring Flora Transects

- Round 1 (5m/10m) & Round 2 (10m/20m)
- Round 3 (10m/20m) & Round 4 (10m/20m)
- Round 5 (10m/20m) & Round 6 (20m/40m)

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: May 2025

Imagery: eg NearMap, Date
Spatial Reference: GDA2020 MGA Zone 56

0 30 60 m
Scale: 1:3,000

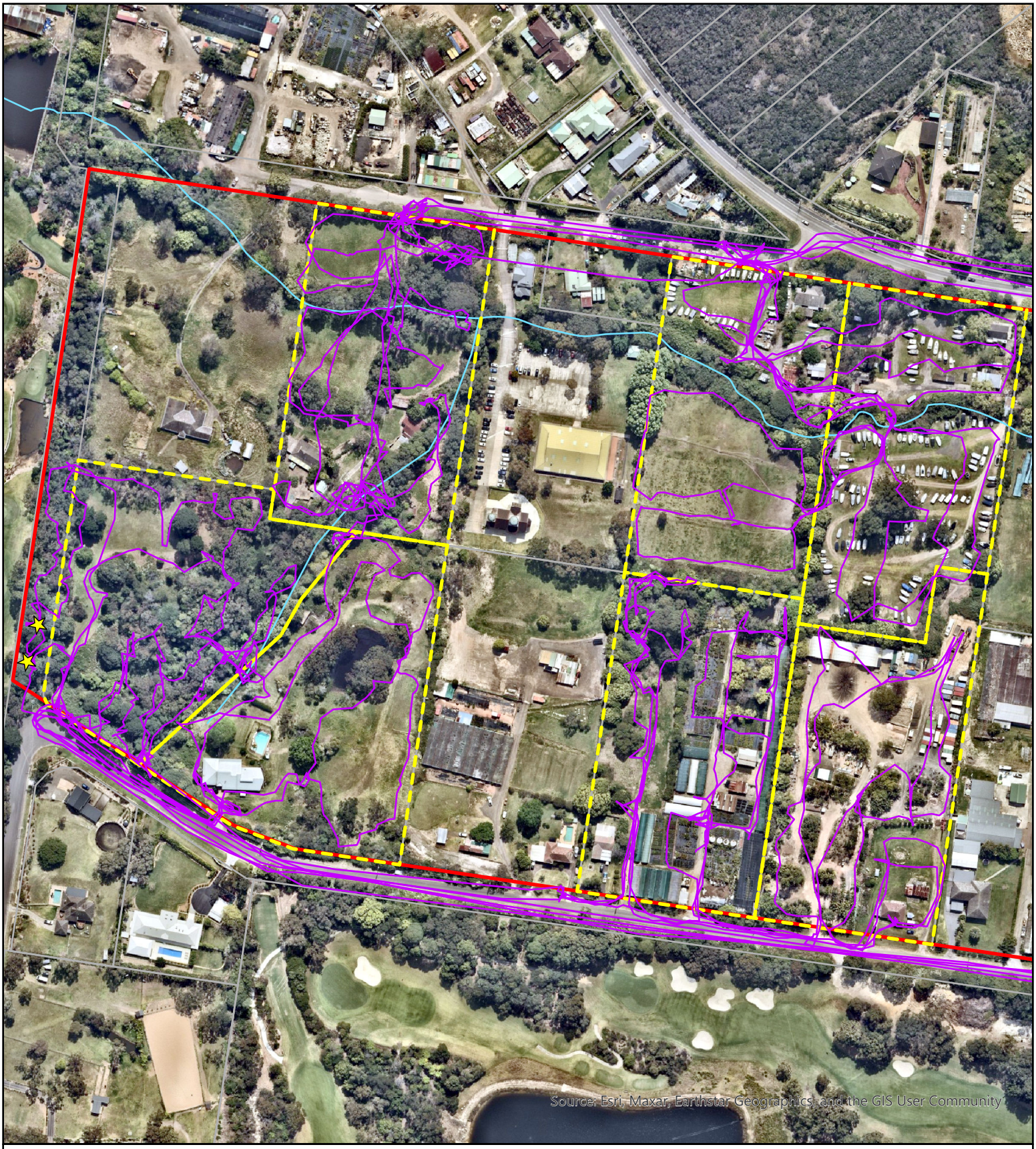
N
W E
S

# Figure 7 - Flora Survey Effort (October - November 2024)

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan




## Legend

- Study Area
- Subject Lands
- Cadastre
- Hydroline
- *Syzygium paniculatum*
- *Syzygium paniculatum* Transects (20m/40m)

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: May 2025

Imagery: NearMap 2024
Spatial Reference: GDA2020 MGA Zone 56

0 30 60 m
Scale: 1:3,000

N
W E
S

# Figure 8 - Flora Survey Effort (April 2025)

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan


## Legend

- Study Area
- Subject Lands
- Cadastre
- Hydroline
- Nocturnal Mammal Survey
- Snail Search
- Frog Survey
- Koala SAT
- Koala SAT Central Tree
- Hollow Bearing Tree (HBT)
- ANABAT
- Camera Trap
- Call Playback

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: May 2025

Imagery: NearMap
Spatial Reference: GDA2020 MGA Zone 56

0 30 60 m
Scale: 1:3,000

N
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# Figure 9 - Fauna Survey Effort

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan

# 7.0 Review of previous studies

The Ingleside area has been subject to previous planning strategies and assessments, led by State Government Departments identifying it as a potential location for large-scale rezoning to provide additional residential dwellings, biodiversity conservations and water services as well as urban facilities.

The draft Ingleside Place Strategy was submitted for public exhibition during May- July 2021. Upon public consultation, it was determined that the department would not proceed with the strategy due to infrastructure costs and environmental factors making the rezoning non- viable.

Eco Logical Australia (ELA) conducted a biodiversity assessment across the wider Precinct to identify biodiversity values and provide conservation management actions to be incorporated into the Precinct Structure Plan. The wider precinct was subject to confirmation of vegetation communities, assessment of threatened species habitat and targeted threatened species surveys. Review of Eco Logical (2016), presented a number of findings and assessments for the Ingleside Precinct.

Similarly, the ELA assessment was limited by the ability to gain access to all lands proposed for land use change. Desktop assessment or visual surveys from distance were also utilised to ascertain vegetation communities and threatened species habitat with the precinct. Only two of the lots within the Study Area of the Ingleside Wilga Precinct were accessible, so limited knowledge of the biodiversity values for the Study Area was presented for the area. *Microtis sp.* specimens were largely recorded within the wider precinct with habitat of known recordings commensurate with the specimen recorded within the Ingleside Wilga Precinct.

Ecological connectivity and protection of 'high' ecological value were a significant conservation measure recommended as part of the draft strategy. As the precinct is bordered by substantial patches of remnant vegetation including, Ku-ring-gai Chase National Park, Garigal National Park and Ingleside Chase Reserve the report recommended that wildlife corridors and linkages ensuring species movement were not fragmented by large infrastructure or development. Where fragmentation or blockages were to occur as part of the precinct, it was recommended to provide strategies to enhance fauna movement through these areas.

The report concluded that with considerable management recommendations considered and implemented in future land use planning then the precinct was suitable for higher density development to meet the planning objectives proposed for the area.

# 8.0 Inaccessible Land Assessment

A significant portion of the lands within the Study Area are located on private land and access was not granted as part of this assessment.

Land parcels of non-surveyed areas fall under the same zoning as the Subject Land (RU2 – Rural Landscape) and consist of similar land uses seen throughout the surveyed parcels. A mixture of small seniors living to large lot residential housing and, commercial and industrial type land uses exist outside the Subject Land. An Orthodox Church is also located within the centre of the precinct area, with a plant nursery situated along Powderworks Road to the eastern edge.

With no access granted to a portion of these lands proposed for future development, validation of vegetation types, habitat suitability and assessments for threatened species, were all unable to be formulated at a detailed level; therefore, were primarily derived from desktop assessment. Assessment included GIS analysis of aerial imagery and reviews of the SVTM (DCCEEW, 2024), NSW watercourse mapping, geology mapping (MinView, 2025) and BioNet threatened species records in the locality. Observations taken from neighbouring properties during the surveys in the Subject Land also provides a level of understanding of these lands. Vegetation within the private lands occurs in small patches of connected canopy adjoining any infrastructure building or clearing that is associated with that land use. From surveys in the Subject Land, vegetation along the east-west riparian corridor within inaccessible lots, was similarly in a highly disturbed state, with Bamboo and Lantana thickets the dominant species. Other areas of canopy cover, seen from aerial imagery, occur in small single stands around houses and industrial lots, implying that these singular bunches are not remnant vegetation and not naturally occurring, more so, have been planted.

From the visual assessment of neighbouring properties, no significant or notable habitat features were found present, reducing the likelihood of some threatened species from potentially occurring within these areas. Since the inaccessible lands share natural connectivity, similar landscape features, land uses and levels of disturbance with those within the Subject Site, their biodiversity values are assumed to be low and therefore, characteristic of the Ingleside Wilga Precinct. Further detailed investigations in these areas would be required as part of future development applications to confirm the presence of any native vegetation and threatened species habitat that was not visually accessible. Due to the occurrence of *Microtis angusii* found within the Subject Site and its known populations within the wider locality, it is recommended the detailed surveys would be conducted in inaccessible lands with future development applications.

The current Masterplan provides adequate consideration to the avoid and minimise principles within the non-surveyed lands, with preservation of riparian corridors and connectivity being maintained to the wider area. Land parcels with assumed exotic or planted vegetation are proposed for higher density zoning, reducing the need to build right at the interface with areas of higher ecological importance.

The items discussed above, the assessment from neighbouring lots and aerial imagery determined that lands not surveyed within the precinct would also be suitable for future higher-density development as proposed by the masterplan.

# 9.0 Avoid and Minimise Considerations

Section 7 of the BAM provides a list of measures that need to be taken into consideration during project planning and design to minimise impacts upon native vegetation, habitat and other prescribed biodiversity values. Applicable measures which have been considered as part of this Planning Proposal to minimise impacts are provided below.

The proposed Masterplan design as shown in **Appendix A** is the result of an iterative design process involving consultation with all relevant consultants, with the aim of achieving optimal biodiversity conservation outcomes whilst delivering expected development outcomes.

## 9.1 Threatened Biodiversity Impact Avoidance and Minimisation

### 9.1.1 Threatened Ecological Communities

Large intact patches of remnant native vegetation will be retained as part of future development plans, providing areas of higher ecological function to be improved further.

Areas of Duffys Forest EEC and Swamp Sclerophyll Forest EEC will be retained, reducing the potential for significant impacts to these sensitive areas. Approximately 35.2% of Duffys Forest EEC and 55.6% of Swamp Sclerophyll Forest EEC found within the Subject Site is proposed to be retained.

All areas of retained native vegetation will be managed under a Vegetation Management Plan (VMP). The intent of the VMP will be to improve the overall quality of the vegetation and enhance biodiversity by undertaking activities such as supplementary planting and weed management. Non-native vegetation areas proposed for conservation will be subject to reconstruction approaches and regenerated back to plant community types associated with Duffys Forest EEC or Swamp Sclerophyll EEC respectfully, to enhance the TECs already present on site and to provide a net positive outcome for biodiversity in the Study Area. Areas proposed for retention are shown in **Figure 10**.

The Study Area has sufficient land outside of these retained areas identified as lower ecological importance, where future development is proposed. Preventing development of these areas as demonstrated how the masterplan has first avoided and then minimised impacts to biodiversity values resulting in a net positive biodiversity outcome for the wider locality.

### 9.1.2 Threatened Flora

As described in **Section 5.1**, two threatened flora species, *Microtis angusii* (Angus Onion Orchid) and *Syzygium paniculatum* (Magenta Lily Pilly) were identified within the Study Area. The location of core areas of suitable habitat for these species has been considered in the iterative design process, and particular for flora species, where possible impacts to individuals are proposed to be avoided. Locations of the *Microtis angusii* specimens have been withheld due to the sensitivity of the species. locations of the *Syzygium paniculatum* records are provide in **Figure 10**.


## Legend

- Study Area
- Subject Lands
- Cadastre
- Hydroline

**Avoidance**

- Retained HBTs
- *Syzygium paniculatum*
- Retained Duffys Forest EEC
- Retained Swamp Sclerophyll Forest EEC

**Minimisation**

- Riparian Corridor/Conservation Area

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: May 2025

Imagery: NearMap
Spatial Reference: GDA2020 MGA Zone 56

0 40 80 m
Scale: 1:4,500

N W E S

# Figure 10 - Avoidance and Minimisation

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan

## 9.2 Preliminary impact assessment

### 9.2.1 Prescribed impacts

*Habitat features (excluding non- native vegetation)*

Features having the potential to contain habitat values, that are not native vegetation, and which occur within the Subject Land, include dams, watercourses and patches of exotic flora species. The main watercourses are proposed to be retained. Therefore, it is considered that prescribed impacts are likely to be limited as a result of the proposed rezoning and subsequent development.

*Movement corridors and connected areas of habitat*

Through iterative consultations, and following review of ecological data collected on site, the Masterplan proposes to retain and enhance key biodiversity corridors, mainly through the east-west riparian corridor, and the additional adjoining corridor to the south-west. These corridors are mapped as 'Biodiversity' areas under the Pittwater Local Environment Plan 2014 (LEP) and will be maintained to provide connectivity and habitat from the surrounding area and throughout the Study Area. The retention of such corridors is intended to ensure preservation of available habitat and to allow movement throughout the precinct for mobile species. In particular, maintenance of the corridors along Powderworks Road through to Wilga Street will maintain the connectivity between Ingleside Chase Reserve in the east and Garigal National Park in the south-west (refer to **Figure 11**). Additional vegetation linkages to these areas will be created through the change in land use proposed by the masterplan in the northern portion of the Study Area. Presently, the land in part is utilised as a boat storage facility, equine agistment, and contains residential dwellings; however, the masterplan proposes these areas along the creek corridor be revegetated and managed for biodiversity conservation, maximising the width of the riparian corridors and providing corridors of connected habitat.

*Waterbodies and hydrological processes*

A variety of watercourses and associated Vegetated Riparian Zones (VRZ's) are proposed to be retained as part of the Masterplan. Through regeneration of the VRZs and potential aquatic zones, hydrological processes will be improved, providing higher quality water arriving into Mullet Creek and largely the Narrabeen Lagoon. Planting of native vegetation along these corridors will provide stability along creek banks and prevent erosion. Additionally, this improvement of the VRZ will add to the ecological function of the Study Area.

T*urbine strikes*

No wind turbine is proposed to be installed within the development.

*Vehicle strikes*

The proposed development will lead to a significant increase in vehicular traffic within the Subject Land. Fencing and signage will be installed to limit the risk of incursions by fauna from within conservation lands into developed areas. Speed limits within residential subdivisions are likely to be 50km/hr, thus reducing the risk of vehicle strike with fauna.

### 9.2.2 Direct, indirect and residual impacts

Impacts to threatened entities have been assessed, with surveys across the Subject Site having been completed over 2024 and 2025.

The iterative design process has achieved a significant reduction in the extent of proposed impacts in comparison to early iterations. It is proposed to retain patches of Duffys Forest EEC and Swamp Sclerophyll Forest EEC on site, in addition to sections of threatened fauna and flora habitat. Furthermore, the proponent has sought to limit impacts to threatened species, by concentrating the majority of the development lands on areas of the Subject Land which contain biodiversity values. Impacts proposed to native vegetation are presented in **Table 10.**

**Table 10 - PCT Impact Assessment**

| PCT | Impact Area (ha) |
|---|---|
| PCT 3593 | 0.97 |
| PCT 3595 | 0.14 |
| PCT 3986 | 0.39 |
| **Total** | **1.50** |


## Legend

- Study Area
- Habitat Connectivity
- Proposed Habitat Connectivity
- Ecological Corridor

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: May 2025

Imagery: World Imagery
Spatial Reference: GDA2020 MGA Zone 56

0 130 250 m
Scale: 1:12,000

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W E
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# Figure 11 - Habitat Connectivity

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan


## Legend

Study Area | Cadastre | Impact Area

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: May 2025

Imagery: NearMap
Spatial Reference: GDA2020 MGA Zone 56

0 40 80 m
Scale: 1:4,500

N W E S

# Figure 12 - Impact Area

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan


## Legend

- Study Area
- Subject Lands
- Cadastre
- Hydroline
- Ground-truthed Waterbodies
- Southern Myotis Species Polygon

Address: Wilga Wilson Planning Proposal, Ingleside NSW
Client: Mirvac Projects Pty Ltd | AEP Ref: 3499 | Date: May 2025

Imagery: NearMap
Spatial Reference: GDA2020 MGA Zone 56

0 30 60 m
Scale: 1:3,000

N
W E
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# Figure 13 - Southern Myotis Species Polygon

AEP



Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan

# 10.0 Future Approval Pathway

Given the fragmentation of land, it is unlikely that Bio-Certification is a feasible option and able to be agreed upon to deliver a coordinated outcome. Instead, it will be necessary for development applications (DAs) to comply with requirements of the BC Act and progress landholding specific Biodiversity Development Assessment Reports (BDARs).

For the purpose of Mirvac and Truslan landholdings, it is considered that separate DAs, based on the conservation outcomes identified in the masterplan, will be able to demonstrate appropriate levels of avoidance and on-site management measures to be supplemented by offsite offsets. Additionally, where vegetation is to be conserved and / or revegetated, appropriate VMPs will be prepared and implemented to enhance the biodiversity values of the site and create a net positive biodiversity outcome.

# 11.0 Conclusion

Application of the BAM against the proposal has quantified current biodiversity values within the site. A comprehensive assessment of biodiversity values presents within the Subject Land has been undertaken in April, October and November 2024 and March- April 2025 in accordance with the BAM, with numerous field surveys to identify any potential threatened entities occurring on site. As a result of this assessment, it was identified that native vegetation within the Subject Land was in a generally poor and disturbed, condition, and contains marginal habitat values for a selection of threatened species.

The iterative design process has led to the formulation of a Masterplan that seeks to balance sustainable environmental outcomes with local housing development needs.

As such, the resulting Masterplan proposes to retain areas of higher ecological importance, such as remnant native vegetation including those identified as an EEC, riparian corridors and aquatic areas, and habitat corridors. All retained native vegetation will be managed under a Vegetation Management Plan.

With the implementation of the management strategies identified above, the proposed development is expected to result in a net positive outcome for biodiversity values across the precinct, while also accommodating for higher-density residential living.

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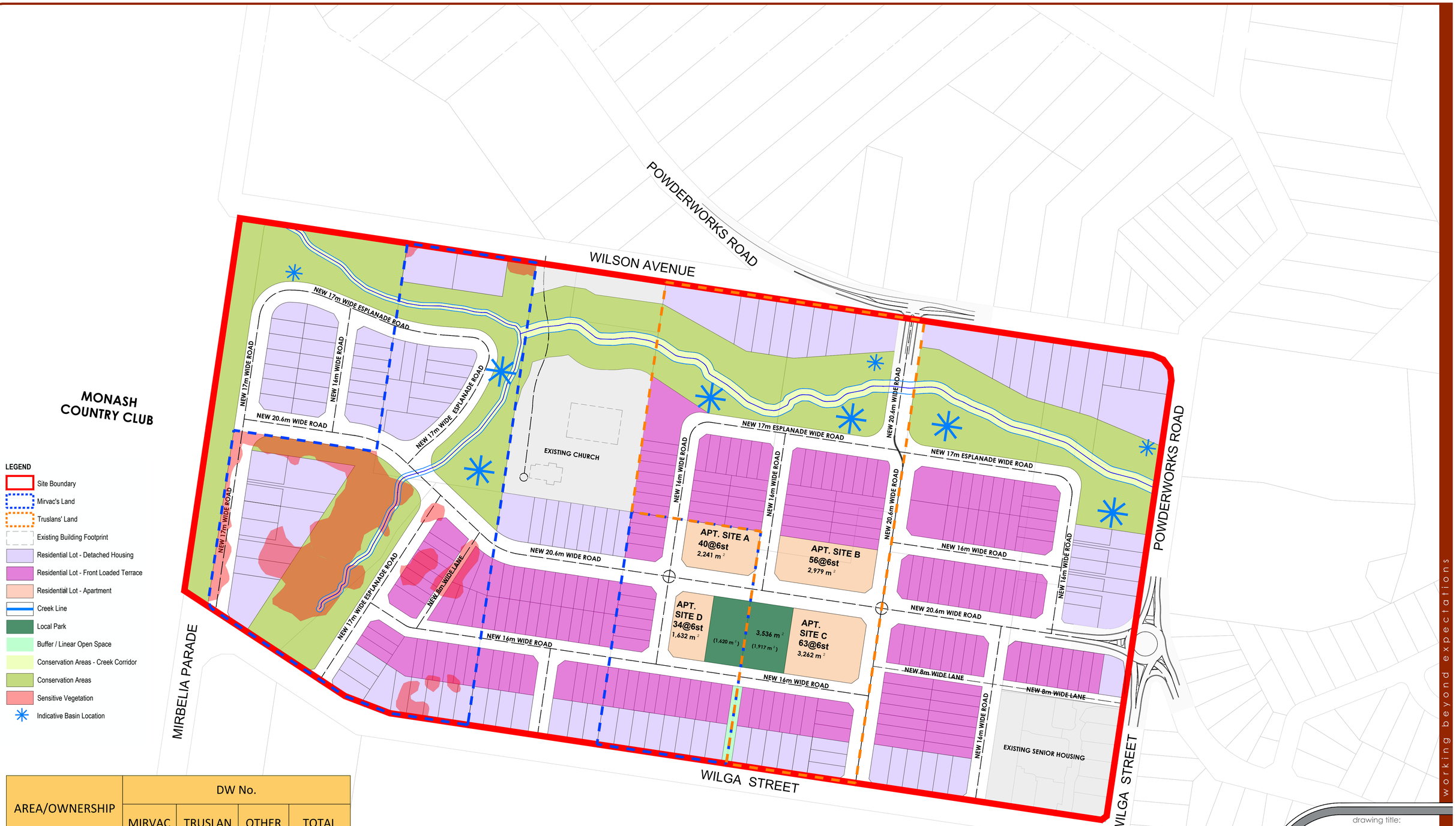
# Appendix A – Proposed Masterplan

300360-MP_ADWJ_MP




**LEGEND**

- Site Boundary
- Mirvac's Land
- Truslans' Land
- Existing Building Footprint
- Residential Lot - Detached Housing
- Residential Lot - Front Loaded Terrace
- Residential Lot - Apartment
- Creek Line
- Local Park
- Buffer / Linear Open Space
- Conservation Areas - Creek Corridor
- Conservation Areas
- Sensitive Vegetation
- Indicative Basin Location

| AREA/OWNERSHIP | | DW No. | | | |
|---|---|---|---|---|---|
| | | MIRVAC | TRUSLAN | OTHER | TOTAL |
| | Detached Housing | 39 | 16 | 78 | 133 |
| | Terrace Housing | 46 | 57 * | 107 * | 210 * |
| | Apartment | 74 | 119 | 0 | 193 |
| **TOTAL** | | **159** | **192** | **185** | **536** |

**NOTE(1)*: This number includes both Terrace Housing and Manor Housing with each site allocated for Manor Housing accommodating 4 dwellings.**
**NOTE (2) There is 1000 sqm of GBA Retail on Truslan's land (Apt Site C) equivalent to approx 5 Apt Units**
**NOTE (3) The Dwelling Number in Other's land includes the Existing Senior Housing**

N

drawing title:

# CONCEPT MASTERPLAN

location: INGLESIDE AND ELANORA HEIGHTS, NSW

council: NORTHERN BEACHES COUNCIL

dwg ref: 300360-MP-012-V01

client:

| ver. | date | comment | drawn | pm | co-ordinate information | level information | scale (A1 original size) | notes |
|---|---|---|---|---|---|---|---|---|
| A | 09.04.2025 | DRAFT | JDU | PJA | CO-ORDINATE SYSTEM: MGA56 GDA2020 | DATUM: N/A<br>CONTOUR INTERVAL: N/A | A1 1:1500 0 30 60 75m A3 1:3000 | |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hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411
www.adwjohnson.com.au

# Appendix B – Flora Species List

**Plot no:** 1 **Job:** Ingleside **Job no:** 3499 **Date:** 20.03.2024 **Observers:** DK ALR

**Mapped Regional Vegetation community:**

| Upper stratum | Unknown (Comment) | C | Ab | Mid stratum | (Comment) | C | Ab | Lower stratum | (Comment) | C | Ab |
|---|---|---|---|---|---|---|---|---|---|---|---|
| angophora costata | | 15 | 5 | acacia longifolia | Acacia long | 2 | 5 | commelina cyanea | Commaleana | 1 | 50 |
| eucalyptus haemastoma | | 8 | 3 | pittosporum | Pitto rev | 7 | 20 | lomandra longifolia | Lomandra | 0.1 | 2 |
| corymbia gummifera | | 5 | 4 | polyscias sambucifolia | Polyscias | 5 | 10 | cenchrus clandestinus | Kikuyu | 1 | 20 |
| Elaeocarpus reticulatus | | 3 | 10 | smilax glyciphylla | Smilax glyci | 0.4 | 5 | hypolepis muelleri | Pteridium | 30 | 100 |
| glochidion ferdinandi | | 5 | 15 | lantana camara | Lantana | 3 | 50 | dillwynia retorta | Dilwynia sp | 0.1 | 1 |
| | | | | ceratopetalum | Ceratopetalu | 1 | 5 | paspalidium distans | Paspalidium | 0.1 | 5 |
| | | | | parsonsia straminea | Parsonsia | 0.1 | 10 | paspalum urvillei | Paspalum | 2 | 30 |
| | | | | homalanthus | Bleeding heart | 0.1 | 1 | pterostylis spp. | Pterostylis sp | 0.2 | 20 |
| | | | | | | | | microlaena stipoides | Microlaena | 1 | 50 |
| | | | | | | | | paspalum dilatatum | Paspalum | 0.1 | 10 |
| | | | | | | | | dianella caerulea | Dianella cae | 0.2 | 0 |
| | | | | | | | | entolasia stricta | Entolasia | 0.1 | 1 |
| | | | | | | | | actinotus helianthi | Actinotus sp. | 0.1 | 1 |
| | | | | | | | | hibbertia spp. | Hibbertia | 0.1 | 1 |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Total Cover** | | 36 | | | | 18.6 | | | | 36.1 | |

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Arrival time:** | 12:30 | | **Departure time:** | 01:25 | **Weather:** | Overcast | **TWO transect photos (one landscape, one portrait) taken** | | **Transect GPS points taken** | |
| **Start easting/northing:** | 339,494 | 6270707 | | **End easting/northing:** | 339,445 | 6270718 | **Zone:** | 56 | **Bearing:** | 268 |

| **Tree Stem Size Class at DBH** | **Presence(TRUE)/Absence(FALSE)** | **Number** | **Count of Hollow Bearing Trees** |
|---|---|---|---|
| **< 5 cm** | TRUE | [redacted] | 1 |
| **5 - 9 cm** | TRUE | [redacted] | [redacted] |
| **10 – 19 cm** | TRUE | [redacted] | |
| **20 – 29 cm** | TRUE | [redacted] | **Length of logs (m)** |
| **30 – 49cm** | TRUE | 2 | 0 |
| **50 -79cm** | TRUE | 2 | [redacted] |
| **>80cm** | FALSE | 0 | |

**Leaf Litter Cover within 5 x 1m2 sub-plots**

| | **Leaf litter** | **Live vegetation** | **Bare ground** | **Rocks** | **Other** | **Total** |
|---|---|---|---|---|---|---|
| **1** | 80 | 15 | 5 | 0 | 0 | **100** |
| **2** | 90 | 15 | 5 | 0 | 0 | **110** |
| **3** | 85 | 20 | 0 | 0 | 0 | **105** |
| **4** | 25 | 75 | 5 | 0 | 0 | **105** |
| **5** | 80 | 15 | 5 | 0 | 0 | **100** |
| **Average** | 72 | 28 | 4 | 0 | 0 | **104** |

**Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)**

Infested with lantana (had to change location of leaf litter cover in areas )

**Habitat features, comments and incidental fauna observations:**

**Plot no:** 2 **Job:** Ingleside **Job no:** 3499 **Date:** 20.03.2024 **Observers:** DK ALR

**Mapped Regional Vegetation community:**

| Upper stratum | (Comment) | C | Ab | Mid stratum | n | C | Ab | Lower stratum | (Comment) | C | Ab |
|---|---|---|---|---|---|---|---|---|---|---|---|
| eucalyptus punctata | Euc | 20 | 3 | acacia longifolia | Acacia | 1 | 3 | Bouteloua dactyloides | Buffalo grass | 50 | 1000 |
| cyathea australis | Cyathea | 1 | 1 | Kunzea ambigua | Kunzea | 10 | 20 | centella asiatica | Centella | 1 | 50 |
| pinus spp. | Pinus sp | 0.5 | 2 | dillwynia spp. | Dilwynia | 0.1 | 1 | Sida rhombifolia | Sida | 0.1 | 10 |
| Cinnamomum camphora | Camphor | 1 | 5 | | | | | dianella caerulea | Dianella cae | 0.1 | 20 |
| allocasuarina torulosa | Allocasuarin | 0.5 | 2 | acacia fimbriata | Acacia fim | 2 | 5 | senna spp. | Senna | 4 | 30 |
| acacia decurrens | Acacia | 15 | 5 | lantana camara | Lantana | 2 | 20 | asparagus aethiopicus | Asparagus | 0.1 | 1 |
| Glochidion ferdinandi | Glochidium | 1 | 5 | grevillea spp. | Grevillea | 0.1 | 5 | hydrocotyle bonariensis | Hydrocotyl | 0.1 | 5 |
| Banksia ericifolia | Banksia | 3 | 10 | acacia saligna | Acacia | 0.1 | 1 | cyperus eragrostis | Cyperus era | 0.1 | 5 |
| allocasuarina spp. | Allocasuarin | 1 | 1 | Leptospermum polygalifolium | Lepto sp | 0.5 | 3 | setaria parviflora | Setaria parv | 0.1 | 10 |
| | | | | callistemon salignus | Callistemo | 0.1 | 2 | commelina cyanea | Commaleana | 0.5 | 20 |
| | | | | | | | | paspalum spp. | Paspalum | 0.2 | 5 |
| | | | | | | | | ageratina adenophora | Crofton | 0.5 | 30 |
| | | | | | | | | rubus anglocandicans | Blackberry | 0.1 | 1 |
| | | | | | | | | lomandra longifolia | Lomandra | 0.1 | 5 |
| | | | | | | | | gomphocarpus fruticosus | Gomphocpus | 0.1 | 5 |
| | | | | | | | | microlaena stipoides | Microlaena | 0.5 | 50 |
| | | | | | | | | axonopus fissifolius | Aconopus | 0.2 | 30 |
| | | | | | | | | ehrharta erecta | Erharta erecta | 0.1 | 10 |
| | | | | | | | | nephrolepis cordifolia | Fish one fern | 0.1 | 5 |
| | | | | | | | | Oplismenus imbecillis | Oplismenus | 2 | 100 |
| | | | | | | | | pittosporum revolutum | Pitto rev | 0.1 | 5 |
| | | | | | | | | andropogon virginicus | Whiskey | 0.2 | 30 |
| | | | | | | | | paspalidium distans | Paspalum | 1 | 20 |
| | | | | | | | | lepyrodia scariosa | Leproydia | 0.5 | 30 |
| | | | | | | | | eragrostis brownii | Eragrostis | 0.1 | 5 |
| | | | | | | | | | | | |
| | | | | | | | | calochlaena dubia | Calocleana | 0.1 | 1 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Total Cover** | | 43 | | | | 15.9 | | | | 62 | |

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Arrival time:** | 01:50 | | **Departure time:** | 03:00 | **Weather:** | Raining | **TWO transect photos (one landscape, one portrait) taken** | Done | **Transect GPS points taken** | Done |
| **Start easting/northing:** | 339,551 | 6270509 | | **End easting/northing:** | 339,533 | 6270510 | **Zone:** | 56 | **Bearing:** | 268 |
| **Tree Stem Size Class at DBH** | **Presence(TRUE)/Absence(FALSE)** | **Number** | **Count of Hollow Bearing Trees** | **Leaf Litter Cover within 5 x 1m2 sub-plots** | | | | | | |
| **< 5 cm** | TRUE | | 0 | | **Leaf litter** | **Live vegetation** | **Bare ground** | **Rocks** | **Other** | **Total** |
| **5 - 9 cm** | TRUE | | | **1** | 30 | 80 | 0 | 0 | 0 | **110** |
| **10 – 19 cm** | TRUE | | | **2** | 45 | 45 | 10 | 0 | 0 | **100** |
| **20 – 29 cm** | TRUE | | **Length of logs (m)** | **3** | 20 | 5 | 0 | 75 | 0 | **100** |
| **30 – 49cm** | TRUE | 1 | 0 | **4** | 65 | 35 | 0 | 0 | 0 | **100** |
| **50 -79cm** | TRUE | 1 | | **5** | 50 | 50 | 0 | 0 | 0 | **100** |
| **>80cm** | FALSE | 0 | | **Average** | 42 | 43 | 2 | 15 | 0 | **102** |
| **Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)** | | | | | | | | | | |
| | | | | | | | | | | |
| **Habitat features, comments and incidental fauna observations:** | | | | | | | | | | |
| Completed a 20x20 plot. Couldn't walk further due to weed infestation and the represented vegetation was no longer present. Therefore leaf litter cover was completed at every 4ms | | | | | | | | | | |

**Plot no:** 3 **Job:** Ingleside **Job no:** 3499 **Date:** 20.03.2024 **Observers:** DK AR

**Mapped Regional Vegetation community:**

| Upper stratum | Unknown (Comment) | C | Ab | Mid stratum | (Comment) | C | Ab | Lower stratum | (Comment) | C | Ab |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Casuarina cunninghamiana subsp. cunninghamiana | Cas cunningham | 30 | 5 | Anredera cordifolia | Madeira vine | 15 | 100 | Tradescantia fluminensis | Trad | 40 | 1000 |
| | | | | Lantana camara | Lantana | 1 | 5 | Stephania japonica | Stephanica | 0.5 | 10 |
| Neolitsea dealbata | Bolly gum | 0.2 | 1 | pittosporum undulatum | Pitto rev | 0.2 | 1 | Pteridium esculentum | Pteridium | 3 | 80 |
| | | | | | | | | calochlaena dubia | Calochloa | 2 | 10 |
| erythrina x sykesii | Coral tree | 0.5 | 1 | | | | | Ehrharta erecta | Erharta erecta | 8 | 100 |
| cyathea australis | Tree fern | 2 | 2 | | | | | | | | |
| Lophostemon confertus | Lophostemon confertus | 5 | 2 | | | | | Oplismenus aemulus | Oplismenus | 0.5 | 50 |
| Eucalyptus robusta | Eucalyptus robusta | 8 | 2 | | | | | commelina cyanea | Commaleana | 0.2 | 20 |
| | | | | | | | | | | | |
| | | | | | | | | Paspalum quadrifarium | Paspalum | 0.2 | 20 |
| | | | | | | | | Dichondra repens | Dichondria | 0.1 | 10 |
| | | | | | | | | rumex sagittatus | Rumex | 0.1 | 5 |
| | | | | | | | | acetosa sagittata | Turkey | 0.1 | 2 |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Total Cover** | | 45.7 | | | | 16.2 | | | | 54.7 | |

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Arrival time:** | 04:15 | | **Departure time:** | 05:10 | **Weather:** | Cloudy | **TWO transect photos (one landscape, one portrait) taken** | Done | **Transect GPS points taken** | Done |
| **Start easting/northing:** | 339,577 | 6270836 | | **End easting/northing:** | 339,623 | 6270818 | **Zone:** | 56 | **Bearing:** | 100 |
| **Tree Stem Size Class at DBH** | **Presence(TRUE)/ Absence(FALSE)** | **Number** | **Count of Hollow Bearing Trees** | **Leaf Litter Cover within 5 x 1m2 sub-plots** | | | | | | |
| **< 5 cm** | TRUE | [redacted] | 1 | | **Leaf litter** | **Live vegetation** | **Bare ground** | **Rocks** | **Other** | **Total** |
| **5 - 9 cm** | TRUE | [redacted] | [redacted] | **1** | 25 | 75 | 0 | 0 | 0 | **100** |
| **10 – 19 cm** | TRUE | [redacted] | [redacted] | **2** | 0 | 15 | 85 | 0 | 0 | **100** |
| **20 – 29 cm** | TRUE | [redacted] | **Length of logs (m)** | **3** | 15 | 85 | 0 | 0 | 0 | **100** |
| **30 – 49cm** | TRUE | 7 | 8 | **4** | 40 | **40** | 20 | 0 | 0 | **100** |
| **50 -79cm** | TRUE | 1 | [redacted] | **5** | 0 | 0 | 0 | 0 | 100 | **100** |
| **>80cm** | TRUE | 3 | [redacted] | **Average** | 16 | 43 | 21 | 0 | 20 | **100** |
| **Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)** | | | | | | | | | | |
| | | | | | | | | | | |
| **Habitat features, comments and incidental fauna observations:** | | | | | | | | | | |
| Bridge with creek running through middle of plot. High banks either side. Over grown with vines. Number 5 for leaf litter cover OTHER = creek | | | | | | | | | | |

**Plot no:** 4 **Job:** Ingleside **Job no:** 3499 **Date:** 21.03.2024 **Observers:** DK ALR

**Mapped Regional Vegetation community:**

| Upper stratum | Unknown (Comment) | C | Ab | Mid stratum | (Comment) | C | Ab | Lower stratum | (Comment) | C | Ab |
|---|---|---|---|---|---|---|---|---|---|---|---|
| corymbia gummifera | Corymbia gummifera | 25 | 4 | pittosporum undulatum | Pitto ung | 2 | 20 | gleichenia dicarpa | Glechnia | 20 | 1000 |
| eucalyptus sieberi | Eucalyptus seiberi | 5 | 1 | Leucaena leucocephala | Leucaena | 0.5 | 10 | Lindsaea linearis | Lindsea | 0.1 | 5 |
| Angophora costata | Angophora costata | 10 | 3 | senna spp. | Senna | 0.1 | 2 | Pteridium esculentum | Pteridium | 25 | 200 |
| ceratopetalum gummiferum | Certaopetalum gum | 20 | 15 | Lantana camara | Lantana | 0.5 | 2 | lomandra spp. | Lomandra sp | 0.2 | 10 |
| elaeocarpus reticulatus | Blueberry ash | 2 | 3 | Polyscias sambucifolia | Polyscias | 0.5 | 20 | dianella caerulea | Dianella cae | 0.1 | 10 |
| livistona australis | Livistona austral | 0.5 | 1 | parsonsia straminea | Parsonsia | 2 | 5 | passiflora herbertiana | | 0.1 | 1 |
| Cinnamomum camphora | Camphor laurel | 0.1 | 2 | smilax glyciphylla | Smilax glicy | 2 | 10 | | | | |
| Homalanthus populifolius | Bleeding heart | 0.1 | 1 | ligustrum sinense | Privet small | 0.5 | 20 | entolasia stricta | Entolasia | 2 | 20 |
| Glochidion ferdinandi | Glochidium ferd | 0.1 | 2 | lomatia silaifolia | Lomatia sal | 0.2 | 20 | lomandra longifolia | Lomandra | 1 | 10 |
| | | | | | | | | | | | |
| | | | | acacia ulicifolia | Acacia ul? | 0.1 | 5 | Lomandra obliqua | Lomandra obl. | 0.1 | 5 |
| | | | | breynia oblongifolia | Breynia oblong | 0.1 | 1 | Billardiera scandens | Billaderia | 0.1 | 1 |
| | | | | Platylobium formosum | Platylobium | 0.2 | 5 | oplismenus aemulus | Oplismenus | 0.1 | 10 |
| | | | | Acacia decurrens | Acacia | 0.1 | 1 | | | | |
| | | | | | | | | Hypochaeris glabra | Hypochareis | 0.1 | 1 |
| | | | | | | | | ageratina adenophora | Crofton | 0.1 | 3 |
| | | | | | | | | caustis flexuosa | Caustis sp. | 0.2 | 20 |
| | | | | | | | | corybas spp. | Corybas sp. | 0.1 | 5 |
| | | | | | | | | asparagus aethiopicus | Asparagus | 0.1 | 1 |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Total Cover** | | 62.8 | | | | 8.8 | | | | 49.4 | |

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Arrival time:** | 10:50 | | **Departure time:** | 07:12 | **Weather:** | Sunny | **TWO transect photos (one landscape, one portrait) taken** | | **Transect GPS points taken** | |
| **Start easting/northing:** | 339,486 | 6270645 | | **End easting/northing:** | 339,460 | 6270608 | **Zone:** | 56 | **Bearing:** | 198 |
| **Tree Stem Size Class at DBH** | **Presence(TRUE)/ Absence(FALSE)** | **Number** | **Count of Hollow Bearing Trees** | **Leaf Litter Cover within 5 x 1m2 sub-plots** | | | | | | |
| **< 5 cm** | TRUE | [redacted] | 1 | | **Leaf** | **Live vegetation** | **Bare ground** | **Rocks** | **Other** | **Total** |
| **5 - 9 cm** | TRUE | [redacted] | [redacted] | **1** | 85 | 20 | 5 | 0 | 0 | **110** |
| **10 – 19 cm** | TRUE | [redacted] | [redacted] | **2** | 70 | 30 | 0 | 0 | 0 | **100** |
| **20 – 29 cm** | TRUE | [redacted] | **Length of logs (m)** | **3** | 85 | 15 | 0 | 0 | 0 | **100** |
| **30 – 49cm** | TRUE | 10 | 0 | **4** | 60 | 40 | 0 | 0 | 0 | **100** |
| **50 -79cm** | TRUE | 3 | [redacted] | **5** | 80 | 20 | 0 | 0 | 0 | **100** |
| **>80cm** | FALSE | 0 | [redacted] | **Average** | 76 | 25 | 1 | 0 | 0 | **102** |
| **Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)** | | | | | | | | | | |
| | | | | | | | | | | |
| **Habitat features, comments and incidental fauna observations:** | | | | | | | | | | |
| Creek running perpendicular through site. | | | | | | | | | | |

**Plot no:** 5 **Job:** Ingleside **Job no:** 3499 **Date:** 11/112024 **Observers:** JS

**Mapped Regional Vegetation community:**

| Upper stratum | Unknown (Comment) | C | Ab | Mid stratum | (Comment) | C | Ab | Lower stratum | (Comment) | C | Ab |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Casuarina cunninghamiana subsp. cunninghamiana | Cunningham | 8 | 3 | Melaleuca linariifolia | Melaleuca | 10 | 4 | Syngonium spp. | syngpunium | 1 | 3 |
| Triadica sebifera | sapium | 3 | 1 | Elaeocarpus reticulatus | ealeocarpus | 5 | 2 | Ageratina adenophora | ageratina | 0.5 | 5 |
| Eucalyptus robusta | robusta | 15 | 3 | Pittosporum undulatum | pitto undo | 5 | 5 | Calochlaena dubia | calochleana | 1 | 5 |
| | | | | Cestrum parqui | cestrum | 5 | 20 | Livistona australis | livistona | 0.2 | 1 |
| Cyathea cooperi | cyeathea thin | 5 | 1 | Glochidion ferdinandi | glochidion | 3 | 2 | Tradescantia fluminensis | trad | 0.5 | 20 |
| acer spp. | maple | 1 | 1 | Bambusa balcooa | bamboo | 3 | 20 | Agave spp. | Agave | 0.5 | 1 |
| Melaleuca quinquenervia | melq | 1 | 5 | | | | | Senna pendula var. glabrata | senna | 0.2 | 2 |
| Cinnamomum camphora | Cinnamomum camphora | 5 | 2 | | | | | Lantana camara | lanatana | 1 | 5 |
| Lophostemon confertus | brush box | 5 | 3 | | | | | Oplismenus imbecillis | basket grass | 5 | 30 |
| Archontophoenix cunninghamiana | palm | 2 | 1 | | | | | Nothoscordum borbonicum | nothiacodum | 0.2 | 5 |
| | | | | | | | | Geranium homeanum | geranium | 0.1 | 5 |
| | | | | | | | | Commelina cyanea | commelina | 0.2 | 15 |
| | | | | | | | | Stellaria media | chickweed | 0.1 | 10 |
| | | | | | | | | Zantedeschia aethiopica | lily | 0.2 | 5 |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |
| **Total Cover** | | 45 | | | | 31 | | | | 10.7 | |

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Arrival time:** | 03:40 | | **Departure time:** | 05:00 | **Weather:** | Cloudy | **TWO transect photos (one landscape, one portrait) taken** | Done | **Transect GPS points taken** | Done |
| **Start easting/northing:** | 339,578 | 6270717 | | **End easting/northing:** | 339,618 | 6270718 | **Zone:** | 56 | **Bearing:** | 47.5 |
| **Tree Stem Size Class at DBH** | **Presence(TRUE)/ Absence(FALSE)** | **Number** | **Count of Hollow Bearing Trees** | **Leaf Litter Cover within 5 x 1m2 sub-plots** | | | | | | |
| **< 5 cm** | FALSE | | 0 | | **Leaf litter** | **Live vegetation** | **Bare ground** | **Rocks** | **Other** | **Total** |
| **5 - 9 cm** | TRUE | | | **1** | 95 | 0 | 0 | 0 | 0 | **95** |
| **10 – 19 cm** | FALSE | | | **2** | 5 | 0 | 0 | 0 | 0 | **5** |
| **20 – 29 cm** | TRUE | | **Length of logs (m)** | **3** | 90 | 0 | 0 | 0 | 0 | **90** |
| **30 – 49cm** | TRUE | 1 | | **4** | 1 | 0 | 0 | 0 | 0 | **1** |
| **50 -79cm** | TRUE | 4 | | **5** | 5 | 0 | 0 | 0 | 0 | **5** |
| **>80cm** | FALSE | 0 | | **Average** | 39.2 | 0 | 0 | 0 | 0 | **39.2** |
| **Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)** | | | | | | | | | | |
| | | | | | | | | | | |
| **Habitat features, comments and incidental fauna observations:** | | | | | | | | | | |
| | | | | | | | | | | |

**Plot no:** 6 **Job:** Ingleside **Job no:** 3499 **Date:** 11/11/24 **Observers:** JS

**Mapped Regional Vegetation community:**

| Upper stratum | Unknown (Comment) | C | Ab | Mid stratum | (Comment) | C | Ab | Lower stratum | (Comment) | C | Ab |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Eucalyptus punctata | punctata | 18 | | Pittosporum undulatum | pittosporum | 20 | | Gahnia Clarkei | gahnia | 35 | 60 |
| Eucalyptus grandis | flooded gum | 20 | | Elaeocarpus reticulatus | Elaeocarpus | 5 | 1 | Senna pendula var. glabrata | senna | 1 | 10 |
| | | | | Cinnamomum camphora | camphor | 20 | | Hypolepis muelleri | hypolepos | 5 | 30 |
| | | | | Ligustrum lucidum | large leaf | 5 | 50 | Lantana camara | lanatana | 15 | 30 |
| | | | | | | | | Araujia sericifera | moth vin | 0.1 | 5 |
| | | | | | | | | Asparagus aethiopicus | asparagus | 0.5 | 15 |
| | | | | | | | | Passiflora spp. | passiflora | 0.5 | 5 |
| | | | | | | | | Ligustrum sinense | small leave | 1 | 10 |
| | | | | | | | | Dianella caerulea var. caerulea | dianella c | 0.1 | 15 |
| | | | | | | | | Microlaena stipoides | microleana | 0.1 | 15 |
| | | | | | | | | | | | |
| | | | | | | | | Passiflora caerulea | ginger | 0.3 | 5 |
| | | | | | | | | Cyathochaeta diandra | cyathocheata? | 0.1 | 5 |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |
| **Total Cover** | | 38 | | | | 50 | | | | 58.7 | |

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Arrival time:** | 05:00 | | **Departure time:** | 06:00 | **Weather:** | cloudy humid | **TWO transect photos (one landscape, one portrait) taken** | Done | **Transect GPS points taken** | Done |
| **Start easting/northing:** | 339,727 | 6270640 | | **End easting/northing:** | 339,775 | 6270633 | **Zone:** | 56 | **Bearing:** | 100 |

| **Tree Stem Size Class at DBH** | **Presence(TRUE)/Absence(FALSE)** | **Number** | **Count of Hollow Bearing Trees** |
|---|---|---|---|
| **< 5 cm** | FALSE | [redacted] | 0 |
| **5 - 9 cm** | FALSE | | [redacted] |
| **10 – 19 cm** | TRUE | | |
| **20 – 29 cm** | TRUE | | **Length of logs (m)** |
| **30 – 49cm** | TRUE | 2 | 0 |
| **50 -79cm** | TRUE | 5 | |
| **>80cm** | FALSE | 0 | |

**Leaf Litter Cover within 5 x 1m2 sub-plots**

| | **Leaf litter** | **Live vegetation** | **Bare ground** | **Rocks** | **Other** | **Total** |
|---|---|---|---|---|---|---|
| **1** | 40 | 0 | 0 | 0 | 0 | **40** |
| **2** | 30 | 0 | 0 | 0 | 0 | **30** |
| **3** | 50 | 0 | 0 | 0 | 0 | **50** |
| **4** | 70 | 0 | 0 | 0 | 0 | **70** |
| **5** | 40 | 0 | 0 | 0 | 0 | **40** |
| **Average** | 46 | 0 | 0 | 0 | 0 | **46** |

**Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)**

**Habitat features, comments and incidental fauna observations:**

# Appendix C – Fauna Species List

# Observed Fauna Species List

The following list includes fauna species that were observed or indicated by scats, tracks, etc. on, over or near the site during the various field investigations undertaken by AEP (April 2024, October 2024 and November 2024).

* - Introduced species

? - Unconfirmed record, anecdotal records, etc.

A - NSW Atlas of Wildlife record of threatened species for the site.

Threatened species listed under the Biodiversity Conservation Act 2016 (BC Act) or the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) are indicated in bold font.

**Surveyed Observations** - Observed (O), Heard (W), Scat (P), Miscellaneous (M), Track/scratchings (F), Nest (E), Burrow (FB)

**Bat Records** - Observed (O), Definitely (D) Possible or within Species Group (P) Likely (L)

**Survey Equipment** - Anabat (U), Songmeter (AR), Camera Trap (Q)

| Scientific Name | Common Name | NSW status | Comm. status | Surveyed Observations | Survey Equipment |
|---|---|---|---|---|---|
| **Amphibians** | | | | | |
| *Limnodynastes peronii* | Brown-striped Frog | P | | W | |
| *Crinia signifera* | Common Eastern Froglet | P | | O | |
| *Litoria fallax* | Eastern Dwarf Tree Frog | P | | O | |
| *Litoria peronii* | Person's Tree Frog | P | | O | |
| *Litoria verreauxii* | Whistling Tree Frog | P | | O | |
| **Reptiles** | | | | | |
| *Egernia striolata* | Tree Skink | P | | O | |
| *Hemiaspis signata* | Marsh Snake | P | | O | |
| *Intellagama lesueurii* | Eastern Water Dragon | P | | O | |
| *Pseudechis porphyriacus* | Red-bellied Black Snake | P | | O | |
| *Eulamprus quoyii* | Eastern Water Skink | P | | O | |
| **Aves** | | | | | |
| *Chenonetta jubata* | Australian Wood Duck | P | | O, W | |
| *Ocyphaps lophotes* | Crested Pigeon | P | | O, W | |
| *Threskiornis moluccus* | Australian White Ibis | P | | O, W | |
| *Gallinula tenebrosa* | Dusky Moorhen | P | | O, W | |
| *Vanellus miles* | Masked Lapwing | P | | O, W | |
| *Cacatua galerita* | Sulphur-crested Cockatoo | P | | O, W | |
| *Eolophus roseicapilla* | Galah | P | | O | |
| *Dacelo novaeguineae* | Laughing Kookaburra | P | | O | |
| *Caligavis chrysops* | Yellow-faced Honeyeater | P | | O | Q |
| *Manorina melanocephala* | Noisy Miner | P | | O, W | |
| *Gymnorhina tibicen* | Australian Magpie | P | | O, W | |
| *Rhipidura leucophrys* | Willie Wagtail | P | | O | |
| *Corvus coronoides* | Australian Raven | P | | O | |
| *Grallina cyanoleuca* | Magpie-lark | P | | O | |
| *Eopsaltria australis* | Eastern Yellow Robin | P | | O | Q |
| *Hirundo neoxena* | Welcome Swallow | P | | O | |
| *Nycticorax caledonicus* | Nankeen Night Heron | P | | O | |

| Scientific Name | Common Name | NSW status | Comm. status | Surveyed Observations | Survey Equipment |
|---|---|---|---|---|---|
| *Anthochaera chrysoptera* | Little Wattlebird | P | | O, W | |
| *Cracticus nigrogularis* | Pied Butcherbird | P | | O | Q |
| *Accipiter fasciatus* | Brown Goshawk | P | | O | Q |
| *Lichenostomus leucotis* | White-eared honeyeater | P | | O | Q |
| *Meliphaga lewinii* | Lewin's Honeyeater | P | | O | Q |
| *Pachycephala pectoralis* | Australian Golden Whistler | P | | O | Q |
| *Sericornis frontalis* | White-browed Scrubwren | P | | O | |
| *Psophodes olivaceus* | Eastern Whipbird | P | | O, W | |
| *Acridotheres tristis* | Common Myna | P | | O, W | |
| *Zanda funerea* | Yellow-tailed Black-Cockatoo | P | | O, W | |
| *Alectura lathami* | Australian Brush Turkey | P | | O | |
| *Trichoglossus moluccanus* | Rainbow Lorikeet | P | | O | |
| *Phalacrocoraxc carbo* | Great Cormorant | P | | O | |
| *Pycnonotus jocosus* | Red-whiskered bulbul | P | | O | |
| *Maleurus cyaneus* | Superb Fairywren | P | | O | |
| *Gallinula chloropus* | Euarsian Moorhen | P | | O | |
| *Podargus strigoides* | Tawny Frogmouth | P | | O | |
| **Mammals** | | | | | |
| *Pseudocheirus peregrinus* | Common Ringtail Possum | P | | O, P | Q |
| *Trichosurus vulpecula* | Common Brushtail Possum | P | | O, P | Q |
| ***Pteropus poliocephalus*** | **Grey-headed Flying-fox** | **P** | | **O** | |
| *Oryctolagus cuniculus* | Rabbit* | | | O | |
| *Chalinolobus morio* | Chocolate Wattled Bat | P | | O | U |
| ***Myotis macropus*** | **Southern Myotis** | **V** | | **P** | **U** |
| *Perameles nasuta* | Long-nosed bandicoot | P | | O | Q |
| *Vulpes vulpes* | Fox* | P | | O | Q |
| *Felis catus* | Cat* | P | | O | Q |
| *Petaurus breviceps* | Sugar Glider | P | | O | Q |
| *Rattus fuscipes* | Bush Rat | P | | O | Q |
| *Rattus sp.* | Rat | P | | O | Q |
| *Wallabia bicolor* | Swamp wallaby | P | | O | Q |
| *Acrobates pygmaeus* | Feathertail Glider | P | | O | Q |

| Scientific Name | Common Name | NSW status | Comm. status | Surveyed Observations | Survey Equipment |
|---|---|---|---|---|---|
| *Hydromys chrysogaster* | Water Rat | P | | O | |
| *Equus caballus* | Horse | P | | O | |
| *Macropus* | Kangaroo | P | | O | |

# Appendix D – BAM Field Sheets

| Family | Scientific Name | Synonym | Common Name | Plot 1 | Plot 2 | Plot 3 | Plot 4 | Plot 5 | Plot 6 |
|---|---|---|---|---|---|---|---|---|---|
| Fabaceae (Mimosoideae) | Acacia decurrens | Acacia decurrens | Black Wattle | | 15 | | 0.1 | | |
| Fabaceae (Mimosoideae) | Acacia fimbriata | Acacia fimbriata | Fringed Wattle | | 2 | | | | |
| Fabaceae (Mimosoideae) | Acacia longifolia | Acacia longifolia | 0 | 2 | 1 | | | | |
| Fabaceae (Mimosoideae) | Acacia saligna | Acacia saligna | Golden Wreath Wattle | | 0.1 | | | | |
| Fabaceae (Mimosoideae) | Acacia ulicifolia | Acacia ulicifolia | Prickly Moses | | | | 0.1 | | |
| Sapindaceae | Acer spp. | Acer spp. | 0 | | | | | 1 | |
| Polygonaceae | Acetosa sagittata | Acetosa sagittata | Rambling Dock | | | 0.1 | | | |
| Apiaceae | Actinotus helianthi | Actinotus helianthi | Flannel Flower | 0.1 | | | | | |
| Agavaceae | Agave spp. | Agave spp. | 0 | | | | | 0.5 | |
| Asteraceae | Ageratina adenophora | Eupatorium adenophorum | Crofton Weed | | 0.5 | | 0.1 | 0.5 | |
| Casuarinaceae | Allocasuarina spp. | Allocasuarina spp. | 0 | | 1 | | | | |
| Casuarinaceae | Allocasuarina torulosa | Allocasuarina torulosa | Forest Oak | | 0.5 | | | | |
| Poaceae | Andropogon virginicus | Andropogon virginicus | Whisky Grass | | 0.2 | | | | |
| Myrtaceae | Angophora costata | Angophora costata | Sydney Red Gum | 15 | | | 10 | | |
| Basellaceae | Anredera cordifolia | Anredera cordifolia | Madeira Vine | | | 15 | | | |
| Apocynaceae | Araujia sericifera | Araujia hortorum | Moth Vine | | | | | | 0.1 |
| Arecaceae | Archontophoenix cunninghamiana | Archontophoenix cunninghamiana | Bangalow Palm | | | | | 2 | |
| Asparagaceae | Asparagus aethiopicus | Asparagus aethiopicus | Asparagus Fern | | 0.1 | | 0.1 | | 0.5 |
| Poaceae | Axonopus fissifolius | Axonopus affinis | Narrow-leafed Carpet Grass | | 0.2 | | | | |
| Poaceae | Bambusa balcooa | Bambusa balcooa | 0 | | | | | 3 | |
| Proteaceae | Banksia ericifolia | Banksia ericifolia | Heath-leaved Banksia | | 3 | | | | |
| Pittosporaceae | Billardiera scandens | Billardiera scandens var. scandens | Hairy Apple Berry | | | | 0.1 | | |
| Poaceae | Bouteloua dactyloides | Buchloe dactyloides | Buffalo Grass | | 50 | | | | |
| Phyllanthaceae | Breynia oblongifolia | Breynia oblongifolia | Coffee Bush | | | | 0.1 | | |
| Myrtaceae | Callistemon salignus | Callistemon salignus | Willow Bottlebrush | | 0.1 | | | | |
| Dicksoniaceae | Calochlaena dubia | Culcita dubia | Rainbow Fern | | 0.1 | 2 | | 1 | |
| Casuarinaceae | Casuarina cunninghamiana subsp. cunninghamiana | Casuarina cunninghamiana subsp. cunninghamiana | River Oak | | | 30 | | 8 | |
| Cyperaceae | Caustis flexuosa | Caustis flexuosa | Curly Wig | | | | 0.2 | | |
| Poaceae | Cenchrus clandestinus | Cenchrus clandestinus | Kikuyu Grass | 1 | | | | | |
| Apiaceae | Centella asiatica | Centella asiatica | Indian Pennywort | | 1 | | | | |
| Cunoniaceae | Ceratopetalum gummiferum | Ceratopetalum gummiferum | Christmas Bush | 1 | | | 20 | | |
| Solanaceae | Cestrum parqui | Cestrum parqui | Green Cestrum | | | | | 5 | |
| Lauraceae | Cinnamomum camphora | Cinnamomum camphora | Camphor Laurel | | 1 | | 0.1 | 5 | 20 |
| Commelinaceae | Commelina cyanea | Commelina cyanea | Native Wandering Jew | 1 | 0.5 | 0.2 | | 0.2 | |
| Orchidaceae | Corybas spp. | Corybas spp. | 0 | | | | 0.1 | | |
| Myrtaceae | Corymbia gummifera | Eucalyptus gummifera | Red Bloodwood | 5 | | | 25 | | |
| Cyatheaceae | Cyathea australis | Cyathea australis | Rough Treefern | | 1 | 2 | | | |
| Cyatheaceae | Cyathea cooperi | Cyathea cooperi | Straw Treefern | | | | | 5 | |
| Cyperaceae | Cyathochaeta diandra | Cyathochaeta diandra | 0 | | | | | | 0.1 |
| Cyperaceae | Cyperus eragrostis | Cyperus eragrostis | Umbrella Sedge | | 0.1 | | | | |
| Asphodelaceae | Dianella caerulea | Dianella caerulea | Blue Flax-lily | 0.2 | 0.1 | | 0.1 | | |
| Asphodelaceae | Dianella caerulea var. caerulea | Dianella caerulea var. caerulea | 0 | | | | | | 0.1 |
| Convolvulaceae | Dichondra repens | Dichondra repens | Kidney Weed | | | 0.1 | | | |
| Fabaceae (Faboideae) | Dillwynia retorta | Dillwynia retorta subsp. A | 0 | 0.1 | | | | | |
| Fabaceae (Faboideae) | Dillwynia spp. | Dillwynia spp. | 0 | | 0.1 | | | | |
| Poaceae | Ehrharta erecta | Ehrharta erecta | Panic Veldtgrass | | 0.1 | 8 | | | |
| Elaeocarpaceae | Elaeocarpus reticulatus | Elaeocarpus reticulatus | Blueberry Ash | 3 | | | 2 | 5 | 5 |
| Poaceae | Entolasia stricta | Entolasia stricta | Wiry Panic | 0.1 | | | 2 | | |
| Poaceae | Eragrostis brownii | Eragrostis brownii | Brown's Lovegrass | | 0.1 | | | | |
| Fabaceae (Faboideae) | Erythrina x sykesii | Erythrina sykesii | Coral tree | | | 0.5 | | | |
| Myrtaceae | Eucalyptus grandis | Eucalyptus grandis | Flooded Gum | | | | | | 20 |
| Myrtaceae | Eucalyptus haemastoma | Eucalyptus haemastoma | Broad-leaved Scribbly Gum | 8 | | | | | |
| Myrtaceae | Eucalyptus punctata | Eucalyptus punctata | Grey Gum | | 20 | | | | 18 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Myrtaceae | Eucalyptus robusta | Eucalyptus robusta | Swamp Mahogany | | | | 8 | | 15 | |
| Myrtaceae | Eucalyptus sieberi | Eucalyptus sieberi | Silvertop Ash | | | | | 5 | | |
| Cyperaceae | Gahnia clarkei | Gahnia clarkei | Tall Saw-sedge | | | | | | | 35 |
| Geraniaceae | Geranium homeanum | Geranium homeanum | | 0 | | | | | 0.1 | |
| Gleicheniaceae | Gleichenia dicarpa | Gleichenia dicarpa | Pouched Coral Fern | | | | | 20 | | |
| Phyllanthaceae | Glochidion ferdinandi | Glochidion ferdinandii | Cheese Tree | | 5 | 1 | | 0.1 | 3 | |
| Apocynaceae | Gomphocarpus fruticosus | Gomphocarpus fruticosus | Narrow-leaved Cotton Bush | | | 0.1 | | | | |
| Proteaceae | Grevillea spp. | Grevillea spp. | | 0 | | 0.1 | | | | |
| Dilleniaceae | Hibbertia spp. | Hibbertia spp. | | 0 | 0.1 | | | | | |
| Euphorbiaceae | Homalanthus populifolius | Homalanthus populifolius | | 0 | 0.1 | | | 0.1 | | |
| Apiaceae | Hydrocotyle bonariensis | Hydrocotyle bonariensis | | 0 | | 0.1 | | | | |
| Asteraceae | Hypochaeris glabra | Hypochaeris glabra | Smooth Catsear | | | | | 0.1 | | |
| Dennstaedtiaceae | Hypolepis muelleri | Hypolepis muelleri | Harsh Ground Fern | | 30 | | | | | 5 |
| Myrtaceae | Kunzea ambigua | Kunzea ambigua | Tick Bush | | | 10 | | | | |
| Verbenaceae | Lantana camara | Lantana camara | Lantana | | 3 | 2 | 1 | 0.5 | 1 | 15 |
| Myrtaceae | Leptospermum polygalifolium | Leptospermum flavescens | Tantoon | | | 0.5 | | | | |
| Restionaceae | Lepyrodia scariosa | Lepyrodia scariosa | | 0 | | 0.5 | | | | |
| Fabaceae (Mimosoideae) | Leucaena leucocephala | Leucaena leucocephala subsp. glabrata | | 0 | | | | 0.5 | | |
| Oleaceae | Ligustrum lucidum | Ligustrum lucidum | Large-leaved Privet | | | | | | | 5 |
| Oleaceae | Ligustrum sinense | Ligustrum sinense | Small-leaved Privet | | | | | 0.5 | | 1 |
| Lindsaeaceae | Lindsaea linearis | Lindsaea linearis | Screw Fern | | | | | 0.1 | | |
| Arecaceae | Livistona australis | Livistona australis | Cabbage Palm | | | | | 0.5 | 0.2 | |
| Lomandraceae | Lomandra longifolia | Lomandra longifolia subsp. exilis | Spiny-headed Mat-rush | | 0.1 | 0.1 | | 1 | | |
| Lomandraceae | Lomandra obliqua | Lomandra obliqua | | 0 | | | | 0.1 | | |
| Lomandraceae | Lomandra spp. | Lomandra spp. | Mat-rush | | | | | 0.2 | | |
| Proteaceae | Lomatia silaifolia | Lomatia silaifolia | Crinkle Bush | | | | | 0.2 | | |
| Myrtaceae | Lophostemon confertus | Lophostemon confertus | Brush Box | | | | 5 | | 5 | |
| Myrtaceae | Melaleuca linariifolia | Melaleuca linariifolia | Flax-leaved Paperbark | | | | | | 10 | |
| Myrtaceae | Melaleuca quinquenervia | Melaleuca quinquenervia | Broad-leaved Paperbark | | | | | | 1 | |
| Poaceae | Microlaena stipoides | Microlaena stipoides | Weeping Grass | | 1 | 0.5 | | | | 0.1 |
| Lauraceae | Neolitsea dealbata | Neolitsea dealbata | Hairy-leaved Bolly Gum | | | | 0.2 | | | |
| Davalliaceae | Nephrolepis cordifolia | Nephrolepis cordifolia | Fishbone Fern | | | 0.1 | | | | |
| Alliaceae | Nothoscordum borbonicum | Nothoscordum gracile | Onion Weed | | | | | | 0.2 | |
| Poaceae | Oplismenus aemulus | Oplismenus aemulus | | 0 | | | 0.5 | 0.1 | | |
| Poaceae | Oplismenus imbecillis | Oplismenus imbecillis | | 0 | | 2 | | | 5 | |
| Apocynaceae | Parsonsia straminea | Parsonsia straminea | Common Silkpod | | 0.1 | | | 2 | | |
| Poaceae | Paspalidium distans | Setaria distans | | 0 | 0.1 | 1 | | | | |
| Poaceae | Paspalum dilatatum | Paspalum dilatatum | Paspalum | | 0.1 | | | | | |
| Poaceae | Paspalum quadrifarium | Paspalum quadrifarium | Tussock Paspalum | | | | 0.2 | | | |
| Poaceae | Paspalum spp. | Paspalum spp. | | 0 | | 0.2 | | | | |
| Poaceae | Paspalum urvillei | Paspalum urvillei | Vasey Grass | | 2 | | | | | |
| Passifloraceae | Passiflora caerulea | Passiflora caerulea | Blue Passionflower | | | | | | | 0.3 |
| Passifloraceae | Passiflora herbertiana | Passiflora herbertiana | | 0 | | | | 0.1 | | |
| Passifloraceae | Passiflora spp. | Passiflora spp. | | 0 | | | | | | 0.5 |
| Pinaceae | Pinus spp. | Pinus spp. | | 0 | | 0.5 | | | | |
| Pittosporaceae | Pittosporum revolutum | Pittosporum revolutum | Rough Fruit Pittosporum | | 7 | 0.1 | | | | |
| Pittosporaceae | Pittosporum undulatum | Pittosporum undulatum | Sweet Pittosporum | | | | 0.2 | 2 | 5 | 20 |
| Fabaceae (Faboideae) | Platylobium formosum | Platylobium formosum | | 0 | | | | 0.2 | | |
| Araliaceae | Polyscias sambucifolia | Polyscias sambucifolia | Elderberry Panax | | 5 | | | 0.5 | | |
| Dennstaedtiaceae | Pteridium esculentum | Pteridium esculentum | Bracken | | | | 3 | 25 | | |
| Orchidaceae | Pterostylis spp. | Pterostylis spp. | Greenhood | | 0.2 | | | | | |
| Rosaceae | Rubus anglocandicans | Rubus anglocandicans | Blackberry | | | 0.1 | | | | |
| Fabaceae (Caesalpinioideae) | Senna pendula var. glabrata | Senna coluteoides var. glabrata | | 0 | | | | | 0.2 | 1 |
| Fabaceae (Caesalpinioideae) | Senna spp. | Senna spp. | | 0 | | 4 | | 0.1 | | |
| Poaceae | Setaria parviflora | Setaria geniculata | | 0 | | 0.1 | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Malvaceae | Sida rhombifolia | Sida rhombifolia | Paddy's Lucerne | | 0.1 | | | | |
| Smilacaceae | Smilax glyciphylla | Smilax glyciphylla | Sweet Sarsparilla | 0.4 | | | 2 | | |
| Caryophyllaceae | Stellaria media | Stellaria media | Common Chickweed | | | | | 0.1 | |
| Menispermaceae | Stephania japonica | Stephania japonica | Snake vine | | | 0.5 | | | |
| Araceae | Syngonium spp. | Syngonium spp. | | 0 | | | | 1 | |
| Commelinaceae | Tradescantia fluminensis | Tradescantia albiflora | Wandering Jew | | | 40 | | 0.5 | |
| Euphorbiaceae | Triadica sebifera | Triadica sebifera | Chinese Tallowood | | | | | 3 | |
| Araceae | Zantedeschia aethiopica | Zantedeschia aethiopica | Arum Lily | | | | | 0.2 | |

# Appendix E – BMAT Report

Department of Planning and Environment

# Biodiversity Values Map and Threshold Report

This report is generated using the Biodiversity Values Map and Threshold (BMAT) tool. The BMAT tool is used by proponents to supply evidence to your local council to determine whether or not a Biodiversity Development Assessment Report (BDAR) is required under the Biodiversity Conservation Regulation 2017 (Cl. 7.2 & 7.3).

The report provides results for the proposed development footprint area identified by the user and displayed within the blue boundary on the map.

There are two pathways for determining whether a BDAR is required for the proposed development:

1. Is there Biodiversity Values Mapping?
2. Is the 'clearing of native vegetation area threshold' exceeded?

## Biodiversity Values Map and Threshold Report

| | | |
|---|---|---|
| **Date of Report Generation** | | 05/05/2025 12:47 PM |
| **1. Biodiversity Values (BV) Map - Results Summary (Biodiversity Conservation Regulation Section 7.3)** | | |
| 1.1 | **Does the development Footprint intersect with BV mapping?** | no |
| 1.2 | Was ALL BV Mapping within the development footprinted added in the last 90 days? (dark purple mapping only, no light purple mapping present) | no |
| 1.3 | **Date of expiry of dark purple 90 day mapping** | N/A |
| 1.4 | **Is the Biodiversity Values Map threshold exceeded?** | no |
| **2. Area Clearing Threshold - Results Summary (Biodiversity Conservation Regulation Section 7.2)** | | |
| 2.1 | **Size of the development or clearing footprint** | 296,714.6 sqm |
| 2.2 | **Native Vegetation Area Clearing Estimate (NVACE)** (within development/clearing footprint) | 149,186.7 sqm |
| 2.3 | **Method for determining Minimum Lot Size** | LEP |
| 2.4 | **Minimum Lot Size** (10,000sqm = 1ha) | 550 sqm |
| 2.5 | **Area Clearing Threshold** (10,000sqm = 1ha) | 2,500 sqm |
| 2.6 | **Does the estimate exceed the Area Clearing Threshold?** (NVACE results are an estimate and can be reviewed using the Guidance) | yes |

| | |
|---|---|
| **REPORT RESULT: Is the Biodiversity Offset Scheme (BOS) Threshold exceeded for the proposed development footprint area?** (Your local council will determine if a BDAR is required) | **yes** |

## What do I do with this report?

• If the result above indicates the BOS Threshold has been exceeded, your local council may require a Biodiversity Development Assessment Report with your development application. Seek further advice from Council. An accredited assessor can apply the Biodiversity Assessment Method and prepare a BDAR for you. For a list of accredited assessors go to: https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor.

• If the result above indicates the BOS Threshold has not been exceeded, you may not require a Biodiversity Development Assessment Report. This BMAT report can be provided to Council to support your development application. Council can advise how the area clearing threshold results should be considered. Council will review these results and make a determination if a BDAR is required. Council may ask you to review the area clearing threshold results. You may also be required to assess whether the development is '"likely to significantly affect threatened species" as determined under the test in Section 7.3 of the *Biodiversity Conservation Act 2016*.

• If a BDAR is not required by Council, you may still require a permit to clear vegetation from your local council.

• If all Biodiversity Values mapping within your development footprint was less than 90 days old, i.e. areas are displayed as dark purple on the BV map, a BDAR may not be required if your Development Application is submitted within that 90 day period. Any BV mapping less than 90 days old on this report will expire on the date provided in Line item 1.3 above.

For more detailed advice about actions required, refer to the Interpreting the evaluation report section of the Biodiversity Values Map Threshold Tool User Guide .

## Review Options:

• If you believe the Biodiversity Values mapping is incorrect please refer to our BV Map Review webpage for further information.

• If you or Council disagree with the area clearing threshold estimate results from the NVACE in Line Item 2.6 above (i.e. area of Native Vegetation within the Development footprint proposed to be cleared), review the results using the Guide for reviewing area clearing threshold results from the BMAT Tool.

## Acknowledgement

I, as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature: _____ Date: _____

(Typing your name in the signature field will be considered as your signature for the purposes of this form)

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# Biodiversity Values Map and Threshold Tool

The Biodiversity Values (BV) Map and Threshold Tool identifies land with high biodiversity value, particularly sensitive to impacts from development and clearing.

The BV map forms part of the Biodiversity Offsets Scheme threshold, which is one of the factors for determining whether the Scheme applies to a clearing or development proposal. You have used the Threshold Tool in the map viewer to generate this BV Threshold Report for your nominated area. This report calculates results for your proposed development footprint and indicates whether Council may require you to engage an accredited assessor to prepare a Biodiversity Development Assessment Report (BDAR) for your development.

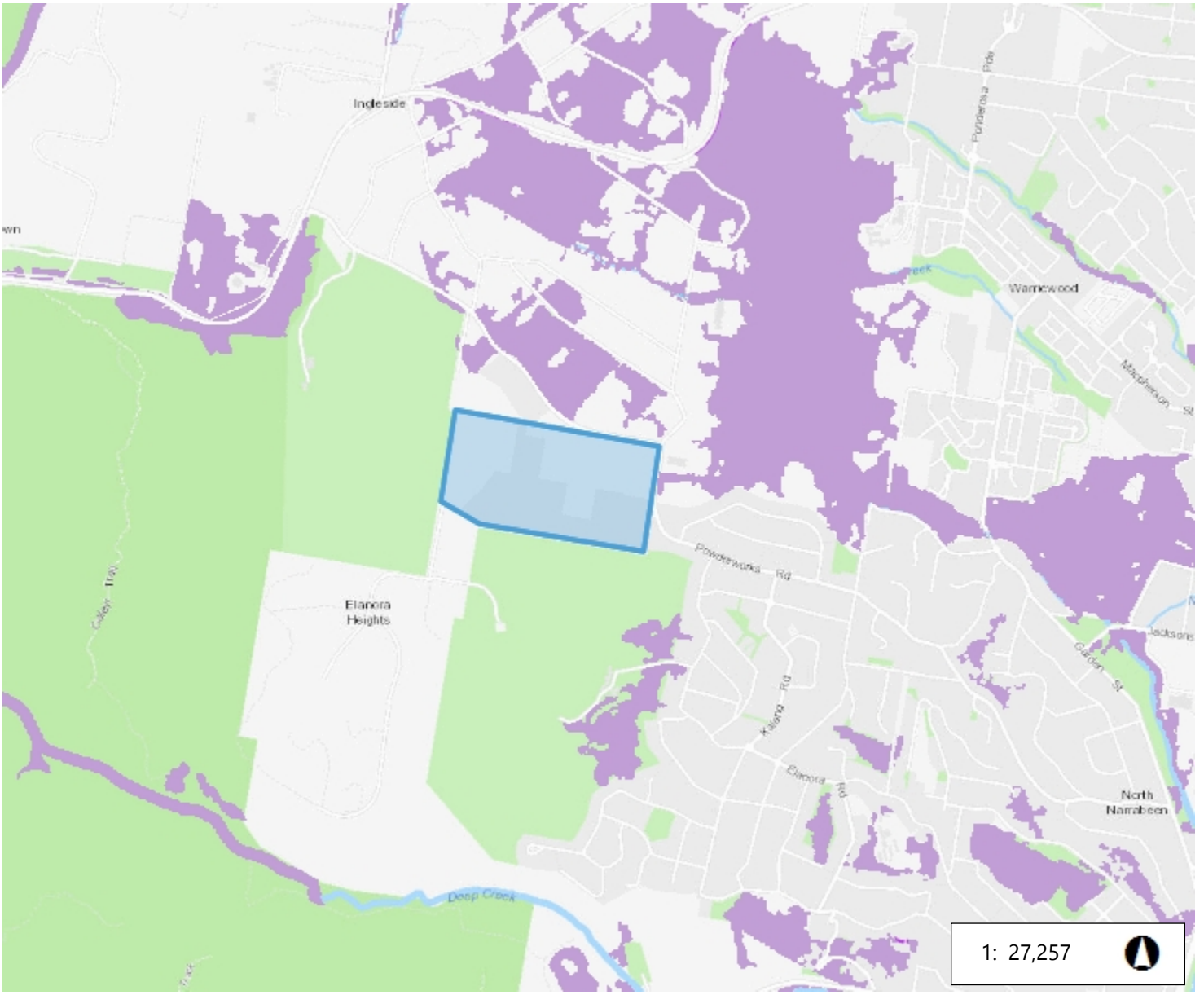
This report may be used as evidence for development applications submitted to councils. You may also use this report when considering native vegetation clearing under the State Environmental Planning Policy (Biodiversity and Conservation) 2021 - Chapter 2 vegetation in non-rural areas.

What's new? For more information about the latest updates to the Biodiversity Values Map and Threshold Tool go to the updates section on the Biodiversity Values Map webpage.

Map Review: Landholders can request a review of the BV Map where they consider there is an error in the mapping on their property. For more information about the map review process and an application form for a review go to the Biodiversity Values Map Review webpage.

If you need help using this map tool see our Biodiversity Values Map and Threshold Tool User Guide or contact the Map Review Team at map.review@environment.nsw.gov.au or on 1800 001 490.

# Biodiversity Values Map




1,384.6 0 692.32 1,384.6 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days
- Native Vegetation Area Clearing Estimate (NVACE)
- Development area selected by proponent

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The results provided in this tool are generated using the best available mapping and knowledge of species habitat requirements.

This map is valid as at the date the report was generated. Checking the Biodiversity Values Map viewer for mapping updates is recommended.

# Appendix F – Site Photographs

**Above: Photo of PCT 3593 – Degraded within Lot 5 DP24637**

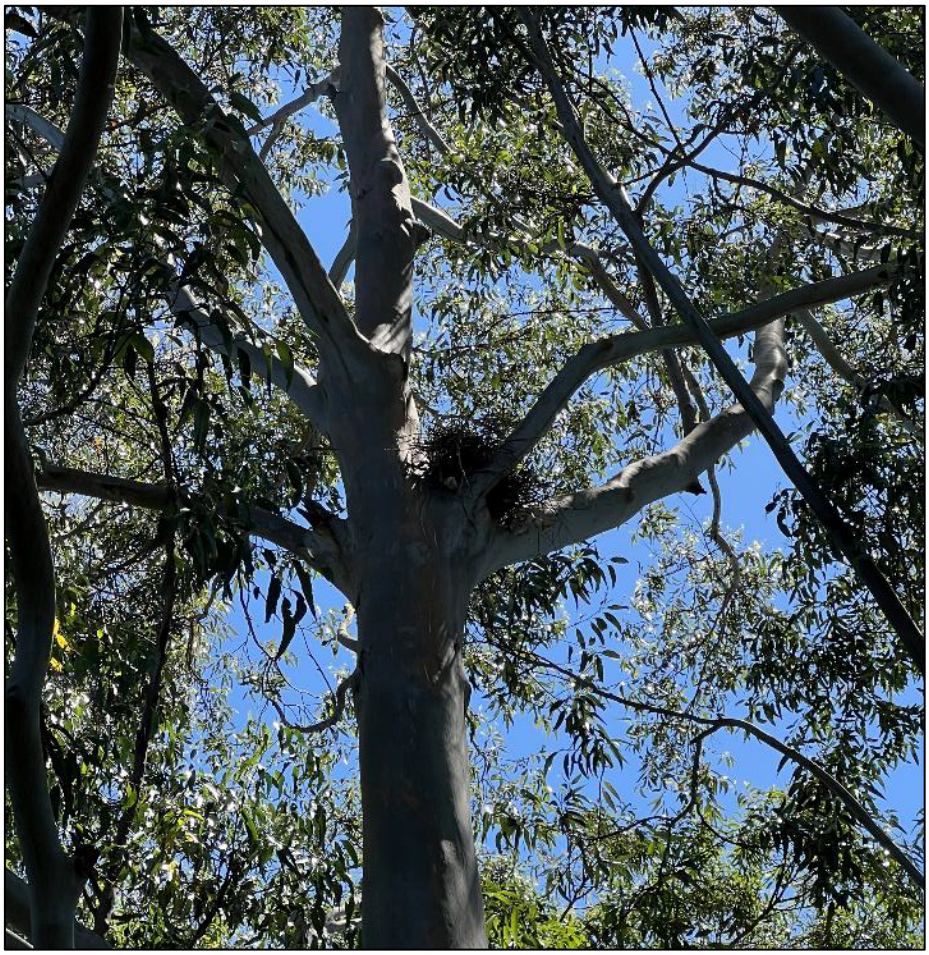
**Below: Nankeen Night Heron above the dam**

**Above: Dam located within Lot 2 DP24637**

**Below: Common Ringtail Possum spotted during nocturnal surveys**

**Above: Marsh Snake found within easement along western boundary**

**Below: Large bird nest**



# Appendix G – Other Legislation

# EPBC Act Assessment

A Protected Matters Search of an area of 5km radius of the Study Area was conducted in November 2024 for Matters of National Environmental Significance as relevant to the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act). The following Matters of National Significance are considered in this assessment.

**World Heritage Properties:**

The site is not a World Heritage area and is not in close proximity to any such area.

**National Heritage Places:**

The site is not a National Heritage place; however, one (1) listed place is present in the buffer area: Ku-ring-gai Chase National Park, Lion, Long and Spectacle Island Nature Reserves.

Ku-ring-gai Chase National Park is within 5km; however, there is minimal habitat connectivity between the National Park and the Study Area. Areas in the wider locality provide greater connectivity to the National Park.

**Wetlands of International Significance (declared Ramsar wetlands):**

The site is not part of, or within close proximity to, Wetlands of International Significance.

**Great Barrier Reef Marine Park:**

The site is not part of, or within close proximity to, the Great Barrier Reef Marine Park.

**Commonwealth Marine Areas:**

The site is not part of, or within close proximity to, any Commonwealth Marine Area.

**Threatened Ecological Communities:**

From a search of the EPBC Act Protected Matters website (21/11/2024), eight (8) listed Threatened Ecological Communities (TECs) were considered likely to occur within the Study Area or in a 5km radius of the Study Area.

One (1) Vulnerable Ecological Community:

- *Subtropical and Temperate Coastal Saltmarsh.*

Four (4) Endangered Ecological Communities:

- *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community;*
- *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland;*
- *Coastal Upland Swamps in the Sydney Basin Bioregion; and*
- *Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion.*

Three (3) Critically Endangered Ecological Communities:

- *Eastern Suburbs Banksia Scrub of the Sydney Region;*
- *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia; and*
- *River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria.*

Assessment of vegetation communities associated with EPBC Act listed TECs are referenced above in **Section 2.**

**Threatened Species:**

From a search of the EPBC Act Protected Matters website (21/11/2024), a total of 112 listed threatened species or their habitat were found likely to occur within the area. Threatened species were assessed from field inspections/surveys and utilising the NSW BioNet Atlas search tool within a 10km search radius of the Study Area, with most recent records assessed.

During the flora surveys conducted on site, two (2) EPBC Act listed species was found in the Subject Land:

- *Microtis angusii.* (Angus's Onion Orchid) – Endangered; and
- *Syzygium paniculatum* (Magenta Lily Pilly) – Vulnerable.

**Migratory Species:**

From a search of the EPBC Act Protected Matters website (21/11/2024), a total of 58 listed migratory species have the potential to utilise the site on an irregular basis. A total of one (1) species has been recorded in proximity to the Study Area, occurring in areas of higher vegetation quality and greater connectivity to the wider landscape.

**EPBC Act Assessment Conclusion:**

Native vegetation present within the site has been assess as being commensurate with the EPBC listed EEC *Coastal Swamp Sclerophyll Forest of New South Wales and Queensland.* The area of this community is approx. 0.89ha. A total of 0.39ha is proposed to be impacted by the proposal. Management strategies will be implemented under a future Vegetation Management Plan, that will assist regeneration and the increase in quality of the EEC, reducing the likelihood of any significant adverse impacts.

Given the small extent of impacts to the EPBC Act listed community, it is not likely that a referral to the Commonwealth Government will be required. Future applications may require this referral if impacts to this community are change and are deemed significant.

## Water Management Act 2000 (WM Act)

DPIE (Water) administers the WM Act and is required to assess activities carried out on waterfront land. Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 meters of the highest bank of the river, lake or estuary. Certain activities within waterfront land are designated as 'Controlled Activity' and require a Controlled Activity Approval (CAA) from NSW DCCEEW. As future development is proposed to be within 40m of water front land, a CAA will be required in future development applications.

Assessment of watercourses on site, concluded that one (1) 1st order streams and one (1) 2nd order stream are present within the Study Area. Under the WM Act, Vegetation Riparian Zones (VRZ) are required to form a transitional zone between the land and watercourse and have been incorporated in to the current Masterplan. These zones will be maintained with the production of a Vegetation Management Plan, also incorporating retained vegetation.

The principles of Water Sensitive Urban Design (WSUD) should be incorporated within future development plans to ensure the quality of water is maintained and improved on and offsite before entering the wider catchment.

## State Environmental Planning Policy (Resilience and Hazards) 2021 – Chapter 2

Consultation of Chapter 2 Coastal Management maps revealed that the Study Area is not mapped on the Coastal Environment Area Map or the Coastal Use Area Map. As such, this is not expected to be a topic of concern in the assessment of biodiversity impacts as a result of the proposed rezoning and subsequent development.

# State Environmental Planning Policy (Biodiversity and Conservation) 2021

## Chapter 4 Koala Habitat Protection

The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (BC SEPP) commenced on the 1st March 2022, under the *Environmental Planning and Assessment Act 1979*, and repealing the previous *State Environmental Planning Policy (Koala Habitat Protection) 2020* and *State Environmental Planning Policy (Koala Habitat Protection) 2021*. This Policy aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.

The application of this chapter differs between local government areas in addition to exclusions between applicable to certain land designations, as detailed below:

| Chapter 4 Considerations | Application |
|---|---|
| Local government area as listed within Schedule 2. | Northern Beaches Council |
| Koala Management Area(s) as defined in Schedule 2. | Central Coast |
| This Chapter does not apply to:<br>land dedicated or reserved under the National Parks and Wildlife Act 1974, or acquired under Part 11 of that Act, or<br>land dedicated under the Forestry Act 2012 as a State forest or a flora reserve, or<br>land on which biodiversity certification has been conferred, and is in force, under Part 8 of the Biodiversity Conservation Act 2016, or<br>land in the following land use zones, or an equivalent land use zone, unless the zone is in a local government area marked with an * in Schedule 2—<br>Zone RU1 Primary Production,<br>Zone RU2 Rural Landscape,<br>Zone RU3 Forestry. | The precinct is zoned RU2 – Rural Landscape, however Northern Beaches LGA is marked with an * in Schedule 2. Therefore Chapter 4 applies. |

According to Section 4.9 *Development assessment process – no approved koala plan of management for land* of the BC SEPP 2021, the policy applies if:

*(1) This clause applies to land to which this Policy applies if the land—*

*(a) has an area of at least 1 hectare (including adjoining land within the same ownership), and*

*(b) does not have an approved koala plan of management applying to the land.*

The total Study Area is over 1ha and does not have a koala plan of management. Therefore, the BC SEPP 2021 applies and additional assessment is required. The following clauses are therefore applicable and have been assessed.

**Development Assessment Process – no Koala plan of Management**

| Clause | Assessment |
|---|---|
| *(2) Before a council may grant consent to a development application for consent to carry out development on the land, the council must assess whether the development is likely to have any impact on koalas or koala habitat* | Clauses apply to Northern Beach Council. |
| *(3) If the council is satisfied that the development is likely to have low or no impact on koalas or koala habitat, the council may grant consent to the development application.* | |
| *(4) If the council is satisfied that the development is likely to have a higher level of impact on koalas or koala habitat, the council must, in deciding whether to grant consent to the development application, take into account a koala assessment report for the development* | |
| *(5) However, despite subsections (3) and (4), the council may grant development consent if the applicant provides to the council—*<br>*(a) information, prepared by a suitably qualified and experienced person, the council is satisfied demonstrates that the land subject of the development application—*<br>*(i) does not include any trees belonging to the koala use tree species listed in Schedule 3 for the relevant koala management area, or*<br>*(ii) is not core koala habitat, or*<br>*(b) information the council is satisfied demonstrates that the land subject of the development application—*<br>*(i) does not include any trees with a diameter at breast height over bark of more than 10 centimetres, or*<br>*(ii) includes only horticultural or agricultural plantations.* | 5(a)(i) – Koala use trees applicable to the Central Coast Management Area were identified within the Study Area.<br>**Exclusion does not apply.**<br><br>5(a)(ii) – Further assessment is required to determine whether the site comprises Core Koala Habitat.<br><br>5(b)(i) – Trees with a DBH >10cm were identified within the Study Area.<br>**Exclusion does not apply.**<br><br>5(b)(ii) – Part of the Subject Land includes horticultural plantations; however, the site is predominantly native vegetation which does not comprise a horticultural or agricultural plantation.<br>**Exclusion does not apply.** |

In order to assess whether the site comprises core koala habitat, a Koala Assessment has been undertaken.

# Koala Assessment

The Koala Assessment is structured as follows:

- Assessment of whether the site comprises Core Koala habitat;
    - Assessment of whether the site comprises '*Highly Suitable Koala Habitat'*;
    - Site based assessment of current/recent Koala presence within the site; and
    - Desktop assessment of recorded Koala presence within the site.
- Assessment of the site and proposal development against the 5 key principles listed within the Koala SEPP 2021 Factsheet – Development Applications.

**Core Koala Habitat Assessment**

Core Koala Habitat is defined within Section 4.2 of the SEPP as:

a. *an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or*

b. *an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.*

Both qualifications of defined Core Koala Habitat consider whether the site is an area of land that has been assessed as 'Highly Suitable Koala Habitat'. This assessment has been undertaken below:

**Highly Suitable Koala Habitat Assessment**

| **Definition of '*Highly Suitable Koala Habitat*'** | **Assessment** |
|---|---|
| *'where 15% or greater of the total number of trees within any Plant Community Type (PCT) are the regionally relevant species of those listed in Schedule 2 of the SEPP.'* | Each PCT identified within the site contains >15% abundance of tree species listed under the Central Coast koala management area, under Schedule 2 of the SEPP.<br>The most abundant species identified on site were *Angophora costata* and *Corymbia gummifera*. Other canopy species identified within the site and listed under Schedule 2 for the Central Coast koala management area include *Eucalyptus haemastoma, E. punctata, Allocasuarina torulosa, E. robusta, E. sieberi,* and *Melaleuca quinquenervia*. |
| **The site meets the definition and as such is considered to comprise '*Highly Suitable Koala Habitat*'.** | |

Given the site comprises '*Highly Suitable Koala Habitat*' the qualifications of defined Core Koala Habitat subsequently consider whether Koalas have been recorded as present within the site at the time of assessment or recorded as being present within the previous 18 years. This has been addressed by carrying out site surveys and a desktop assessment of Koala records within or in proximity to the site.

**Core Koala Habitat Assessment**

| **Qualification of 'Core Koala Habitat'** | **Assessment** |
|---|---|
| *'koalas are recorded as being present at the time of assessment'* | The following surveys were undertaken to assess current/recent presence:<br>Camera trap surveys were undertaken between 25/10/2024 and 08/11/2024;<br>2x Spot Assessment Techniques (SATs) were undertaken within the site;<br>Nocturnal surveys were undertaken on 26/11/2024 and 27/11/2024, including call playback.<br>No koalas, scats or markings were identified within the Subject Land.<br>The site does not meet this qualification of Core Koala Habitat. |
| *'koalas have been recorded as being present in the previous 18 years'* | The site is located within the Central Coast Koala Management Area, as such a 2.5km maximum search radius applies to this assessment.<br>Four (4) records of koalas are present within 2.5km of the Study Area, with all records dating between 1949-1972.<br>The site does not meet this qualification of Core Koala Habitat. |
| **The site does not meet either qualification to be defined as Core Koala Habitat.** | |

Assessment of the site against the prescribed definition of Core Koala Habitat concludes that the site does not meet the definition and therefore does **not** comprise Core Koala Habitat.

**Assessment of the 5 Key Principles**

Assessment of the site's qualification under the definition of Core Koala Habitat has concluded that the site does not meet this criterion; however, the site is considered as highly suitable koala habitat.

Therefore, to determine the impact on highly suitable koala habitat, an assessment of the site and development proposal has been undertaken against the 5 key principles listed within the Koala Sepp 2021 Factsheet – Development Applications. This aims to also satisfy Chapter 4, Section 4.9 Clauses 2, 3, and 4 of the Biodiversity and Conservation SEPP whereby the Council may grant consent to a development application following assessment of development impact on koalas or koala habitat.

The assessment of the site and proposed development in relation to the 5 Key principles is undertaken below.

**Assessment of 5 Key Principles**

| Principle | Criteria | Assessment |
|---|---|---|
| 1. Understand Koala habitat values | *1. The site is established as containing core koala habitat if a site area survey undertaken by a suitably qualified and experienced person has identified the presence of core koala habitat.* | The Subject Land is not considered Core Koala Habitat as addressed above. |
| | *2. Further analysis is undertaken in order to understand the broader values of the core koala habitat, including information about the koala population using the habitat and any specific ecological functions the habitat might serve.* | **The Subject Land does not comprise core Koala Habitat; therefore, no further assessment is required.** However, general commentary on these points is provided below.<br>Whilst the site provides '*Highly Suitable Koala Habitat*', it is highly unlikely that the species could gain access to these resources, as evidenced by the lack of recent records within the Study Area and the absence of Koalas or associated field signs during targeted surveys conducted within the Subject Land. This can be attributed to the limited access to tree use species due to habitat fragmentation from roads, fencing, infrastructure, and clearing. Additionally, the native vegetation on site is highly disturbed and therefore not of high quality. |
| 2. Avoid intensifying land use in koala habitat areas through appropriate landscape planning and site selection | *3. Site selection for development takes into account koala habitat values.* | **The Subject Land does not comprise core Koala Habitat; therefore, no further assessment is required.** However, general commentary on these points is provided below.<br>Given the lack of ecological functionality of the site in its current form for the koala, the selection of the development site is not considered to impact koala habitat values. Additionally, as koalas are unable to utilise the site as a foraging resource as addressed above, the development is not considered to result in the direct loss of koala habitat values. Importantly, as the site is not |
| 3. Encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas | *4. Development avoids the direct loss of core koala habitat within the site area and avoids fragmentation* | |
| | *5. Core koala habitat is excluded from the development footprint* | |

| Principle | Criteria | Assessment |
|---|---|---|
| 4. Minimise potential direct impacts to koalas through koala sensitive design | *6. Development avoids direct impacts to core koala habitat within the site area.* | considered to be Core Koala Habitat, there are no direct impacts. |
| | *7. Where some loss of core koala habitat cannot be avoided (and provided it is consistent with all other criteria), development is designed in a way that retains higher value areas across the site and avoids fragmentation of habitat within the site area and more broadly within the region.* | |
| | *8. Development is undertaken in a way that maintains the potential function of the core koala habitat.* | |
| 5. Implement best practice measures for the management of identified risks to koalas. | *9. All relevant indirect impacts to koalas and koala habitat associated with the development are identified.* | **The Subject Land does not comprise Core Koala Habitat, therefore no further assessment is required.** |
| | *10. Development uses best practice management measures to address the potential impacts considered likely to pose an increased risk to koalas or their habitat.* | |
| **Additional Principles** | | |
| 6. Use compensatory measures only where they can be shown to better promote the aim of the SEPP | *11. Compensatory measures are only used once it has been demonstrated that options to avoid, minimise and manage impacts to core koala habitat have been exhausted.* | **The Subject Land does not comprise Core Koala Habitat, therefore no further assessment is required.** |
| | *12. Where there is any direct loss of habitat or compromise in the potential function of a koala habitat area (and provided it is consistent with all other criteria outlined here), suitable compensatory measures are provided.* | |
| 7. Use adaptive management strategies to monitor, evaluate and deliver appropriate planning outcomes for koalas | *13. The development application includes a monitoring, adaptive management and reporting component against the key outcomes.* | **The Subject Land does not comprise core Koala Habitat, therefore no further monitoring and reporting is required.** |

## Conclusion

Field surveys to identify dominant canopy species and their abundance revealed that the site contained areas of '*Highly Suitable Koala Habitat*'. As such, further assessment was undertaken. Detailed koala surveys were completed on site but did not detect the presence of koalas within the Subject Land. Additionally, desktop assessment through the NSW BioNet Atlas showed no

records of koalas within 2.5km of the Study Area in the last 52 years. Consequently, the site is not considered to be Core Koala Habitat. Therefore, it is unlikely that a koala population is, or has recently been, utilising the Study Area and it is not anticipated the proposal will impact any remaining koala populations.

Ultimately, assessment of the site and development proposal against the Key Principles of the Koala SEPP 2021 Factsheet – Development Applications addresses Chapter 4 Section 4.9 Clauses 2, 3, and 4 of the BC SEPP (2021) such that Council may consider granting Development Consent under these clauses.

# Pittwater Local Environmental Plan 2014

The Pittwater Local Environmental Plan (LEP) 2014 commenced on the 27th June 2014. The LEP aims to make local environmental planning provisions for land in Pittwater in accordance with the relevant standard environmental planning instrument under section 3.20 of the *Environmental Planning and Assessment Act 1979*.

Specific to the Study Area, section 7.6 Biodiversity under Part 7 – Additional local provisions apply and is discussed below.

**7.6 Biodiversity**

*(1) The objective of this clause is to maintain terrestrial, riparian and aquatic biodiversity by—*

*(a) protecting native fauna and flora, and*

*(b) protecting the ecological processes necessary for their continued existence, and*

*(c) encouraging the conservation and recovery of native fauna and flora and their habitats.*

*(2) This clause applies to land identified as "Biodiversity" on the Biodiversity Map.*

Land which the Study Area belongs to is mapped as Biodiversity; clause applies.

*(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider—*

*(a) whether the development is likely to have—*

*(i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and*

*(ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and*

Whilst the future development will impact the area, appropriate measures have been employed to avoid, minimise, and mitigate any adverse impacts. Importantly, the condition and ecological values of the land will be enhanced via the implementation of a VMP which will create connectivity whilst improving the aquatic values of the site. In VMP lands, areas of existing native vegetation will be retained as well as revegetated with native species relevant to the locality; therefore, providing continued opportunities for fauna to forage, roost, and shelter. Finally, special consideration has been given to trees identified as stags and hollow bearing, as these are important habitat features for many species.

*(iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and*

*(iv) any adverse impact on the habitat elements providing connectivity on the land, and*

The Study Area presently shows areas of fragmentation due to the existing land use. However, stretches of vegetation, predominantly riparian zones, throughout the site enable habitat corridors to form with the wider landscape. Whilst the removal of marginal native vegetation is proposed, areas of identified PCTs which contribute to these corridors will be retained and managed under a VMP. This will involve replanting with native species which are relevant to the PCTs in addition to weed removal and ongoing management. As a result, the proposed development will not further fragment the land but rather maintain and improve its connectivity.

*(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*

Measures to avoid, minimise, or mitigate any potential impacts have been applied and every effort to protect native fauna and flora has been undertaken. Areas of high biodiversity value have been avoided and marked for retention where practical. Future management of vegetation present on site will adhere to the VMP, which will enhance VMP lands as discussed above.

*(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that—*

*(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or*

*(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or*

*(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.*

The selection of the Study Area in the proposed location is deemed most appropriate for the development due to existing land use and the current degraded nature of the site. The development will enhance habitat connectivity values and ecological function in the locality through the implementation of a VMP as discussed above.

# Appendix H - Anabat Report

AEP

BIODIVERSITY | BUSHFIRE | ARBORICULTURE

NEWCASTLE SYDNEY

# Bat Call Summary Report

Wilga Wilson Precinct, Ingleside, NSW

**20 November 2024**

**AEP Ref: 3499**

Newcastle | Sydney
10 Darvall St Carrington 2294 | 275 Stanmore Rd Petersham 2049
P 0420 624 707 E info@andersonep.com.au ABN 57 659 651 537

# 1.0 Method

Analysis of bat echolocation calls was undertaken using Anabat Insight software. Identification was carried out utilising Bat call guides developed for NSW by Pennay et al. (2004) and for North NSW and Queensland by Reinhold et al. (2001).

Reference calls used were obtained from the NSW database and AEP confirmed bat call collection.

Calls were recorded on one Anabat Express, one Anabat Express Full Spectrum device. Devices were left out from 25 October 2024 and picked up on 8 November 2024, giving a total of 28 recording nights across the two devices.

All files were viewed, with *Vespadelus troughtoni, Chalinolobus dwyeri* and *Myotis macropus* calls targeted and identified. Calls that were too short (three pulses or less) were not analysed and tagged as unknown.

Calls were analysed by Chris Wark, an AEP ecologist with 10+ years microbat ultrasonic call analysis experience.

Certain microbat species have similar call frequencies, call shape and other characteristics which can make identification to species impossible using just call analysis. Where it was not possible to differentiate calls due to similar call characteristics the call was marked as species group.

**Table 1: Confidence ratings of bat call sequences**

| Confidence | Description |
|---|---|
| Definite | Call has been identified to a particular species and could not be confused with another species. |
| Probable | Call has been identified to a particular species, with a low chance that it could be confused with another species. |
| Possible | Call has been identified to a particular species, but there is a moderate chance of confusion with another species. |
| Species complex | Call could not be identified as a particular species due to call characteristics (poor quality/short sequence, bat species with overlapping frequencies, etc). |
| Unknown | Call sequences that are too short or of very poor quality. |

**Table 2: Location of Ultrasonic Recording devices**

| Device ID | Location of Device (Co-ordinates in Lat/Long) |
|---|---|
| AEP 3 (FS) | -32.690327, 151.269730 |
| AEP 6 | -33.691330, 151.272030 |

(FS) – Full spectrum

# 2.0 Differentiation of species with similar calls

Separation of species with similar calls is possible using particular call characteristics, a short description of characteristics used to distinguish species is included in **Table 2**. Note that it is not always possible to separate similar calls and is affected by the length and quality of recorded calls.

Species names are based on the Australian Chiroptera taxonomic list (Reardon et al. 2015) with changes made to keep the naming conventions in line with DPIE.

**Table 2: Call characteristics used to differentiate species**

| Species | Characteristic |
|---|---|
| *Vespadelus troughtoni / Vespadelus vulturnus / Vespadelus pumilus / Chalinolobus morio* | It is not currently possible to differentiate between *V.vulturnus* and *V.troughtoni* on call characteristics alone. *V.pumilus* can be differentiated only when call frequency is above 54khz.<br>*C.morio* can usually be differentiated by the alternating calls and shape of the call but in poorer quality calls this is not always possible. |
| *Chalinolobus dwyeri* | Differentiated from other species by frequency and presence of curved alternating calls. |
| *Myotis macropus/ Nyctophilus spp.* | *M.macropus* differentiated based on calls with initial slope >400 OPS and pulse intervals <75ms. Secondary characters used include central kink and slope variances between pulses. Requires high quality calls and is not always reliable. |

It should be noted that the number of call sequences for specific species does not allow for a quantitative understanding of the numbers present on site. Instead, it should be taken as an idea of activity within the site for that particular species. It is not possible to compare activity levels between species due to differences in species detectability, foraging strategies and call characteristics.

# 3.0 Results

23,668 call sequences were recorded, these were run through a “noise and unknown filter” removing calls that were most likely noise and those calls less than 3 pulses in duration. This left a total of 2804 calls that were analysed further by running specific filters for the target species using call characteristics to provide an initial identification. Calls were then verified by the ecologist.

Of the species that were targeted during analysis *Myotis macropus* species complex and *Vespadelus troughtoni* species complex calls were recorded.

As *Nyctophilus spp*. and *Myotis macropus* have highly similar calls, identifying to species via ultrasonic recording only is complex and inaccurate unless high-quality calls have been recorded.

*Vespadelus troughtoni* and *Vespadelus vulturnus* also have highly similar calls which means it is not possible to separate these species via ultrasonic recordings.

Taking a conservative approach, it should be assumed that *Myotis macropus* are present within the site given there are appropriate water bodies within and near the site. Habitat analysis should be undertaken to determine whether there is suitable roost habitat for *Vespadelus troughtoni* within 2km of the Subject Site. If suitable habitat is present then both species should be considered for species credits.

Other bat species were present on site, including definite calls for *Chalinolobus morio*, however, as these species were not being targeted during this analysis, while analysed, they were not identified to species.

While all care has been taken it should be noted that certain bat species are difficult to identify by bat call and others may not have been recorded by the detectors. It is therefore recommended that a habitat

assessment should be used in conjunction with this analysis to determine the likely occurrence of other bat species.

## 4.0 Sample Time vs Frequency graphs

Sample calls for the species groups that were identified have been included below.

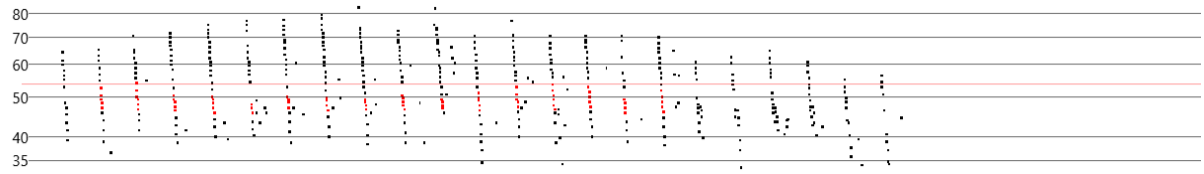



**Figure 1 – *Myotis macropus* species complex call**

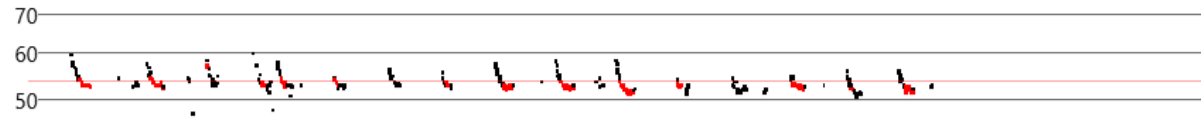



**Figure 2 – *Vespadelus troughtoni* species complex call**

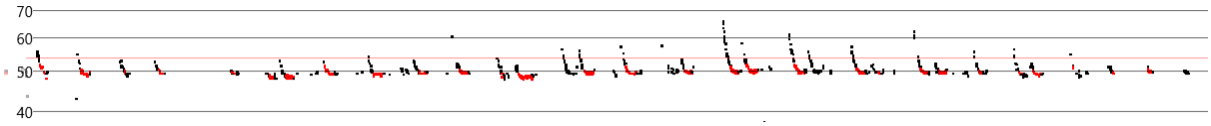



**Figure 3 – *Vespadelus troughtoni* species complex call**

# Appendix I – CVs

# ALESSANDRO RONCOLATO

## Ecologist

## Profile Summary

Alessandro is an ecologist at Anderson Environmental & Planning, where he applies his knowledge and experience to a variety of environmental projects. Having recently completed his undergraduate degree in Environmental Science, he has developed a wide set of skills that are crucial to his role.

During his time at AEP, Alessandro has honed his abilities in fauna and flora identification and surveys, GIS, animal handling, environmental planning, ecological assessments, restoration, land management and report writing. His knowledge and practical experience make him a valuable asset in promoting sustainable environmental practices and effective ecological restoration.

### Academic Qualifications

- Bachelor of Science (Environmental Biology) and Bachelor of Arts in International Studies – University of Technology Sydney, 2023

### Training, Licences and Professional Memberships

- NSW Class C Driver's Licence
- WHS NSW Construction Induction White Card
- First Aid (Provide First Aid HLTAID011)
- SSI Open Water Divers License

### Professional Experience

**Ecologist** — 2023 – Present
Anderson Environment & Planning
Newcastle NSW

**Sales Assistance** — 2019 – 2024
Rebel Sport

**Construction Labourers** — 2017
Bedrock

### Relevant Project Experience

**Ecological Surveys**

- Camera trapping surveys for ground and arboreal species including deployment, completion, and analysis at Bermagui, Scone and Pleasure Point.
- Completed threatened orchid and ground cover surveys via 5m transects at various sites.
- Completed threatened shrub surveys via 10m transects at various sites.
- Completed threatened tree surveys via 20m transects at various sites.
- Microbat surveys by Anabat deployment, and collection at Santa Sabina, Revesby, Pleasure Point, Mount Vicotria, Blackheath.
- Spot Analysis Techniques surveys: Colo heights, Mount Victoria, Scone and Singleton.

- Nocturnal surveys for forest owls such as Powerful Owls, Sooty Owls and Barking Owls which includes stag watching, call playback and spot lighting at various sites.
- Diurnal bird surveys which include the deployment and collection song meters at various sites.
- Conducting frog surveys for threatened species at various sites.
- Bushfire vegetation inspection and assessment in accordance with PBP 2019 at various sites.
- Habitat and Hollow Bearing Tree Assessments completed at Wyee, Illawarra, Wentworth and Mount Victoria.
- Arborist Assessment for Austin Butler Reserve, Yanco and Catherine fields
- Conducted target surveys for a variety of threatened flora and fauna at various sites in the Blue Mountains.

**Ecological Assessment**

- Biodiversity Assessment Method (BAM) plots completed at various sites under the supervision of BAM accredited assessor Joelan Sawyer.

**Ecological Monitoring**

- Assisted in the locating, trapping, handling and microchipping of native bush rats at North head.

# DARCY KILVERT

## Senior Ecologist & Sydney Office Manager

## Profile Summary

Darcy works with AEP in the role of Senior Ecologist / Sydney Office Manager, overseeing the Sydney Office since its establishment in 2023. With a comprehensive grasp of environmental legislation and approval processes, he possesses extensive expertise in implementing the Biodiversity Assessment Method. Having worked in the Natural Resource Management sector since 2015, Darcy has developed skills in Botany, Report Writing, Project Management, and GIS. His areas of special interest include Botany and Ecological Community identification, with a particular focus on the Greater Sydney Region.

### Academic Qualifications

- Bachelor of Science (Biology), The University of Newcastle, completed in September 2021

### Training, Licences and Professional Memberships

- NSW Class C Driver's Licence
- WHS NSW Construction Induction White Card
- First Aid (Provide First Aid HLTAID011)
- Working at Heights
- Chemcert and EPA ground applicator licence

### Professional Experience

**Senior Ecologist / Sydney Office Manager** — 2023 - Present
Anderson Environment & Planning
Newcastle NSW

**Ecologist / Project Lead** — 2022 - 2023
Anderson Environment & Planning
Newcastle NSW

**Ecologist** — 2021 - 2022
Anderson Environment & Planning
Newcastle NSW

**Senior Field Supervisor** — 2018 - 2021
Traditional Aussie Gardens
Newcastle

**Field Worker** — 2015 - 2017
Newcastle City Council
Newcastle

## Relevant Project Experience

### Ecological Survey examples

- Botanical surveys including BAM plots: Bermagui, Greendale, Waringah, Gosford, Lake Macquarie, Singleton, Quirindi, Lake Cathie, Dilkoon and Tweed Heads.
- Threatened flora surveys: Carrai, Blueys Beach, Dilkoon, and South West Rocks.
- Targeted Koala Nocturnal searches: Upper Rouchel, Greendale, South West Rocks, and Bundanoon.
- Spot Analysis Techniques surveys: Newcastle, Maitland, Hawkesbury, Camden, and Penrith.

### Ecological Assessment examples

- Biodiversity Development Assessment Report project management: Greendale, Empire Bay, Hawkesbury, Pleasure Point, South West Rocks
- Ecological Assessment Reports: Carramar, Lake Macquarie, Gosford, and Woolwich.
- Biocertification Assessments: West Wilton, Strathfield, Schofields, and Rouse Hill
- Part-5 Ecological Assessments: Liverpool, Wollongong, and Homebush.
- BDAR Waivers: Revesby, Strathfield and Schofields.

### Ecological Monitoring

- Biodiversity Stewardship Agreements including Blueys Beach and South West Rocks;
- Vegetation Monitoring Plots: Pheasants Nest and Warriewood.

# EVE DUBOURDIEU

## Ecologist

## Profile Summary

Eve joined the Anderson Environment & Planning (AEP) team in October of 2024 as an Ecologist. Driven by a passion for wildlife conservation, she completed a Bachelor of Biodiversity and Conservation and gained experience volunteering in fieldwork and in the Zoological industry. Eve contributes relevant knowledge on the current climate whilst effectively applying her skills in report writing, research, data entry, ecological surveying, and GIS, providing trusted ecological consulting services to AEP clients.

### Academic Qualifications

- Bachelor of Biodiversity and Conservation - Macquarie University, 2024
- Certificate III Captive Animals ACM30317 - Taronga Training Institute, 2021
- Certificate II Animal Studies ACM20117 - Taronga Training Institute, 2020

### Training, Licences and Professional Memberships

- NSW Class C Driver's Licence
- Provide First Aid (HLTAID011), Basic emergency life support (HLTAID010) and CPR (HLTAID009)
- WHS NSW Construction Induction White Card (CPCWHS1001)
- Vertebrate Pesticide Induction Certificate (VPIT)

### Professional Experience

**Ecologist** 2024 - Present
Anderson Environment & Planning
Sydney NSW

**Volunteer Field Hand & Data Analyst** 2023 - 2024
Macquarie University School of Natural Sciences
Macquarie Park NSW

**Veterinary Receptionist & 2IC** 2019 - 2024
North Shore Veterinary Hospital
Artarmon NSW

**Volunteer Zookeeper** 2021 - 2023
Taronga Zoo Conservation Society
Mosman NSW

**Manager, Buyer, Visual Merchandiser, Retail Assistant** 2016 - 2019
Opus Design
Paddington NSW

## Relevant Project Experience

### Ecological Surveys

- 5m/10m/20m/40m flora transects for threatened groundcover, shrub, and canopy species at Oxford Falls, Ingleside, Cattai, and Homebush.
- Targeted Rhizanthella slateri search at Oxford Falls.
- Incidental fauna surveys during all stages of fieldwork at various sites through observation and call recognition.
- Microbat surveys through the deployment and collection of Anabats at Ingleside.
- Wildlife camera trap surveys for terrestrial and arboreal species at Ingleside, including deployment, collection, and data analysis.
- Koala Spot Assessment Technique (SAT) at Oxford Falls and Ingleside.
- Small mammal trapping including handling, microchipping, and DNA collection at North Head, Manly.
- Aural-visual nocturnal frog surveys, including call-playback, in the Central Coast.

### Ecological Assessment

- Biodiversity Assessment Methodology (BAM) plots with accredited botanists at Homebush and St Ives.
- Habitat Assessments including tree hollow identification at Oxford Falls, Ingleside, and St Ives.
- GIS mapping for various sites.

### Ecological Reporting

- Environmental Assessment: Austral.
- Ecological Assessment Report: St Ives and Kogarah.
- Due Diligence: Jindabyne.
- Biodiversity Management Plan: Bundanoon.

# GEOFF TURNER
## Ecologist / GIS Officer

## Profile Summary

Geoff is a junior Ecologist and GIS Officer with Anderson Environmental & Planning. Having recently completed an undergraduate degree in environmental science where he garnered experience in environmental science and undertaking ecological fieldwork such as targeted flora and fauna surveys, he has begun to broaden his skills by commencing a Master of Geographic Information Science at the University of Queensland. During his time working as an Ecologist / GIS Officer he has furthered his ecology skills in conducting ecological assessments and surveys, in addition to performing the accompanying geospatial work that both informs the fieldwork and concisely communicates the data. His work with Anderson Environment & Planning has helped consolidate report writing skills first honed as a requirement of his bachelor's degree.

### Academic Qualifications

- Master of Geographic Information Science - University of Queensland, Current
- Bachelor of Science (Environmental Science) – University of Sydney, 2023

### Training, Licences and Professional Memberships

- NSW Class C Driver's Licence
- WHS NSW Construction Induction White Card
- First Aid (Provide First Aid HLTAID011)

### Professional Experience

**Ecologist / GIS Officer** — 2024 – Present
Anderson Environment & Planning
Newcastle NSW

**Technician (Espresso machines)** — 2023 - 2024
Buccheri Group
Melbourne VIC

**Farm Hand** — 2020 - 2021
Pocket City Farms
Sydney NSW

### Relevant Project Experience

**Ecological Surveys**

- Diurnal bird surveys (Various sites, 2024-onwards).
- Frog surveys for threatened species (Oxford Falls, April 2024).
- Habitat surveys, including tree hollow identification (Various sites, 2024-onwards).
- Nocturnal surveys for nocturnal avian fauna, including stagwatching, spotlighting, quiet listening and call playback (Wyee, 2024).

**Ecological Assessment**

- Biodiversity assessment methodology (BAM) plots, under supervision of BAM accredited assessor Joelan Sawyer (Narellan, May 2024).
- Bushfire vegetation inspection and assessment in accordance with PBP 2019 (Clarendon, April 2024).

**Geospatial Analysis**

- Perform Geospatial analysis according to guidelines and legislation for various reports such as Ecological Assessments and Biodiversity Management Plans.
- Design and present complex spatial data for government and industry.

# Ian Benson

## Director & Principal Ecologist

## Profile Summary

Ian has been with AEP since 2016 and was appointed as a Director in 2022 and continues in the role of Principal Ecologist. Ian has detailed knowledge of environmental legalisation and biodiversity approval pathways. He is highly proficient in the implementation of the NSW Biodiversity Assessment Method including a detailed understanding of the Biodiversity Credit market to inform feasibility studies as well as minimising the costs of providing biodiversity offsets.

Ian's special interest areas and expertise include Song Meter surveys for Koala and Forest Owl, camera trapping for cryptic fauna, avifauna surveys in challenging wetland & shorebird environs and nocturnal survey of arboreal mammals and nocturnal birds

Ian is a conservation detection dog handler and is currently working with his purpose breed working Cocker Spaniel "Dash" who is currently trained to detect Koala scat, Forest Owl pellets and Cane Toads.

Ian also volunteers moderating and vetting bird surveys from *Birdata* which is the Birdlife Australia Atlas to ensure a robust database for both the Hunter Valley and Central Coast reporting areas totalling approximately 5000 surveys per year. This important data from Birdlife is periodically included in the NSW Bionet Atlas.

### Academic Qualifications

- Graduate Diploma in Science (Ecology) University of New England (2014)
- Bachelor Engineering (Civil) University of Newcastle (2008)

### Training, Licences and Professional Memberships

- Biodiversity Accredited Assessor System: 18147
- Ecological Consultants Association: Member
- Environment Institute of Australia and New Zealand: Member
- Zoological Society of NSW: Scientific Member
- Hunter Bird Observers Club: Member
- Birdlife Australia: Member
- NSW Class C Driver's Licence. Experienced 4WD operator
- WHS NSW Construction Induction White Card
- First Aid (Provide First Aid HLTAID003)
- Advanced Plant Identification (University of New South Wales)
- Remoted Piloted Aircraft Excluded Category Training with Aviassist Pty Ltd

### Professional Experience

**Director & Principal Ecologist** 2022 - Present

Anderson Environment & Planning

**Principal Ecologist** 2019 – 2022

Anderson Environment & Planning

**Senior Ecologist** 2018 – 2019

Anderson Environment & Planning

| | |
|---|---|
| **Ecologist**<br>Anderson Environment & Planning | 2016 – 2018 |
| **Geotechnical Engineer/Project Manager**<br>Douglas Partners, Newcastle | 2008 – 2016 |
| **General Council Member, Ecological Consultants Association of NSW** | 2024 |
| **Birdata Moderator, Birdlife Australia** | 2017 - Present |

# Relevant Project Experience

**Ecological Survey examples**

- Targeted surveys for *Dichanthium setosum* in Glen Innes Region;
- Target surveys for *Eucalyptus cannonii*, Western Rail Coal Unloader, Pipers Flat;
- White-bellied Sea-Eagle nest locating and monitoring Glenning Valley and Chisholm;
- Powerful Owl nest locating and monitoring: Salamander Bay, Soldiers Point, Anna Bay North, Wallsend, Cameron Park and Edgeworth;
- Spot Analysis Techniques surveys: Nelsons Plains, Wallsend, Anna Bay, Boat Harbour, Salamander Bay, North Arm Cove, Warnervale, Hamlyn Terrace, Kincumber, Palmdale, Wyee, Charlestown, Chisholm, Gillieston Heights, Mount Vincent, Radford Park and Cessnock;
- Surveys for Squirrel Glider (*Petaurus norfolcensis*) Warnervale Area June 2020;
- Cat Tracker Pilot Program Associated with The Hunter Estuary Wetlands for Hunter Local Land Services;

**Ecological Assessment examples**

- Accredited Assessor for approved Biodiversity Development Assessment Reports:
  - Cromarty Lane, Bobs Farm
  - Teraglin Village, Chain Valley Bay;
  - Berkeley Vale Road, Glenning Valley;
  - Railway Road, Warnervale;
  - Barden Ridge Townhouses;
  - McFarlane's Road, Chisholm;
  - Fairlands Road, Medowie;
  - Rosella Rise, Warnervale;
  - Carr's Road, Neath;
  - Jack Grant Avenue, Warnervale;
  - Minnesota Road, Hamlyn Terrace;
  - Bellbird North;
  - Waterford, Chisholm;
  - The Entrance Road, Erina Heights;
  - Port Macquarie Rezoning;
  - Blanch Street, Boat Harbour
  - Newell Highway, Gilgandra
  - Narromine Road, Dubbo

- Ecological Assessment Report for Proposed Modification To Approved Western Rail Coal Unloader At Pipers Flat;
- Infrastructure;
    - Gwandalan Recycled Water Main;
    - Lower Belford Water Main;
    - Raymond Terrace Rising Main;
    - Astra Street Landfill Rehabilitation Assessment;

**Ecological Offsets and Monitoring**

- Biodiversity Stewardship Agreements including:
    - Bobs Farm;
    - Cedar Brush Creek;
    - Girvan;
    - Mardi;
    - Wallsend;
    - Ellalong;
    - Blueys Beach;
    - South-West Rocks.

**Publications**

- Callaghan, C.T., Benson, I., Major, R.E., Martin, J.M., Longden T., Kingsford, R.T. (2020) *Birds are valuable: the case of vagrants*. Journal of Ecotourism 19:82-92 January 2020.
- Fawcett, A., Benson, I., Roderick, M. (2024) *First confirmed sighting of Great Frigatebird within the Hunter Region, NSW*. The Whistler 18 (2024): 10-13.

# JEREMY BURRILL

## Senior Ecologist & Project Manager

## Profile Summary

Jeremy works with AEP in the role of Senior Ecologist/ Project Manager. He is a graduate of environmental science and management, and has experience in voluntary roles in environmental fields, involving threatened fauna and flora surveying, biodiversity reporting, management plans, consultancy projects and project management. He possesses a range of knowledge across ecological legislation and impact assessment. His background in environmental fields with his ecological knowledge and management experience is utilised in a diverse array of applications in his current role.

### Academic Qualifications

- Bachelor of Environmental Science (Environmental Management and Sustainability) Deakin University (2020)

### Training, Licences and Professional Memberships

- NSW Class C Driver's Licence
- WHS NSW Construction Induction White Card
- First Aid (Provide First Aid HLTAID011)
- Work Safely at Heights

### Professional Experience

**Senior Ecologist**
Anderson Environment & Planning
Sydney NSW
2024 - Present

**Ecologist / Project Manager**
Anderson Environment & Planning
Sydney NSW
2022 – 2024

**Ecologist**
Anderson Environment & Planning
Sydney NSW
2020 – 2022

### Relevant Project Experience

**Ecological Surveys**

- Botanical surveys including Biodiversity Assessment Method (BAM) vegetation plots under supervision of BAM accredited assessors Frances O'Brien and Timothy Mouton across various sites.
- Threatened flora surveys: Bundanoon, Greendale, Edmondson Park, Loftus, Glenning Valley, Wyee, Wadalba, Halloran, Ingleside, Somersby, Mardi, Wallsend, North Kellyville, Loftus and Pleasure Point.

- Threatened Nocturnal Fauna surveys: Bundanoon, Greendale, Edmondson Park, Loftus, Glenning Valley, Wyee, Wadalba, Halloran, Ingleside, Somersby, Mardi, Wallsend, Cattai, Barrington Tops and Somersby.
- Threatened Diurnal Fauna Surveys: Bundanoon, Greendale, Edmondson Park, Loftus, Glenning Valley, Wyee, Wadalba, Halloran, Ingleside, Somersby, Mardi, Wallsend, Cattai, Barrington Tops, Pleasure Point and Somersby.
- Microbat Nocturnal Harp Trapping: Wallsend and Mardi.
- Koala Spot Assessment Technique Surveys: Greendale, Wadalba, Girvan and Somersby.
- Nestbox installation: Glenning Valley and Narellan Vale.
- Habitat surveys including hollow bearing tree identification: Bundanoon, Greendale, Edmondson Park, Wyee, Somersby, Cattai, Barrington Tops and Somersby.
- Vegetation Clearance Surveys and Supervision: Glenning Valley, Wyee, Warnervale, Chain Valley Bay, Narellan Vale and Carramar.

**Ecological Assessment**

- Biodiversity Development Assessment Report contribution: Greendale, Edmondson Park, Austral, Rouse Hill and Annangrove.
- Ecological Assessment Reports: Minto, Berkeley Vale, Rooty Hill, Warriewood, Macquarie Park, Carramar and Ambarvale.
- Biocertification Assessments: West Wilton, Edmondson Park and Schofields.
- Weed Management Plan: Pheasants Nest and Tahmoor.
- Vegetation/ Biodiversity Management Plans: Woy Woy, Pheasants Nest, Vineyard, Grantham Farm, Warriewood, Loftus and Greendale.
- Riparian Assessment Reports: Schofields, Greendale, Quakers Hill and Ingleside.
- BDAR Waiver Letters: Revesby, Strathfield and Schofields.
- Plant Community Type determination.
- GIS Mapping.

**Ecological Monitoring**

- Vegetation Monitoring Plots: Pheasants Nest, Warriewood and Werrington.
- Fauna Monitoring/ Nestbox Monitoring: Glenning Valley and Wyee.

# JOELAN SAWYER
## Senior Ecologist

## Profile Summary

Joelan works with AEP in the Role of Senior Ecologist, Joelan Specialises in botany with experience focused in the Greater Sydney area and along the NSW coastline. He is proficient in performing flora and fauna surveys, plant identification and taxonomy, GIS, and reporting for biodiversity and impact assessments. He also has in-depth knowledge of the NSW legislative pathways, namely the Biodiversity Conservation Act 2016 and the associated Biodiversity Assessment Method (BAM). Joelan is an accredited assessor. Accreditation No. BAAS23016

### Academic Qualifications

- Bachelor of Science (Biology), The University of Western Sydney, completed September 2018
- BAM Assessor; accreditation number: BAAS23016.

### Training, Licences and Professional Memberships

- NSW Class C Driver's Licence
- WHS NSW Construction Induction White Card
- First Aid (Provide First Aid HLTAID011)

### Professional Experience

**Senior Ecologist** — 2023 – Present
Anderson Environment & Planning
Sydney NSW

**Ecologist** — 2017 - 2023
Anne Clements & Associates

**Nursery Worker / Horticulturalist** — 2015 - 2017
Wingham Nursery & Florist

### Relevant Project Experience

**Ecological Surveys**

- Flora
  - Targeted surveys for *Dichanthium setosum* in the Hunter Region;
  - Targeted surveys for *Tetratheca glandulosa* and *Hibbertia procumbens* on the Somersby Plateau;
  - Targeted surveys for *Eucalyptus benthamii*, *Dillwynia tenuifolia* and *Grevilliea juniperina*, Western Sydney;
  - Targeted surveys for *Genoplesium baueri*, and *Grammitis stenophylla* Northern Sydney;
- Fauna
  - Spot Analysis Techniques surveys: Muswellbrook, Gunnedah, Scone, Bermagui, Blue Mountains, Western Sydney;
  - Targeted surveys for Cumberland Plain Land Snail, Western Sydney;

- Targeted surveys for Broad Headed Snake, Cattai;
- Targeted surveys for Striped Legless Lizard and Pink Tailed Legless Lizard, Muswellbrook;
- Targeted surveys for Green and Golden Bell Frog, Eastern Suburbs, Sydney;

- Bushfire
  - Bushfire vegetation inspection and assessment in accordance with PBP 2019, various sites;
- Arboriculture
  - Waste recycling facility, 120 trees assessed, West Gosford;
  - Industrial development, 140 trees assessed, Stanmore Park;
  - Commercial development, 80 trees assessed, Marsden Park;

**Ecological Assessment**

- BAM assessment for Biodiversity Development Assessment Reports;
  - Sandstone quarry extension, Cattai;
  - Aged care housing, Bermagui;
  - Residential development, Pleasure Point;
  - Solar Farm, Stubbo;
  - Eco cabins, Colo;
  - Farm building and agricultural infrastructure, Richmond;
  - Mountain bike track, Delrio, Webbs Creek;
  - Aged care housing, Mollymook;
  - Hunter Gas Pipeline project, Hunter region;
- Accredited assessor for Landscaping Material Supply Facility Biodiversity Development Assessment Report, Greendale;
- BAM assessment and PCT for Ecological Assessment Reports;
  - Horse stabling development, Clarendon;
  - Great southern walk accommodation, Illawarra Escarpment;
  - Rezoning for Carrathool Shire Council at Merriwagga and Rankin Springs;
  - Biodiversity assessment of various Sydney Water assets, Greater Sydney;
  - Biodiversity assessment of Newcastle Councils bushland assets, Newcastle;
  - Biodiversity assessment of Penrith Councils assets at St Marys industrial area;

**Ecological Monitoring**

- Vegetation monitoring on VMP lands;
  - St Narsai Assyrian Christian College, Horsley Park;
  - Residential development, Cooranbong;
  - Sandstone Quarry restoration, Red Hill Reserve, Beacon Hill;
- Publications
  - Sawyer, J. (2021). *Achieving resilient biodiversity offsets on reconstructed landforms* [Poster Presentation]. Ecological Society of Australia 2021 “Symposium: Practitioners collaborating to restore and rewild landscapes” Darwin, Australia