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# Biodiversity Assessment Report

## Framework for Biodiversity Assessment

Lots 1, 2 and 4 // DP 1151638, University of Technology, Ku-ring-gai Campus, Lindfield

Proposed Learning Village Refurbishment (SSD 8114)

Prepared for DesignInc Sydney Pty Ltd

**7 June 2017**

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|---|---|---|
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# Glossary and abbreviations

| Acronym | Description |
|---|---|
| BAR | Biodiversity Assessment Report |
| BCF | Biodiversity Conservation Fund |
| BCT | Biodiversity Conservation Trust |
| COLA | Covered Outdoor Learning Area |
| DA | Development Application |
| DoEE | Department of the Environment and Energy |
| DPE | NSW Department of Planning and Environment |
| Subject site | UTS Ku-ring-gai campus, Eton Rd, Lindfield |
| EEC | Endangered Ecological Community |
| EPBC Act | Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* |
| FBA | Framework for Biodiversity Assessment |
| ha | hectare(s) |
| IBRA | Interim Bioregionalisation of Australia |
| km | kilometre |
| LGA | Local Government Area |
| LPI | Land and Property Information |
| masl | Metres above sea level |
| NSW | New South Wales |
| OEH | NSW Office of Environment and Heritage |
| PCT | Plant community type, as defined by OEH (2017) |
| RFEF | River-Flat Eucalypt Forest |
| SEARs | Secretary's Environmental Assessment Requirements |
| SSD | State Significant Development |
| TSC Act | NSW *Threatened Species Conservation Act 1995* |

# 1. Introduction

## 1.1 Background

This Biodiversity Assessment Report (BAR) has been undertaken to accompany a Development Application (DA) relating to the internal refurbishment of UTS Ku-ring-gai campus, Eton Rd, Lindfield. The refurbishment will cater for 2,100 students and 200 staff from kindergarten to Year 12. The building will be organised around six home bases consisting of 350 students in grades kindergarten to year 12. There is a gymnasium, main auditorium, two lecture theatres, science labs, cafeteria, hospitality kitchens, visual arts and wood work areas. The subject site for this BAR covers an area of 4.90 ha.

The proposed development is considered a State Significant Development (SSD), and as such Secretary's Environmental Assessment Requirements (SEARS) have been issued by the Department of Planning and Environment (DPE). The SEARs state the following regarding the assessment of biodiversity impacts:

> *Biodiversity impacts related to the proposed development are to be assessed and documented in accordance with the Framework for Biodiversity Assessment, by a person accredited in accordance with section 142B(1)(c) of the Threatened Species Conservation Act 1995.*

This BAR has been prepared by Lucas McKinnon, an Accredited BioBanking Assessor (No. 76) under Part 7A of the TSC Act, and is consistent with the Framework for Biodiversity Assessment (FBA) (OEH 2014). This BAR, therefore, satisfies the requirements of the SEARs.

Two native vegetation types were identified in the subject site. Most native vegetation within the subject site is consistent with the description of Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney (PCT1782) and Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast (PCT1776). Neither of the two communities are listed as threatened ecological communities (TEC) under the NSW *Threatened Species Conservation Act 1995* (TSC Act) (NSW SC 2014) or the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) (CoA 2010).

Sections of plantings 'exotic and non-indigenous occur in areas of the subject site, particularly surrounding the buildings. This vegetation contains occasional species representative of Red Bloodwood – Scribbly Gum Heathy Woodland, however, occurs in a modified condition.

Direct impacts to the ecological values of the development site are limited, as a majority of the development is associated with the internal refurbishment of the premises onsite. However, direct impact will occur to the vegetation surrounding the development site with the installation of a new boundary fence and associated 3 metre buffer for vehicle movement (6 metres total). An additional small impact is caused through the construction of a Covered Outdoor Learning Area (COLA) at the southern end of the subject site. The total impact is 0.22 ha, and the impacts have been assessed using the FBA (OEH 2014).

Sources of information for this report included:

- NSW Planning Viewer (NSW Dept. of Planning and Environment 2017)
- BioNet Atlas of NSW Wildlife (NSW Office of Environment and Heritage 2017)
- Protected Matters Search Tool (Commonwealth Dept. of the Environment and Energy 2017)
- Native vegetation of the Sydney Metropolitan Catchment Management Authority (OEH 2016)
- Soil Landscapes of the Sydney 1:100,000 Sheet map and report, Soil Conservation Service of NSW, Sydney (Chapman et al 2009)
- SIX Maps (LPI 2017)

Plot based vegetation survey data, which was collected in accordance with FBA (2014), were captured and used for this assessment. Targeted threatened species survey was also conducted.

## 1.2 Location and site identification

This subject site for this BAR covers a total area of 4.90 ha and consists of lots 1 (part), 2 and 4 // DP 1151638, Eton Road, Lindfield (**Figure 1.1**). The subject site includes the full extent of the planned building refurbishment works (lot 2 // DP 1151638 - 3.6 ha) known as the Lindfield Learning Village site area (**Figure 1.2)**. The BAR subject site has been extended past the Lindfield Learning Village site area to allow for the assessment of impacts related to the construction of a boundary fence. **Figure 1.3** contains the footprint of the proposed development.

The subject site is bounded by Lane Cover River National Park to the south, east and west, and existing development to the north. It is situated approximately 50-70 metres above sea level (masl). The highest point of the site occurs on the north-eastern boundary. The majority of the site is mapped as the Hawkesbury soil landscape, which is characterised by rugged, rolling to very steep hills on Hawkesbury Sandstone (Bannerman and Hazelton 1990). The northern part of the subject site is mapped as the Lucas Heights soil landscape, which comprises gently undulating crests and ridges on plateau surfaces of the Mittagong formation (Bannerman and Hazelton 1990).

Regional scale geological mapping by Herbert (1983) shows the site is drawn from Wianamatta Group (Rh) geology, dominated by medium to coarse grained quartz sandstone, very minor shale and laminate lenses. The location of the site is provided in and the site map is shown in.

## 1.3 Land use history

The subject site consists of native intact bushland, cleared land, exotic/non-indigenous vegetation and various infrastructure (i.e. buildings, roads etc.) on land zoned as B4 – Mixed Use. The south, east and western perimeters of the site contain a mixture of intact and underscrubbed native vegetation. To the south of the subject site is Blue Gum Creek, which is a tributary to the Lane Cove River. The vegetation surround the subject site has direct connectivity to Lane Cove National Park, however, is partly dissected by Lady Game Drive.

The native vegetation surrounding the campus buildings has been modified through the installation of various non-indigenous native plants. These areas also contain a higher proportion of exotic species, such as *Senna pendula* var. *glabrata*, Asparagus aethiopicus** (Ground Asparagus) and *Ehrharta erecta** (Panic Veldtgrass) than the remainder of the site. A large portion of the vegetation surrounding the subject site has been underscrubbed and is currently managed within an existing APZ. Several small areas of cleared land are present in the subject site, which are currently unmanaged and consist exclusively of exotic grasses and herbaceous weeds, such as *Cenchrus clandestinus** (Kikuyu Grass).

The land use surrounding the subject site consists of land zoned as R2 – Low Density Residential and R1 – General Residential to the north of the subject site. To the south, west and east of the subject site is land zoned as E1 - National Parks and Nature Reserves, E2 – Environmental Conservation and E3 – Environmental Management. Charles Bean Oval is located to the north of the subject site.

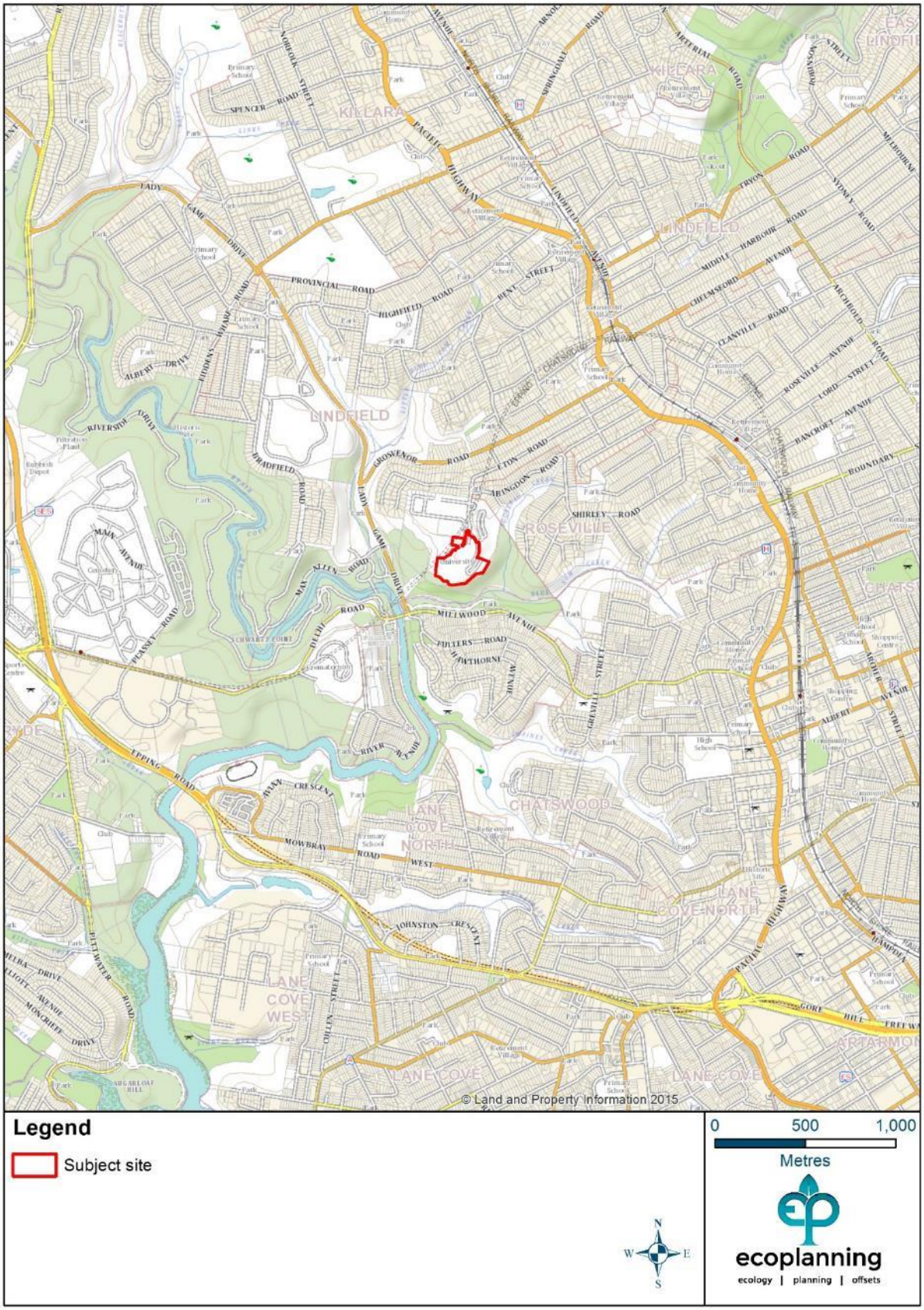


**Figure 1.1: Subject site location.**

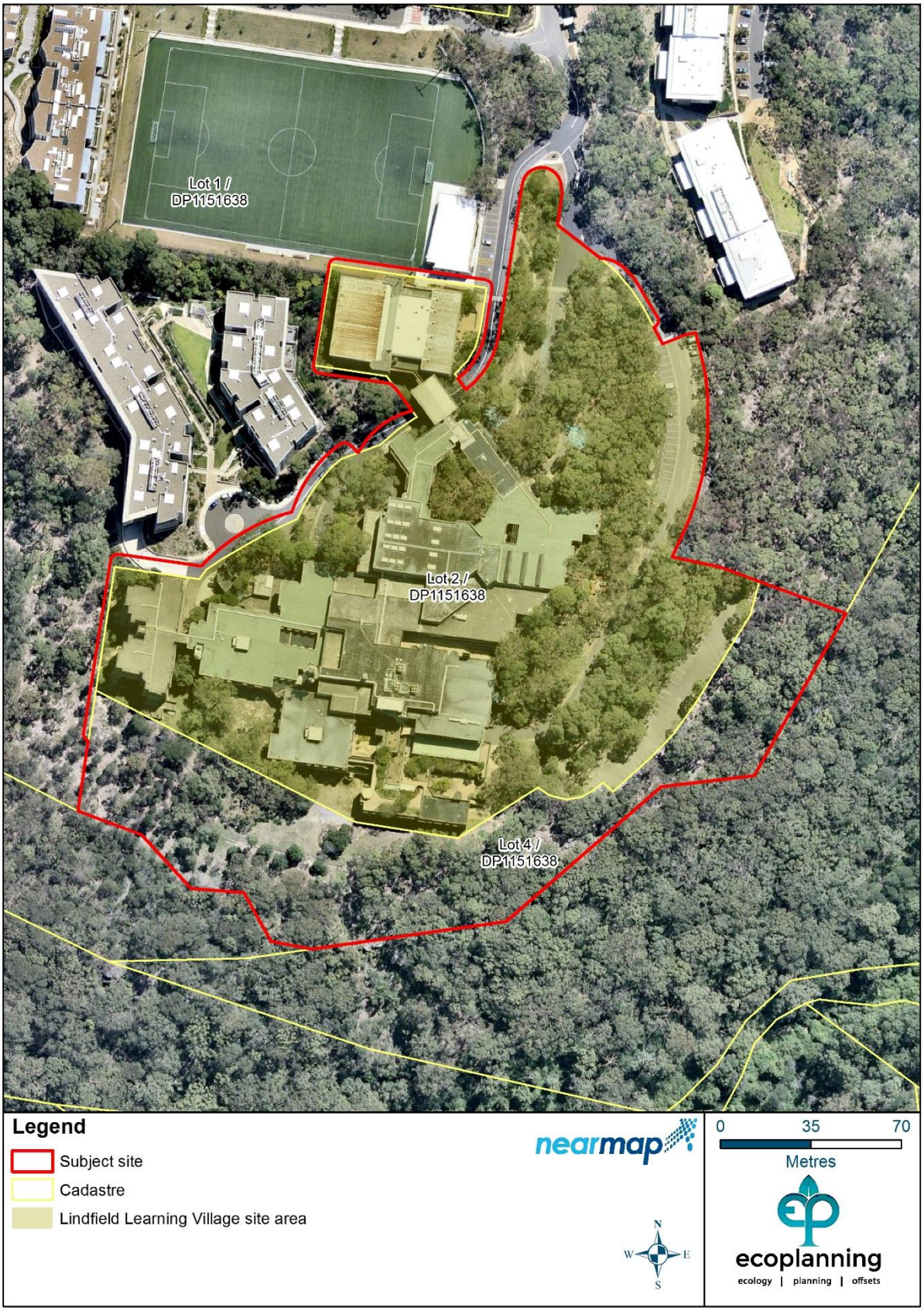


**Figure 1.2: Site map.**

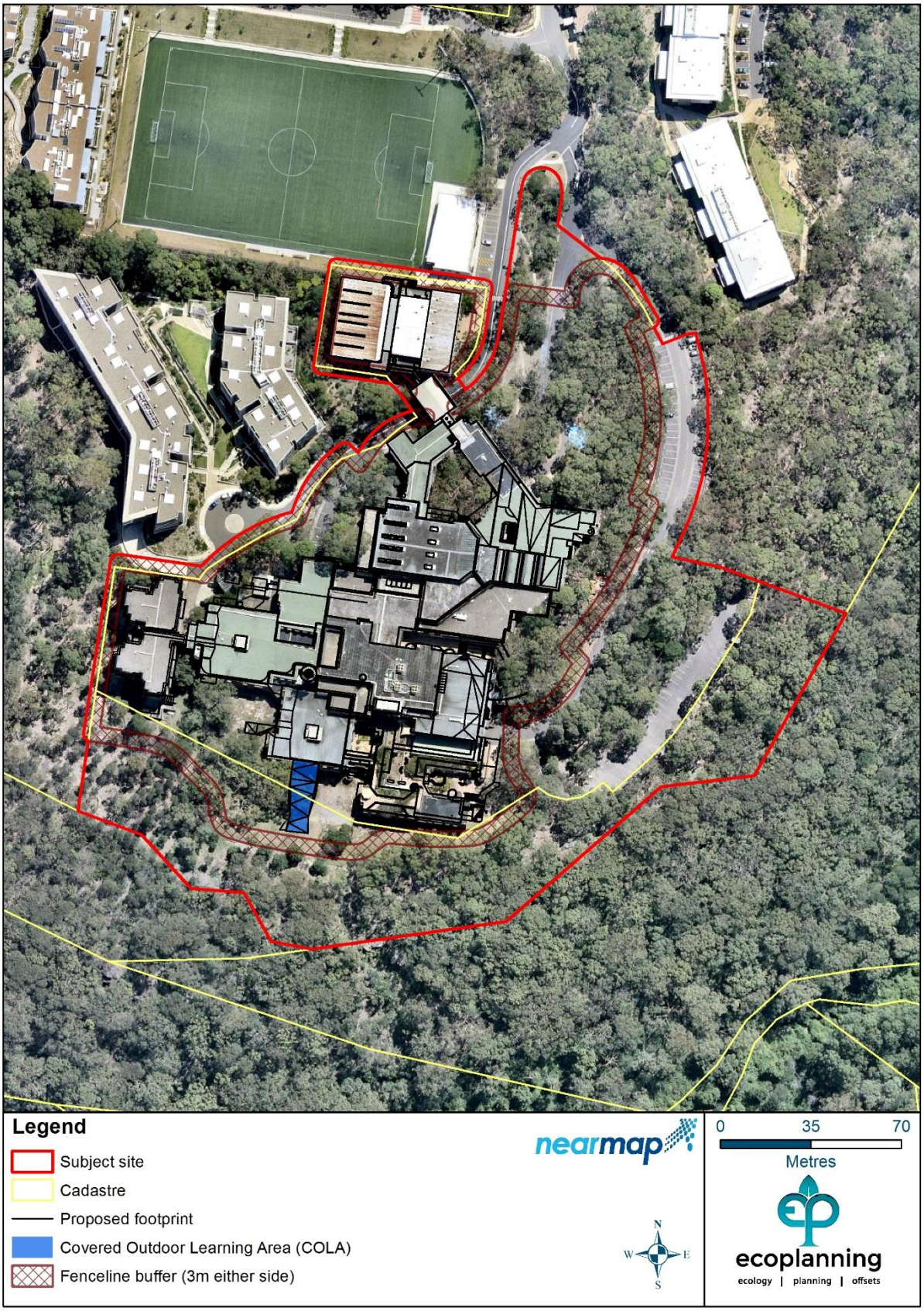


**Figure 1.3: Proposed development footprint.**

# 2. Landscape features

In accordance with the FBA, a number of features are assessed within and surrounding the subject site in order to describe the landscape features and to calculate the final landscape score. Provided below are details related to IBRA region and subregion, NSW landscape regions (Mitchell Landscapes), rivers, streams, estuaries and wetlands, surrounding native vegetation extent and the existence of state or regionally significant biodiversity values.

### 2.1.1 IBRA bioregions and IBRA subregions

The subject site is located entirely within the Pittwater IBRA subregion (Version 7) and within the NSW Sydney Basin IBRA region (version 7). The outer assessment circle crosses partially into the Cumberland IBRA subregion on its eastern side.

The Pittwater IBRA subregion was entered into the credit calculator.

### 2.1.2 NSW landscape regions (Mitchell Landscapes)

The subject site occurs in only one NSW Mitchell Landscape, being the '*Port Jackson Basin*' landscape (Mitchell Landscapes V3).

The landscapes '*Pennant Hills Ridges*' also occur within the outer assessment circle. This is shown on the Locality Map (**Figure 2.1**) and area calculations for each landscape are shown in **Table 2.1**.

The Port Jackson Basin Mitchell Landscape was entered into the credit calculator due to it being the dominant Mitchell Landscape within the subject site – occupying 100.0% of the subject site.

**Table 2.1: Mitchell Landscapes and areas.**

| Mitchell Landscape (ML) | Area of ML within outer assessment circle (ha) | Area of ML within subject site (ha) | % of subject site |
|---|---|---|---|
| Port Jackson Basin | 810 | 4.90 | 100 |
| Pennant Hills Ridges | 190 | 0 | 0 |
| **Total** | **1000** | **4.90** | **100** |

### 2.1.3 Rivers, streams and estuaries

There are no rivers, streams or estuaries identified within the subject site. A riparian assessment was conducted for the subject site using both desktop and field based methods.

An initial desktop assessment of mapped waterways was conducted for the subject site and surrounding lands. This assessment found that no mapped waterways are present on the subject site. The closest mapped waterway is approximately 150 m to the south of the subject site. This waterway is a tributary of Lane Cover River known as Blue Gum Creek, drains in a westerly direction and is a Strahler Stream Order 2 waterway.

The site inspection identified no waterways or waterbodies within the subject site. A further assessment of waterfront or riparian land is, therefore, not required.

### 2.1.4 Local and important wetlands

There are no local or important wetlands within the 1,000 ha assessment circle.

### 2.1.5 Native vegetation extent

A layer of native vegetation cover is required for each assessment circle (100 ha and 1,000 ha) to assess the impact of the development to native vegetation. The extent of native vegetation on the subject site and immediate surrounds was mapped using the Sydney Metropolitan Catchment Management Authority (CMA) Vegetation Map (OEH 2013). Areas of Rock, Cleared Land and Weeds and Exotics were removed from the layer before the vegetation extent was clipped to the outer and inner assessment circles.

The native vegetation cover was mapped for both the 100 ha and 1,000 ha circles (**Figure** 2.1). The proposed footprint of the development will impact on 0.22 ha, and the calculations related to future native vegetation cover include this proposed impact.

### 2.1.6 State, regional and local biodiversity links

The site does not incorporate a state, regional or local biodiversity link.

### 2.1.7 Other landscape features

There are no other landscape features identified in the SEARs.

## 2.2 Landscape value score components

### 2.2.1 Percent native vegetation cover in the landscape

Consideration of the native vegetation within the inner and outer circles (**Figure 2.1**) and the impact of the development which would require the removal of 0.22 ha of native vegetation, Table 9 in FBA (OEH 2014) was used to determine current and future scores for the percent native vegetation cover component of the landscape score. The results of the analysis are shown in **Table 2.2**. Due to the relatively minor amount of clearing proposed, no change in future score is recorded for this variable.

**Table 2.2: Estimates of native vegetation and scores in the inner and outer assessment circles.**

| Assessment circle | Current (ha) | Current (%) | Current (score) | Future (ha) | Future (%) | Future (score) |
|---|---|---|---|---|---|---|
| Inner (100 ha) | 55.9 | 56 - 60 | 7.7 | 55.7 | 56 - 60 | 7.7 |
| Outer (1,000 ha) | 493.2 | 46 - 50 | 11.3 | 493.0 | 46 - 50 | 11.3 |


**Figure 2.1: Location map.**

### 2.2.2 Connectivity value

The subject site is not part of a State or Regionally Significant Biodiversity Link, as identified by the 'connectivity value classes' in Table 10 of Appendix 4 in the FBA.

The subject site is well connected to the south, with other more restricted vegetated links also occurring to both the east and west. The subject site also lies directly adjacent to the Lane Cove River National Park. However, as the Lindfield Learning Village is already constructed, and the refurbishment includes only the addition of a perimeter fence (total 6 m impact), no impacts to connectivity are expected. This includes no changes to either the minimum width, or the overall condition, of the link.

Based on the above the following was entered into the credit calculator:

- **Connectivity width:** 100 - 500 m before development and after development;
- **Connectivity over storey condition:** PFC at benchmark before development and after development;
- **Connectivity mid storey/ground cover condition:** PFC of mid-storey/ground cover at benchmark before development and after development.

As there was no change in the current or future connectivity scores, no score was recorded for this variable.

### 2.2.3 Patch size

Patch size as defined by the FBA as *'an area of native vegetation that:*

*a) Occurs on the development site or offset site, and*
*b) Is in moderate to good condition, and*
*c) Includes native vegetation that has a gap of <100 m from the next area of moderate to good condition native vegetation (or ≤ 30 m for non-woody vegetation)*

*Patch size may extend onto adjoining land that is not part of the development site.'*

Patch size was calculated for the vegetation on the development site using the field validated map of vegetation types identified and the SMCMA (OEH 2013) vegetation map referenced earlier.

As the site is well connected, and lies adjacent to a large amount of contiguous vegetation extending throughout Lane Cove National Park, the total patch size calculated was the maximum required by the FBA (OEH 2014), being 1,001 ha. 1,001 ha was entered into the credit calculator resulting in a total patch size score of 12.

## 2.3 Landscape value score

Using the above data, the final landscape score was calculated to be **12** (**Table 2.3**).

**Table 2.3: Landscape score components.**

| Landscape score component | Score Awarded |
|---|---|
| Change in connectivity score | 0 |
| Decrease in native vegetation cover (inner assessment circle) score | 0 |
| Decrease in native vegetation cover (outer assessment circle) score | 0 |
| Patch size area score | 12 |
| **Total** | **12** |

# 3. Native vegetation

## 3.1 Plant community types (PCTs) and threatened ecological communities

Desktop assessment determined the vegetation in the subject site to be mapped as 'Hornsby Enriched Sandstone Exposed Woodland' (S_DSF10), 'Coastal Enriched Sandstone Dry Forest' (S_DSF04), with areas of 'Coastal Enriched Sandstone Moist Forest' (S_WSF02) occurring in the sheltered gullies surrounding the subject site (OEH 2013). Small fragments of vegetation were not mapped by OEH (2013), particularly to the east and south east of Charles Bean Oval.

Field assessment confirmed the presence of Coastal Enriched Sandstone Dry Forest and Hornsby Enriched Sandstone Exposed Woodland in the subject site. Coastal Enriched Sandstone Moist Forest was identified to the south of the subject site, extending slightly further north than indicated by OEH (2013) mapping, however, will not be subject to direct or indirect impacts of the proposed development. Areas previously mapped as Hornsby Enriched Sandstone Exposed Woodland surrounding the buildings were assessed to contain exotic species and planted non-indigenous native species, including *Eucalyptus grandis** (Flooded Gum). Other non-native vegetation types and features identified included cleared land 'exotics' and infrastructure – 'buildings, road etc.' (**Figure 3.2**).

Hornsby Enriched Sandstone Exposed Woodland is equivalent to the Plant Community Type (PCT), *Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney* (ME67, PCT1782) (OEH 2017). The Hornsby Enriched Sandstone Exposed Woodland vegetation in the subject site is not listed as a TEC under the EPBC or TSC Acts. Three distinct condition classes of this community occur in the subject site, including 'intact', 'underscrubbed' and 'disturbed/shrubby'. A large portion of the mapped extent of the community in the south and the west of the site contains vegetation that is managed within the APZ. The intact Hornsby Enriched Sandstone Woodland vegetation occurs as fragments of bushland amongst the buildings within the campus, with the disturbed/shrubby comprising a small patch at the far southern boundary of the subject site.

Coastal Enriched Sandstone Dry Forest is equivalent to the PCT, *Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast* (ME64; PCT1776) (OEH 2017). The Coastal Enriched Sandstone Dry Forest in the subject site is not listed as a TEC under the EPBC or TSC Acts. Only one vegetation zone/condition class is identified onsite, which occurs in an 'intact' condition. This community transitions into Coastal Enriched Sandstone Moist Forest in the sheltered gullies to the south of the subject site. An increase in mesic species, including *Pittosporum undulatum* (Native Daphne), *Glochidion ferdinandi* (Cheese Tree) and *Elaeocarpus reticulatus* (Blueberry Ash), is typical for Coastal Enriched Sandstone Moist Forest and marks the shift between the two communities.

The total area of each vegetation type is displayed in **Table 3.1**. 'Cleared land exotics and exotic/non-indigenous plantings' constitute 0.66 ha, or 13.50% of the development site. Native vegetation occupies 34.98% of the site, with Smooth-barked Apple - Red Bloodwood open

forest on enriched sandstone slopes around Sydney and the Central Coast mapped over 0.44 ha (8.91% of the development site) and Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney mapped over 1.28 ha (26.07% of the development site). Additional information on both vegetation types on site is provided below.

**Table 3.1: Vegetation types and zones, a description and the total area within the development site.**

| Vegetation type (OEH 2013) | Plant community type (OEH 2016) | Threatened ecological communities | Condition | Area (ha) | Proportion of development site (%) |
|---|---|---|---|---|---|
| Hornsby Enriched Sandstone Exposed Woodland | PCT 1782 - Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney | N/A | Underscrubbed | 0.66 | 13.50 |
| | | | Intact | 0.57 | 11.65 |
| | | | Disturbed/shrubby | 0.04 | 0.91 |
| Coastal Enriched Sandstone Dry Forest | PCT 1776 - Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast | N/A | Intact | 0.44 | 8.91 |
| Other vegetation | Cleared land exotics and exotic/non-indigenous plantings | N/A | Exotics/non-indigenous | 0.66 | 13.49 |
| | Cleared land, infrastructure | N/A | Cleared land, infrastructure | 2.53 | 51.54 |
| | | | **Total** | **4.90** | **100.0** |

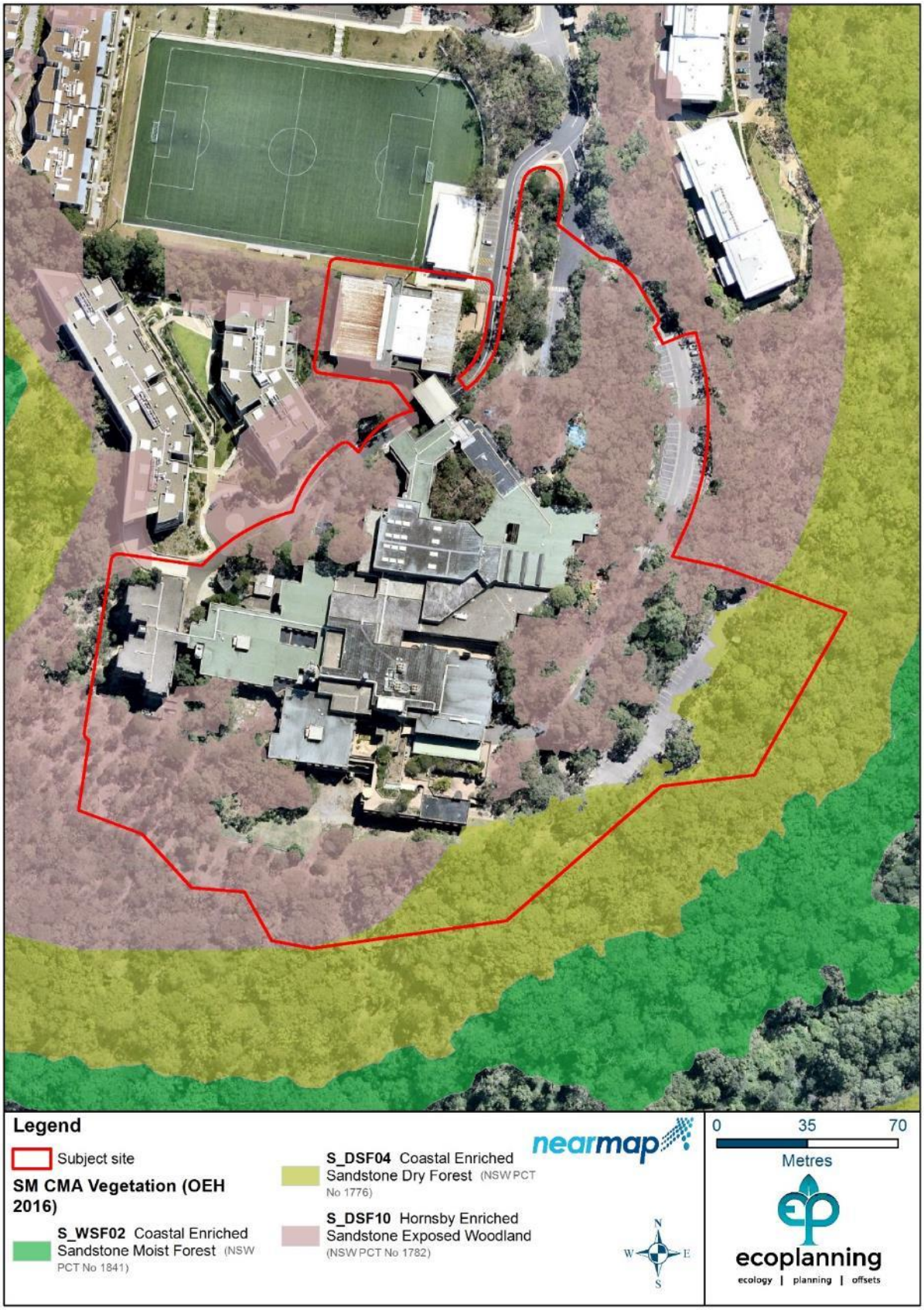


**Figure 3.1: Vegetation types (OEH 2016).**


**Figure 3.2: Field validated vegetation (Ecoplanning 2016).**

### 3.1.1 Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast (ME64; PCT1776)

This vegetation type is located along the southern and the western boundaries of the development site. It is characterised by intact open forest with an established overstorey of *Eucalyptus piperita* (Sydney Peppermint) and *Angophora costata* (Sydney Red Gum). Some sections of the vegetation type contain a low abundance and cover of herbaceous and woody weeds, which mostly occur in areas with increased soil moisture. This vegetation type has been distinguished from other vegetation types onsite (i.e. Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland) by the presence of *E. piperita* and *A. costata*, and the absence of *Eucalyptus haemastoma* (Scribbly Gum). This vegetation is remnant, and contains several hollow bearing trees (**Figure 3.3**).

The midstorey is dominated by native shrub species, including *Banksia serrata* (Old-man Banksia), *Banksia oblongifolia* (Fern-leaved Banksia) *Persoonia levis* (Broad-leaved Geebung), *Ceratopetalum gummiferum* (Christmas Bush), *Platysace lanceolata* (Shrubby Platysace), *Zieria smithii* (Sandfly Zieria), *Dillwynia retorta*, *Dodonaea triquetra* (Large-leaf Hop-bush) and *Acacia longifolia* subsp. *longifolia* (Sydney Golden Wattle). The groundlayer is dominated by native groundcovers, grasses and ferns, including *Gonocarpus teucrioides* (Raspwort), *Pteridium esculentum* (Bracken Fern), *Lomandra longifolia* (Spiny-headed Mat-rush), *Xanthorrhoea arborea*, *Stylidium productum, Dianella caerulea* var. *producta, Cryptostylis erecta* (Bonnet Orchid) and *Billardiera scandens* (Hairy Apple Berry).

A range of herbaceous and woody weeds are present through the vegetation type in low quantities, including *Senna pendula* var. *glabrata**, *Bidens pilosa** (Cobblers Peg), *Solanum nigrum** (Black-berry Nightshade), *Ligustrum sinense** (Small-leaved Privet), *Asparagus aethiopicus**, *Phyllanthus tenellus** (Hen and Chicken), *Ageratina adenophora** (Crofton Weed), *Nephrolepis cordifolia** (Fishbone Fern), and *Cinnamomum camphora** (Camphor Laurel).

A summary of the PCT profile for this vegetation type in the Vegetation Information System (VIS) (OEH (2017) is provided in **Table 3.3**. Species recorded onsite within this patch are highlighted in **bold text**.