

26 February 2016

Mr Rick Alloggia  
Managing Director  
Invoke Property Group Pty Ltd  
PO Box 667  
CASTLE HILL NSW 1765

Dear Rick,

**Re: Preliminary Flora and Fauna Constraints Assessment for potential rezoning of properties along the northern side of Kathleen Avenue, Castle Hill**

**Project no. 21778**

Biosis Pty Ltd was engaged by Invoke Property Group on behalf of the landowners along the northern side of Kathleen Avenue (the odd numbered properties between 1 and 25 Kathleen Avenue Castle Hill) to carry out a preliminary flora and fauna study highlighting the ecological values and constraints associated with potential rezoning of the land.

The current zoning of these properties along the northern side of Kathleen Avenue according to The Hills Local Environmental Plan 2012 is E4, which permits large lot residential development, while the Department of Planning and Environment (DPE) proposed Showground Precinct Structure Plan, which affects the southern side of Kathleen Avenue, permits more intensive residential development.

The purpose of this preliminary study is to identify any ecological constraints to potential rezoning and consequent future higher density residential development within the subject properties, similar to that permitted within the properties on the southern side of Kathleen Avenue under the proposed Structure Plan, and the adjustment of the northern boundary of the proposed Structure Plan to coincide with the rear of the subject properties.

Preliminary research indicates that the vegetation within or adjoining the study area may comprise a Threatened Ecological Community (TEC) listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or NSW *Threatened Species Conservation Act 1995* (TSC Act). In addition, the study area may potentially provide habitat for NSW or Commonwealth listed threatened flora and fauna species.

The objective of this flora and fauna assessment is therefore to inform the rezoning proposal and determine whether the vegetation comprises a TEC, or may provide habitat for any threatened flora or fauna listed under the EPBC Act and/or TSC Act.

## **Background**

The study area (see Figure 1) is defined as the area directly affected by the proposed rezoning and proposed inclusion in the Showground Precinct Structure Plan, which would subsequently allow higher density residential development, and includes the buffer area to the creekline. The study area is

Biosis Pty Ltd  
**Newcastle Resource Group**

approximately 5.6 hectares in area and is situated within The Hills Shire Council Local Government Area (LGA). The surrounding land use comprises a mixture of residential, industrial/commercial and remnant bushland. Fred Caterson Recreation Reserve, which contains substantial areas of remnant native vegetation, adjoins the study area to the west of Gilbert Road. The creekline at the northern boundary of the study area also flows through this reserve.

## Background research

Prior to completing the field investigation, information provided by Invoke Property Group as well as other key information was reviewed, including:

- Office of Environment and Heritage (OEH) BioNet Atlas of NSW Wildlife for TSC Act listed threatened biota (OEH 2015a).
- Department of Environment (DoE) EPBC Act Protected Matters Search Tool (DoE 2015).
- NSW Department of Primary Industries (DPI) *Noxious Weeds Act, 1993* (NW Act) listed weeds for the Hornsby Shire Council (DPI 2015).
- OEH Vegetation Information System (VIS) mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer (OEH 2015b), for
  - VIS Map 2230 - *Native vegetation of south eastern NSW: a revised classification and map for the coast and eastern tablelands*. Tozer et al. (2010).
  - VIS Map 2236 - *The Bushland of Hunts Creek Reserve and Seville Reserve*. Baulkham Hills Shire Council (2007).

## Field investigation

A field investigation of the study area was undertaken on 7 August 2015 by Brian Wilson (Senior Consultant Ecologist) and Stefan Rose (Senior Ecologist) of Biosis. The focus of the field investigation was to determine whether the ecological values of the study area contain any threatened species or ecological communities listed under the EPBC Act or TSC Act, or whether the study area supports suitable habitat for threatened biota considered likely to occur.

Vegetation and potential habitat features for fauna within the study area were surveyed on foot using a rapid field assessment through all properties within the study area over six person hours. The main focus of the field investigation was on the habitat along the creek at the rear of the properties, particularly any potentially significant habitat south of an assumed buffer of 10 metres from the watercourse in accordance with the NSW *Water Management Act 2000*. This mainly comprised habitat at the rear of the houses within the existing lots, however any significant ecological features within lots at the front and sides of the houses were also noted.

## Relevant Legislation

Potential implications or constraints for proposed rezoning were assessed in relation to key biodiversity legislation and policy including:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Threatened Species Conservation Act 1995* (TSC Act).
- *Water Management Act 2000* (WM Act).

## Results

### Vegetation Communities

Prior to the field investigation, Biosis confirmed that various native vegetation communities including some TECs have been previously mapped in the broader landscape (Baulkham Hills Shire Council 2007; Tozer et al. 2010). These include:

- *Sydney Turpentine-Ironbark Forest* (Critically Endangered, EPBC Act; Endangered, TSC Act).
- *Sydney Sandstone Ridgetop Woodland*.

The distribution of these communities according to the regional and local mapping studies is shown on the maps in Appendix 3.

A key focus of the field investigation was to assess the vegetation of the study area against the final determinations for above listed TECs to determine presence or absence. This is discussed further below.

### Threatened Species

Background searches identified a number of records for threatened fauna and flora listed under the EPBC Act and/or the TSC Act as occurring within a 5 kilometre radius of the study area (OEH 2015a) or predicted to occur (DoE 2015). A habitat based assessment was completed to determine the presence of suitable habitat for these 14 threatened fauna species and 6 threatened flora species. Those species considered of moderate or greater likelihood of occurrence based on the presence of potentially suitable habitat within the study area comprise:

- Gang-gang Cockatoo *Callocephalon fimbriatum* (Vulnerable and Endangered Population, TSC Act).
- Varied Sittella *Daphoenositta chrysoptera* (Vulnerable, TSC Act).
- Little Lorikeet *Glossopsitta pusilla* (Vulnerable, TSC Act).
- Barking Owl *Ninox connivens* (Vulnerable, TSC Act).
- Powerful Owl *Ninox strenua* (Vulnerable, TSC Act).
- Masked Owl *Tyto novaehollandiae* (Vulnerable, TSC Act).
- Grey-headed Flying-fox *Pteropus poliocephalus* (Vulnerable, EPBC Act and TSC Act).
- Little Bentwing-bat *Miniopterus australis* (Vulnerable, TSC Act).
- Eastern Bentwing-bat *Miniopterus schreibersii oceanensis* (Vulnerable, TSC Act).
- Eastern Freetail-bat *Mormopterus norfolkensis* (Vulnerable, TSC Act).
- Yellow-bellied Sheath-tail-bat *Saccolaimus flaviventris* (Vulnerable, TSC Act).
- Southern Myotis *Myotis macropus* (Vulnerable, TSC Act).
- Eastern False Pipistrelle *Falsistrellus tasmaniensis* (Vulnerable, TSC Act).
- Greater Broad-nosed Bat *Scoteanax rueppellii* (Vulnerable, TSC Act).
- *Acacia gordonii* (Endangered, EPBC Act and TSC Act).
- *Epacris purpurascens* var. *purpurascens* (Vulnerable, TSC Act).
- *Leucopogon fletcheri* subsp. *fletcheri* (Endangered, TSC Act).
- Hairy Geebung *Persoonia hirsuta* (Endangered, EPBC Act and TSC Act).

- Magenta Lilly Pilly *Syzygium paniculatum* (Endangered, EPBC Act; Vulnerable, TSC Act).
- *Tetratheca glandulosa* (Vulnerable, EPBC Act and TSC Act).

### **Migratory Species**

From the full report from the EPBC Act Protected Matters Search Tool there is some potential for the following migratory species (Commonwealth EPBC Act) to occur seasonally within the study area:

- Black-faced Monarch *Monarcha melanopsis* (Migratory, EPBC Act).
- Rufous Fantail *Rhipidura rufifrons* (Migratory, EPBC Act).

No Matters of National Environmental Significance (nationally listed threatened or migratory species or threatened ecological communities) listed in the report are considered likely to be impacted significantly as a result of the proposed Master Plan Concept.

### **Presence of important fauna habitat features**

The important fauna habitat features present within the site comprise large mature trees, hollow-bearing trees and the riparian corridor including the watercourse itself.

The watercourse runs along the northern boundary of most lots and the other important habitat features present are mostly located in the northern part of each lot, with some also located near the Kathleen Avenue frontage of some lots as a result of the existing dwellings on each property being located mostly in the middle of the lot.

The threatened fauna species listed above that have some potential to occur within the site are highly mobile species comprising birds and bats. These species may utilise the large trees and tree hollows on the site but as stated above most of these habitat features are located in the rear of each lot. Some individual large trees may be removed if they are located in the central part of lots, but most will be retained at the rear.

The six threatened flora species noted above have all been recorded within five kilometres of the study area, mostly within the past ten years. The habitat preferences of these species mean they have greater potential to occur in the study area than other species recorded or predicted within five kilometres.

However, none of these species were detected during the field inspection, and none are expected to occur given the high levels of modification, disturbance, weed encroachment and general degradation of the available habitat.

### **Threatened Ecological Communities**

Some of the clusters of remnant native trees dominated by Turpentine *Syncarpia glomulifera* would qualify as a highly modified form of the Endangered Ecological Community (EEC) *Sydney Turpentine-Ironbark Forest*, as listed by the NSW TSC Act. The largest area of occurrence of this EEC is at the eastern end of the study area, with smaller disconnected patches throughout the study area.

However, none of these patches, nor any other areas of remnant native vegetation within the study area, would qualify as the equivalent TEC *Turpentine-Ironbark Forest of the Sydney Basin Bioregion*, listed as a Critically Endangered Ecological Community under the Commonwealth EPBC Act. To qualify under the EPBC Act, the community must contain some characteristic components from all structural layers (tree canopy, small tree/midstorey and understorey) and must have a remnant size greater than one hectare. The

remnants within the study area are neither one hectare or greater in size, nor are all structural layers still present in any patch.

No other areas of native vegetation within the study area would qualify as a TEC.

## **Review of master plan concept**

The master plan concept has been developed taking into account the ecological features identified during the initial habitat assessment.

The 15 metre setback from the centreline of the creek and proposed 10 metre setback from the top of the southern bank of the creek are suitable on ecological grounds and this setback will allow retention of many larger trees including trees with hollows.

This setback will also permit retention of the core parts and majority of the area of the *Sydney Turpentine-Ironbark Forest* EEC within the study area.

## **Recommendations**

While the master plan concept is sympathetic to the major ecological values of the site, it may be possible to retain further individual large trees, hollow-bearing trees and *Sydney Turpentine-Ironbark Forest* vegetation with the adoption of the following recommendations to minimise disturbance to the existing native vegetation and fauna habitat:

- Plot the location of all large (40 centimetres diameter or above, at breast height) or hollow-bearing trees in order to refine the master plan concept and to avoid as many as possible of those trees.
- The proposed boardwalk would provide a worthwhile asset for the local community and could be extended to intersect with Kathleen Avenue itself, via the drainage easements, and could also be linked to other similar walkways in the local area.
- Minimise to the fullest extent practicable, disturbance to native vegetation within and/or adjacent to the creekline setback, in the construction of the boardwalk.
- Should construction of the apartments proceed, all trees to be retained should be marked and protective fencing should be provided around each tree, if the tree is located adjacent to the construction area.
- In accordance with current best practice, establish and maintain for the duration of the construction period, sedimentation and erosion control measures including an effective sedimentation fence running roughly parallel to and upslope of the top of the bank on the southern side of the watercourse.
- The preparation of a vegetation management plan (VMP) including measures for removal and disposal of weed species along the watercourse and replanting with local native species to enhance the ecological values of the watercourse and stabilise the banks. A qualified bushland regeneration contractor should be used to implement the various measures in the VMP.
- At least four species of noxious weeds within the Hornsby Shire Council LGA were identified within the study area during the site investigation (identified as such in Appendix 3). Appropriate measures should be implemented to minimise the spread of these and any other noxious species according to the relevant control class for the species.

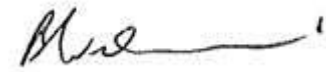
## **References**

- Baulkham Hills Shire Council 2007. *The Bushland of Hunts Creek Reserve and Seville Reserve*. Booklet.

- DoE 2015. Protected Matters Search Tool.
- DPI 2015. Noxious Weed Declarations: The Hornsby Shire Council LGA.
- OEH 2015a. BioNet the website for the Atlas of NSW Wildlife.
- OEH 2015b. Spatial Information eXchange (SIX) Vegetation Map Viewer.
- Tozer MG et al. 2010. Native vegetation of south eastern NSW: a revised classification and map for the coast and eastern tablelands. *Cunninghamia* 11(3):1-48.

I trust that this advice is of assistance to you however please contact me if you would like to discuss any elements of this ecological advice further.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Brian Wilson'.

**Brian Wilson**

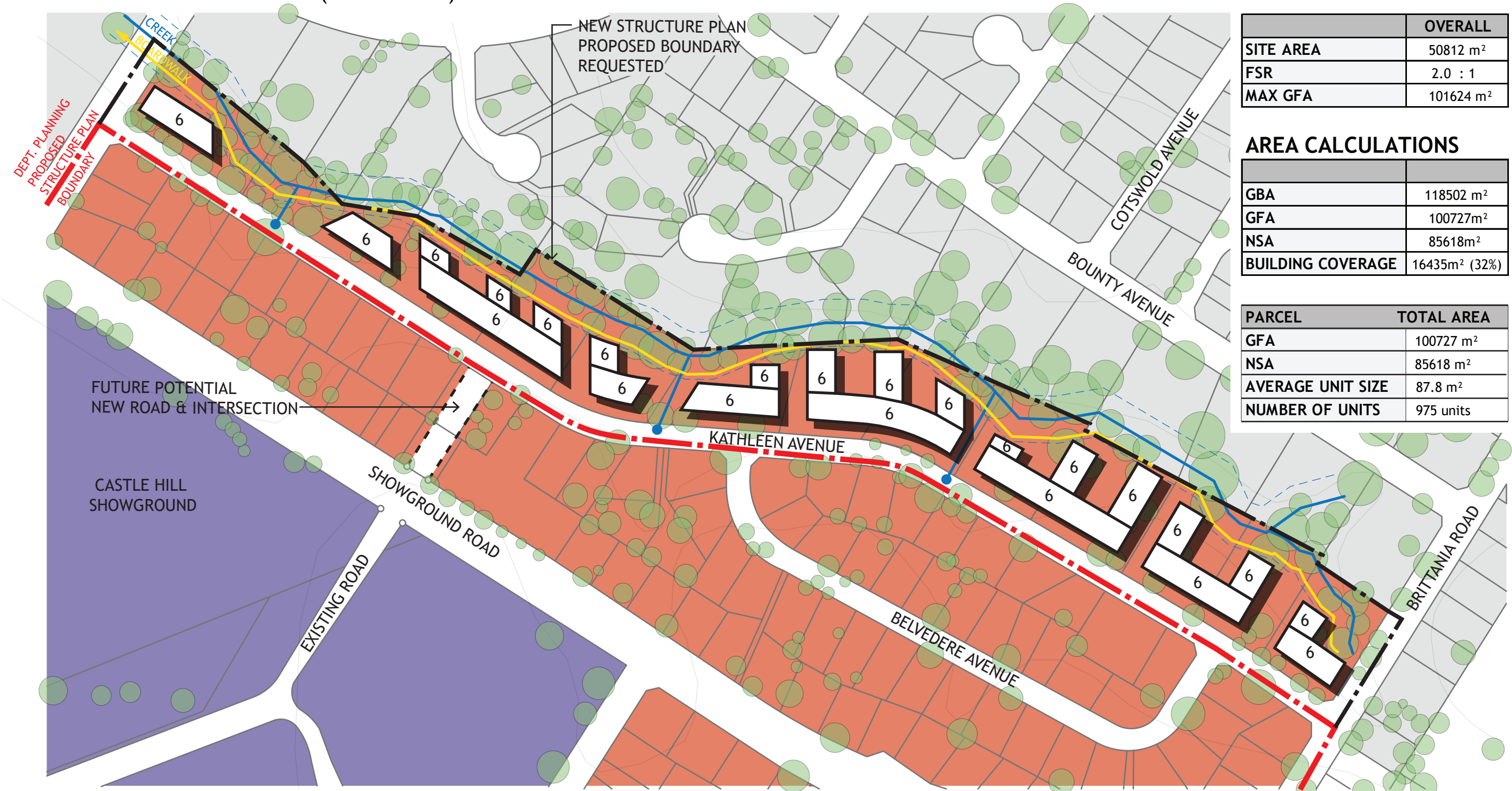
Senior Consultant Ecologist

## Appendix 1: Figure 1

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MASTER PLAN CONCEPT (FSR 2.0 : 1)



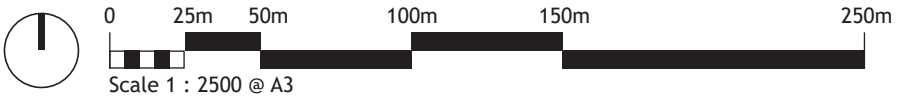
	OVERALL
SITE AREA	50812 m <sup>2</sup>
FSR	2.0 : 1
MAX GFA	101624 m <sup>2</sup>

AREA CALCULATIONS	
GBA	118502 m <sup>2</sup>
GFA	100727m <sup>2</sup>
NSA	85618m <sup>2</sup>
BUILDING COVERAGE	16435m <sup>2</sup> (32%)

PARCEL	TOTAL AREA
GFA	100727 m <sup>2</sup>
NSA	85618 m <sup>2</sup>
AVERAGE UNIT SIZE	87.8 m <sup>2</sup>
NUMBER OF UNITS	975 units

- SHOWGROUND PRECINCT STRUCTURE PLAN BOUNDARY
- DRAINAGE EASEMENT
- CREEK
- Conservative 15m setback from centreline of creek based on top of bank location approximately 2m from centreline.
- - - 10m setback from top of bank generally expected following confirmation by survey
- EXISTING TREE
- ← BOARDWALK

SUBJECT TO FUTURE DESIGN, MASTERPLAN COMPLIANT TO SEPP65 - ADG PRINCIPLES FOR BUILDING ENVELOPE SETBACK SEPERATION DISTANCES AND SOLAR





MASTER PLAN CONCEPT (FSR 2.0 : 1)



	OVERALL
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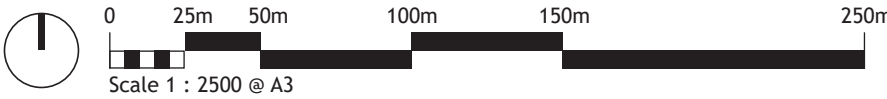
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— CREEK

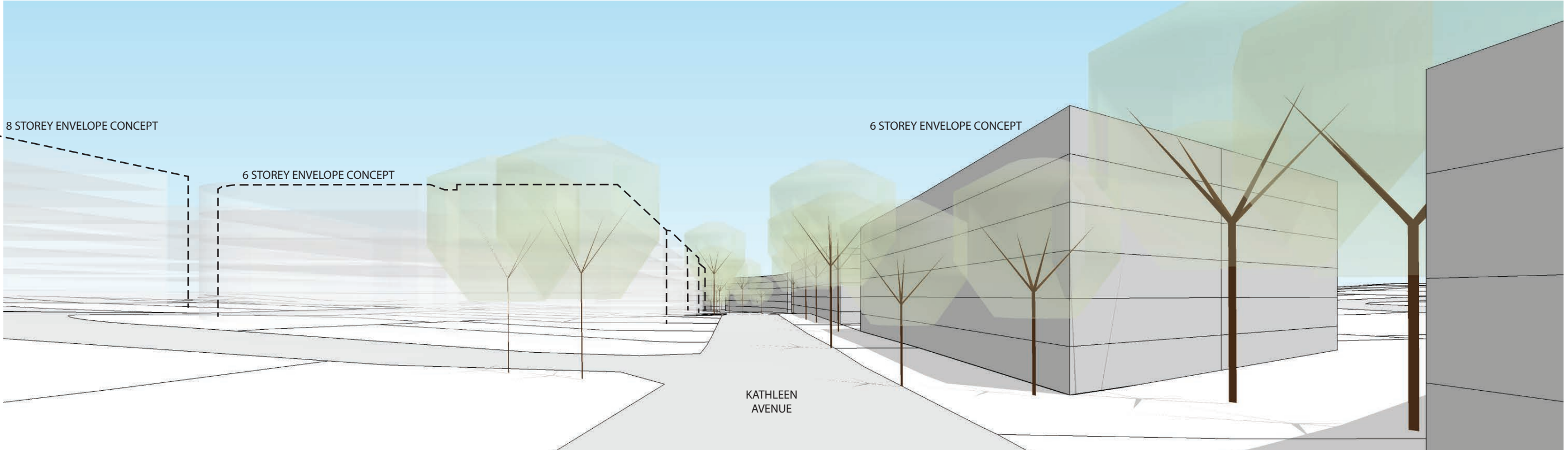
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10m setback from top of bank generally expected following confirmation by survey

SUBJECT TO FUTURE DESIGN, MASTERPLAN COMPLIANT TO SEPP65 - ADG PRINCIPLES FOR BUILDING ENVELOPE SETBACK SEPERATION DISTANCES AND SOLAR

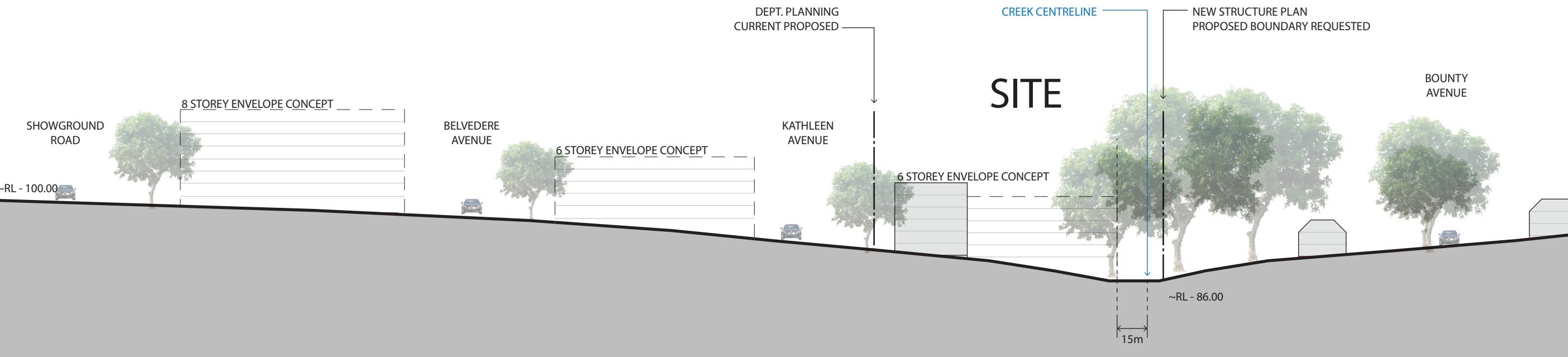




MASTER PLAN CONCEPT (FSR 2.0 : 1)



STREET VIEW FROM KATHLEEN AVENUE



SECTION

Conservative 15m setback from centreline of creek based on top of bank location approximately 2m from centreline.  
10m setback from top of bank generally expected following confirmation by survey

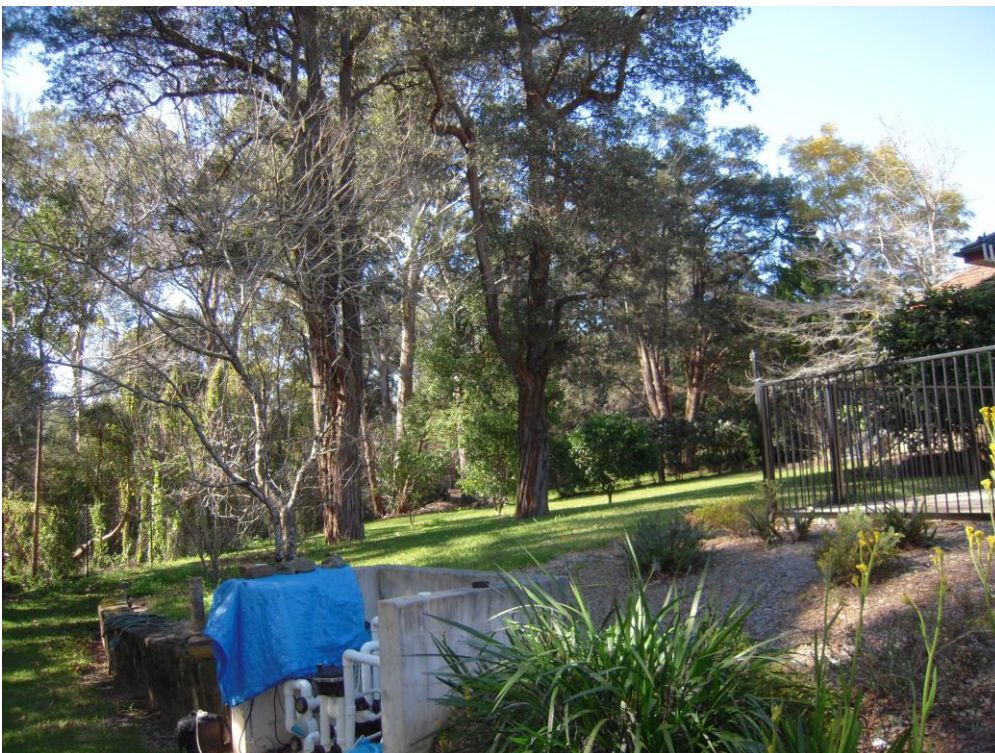


## Appendix 2: Plates

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**Plate 1: Large trees and creekline at eastern end of study area**



**Plate 2: Typical example of where native vegetation could be retained and restored within the proposed creek setback**





**Plate 3: Existing fauna habitat features within proposed creekline setback**



**Plate 4: Large trees that could be retained in creekline setback (western part of study area)**





**Plate 5: Large trees that could be retained within a drainage easement from Kathleen Avenue to the creekline**





**Plate 6: Typical weedy area**



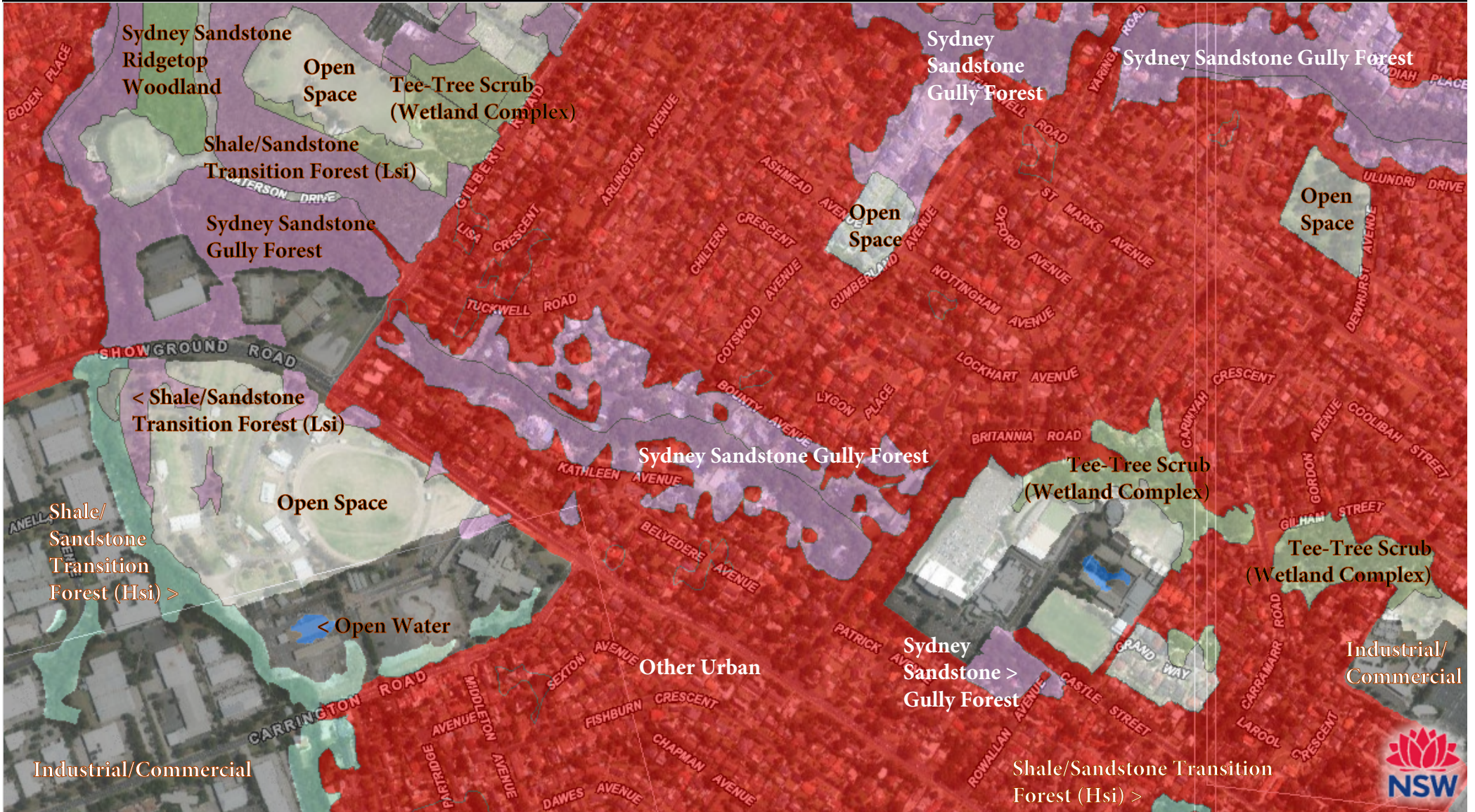
**Plate 7: Remnant Sydney Turpentine Ironbark Forest at eastern end of Kathleen Avenue**

## Appendix 3: VIS Vegetation Mapping

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## Baulkham Hills (2236)



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## South Coast (2230)



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## Appendix 4: Flora species recorded

### Flora species recorded in the study area by Biosis 07/08/2015

Status	Family	Scientific Name	Common Name
<b>Native species</b>			
	<i>Casuarinaceae</i>	<i>Allocasuarina torulosa</i>	Forest Oak
	<i>Casuarinaceae</i>	<i>Casuarina cunninghamiana</i>	River Oak
	<i>Convolvulaceae</i>	<i>Dichondra repens</i>	Kidney Weed
	<i>Cyatheaceae</i>	<i>Cyathea australis</i>	Rough Tree Fern
	<i>Dennstaedtiaceae</i>	<i>Pteridium esculentum</i>	Bracken Fern
	<i>Fabaceae (Mimosoideae)</i>	<i>Acacia irrorata</i>	Green Wattle
	<i>Lobeliaceae</i>	<i>Pratia purpurascens</i>	Whiteroot
	<i>Lomandraceae</i>	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
	<i>Meliaceae</i>	<i>Melia azedarach</i> var. <i>australasica</i>	White Cedar
	<i>Myrtaceae</i>	<i>Angophora bakeri</i>	Narrow-leaved Apple
	<i>Myrtaceae</i>	<i>Angophora costata</i>	Sydney Red Gum
	<i>Myrtaceae</i>	<i>Angophora floribunda</i>	Rough-barked Apple
	<i>Myrtaceae</i>	<i>Backhousia myrtifolia</i>	Grey Myrtle
	<i>Myrtaceae</i>	<i>Corymbia maculata</i>	Spotted Gum
	<i>Myrtaceae</i>	<i>Eucalyptus microcorys</i>	Tallowwood
	<i>Myrtaceae</i>	<i>Eucalyptus pilularis</i>	Blackbutt
	<i>Myrtaceae</i>	<i>Eucalyptus punctata</i>	Grey Gum
	<i>Myrtaceae</i>	<i>Eucalyptus robusta</i>	Swamp Mahogany
	<i>Myrtaceae</i>	<i>Eucalyptus saligna</i>	Sydney Blue Gum
	<i>Myrtaceae</i>	<i>Eucalyptus umbra</i>	Broad-leaved White Mahogany
	<i>Myrtaceae</i>	<i>Leptospermum polygalifolium</i>	Lemon-scented Tea Tree
	<i>Myrtaceae</i>	<i>Syncarpia glomulifera</i>	Turpentine
	<i>Myrtaceae</i>	<i>Melaleuca linariifolia</i>	Snow in Summer
	<i>Myrtaceae</i>	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark
	<i>Myrtaceae</i>	<i>Melaleuca styphelioides</i>	Prickly-leaved Paperbark
	<i>Pittosporaceae</i>	<i>Pittosporum undulatum</i>	Sweet Pittosporum
	<i>Proteaceae</i>	<i>Banksia integrifolia</i>	Coastal Banksia
	<i>Proteaceae</i>	<i>Grevillea robusta</i>	Silky Oak
	<i>Proteaceae</i>	<i>Persoonia linearis</i>	Narrow-leaved Geebung

	<i>Vitaceae</i>	<i>Cissus antarctica</i>	Kangaroo Vine
<b>Exotic species</b>			
	<i>Alliaceae</i>	<i>Agapanthus praecox</i>	Agapanthus
	<i>Anacardiaceae</i>	<i>Schinus molle</i>	Pepper Tree
	<i>Bassellaceae</i>	<i>Anredera cordifolia</i>	Madeira Vine
	<i>Bignoniaceae</i>	<i>Jacaranda mimosifolia</i>	Jacaranda
	<i>Lauraceae</i>	<i>Cinnamomum camphora</i>	Camphor Laurel
	<i>Myrtaceae</i>	<i>Corymbia citriodora</i>	Lemon-scented Gum
<b>N4</b>	<i>Oleaceae</i>	<i>Ligustrum lucidum</i>	Large-leaved Privet
<b>N4</b>	<i>Oleaceae</i>	<i>Ligustrum sinense</i>	Small-leaved Privet
	<i>Poaceae</i>	<i>Ehrharta erecta</i>	Panic Veldtgrass
	<i>Poaceae</i>	<i>Pennisetum clandestinum</i>	Kikuyu Grass
	<i>Poaceae</i>	<i>Stenotaphrum secundatum</i>	Buffalo Grass
	<i>Sapindaceae</i>	<i>Cardiospermum grandiflorum</i>	Balloon Vine
<b>N3</b>	<i>Solanaceae</i>	<i>Cestrum parqui</i>	Green Cestrum
<b>N4</b>	<i>Verbenaceae</i>	<i>Lantana camara</i>	Lantana

N3 = Noxious weed (NW Act) Class 3, N4 =Noxious weed (NW Act) Class 4.