

# **Terrestrial flora and fauna assessment Warriewood Sector 3**



**August 2004**

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**Report for  
Mirvac Homes (NSW) Pty Ltd**

**Terrestrial flora and  
fauna assessment –  
Warriewood Sector 3**

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## ABBREVIATIONS

|          |  |
|----------|--|
| ANW      | Atlas of NSW Wildlife  |
| AHD      | Australian Height Datum  |
| CAV      | Census of Australian Vertebrates   |
| DEC      | Department of Environment and Conservation<br>(formerly NSW NPWS)              |
| DEH      | Department of the Environment and Heritage (formerly<br>Environment Australia) |
| DCP      | Development Control Plan   |
| EIS      | Environmental Impact Statement   |
| EP&A Act | <i>Environmental Planning and Protection Act 1979</i>                          |
| EPBC Act | <i>Environment Protection and Biodiversity Conservation<br/>Act 1999</i>       |
| LGA      | Local Government Area  |
| MNES     | Matter of National Environmental Significance                                  |
| NPWS     | National Parks and Wildlife Service  |
| ROTAP    | Rare or Threatened Australian Plant as listed by Briggs<br>and Leigh (1995)    |
| SIS      | Species Impact Statement   |
| SEPP     | State Environmental Planning Policy  |
| TSC Act  | <i>Threatened Species Conservation Act 1995</i>                                |
| sp.      | Species (singular)   |
| spp.     | Species (plural)   |
| ssp.     | Subspecies   |
| var.     | Variety  |

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## 1.0 SUMMARY

Biosis Research was commissioned by Mirvac Homes to conduct an assessment of the terrestrial ecological constraints and development options for Sector 3 within the Warriewood Valley Urban Release Area. The study area covers approximately 7.6 ha and is located between Warriewood Road and MacPherson Street, Warriewood (Figure 2). The study area is comprised of four allotments on the northern side of MacPherson Street. The allotments are currently used for plant nurseries and market garden operations (glasshouses and market gardens).

Previous development within the study area has resulted in a highly altered and degraded native habitat for plant and animal species. The vegetation within the study area does not represent a native vegetation community and contains few resources for native animal species.

No threatened plant species, populations or communities listed on the TSC and/or EPBC Acts were recorded within the study area during the current survey. The study area is not considered to contain potential habitat for any threatened flora.

One migratory species listed on the EPBC Act was recorded within the study area, the Pacific Black Duck. The study area may also provide a notional food resource for two threatened bird species listed on the TSC and EPBC Acts (Regent Honeyeater and Swift Parrot). It is considered unlikely that the Pacific Black Duck, Regent Honeyeater or Swift Parrot would be dependent on the resources within the study area. Therefore it is unlikely that the proposed development would result in individual death or injury, loss of limiting foraging or breeding resources, or disturbance to limiting breeding or foraging habitat. Further consideration under the TSC Act or EPBC Act is not recommended for any threatened species known to occur within the study area.

Two Koala feed trees listed in SEPP 44, Schedule 2 (*Eucalyptus tereticornis* and *E. robusta*) were identified in the area. These Koala feed trees appear in densities greater than 15% of the total number of trees within the study area. However, these trees occur in such low numbers and no Koalas or indirect evidence of them, were observed during the current surveys and there are no records of these species on site. The study area is therefore not considered to be 'core' Koala habitat and a SEPP 44 Assessment is not recommended.

Narrabeen Creek runs along the northeastern boundary of the study area and was flowing at the time of this survey. Although the riparian vegetation of Narrabeen Creek was highly degraded and did not constitute a native vegetation community, it has been identified by Pittwater Council as one of the creekline corridors in

DCP 29 (Warriewood Valley Urban Release Area). It is therefore recommended in accordance with DCP 29 that Narrabeen Creek be set-aside as an area of conservation priority. DCP 29 states that “a landscape plan for the creekline corridor adjoining the sector must be prepared” prior to development. Based on DCP 29 the creekline corridor will generally be 100 m in width, comprising a 50 m wide multifunction corridor with a 25 m buffer strip on either side. Vegetation within this area would be restricted to indigenous native species. The regeneration and revegetation of Narrabeen Creek, is likely to improve the habitat value for native flora and fauna within the study area.

Whilst the proposed development is unlikely to have a significant impact on threatened species, endangered communities or populations it is recommended that the following points be taken into consideration to minimise any disturbances on the ecological values of the study area:

- appropriate sediment/erosion and drainage control devices should be utilised during and after excavation works in order to prevent sediment laden run off;
- where possible remnant trees should be retained;
- a weed eradication plan for the study area should be prepared and implemented; and
- following completion of any works, locally indigenous species should be used in landscaping.

## 2.0 INTRODUCTION

Biosis Research Pty. Ltd. was commissioned by Mirvac Homes (NSW) Pty Ltd to conduct an assessment of the terrestrial ecological constraints and development options for Sector 3 of the Warriewood Valley Urban Release Area. Sector 3 is located approximately 1.5 km north-west of Warriewood Beach and approximately 3 km east of Ku-ring-gai Chase National Park within the Pittwater Local Government Area (LGA).

The study area is approximately 7.6 ha and consists of four allotments on the northern side of MacPherson Street that are currently used for plant nursery and market gardens operations (glasshouses and gardens). The proposed masterplan rezoning application is for the construction of residential development consisting of medium density housing at approximately 25 dwellings per hectare.

This report has been prepared in accordance with Pittwater Council's Development Control Plan (DCP) 21 (Pittwater 21 DCP) and DCP 29 (Warriewood Valley Urban Release Area). For details of relevant sections of these plans see Appendix 1.

### 2.1 Aims

The general aim of this report is to undertake a preliminary flora and fauna assessment of Sector 3 of the Warriewood Valley Urban Release Area, Warriewood.

Specific aims are to:

1. conduct a literature review and database search of terrestrial flora and fauna for the area surrounding the study site;
2. undertake targeted field surveys for habitat of threatened plant and animal species, populations or ecological communities that are listed on the *Threatened Species Conservation Act 1995* (TSC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and have been identified as potentially occurring in the area;
3. provide a brief assessment of the habitat values of the site;
4. assess the need for Eight Part Test assessments (for threatened species listed on the TSC Act) and Assessment of Significance (for threatened species listed on the EPBC Act) for significant plant and animal species, populations and ecological communities existing or potentially occurring in the study area;
5. provide recommendations to minimise any potentially adverse environmental impacts of the proposed development; and,



6. identify areas of potential for development and areas of conservation priority.

## 2.2 Study area

The study area covers approximately 7.6 ha and is located between Warriewood Road and MacPherson Street, Warriewood (Figure 2). The study area was comprised of four allotments on the northern side of MacPherson Street. The allotments are currently used for plant nurseries and market garden operations (glasshouses and market gardens).

Narrabeen Creek runs along the northeastern boundary of the study area. Pittwater Council has identified the creek as one of the creek corridors within DCP 29 (Warriewood Valley Urban Release Area). One of the objectives of DCP 29 is to provide a network of multifunctional living creek corridors on Narrabeen Creek and other creeks.

The soil landscapes of the Sydney mapsheet are mapped at a scale of 1: 100 000 by Chapman *et al.* (1989). Chapman *et al.* (1989) mapped the soil landscape of the study area as the swamp landscape 'Warriewood', described as level to gently undulating swales depressions and infilled lagoons on Quaternary sands. Local relief is less than 10 m, with slopes <3% and the water table at < 200 cm.

The topography of the site is flat, with an elevation of approximately 10 m AHD.

## 3.0 METHODS

The study area was inspected on 21<sup>st</sup> July, 2004. The general condition of the site was assessed and observations of terrestrial flora, fauna and vegetation communities were recorded (as detailed below). During the site visit the weather was clear with a temperature of 19 °C.

### 3.1 Taxonomy

The plant taxonomy (method of classification) used in this report follows Harden (1990, 1992, 1993, 2002), Fairley and Moore (2000), Robinson (1994), and subsequent advice from the National Herbarium of NSW. In the body of this report plants are referred to by their scientific names only. Scientific and common names are included in the Appendices.

Names of vertebrates follow the Census of Australian Vertebrates (CAVs) maintained by Department of the Environment and Heritage (DEH - formerly Environment Australia). In the body of this report Vertebrates are referred to by both their common and scientific names when first mentioned. Subsequent references to these species cite the common name only. Common and scientific names are included in the Appendices.

### 3.2 Literature and database review

A list of documents used to prepare this report is located in References. Records of threatened species, populations and communities were obtained from the Department of the Environment and Conservation (DEC) Atlas of NSW Wildlife within a 10 km radius of the study area, using the Sydney 1:100 000 map sheet. Records for threatened species, populations and communities listed on the EPBC Act were obtained from DEH EPBC Online Database within a 10 km radius of the study area. Database searches were conducted on the 16<sup>th</sup> July (Atlas of NSW Wildlife Database) and 13<sup>th</sup> July (EPBC Online Database), 2004.

### 3.3 Field survey

#### 3.3.1 Flora survey

Terrestrial flora assemblages and broad vegetation types were assessed by the random-meander method, as described by Cropper (1993). The meander route is designed to traverse all communities and topographical features within the study area, recording plants as they are encountered. The dominant flora was recorded.

Targeted searches for threatened species known to occur in the vicinity of the study area were also conducted in areas of suitable habitat.

### 3.3.2 Flora habitat assessment

The condition of the vegetation was assessed according to the degree to which it resembled relatively natural, undisturbed vegetation using the following criteria:

- species composition (species richness, degree of weed invasion); and,
- vegetation structure (representation of each of the original layers of vegetation).

Three categories were used to evaluate general habitat value; Good, Moderate or Poor, as detailed below:

**Good:** containing a high number of indigenous species; no weeds present or weed invasion restricted to edges and track margins; vegetation community contains original layers of vegetation; vegetation layers (ground, shrub, canopy etc) are intact.

**Moderate:** containing a moderate number of indigenous species; moderate level of weed invasion; weeds occurring in isolated patches or scattered throughout; one or more of original layers of vegetation are modified; vegetation layers (ground, shrub, canopy etc) are largely intact.

**Poor:** containing a low number of indigenous species; high level of weed invasion; weeds occurring in dense patches or scattered throughout; one or more of the original layers of vegetation are highly modified; one or more original vegetation layers (ground, shrub, canopy etc) are modified or missing.

### 3.3.3 Fauna survey

Fauna species using the site were surveyed by undertaking active searching and listening as well as recording incidental observations.

### 3.3.4 Fauna habitat assessment

The three categories used to evaluate habitat value were Good, Moderate or Poor, as detailed below:

**Good:** ground flora containing a high number of indigenous species; vegetation community structure, ground, log and litter layer intact and undisturbed; a high

level of breeding, nesting, feeding and roosting resources available; a high richness and diversity of native animal species.

**Moderate:** ground flora containing a moderate number of indigenous species; vegetation community structure, ground log and litter layer moderately intact and undisturbed; a moderate level of breeding, nesting, feeding and roosting resources available; a moderate richness and diversity of native animal species.

**Poor:** ground flora containing a low number of indigenous species, vegetation community structure, ground log and litter layer disturbed and modified; a low level of breeding, nesting, feeding and roosting resources available; a low richness and diversity of native animal species.

Other habitat features, such the value of the study area as a habitat corridor, or the presence of remnant communities, or unusual ecological vegetation community structure, were also used to assess habitat quality.

### 3.4 Limitations

This study was by design a brief and preliminary habitat assessment and was conducted in accordance to methodology that would be employed for an assessment in accordance with Section 5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Therefore no trapping, spotlighting, call playback or vegetation quadrat sampling techniques were used.

Eight Part Tests Assessment and DEH Guidelines for Assessment of Significance are outside the scope of works of this report. As such this report does not constitute an assessment under Section 5A of the EP&A Act, TSC and EPBC Acts.

## 4.0 RESULTS

Lists of terrestrial plant and animal species recorded in the current survey are given in Appendix 2 and Appendix 3 respectively.

### 4.1 Vegetation communities

#### 4.1.1 Previous vegetation mapping

The vegetation of the Sydney area was mapped by Benson and Howell (1994) at a scale of 1:100 000. Benson and Howell (1994) mapped the vegetation of the study area as cleared. Cleared areas are described as mostly suburban development that may contain small remnants of vegetation too small to map.

The nearest patches of remnant vegetation mapped by Benson and Howell (1994) were a small patch of Coastal Swamp Forest Complex (approximately 500 m to the east) and a larger patch of Sydney Sandstone Gully Forest (approximately 500 m to the west of the study area).

#### 4.1.2 Vegetation communities of the current survey

The vegetation within the four allotments does not represent a native vegetation community. The area has previously been cleared of all native vegetation to allow industrial development. The condition of the vegetation within this area was considered to be poor.

##### Narrabeen Creek

The vegetation of Narrabeen Creek was not a native vegetation community. The condition of the vegetation of Narrabeen Creek was considered to be poor.

The vegetation on the northern bank of the creek had mostly been cleared of all vegetation and mulched. An area on the northern bank in the west has been regenerated, with numerous well established plantings of native species. Few trees of the exotic *Erythrina X sykesii* and the native *Eucalyptus robusta* were recorded on northern bank in the east.

On the southern bank of the creek, a canopy was absent in the east and west, with exotic trees (including *Ficus macrophylla* and *Eucalyptus globulus*) and a few remnant trees of *E. robusta* and *E. tereticornis* in the centre. The understorey of the southern bank consisted of exotic shrubs (including *Cestrum parqui*, *Lantana camara*, *Ricinus communis* and *Senna pendula* var. *glabrata*), exotic vines

(including *Anredera cordifolia*, *Ipomoea indica* and *Rubus fruticosus*) and exotic groundcovers (including *Ageratina adenophora*, *Parietaria judaica* and *Pennisetum clandestinum*).

#### 4.1.3 Significant vegetation communities

No Endangered Ecological Communities listed on the TSC or EPBC Acts were recorded in the study area. Endangered Ecological Communities listed on the TSC Act that have previously been recorded in the Pittwater LGA are:

| Community                           | Habitat requirements  | Habitat present in study area? |
|-------------------------------------|---|--------------------------------|
| Sydney Coastal Estuary Swamp Forest | Waterlogged estuarine alluvial soils that are strongly influenced by periodically poor drainage conditions.   | No                             |
| Pittwater Spotted Gum Forest        | Shale-derived soils on the Narrabeen group - Newport Formation on lower hillslopes.   | No                             |
| Sydney Freshwater Wetlands          | Freshwater swamps in swales and depressions on sand dunes and no low nutrient sandplain sites in coastal areas.   | No                             |
| Duffys Forest                       | Ridgetops, plateaus, upper slopes or mid slopes on Hawkesbury sandstone geology, in association with laterite soils and soils derived from shale and laminite lenses. | No                             |

No Endangered Ecological Communities listed on the EPBC Act have previously been recorded within 10 km of the study area.

## 4.2 Flora species

A total of 41 (10 native) plant species were recorded in the study area.

A few remnant trees of *Eucalyptus robusta* occur in the study area along Burns Lane. Along Burns Lane there were also planted trees, including *Acacia baileyana*. Some landscape plantings existed on the boundaries of the plant nurseries, and planted street trees including *Lophostemon confertus* occurred along MacPherson Street.

In the western allotment, numerous exotic species were recorded including *Acetosa sagittata*, *Ipomoea indica*, *Foeniculum vulgare*, *Pennisetum clandestinum* and *Senecio madagascariensis*.

Twelve of the exotic species recorded in the study area are listed as noxious in the Pittwater LGA, as listed in Appendix 4.

#### 4.2.1 Significant plant species

No threatened species listed on the TSC and/or EPBC Act were recorded in the study area.

A total of 16 threatened species listed on the TSC Act and/or EPBC Act have previously been recorded within 10 km of the study area (Table 1). The study area does not contain potential habitat for any threatened plant species (Table 1).

**Table 1: Threatened flora species listed on the TSC Act and/or EPBC Act that have been recorded in the local area**

| Latin name   | TSC Act | EPBC Act | Habitat   | Potential habitat in the study area?                           |
|--|---------|----------|---|--|
| <i>Acacia bynoeana</i>                               | E1      | V        | Sandstone ridgetop and Castlereagh Woodlands on sandy clay soil, often with ironstone gravels (NSW Scientific Committee 1999a).   | No, characteristic soils not present.                          |
| <i>Caladenia tessellata</i>                          | E1      | E        | Low open forest with heath or sometimes grass understorey – this species only grows in very dense shrubbery in coastal areas (Bishop 1996)  | No, no very dense shrubbery present.                           |
| <i>Chamaesyce psammogeton</i>                        | E1      | -        | A coastal species which is found on foredunes and exposed headlands (NSW Scientific Committee 1998a).   | No, no foredunes or exposed headlands present.                 |
| <i>Cryptostylis hunteriana</i>                       | V       | V        | This species typically grows in swamp-heath on sandy soils chiefly in coastal districts (Harden 1993) but has also been recorded on steep bare hillsides (Bishop 1996).   | No, no swamp heath vegetation or steep bare hillsides present. |
| <i>Epacris purpurascens</i> var. <i>purpurascens</i> | V       | -        | Sclerophyll forest, scrub and swamps – from Gosford and Sydney districts (Harden 1992) specifically this species is thought to require wet heath vegetation (T. James pers. comm.)  | No, no wet heath vegetation present.                           |
| <i>Eucalyptus camfieldii</i>                         | V       | V        | Shallow soiled sandstone or lateric tops amongst <i>Angophora hispida</i> , <i>Eucalyptus haemastoma</i> , and <i>E. oblonga</i> (Robinson 1994).   | No, characteristic soils not present.                          |
| <i>Grevillea caleyi</i>                              | V       | V        | Restricted to deeply eroded Narrabeen Shale (Robinson 1994) on laterised sandstone ridgetops between elevations of 170-240 m. Occurs in open forest or woodland generally dominated by <i>Eucalyptus sieberi</i> and <i>E. gummifera</i> or <i>E. gummifera</i> and <i>E. haemastoma</i> with an understorey of Proteaceae (Harden 1991, NPWS 1999e). | No, characteristic soils not present.                          |
| <i>Haloragodendron lucasii</i>                       | V       | V        | Grows in dry sclerophyll forest or low open woodland on sheltered sandstone slopes near creeks in moist sandy loam soil (Harden 1991, NPWS 1999f). Often found below cliff lines with an understorey of ferns and sedges (Fairley & Moore 2000).  | No, no sheltered sandstone slopes present.                     |
| <i>Kunzea rupestris</i>                              | E1      | V        | Occurs between Maroota and Ku-Ring-Gai Chase National Park where it grows in heath and rock platforms (Harden 2002)   | No, no heath or rock platforms present.                        |
| <i>Lasiopetalum joyceae</i>                          | V       | V        | Grows in heath and open woodland in sandy soils on sandstone. (Harden 1990 Fairley, 2000 #432, Robinson 1994). Occurs on lateritic to shaley  | No, no lateritic to shaley ridgetops present.                  |

|  |    |   |  |  |
|--|----|---|--|--|
|  |    |   | ridgetops of the Hornsby Plateau (NSW Scientific Committee 1999b).   |  |
| <i>Leptospermum deanei</i>                       | E1 | E | Restricted to woodland on either side of the Pymble-Hornsby ridge (Robinson 1994), on the slopes near the watershed of the Lane Cove River (Harden 1991).                            | No, no suitable habitat present.                   |
| <i>Melaleuca deanei</i>                          | E1 | E | Wet heath on sandstone – coastal districts from Berowra to Nowra (Harden 1991)   | No, no wet heath present.                          |
| <i>Microtis angusii</i>                          | V  | V | This terrestrial orchid is currently known from only one population in the Warringah Pittwater area in the vicinity of a major road (NSW Scientific Committee 1997).                 | No, no suitable habitat present.                   |
| <i>Pimelea curviflora</i> var. <i>curviflora</i> | V  | V | Restricted to coastal areas on sandstone (Harden 1990, Fairley & Moore 2000) and laterite where it is often found amongst dense grasses and sedges (NSW Scientific Committee 1998b). | No, no dense grasses and sedges present.           |
| <i>Syzygium paniculatum</i>                      | V  | V | Subtropical and littoral rainforest on sandy soils or stabilised dunes near the sea (Harden 1991)  | No, no subtropical or littoral rainforest present. |
| <i>Tetratheca glandulosa</i>                     | V  | V | Found on sandy or rocky soils in heath, scrub (Harden 1992) or woodland (Robinson 1994)  | No, no heath, scrub or woodland present.           |

V: Vulnerable E: Endangered

#### 4.2.2 Noxious weed species

Noxious weeds are exotic plant species specifically listed in the *Noxious Weeds Act* 1993 and are required by law to be controlled. Private landowners and managers are responsible for control of noxious weeds on their land. The Local Control Authorities (usually local councils) are responsible for implementation of the NWA on private land and for noxious weed control on council land.

Of the 43 species listed as noxious in the Pittwater LGA, 12 were recorded in the study area. These species were recorded in the western allotment and along Narrabeen Creek. The noxious weed species recorded in the study area and their control requirements are listed in Appendix 4.

### 4.3 Fauna habitats

The fauna habitat types within the study area broadly correspond with the vegetation communities described in Section 4.1. The study area consists of plant nursery and market gardens operations (glasshouses and gardens) and contains few habitat opportunities for native fauna (Plate 1 and 2). The vegetation is dominated by exotic plant species with a few scattered Eucalypts (*Eucalyptus robusta*. and *E. tereticornis*). The tree canopies provide limited refuge and nesting opportunities for native and exotic avifauna common to disturbed habitats. Although most of the eucalypts were mature specimens, none had showed any obvious tree-hollow development and consequently there were no opportunities for hollow-dwelling fauna.



Exotic plants provide most of the foraging resource within the study area including both direct (foliage, nectar, exudates) and indirect food (arthropods). These resources are considered as having no greater value than any other comparable development or residential setting. Although the study area might provide notional food resource for threatened bird species occasionally recorded in Sydney, eg. Regent Honeyeater *Xanthomyza phrygia* and Swift Parrot *Lathamus discolor*, these resources are in such low supply that they could not be considered sufficient to meet their needs.

In most areas the shrub and groundcover layers have been removed for development (plant nursery and market gardens operations). Where the understorey vegetation was present it was highly altered and dominated by weeds, providing shelter and foraging habitat for common animal species (Plate 3 and 4).

Narrabeen Creek runs along the northeastern boundary of the study area and was flowing at the time of this survey. This creekline is highly degraded and is considered to be poor condition (Plate 5 and 6). The riparian vegetation is dominated by exotic species with a few scattered Eucalypts along the bank. The creekline contains little emergent vegetation although isolated rocks may provide some habitat for common frog and reptile species. A small section along the northern bank of the creekline to the east has been regenerated with numerous well established planting's of native species. This area provides foraging and shelter for common animals species including birds, reptiles and frogs.

The study area is severely limited in resources and opportunities for native fauna, particularly rare and threatened species. Only generalist avifauna (those adapted to urban environments) would visit the site on any regular basis. Permanent residents would be limited to common reptile and frog species.

Fauna habitats within the study site are considered to be in poor condition

## 4.4 Animal species

A detailed fauna survey was not undertaken for this assessment, instead this report is a habitat based assessment of the study area and includes active searching for reptiles, amphibians and other fauna.

Only 14 animal species were recorded from or near the study area including the Pacific Black Duck, *Anas superciliosa* that is covered under the migratory provisions on the EPBC Act. Incidental observations of animal species utilising the study area are listed in Appendix 3 and include one reptile, 11 native bird species and two mammals (one introduced mammal). The apparent low species

diversity is not unexpected and reflects the narrow range of habitat opportunities within the study area.

#### 4.4.1 Significant animal species

A total of 49 threatened or migratory animal species or their habitat have been previously recorded within the local area (DEC Atlas of NSW Wildlife and DEH EPBC Online Database) (Table 2). Of these 41 animal species are listed under the TSC Act and 37 animal species listed under the EPBC Act. Twenty-two threatened marine species or their habitat have been recorded within a 10 km radius. As the proposed works will not occur or are unlikely to have a significant impact on marine species they have not been considered further in this report.

One migratory species, Pacific Black Duck listed on the EPBC Act was recorded within the study area. A further two threatened animal species, Regent Honeyeater and Swift Parrot have limited potential habitat within the study area.

**Table 2: Threatened fauna listed on the TSC Act and/or EPBC Act known to occur or have potential habitat in the vicinity of the study site**

| Latin Name                      | Common Name <sup>1</sup>   | TSC Act <sup>2</sup> | EPBC Act <sup>3</sup> | Habitat   | Potential habitat |
|---------------------------------|----------------------------|----------------------|-----------------------|---|-------------------|
| <b>Amphibians</b>               |                            |                      |                       |   |                   |
| <i>Heleioporus australiacus</i> | Giant Burrowing Frog       | V                    | V                     | Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks (Daly 1996, Recsei 1996). Can also occur within shale outcrops within sandstone formations. In the southern part of its range can occur in wet and dry forests, montane sclerophyll woodland and montane riparian woodland (Daly 1996). Individuals can be found around sandy creek banks or foraging along ridge-tops during or directly after heavy rain. Males often call from burrows located in sandy banks next to water (Barker <i>et al.</i> 1995). | No                |
| <i>Litoria aurea</i>            | Green and Golden Bell Frog | E1                   | V                     | Found in marshes, dams and stream sides, particularly those containing bullrushes or spikerushes (NPWS 1999d). Preferred habitat contains water bodies that are unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks (White & Pyke 1996, NPWS 1999d).   | No                |
| <i>Litoria littlejohni</i>      | Little John's Tree Frog    | V                    | V                     | Occurs in wet and dry sclerophyll forests associated with sandstone outcrops between 280 and 1000 m on the eastern slopes of the Great Dividing Range (Barker <i>et al.</i> 1995). Prefers rock flowing streams, but individuals have also been collected from semi-permanent dams with some emergent vegetation (Barker <i>et al.</i> 1995). Forages both in the tree canopy and on the ground, and has been observed sheltering under rocks on high exposed ridges during summer. It is not known from coastal habitats.                        | No                |

| Latin Name                      | Common Name <sup>1</sup> | TSC Act <sup>2</sup> | EPBC Act <sup>3</sup> | Habitat   | Potential habitat |
|---------------------------------|--------------------------|----------------------|-----------------------|---|-------------------|
| <i>Mixophyes balbus</i>         | Stuttering Frog          | E1                   | V                     | This species is usually associated with mountain streams, wet mountain forests and rainforests (Barker <i>et al.</i> 1995). It rarely wanders very far from the banks of permanent forest streams, although it will forage on nearby forest floors. Eggs are deposited in leaf litter on the banks of streams and are washed into the water during heavy rains (Barker <i>et al.</i> 1995).                         | No                |
| <i>Pseudophryne australis</i>   | Red-crowned Toadlet      | V                    | -                     | Occurs on wetter ridge tops and upper slopes of sandstone formations on which the predominant vegetation is dry open forests and heaths. This species typically breeds within small ephemeral creeks that feed into larger semi-perennial streams. These creeks are characterised after rain by a series of shallow pools lined by dense grasses, ferns and low shrubs (Thumm & Mahony 1996, Thumm & Mahoney 1997). | No                |
| <b>Birds</b>                    |                          |                      |                       |   |                   |
| <i>Burhinus grallarius</i>      | Bush Stone-curlew        | E1                   | -                     | Lightly timbered open forest and woodland, or partly cleared farmland with remnants of woodland, with a ground cover of short sparse grass and few or no shrubs where fallen branches and leaf litter are present (Marchant & Higgins 1993a).   | No                |
| <i>Calidris alba</i>            | Sanderling               | V                    | M                     | Occurs on the coast mostly on open sand beaches exposed to open sea-swells (Higgins & Davies 1996).   | No                |
| <i>Calidris tenuirostris</i>    | Great Knot               | V                    | M                     | Mainly found on intertidal mudflats, sandflats and sandy beaches (Higgins & Davies 1996).   | No                |
| <i>Calyptorhynchus lathamii</i> | Glossy Black-cockatoo    | V                    | -                     | Inhabits forest with low nutrients, characteristically with key Allocasuarina species. Tends to prefer drier forest types (NPWS 1999c) with a middle stratum of Allocasuarina below Eucalyptus or Angophora. Often confined to remnant patches in hills and gullies (Higgins 1999). Breed in hollows stumps or limbs, either living or dead (Higgins 1999).   | No                |
| <i>Charadrius leschenaultii</i> | Greater Sand Plover      | V                    | M                     | Almost entirely coastal, in littoral and estuarine habitats (Marchant & Higgins 1993b).   | No                |
| <i>Charadrius mongolus</i>      | Lesser Sand Plover       | V                    | M                     | Usually coastal, in littoral and estuarine environments (Marchant & Higgins 1993b).   | No                |
| <i>Anas superciliosa</i>        | Pacific Black Duck*      | -                    | M                     | Occurs in temperate and tropical terrestrial wetlands and sheltered estuarine and marine waters (Marchant & Higgins 1990).  | Yes               |
| <i>Esacus neglectus</i>         | Beach Stone-curlew       | E1                   | -                     | Occurs on open, undisturbed beaches, islands, reefs and estuarine intertidal sand and mudflats (Marchant & Higgins 1993b).  | No                |
| <i>Gallinago hardwickii</i>     | Latham's Snipe           | -                    | M                     | Typically found on wet soft ground or shallow water with good cover of tussocks. Often found in wet paddocks, seepage areas below dams (Pizzey & Knight 1997).  | No                |
| <i>Haematopus fuliginosus</i>   | Sooty Oystercatcher      | V                    | -                     | Found on undisturbed tidal rocks on ocean shores and islands. Occasionally found on sandspits and mudflats (Pizzey 1983).   | No                |
| <i>Haematopus longirostris</i>  | Pied Oystercatcher       | V                    | -                     | An intertidal forager found on undisturbed sandy beaches and spits, tidal mudflats and estuaries. Occasionally found in paddocks near the coast (Pizzey 1983).  | No                |

| Latin Name                          | Common Name <sup>1</sup>   | TSC Act <sup>2</sup> | EPBC Act <sup>3</sup> | Habitat   | Potential habitat |
|-------------------------------------|----------------------------|----------------------|-----------------------|---|-------------------|
| <i>Haliaeetus leucogaster</i>       | White-bellied Sea-eagle    | -                    | M                     | A migratory species that is resident to Australia. Found in terrestrial and coastal wetlands; favoring deep freshwater swamps, lakes and reservoirs; shallow coastal lagoons and saltmarshes (English & Predavec 2001).   | No                |
| <i>Hirundapus caudacutus</i>        | White-throated Needle-tail | -                    | M                     | An aerial species found in feeding concentrations over cities, hilltops and timbered ranges (Pizzey 1983).  | No                |
| <i>Ixobrychus flavicollis</i>       | Black Bittern              | V                    | -                     | Usually found on coastal plains below 200 m. Often found along timbered watercourses, in wetlands with fringing trees and shrub vegetation. The sites where they occur are characterized by dense waterside vegetation (NPWS 1999a).  | No                |
| <i>Lathamus discolor</i>            | Swift Parrot               | E1                   | EM                    | The Swift Parrot occurs in woodlands and forests of New South Wales from May to August, where it feeds on eucalypt nectar, pollen and associated insects (Forshaw & Cooper 1981). The Swift Parrot is dependent on flowering resources across a wide range of habitat in its wintering grounds in New South Wales (Shields & Crome 1992). This species is migratory breeding in Tasmania and also nomadic moving about in response to changing food availability (Pizzey 1983). | Yes               |
| <i>Melithreptus gularis gularis</i> | Black-chinned Honeyeater   | V                    | -                     | Found mostly in open forests and woodlands dominated by box and ironbark eucalypts (Higgins <i>et al.</i> 2001). It is rarely recorded east of the Great Dividing Range (Higgins <i>et al.</i> 2001).   | No                |
| <i>Monarcha melanopsis</i>          | Black-faced Monarch        | -                    | M                     | A migratory species found during the breeding season in damp gullies in temperate rainforests. Disperses after breeding into more open woodland (Pizzey 1983).  | No                |
| <i>Myiagra cyanoleuca</i>           | Satin Flycatcher           | -                    | M                     | Migratory species that occurs in coastal forests, woodlands and scrubs during migration. Breeds in heavily vegetated gullies (Pizzey 1983).   | No                |
| <i>Neophema pulchella</i>           | Turquoise Parrot           | V                    | -                     | Occurs in open woodlands and eucalypt forests with a ground cover of grasses and understorey of low shrubs (Morris 1980). Generally found in the foothills of the Great Divide, including steep rocky ridges and gullies (Higgins 1999). Nest in hollow-bearing trees, either dead or alive; also in hollows in tree stumps. Prefer to breed in open grassy forests and woodlands, and gullies which are moist (Higgins 1999).  | No                |
| <i>Ninox connivens</i>              | Barking Owl                | V                    | -                     | Generally found in open forests, woodlands, swamp woodlands and dense scrub. Can also be found in the foothills and timber along watercourses in otherwise open country (Pizzey 1983).  | No                |

| Latin Name                         | Common Name <sup>1</sup> | TSC Act <sup>2</sup> | EPBC Act <sup>3</sup> | Habitat  | Potential habitat |
|------------------------------------|--------------------------|----------------------|-----------------------|--|-------------------|
| <i>Ninox strenua</i>               | Powerful Owl             | V                    | -                     | Occupies wet and dry eucalypt forests and rainforests. Can occupy both un-logged and lightly logged forests as well as undisturbed forests where it usually roosts on the limbs of dense trees in gully areas. It is most commonly recorded within Red Turpentine in tall open forests and Black She-oak within open forests (Debus & Chafer 1994). Large mature trees with hollows at least 0.5 m deep are required for nesting (Garnett 1992). Tree hollows are particularly important for the Powerful Owl because a large proportion of the diet is made up of hollow-dependent arboreal marsupials (Gibbons & Lindenmayer 1997). Nest trees for this species are usually emergent with a diameter at breast height of at least 100 cm (Gibbons & Lindenmayer 1997). | No                |
| <i>Pandion haliaetus</i>           | Osprey                   | V                    | M                     | Found in coastal waters, inlets, estuaries and offshore islands. Occasionally found up larger rivers (Pizzey 1983).  | No                |
| <i>Ptilinopus magnificus</i>       | Wompoo Fruit-dove        | V                    | -                     | Mainly occurs in large undisturbed patches of tall tropical or subtropical rainforest. Occasionally occurs in patches of monsoon forest, closed gallery forest, wet sclerophyll forest, tall open forest, open woodland or vine thickets near rainforest (Higgins & Davies 1996).  | No                |
| <i>Ptilinopus superbus</i>         | Superb Fruit-dove        | V                    | -                     | Mostly closed forests, including monsoon rainforests and mesophyll vine forests (Higgins & Davies 1996).   | No                |
| <i>Puffinus carneipes</i>          | Flesh-footed Shearwater  | V                    | M                     | Oceanic species found in coastal areas on the east and west coasts (Simpson & Day 1996).   | No                |
| <i>Rhipidura rufifrons</i>         | Rufous Fantail           | -                    | M                     | Migratory species that prefers dense, moist undergrowth of tropical rainforests and scrubs. During migration it can stray into gardens and more open areas (Pizzey 1983).  | No                |
| <i>Rostratula benghalensis</i>     | Painted Snipe            | V                    | M                     | Found in the fringes of swamps, dams, sewage farms, marshy areas, generally with cover of grasses, lignum or open timber (Pizzey & Knight 1997).   | No                |
| <i>Sterna albifrons</i>            | Little Tern              | E1                   | M                     | Found in sheltered coastal environments including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets (Higgins & Davies 1996).   | No                |
| <i>Thalassarche melanorhynchus</i> | Black-browed Albatross   | -                    | M                     | Inhabits Antarctic, subantarctic and subtropical waters. Although generally pelagic the species also occurs on the continental shelf and can be seen from land (NPWS 1999b).   | No                |
| <i>Tyto novaehollandiae</i>        | Masked Owl               | V                    | -                     | Inhabits a diverse range of wooded habitat that provide tall or dense mature trees with hollows suitable for nesting and roosting (Higgins 1999). Mostly recorded in open forest and woodlands adjacent to cleared lands. Nest in hollows, in trunks and in near vertical spouts or large trees, usually living but sometime dead (Higgins 1999). Nest hollows are usually located within dense forests or woodlands (Gibbons & Lindenmayer 1997). Masked owls do prey upon hollow-dependent arboreal marsupials, but terrestrial mammals make up the largest proportion of the diet (Gibbons & Lindenmayer 1997, Higgins 1999).   | No                |

| Latin Name                                 | Common Name <sup>1</sup>  | TSC Act <sup>2</sup> | EPBC Act <sup>3</sup> | Habitat  | Potential habitat |
|--|---------------------------|----------------------|-----------------------|--|-------------------|
| <i>Xanthomyza phrygia</i>                  | Regent Honeyeater         | E1                   | EM                    | A semi-nomadic species occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forests associations and wet lowland coastal forests (Pizzey 1983, NPWS 1999g).   | Yes               |
| <b>Mammals</b>                             |                           |                      |                       |  |                   |
| <i>Cercartetus nanus</i>                   | Eastern Pygmy-possum      | V                    | -                     | Inhabits rainforest through sclerophyll forest to tree heath. Banksias and myrtaceous shrubs and trees are a favoured food source. Will often nest in tree hollows, but can also construct its own nest (Turner & Ward 1995). Because of its small size it is able to utilise a range of hollow sizes including very small hollows (Gibbons & Lindenmayer 1997). Individuals will use a number of different hollows and an individual has been recorded using up to 9 nest sites within a 0.5ha area over a 5 month period (Ward 1990).  | No                |
| <i>Dasyurus maculatus</i>                  | Spotted-tailed Quoll      | V                    | E                     | Uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands and rainforests (Dickman & Read 1992). Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, and abundance of food and an area of intact vegetation in which to forage (Edgar & Belcher 1995).   | No                |
| <i>Dasyurus viverrinus</i>                 | Eastern Quoll             | E1                   | -                     | This species occurs in a variety of habitats including scrub, heathland, cultivated land and dry sclerophyll forest (Strahan 1995; NPWS 1999). Den sites can consist of a number of chambers in range of structure from underground burrows, hollow logs, rock piles and hay sheds. The Eastern Quoll is a solitary feeder with males often travelling over a kilometer in a night to forage (Strahan 1995). Females restrict their movements to a few hundred meters around their dens. This species feeds on agricultural pest, insect and large animals including ground-nesting birds and small mammals (NPWS 1999). | No                |
| <i>Falsistrellus tasmaniensis</i>          | Eastern False Pipistrelle | V                    | -                     | Inhabit sclerophyll forests, preferring wet habitats where trees are more than 20 m high (Churchill 1998). Two observations have been made of roosts in stem holes of living eucalypts (Phillips 1995). There is debate about whether or not this species moves to lower altitudes during winter, or whether they remain sedentary but enter torpor (Menkhorst & Lumsden 1995). This species also appears to be highly mobile and records showing movements of up to 12 km between roosting and foraging sites (Menkhorst & Lumsden 1995).   | No                |
| <i>Isodon obesulus</i>                     | Southern Brown Bandicoot  | E1                   | E                     | Prefers sandy soils with scrubby vegetation and/or areas with low ground cover that are burn from time to time (Braithwaite 1995). A mosaic of post fire vegetation is important for this species (Maxwell <i>et al.</i> 1996).  | No                |
| <i>Miniopterus schreibersii oceanensis</i> | Large Bentwing Bat        | V                    | -                     | Broad range of habitats including rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands. Roost in caves and man made habitats and under road culverts (Strahan 1995).   | No                |

| Latin Name                       | Common Name <sup>1</sup> | TSC Act <sup>2</sup> | EPBC Act <sup>3</sup> | Habitat   | Potential habitat |
|----------------------------------|--------------------------|----------------------|-----------------------|---|-------------------|
| <i>Mormopterus norfolkensis</i>  | Eastern Freetail Bat     | V                    | -                     | Most records are from dry eucalypt forests and woodlands to the east of the Great Dividing Range. Appears to roost in trees, but little is known of this species habits (Allison & Hoyer 1995, Churchill 1998).   | No                |
| <i>Petaurus norfolcensis</i>     | Squirrel Glider          | V                    | -                     | Generally occurs in dry sclerophyll forests and woodlands but is absent from dense coastal ranges in the southern part of its range (Suckling 1995). Requires abundant hollow bearing trees and a mix of eucalypts, banksias and acacias (Quin 1995). There is only limited information available on den tree use by Squirrel gliders, but it has been observed using both living and dead trees as well as hollow stumps (Gibbons & Lindenmayer 1997). Within a suitable vegetation community at least one species should flower heavily in winter and one species of eucalypt should be smooth barked (Menkhorst <i>et al.</i> 1988). | No                |
| <i>Phascolarctos cinereus</i>    | Koala                    | V                    | -                     | Inhabits eucalypt forests and woodlands. The suitability of these forests for habitation depends on the size and species of trees present, soil nutrients, climate and rainfall (Reed & Lunney 1990, Reed <i>et al.</i> 1990).  | No                |
| <i>Pteropus poliocephalus</i>    | Grey-headed Flying-fox   | V                    | V                     | This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, Melaleuca swamps and Banksia woodlands. Bats commute daily to foraging areas, usually within 15 km of the day roost (Tidemann 1995) although some individuals may travel up to 70 km (Augee & Ford 1999).   | No                |
| <i>Scoteanax rueppellii</i>      | Greater Broad-nosed Bat  | V                    | -                     | Prefer moist gullies in mature coastal forests and rainforests, between the Great Dividing Range and the coast. They are only found at low altitudes below 500 m (Churchill 1998). In dense environments they utilise natural and human-made opening in the forest for flight paths. Creeks and small rivers are favoured foraging habitat (Hoyer & Richards 1995). This species roosts in hollow tree trunks and branches (Churchill 1998).  | No                |
| <b>Reptiles</b>                  |                          |                      |                       |   |                   |
| <i>Hoplocephalus bungaroides</i> | Broad-headed Snake       | E1                   | V                     | Mainly occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitat they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer (Webb 1996, Webb & Shine 1998).  | No                |
| <i>Varanus rosenbergi</i>        | Rosenberg's Goanna       | V                    | -                     | This species is a Hawkesbury/Narrabeen sandstone outcrop specialist (Wellington & Wells 1985). Occurs in coastal heaths, humid woodlands and both wet and dry sclerophyll forests (Cogger 1992).  | No                |

Key: 1) \* recorded during the current survey

2) Listed on the TSC Act as Endangered (E1), Vulnerable (V)

3) Listed on the EPBC Act as Endangered (E) or Vulnerable (V) or covered under migratory provisions (M) on the EPBC Act



Where there is potential habitat (foraging or breeding resources) for a threatened species in the study area, further consideration must be given to the potential impact of the proposed development on these species.

The proposed development may significantly impact threatened species by causing any of the following situations to arise:

- death or injury of individuals;
- loss or disturbance of limiting foraging resources; and,
- loss or disturbance of limiting breeding resources

The Pacific black Duck, Regent Honeyeater and Swift Parrot may use areas and resources within the study area on a temporary basis, however, given the mobility and limited foraging habitat within the study area it is unlikely that they would be dependent on these resources. Therefore it is unlikely that the proposed development would result in the individual death or injury, loss of limiting foraging or breeding resources, or disturbance to limiting breeding or foraging habitat. Further consideration under the TSC Act or EPBC Act is not recommended for these species.

#### 4.4.2 Koala habitat (SEPP 44)

This Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas, ensuring a permanent free-living population over their present range and attempting to reverse the current trend of koala population decline.

SEPP 44 applies to land within Local Government Areas (including Pittwater) listed in SEPP 44, Schedule 1 for which a development application has been made (SEPP 44, Section 6) and Council is the determining authority. Under this policy the distinction is made between ‘potential’ and ‘core’ Koala habitat.

“Potential Koala habitat” means areas of native vegetation where the trees of the types listed in Schedule 2 of the Policy constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

“Core Koala habitat” means an area of land with a resident population of Koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.

Two Koala feed trees listed in SEPP 44, Schedule 2 (*Eucalyptus robusta* and *E. tereticornis*) were identified in the area. A few remnant trees of *E. robusta* and *E. tereticornis* were recorded in the study area along Burns Lane and Narrabeen



Creek. These Koalas feed trees appear in densities greater than 15% of the total number of trees within the study area. Hence some of the study area should be considered Potential Koala Habitat. These tree species occur in such low numbers and no Koalas, or indirect evidence of them, were observed during the current surveys and there are no records of this species on site. Therefore study area is not considered to be 'core' Koala habitat thus a SEPP 44 Assessment is not recommended.

## 5.0 OPPORTUNITIES AND CONSTRAINTS

Previous development within the study area has resulted in a highly altered and degraded native habitat for plant and animal species. The vegetation within the study area does not represent a native vegetation community and contains few resources for native animal species.

No threatened plant species, populations or communities were recorded within the study area during the current survey. The study area is not considered to contain potential habitat for any threatened flora.

One migratory species listed on the EPBC Act was recorded within the study area, Pacific Black Duck. The study area may also provide a notional food resource for two threatened bird species listed on the TSC Act and EPBC Act (Regent Honeyeater and Swift Parrot). Under the current legislative requirements threatened species with potential habitat (foraging or breeding resources) on site need to be considered further under the Eight Part Test Assessment (TSC Act) and /or DEH Guidelines for Assessment of Significance (EPBC Act) if the proposed development may cause any of the following situations to arise:

- death or injury of individuals;
- loss or disturbance of limiting foraging resources; and,
- loss or disturbance of limiting breeding resources.

It is considered unlikely that the Pacific Black Duck, Regent Honeyeater or Swift Parrot would be dependent upon the foraging resources within the study area. Therefore it is unlikely that the proposed development would result in the individual death or injury, loss of limiting foraging or breeding resources, or disturbance to limiting breeding or foraging habitat. Thus further consideration under the TSC Act or EPBC Act is not recommended for any threatened species known or with the potential to occur within the study area.

The riparian vegetation of Narrabeen Creek was highly degraded and did not constitute a native vegetation community. It is likely that only generalist avifauna (those adapted to urban environments) would visit the site on any regular basis. Permanent residents would be limited to common reptile and frog species. It is unlikely that the proposed development would significantly reduce or further degrade this creekline habitat.

Twelve of the exotic species recorded in the study area are listed as noxious in the Pittwater LGA.

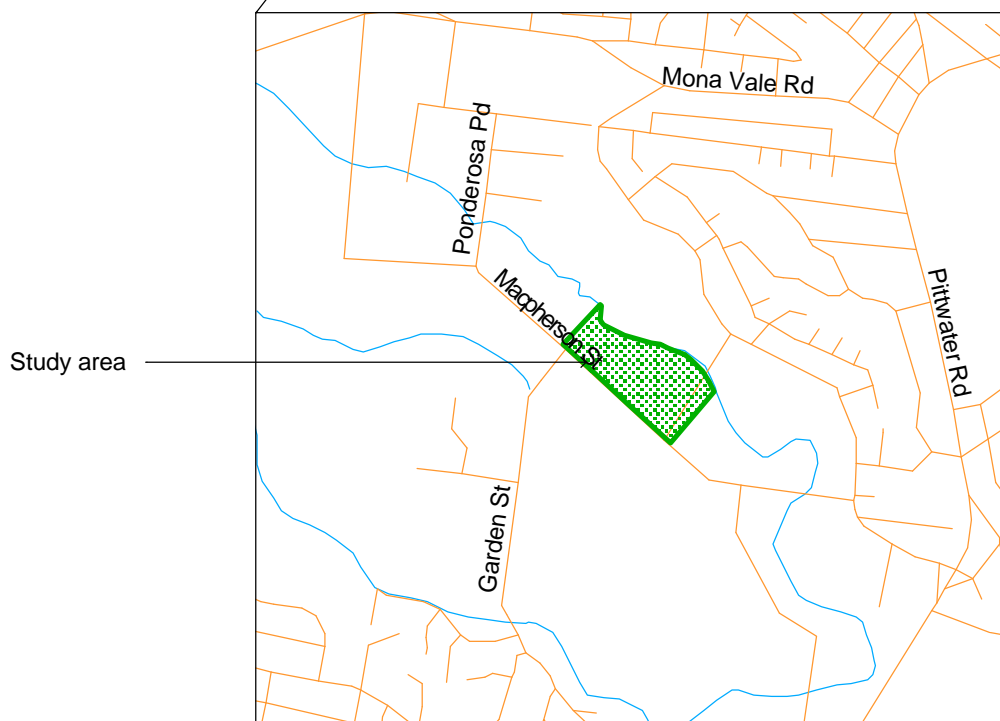
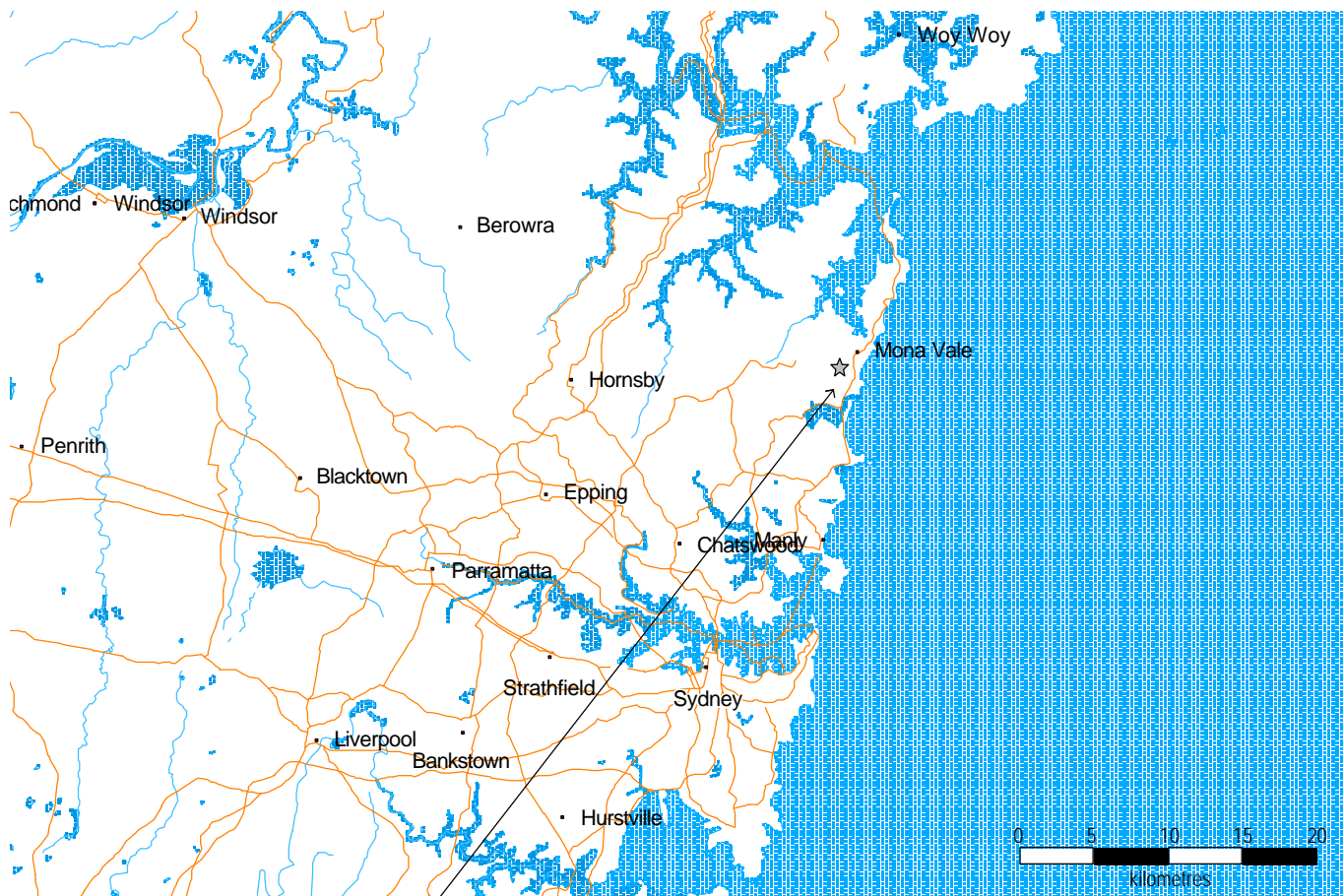
Although Narrabeen Creek is considered to be in poor condition, it has been identified by Pittwater Council as one of the creekline corridors within DCP 29 (Warriewood Valley Urban Release Area). One of the objectives of DCP 29 is to provide a network of multifunctional living creekline corridors on Narrabeen Creek and other creeks within the LGA. It is therefore recommended in accordance with the DCP 29 that Narrabeen Creek be set-aside as an area of conservation priority.

The DCP 29 states that “a landscape plan for the creekline corridor adjoining the sector must be prepared” prior to development. Based on the DCP 29 the creekline corridor will generally be 100 m in width, comprising a 50 m wide multi function corridor with a 25 m buffer strip on either side. Vegetation within this area would be restricted to indigenous native species. The regeneration and revegetation of Narrabeen Creek, is likely to improve the habitat value for native flora and fauna within the study area.

Whilst the proposed development is unlikely to have a significant impact on threatened species, endangered communities or populations it is recommended that the following points be taken into consideration to minimise any disturbances on the ecological values of the study area:

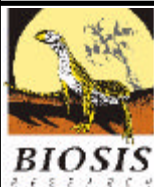
- appropriate sediment/erosion and drainage control devices should be utilised during and after excavation works in order to prevent sediment laden run off;
- where possible remnant trees should be retained;
- a weed eradication plan for the study area should be prepared and implemented; and,
- following completion of any works, locally indigenous species should be used in landscaping.

# FIGURES



Acknowledgement: Geoscience Australia  
(1:250000 - Newcastle, Singleton and Sydney)

Figure 1: Location of the study area in a regional context.



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10 Bartley Street  
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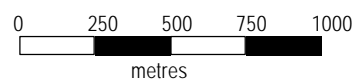
DATE: 5 August 2004

Checked by: TE

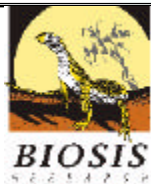
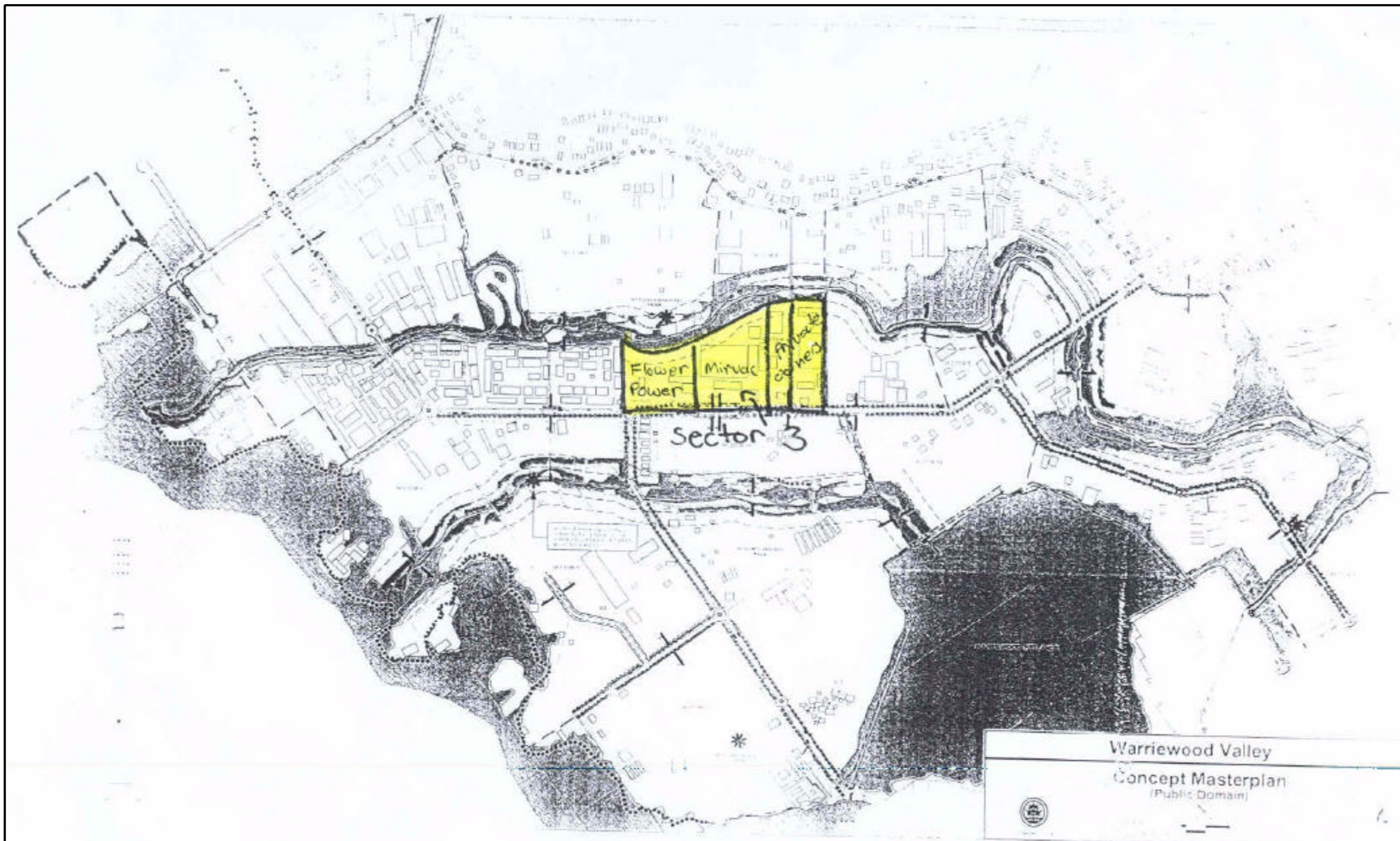
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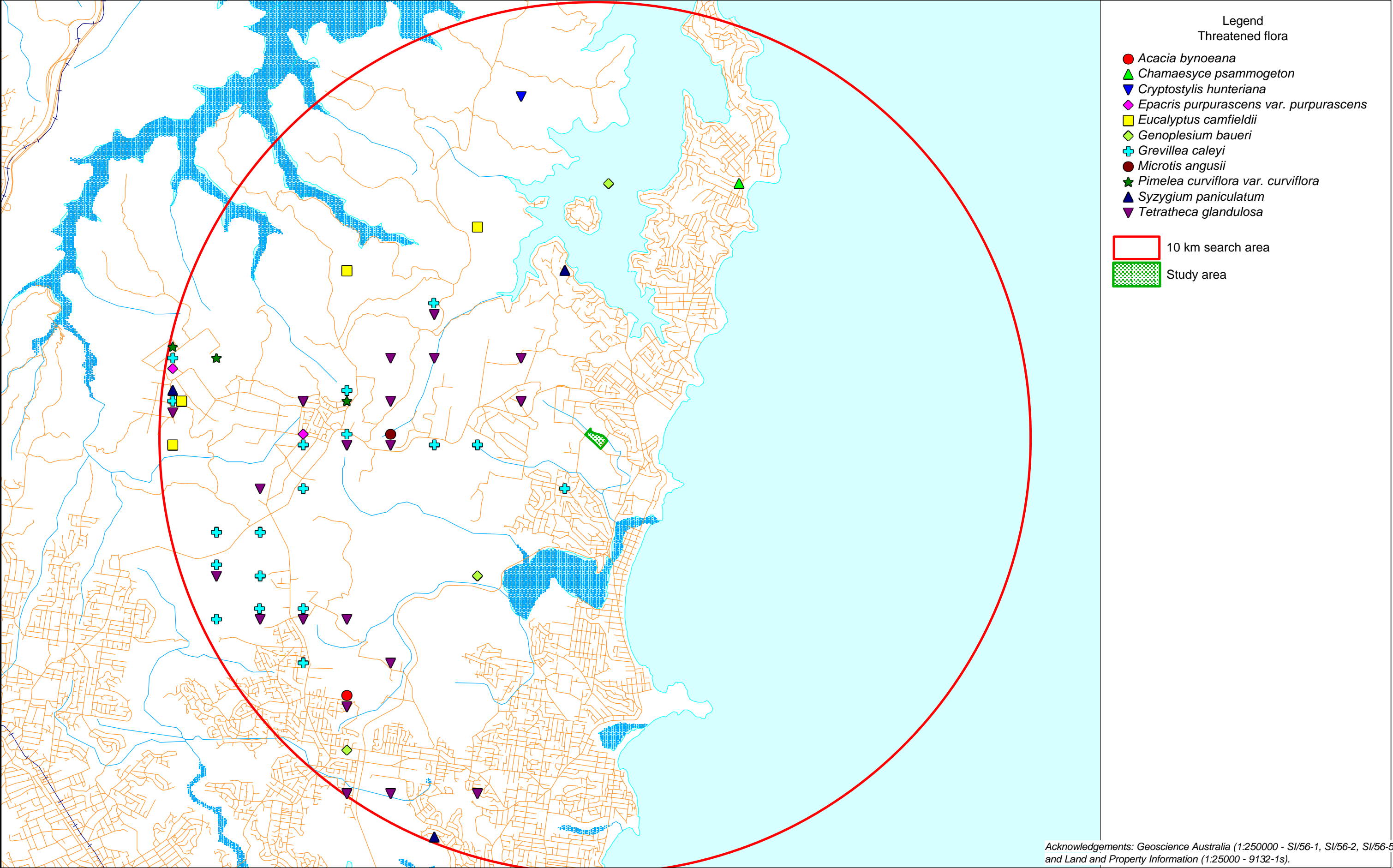
Figure 2: Concept Masterplan

DATE: 5 August 2004

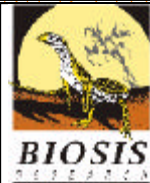
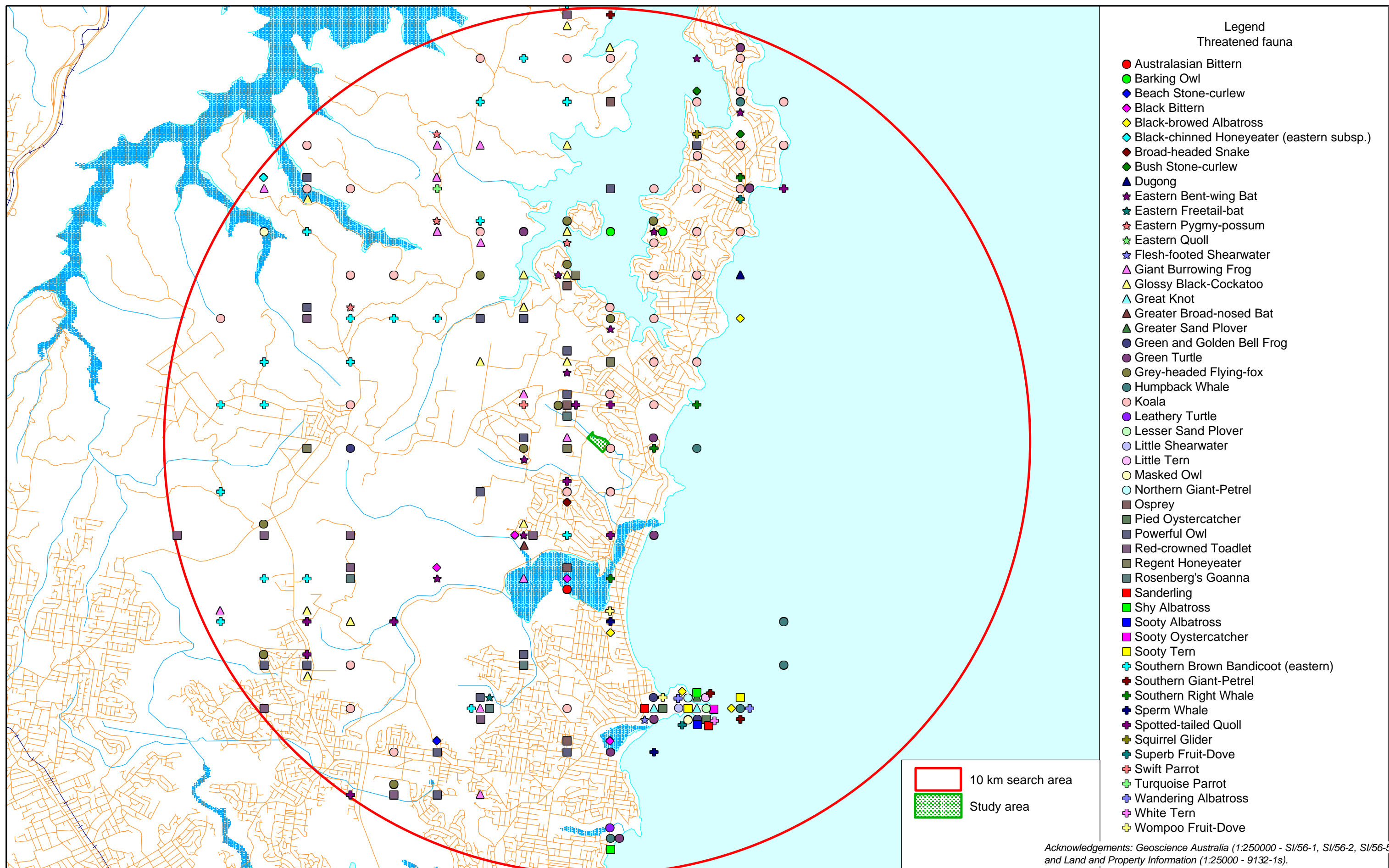
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Figure 4: Threatened fauna records within 10km of the study area.

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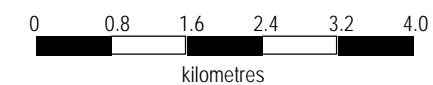


Figure 4: Threatened fauna records within 10km of the study area.



# PLATES

**Plate 1: Flower Power Nursery on the western side of the study area.**



**Plate 2: Market garden operations**





**Plate 3: Understorey vegetation along the northeastern section of the study area dominated by exotic plant species.**



**Plate 4: Exotic plant species along the southern creek bank.**





**Plate 5: Western view of Narrabeen Creekline**



**Plate 6: A closer view of Narrabeen Creekline with little emergent vegetation.**



# APPENDICES

# **APPENDIX 1**

## **Relevant Development Control Plans**

**DCP 21**

DCP 21 maps the study area as occurring within flora and fauna conservation category areas 1 and 2 and states that in these areas the:

- Development shall not directly impact on vulnerable species, endangered populations or endangered ecological communities (Categories 1 and 2);
- Development shall not significantly reduce or degrade habitat for locally native species, vulnerable species, endangered populations or endangered ecological communities (Categories 1 and 2);
- Development shall not result significant loss of canopy cover or a net loss in native canopy trees (Categories 1 and 2);
- Development shall ensure any landscaping works are made up of 80% locally native species (i.e. species included in the endangered ecological community) (Categories 1 and 2); and
- Development shall provide flora and fauna habitats by active restoration, regeneration, and/or creation (Category 2).

**DCP 29**

DCP 29 details the Warriewood Valley Land Release, which consists of 13 sectors. Sector 3 is to be medium density housing (25 dwellings per hectare, with a total of 165 dwellings) with a pedestrian pathway and creekline corridor planned along Narrabeen Creek. The creekline corridor will generally be 100 m in width, comprising a 50 m wide multi function corridor with a 25 m buffer strip on either side. It is also stated in DCP 29 that:

*Applications must be designed to maximise the restoration, retention and preservation of indigenous trees, shrubs and groundcovers, as well as natural features, including rock features and watercourses.*



# APPENDIX 2

## Flora Results

### Dominant plant species recorded in the current survey

| Family                      | Latin name  | Common name            | Native? |
|-----------------------------|---|------------------------|---------|
| <b>Monocotyledons</b>       |   |                        |         |
| Araceae                     | <i>Calocasia esculenta</i>                          | Elephant Ear Plant     | No      |
| Asparagaceae                | <i>Protasparagus aethiopicus</i>                    | Sprengeri Fern         | No      |
| Commelinaceae               | <i>Tradescantia albiflora</i>                       | Wandering Jew          | No      |
| Juncaceae                   | <i>Juncus acutus</i>                                | Juncus                 | No      |
| Lomandraceae                | <i>Lomandra longifolia</i>                          | Spiny-headed Mat-rush  | Yes     |
| Poaceae                     | <i>Arundo donax</i>                                 | Giant Reed             | No      |
|                             | <i>Ehrharta erecta</i>                              | Panic Veldtgrass       | No      |
|                             | <i>Paspalum urvillei</i>                            | Vasey Grass            | No      |
|                             | <i>Pennisetum clandestinum</i>                      | Kikuyu Grass           | No      |
|                             | <i>Phyllostachys</i> spp.                           | Phyllostachys          | Yes     |
| <b>Dicotyledons</b>         |   |                        |         |
| Apiaceae                    | <i>Foeniculum vulgare</i>                           | Fennel                 | No      |
| Asclepiadaceae              | <i>Araujia sericifera</i>                           | Araujia                | No      |
| Asteraceae                  | <i>Ageratina adenophora</i>                         | Crofton Weed           | No      |
|                             | <i>Bidens pilosa</i>                                | Cobbler's Pegs         | No      |
|                             | <i>Conyza albida</i>                                | Tall Fleabane          | No      |
|                             | <i>Senecio madagascariensis</i>                     | Fireweed               | No      |
|                             | <i>Sonchus oleraceus</i>                            | Common Sowthistle      | No      |
| Basellaceae                 | <i>Anredera cordifolia</i>                          | Madeira Vine           | No      |
| Convolvulaceae              | <i>Ipomoea indica</i>                               | Blue Morning Glory     | No      |
| Euphorbiaceae               | <i>Omalanthus populifolius</i>                      | Omalanthus             | No      |
|                             | <i>Ricinus communis</i>                             | Castor Oil Plant       | No      |
| Fabaceae (Caesalpinioideae) | <i>Senna pendula</i> var. <i>glabrata</i>           | Senna                  | No      |
| Fabaceae (Faboideae)        | <i>Erythrina</i> X <i>sykesii</i>                   | Coral tree             | No      |
|                             | <i>Kennedia rubicunda</i>                           | Red Kennedy Pea        | Yes     |
|                             | <i>Vicia sativa</i> ssp. <i>angustifolia</i>        | Narrow-leaved Vetch    | No      |
| Fabaceae (Mimosoideae)      | <i>Acacia baileyana</i>                             | Cootamundra Wattle     | No      |
|                             | <i>Acacia longifolia</i>                            | Coast/Sallow Wattle    | Yes     |
| Malvaceae                   | <i>Sida rhombifolia</i>                             | Paddy's Lucerne        | No      |
| Moraceae                    | <i>Ficus macrophylla</i> ssp. <i>macrophylla</i>    | Moreton Bay Fig        | Yes     |
| Myrtaceae                   | <i>Eucalyptus paniculata</i> ssp. <i>paniculata</i> | Eucalyptus             | Yes     |
|                             | <i>Eucalyptus robusta</i>                           | Swamp Mahogany         | Yes     |
|                             | <i>Eucalyptus tereticornis</i>                      | Forest Red Gum         | Yes     |
| Oleaceae                    | <i>Ligustrum sinense</i>                            | Small-leaved Privet    | No      |
| Onagraceae                  | <i>Ludwigia peploides</i> ssp. <i>montevidensis</i> | Water Primrose         | Yes     |
| Pittosporaceae              | <i>Pittosporum undulatum</i>                        | Sweet Pittosporum      | Yes     |
| Polygonaceae                | <i>Acetosa sagittata</i>                            | Rambling Dock          | No      |
| Rosaceae                    | <i>Rubus fruticosus</i>                             | Blackberry             | No      |
| Solanaceae                  | <i>Cestrum parqui</i>                               | Green Cestrum          | No      |
|                             | <i>Solanum nigrum</i>                               | Black-berry Nightshade | No      |
| Urticaceae                  | <i>Parietaria judaica</i>                           | Pellitory              | No      |
| Verbenaceae                 | <i>Lantana camara</i>                               | Lantana                | No      |

# APPENDIX 3

## Fauna Results

## Terrestrial Fauna Species Recorded in Study area

| Scientific Name <sup>1</sup> | Common Name            | Type of Record <sup>2</sup> |
|------------------------------|------------------------|-----------------------------|
| <b>Amphibians</b>            |                        |                             |
| <i>Crinia signifera</i>      | Common Eastern Froglet | H                           |
| <b>Native Birds</b>          |                        |                             |
| <i>Anas superciliosa</i> *   | Pacific Black Duck     | O                           |
| <i>Gymnorhina tibicen</i>    | Australian Magpie      | O/H                         |
| <i>Strepera graculina</i>    | Pied Currawong         | H                           |
| <i>Rhipidura leucophrys</i>  | Willie Wagtail         | O                           |
| <i>Zosterops lateralis</i>   | Silvereye              | O                           |
| <b>Introduced Birds</b>      |                        |                             |
| <i>Passer domesticus</i>     | House Sparrow          | O                           |
| <i>Acridotheres tristis</i>  | Common Myna            | O                           |
| <b>Introduced Mammals</b>    |                        |                             |
| <i>Canis familiaris</i>      | Dog (feral)            | H                           |

Key: 1) Covered under migratory provisions (m) on the EPBC Act

2) O = Observed, H= heard

## **APPENDIX 4**

### **Noxious weed species recorded in the study area**

| Species name               | Common name         | Control Category* |
|----------------------------|---------------------|-------------------|
| <i>Acetosa sagittata</i>   | Turkey Rhubarb      | W4b               |
| <i>Anredera cordifolia</i> | Madeira Vine        | W4c               |
| <i>Araujia sericifera</i>  | Moth Vine           | W4c               |
| <i>Arundo donax</i>        | Giant Reed          | W4a               |
| <i>Cestrum parqui</i>      | Green Cestrum       | W2                |
| <i>Ipomoea indica</i>      | Morning Glory       | W4c               |
| <i>Lantana camara</i>      | Lantana             | W2                |
| <i>Ligustrum sinense</i>   | Privet - narrowleaf | W4b               |
| <i>Parietaria judaica</i>  | Pellitory           | W3                |
| <i>Phyllostachys</i> sp.   | Rhizomatous Bamboo  | W4a               |
| <i>Ricinus communis</i>    | Castor Oil Plant    | W2                |
| <i>Rubus fruticosus</i>    | Blackberry          | W2                |

\* Control Categories:

- W2 – The weed must be fully and continuously suppressed and destroyed.
- W3 - The weed must be prevented from spreading and its numbers and distribution reduced.
- W4a - The weed must not be sold, propagated or knowingly distributed and any part of the weed must be prevented from growing within 3 metres of the boundary of a property.
- W4b - The weed must not be sold, propagated or knowingly distributed and any existing weed must be prevented from flowering and fruiting.
- W4c - The weed must not be sold, propagated or knowingly distributed and the weed must be prevented from spreading to an adjoining property.

Information from <http://www.agric.nsw.gov.au/noxweed/> (accessed August 2004).

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