cranbourne east
precinct structure plan

Flora and fauna: existing conditions

CEUGP/SR4B

September 2007

Cranbourne East Precinct Structure Plan

CRANBOURNE EAST
PRECINCT STRUCTURE PLAN

FLORA AND FAUNA: EXISTING CONDITIONS

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Prepared by:

Golder Associates Pty Ltd

Level 3, 50 Burwood Road

Hawthorn West, 3122

Tel: 8862 3500 Fax: 8862 3501

Lawrie Conole (Senior Ecologist, Golder Associates Pty Ltd)

John Kershaw (Botanist, Ecology Australia Pty Ltd)

Global Issues Local Solutions

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Glossary of terms

AVW	Atlas of Victorian Wildlife database, curated by DSE.
CaLP	Victorian *Catchment and Land Protection Act* 1994
CD	IUCN 'Red List' category of threat – Lower Risk (Conservation Dependant); usually abbreviated to Conservation Dependant. Used for taxa that are being intensively managed, and without such intervention would decline to a higher category of threat (VU, EN, CR).
CR	IUCN 'Red List' category of threat – Critically Endangered. Used for taxa facing an extremely high risk of extinction in the wild in the near future.
DEWR	Federal Department of the Environment and Water Resources (formerly DEH – Department of the Environment and Heritage)
DRA	Data Review Area. A geographic area, usually 5km in radius, centred on the study site, within which all secondary data on species and community occurrence are reviewed.
DSE	Victorian Department of Sustainability and Environment (formerly DNRE – Department of Natural Resources and Environment)
EBBC	Federal *Environment Protection and Biodiversity Conservation Act* 1999
EN	IUCN 'Red List' category of threat – Endangered. Used for taxa facing a very high risk of extinction in the wild in the near future.
EVC	Ecological Vegetation Class
FFG	Victorian *Flora and Fauna Guarantee Act* 1988
FIS	Flora Information System database, curated by DSE.
HHa (or hha)	Habitat hectare. The unit used in describing habitat condition and extent in 'Net Gain' accounting.
IUCN	The International Union for the Conservation of Nature; compiler of the 'Red List', and of the internationally accepted 'Red List' terminology, methodology and criteria used to classify the status of threatened species (see CR, EN, VU, NT, CD in this glossary).
LRO	Likelihood of Regular Occurrence. An estimation based on expert opinion and supporting data that a taxon will be found in a given area on greater than 50% of occasions when targeted surveys are conducted.
MNES	Matters of National Environmental Significance, refers to the seven areas of national environmental significance which define the coverage of the Federal EPBC Act 1999 (see EPBC). These matters are: (i) listed threatened species and ecological communities, (ii) migratory species protected under international agreements, (iii) Ramsar wetlands, (iv) the Commonwealth marine environment, (v) World Heritage properties, (vi) National Heritage places, and (vii) nuclear actions.
Net Gain	Shorthand for the Victorian government policy known as 'Victoria's Native Vegetation Management Framework'; also known as 'the Framework'.
NT	IUCN 'Red List' category of threat – Lower Risk (Near Threatened); usually abbreviated to Near Threatened. Used for taxa that are of conservation concern, and close to qualifying as Vulnerable.
NVPP	Precinct Native Vegetation Management Plan
RBG	Royal Botanic Gardens
s.s.	*sensu stricto*; a latin term used to denote a taxon description 'in the strict sense' (cf. s.l. – *senso lato* – in the broad sense). Used where

understandings of species boundaries have changed, and several forms have been recognised but not yet formally described.

ssp. Shorthand for sub-species (or subspecies).

sp. Shorthand for species. Often used to denote an undescribed species, e.g. *Eucalyptus* sp., meaning a recognised species of *Eucalyptus*, but one which has not yet been formally described and named.

Taxon Plural = taxa. A term used to describe recognisable taxonomic entities such as species and sub-species.

var. Used in botany to denote a low level taxon called a variety. Varieties can be named forms of species judged not distinct enough to call sub-species, or can even be named forms of sub-species. Not used in zoology.

VU IUCN 'Red List' category of threat – Vulnerable. Used for taxa facing a high risk of extinction in the wild in the medium term.

Executive Summary

INTRODUCTION

The purpose of this technical report is to document the existing flora and fauna values of the Cranbourne East precinct. The report includes a review of existing data from State databases, the Federal EPBC Protected Matters database, and other consultants' reports. Field site assessments conducted during the project provided further data enabling the distribution, abundance and condition of native vegetation, terrestrial fauna and fauna habitat to be documented and mapped. The synthesis of flora and fauna data review and field assessment forms the basis of a constraint mapping exercise, which will inform the consultant team during the design workshop, and will also provide geographic and ecological data for inclusion in the resulting Precinct Native Vegetation Management Plan (PNVMP).

LEGISLATIVE AND POLICY CONTEXT

Federal *Environment Protection & Biodiversity Conservation Act* 1999 (EPBC)

No plant communities listed under the EBPC Act have been confirmed as occurring in the study area. One plant species, River Swamp Wallaby-grass, has been confirmed as occurring at one site within the precinct (Blue Hills); the development area has been assessed and referred under the EPBC Act, and the development deemed 'not a controlled action' under the Act.

Three EPBC-listed fauna species – Southern Brown Bandicoot, Growling Grass Frog and Dwarf Galaxias – are regarded as of negligible – low likelihood of regularly occurring in the study area. The Grey-headed Flying-fox is likely to pass through the area on larger movements throughout the district, but not sustain important populations in the precinct. The nature and extent of habitat within the precinct is not regarded as important or limiting for any EPBC-listed threatened or migratory fauna species.

The study area falls within the upper catchments of two Ramsar wetlands: (i) Western Port, and (ii) Edithvale Seaford Wetlands. It is not considered likely that there will be any significant downstream impacts arising from future urbanisation of the precinct, due to the long distance from source to receiving waters, and the numerous storm-water treatment facilities that fall between the two extremes.

Victorian *Flora & Fauna Guarantee Act* 1988 (FFG)

No threatened plants listed under the FFG were detected during fieldwork, or are regarded as at least moderately likely to occur in the precinct.

Two FFG-listed fauna species – Growling Grass Frog and Dwarf Galaxias – are regarded as of negligible – low likelihood of regularly occurring in the study area. The Grey-headed Flying-fox is only likely to pass through the area on larger movements throughout the district, but not sustain important populations in the precinct. The nature and extent of habitat within the precinct is not regarded as important or limiting for any FFG-listed threatened species.

Net Gain

Specific requirements for the protection and removal of native vegetation within the study area are not addressed in this report. A Native Vegetation Precinct Plan (NVPP) is to be developed that will account for potential losses of native vegetation (remnant patch and scattered trees) within the Cranbourne East precinct. However, habitat hectare scores have been provided (Table 3) as an indication of the extent and condition of remnant vegetation and scattered trees within the study area.

EXISTING CONDITIONS

Flora

Remnant indigenous vegetation occurs to varying degrees throughout the Cranbourne East precinct in the form of isolated, highly degraded remnant patches and scattered trees and shrubs. Remnant patches are comprised of three Ecological Vegetation Classes (EVCs): EVC 48 Heathy Woodland, EVC 175 Grassy Woodland and EVC 53 Swamp Scrub. EVC 48 Heathy Woodland has a conservation status of Least Concern within the Gippsland Plain Bioregion while EVC 175 Grassy Woodland and EVC 53 Swamp Scrub both have a conservation status of Endangered within the bioregion. Remnant scattered trees occur infrequently throughout the study area in roadsides, as isolated paddock trees or scattered amongst highly degraded patches of remnant vegetation.

A population of the nationally significant River Swamp Wallaby-grass was recorded from a farm dam within the study area in April 2006 (Biosis Research 2006).

Remnant vegetation in the region is considered to be of at least Local conservation significance.

Fauna

A total of 87 fauna species (11 exotic) were recorded within the fauna Data Review Area (DRA) prior to 2004. This total comprised 68 bird species, 11 mammal species, six reptile species, and two frog species (Appendix 2). An additional nine fauna species (eight birds, one mammal; of these two were exotic) were recorded during field work for this project.

The fauna habitats of the Cranbourne East precinct can be broadly defined as an agricultural landscape containing small, widely-separated pockets of degraded remnant vegetation. The area is highly modified and has undergone a substantial loss of habitat and biodiversity values. The rural and rural residential habitats of the precinct support a suite of abundant, generalist fauna species typical of urban fringe and rural areas.

Some of the remaining scattered old trees may develop hollows, and though these will to some extent be monopolised by aggressive, exotic hollow-nesting birds such as *Common Starlings and *Common Mynas, they are also likely to used by native hollow-nesting birds such as Galahs, cockatoos, parrots and owls, as well as hollow-dependent mammals such as possums and microbats.

Biosites

DSE Sites of Biological Significance (BioSites) mapping (DSE 2005a) identifies 'BioSite 8095 - Royal Botanic Gardens - Cranbourne Annexe' as occurring adjacent to the southwest of the Cranbourne East Precinct. This BioSite is of State significance, and is only separated from the study area by the South Gippsland Highway. This is the only BioSite recorded by DSE (2005a) as occurring within or adjacent to the Cranbourne East precinct.

OPPORTUNITIES

The greater proportion of this study area is situated in dryland areas in which the habitat values have been greatly reduced, principally due to land clearing and agricultural practices. Remnant vegetation along roadside corridors has therefore become valuable in terms of its value to biodiversity, and as a link (even if fragmented) to important habitat areas such as the Royal Botanic Gardens – Cranbourne Annexe.

There is an opportunity for development within the Cranbourne East precinct to take advantage of these existing native vegetation patches and linear fragments to

- protect existing habitat values;
- develop linkages that enhance habitat values and provide movement corridors for fauna (e.g. between the study area an the Cranbourne Botanic Gardens; and
- these linkages could also provide amenity value to other user groups i.e. bike paths/walking trails.

CONSTRAINTS

The vast majority of the study area contains no native vegetation. As the remaining native vegetation is overwhelmingly discrete and clustered (see Figure 3), the opportunity to retain most or all of it without constraining other opportunities is considerable. Development within the vicinity of extant remnant indigenous vegetation may negatively impact the vegetation which remains, but this can be minimised by appropriate buffering.

The most significant potential impacts to biodiversity values from development within the Cranbourne East precinct are associated with:

- potential impacts to State and Nationally listed species (low); and
- potential loss of scattered old trees in pasture and woodland vegetation on roadsides and the disused rail reserve (moderate).

1 Introduction

1.1 Purpose of report

The Growth Areas Authority commissioned a consultant team lead by David Lock and Associates to develop a Precinct Structure Plan for Cranbourne East. Golder Associates Pty Ltd (Golder) is the sub-consultant responsible for flora and fauna assessment, interpretation and advice, and preparation of the Native Vegetation Precinct Plan(NVPP). This existing conditions technical report for flora and fauna has been prepared by Golder, with botanical input from Ecology Australia Pty Ltd.

The purpose of this technical report is to document the existing flora and fauna values of the Cranbourne East precinct. The report includes a review of existing data from State databases, the Federal EPBC Protected Matters database, and other consultants' reports. Field site assessments conducted during the project provided further data enabling the distribution, abundance and condition of native vegetation and terrestrial fauna to be documented and mapped. The synthesis of flora and fauna data review and field assessment will:

- form the basis of a constraint mapping exercise;
- inform the consultant team during the design workshop; and
- will also provide geographic and ecological data for inclusion in the resulting Precinct Native Vegetation Management Plan.

1.2 Cranbourne East study area

The Cranbourne East Precinct (see Figure 3, 'study area') is situated between the eastern edge of the current developed urban area of Cranbourne and the Clyde Road, City of Casey, Victoria. There are two polygons, connected at one corner, which make up the precinct. The eastern polygon (more or less a rectangle) is bounded by Clyde Road in the east, Thompson's Road in the north, a line running north from the intersection of Berwick-Cranbourne Road and the rail line to Thompson's Road in the west, and the disused Cranbourne East rail line in the south. The western polygon (an irregular shape) is bounded by Berwick-Cranbourne Road in the north, the South Gippsland Highway in the west, and a line running south from the intersection of Berwick-Cranbourne Road and the rail line to a point near the South Gippsland Highway; a section of Ballarto Road is contained within this polygon.

The study area is contained entirely within the Gippsland Plain Bioregion, but with several underlying geologies (Figure 1):

- Older Volcanics straddling much of the western polygon;
- Unnamed swamp and lake deposits along drainage lines through eastern polygon;
- Cranbourne Sands – small area of deep sand along South Gippsland Highway edge of western polygon and several patches at the top of eastern polygon straddling Thompson's Road; and

- Baxter (Sandstone) Formation, sandy and clay substrates, across most of the area; takes up much of the eastern polygon.

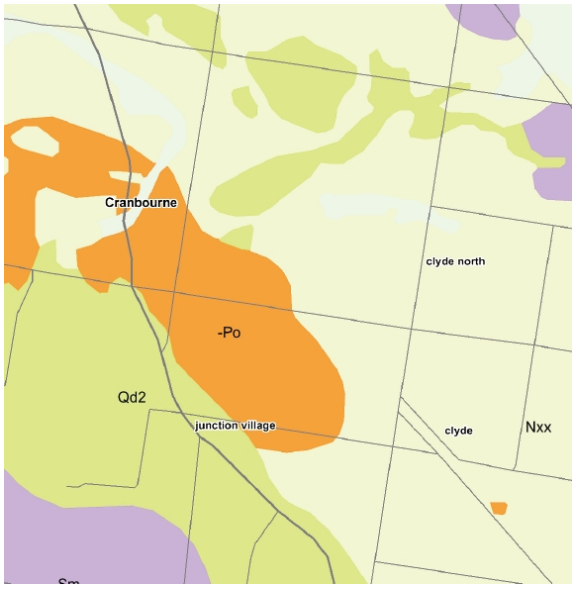

Figure 1: Underlying geology, Cranbourne East precinct (source: DSE 2007c)

The geologic diversity is reflected by the series of pre-1750 Ecological Vegetation Classes (EVCs) modelled for the area:

- Plains Woodland/Plains Grassland Mosaic EVC693 (coinciding largely with the Baxter Formation and Older Volcanics);
- Heathy Woodland EVC48 (coinciding largely with the Cranbourne Sands); and
- Swamp Scrub EVC53 (coinciding with the swamp and lake deposits).

The vegetation has largely been cleared, and is highly modified. Remnant indigenous vegetation occurs largely as small, fragmented patches of trees and shrubs with isolated grasses and herbs on roadsides and the rail line reserve, with several patches in paddocks, and as scattered mature trees in pastures and roadsides.

2 Methods

2.1 FLORA

2.1.1 Desktop review

Existing information was reviewed, including:

- flora records within 5 km of the study area (referred to as the Data Review Area – DRA) held in the Victorian Flora Information System (FIS), a state-wide database maintained by the Department of Sustainability and Environment (DSE 2004a);
- Department of Environment and Water Resources Protected Matters Database (DEWR 2007a), using a 5 km radius search area;
- Ecological Vegetation Class modelling of the study area (both extant and pre-1750) (DSE 2007a);
- Sites of Biological Significance (BioSites) mapping of the study area (DSE 2005a);
- aerial imagery supplied to the consultant team; and
- previous reports from the general study area (Ecology Australia 2002; Ecology Australia 2003; Ecology Australia 2004a; Ecology Australia 2004b; Biosis Research 2006).

2.1.2 Field survey

The study area was visited in the period 25 - 31 July 2007 to determine and document values and threats associated with indigenous and exotic vegetation.

2.1.3 Taxonomy and terminology

An asterisk (*) preceding plant names signifies non-indigenous (exotic) taxa, which are those that would not naturally occur in the particular habitat. A hash sign (#) is used to denote native plants that are not indigenous in the relevant vegetation types.

Plant taxonomy and the use of common names follow the accepted authorities – Ross and Walsh (2003) and DSE (2005b, 2004b).

2.1.4 Conservation significance

Categories of significance used in this report and how they are assessed are explained in Appendix 1.

2.1.5 Limitations

As for all flora surveys, the seasonality of some plant species may be a limitation. Some species will have been overlooked because they are inconspicuous in late winter when the survey was conducted, or have been identified to genus level only due to the absence of fertile material. These limitations are, however, unlikely to alter the findings regarding overall quality and conservation significance of the vegetation.

2.2 FAUNA

2.2.1 Desktop review

Existing information was reviewed, including:

- fauna records within 5 km of the study area (referred to as the Data Review Area – DRA) held in the Victorian Fauna Display, a CD-ROM interface to the Atlas of Victorian Wildlife (AVW) database maintained by the Department of Sustainability and Environment (DSE 2004b);
- Department of Environment and Water Resources Protected Matters Database (DEWR 2007), using a 5 km radius search area; and
- previous reports from the general study area (Ecology Australia 2002; Ecology Australia 2003; Ecology Australia 2004a; Ecology Australia 2004b; Biosis Research 2006; Brett Lane & Associates 2006a,b).

2.2.2 Field survey

The study area was visited in the period 25 - 31 July 2007 to assess and document values and threats associated with fauna and faunal habitat.

2.2.3 Limitations

This is a preliminary study, not all fauna species in the study area will have been detected. This limitation is overcome to some extent through the information on species recorded from the DRA, sourced from the AVW database (DSE 2004b), other consultant reports, and from discussions with individuals with relevant local knowledge.

2.2.4 Taxonomy and terminology

An asterisk (*) preceding the species' name is used to signify non-indigenous taxa, which are those that would not naturally occur in the particular habitat. The scientific names, common names and systematic orders of vertebrates follow Christidis & Boles (1994) and Schodde & Mason (1999) for birds, and the 'Atlas of Victorian Wildlife' (DSE 2004b) for all other taxa.

2.2.5 Conservation significance

Species of State and/or National significance are determined by reference to DSE's advisory list of threatened vertebrates for Victoria (DSE 2007a), listings under the Victorian *Flora and Fauna Guarantee Act* 1988 (FFG Act) and the Federal *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act), and by reference to National Action Plans. Further information regarding significance criteria can be found in Appendix 1.

3 Biodiversity values

3.1 Flora

3.1.1 Ecological Vegetation Class (EVC) mapping

Department of Sustainability and Environment Ecological Vegetation Class (EVC) modelling maps the pre – 1750 EVCs of the study area as predominantly EVC 693 Plains Woodland/Plains Grassland with small incursions of EVC 53 Swamp Scrub and EVC 48 Heathy Woodland (Figure 1).

Extant EVC modelling identifies no remnant patch vegetation within the study area (Figure 2), however field surveys undertaken for this study have identified several small patches of EVC 48 Heathy Woodland, EVC 175 Grassy Woodland and EVC 53 Swamp Scrub within the study area. These EVCs are discussed in Sections 4.1.3 and 5.1.1.

Remnant indigenous vegetation occurs to varying degrees throughout the study area in the form of isolated, highly degraded remnant patches and scattered trees and shrubs, and is discussed below.

EVC 48 Heathy Woodland
Several highly degraded patches of EVC 48 Heathy Woodland occur on sandy soils in the south west and north of the study area (Figure 3). Coast Manna Gum (*Eucalyptus viminalis* ssp. *pryoriana*), Narrow-leaf Peppermint (*E. radiata* ssp. *radiata*) and Silver-leaf Stringybark (*E. cephalocarpa*) dominate the tree canopy, while Austral Bracken (*Pteridium esculentum*), Burgan (*Kunzea ericoides* s.l.) and Weeping Grass (*Microlaena stipoides* var. *stipoides*) are variously abundant in

Plate 1: Highly degraded EVC 48 Heathy Woodland in the north of the Cranbourne East precinct, July 2007

the understorey. A restricted diversity of indigenous herbaceous species and small shrubs occur sporadically throughout. Common weed species include Blackberry (**Rubus anglocandicans*), Kikuyu (**Pennisetum clandestinum*), Gorse (**Ulex europaeus*), Radiata Pine (**Pinus radiata*), Sallow Wattle (**Acacia longifolia* ssp. *longifolia*) and Sweet Pittosporum (**Pittosporum undulatum*). If not managed, ongoing degradation processes (weed invasion, grazing, and vegetation clearance) will further degrade EVC 48 Heathy Woodland within the study area.

EVC 175 Grassy Woodland

Highly degraded, artefactual remnants of EVC 175 Grassy Woodland occur along the disused train-line in the east of the study area (Figure 3). This vegetation community has been reduced to stands of Blackwood (*Acacia melanoxylon*) and scattered Swamp Gum (Eucalyptus ovata var. ovata), with a few indigenous herbaceous species occurring infrequently. The exotic Bulbil Watsonia (**Watsonia meriana* var. *bulbillifera*) is extremely abundant throughout, while Blackberry thickets are common (herbicide control of this species was evident).

Habitat zone 5 (see Section 5.1.1) displays characteristics of both EVC 175 Grassy Woodland and EVC 48 Heathy Woodland, and is likely an ecotone between these two communities. For the purpose of this study however, it has been dealt with as Heathy Woodland.

Plate 2: Blackwood (*Acacia melanoxylon*) dominates this highly degraded patch of EVC 175 Grassy Woodland, rail reserve, south-east Cranbourne East precinct, July 2007

EVC 53 Swamp Scrub

One small patch of EVC Swamp Scrub occurs in the south-west of the study area on the northern side of Ballarto Road (Figure 3).

Indigenous vegetation within this patch is comprised almost entirely of a mixed age-class of Swamp Paperbark (*Melaleuca ericifolia*). Scattered remnant Silver-leaf Stringybark (*E. cephalocarpa*) located in the vicinity indicates that this patch may be an artefact of a historical woodland community.

Figure 2: Extant Ecological Vegetation Classes (EVCs) mapped for the Cranbourne East precinct and surrounds (Source: DSE 2007b)

Scattered trees

Remnant indigenous trees occur throughout the study area in roadsides, as isolated paddock trees or scattered amongst highly degraded patches of remnant vegetation. Common overstorey species include Coast Manna Gum (*Eucalyptus viminalis* ssp. *pryoriana*), Swamp Gum (*E. ovata* var. *ovata*), Silver-leaf Stringybark and Narrow-leaf Peppermint (*E. radiata* ssp. *radiata*), while River Red-gum (*E. camaldulensis*) and White Sallee (*E. pauciflora* ssp. *pauciflora*) occur less frequently. Small trees consist of Blackwood (*Acacia melanoxylon*), Black Wattle (*A. mearnsii*), Cherry Ballart (*Exocarpus cupressiformis*) and Swamp Paperbark. The health of many of these trees is sub-optimal and there is often little chance for recruitment due to hostile processes (e.g. grazing, slashing and competition from exotic species).

Degraded native vegetation

Occurring in small, highly degraded, linear patches along roadsides and train-lines, or as individual plants, this vegetation consists of remnant and regenerating indigenous species amongst a generally exotic ground flora. Common tree and shrub species include Swamp Gum, Blackwood, Hedge Wattle (*Acacia paradoxa*) and Swamp Paperbark, while Austral Bracken (*Pteridium esculentum*) is often present in the ground storey.

All patches of remnant indigenous vegetation that do not qualify as remnant patch vegetation under the Guide for Assessment of Referred Planning Permit Applications (DSE 2006) (due to their highly degraded nature) are considered 'degraded roadside vegetation' in this report. Similarly, scattered trees are not included in this category.

3.1.2 Flora significance

A search of the FIS and EPBC databases within an area of 5km radius centred on the Cranbourne East precinct (the flora DRA) was undertaken. The FIS database search returned 13 records of State or Nationally significant plant species within the DRA (Table 1), of which three were from within the study area. The inclusion of the Cranbourne Royal Botanic Gardens within the flora DRA is responsible for the large numbers of indigenous and significant taxa recorded on the FIS. A search of the EPBC database returned six species which may have a likelihood of occurrence within the DRA (Table 2), though this is negligible for all but one species (River-Swamp Wallaby-grass *Amphibromus fluitans*) due to a lack of suitable habitat.

A population of the nationally significant River- Swamp Wallaby-grass was recorded from the precinct by consultants in April 2006 (Biosis Research 2006). This population was found to occur around the perimeter of a farm dam within a proposed development area at 220–280 Berwick–Cranbourne Road, Cranbourne. In a targeted survey in May 2006, over 600 individuals of River- Swamp Wallaby-grass were recorded from the dam site (Biosis Research 2006; DEWR 2007b). An EPBC referral has been submitted for this population of River- Swamp Wallaby-grass, proposing to retain and manage the grass *in situ*; and the proposed action has been deemed to be 'not a

controlled action' (DEWR 2007b). The location of this population of River- Swamp Wallaby-grass is mapped in Figure 3.

It should be noted that remnant vegetation in the region is considered to be of at least Local conservation significance. It is calculated that only *circa* 7% of former vegetation exists in the City of Casey, and that which remains is often severely degraded (Ecology Australia 2003).

Ecological Vegetation Classes (EVCs) are assigned a bioregional conservation status based on the level of depletion and rarity of occurrence, degree of threat and importance for supporting other significant features (DNRE 2002). Of the three extant EVCs occurring within the study area (Figure 3), EVC 48 Heathy Woodland has a conservation status of Least Concern within the Gippsland Plain Bioregion while EVC 175 Grassy Woodland and EVC 53 Swamp Scrub both have a conservation status of Endangered within the Gippsland Plain Bioregion (Table 1).

Table 1: Conservation status of Ecological Vegetation Communities (EVCs) mapped for the Cranbourne East precinct, 2007

EVC no.	EVC name	Conservation Status
48	Heathy Woodland	Least Concern
53	Swamp Scrub	Endangered
175	Grassy Woodland	Endangered

3.1.3 Biosites

The Department of Sustainability and Environment (DSE 2005a) define a BioSite (Site of Biological Significance) as an area of land or water containing biological assets with particular attributes, such as the presence of rare or threatened flora, fauna or habitat required for their survival, and/or rare or threatened vegetation communities. These sites are determined by DSE in liaison with Local Government Authorities, Melbourne Water, and community groups, and may be rated as being of International, National, State, Regional or Local significance. There are currently 939 BioSites recorded for the Port Phillip Region with *circa* 80% of these sites having been mapped (DSE 2005c).

DSE BioSite mapping (DSE 2005a) identifies 'BioSite 8095 - Royal Botanic Gardens - Cranbourne Annexe' as occurring adjacent to the southwest of the Cranbourne East Precinct. This BioSite is of State significance, and is only separated from the study area by the South Gippsland Highway. This is the only BioSite recorded by DSE (2005a) as occurring within or adjacent to the Cranbourne East precinct.

3.1.4 Significant roadsides

Vegetation on roadsides is important for land protection, flora and fauna habitat and landscape character. Vegetated roadsides can provide important links between larger areas of native vegetation, and where larger remnants no longer exist, roadside vegetation may provide the only functional habitat for native flora and fauna.

In a report undertaken by Ecology Australia for the City of Casey (Ecology Australia 2002), rural roadside vegetation within the municipality was documented and mapped according to its Conservation Value (low, moderate or high). One roadside patch occurring within the Cranbourne East Precinct was identified as containing remnant vegetation of moderate Conservation Value. This patch accords with 'habitat zone 1' on the South Gippsland Highway (see Figure 3).

3.2 Net Gain

The Net Gain approach to protection, enhancement and revegetation of native vegetation is presented in the DNRE (now DSE) publication: Victoria's Native Vegetation Management: a framework for action (DNRE 2002) (hereafter referred to as the Framework). The Framework specifically focuses on achieving biodiversity goals on private land, in the context of modification and clearing of native vegetation, but is also applicable to Public Land.

The implementation of Net Gain is part of Victoria's Biodiversity Strategy (DNRE 1997), and the Framework has been incorporated into the Victorian Planning Provisions. The Net Gain approach is summarised in the Framework as follows:

> *"Net Gain is the outcome for native vegetation and habitat where overall gains are greater than overall losses and where*

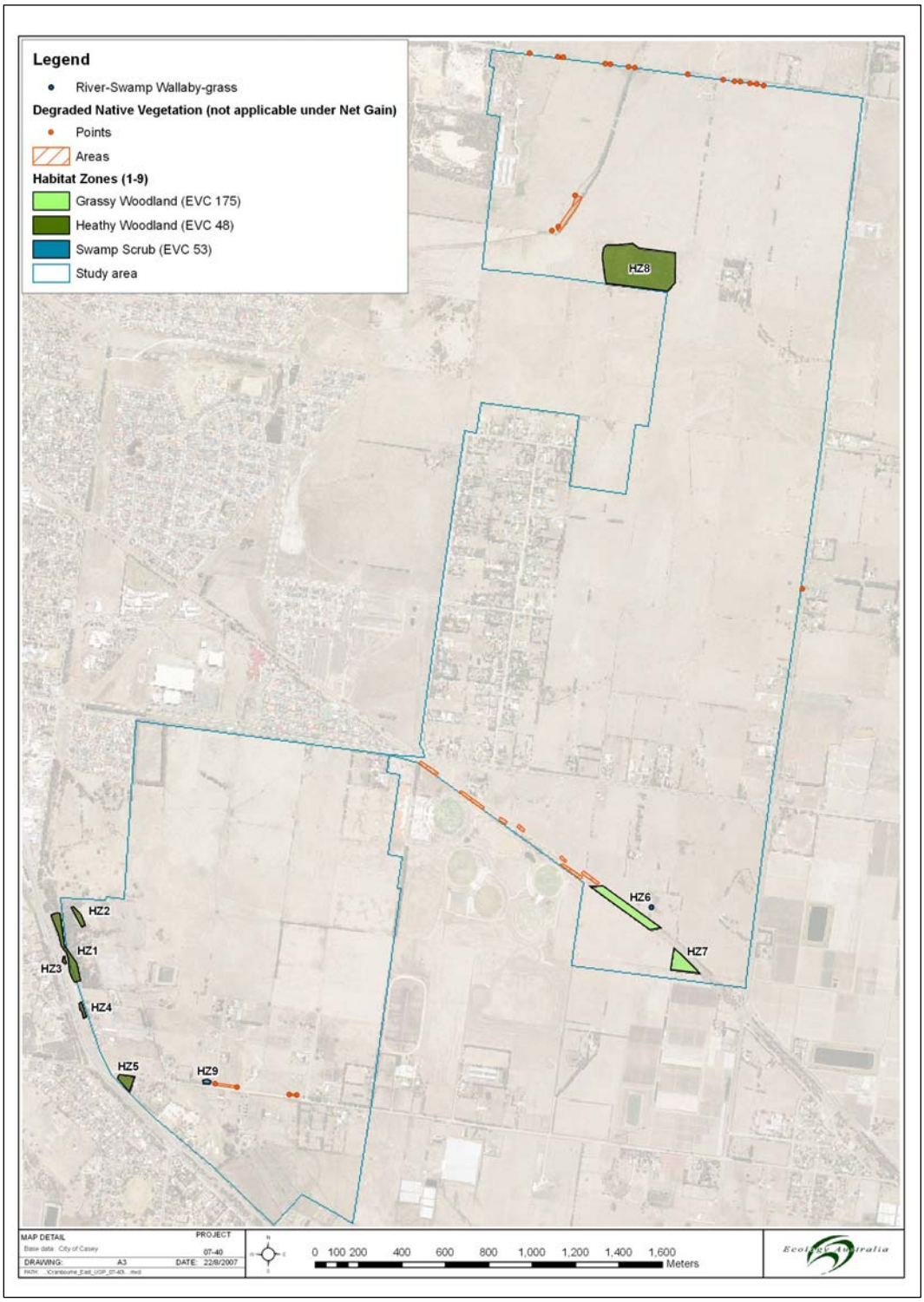

Figure 3: Native vegetation (excluding scattered trees) within the Cranbourne East precinct, July 2007.

individual losses are avoided where possible. The losses and gains are determined by a combined quality-quantity measure and over a specified area and period of time. Gains may be either required offsets for permitted clearing actions or as a result of landholder and Government assisted efforts that are not associated with clearing" (DNRE 2002).

Fundamental to vegetation management is that remnant vegetation is of greater ecological value and inherently more important than revegetation. Therefore, emphasis is given in the Framework to avoiding or minimising losses, as reflected in the three step approach:

1. To avoid adverse impacts, particularly through vegetation clearance (AVOIDANCE)
2. If impacts cannot be avoided, to minimise impacts through appropriate consideration in planning processes and expert input to project design or management (MINIMISATION)
3. Identify appropriate offset options (OFFSETTING)

3.2.1 Potential native vegetation losses

Native vegetation occurs within the study area as 'remnant patch' vegetation and as 'scattered trees'. DSE (2006) define a 'remnant patch' as "an area of vegetation, with or without trees, where less than 75% of the total understorey plant cover is weeds or non-native plants (bare ground is not included), or an are of treed vegetation where the density of the trees is such that canopy tree cover is at least at benchmark canopy cover". DSE (2006) also define scattered trees as "(indigenous) trees that occur at densities below benchmark densities and are within areas where at least 75% of the total understorey plants are weeds or non-native plants".

Specific requirements for the protection and removal of native vegetation within the study area are not dealt with in this report. A Native Vegetation Precinct Plan is to be developed that will account for potential losses of native vegetation (remnant patch and scattered trees) within the Cranbourne East precinct.

Habitat hectare (hha) scores have been provided (Section 5.1.1, Table 3) as an indication of the extent of remnant vegetation within the study area. Large-tree data for remnant patches and scattered tree data (e.g. diameter at breast-height) will be addressed in the Native Vegetation Precinct Plan.

3.2.2 Remnant patch vegetation

Nine habitat zones were identified within the Cranbourne East study area and a vegetation condition assessment was undertaken within each zone (Figure 3 and Table 3). A habitat zone is defined by DSE 2004 as:

'*... a discrete area of native vegetation consisting of a single vegetation type (EVC) with an assumed similar averaged quality (that) is the base spatial unit for conducting a habitat hectare assessment* ...'.

EVC 48 Heathy Woodland vegetation comprises six of these habitat zones, two are EVC 175 Grassy Woodland, and one is EVC 53 Swamp Scrub.

A total of 1.94 hha (habitat hectares) of remnant patch vegetation occurs within the Cranbourne East precinct (Table 3).

Table 2: Significant plant species recorded within a 5 km radius Data Review Area (DRA) (source: Flora Information System, DSE 2004a), with their likelihood of regular occurrence (LRO).

Scientific Name	Common Name	Significance			LRO
Amphibromus fluitans	River Swamp Wallaby-grass	V			H
Caladenia aurantiaca	Orange-tip Finger-orchid			r	N
Caladenia fragrantissima ssp. *orientalis* ♦	Eastern Spider-orchid	E	*f*	e	N
Cardamine paucijuga s.s.	Annual Bitter-cress			v	N
Correa reflexa var. *lobata*	Powelltown Correa			r	N
Craspedia canens	Grey Billy-buttons			e	N
Dianella amoena ♦	Matted Flax-lily	E		e	N
Entolasia stricta	Upright Panic			k	L
Glycine latrobeana	Clover Glycine	V	*f*	v	N
Helichrysum aff. rutidolepis (Lowland Swamps)	Pale Swamp Everlasting			v	N
Lachnagrostis filiformis var. 2	Wetland Blown-grass			k	M
Lachnagrostis punicea subsp. filifolia	Purple Blown-grass		*f*	r	L
Microseris sp. 1	Plains Yam-daisy			v	N
Prasophyllum frenchii	Maroon Leek-orchid	E	*f*	e	N
Thelymitra circumsepta	Naked Sun-orchid			v	N
Thelymitra epipactoides ♦	Metallic Sun-orchid	E	*f*	e	N
Xerochrysum palustre ♦	Swamp Everlasting	V	*f*	v	N

Key:

EPBC:	National *Environment Protection and Biodiversity Conservation Act* 1999
FFG:	Victorian *Flora and Fauna Guarantee Act* 1988
DSE:	Department of Sustainability and Environment (Victoria)
CR:	Critically Endangered in Australia, listed under the EPBC Act
EN:	Endangered in Australia, listed under the EPBC Act
VU:	Vulnerable in Australia, listed under the EPBC Act
f:	Listed under the FFG Act
e:	Endangered in Victoria (DSE 2005b)
v:	Vulnerable in Victoria (DSE 2005b)
r:	Rare in Victoria (DSE 2005b)
k:	Poorly known in Victoria (DSE 2005b)
LRO:	Likelihood of regular occurrence
R:	Recorded
H:	High
M:	Moderate
L:	Low
N:	Negligible
♦:	Species not recorded in FIS search, only from EPBC Protected Matters database

Table 3: Habitat hectare scores for remnant patch vegetation within the Cranbourne East precinct

Habitat Zone			HZ1	HZ2	HZ3	HZ4	HZ5	HZ6	HZ7	HZ8	HZ9
EVC Name (Initials)			HW	HW	HW	HW	HW	GW	GW	HW	SS
EVC Number			48	48	48	48	48	175	175	48	53
		Max Score	Score	Score	Score	Score	Score	Score	Score	Score	Score
Site	Large Old Trees	10	5	9	10	9	9	0	0	2	n/a
Condition	Canopy Cover	5	4	4	5	4	4	3	0	2	5
	Understorey	25	10	5	5	5	10	5	5	10	0
	Lack of Weeds	15	0	0	2	0	4	0	0	4	0
	Recruitment	10	1	0	1	0	0	3	1	3	5
	Organic Matter	5	2	0	2	2	3	2	2	0	3
	Logs	5	3	0	0	0	0	0	2	0	n/a
	Total Site Score	75	25	18	25	20	30	13	10	21	13
	*Multiplier		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	75/60
	Adjusted Site Score	75	25	18	25	20	30	13	10	21	16.25
Landscape	Patch Size	10	1	1	1	1	1	1	1	2	1
value	Neighbourhood	10	0	0	0	0	0	0	0	0	0
	Distance to core	5	4	4	4	4	4	2	2	2	4
Habitat Score		100	30	23	30	25	35	16	13	25	21.25
Habitat Score		1	0.30	0.23	0.30	0.25	0.35	0.16	0.13	0.25	0.21
Habitat Zone area (ha)		(#.#)	0.63	0.37	0.04	0.06	0.4	0.89	0.75	5	0.024
Habitat hectares		(#.#)	0.19	0.09	0.01	0.02	0.14	0.14	0.10	1.25	0.01
Bioregion			GP	GP	GP	GP	GP	GP	GP	GP	GP
EVC Conservation Status			LC	LC	LC	LC	LC	E	E	LC	E
Conservation Significance			Low	Low	Low	Low	Low	High	High	Low	High

HW	EVC 48 Heathy Woodland	GP	Gippsland Plain Bioregion
GW	EVC 175 Grassy Woodland	LC	Least Concern
SS	EVC 53 Swamp Scrub		
E	Endangered	*	Where certain site condition components are irrelevant (e.g. Large Old Trees in grassland communities)

3.3 Fauna

3.3.1 Introduction

There were 87 fauna species (11 exotic) recorded within the fauna Data Review Area (DRA). This total consisted of 68 bird species, 11 mammal species, six reptile species, and two frog species (Appendix 2).

An additional 9 fauna species (eight birds, one mammal; of these two were exotic) were recorded during field work for this project (Table 4).

Table 4: Fauna species recorded in Cranbourne East precinct during July 2007

Common name	Scientific name
White-necked Heron	*Ardea pacifica*
White-faced Heron	*Egretta novaehollandiae*
Australian White Ibis	*Threskiornis molucca*
Straw-necked Ibis	*Threskiornis spinicollis*
Yellow-billed Spoonbill	*Platalea flavipes*
Australian Wood Duck	*Chenonetta jubata*
Pacific Black Duck	*Anas superciliosa*
Brown Goshawk	*Accipiter fasciatus*
Brown Falcon	*Falco berigora*
*Spotted Turtle-Dove	*Streptopelia chinensis*
Crested Pigeon	*Ocyphaps lophotes*
Galah	*Cacatua roseicapilla*
Long-billed Corella	*Cacatua tenuirostris*
Little Corella	*Cacatua sanguinea*
Eastern Rosella	*Platycercus eximius*
Red-rumped Parrot	*Psephotus haematonotus*
Musk Lorikeet	*Glossopsitta concinna*
*Skylark	*Alauda arvensis*
Welcome Swallow	*Hirundo neoxena*
Australasian Pipit	*Anthus novaeseelandiae*
*Common Blackbird	*Turdus merula*
Willie Wagtail	*Rhipidura leucophrys*
Superb Fairy-wren	*Malurus cyaneus*
Brown Thornbill	*Acanthiza pusilla*
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Yellow Thornbill	*Acanthiza nana*
Striated Pardalote	*Pardalotus striatus*
Silvereye	*Zosterops lateralis*
White-plumed Honeyeater	*Lichenostomus penicillatus*
Noisy Miner	*Manorina melanocephala*
Red Wattlebird	*Anthochaera carunculata*
Magpie-lark	*Grallina cyanoleuca*
Grey Butcherbird	*Cracticus torquatus*
Australian Magpie	*Gymnorhina tibicen*

Common name	Scientific name
Little Raven	*Corvus mellori*
*Common Myna	*Acridotheres tristis*
*Common Starling	*Sturnus vulgaris*
*House Sparrow	*Passer domesticus*
Red-browed Finch	*Neochmia temporalis*
*European Goldfinch	*Carduelis carduelis*
*Brown Hare	*Lepus capensis*
*Rabbit	*Oryctolagus cuniculus*
*Fox	*Vulpes vulpes*
Common Eastern Froglet	*Crinia signifera*

3.3.2 Species of conservation significance

Of the 87 species in the database search, there were four fauna species (Table 5) listed under either the *EPBC Act*, the *FFG Act*, or as threatened in Victoria by DSE (2007b). In addition to these, an additional (one) species is regarded as at least moderately likely to occur in the Cranbourne East precinct, due to the presence of suitable habitat and proximity to other known occurrences.

Table 5: Conservation significant fauna recorded in, or regarded as likely to occur in, the Cranbourne East precinct

Common name	Scientific name	EPBC	FFG	DSE	LRO
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	EN		NT	L
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU	L	VU	M
Pacific Gull	*Larus pacificus*			NT	H
Swamp Skink	*Egernia coventryi*		L	VU	N
Growling Grass Frog	*Litoria raniformis*	VU	L	EN	N - L

Southern Brown Bandicoot (*Isoodon obesulus obesulus*) – National significance

The highly significant regional 'hot spot' for this nationally threatened species is the Royal Botanic Gardens – Cranbourne Annexe immediately adjacent to the south-west corner of the precinct, separated by the South Gippsland Highway. Despite this close proximity to the Cranbourne East precinct, there no recent survey or anecdotal records from the precinct (DSE 2004b; David Nichols, Chisholm Institute, pers. comm., 23 August 2007), and little suitable or connected habitat remains.

Despite an apparent lack of suitable habitat in the study area under current conditions, potential exists to create and link suitable habitat for bandicoots in habitat corridors across the landscape. Establishment of *Melaleuca* scrub along drainage lines and Heathy Woodland vegetation in linear reserves on Cranbourne Sands have potential to be used by dispersing bandicoots. If of sufficient quality and size, revegetation has the potential to provide ongoing habitat

for the species, potentially contributing to an increase in the regional population size, and by dispersing animals over a wider area, lead to a slight diminution of the extinction risk to the local population.

Grey-headed Flying-fox (*Pteropus poliocephalus)* – National significance

The Grey-headed Flying-fox ranges widely throughout the Port Phillip – Western Port region from a large colony on the Yarra River at Kew. Though much of the species' foraging occurs within parks, gardens and street trees of the metropolitan areas, individuals or small groups are known to regularly range as far away from Kew as Geelong to the west (where a large camp established temporarily after the bats were evicted from the Royal Botanic Gardens at South Yarra) (Grant Baverstock, City of Greater Geelong, unpubl. obs.), and parts of the Mornington and Bellarine Peninsulas to the south and east (DSE 2004b). The flying-fox camp at Kew is the only established one currently known from Victoria, since the colony was relocated from South Yarra. No other temporary or permanent camps of flying-foxes are known from the Cranbourne East precinct, or from the broader Port Phillip – Western Port region.

Grey-headed Flying-foxes feed primarily on nectar and fruit from Australian flowering trees (*Eucalyptus, #Corymbia, Banksia*, etc.) and exotic fruit trees (**Ficus, *Prunus*, etc.). Mature, potential, flying-fox food tree species within the Cranbourne East precinct are relatively few, and clustered. Remnant indigenous trees such as Coast Manna Gums (*E. viminalis* ssp *pryoriana*), Silver-leaved Stringybarks (*E. cephalocarpa*) and River Red Gums (*E. camaldulensis*) are also not noted nectar-producing species; though Swamp Gums (*E. ovata* s.l.) can occasionally be important in larger stands.

The Grey-headed Flying-fox may be observed passing through the area regularly as part of wider movements through the region, but there are no food or roosting resources available for anything other than itinerant visits. It is unlikely that the small groups of non-indigenous flowering trees such as Sugar Gums (**Eucalyptus cladocalyx*) and Spotted Gums (*#Corymbia maculata*) or back-yard fruit trees provide anything other than intermittent and ephemeral food resources. Most surviving indigenous trees are not suitable nectar-producing species, and do not occur in sufficient numbers to provide a useful foraging resource.

Growling Grass Frog (*Litoria raniformis*) – National significance

Though the most recent record from the area surrounding Cranbourne East precinct in the State database for this species is given as 1980 (DSE 2004b), indicating a relatively old record, there are more recent records from immediately outside the study area in the City of Casey (DSE 2004b; Aaron Organ, Ecology Partners Pty Ltd, pers. comm., 23 August 2007).

Although suitable habitat for this species exists within and immediately adjacent to the study area, the extent and connectivity of these habitats is considered too small and fragmented to support Growling Grass Frogs (Aaron Organ, pers. comm.). In agricultural landscapes intersected by linear waterways (creeks and irrigation channels) and with a network of vegetated dams separated by

distances of no more than 500m, Growling Grass Frogs can sustain metapopulation structure, with numerous small habitat nodes in an otherwise hostile matrix (Ecology Australia 2006; A. Organ, pers. comm.).

As suitable habitat conditions are absent from the Cranbourne East precinct, the likelihood that the area sustains an important population of the Growling Grass Frog is considered negligible – low.

Dwarf Galaxias (*Galaxiella pusilla*) – National significance

Dwarf Galaxias typically occur in the slow-flowing waters of the middle and lower reaches of waterways. The precinct contains the headwaters of several minor waterways, including Clyde Creek, which are ephemeral and degraded in nature, and from which there are no known records of this fish (DSE 2004b). There is no evidence of suitable habitat for this species within the precinct, or immediately adjacent areas; and the precinct is unlikely to receive flood-borne fish from other areas due to its position at the head of the streams. Consistent with the assessment for Growling Grass Frogs (see above), the likelihood of important populations of the Dwarf Galaxias occurring in the Cranbourne East precinct is considered as negligible.

Swamp Skink (*Egernia coventryi*) – State significance

The records of this species from the DRA come from the Royal Botanic Gardens Cranbourne Annexe (DSE 2004b). The vegetated swamp and stream habitats that this species requires are not present in the precinct, and therefore the likelihood that Swamp Skinks occur there is negligible.

3.3.3 Fauna habitat values

The habitats of the Cranbourne East precinct can be broadly defined as a predominantly agricultural landscape containing small, widely-separated pockets of degraded remnant vegetation. The area is highly modified and has undergone a substantial loss of habitat and biodiversity values. The rural and rural residential habitats of the precinct support a suite of abundant, generalist fauna species typical of urban fringe and rural areas.

Some of the remaining scattered old trees may develop hollows, and though these will to some extent monopolised by aggressive, exotic hollow-nesting birds such as *Common Starlings and *Common Mynas, they are also likely to used by native hollow-nesting birds such as Galahs, cockatoos, parrots and owls, as well as hollow-dependent mammals such as Common Brushtail Possums and microbats.

4 Legislative and policy implications

4.1 Federal *Environment Protection & Biodiversity Conservation Act* 1999 (EPBC)

The EPBC Act pertains to matters of national environmental significance including Ramsar Wetlands, listed threatened species and ecological communities, listed migratory species and commonwealth marine areas. It applies to public and private land and a referral is necessary whenever a proposed action is considered likely to significantly impact on any matters of national environmental significance (MNES) listed under the Act.

No plant communities listed under the EBPC Act have been confirmed as occurring in the study area.

One plant species, River Swamp Wallaby-grass, has been confirmed as occurring at one site within the precinct. This site in the Blue Hills development area has been assessed and referred under the EPBC Act, a management plan developed, and the development deemed 'not a controlled action' under the Act.

Three EPBC-listed fauna species – Southern Brown Bandicoot, Growling Grass Frog and Dwarf Galaxias – are regarded as of negligible – low likelihood of regularly occurring in the study area. The Grey-headed Flying-fox is likely to pass through the area on larger movements throughout the district, but not sustain important populations in the precinct.

The nature and extent of habitat within the precinct is not regarded as important or limiting for any EPBC-listed threatened or migratory species.

The study area falls within the upper catchments of two Ramsar wetlands: (i) Western Port, and (ii) Edithvale Seaford Wetlands. It is not considered likely that there will be any significant downstream impacts arising from future urbanisation of the precinct, due to the long distance from source to receiving waters, and the numerous storm-water treatment facilities that fall between the two extremes.

4.2 Victorian *Flora & Fauna Guarantee Act* 1988 (FFG)

The FFG Act lists species and ecological communities that are recognised to be rare or threatened in Victoria. It also identifies threatening process. The full extent of the FFG Act only applies to public land, but the intent of the Act also applies to other land tenures through action statements, Victoria's biodiversity policy, and through the planning scheme referral process.

No threatened plants listed under the FFG were detected during fieldwork, or are regarded as at least moderately likely to occur in the precinct.

Two FFG-listed fauna species – Growling Grass Frog and Dwarf Galaxias – are regarded as of negligible – low likelihood of regularly occurring in the study area. The Grey-headed Flying-fox is only likely

to pass through the area on larger movements throughout the district, but not sustain important populations in the precinct.

The nature and extent of habitat within the precinct is not regarded as important or limiting for any FFG-listed threatened species.

4.3 Victorian *Catchment & Land Protection Act* 1994 (CaLP)

The CALP Act provides a legislative framework for the management of land including the control of declared noxious weeds and pest animals.

The Act sets out the responsibilities of private and public land managers, stating that they must take all reasonable steps to:

- avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner;
- conserve soil;
- protect water resources;
- eradicate regionally prohibited weeds;
- prevent the growth and spread of regionally controlled weeds; and
- prevent the spread of, and as far as possible eradicate, established pest animals.

For details on serious environmental weeds in the City of Casey refer to Ecology Australia (2005).

4.4 Victoria's Native Vegetation Management Framework

In Victoria, where a permit is required for the removal of native vegetation, the proponent is required to offset the loss with appropriate 'gains' - as defined in Victoria's Native Vegetation Management – A Framework for Action (DNRE 2002) (hereafter referred to as the Framework). After options for avoidance and minimisation of loss have been considered, the extent of vegetation loss is calculated based on an assessment of its condition (H) and area of loss (ha): the losses are thus expressed as habitat hectares (hha). The offsets required are determined by consideration of the vegetation lost (hha) and the conservation status of the Ecological Vegetation Class (EVC).

The Net Gain approach is summarised in the Framework document as follows:

> "... *Net Gain is the outcome for native vegetation and habitat where overall gains are greater than overall losses and where individual losses are avoided where possible. The losses and gains are determined by a combined quality-quantity measure and over a specified area and period of time* ..." (DNRE 2002)

Fundamental to vegetation management is the concept that remnant indigenous vegetation is of greater ecological value and inherently more important than that achieved through revegetation.

Therefore, emphasis is given in the Framework to avoiding or minimising losses, as reflected in the three-step approach:

1. To avoid adverse impacts, particularly through vegetation clearance (*Avoidance*);
2. If impacts cannot be avoided, to minimise impacts through appropriate consideration in planning processes and expert input to project design or management (*Minimisation*); and
3. Identify appropriate offset options (*Offsets*).

Any loss of native vegetation in the Cranbourne East precinct will need to be assessed under the Net Gain framework, and offsets will ideally be met on-site or locally. The areas of native vegetation and scattered trees to be retained, lost and offset will be identified in the Native Vegetation Precinct Plan(NVPP).

Specific requirements for the protection and removal of native vegetation within the study area are not addressed in this report. A Native Vegetation Precinct Plan(NVPP) is to be developed that will account for potential losses of native vegetation (remnant patch and scattered trees) within the Cranbourne East precinct. However, habitat hectare scores have been provided (Table 3) as an indication of the extent and condition of remnant vegetation within the study area. Large-tree data for remnant patches and scattered tree data (e.g. diameter at breast-height) will be collected during additional planned field work, and documented in the final version of this technical report, as well as in the NVPP.

5 Discussion

5.1 Potential impacts and constraints to development

The vast majority of the study area contains no native vegetation. As the remaining native vegetation is overwhelmingly discrete and clustered (see Figure 3), the opportunity to retain most or all of it without constraining other opportunities is considerable. Development within the vicinity of extant remnant indigenous vegetation may negatively impact the vegetation which remains, but this can be minimised by appropriate buffering.

The most significant potential impacts to biodiversity values from development within the Cranbourne East precinct are associated with:

- potential impacts to State and Nationally listed species (low); and
- potential loss of scattered old trees in pasture and woodland vegetation on roadsides and the disused rail reserve (moderate).

Recommendations are given in section 6 to ameliorate these impacts.

5.2 Potential opportunities to enhance biodiversity values

As discussed previously, the greater proportion of this study area is situated in dryland areas in which the habitat values have been greatly reduced, principally due to land clearing and agricultural practices. Remnant vegetation along roadside corridors has therefore become valuable in terms of its value to biodiversity, and as a link (even if fragmented) to important habitat areas such as the Cranbourne Botanic Gardens.

There is an opportunity for development within the Cranbourne East precinct to take advantage of these existing native vegetation patches and linear fragments to

- protect existing habitat values;
- develop linkages that enhance habitat values and provide movement corridors for fauna (e.g. between the study area an the Cranbourne Botanic Gardens; and
- these linkages could also provide amenity value to other user groups i.e. bike paths/walking trails.

6 Recommendations

The following recommendations are made in regards to conserving and enhancing the flora and fauna values within the Cranbourne East precinct:

- retain remnant native vegetation patches and scattered trees within the study area, and where feasible incorporate into reserves;
- avoid woody native vegetation removal along roadsides, and of scattered old indigenous trees;
- ensure 'BioSite 8095 - Royal Botanic Gardens - Cranbourne Annexe' is not negatively impacted by development within the Cranbourne East UGP study area;
- undertake control of environmental weed species, particularly in and adjacent to remnant vegetation patches;
- utilise locally indigenous plant species in landscaping and revegetation exercises.
- undertake pest animal control programs;
- undertake revegetation work along drains and roadsides to provide habitat corridors for local fauna;
- any standing dead indigenous trees, with at least moderate structural integrity (subject to arboricultural safety standards), and which occur in or close to any proposed linear reserves or easements, should be prioritised for retention as fauna habitat (hollows, fissures and cracks used by hollow-dependant fauna); and
- use principles from the construction and operation of the Evan's Road wetland in Cranbourne West to guide similar developments within the Cranbourne East precinct.

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Appendix 1: Criteria for assessment of conservation significance of flora and fauna values.

Flora

In the context of the present study the following areas apply to the scale of significance for indigenous plant species and biodiversity of a site:

Local:	City of Casey
Regional:	Gippsland Plain Bioregion
State:	Victoria
National:	Australia

Significance of plant species

Species significance is generally an indication of rarity or population decline. The assessment of significance of plant species recorded during this study is assessed according to the following criteria for each geographic scale:

Local All indigenous flora is considered significant at a local level because of the massive decline in native vegetation since European settlement, and the continued incremental loss of habitat and reductions in abundance due to development and habitat degradation.

Regional In the context of the relevant Victorian bioregion, plant species are considered to be of regional significance when the species has a recording rate of less than 1%, as determined by interrogation of the Flora Information System database. However, this approach is influenced by sampling bias in particular vegetation types, so species may be included or excluded from the regional significance category where common sense and knowledge of the regional flora indicates.

State A taxon is considered significant at a State level if it is:

- listed under the Victoria *Flora and Fauna Guarantee Act* 1988; or
- considered to be rare, vulnerable, or endangered in Victoria by DSE (2005b), or Ross and Walsh (2003).

National A taxon is considered significant at a National level if it is:

- listed as Vulnerable, Endangered, Critically Endangered, or Presumed Extinct under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999; or
- considered to be rare, vulnerable, or endangered in Australia by DSE (2005b) or Ross and Walsh (2003).
- • endemic to Victoria and is considered to be rare, vulnerable, or endangered in Victoria by DSE (2005b), or Ross and Walsh (2003).

Significance of Vegetation Communities and Ecological Vegetation Classes (EVCs)

Significance of vegetation types has been determined in two ways in this report:

1. Significance of a remnant according to its condition and the status of the EVC within the Bioregion (the Net Gain approach to significance: explained further below)
2. Listing of a vegetation community as rare or threatened under the Victorian Flora and Fauna Guarantee Act 1988 or the Federal Environment Protection and Biodiversity Conservation Act 1999.

Determination of significance according to Net Gain

Victoria is implementing a new approach to the assessment of remnant vegetation through the 'habitat hectare' system (a measure of size and condition), as set out in Victoria's Native Vegetation Management – A Framework for Action (DNRE 2002b). Of particular relevance is Table 5 (Appendix 3) of that document which is largely summarised in Table A, below.

To assist in planning for biodiversity conservation, Victoria is divided into 27 'bioregions' - geographic units based on a common suite of biophysical characteristics (DNRE 2002a). The Ecological Vegetation Classes occurring within each bioregion have been assessed, based on the degree of depletion / clearing that has occurred since European settlement and the area of extant vegetation secured in a conservation reserve, to determine their conservation status. Criteria for each conservation status are given in Table B.

The condition score (h) of a particular remnant is then combined with the bioregional conservation status of the relevant EVC to determine the conservation significance of the EVC at the site.

The relationship between EVC Conservation Status, Vegetation Condition, and Conservation Significance (Low – Very High).

Conservation Status*	Condition Score (h)									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Endangered	HIGH					VERY HIGH**				
Vulnerable	MEDIUM		HIGH			VERY HIGH				
Rare	MEDIUM		HIGH				VERY HIGH			
Depleted	LOW		MEDIUM				HIGH			
Least Concern	LOW						MEDIUM			

* As determined by reference to relevant bioregional plan / EVC database

** Other attributes (such as population size of a threatened taxon) may over-ride condition score alone.

Table B. Criteria for the Bioregional Conservation Status categories of EVCs

Status		Criteria
Presumed Extinct	X	Probably no longer present in the bioregion
Endangered	E1	Contracted to less than 10% of former range;or Less than 10% of the pre-European extent remains;
	E2	Combination of depletion, degradation, current threats and rarity is comparable overall to E1: • 10 to 30% pre-European extent remains and severe degradation over a majority of this area; or • naturally restricted EVC reduced to 30% or less of former range and subject to moderate degradation and/or a threatening process over a majority of remaining area; or • rare EVC cleared and / or subject to moderate degradation and/or a threatening process over a majority of former area.
Vulnerable	V1	10 to 30% pre-European extent remains;
	V2	Combination of depletion, degradation, current threats and rarity is comparable overall to V1: • greater than 30% and up to 50% pre-European extent remains and subject to moderate degradation and/or a threatening process over a majority of this area;or • greater than 50% pre-European extent remains and severely degraded over a majority of this area;or • naturally restricted EVC where greater than 30% pre-European extent remains and subject to moderate degradation and/or a threatening process over majority of this area;or • rare EVC cleared and/or subject to moderate degradation and/or a threatening process over a minority of former area.
Depleted	D1	Greater than 30% and up to 50% pre-European extent remains;
	D2	Combination of depletion, degradation and current threats is comparable overall to D1, and: Greater than 50% pre-European extent remains moderately degraded over a majority of this area;
Rare	R	Rare EVC
Least Concern	LC	Greater than 50% pre-European extent remains and subject to little to no degradation over a majority of this area

Fauna

In the context of the present study the following areas apply to the scale of significance for indigenous fauna species:

Local:	City of Casey
Regional:	Gippsland Plain Bioregion
State:	Victoria
National:	Australia

Significance of fauna species

The criteria for assessing zoological significance of taxa (fauna species, subspecies, other recognised forms) in this study is determined according to the following criteria for each geographic scale:

Local

All indigenous fauna is considered significant at a Local level, because of the overall decline in the fauna since European settlement, and the continued incremental loss of habitat and reduction in abundance due to development. The exceptions to this are locally over-abundant native species which can pose a threat to local biodiversity values (e.g. Noisy Miner, Rainbow Lorikeet).

Regional

A taxon is considered significant at a Regional level if:

- it has a disjunct distribution in the bioregion; or
- it is represented in high concentrations in terms of colonial nesting, roosting or feeding sites; or
- it is substantially depleted or restricted in the bioregion; or
- it has an unusual ecological or biogeographical occurrence,

State

A taxon is considered significant at a State level if it is:

- listed under Schedule 2 of the Victorian *Flora and Fauna Guarantee Act* 1988; or
- listed under the Advisory List of Threatened Vertebrate Fauna in Victoria – 2007 (DSE 2007a); or
- Listed as Data Deficient or Insufficiently Known under the following Australian Action Plans: Bannister et al. (1996), Cogger et al. (1993), Duncan et al. (1999), Garnett and Crowley (2000), Lee (1995), Maxwell et al. (1996), Pogonoski et al. (2002), Tyler (1997), Wager and Jackson (1993), or Sands and New (2003).

National

A taxon is considered significant at a National level if it is:

- listed as Critically Endangered, Endangered, Vulnerable, Conservation Dependant or Presumed Extinct on the

Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999; or

- listed as Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Rare, Near Threatened) or Conservation Dependent under the following Australian Action Plans: Bannister et al. (1996), Cogger et al. (1993), Duncan et al. (1999), Garnett and Crowley (2000), Lee (1995), Maxwell et al. (1996), Pogonoski et al. (2002), Tyler (1997), Wager and Jackson (1993), or Sands and New (2003).

Zoological site significance

We use as the basis for zoological site and faunal habitat significance the 'Standard criteria for sites of biological significance in Victoria' (DSE 2004d).

Appendix 2: Fauna recorded from the 5km radius Data Review Area (source: Atlas of Victorian Wildlife, DSE 2004b)

FAMILY	EPBC	FFG/DSE	FERAL	COMMON NAME	SCIENTIFIC NAME
Bovidae					
			*	Goat (feral)	*Capra hircus*
Canidae					
			*	Red Fox	*Vulpes vulpes*
Leporidae					
			*	European Rabbit	*Oryctolagus cuniculus*
Muridae					
			*	Black Rat	*Rattus rattus*
			*	House Mouse	*Mus musculus*
				Swamp Rat	*Rattus lutreolus*
				Water Rat	*Hydromys chrysogaster*
Peramelidae					
	E	*n*		Southern Brown Bandicoot	*Isoodon obesulus obesulus*
Phalangeridae					
				Common Brushtail Possum	*Trichosurus vulpecula*
Phascolarctidae					
				Koala	*Phascolarctos cinereus*
Pseudocheiridae					
				Common Ringtail Possum	*Pseudocheirus peregrinus*
Accipitridae					
				Wedge-tailed Eagle	*Aquila audax*
Anatidae					
				Australian Wood Duck	*Chenonetta jubata*
				Chestnut Teal	*Anas castanea*
				Grey Teal	*Anas gracilis*
				Pacific Black Duck	*Anas superciliosa*
Ardeidae					
				Cattle Egret	*Ardea ibis*
				White-faced Heron	*Egretta novaehollandiae*
Artamidae					
				Australian Magpie	*Gymnorhina tibicen*
				Dusky Woodswallow	*Artamus cyanopterus*
				Grey Butcherbird	*Cracticus torquatus*
Cacatuidae					
				Galah	*Cacatua roseicapilla*
				Long-billed Corella	*Cacatua tenuirostris*
Campephagidae					
				Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
Charadriidae					

FAMILY	EPBC	FFG/DSE	FERAL	COMMON NAME	SCIENTIFIC NAME
				Black-fronted Dotterel	*Elseyornis melanops*
				Masked Lapwing	*Vanellus miles*
Columbidae					
				Common Bronzewing	*Phaps chalcoptera*
			*	Spotted Turtle-Dove	*Streptopelia chinensis*
Corvidae					
				Australian Raven	*Corvus coronoides*
				Little Raven	*Corvus mellori*
Cuculidae					
				Fan-tailed Cuckoo	*Cacomantis flabelliformis*
				Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*
				Pallid Cuckoo	*Cuculus pallidus*
Dicaeidae					
				Mistletoebird	*Dicaeum hirundinaceum*
Dicruridae					
				Grey Fantail	*Rhipidura fuliginosa*
				Magpie-lark	*Grallina cyanoleuca*
				Willie Wagtail	*Rhipidura leucophrys*
Falconidae					
				Brown Falcon	*Falco berigora*
Fringillidae					
			*	European Goldfinch	*Carduelis carduelis*
Halcyonidae					
				Laughing Kookaburra	*Dacelo novaeguineae*
Hirundinidae					
				Welcome Swallow	*Hirundo neoxena*
Laridae					
		n		Pacific Gull	*Larus pacificus*
				Silver Gull	*Larus novaehollandiae*
Maluridae					
				Superb Fairy-wren	*Malurus cyaneus*
Meliphagidae					
				New Holland Honeyeater	*Phylidonyris novaehollandiae*
				Noisy Miner	*Manorina melanocephala*
				Red Wattlebird	*Anthochaera carunculata*
				Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*
				White-eared Honeyeater	*Lichenostomus leucotis*
				White-naped Honeyeater	*Melithreptus lunatus*
				White-plumed Honeyeater	*Lichenostomus penicillatus*
Motacillidae					
				Richard's Pipit	*Anthus novaeseelandiae*
Muscicapidae					
			*	Common Blackbird	*Turdus merula*
Pachycephalidae					

FAMILY	EPBC	FFG/DSE	FERAL	COMMON NAME	SCIENTIFIC NAME
				Crested Shrike-tit	*Falcunculus frontatus*
				Golden Whistler	*Pachycephala pectoralis*
				Grey Shrike-thrush	*Colluricincla harmonica*
Pardalotidae					
				Brown Thornbill	*Acanthiza pusilla*
				Spotted Pardalote	*Pardalotus punctatus*
				Striated Pardalote	*Pardalotus striatus*
				Striated Thornbill	*Acanthiza lineata*
				White-browed Scrubwren	*Sericornis frontalis*
				Yellow Thornbill	*Acanthiza nana*
Passeridae					
			*	House Sparrow	*Passer domesticus*
				Red-browed Finch	*Neochmia temporalis*
Petroicidae					
				Eastern Yellow Robin	*Eopsaltria australis*
				Flame Robin	*Petroica phoenicea*
				Scarlet Robin	*Petroica multicolor*
Phalacrocoracidae					
				Little Black Cormorant	*Phalacrocorax sulcirostris*
Psittacidae					
				Eastern Rosella	*Platycercus eximius*
				Rainbow Lorikeet	*Trichoglossus haematodus*
				Red-rumped Parrot	*Psephotus haematonotus*
Rallidae					
				Dusky Moorhen	*Gallinula tenebrosa*
				Eurasian Coot	*Fulica atra*
				Purple Swamphen	*Porphyrio porphyrio*
Sturnidae					
			*	Common Myna	*Acridotheres tristis*
			*	Common Starling	*Sturnus vulgaris*
Threskiornithidae					
				Australian White Ibis	*Threskiornis molucca*
				Straw-necked Ibis	*Threskiornis spinicollis*
Zosteropidae					
				Silvereye	*Zosterops lateralis*
Elapidae					
				Lowland Copperhead	*Austrelaps superbus*
				Tiger Snake	*Notechis scutatus*
Scincidae					
				Delicate Skink	*Lampropholis delicata*
				Garden Skink	*Lampropholis guichenoti*
		f v		Swamp Skink	*Egernia coventryi*
				Weasel Skink	*Saproscincus mustelinus*
Hylidae					
				Whistling Tree	*Litoria verreauxii verreauxii*

FAMILY	EPBC	FFG/DSE	FERAL	COMMON NAME	SCIENTIFIC NAME
				Frog	
Myobatrachidae					
				Common Froglet	*Crinia signifera*

Data From: Flora Information System, Biodiversity and Natural Resources, DSE - May 2005 - © Viridans Biological Databases

Appendix 3: Flora recorded from the 5km radius Data Review Area (source: Flora Information System, DSE 2004a)

FAMILY	EPBC	DSE/FFG	Exotic	Scientific name	Common name
Azollaceae					
				Azolla filiculoides	Pacific Azolla
Blechnaceae					
				Blechnum cartilagineum	Gristle Fern
				Blechnum nudum	Fishbone Water-fern
Culcitaceae					
				Calochlaena dubia	Common Ground-fern
Cyatheaceae					
				Cyathea australis	Rough Tree-fern
Dennstaedtiaceae					
				Pteridium esculentum	Austral Bracken
Gleicheniaceae					
				Gleichenia microphylla	Scrambling Coral-fern
Lindsaeaceae					
				Lindsaea linearis	Screw Fern
Selaginellaceae					
				Selaginella uliginosa	Swamp Selaginella
Cupressaceae					
			*	*Cupressus macrocarpa*	Monterey Cypress
Pinaceae					
			*	*Pinus radiata*	Radiata Pine
Alismataceae					
				Alisma plantago-aquatica	Water Plantain
Alliaceae					
			*	*Agapanthus praecox subsp. orientalis*	Agapanthus
			*	*Allium triquetrum*	Three-corner Garlic
Asparagaceae					
			*	*Asparagus asparagoides*	Bridal Creeper
Cyperaceae					
				Baumea acuta	Pale Twig-sedge
				Baumea tetragona	Square Twig-sedge
				Carex appressa	Tall Sedge
				Carex breviculmis	Common Grass-sedge
				Carex gaudichaudiana	Fen Sedge
			*	*Cyperus eragrostis*	Drain Flat-sedge
			*	*Cyperus tenellus*	Tiny Flat-sedge
				Eleocharis acuta	Common Spike-sedge
				Eleocharis sphacelata	Tall Spike-sedge
				Gahnia radula	Thatch Saw-sedge
				Gahnia sieberiana	Red-fruit Saw-sedge
				Isolepis fluitans	Floating Club-sedge

FAMILY	EPBC	DSE/FFG	Exotic	Scientific name	Common name
				Isolepis inundata	Swamp Club-sedge
				Lepidosperma concavum	Sandhill Sword-sedge
				Lepidosperma curtisiae	Little Sword-sedge
				Lepidosperma laterale	Variable Sword-sedge
				Lepidosperma laterale var. majus	Variable Sword-sedge
				Lepidosperma longitudinale	Pithy Sword-sedge
				Schoenus apogon	Common Bog-sedge
				Schoenus brevifolius	Zig-zag Bog-sedge
				Schoenus lepidosperma	Slender Bog-sedge
				Schoenus tesquorum	Soft Bog-sedge
				Tetraria capillaris	Hair Sedge
Iridaceae					
				Patersonia fragilis	Short Purple-flag
				Patersonia occidentalis	Long Purple-flag
			*	*Romulea rosea*	Onion Grass
Juncaceae					
				Juncus amabilis	Hollow Rush
			*	*Juncus articulatus*	Jointed Rush
				Juncus australis	Austral Rush
				Juncus bufonius	Toad Rush
			*	*Juncus bulbosus*	Bulbous Rush
				Juncus pallidus	Pale Rush
				Juncus planifolius	Broad-leaf Rush
				Juncus procerus	Tall Rush
				Juncus subsecundus	Finger Rush
Juncaginaceae					
				Triglochin striata	Streaked Arrowgrass
Lemnaceae					
				Lemna disperma	Common Duckweed
Orchidaceae					
				Microtis unifolia	Common Onion-orchid
		v		*Thelymitra circumsepta*	Naked Sun-orchid
				Thelymitra sp. aff. holmesii (Terminal hair tufts)	Trim Sun-orchid
				Thelymitra sp. aff. pauciflora (Peppertop)	Peppertop Sun-orchid
Phormiaceae					
				Tricoryne elatior	Yellow Rush-lily
Poaceae					
			*	*Agrostis capillaris*	Brown-top Bent
			*	*Alopecurus geniculatus*	Marsh Fox-tail
				Amphibromus archeri	Pointed Swamp Wallaby-grass
	V			*Amphibromus fluitans*	River Swamp Wallaby-grass
				Amphibromus nervosus	Common Swamp Wallaby-grass
			*	*Anthoxanthum odoratum*	Sweet Vernal-grass
				Austrodanthonia fulva	Copper-awned Wallaby-grass
				Austrodanthonia laevis	Smooth Wallaby-grass
				Austrodanthonia racemosa	Stiped Wallaby-

FAMILY	EPBC	DSE/FFG	Exotic	Scientific name	Common name
				var. racemosa	grass
				Austrofestuca hookeriana	Hooker Fescue
				Austrostipa rudis	Veined Spear-grass
			*	*Avena sativa*	Oat
			*	*Avena sterilis*	Sterile Oat
			*	*Briza maxima*	Large Quaking-grass
			*	*Briza minor*	Lesser Quaking-grass
			*	*Bromus catharticus*	Prairie Grass
			*	*Bromus diandrus*	Great Brome
			*	*Cortaderia selloana*	Pampas Grass
				Cynodon dactylon	Couch
			*	*Cynodon dactylon var. dactylon*	Couch
			*	*Cynosurus echinatus*	Rough Dog's-tail
			*	*Dactylis glomerata*	Cocksfoot
			*	*Ehrharta erecta var. erecta*	Panic Veldt-grass
			*	*Ehrharta longiflora*	Annual Veldt-grass
			*	*Festuca arundinacea*	Tall Fescue
				Glyceria australis	Australian Sweet-grass
				Hemarthria uncinata var. uncinata	Mat Grass
			*	*Holcus lanatus*	Yorkshire Fog
			*	*Hordeum leporinum*	Barley-grass
				Imperata cylindrica	Blady Grass
				Lachnagrostis aemula	Leafy Blown-grass
				Lachnagrostis filiformis	Common Blown-grass
			*	*Lolium perenne*	Perennial Rye-grass
			*	*Lolium rigidum*	Wimmera Rye-grass
				Microlaena stipoides var. stipoides	Weeping Grass
				Notodanthonia semiannularis	Wetland Wallaby-grass
			*	*Paspalum dilatatum*	Paspalum
			*	*Paspalum distichum*	Water Couch
			*	*Pennisetum clandestinum*	Kikuyu
			*	*Phalaris aquatica*	Toowoomba Canary-grass
			*	*Phalaris minor*	Lesser Canary-grass
				Phragmites australis	Common Reed
			*	*Poa annua*	Annual Meadow-grass
				Poa labillardierei	Common Tussock-grass
				Poa morrisii	Soft Tussock-grass
				Poa tenera	Slender Tussock-grass
			*	*Polypogon monspeliensis*	Annual Beard-grass
			*	*Sporobolus africanus*	Rat-tail Grass
			*	*Stenotaphrum secundatum*	Buffalo Grass
				Tetrarrhena juncea	Forest Wire-grass
				Themeda triandra	Kangaroo Grass

FAMILY	EPBC	DSE/FFG	Exotic	Scientific name	Common name
			*	*Triticum aestivum*	Wheat
Restionaceae					
				Empodisma minus	Spreading Rope-rush
				Hypolaena fastigiata	Tassel Rope-rush
				Lepyrodia muelleri	Common Scale-rush
Typhaceae					
				Typha domingensis	Narrow-leaf Cumbungi
				Typha orientalis	Broad-leaf Cumbungi
Xanthorrhoeaceae					
				Lomandra filiformis	Wattle Mat-rush
				Lomandra longifolia	Spiny-headed Mat-rush
				Lomandra longifolia subsp. longifolia	Spiny-headed Mat-rush
				Xanthorrhoea minor subsp. lutea	Small Grass-tree
Amaranthaceae					
			*	*Alternanthera pungens*	Khaki Weed
			*	*Amaranthus powellii*	Powell's Amaranth
Apiaceae					
				Centella cordifolia	Centella
			*	*Daucus carota*	Carrot
				Eryngium vesiculosum	Prickfoot
			*	*Foeniculum vulgare*	Fennel
				Hydrocotyle hirta	Hairy Pennywort
				Platysace heterophylla var. heterophylla	Slender Platysace
				Trachymene composita var. composita	Parsnip Trachymene
Asteraceae					
			*	*Arctotheca calendula*	Cape Weed
			*	*Aster subulatus*	Aster-weed
				Cassinia aculeata	Common Cassinia
				Cassinia arcuata	Drooping Cassinia
				Centipeda cunninghamii	Common Sneezeweed
			*	*Chrysanthemoides monilifera*	Boneseed
			*	*Cirsium vulgare*	Spear Thistle
			*	*Conyza sumatrensis*	Tall Fleabane
			*	*Cotula coronopifolia*	Water Buttons
			*	*Delairea odorata*	Cape Ivy
				Euchiton collinus	Creeping Cudweed
			*	*Gamochaeta purpurea*	Spiked Cudweed
			*	*Helminthotheca echioides*	Ox-tongue
			*	*Hypochoeris radicata*	Cat's Ear
			*	*Leontodon taraxacoides subsp. taraxacoides*	Hairy Hawkbit
				Olearia lirata	Snowy Daisy-bush
				Ozothamnus ferrugineus	Tree Everlasting
				Pseudognaphalium luteoalbum	Jersey Cudweed
				Senecio biserratus	Jagged Fireweed
				Senecio glomeratus	Annual Fireweed

FAMILY	EPBC	DSE/FFG	Exotic	Scientific name	Common name
				Senecio quadridentatus	Cotton Fireweed
			*	*Senecio vulgaris*	Common Groundsel
			*	*Silybum marianum*	Variegated Thistle
			*	*Sonchus asper*	Rough Sow-thistle
			*	*Sonchus oleraceus*	Common Sow-thistle
			*	*Taraxacum officinale spp. agg.*	Garden Dandelion
			*	*Tragopogon porrifolius*	Salsify
			*	*Vellereophyton dealbatum*	White Cudweed
			*	*Xanthium spinosum*	Bathurst Burr
Brassicaceae					
			*	*Capsella bursa-pastoris*	Shepherd's Purse
			*	*Lepidium africanum*	Common Peppercress
			*	*Nasturtium officinale*	Watercress
Callitrichaceae					
			*	*Callitriche stagnalis*	Common Starwort
Campanulaceae					
				Lobelia anceps	Angled Lobelia
				Lobelia pratioides	Poison Lobelia
Caryophyllaceae					
			*	*Cerastium glomeratum*	Common Mouse-ear Chickweed
			*	*Silene gallica var. gallica*	French Catchfly
			*	*Stellaria media*	Chickweed
Casuarinaceae					
				Allocasuarina littoralis	Black Sheoak
Chenopodiaceae					
			*	*Atriplex prostrata*	Hastate Orache
			*	*Chenopodium album*	Fat Hen
			*	*Chenopodium murale*	Sowbane
Clusiaceae					
				Hypericum gramineum	Small St John's Wort
				Hypericum japonicum	Matted St John's Wort
Convolvulaceae					
				Dichondra repens	Kidney-weed
Dilleniaceae					
				Hibbertia acicularis	Prickly Guinea-flower
Droseraceae					
				Drosera whittakeri subsp. aberrans	Scented Sundew
Epacridaceae					
				Epacris impressa	Common Heath
				Leucopogon ericoides	Pink Beard-heath
				Leucopogon virgatus	Common Beard-heath
				Monotoca scoparia	Prickly Broom-heath
Ericaceae					
			*	*Erica arborea*	Tree Heath
			*	*Erica baccans*	Berry-flower Heath
Euphorbiaceae					
				Amperea xiphoclada var. xiphoclada	Broom Spurge
			*	*Euphorbia peplus*	Petty Spurge

FAMILY	EPBC	DSE/FFG	Exotic	Scientific name	Common name
				Ricinocarpos pinifolius	Wedding Bush
Fabaceae					
				Aotus ericoides	Common Aotus
				Bossiaea cinerea	Showy Bossiaea
			*	*Chamaecytisus palmensis*	Tree Lucerne
			*	*Genista linifolia*	Flax-leaf Broom
			*	*Genista monspessulana*	Montpellier Broom
				Kennedia prostrata	Running Postman
			*	*Lotus subbiflorus*	Hairy Bird's-foot Trefoil
			*	*Medicago arabica*	Spotted Medic
			*	*Medicago polymorpha*	Burr Medic
			*	*Psoralea pinnata*	Blue Psoralea
				Pultenaea stricta	Rigid Bush-pea
			*	*Trifolium campestre var. campestre*	Hop Clover
			*	*Trifolium fragiferum var. fragiferum*	Strawberry Clover
			*	*Trifolium repens var. repens*	White Clover
			*	*Trifolium subterraneum*	Subterranean Clover
			*	*Ulex europaeus*	Gorse
			*	*Vicia sativa*	Common Vetch
			*	*Vicia tetrasperma*	Slender Vetch
				Viminaria juncea	Golden Spray
Fumariaceae					
			*	*Fumaria muralis subsp. muralis*	Wall Fumitory
Gentianaceae					
			*	*Centaurium erythraea*	Common Centaury
Geraniaceae					
			*	*Erodium moschatum*	Musky Heron's-bill
			*	*Geranium dissectum*	Cut-leaf Cranesbill
			*	*Geranium molle var. molle*	Dovesfoot
Goodeniaceae					
				Goodenia humilis	Swamp Goodenia
				Goodenia ovata	Hop Goodenia
Haloragaceae					
				Gonocarpus micranthus subsp. micranthus	Creeping Raspwort
				Gonocarpus tetragynus	Common Raspwort
				Myriophyllum crispatum	Upright Water-milfoil
				Myriophyllum pedunculatum	Mat Water-milfoil
				Myriophyllum simulans	Amphibious Water-milfoil
Lamiaceae					
			*	*Prunella vulgaris*	Self-heal
Lauraceae					
				Cassytha glabella	Slender Dodder-laurel
Loranthaceae					
				Amyema pendula	Drooping Mistletoe
Lythraceae					
				Lythrum hyssopifolia	Small Loosestrife
Malvaceae					
			*	*Malva parviflora*	Small-flower Mallow
			*	*Modiola caroliniana*	Red-flower Mallow

FAMILY	EPBC	DSE/FFG	Exotic	Scientific name	Common name
Menyanthaceae					
				Villarsia exaltata	Erect Marsh-flower
				Villarsia reniformis	Running Marsh-flower
Mimosaceae					
			#	*Acacia longifolia subsp. longifolia*	Sallow Wattle
			#	*Acacia longifolia subsp. sophorae*	Coast Wattle
				Acacia mearnsii	Black Wattle
				Acacia melanoxylon	Blackwood
				Acacia oxycedrus	Spike Wattle
				Acacia paradoxa	Hedge Wattle
				Acacia pycnantha	Golden Wattle
				Acacia verticillata	Prickly Moses
Myrtaceae					
			#	*Eucalyptus botryoides*	Southern Mahogany
				Eucalyptus camaldulensis	River Red-gum
				Eucalyptus cephalocarpa	Mealy Stringybark
				Eucalyptus obliqua	Messmate Stringybark
				Eucalyptus ovata	Swamp Gum
				Eucalyptus radiata subsp. radiata	Narrow-leaf Peppermint
				Eucalyptus viminalis	Manna Gum
				Eucalyptus viminalis subsp. pryoriana	Coast Manna-gum
				Leptospermum continentale	Prickly Tea-tree
				Leptospermum myrsinoides	Heath Tea-tree
				Melaleuca ericifolia	Swamp Paperbark
				Melaleuca squarrosa	Scented Paperbark
Onagraceae					
				Epilobium billardierianum	Variable Willow-herb
				Epilobium hirtigerum	Hairy Willow-herb
Oxalidaceae					
			*	*Oxalis corniculata*	Creeping Wood-sorrel
				Oxalis exilis	Shady Wood-sorrel
				Oxalis perennans	Grassland Wood-sorrel
			*	*Oxalis pes-caprae*	Soursob
			*	*Oxalis purpurea*	Large-flower Wood-sorrel
Phytolaccaceae					
			*	*Phytolacca octandra*	Red-ink Weed
Pittosporaceae					
				Billardiera scandens	Common Apple-berry
			#	*Pittosporum undulatum*	Sweet Pittosporum
Plantaginaceae					
			*	*Plantago coronopus*	Buck's-horn Plantain
			*	*Plantago lanceolata*	Ribwort
			*	*Plantago major*	Greater Plantain
Polygalaceae					
				Comesperma calymega	Blue-spike Milkwort
Polygonaceae					
			*	*Acetosella vulgaris*	Sheep Sorrel

FAMILY	EPBC	DSE/FFG	Exotic	Scientific name	Common name
				Persicaria decipiens	Slender Knotweed
			*	*Rumex conglomeratus*	Clustered Dock
			*	*Rumex crispus*	Curled Dock
Portulacaceae					
				Neopaxia australasica	White Purslane
				Portulaca oleracea	Common Purslane
Primulaceae					
			*	*Anagallis arvensis*	Pimpernel
Proteaceae					
				Banksia marginata	Silver Banksia
Ranunculaceae					
				Clematis aristata	Mountain Clematis
				Ranunculus amphitrichus	Small River Buttercup
			*	*Ranunculus muricatus*	Sharp Buttercup
			*	*Ranunculus repens*	Creeping Buttercup
Rhamnaceae					
				Spyridium parvifolium	Dusty Miller
Rosaceae					
				Acaena echinata	Sheep's Burr
				Acaena novae-zelandiae	Bidgee-widgee
			*	*Cotoneaster pannosus*	Velvet Cotoneaster
			*	*Crataegus monogyna*	Hawthorn
			*	*Prunus cerasifera*	Cherry Plum
			*	*Rosa rubiginosa*	Sweet Briar
			*	*Rubus anglocandicans*	Blackberry
			*	*Rubus fruticosus spp. agg.*	Blackberry
				Rubus parvifolius	Small-leaf Bramble
			*	*Rubus ulmifolius*	Blackberry
Rubiaceae					
				Coprosma quadrifida	Prickly Currant-bush
			*	*Coprosma repens*	Mirror Bush
			*	*Galium aparine*	Cleavers
Rutaceae					
				Boronia parviflora	Swamp Boronia
Santalaceae					
				Exocarpos cupressiformis	Cherry Ballart
Scrophulariaceae					
				Gratiola pubescens	Glandular Brooklime
			*	*Veronica arvensis*	Wall Speedwell
Solanaceae					
			*	*Lycium ferocissimum*	African Box-thorn
				Solanum aviculare	Kangaroo Apple
				Solanum laciniatum	Large Kangaroo Apple
			*	*Solanum nigrum*	Black Nightshade
				Solanum prinophyllum	Forest Nightshade
Urticaceae					
			*	*Urtica urens*	Small Nettle
Violaceae					
				Viola hederacea	Ivy-leaf Violet

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