Armstrong Creek Developments PTY LTD

Armstrong Creek West Precinct

Detailed Flora and Fauna Assessment

June 2011
Prepared by CPG Australia

CPG Australia Pty Ltd
A subsidiary of Downer EDI Limited

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Executive Summary

The purpose of this report is to provide a flora and fauna assessment for land known as the Western Precinct within the Armstrong Creek Growth Area.

The assessment results forming this precinct plan has determined that the majority of the Precinct is highly modified cleared agricultural land with fragmented remnant flora and fauna habitats in association with Armstrong Creek, several roadsides and isolated areas of modified native grasslands some of which are regarded habitat zones and others are Degraded Treeless Vegetation (DTV) or Modified treeless vegetation (MTV). In total, 46.4 hectares of patch quality remnant vegetation is located within fifty-one (51) Habitat Zones within the Armstrong Creek West Precinct. Seven of these totalling 3.22 hectares (1.38 Habitat Hectares) are very high conservation significance representatives of the Endangered EVC 175 Grassy Woodland. The remaining patch quality Grassy Woodland amount to 38.59 hectares (9.68 Habitat Hectares) of high conservation significance. Another EVC, Riparian Woodland (EVC 641) covers 0.74 hectares (0.2 Habitat Hectares) of high conservation significance vegetation was also identified on the site. In addition, several native grasslands were identified during subsequent assessments in February-April 2011, of those deemed to be of 'patch quality' and fitted the description of EVC 132: Plains Grassland of the Victorian Volcanic Plain bioregion. In total, 3.38 hectares (0.63 Habitat Hectares) of High conservation significance of the endangered EVC 132 Plains Grassland were also recorded within the Armstrong Creek West Precinct. Within the Habitat Zones, there is currently expected to be removal of 59 LOT's and VLOT's requiring protection of 142 VLOT and LOT trees and recruitment of 600 trees, this is to be determined through the NVPP process. Where possible, manipulation of the design should seek to retain trees of this size.

Other areas (approximately 7.65 hectares) containing heavily modified/improved pasture grasses with Wallaby Grass *Austrodanthonia* spp. or Kangaroo Grass *Themeda triandra* of grassy woodland as the dominant native component were regarded as Degraded Treeless Vegetation (DTV) and Modified Treeless Vegetation (MTV) respectively and have been recorded and mapped for future discussion. The DTV, dominated by Wallaby grasses acting largely as a monoculture has a coverage of 6.81 hectares, whilst the MTV consisting mainly of Kangaroo Grass in small areas or where heavily grazed or mown has coverage of 0.84 hectares.

Scattered Trees are dominated by River Red Gums and Drooping Sheoaks across the site. In total, there are 26 VLOT's, 36 LOT's, 24 MOT's and 229 Small trees across the site that are not forming part of a Habitat Zone. Of this number, many LOT's and VLOT's are dead old trees, some of which form hollows and are habitat trees. The exact number of scattered trees to be removed is to be determined through the NVPP process. It is estimated that of 62 scattered trees (26 Very Large old trees and 36 large old trees) across the site, 52 will be removed in the current plans. Of the 24 Medium Old Trees (MOTs) on the site, currently 18 will be effectively removed in the current plans. The remaining trees consist of 229 small trees and areas mapped as regrowth and not requiring offsetting. It is estimated that approximately 25% of the small trees will be removed.

No threatened species of flora or fauna were recorded during this assessment, largely a result of the modified environment.

Whilst the report explains the findings of the assessment in detail it is relevant to note from the outset that there are few constraints to development from an ecological perspective as the majority of the precinct is cleared agricultural land. Where values are present on the land they tend to have a well defined extent and a close association with the Armstrong Creek which is the most significant and obvious landscape element. In this regard the Armstrong Creek, and possibly some existing roadside vegetation, offer the opportunity to establish a central linear open space system which incorporates selected areas for biodiversity conservation. The exception is native grasslands and isolated patches of native vegetation which have been mapped appropriately and where suitable, may be encumbered within future development plans.

As development proceeds, it is envisaged that the creek will provide the focus for development of a linked, linear open space network with enhanced habitat values that could be achieved as a consequence of complementary revegetation and the establishment of wetland systems for the management of storm water to control and improve water quality before it enters the Armstrong Creek. Re-establishment of the linear riparian vegetation has the potential to enhance biodiversity values by linking remnant patches of vegetation located in the vicinity of the watercourse. The relative importance of the creek corridor as the focus for enhancement of the existing ecological values is heightened by the absence of large patches of remnant vegetation.

The principle finding of this assessment is that the majority of the existing ecological values associated with Armstrong Creek within the precinct have the capacity to be avoided and managed through the planned transition from rural to urban land and that through this process Armstrong Creek and its associated tributaries should be the focus for enhancement of the existing values in the form of a high quality linear open space system. Offsets from any approved vegetation removal could be readily directed toward the creek corridor or the other remnant patches that have the capacity to be enhanced.

Contents

1. Introduction

CPG Australia was commissioned by MESH - Villawood to conduct a preliminary ecological assessment of the Armstrong Creek West Precinct Area (Figure 1 & 2) associated within the Armstrong Creek Urban Growth Corridor Framework Plan principally to inform future precinct structure plans.

The Armstrong Creek Urban Growth Area is the largest contiguous growth area in Victoria, consisting of 2,500 hectares of developable land, and is one of the largest growth fronts in the country. The Armstrong Creek Urban Growth Area (ACUGA) is located 10 kilometres south of the centre of the city of Geelong. The Victorian State Government recognises the importance of the growth area in accommodating the unforeseen levels of population growth in Victoria at the moment. Armstrong Creek is seen as Victoria's sixth biggest growth area alongside the Growth Areas Authority Councils: Wyndham, Hume, Casey-Cardinia, Melton and Whittlesea. The Geelong region is regional Victoria's fastest growing area (COGG 2010).

The Armstrong Creek growth area will provide housing for between 55,000 to 65,000 people and 22,000 jobs, with a focus on high technology jobs and developing synergies with Deakin University (COGG 2010).

1.1 Project Background

The purpose of this report is to identify the biodiversity values within the Armstrong Creek West Precinct (Figure 2) and to inform the planning process. This report is prepared so as to be consistent with the Biodiversity Precinct Structure Planning Kit: (DSE 2010).

1.2 Objectives

The broad objectives of the report:

- To identify, assess and map significant flora, fauna and habitat in the west Precinct area and their level of conservation significance.
- To advise of significant environmental values to be considered in the development plan of the West Precinct.
- To identify how development of the Precinct is able to meet Government legislative and policy requirements for the conservation of indigenous fauna and flora species and communities.
- To identify potential enhancements to existing biodiversity values that may be achieved as part of the west precinct development.

1.3 Study Site

The Armstrong Creek West Precinct is one of three large residential Precincts in the Armstrong Creek Urban Growth Area (Figure 2). The study area is approximately 590 ha in area, located south of the Warrnambool - Melbourne Railway and bound on the east by the Surf Coast Highway. It is bound on the south side by Feehans Rd, Whites Rd and Armstrong Creek, and in the west by Ghazeepore Rd and Airport Rd. Armstrong Creek flows from west to east acting as a boundary for the Precinct, west of Airport Rd,

and flowing through the centre of the eastern half of the Precinct. Armstrong Creek is the focal landscape feature of this Precinct and the entire Growth Area

The Precinct is principally cleared agricultural land and the majority of the vegetation is highly modified from its pre-European settlement condition. The topography is flat to gently undulating. Armstrong Creek flows through the site and is the key landscape and hydrological feature. The majority of the native vegetation consists of scattered trees and remnant patches along Armstrong Creek and on roadsides.

Retaining and enhancing the riparian vegetation and creating large nodes of vegetated open space will optimise the biodiversity conservation for the Precinct and is consistent with the ACUGA Framework Plan (COGG 2010) (See Figure 2).

Figure 1: Site Locality

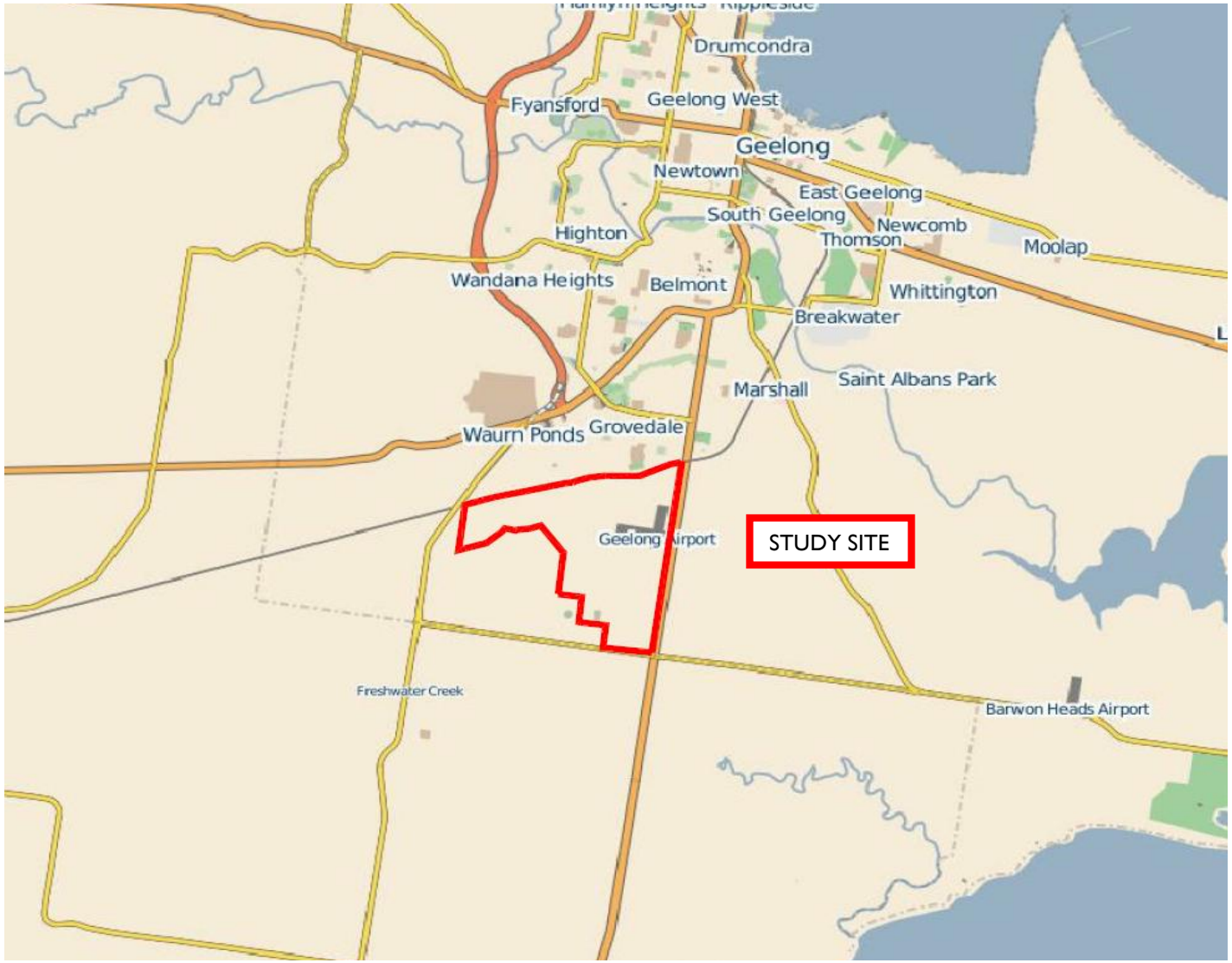


Figure 2: Armstrong Creek Urban Growth Plan Precincts Map (COGG 2010a)

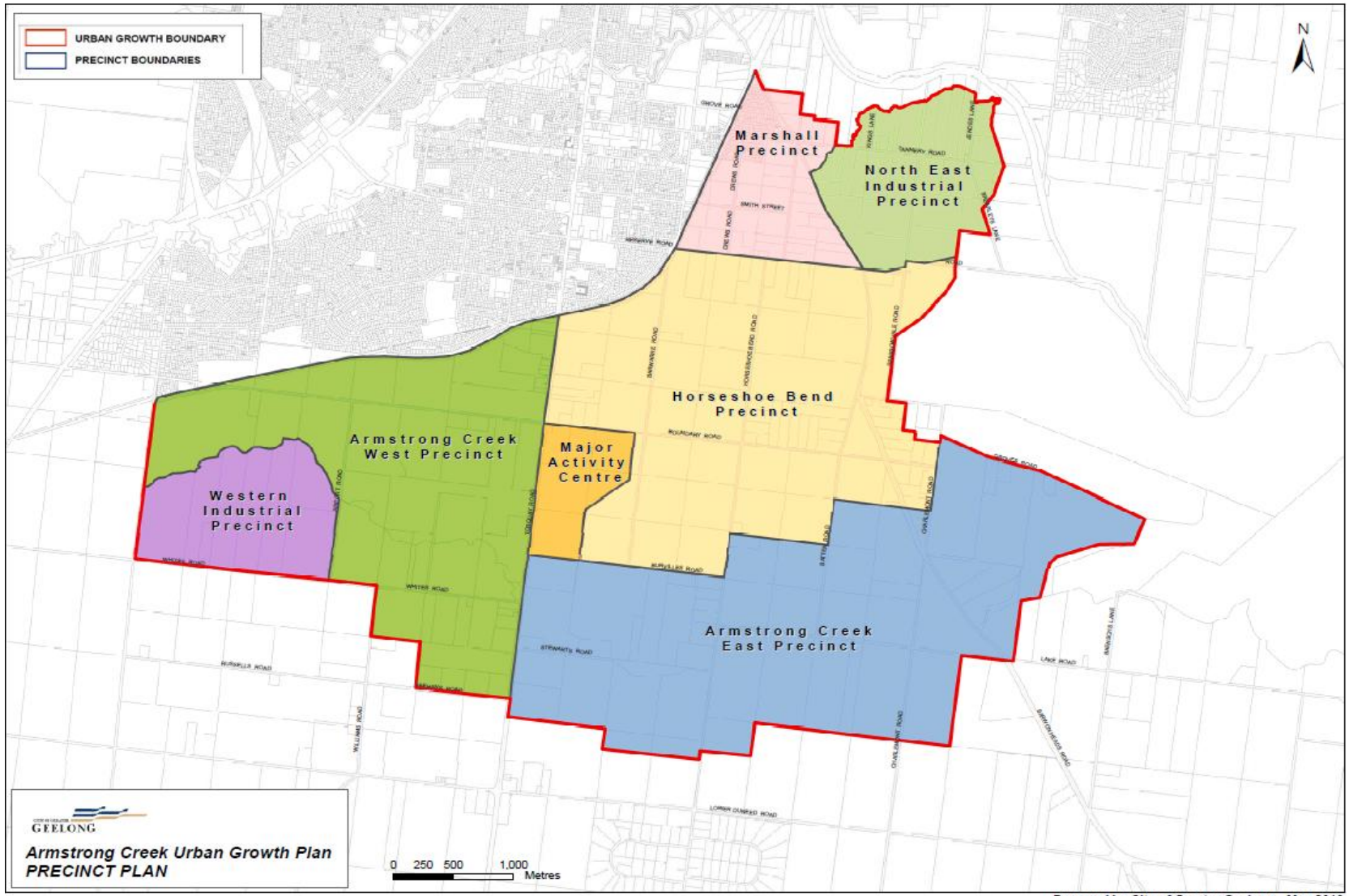
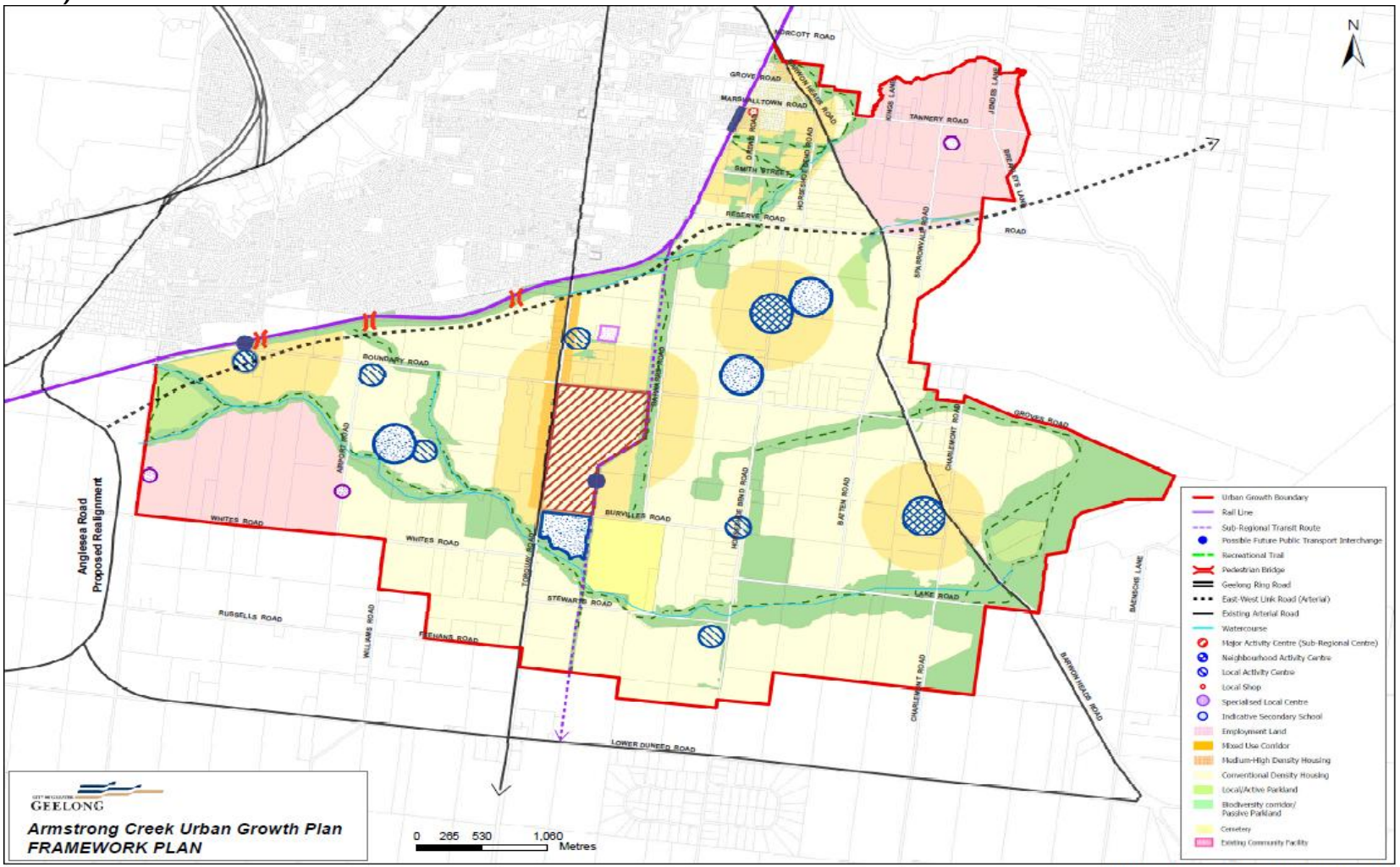


Figure 2: Armstrong Creek Urban Growth Corridor Framework Plan (COGG 2010b)



The majority of the land within the Precinct is privately owned, with the dominant land use being broad acre agriculture including cropping, livestock husbandry including: beef cattle, sheep, horses and goats and also smaller viticulture activities, particularly on Feehans Road. There are several properties on Whites Rd which established agricultural enterprises approximately 100 years ago. Most of the smaller properties have houses built since the 1950's and a large number of smaller residential lots are located on the Surf Coast Highway in the north-east of the site. The Precinct contains several Public Land Road Reserves running east-west or north-south.

Geelong Airport, a small light aircraft airport, is also in the Precinct with both a north-south and east-west airstrip. The Warrnambool-Geelong rail line forms the northern boundary of the Precinct. This transport corridor is intended to hold the proposed East West Link Road, connecting Barwon Heads with the Anglesea and Colac Roads. There is a small linear parcel of Crown land between the rail line and Boundary Road.

1.4 Surrounding Land Use

To the north of the rail line is the suburban landscape of Grovedale and Waurn Ponds, suburbs of Geelong. The surrounding landscape is currently similar in the east, south and west, being largely agricultural and rural living. However, the east will be transformed to an urban environment as a part of the Growth Area development. To the west of the Precinct, and Anglesea Rd, is a large open cut quarry (Boral, formerly Blue Circle) extracting lime for the construction industry. There are also long term plans for upgrades to the Anglesea Rd to the west and Mt Duneed Rd to the south. The western industrial precinct is located west of Airport Road and on the southern side of Armstrong Creek. The popular coastal town of Torquay is 15km to the south in the Surf Coast Shire.

The Armstrong Creek West Precinct is located in the Corangamite Catchment Management Authority area and is within the catchment of the Barwon River. Armstrong Creek forms the boundary of the Otway Plain (OtP) bioregion and the Victorian Volcanic Plain (VVP) bioregion within the Precinct. The Department of Sustainability and Environment (DSE) modelled vegetation of the site indicate patchy occurrences of Ecological Vegetation Class (EVC) 175 Grassy Woodland and EVC - 132 Plains Grassland. Field assessment confirmed that the majority of the remnant native vegetation on the site is EVC 175 – Grassy Woodland, with modified understorey to provide for agriculture. Remnant elements of this EVC are mostly confined to the vicinity of the creek. The exception lies with some modified grasslands EVC 132 Plains Grassland located south of the creek, these are located within the Victorian Volcanic Plain bioregion. Otherwise, the vegetation is heavily modified and consists largely of Degraded Treeless Vegetation in pasture areas and crops. The Precinct is located within 10 km of two wetlands of International Significance (Ramsar) i.e. (Port Phillip Bay (Western Shore line) & Bellarine (Lake Connewarre and Reedy Lake).

Armstrong Creek is an ephemeral stream with intermittent hydrologic connection to the estuary of the Barwon River (Reedy Lake and Lake Connewarre) during periods of peak flow. The hydrologic regime is likely to change as urban development proceeds. There is considerable opportunity to enhance the biodiversity values of the creek by

incorporating appropriately designed complementary wetlands that effectively manage increased peak flows and associated suspended nutrient before being discharged into the creek.

2 Methods

2.1 Literature and Desktop Review

Existing information was reviewed, including:

- Flora and Fauna records within 5 km of the study area held in the Victorian Information System/ Biodiversity Interactive Maps, a state-wide database maintained by the Department of Sustainability and Environment (DSE 2009).
- Department of Environment, Water, Heritage and the Arts Protected Matters Database (SEWPaC 2011), using a 5 km radius search area.
- Ecological Vegetation Class modelling of the study area (both extant and pre-1750) (DSE 2009)
- Aerial photography (1:5000) supplied by the client
- Previous reports from the general study area including Ecology Australia 2006, which incorporated the COGG Roadsides of Conservation Significance.

2.2 Field Survey

Initially, the study area was assessed during Spring/Summer 2009 on: 23, 24 & 30 September , 24 & 28 of October, 4, 5 & 11th November and on 23 September 2010 using methodology consistent with Biodiversity Precinct Planning Kit (DSE 2010). This survey obtained a broad overview of its existing biological values and detailed vegetation surveys and assessments for each habitat zone. Habitat zones were determined where 25% of the benchmark cover of native understorey occurred or where the canopy cover of 3 or more trees was assessed as greater than 20%. Observed fauna species and/or traces were also recorded. The length of the creek lines and all vegetated roadsides were walked. Measuring and recording of Diameter at Breast Height 1.3m from ground (DBH) of all large scattered trees. Trees within remnant patches were subsequently measures and plotted. The habitat zones and scattered trees were mapped and numbered on the Precinct aerial photo (refer Appendix C). After Council and DSE discussion through the Armstrong Creek west technical panel it was established that there were gaps in the results of those initial findings and these were peer reviewed by Chris White (SMEC) with comment that scattered vegetation required further attention to establish a comprehensive flora assessment. Therefore, an internal review has been carried out by the current author, Dr Mick Aberton. The results of this internal review have been subsequently incorporated throughout this report. The internal review largely concentrated on the following:

- Peer review comments made by SMEC's Chris White
- Additional areas thought to require cross checking (including component sof Habitat Zone scores) and clarification (i.e, mapping of large areas of native grass, not necessarily patch quality);

- A cross-check of large and very large old trees within habitat zones;
- Individual and scattered groups of small trees not considered patch quality; and
- Areas where disturbance is thought to be required as a result of either road widening or creek crossing, but has not been formerly selected.

Those assessments were carried out between February and June 2011 on the following dates: (site visit with DSE's Nathan McDonald 15 February and 16 May), 22 February, 16 March, 17 March, 24 March, 31March, 6 April, 18 May and 14th-15th June 2011.

In addition a targeted species survey was carried out concurrently in the Spring 2010 Summer 2010/11 timeframe for fish and frogs within the precinct (CPG 2011).

2.3 Limitations

Initial flora and fauna assessments were carried out in mid Spring/Summer. Summer is not the (DSE) preferred period for the assessment of native vegetation as most of the plants are not in flower and floral parts are frequently the taxonomic characters that identifies the species. However, the comprehensive search of the extensive databases combined with experience of the vegetation of the area and follow up reviews have adequately provided sufficient data to provide accurate assessment..

Targeted fauna assessments for fish and amphibians of conservation significance were carried out in Spring/Summer 2010/2011. In addition, the assessments carried out within an internal review were carried out in late summer and early autumn 2011, with subsequent review of Habitat Scoring in winter 2011. It is possible that some of the initial grasses were not observed through heavy grazing at the time of the assessment and/or due to seasonal variation. Alternatively, some areas may have been considered degraded treeless vegetation (DTV) or modified treeless vegetation (MTV) at other times of assessment and not shown on maps, therefore these have subsequently been recorded and mapped to enable DSE review.. The internal review did not reassess the entire project, but was based on peer review comments for gaps in the data. It is noted that not all details (e.g. exact river crossings) of the broad concept layout have been provided at the time of writing and therefore many areas cannot be accurately determined for vegetation losses, however an indicative quantification can be provided that helps to inform area selection. The Native Vegetation Precinct Plan will ensure this is calculated correctly when more accurate design is available. In addition, given both the size of the precinct and the relative abundance of native vegetation, there will inevitably be some individual scattered shrubs that have not been mapped because they did not meet patch nor scattered tree requirements.

3 Results

3.1 Flora

3.1.1 General Flora Survey

The site is predominantly agricultural land containing agricultural pasture species including: Cocksfoot *Dactylis glomerata,* Toowoomba Canary-grass *Phalaris aquatica*and Rye grass *Lolium* spp. with scattered areas of degraded treeless vegetation dominated by Wallaby Grass *Austrodanthonia* spp. Exceptions occur with some native grasslands considered to be patch quality where dominated by Kangaroo Grass *Themeda triandra*. These are generally "patches" of native grassland, or Grassy Woodland lacking canopy species and compete with pasture grasses. The remnant woodland vegetation canopy species along the creek is dominated by River Red Gum *Eucalyptus camaldulensis* forming the benchmark canopy with other large tree components, particularly Drooping Sheoak and occasionally Wattles (south of the creek within the Victorian Volcanic Plains bioregion). Roadside vegetation along Boundary Rd, Williams Rd and Feehans Rd is dominated by Drooping Sheoak *Allocasuarina verticillata* as the canopy species. Understorey shrub species occur and include Hedge Wattle *Acacia paradoxa*, Golden Wattle *Acacia pycnantha,* Blackwood *Acacia melanoxylon* and the occasional Sweet Bursaria *Bursaria spinosa*. Understorey species such as Kangaroo Grass *Themeda triandra*, Wallaby-grasses *Austrodanthonia spp*., Spear-grasses *Austrostipa spp*., Black-anther Flax-lilies *Dianella revoluta,* Mat Rushes *Lomandra spp.* Nodding Saltbush *Einadia nutans* are commonly present on the roadsides and along the Armstrong creek riparian corridor.

Large trees consisting of old River Red Gums and Drooping Sheoak (LOTs) with a DBH greater than the EVC benchmark specified (DBH of 70 and 40 cm respectively) occur both as scattered trees and within Habitat Zones throughout the site with mature River Red Gums more highly concentrated along the Armstrong Creek corridor and Road Reserve of Whites and Airport Roads. Drooping Sheoak are dominant within the Road Reserves of Boundary Rd, Williams Rd and Feehans Rd with some scattered along the Armstrong Creek corridor . Very large old trees (VLOTs) are also present in these areas; many of these are dead River Red Gums that provide habitat with the presence of hollows. Wattles were observed throughout vegetated parts of the precinct and although considered large trees at 30cm DBH in the Grassy Woodland benchmark south of the creek (considered to be Victorian Volcanic Plain Bioregion) these are excluded from canopy species where it is obvious they are sub-canopy as agreed with DSE's Nathan McDonald.

3.1.2 Plant Species Significance

A search within 5 km of the Armstrong Creek West Precinct of the EPBC database returned seven species which may have a likelihood of occurrence in the area, or may contain habitat within the area to support these species. Significant species, if present, are considered most likely to occur in remnant patches of vegetation along Armstrong Creek and some roadsides. None of these species were observed during field investigations or recorded on public databases such as DSE FIS or threatened species as occurring in the Armstrong Creek West Precinct. The likelihood of the species being present is moderate

to low due to the lack of appropriate high quality native vegetation and due to the modified, grazed condition of the majority of the site (Table 3-1). Generally, the flora of the Armstrong Creek corridor has had some grazing and scored relatively low for understorey, a factor of the highly modified environment with exceptions where grazing animals have restricted or no access (Habitat Scores are discussed in Section 3.1.6.

A full list of FIS Records and observed species from the field investigations appears in Appendix A.

Bellarine Yellow Gum *Eucalyptus leucoxylon subsp bellarinensis* has been recorded in the adjoining precincts (SMEC 2010). Active searching in conjunction with DSE (Nathan MacDonald, Biodiversity Officer, Geelong) of the likely habitat of Bellarine Yellow Gum within the precinct and surround roadsides failed to locate any specimens. However, on internal review, the author found examples of hybrids of these species believed to be planted as they were either in a plantation of similar-aged trees, or isolated occurrence, flowering well outside usual flowering period and not in usual habitat (tree reference medium tree adjacent to grassland HZ50). In addition Feehans Road (front of Feehans Winery) appear to be either planted in a row or have recruited from those planted.

Table 3-1: Threatened Flora Species recorded within 5km of Precinct

Scientific Name	Common Name	EPBC	DSE	FFG	LO
Carex tasmanica	Curly Sedge	V	V	L	M
Eucalyptus leucoxylon subsp bellarinensis	Bellarine Yellow Gum		E	L	M
Glycine latrobeana	Clover Glycine, Purple Clover	V	V	L	M
Pimelea spinescens subsp. Spinescens	Plains Rice-flower,	CE	V	L	L
Pomaderris halmaturina subsp continentis	Glenelg Pomaderris		R		M
Prasophyllum frenchii	Maroon Leek-orchid,	E	E	L	L
Senecio macrocarpus	Large-fruit Fireweed,	V	E	L	M
Thelymitra epipactoides	Metallic Sun-orchid	E	E	L	L
Xerochrysum palustre	Swamp Everlasting	V	V	L	M

EPBC: National Environment Protection and Biodiversity Conservation Act 1999 CE: Critically Endangered, E: Endangered, V: Vulnerable in Australia, listed under the EPBC Act

FFG: Victorian Flora and Fauna Guarantee Act 1988 L: Listed under the FFG Act

DSE: Department of Sustainability and Environment (Victoria) e: Endangered in Victoria (DSE 2005b) v: Vulnerable in Victoria (DSE 2005) r: Rare in Victoria (DSE 2005) k: Poorly known in Victoria (DSE 2005)

LO: Likelihood of occurrence on site: R: Recorded, H: High, M: Moderate, L: Low, N: Negligible

3.1.3 Threatened Flora Species Habitat Assessment

The habitat assessment pathway (Table 2 - DSE 2007) for threatened flora (Table 3-1) that may occur on the site is as follows

- Element A – resident or recorded regularly on site: No go: to D;
- Element D – Habitat on site? Significant use of site within 10 years: No to both; no further consideration.

Hence the threatened species rating for all flora (Table 3.1) on the site is considered to be Low.

3.1.4 Ecological Vegetation Classes

3.1.4.1 Modelled EVC (DSE 2009a)

The DSE modelled vegetation maps indicate patchy occurrences of EVC 175 Grassy Woodland (OtP) north of Armstrong Creek. South of the creek is predominantly EVC 132 Plains Grassland (VVP) and some EVC 175 Grassy Woodland (VVP) in the south eastern part of the site (Figure 3-1).

EVC 175 Grassy Woodland

EVC 175 Grassy Woodland is described as a variable open eucalypt woodland to 15m tall or occasionally Sheoak woodland to 10m over a diverse ground layer of grasses and herb. The shrub component is usually sparse. It occurs on sites with moderate fertility on gentle slopes or undulating hill on a range of geologies (DSE 2006). This EVC is considered to be endangered within the bioregions.

EVC 132 Plains Grassland

EVC132 generally consists of treeless vegetation mostly less than 1 m tall dominated by largely graminoid and herb life forms. The EVC occupies fertile cracking basalt soils prone to seasonal waterlogging in areas receiving at least 500 mm annual rainfall. Kangaroo Grass is often a feature species of a remnant Plains Grassland EVC.

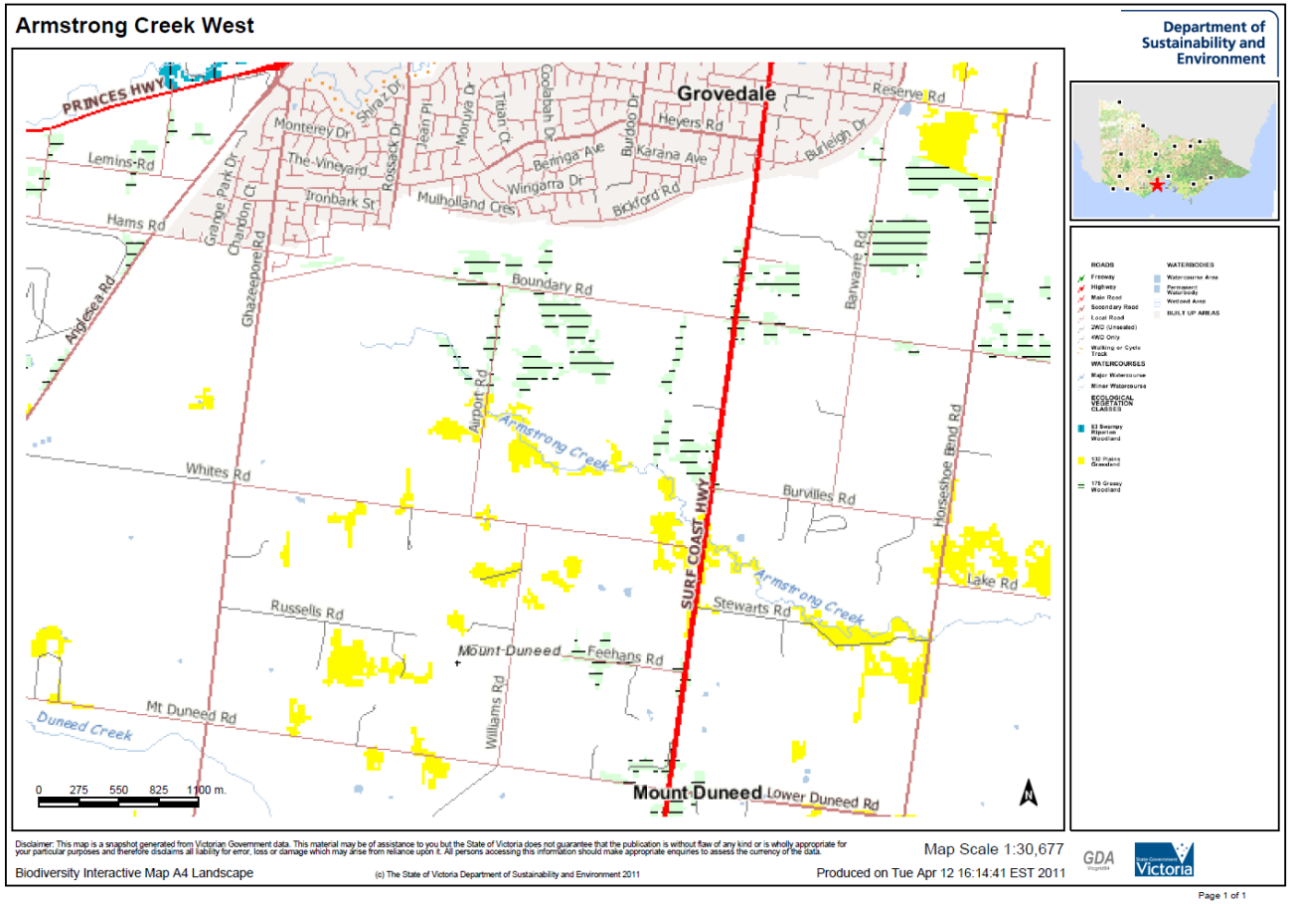
EVC 641 Riparian Woodland

Occurs beside permanent streams, typically on narrow alluvial deposits. Woodland to 15 m tall generally dominated by *Eucalyptus camaldulensis* over a tussock grass-dominated understorey. Tall shrubs may be present and amphibious herbs may occur in occasional ponds and beside creeks. While flooding may be common, sites are rarely inundated for lengthy periods.

3.1.4.2 EVC's located on-site

The presence and distribution of the Woodland species: River Red Gums, Drooping Sheoaks and Wattle species along the creek and across the paddocks and road sides indicate that the Grassy Woodland (EVC 175) is a most appropriate benchmark to assess the quality of the remnant vegetation of the site where treed and in some cases where it is immediately obvious that the tree layer has been removed. EVC 175 Grassy Woodland and has a Bioregional Conservation Status of endangered in both the Otway Plain (OtP) and Victorian Volcanic Plain (VVP) bioregions. Treeless areas are generally considered to be Grassy Woodland with the overstorey removed (as evidenced by the presence of large tree stumps) and/or swathe of existing species, and/or topography. However, some areas lacking trees with native grassland could not be qualified as Grassy Woodland because of insufficient evidence of historic trees and utilising DSE mapping tools, these include HZ G1, 3, 3b and G16 (refer Appendix B). In these cases, EVC 132 Plains Grassland, an endangered EVC was considered to be the most accurate EVC. Several other areas were mapped and later determined to be too small to qualify as patch vegetation or regarded as degraded treeless vegetation (refer to Appendix C). The other EVC present in the south east corner of the precinct is EVC 641 Riparian Woodland which also has a Bioregional Conservation Status of endangered in the VVP bioregion.

Figure 3-1: Armstrong Creek West Bioregions and modelled Ecological Vegetation Classes 2005 (DSE 2011)



3.1.5 EPBC Vegetation Communities

The two EPBC listed vegetation communities that are likely to occur on the subject site are:

- the Grassy Eucalypt Woodland of the Victorian Volcanic Plain (Critically Endangered); and
- Natural Temperate Grassland of the Victorian Volcanic Plain. (Critically Endangered) (DSEWPC/EPBC website 2009).

When assessed against the thresholds used to determine presence (DSEWPC (2009), no habitat zone of native vegetation on the site was considered to be natural temperate grasslands of the Victorian Volcanic.

With regard to the remainder of the patches, the majority of the patches are within or near the Victorian Volcanic Plain bioregion but 50% or more of the perennial vegetation does not consist of native grasses or native dryland wildflowers, a requirement in determining the EPBC listed Grassy Eucalypt Woodland and Natural Temperate Grasslands of the VVP. The vegetation associated with north of Armstrong Creek is considered to be within the Otway Plain bioregion and therefore not considered an EPBC vegetation community of the Victorian Volcanic Plain. Vegetation south of the Armstrong Creek is generally considered grassy eucalypt woodland and should be considered for EPBC referral pending the degree of disturbance. If it is deemed significantly disturbed by the proposed development of the site it should be referred.

3.1.6 Habitat Hectare Assessment

In total, 51Habitat Zones (HZ) consisting of patch quality vegetation amounting to 12 Habitat Hectares were assessed within the Armstrong Creek West Precinct (DSE 2004) (Appendix B & C and table 3-2 Habitat Zones Summary). A further four grasslands were considered to be DTV although having Wallaby Grass as the dominant species and seven sites on the western side of Ghazeepore Road are patches or derivatives of patches that may not be necessary as part of this assessment.

Of the Fifty one (51) Habitat Zones shown in table 3-2 below, the distribution is as follows: In total, 46.4 hectares of patch quality remnant vegetation is located within fifty-one (51) Habitat Zones within the Armstrong Creek West Precinct. Five of these totalling 2.77 hectares (1.19 Habitat Hectares) are very high conservation significance representatives of the Endangered EVC 175 Grassy Woodland. The remaining patch quality Grassy Woodland amount to 39.04 hectares (9.87 Habitat Hectares) of high conservation significance. Another EVC, Riparian Woodland (EVC 641) covers 0.74 hectares (0.2 Habitat Hectares) of high conservation significance vegetation was also identified on the site. In addition, several native grasslands were identified during subsequent assessments in February-April 2011, of those deemed to be of 'patch quality' and fitted the description of EVC 132: Plains Grassland of the Victorian Volcanic Plain bioregion. In total, 3.38 hectares (0.63 Habitat Hectares) of High conservation significance of the endangered EVC 132 Plains Grassland were also recorded within the Armstrong Creek west precinct. Varying qualities of grasslands dominated by Kangaroo Grass make up the majority of Grassland Habitat Zones (coded G) along the Armstrong Creek corridor. One grassland, G1 is relatively large and has a high weed content though

the dominant native species is Kangaroo Grass (reaching >25% cover) and with herb species located on the eastern fringe. The other G coded HZ's are of lower quality and smaller size.

Other areas (approximately 7.65 hectares) containing heavily modified/improved pasture grasses with Wallaby Grass *Austrodanthonia* spp. or Kangaroo Grass *Themeda triandra* of grassy woodland as the dominant native component were regarded as Degraded Treeless Vegetation (DTV) and Modified Treeless Vegetation (MTV) respectively and have been recorded and mapped for future discussion. The DTV, dominated by Wallaby grasses acting largely as a monoculture has a coverage of 6.81 hectares, whilst the MTV consisting mainly of Kangaroo Grasses in small areas or where heavily grazed or mown and significantly modified has coverage of 0.84 hectares.

The majority of the HZ's that occur on the precinct have a High Conservation Significance according to the DSE methodology, on a scale of Very High, High, Medium and Low. Those HZ's considered Very High Conservation significance are located at HZ 15 and HZ16 which occur on Airport Road, HZ36 and HZ37, which occur on Williams Road where potential roadworks are proposed, HZ 43 situated on Ghazeepore Road and HZ48 associated with Armstrong Creek.. .

Habitat zones associated with the creek include HZ 12, HZ 18, HZ 19, HZ 20, HZ 22, HZ 23, HZ 24, HZ 25, H27, HZ 28 and Grassland HZ's G1, , G3, G3B and G16 (Appendix B). These Habitat Zones (HZ's) are generally dominated by large mature River Red Gums with variable quality understorey, often weedy and grazed although containing some relics of understorey and therefore categorised as "up to 50% of the life forms present". It is apparent that on occasions substantial amounts of understorey are present and between 50-90% of the life forms are present (refer to Appendix B, Habitat Scores). HZ 28, at the intersection of Armstrong Creek with the Surf Coast Highway, is similar but has a more diverse and developed grassy understorey associated with some native shrubs and is considered to be EVC 641 Riparian Woodland. .

The majority of the other Habitat Zones are associated with the roadside reserves and contain a diversity of understorey species frequently associated with Drooping Sheoak. Table 3-2 Table 3-2 summarises the Habitat Score and Habitat Hectare values of the Habitat Zones.

Table 3-2 Habitat Zones – Summary

Habitat Zone No	Area of Habitat Zone (ha)	EVC	Habitat Score /100	Conservation Status	Conservation Significance	Habitat Hectares
HZ1	0.21	(GW175)	29	end	High	0.06
HZ2	0.25	(GW175)	26	end	High	0.07
HZ3	0.22	(GW175)	23	end	High	0.05
HZ4	0.07	(GW175)	25	end	High	0.02
HZ5	0.45	(GW175)	43	end	High	0.19
HZ6	0.86	(GW175)	25	end	High	0.22
HZ7	0.28	(GW175)	31	end	High	0.09
HZ8	0.03	(GW175)	17	end	High	0.01
HZ9	0.04	(GW175)	12	end	High	0.04
HZ10	0.17	(GW175)	16	end	High	0.03
HZ11	0.05	(GW175)	28	end	High	0.01
HZ12	3.20	(GW175)	26	end	High	0.83
HZ13	1.33	(GW175)	29	end	High	0.39
HZ14	0.78	(GW175)	26	end	High	0.20
HZ15	1.04	(GW175)	41	end	Very High	0.43
HZ16	0.5	(GW175)	44	end	Very High	0.22
HZ17	1.0	(GW175)	33	end	High	0.33
HZ18	1.41	(GW175)	23	end	High	0.32
HZ19	5.88	(GW175)	37	end	High	2.17
HZ20	2.1	(GW175)	23	end	High	0.48
HZ21	0.15	(GW175)	18	end	High	0.03
HZ22	0.12	(GW175)	16	end	High	0.02
HZ23	1	(GW175)	18	End	High	0.18
HZ24	0.21	(GW175)	18	end	High	0.04
HZ25	0.33	(GW175)	21	end	High	0.07
HZ26	6.1	(GW175)	26	end	High	1.59
HZ27	0.79	(GW175)	37	end	High	0.29
HZ28	0.72	(RW 641)	28	end	High	0.20
HZ29	3	(GW175)	23	end	High	0.69
HZ30	0.07	(GW175)	18	end	High	0.01
HZ31	0.09	(GW175)	24	end	High	0.02
HZ32	0.09	(GW175)	26	end	High	0.21
HZ33	0.01	(GW175)	16	end	High	0.01
HZ34	0.16	(GW175)	19	end	High	0.03
HZ35	0.1	(GW175)	19	end	High	0.02
HZ36 & 36B	0.64	(GW175)	50	end	Very High	0. 32
HZ37	0.52	(GW175)	46	end	Very High	0.28
HZ38	0.07	(GW175)	25	end	High	0.02
HZ39	0.2	(GW175)	28	end	High	0.06
HZ40	0.28	(GW175)	36	end	High	0.10

Habitat Zone No	Area of Habitat Zone	EVC	Habitat Score /100	Conservation Status	Conservation Significance	Habitat Hectares
HZ41	0.07	(GW175)	20	endangered	High	0.01
HZ42	0.05	(GW175)	35	endangered	High	0.02
HZ43	0.07	(GW175)	43	endangered	Very high	0.03
HZ44	0.1	(GW175)	23	endangered	High	0.02
HZ45	0.05	(GW175)	37	endangered	High	0.02
HZ46	0.33	(GW175)	32	endangered	High	0.06
HZ47	4.67	(GW175)	18	endangered	High	0.84
G1	2.69	(PG132)	18	endangered	High	0.51
HZ48	0.49	(PG132)	46	endangered	Very High	0.23
G3and3b	0.12	(PG132)	17	endangered	High	0.02
G16	0.57	(PG132)	21	endangered	High	0.1

Table 3-3 lists other areas of native vegetation. The following areas were not considered to be of patch quality due to there very small areas and level of modification. These are regarded as Modified Treeless vegetation, usually dominated by Kangaroo Grass and often confined to roadsides or pockets that are heavily grazed, with relatively few secondary species.

Table 3-3 Additional areas of Native Vegetation

Area reference on map	Area (ha)	Location
G6	0.05	Ghazeepore Rd (west side)
G9	0.00*	Feehans Rd. North side
G10	0.04	Whites Rd (south side) opposite G11
G13	0.02	Boundary Rd. (east) northern end runway
G15	0.14	Armstrong Ck corridor
G17	0.05	Armstrong Ck corridor
G20	0.54	Adjacent to HZ12, Airport Rd

- Negligible amount is 0.0025 but when rounded to two decimal places shows 0.

In addition to the above table there a number of areas where vegetation is deemed to be native but not patch quality and dominated by secondary species such as Wallaby Grass, or simply too small an area to be determined as a patch. These areas were marked onto the mapping for DSE's and COGG's reference.

Table 3-4 Degraded Treeless Vegetation

Area reference on map	Area (ha)	Location
G11	1.20	Whites Road (central), paddock
G12	0.12	Whites Road (east) paddock
G14	5.49	North-east corner in freeway zone, paddock

3.1.7 Scattered trees

A complete list of all scattered trees in the precinct is tabulated in Appendix F.

For the purposes of calculating scattered trees, the trees were not considered part of a patch and were either located within the site or on roadsides. In total, the number of scattered Very Large Old Trees (VLOTs) is 26, the majority consisting of River Red Gums of which 33% are dead trees, mainly located within the creekline, There are also several VLOT Sheoaks of which several are dead. Large Old Trees (LOT) consisted of 36 trees consisting of both River Red Gums and Sheoaks. With the remainder Wattles located in the Victorian Volcanic Plain (south of the Creek).. A table of scattered medium, large and very large old trees is located in Appendix E. These can be observed in mapping provided in Appendix C.

The locations of all scattered trees (VLOT, LOT and MOT) and individuals and groups of small scattered trees is shown in Appendix C. GPS co-ordinates are shown for (VLOT, LOT and Medium Old Trees MOT) in Appendix E - Scattered Trees, while small trees are grouped and shown on the map due to scale issues and broadly recorded with GPS co-ordinates (Appendix F).

The number of scattered MOT's recorded using GPS outside Habitat Zones is 24, most of which are River Red Gums as shown in Appendix E, while the number of small trees is 229 trees not located within patches throughout the site and roadsides, of which groups and individuals have been mapped (Appendix C and broadly tabulated Appendix E). These contain many dead trees. Areas of regrowth have been mapped accordingly and can be found in tables but are not considered to be 10 years old and would not require offsetting.

3.1.8 Weeds

The vegetation of the majority of the Precinct contains a high cover of agricultural pasture grasses including Cocksfoot *Dactylis glomerata,* Toowoomba Canary-grass *Phalaris aquatica,* and Rye Grass *Lolium spp*. Other weeds include: Prairie Grass *Bromus catharticus*, Soursob *Oxalis pes-caprae*, Carpet Weed *Galena pubescens*, Ribwort *Plantago lanceolata*, Buck's-horn Plantain *Plantago coronopus*, Couch *Cynodon dactylon*, Annual Meadow-grass *Poa annua,* and Kikuyu *Pennisetum clandestinum*, Paspalum *Paspalum dilatatum*, Onion grass *Romulea rosea*, Cats Ear *Hypochoeris radicata*, Parramatta Grass *Sporobolus africanus* and Brown-topped Bent Grass *Agrostis capillaris*. A patch of Wild Watsonia *Watsonia meriana* was recorded along Feehans Road (DSE pers comm. November 2010). The majority of other weeds are common weeds of agricultural land and occur as isolated plants not in discrete patches.

Isolated individuals of other more aggressive declared noxious and environmental weeds occur across the site including: Boneseed *Chrysanthemoides monilifera*, Bridal Creeper *Asparagus asparagoides,* Serrated Tussock *Nassella trichotoma*, Willows *Salix spp,* African Boxthorn *Lycium ferocissimum* and Sweet Briar *Rosa rubiginosa* occur scattered along the creek and roadsides. Heavy infestations of Montpelier Broom *Genista monspessulana*

occur on Airport Road and Armstrong Creek at Torquay Rd. There are also some infestations of Gorse *Ulex europaeus* across the site, mostly along the creek line. Gorse is particularly dense west of Airport Rd and this has been shown in the western-most drainage lines of the site (Appendix C).

The location of patches of these more aggressive weeds should be mapped if they occur in proposed open space reserves. This mapping will be an essential component of effective management and planning.

Table 3-3: lists the most significant weeds present across the site. It includes weeds which are:

- Weeds of National Significance (WONS);
- Environmental Weeds in Victoria, (Carr et al 1992);
- The CALP Act Noxious Weeds; and
- The City of Greater Geelong (G) most threatening environmental weeds.

Table 3-3: Weeds Classifications

Scientific Name	**Common Name**	**Weeds of National Significance** (WONS)	**Environmental Weeds Victoria (Carr et al 1992)**	**CaLP Act** (Noxious) **Geelong**(G)
Lycium ferocissimum	African Boxthorn		*Very serious threat*	*Noxious*
Chrysanthemoides monilifera	Boneseed/ Bitou Bush	*WONS*	*Very serious threat*	*Noxious G*
Rubus fruticosus spp agg.	Blackberry	*WONS*	*Very serious threat*	*Noxious G*
Asparagus asparagoides	Bridal Creeper	*WONS*	*Very serious threat*	*Noxious G*
Nassella neesiana	Chilean Needle Grass	*WONS*	*Very serious threat*	*Noxious G*
Galenia pubescens	Carpet Weed		*Serious threat*	
Ulex europaeus	Gorse/Furze	*WONS*	*Very serious threat*	*Noxious G*
Genista monspessulana	Montpellier Broom		*Very serious threat*	*Noxious G*
Nassella trichotoma	Serrated Tussock	*WONS*	*Very serious threat*	*Noxious G*
Watsonia meriana	Wild Watsonia		*Serious Threat*	*Noxious G*
Salix spp. Except S.babylonica, S.X calodenron and S.X reichardtii	Willows except Weeping Willows, Pussy Willows and Sterile Pussy Willow	*WONS*	*Very serious threat*	*Noxious G*

3.2 Other Vegetation

Several plantations of varying species of trees occur across the Precinct. Some are mixed native (non indigenous) plantations and older plantings of Sugar Gums *Eucalyptus cladocalyx* and Tuarts *Eucalyptus gomphocephala.* These latter species, despite being considered environmental weeds (Carr et al 1992) provide some habitat for native fauna and may be retained for habitat trees where suitable hollows are present. There are also numerous pine plantations and recent plantings of Blue Gums *Eucalyptus globulus*, Pine tree *Pinus radiata* and Cypress Pines *Cupressus* sp. with a number of gardens containing planted species refer Appendix C. Some of those plantations considered to be potentially suitable as a biodiversity value are shown and retained. These areas consist of within the Armstrong Creek corridor, adjacent to proposed roads and in proposed Reserves south of Whites Road.

3.3 Fauna

3.3.1 Threatened Fauna Species

Table 3-4 lists those species of fauna that are listed as threatened on the EPBC Act 1999, the FFG Act 1988 and in DSE Advisory list of threatened fauna (DSE 2005) and have been previously recorded within 5km of the Armstrong Creek West Precinct. None of these species were recorded on the Armstrong Creek West Precinct during the site assessment. The likelihood of occurrence (LO) of the species on the Armstrong Creek West Precinct has been assessed.

There are four recent records of EPBC/FFG listed species in the vicinity of the Precinct. The Southern Brown Bandicoot *Isoodon obesulus obesulus*, has been recorded in the southern part of the Armstrong Creek West Precinct near Feehans Rd (DSE 2009). Grey-headed Flying-fox *Pteropus poliocephalus*, the Growling Grass Frog *Litoria raniformis* and Yarra Pygmy Perch *Nannoperca obscura,* have been recorded in the Waurn Ponds creek, 2km to the north of the study area (DSE 2009).

3.3.2 Threatened Fauna Species Habitat Assessment

The habitat assessment pathway (Table 2 – DSE 2007) for threatened flora (Table 3-4) that may occur on the site is as follows

- Element A – resident or recorded regularly on site: No go to D;
- Element D – Habitat on site? Significant use of site within 10 years: Yes to both go to F
- Element F – Above average condition and landscape context: No – remaining 50% of habitat.

Hence the threatened species rating for fauna on the site associated with the riparian habitats of Armstrong Creek, principally Growling Grass Frog, Yarra Pigmy Perch and Grey-headed Flying-fox is considered to be High.

Table 3-4: Significant Fauna Species potentially occurring within 5 km of Armstrong West Precinct (EPBC-Protected Matters Search Tool)

Species Name	Common Name	EPBC	DSE	FFG	LO
BIRDS					
Anthochaera phrygia	Regent Honeyeater	E			L
Lathamus discolor	Swift Parrot	E	L	e	L-M
Neophema chrysogaster	Orange-bellied Parrot	CE			N
Rostratula australis	Australian Painted Snipe	V			L
FROGS					
Litoria raniformis	Growling Grass Frog,	V	L		M
INSECTS					
Synemon plana	Golden Sun Moth	CE	L		N
MAMMALS					
Dasyurus maculatus (SE mainland population)	Spot-tailed Quoll,	E			N
Isoodon obesulus obesulus	Southern Brown Bandicoot	E		nt	N
Miniopterus schreibersii	Southern Bent-wing Bat	CE	L	e	L
Potorous tridactylus tridactylus	Long-nosed Potoroo	V			N
Pseudomys fumeus	Konoom, Smoky Mouse	E			N
Pteropus poliocephalus	Grey-headed Flying-fox	V	L		L
RAY FINNED FISH					
Galaxiella pusilla	Eastern Dwarf Galaxias,	V			M
Nannoperca obscura	Yarra Pygmy Perch	V	L		L
Prototroctes maraena	Australian Grayling	V	L		L
REPTILES					
Delma impar	Striped Legless Lizard	V			N
MIGRATORY TERRESTIAL SPECIES (BIRDS)					
Haliaeetus leucogaster	White-bellied Sea-Eagle	Mi	L		L
Hirundapus caudacutus	White-throated Needletail	Mi			N
Merops ornatus	Rainbow Bee-eater	Mi			L
Myiagra cyanoleuca	Satin Flycatcher	Mi			N
Rhipidura rufifrons	Rufous Fantail	Mi			L
MIGRATORY WETLAND SPECIES (BIRDS)					
Ardea alba *	Great Egret, White Egret	Mi	L		L
Ardea ibis *	Cattle Egret	Mi	L		L
MIGRATORY MARINE SPECIES (BIRDS)					
Apus pacificus	Fork-tailed Swift	Mi	L		N

EPBC: National Environment Protection and Biodiversity Conservation Act 1999 CE: Critically Endangered, E: Endangered, V: Vulnerable in Australia, Mi: migratory – listed under the EPBC Act
FFG: Victorian Flora and Fauna Guarantee Act 1988 L: Listed under the FFG Act. E – endangered; nt – near threatened
DSE: Department of Sustainability and Environment (Victoria) e: Endangered in Victoria (DSE 2005) v: Vulnerable in Victoria (DSE 2005) r: Rare in Victoria (DSE 2005) k: Poorly known in Victoria (DSE 2005)
LO: Likelihood of occurrence on western precinct: R: Recorded, H: High, M: Moderate, L: Low, N: Negligible
* also listed as Migratory Marine Species – Birds

Mi-Migratory species

3.3.3 Fauna General

Incidental records of fauna were collected during the field survey. Most of these records were birds common to the area with the majority of records associated with the riparian vegetation of Armstrong Creek. The intersection of Armstrong Creek with Airport Road contained the greatest richness of bird and frog fauna. In a previous study (Ecology Australia 2006a) of the entire Armstrong Creek Urban Growth Area 165 fauna species were recorded. Fauna recorded throughout the assessment periods are shown in Appendix D.

No threatened species were recorded during the CPG field assessment.

3.3.4 Fauna Habitats

The site has a long history of agricultural use and as a result habitats on the site are grossly modified. Remnant, mostly sub-optimal habitats are restricted to vegetation associated with the creek and some roadsides. The habitat values of the farm dams are generally poor and contain little fringing vegetation. However, the 4.67ha treeless Grassy Woodland community (HZ 47) provides some habitat for grassland species of fauna with surface rock and native grassland present. It has had a history of grazing but native grass remains the dominant species'. Given that Golden Sun Moth *Synemon plana* and Striped Legless Lizard *Delma impar* came up on EPBC searches some consideration is required as to their presence. The grass is considered too dense to support the Golden Sun Moth but the presence of surface rock, and dense grasses provides some habitat for the Striped Legless Lizard, though lacking sufficient cracking clays. A search of current DSE Biodiversity Interactive Map records indicates both species have not been located on the site or within the immediate vicinity of the site in the past. The nearest sightings for the Striped Legless Lizard are the Corio area, north of Geelong while Golden Sun Moth's nearest proximity is Little River, some 35km north-east of the site.

The Armstrong Creek area through the presence of mature River Red Gums provides roosting sites and hollows for arboreal mammals and hollow dependent fauna. However, given the nearby suburb of Grovedale and presence of housing it is likely that domesticated predatory species would also be present. Cats and foxes are likely predatory species that would occur on the site. However, bird species such as the Barn Owl *Tyto alba* was observed during nocturnal frog surveys and both Brushtail *Trichosurus vulpecula* and Ringtail possums *Pseudocheirus peregrinus* are likely to be present using the site. In addition bird species that utilise hollow bearing trees could be assumed to use the site. Species observed were: Galahs *Eolophus roseicapilla*, Red-rumped parrot *Psephotus haematonotus,* and Pacific Black Duck *Anas superciliosa.*

The creekline of Armstrong Creek and dams within the precinct perimeter contain a number of common frog species, these had favourable conditions during the previous spring/summer period with a constant supply of water. These along with fish species are discussed further in (CPG 2011) and summarised below.

Roadside vegetation provides some canopy connectivity for fauna although these Road Reserves are typically very narrow (2-5m). It is for this reason that they only form a minor role as a corridor in their current condition but areas such as Airport Road could provide a more valuable biodiversity linkage when protected and rehabilitated. These Road reserves have had some impact from ongoing management requirements in the form of lopping for the protection of powerlines which has modified the canopy health and structure. The main roads where this has occurred are: Feehans (south side), Whites (south side), Ghazeepore (east) and Boundary (north). Should road widening of these roads be required, it is anticipated that all but Ghazeepore Road should be widened where the powerlines exist. Ghazeepore Road contains little in the way of vegetation on the western side of the road. Although vegetation is present along roadsides, the high speed use of these roads by motorists would be a contributing factor to fauna mortalities. Areas with connective canopy should be retained where possible with the exception of road widening requirements and cross roads. After construction, it is advisable that where line of sight is not affected, vegetation be replanted to minimise losses to connectivity. It could be expected that given the thick undergrowth along some parts of the road reserves that native Bush Rats *Rattus fuscipes* may be present

Plantations provide some biodiversity value with the presence of a canopy and flowering tree species. One example of planted vegetation recommended for biodiversity is within the Armstrong Creek corridor in the western-most part of the precinct where there is an existing dam surrounded by planted native vegetation. This vegetation provides suitable roosting values in addition to protecting the dam and creek wetlands from over heating.

The **Growling Grass Frog** has been recorded within 5km of the study area and it is a highly mobile species. It utilises open water and vegetated fringes of the creeks and farm dams on either a temporary or permanent basis (DSEWPC 2010). The presence of suitable habitat along the Creek indicates that the species is potentially present on the site. An assessment for Growling Grass Frog was carried out as part of a targeted fauna survey but was not recorded to be using the site (CPG 2011). During targeted species surveys, four common frog species were observed along the Armstrong Creek corridor and across the Armstrong Creek West precinct. Those species were: Pobblebonk *Limnodynastes dumerilii*, Spotted Marsh Frog *Limnodynastes tasmaniensis*, Southern Brown Tree Frog *Litoria ewingii* and the Common Froglet *Crinia signifera* located during the survey but in low densities suggesting the populations are not thriving (CPG 2011). Although low densities were present along Armstrong Creek, dams off the creek contained large numbers of these frogs, particularly Common Froglet which was also recorded in ditches where it would opportunistically breed. Dams across the precinct generally have some emergent vegetation providing ideal habitat for this species.

Yarra Pygmy Perch frequent slow-flowing waters, wetland or drainage channel habitats with abundant submerged aquatic vegetation. It is found in small groups, often mixed with Southern Pygmy Perch. It breeds in spring, at water temperatures between 16 and 24°C (Wager & Jackson 1993). Yarra Pygmy Perch have been recorded in Waurn Ponds Creek (Close et al 2002) and also a very large population to the south in Thompson's Creek (McKinnon & Ryan 2008). An Assessment of the Yarra Pygmy Perch

was carried out as part of a targeted fauna survey and was not identified to be using the site (CPG 2011).

Dwarf Galaxias *Galaxiella pusilla* along with numerous other native fish were expected to be collected by Close et al (2002) in Waurn Ponds Creek. None were recorded. Close et al (2002) consider that the relative dominance of native and exotic fish species varied throughout their study area. Close et al (2002) state that in general, fish communities in the upper reaches (like this study area) are dominated by exotic species, whereas in the mid- to lower reaches native species dominate fish assemblages. The (relatively low) diversity, distribution and abundance of fish observed in their study was considered likely to be a result of numerous anthropogenic factors in the catchment. An Assessment of the Dwarf Galaxias was carried out as part of the targeted fauna survey and was not identified to be using the site . Various other fish species and an eel were recorded as bycatch as part of the targeted species survey, they are: Southern pygmy perch *Nannoperca australis*, Shortfin eel *Anguilla australis*, Common galaxias *Galaxias maculates* and Spotted galaxias *Galaxias truttaceus* (CPG 2011).

The **Grey-headed Flying-fox** has adapted its behaviour to take advantage of new habitat and reliable food supplies. Permanent camp sites have been established close to or in several suburban areas. The Grey-headed Flying Fox has been recorded in Waurn Ponds and there is a roosting camp in Geelong Botanic Gardens (10km to the northeast). It has a large foraging range and is expected to opportunistically utilise the site if suitable food resources are present. The presence of flowering Eucalypts and fruit trees on the precinct provides potential opportunistic feeding sites for this species and it is likely that private gardens will encourage them to occasionally use the site.

The species is a colonial rooster and has been recorded in the Geelong Botanic Gardens where it was relocated to from the colony in the Royal Botanic Gardens, Melbourne. The species tends to move out of its day time roosts on dusk to feed on urban fruit and flowering trees and return in the morning. Anecdotal information suggests that the species may fly to sites in the Otway Ranges to feed (DSE pers comm. November 2010).

The **Southern Brown Bandicoot** prefers dense vegetation including heathy forest and woodlands, heathlands and scrublands. It is known to also utilise Grassy River Redgum Woodlands and Woodlands with sedgy understorey (*Lomandra longifolia)* (Ecology Australia 2006b). Habitat on the site for this species is likely to be confined to the riparian vegetation and associated remnant roadside vegetation, particularly the remnant vegetation patch immediately west of the Surf Coast Highway and also west of Airport Road may provide further information on its status within the study area. Southern Brown Bandicoot is considered unlikely to be present in the area (Nathan MacDonald, Senior Biodiversity Officer, DSE pers comm. July 2010) and therefore it was determined that a targeted species survey was unnecessary. A more likely species in the thick sedge vegetation is the Swamp Rat *Rattus lutreolus*; however influences from domestic predators would reduce their likelihood.

Snakes and other reptiles are likely to be present in association with the Armstrong Creek corridor and existing structures and general rubbish from farming. Armstrong Creek provides snakes with both a source of prey and water in addition to thick cover in isolated places. No snakes or lizards were recorded during the fauna surveys. The

presence of these species requires consideration when planning walking tracks, reserves and vegetation offsets throughout the precinct to ensure public safety.

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3.4 Agricultural and Feral Animals

Much of the site is farming land grazed by cattle, sheep, horses and goats. European Rabbits and Red Foxes occur across the site, particularly associated with the riparian strip and dense thickets of vegetation. Rabbits were most prevalent in the Hedge Wattle thicket just west of Airport Rd on Armstrong Creek and throughout Gorse infested areas of the western part of the precinct. These rabbits will require control as part of the long term management of a riparian reserve. Diggings and ground dwelling small animals were observed in HZ47during March 2011 site visits, these are thought to be made by the house mouse *Mus musculus* of which there are currently high numbers in the area (Aberton pers. comm). Given the location of neighbouring suburbs and current use of the land it is also likely that Brown Rats *Rattus norvegicus* utilise the site, a species that would both compete with native rats and prey on other native fauna.

4 Relevant Policy and Legislation

Several pieces of Government Legislation and policies influence the way biodiversity is assessed and managed in the Precinct.

4.1 Commonwealth

4.1.1 Environmental Protection and Biodiversity Conservation (EPBC) Act 1999

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 activity is considered likely to significantly impact on any matters of national environmental significance (MNES) listed under the Act.

No EPBC listed flora species are considered likely to be present on the site. It is unlikely that an EPBC referral will be triggered on account of native grasslands as they are of lower quality and considered to be too weedy to qualify for natural temperate grassland of the Victorian Volcanic Plain. The impacts on Grassy Woodland community of the Victorian Volcanic Plain is currently deemed low impact and does not meet the significant impact status triggering referral. However, it may be in the interest of the proponents to seek clarification with DSEWPC as referral during construction may have long construction delays. In addition, current proposed wetlands are aimed to catch and hold stormwater prior to being released into the catchment that leads to a RAMSAR and EPBC listed wetland, referral may be a requirement of the larger project when detailed design has progressed. The current status of the entire project is preliminary and at this stage their is insufficient detail for EPBC referral.

Targeted surveys did not locate any of the three EPBC listed species of fauna that are considered to potentially utilise the site. However, potential habitat is located on the site and the retention, management and rehabilitation of the riparian reserve will greatly

improve the habitat and conservation opportunity of these species, potentially encouraging their migration into the area. It is considered that the impact of the development on the listed species is unlikely to be significant, particularly given the reservation and management of the riparian corridor, and as such, a referral to DSEWPC is not considered essential.

4.1.2 The Convention on Wetlands of International Importance 1971 – Ramsar

EPBC listed Wetlands of International significance: (Western boundary – The Port Phillip Bay {Western Shore line & Bellarine (Lake Connewarre and Reedy Lake)) occur approximately 5km to the east of the Armstrong Creek West Precinct.

Armstrong Creek has the potential to discharge into Reedy Lake during peak flow periods. As such runoff from Armstrong Creek may, in the absence of effective management, have a detrimental impact on the wetland. The proposal to install comprehensive storm water, flood mitigation and management systems as part of the development will significantly reduce impact on these wetlands. A referral of the development to DSEWPC based on this potential discharge should be reviewed after consideration of the proposed stormwater management system is designed.

Barwon water has undertaken a Land Capability Assessment of the Armstrong Creek area to determine the effect of changed water regimes. The findings of this report will be included in the design of future water management regimes.

4.2 State

4.2.1 Flora and Fauna Guarantee Act (FFG) 1988

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. Local Government is required to have regard to the FFG Act (Action Statements) when deciding on permit conditions.

It is considered that the requirements of the FFG Act will be adequately accounted for during the development design process via compliance with other legislation.

Roadsides within the precinct are Crown Land managed by delegation to Geelong Council. As such FFG permits will be required to 'take' protected flora from the roadsides.

4.2.2 Catchment and Land Protection Act (CALP) 1994

The CALP *Act* 1994 provides a legislative framework for the management of land including salinity and the control of declared noxious weeds and pest animals on both public and private land. Several CMA Action Plans apply to the site including the Salinity Action Plan.

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.
- Prevent the spread of, and as far as possible eradicate, established pest animals.

The management of salinity as it affects biodiversity on the site will be guided by the Salinity Action Plan (CCMA 2006).

The management of pest plant and animals will be addressed in a Conservation Management Plan for the site, in particular, the riparian strip that is expected to ultimately be managed by Council. Residents will be discouraged from planting restricted or environmental weeds.

4.3 Greater Geelong Planning Scheme

4.3.1 Planning and Environment Act 1987

All planning schemes contain native vegetation provisions at Clause 52.17. A permit is required under the Planning and Environment Act 1987 to remove, destroy or lop native vegetation on a site of more than 0.4 hectares. Several exemptions apply including where a Native Vegetation Precinct Plan applies to the land and is incorporated into the relevant planning scheme. It is intended that the Native Vegetation Precinct Plan that is developed from this report will inform the Precinct Structure Plan.

4.3.2 Native Vegetation

A Planning Permit is required for the removal of native vegetation (DNRE 2002) and a permit application to remove native vegetation must demonstrate that the proposal:

- Avoids adverse impacts, particularly through vegetation clearance.
- If impacts cannot be avoided, to minimise impacts through appropriate consideration in the planning process and expert input to project design or management.
- Identify appropriate offset plan.

The majority of the remnant patches of native vegetation in the Armstrong Creek West Precinct occur within, close to or adjoin the riparian strip or roadsides. The inclusion of these patches within such an expanded linear network will minimise the removal of the majority of native vegetation and provide opportunities to improve the quality and quantity of native vegetation of the precinct. Avoidance of native vegetation cannot be successfully achieved due to the location of the vegetation and necessary road infrastructure to be placed as part of the development of the precinct. Development design should endeavour to achieve the linear networks of the roadsides and riparian corridor of Armstrong creek particularly with the inclusion of storm water and flood mitigation wetlands that will provide habitat. The location of cross roads can generally achieve the minimisation of vegetation loss by placement between habitat zones and

removal of scattered trees rather than 'patches' of native vegetation. However, a construction footprint that is practical must be selected to ensure that construction can progress without stoppages whilst not removing vegetation unnecessarily. For this reason, a footprint larger than the actual bridges of 58m for creek crossings is required, whilst roads will have a 5m buffer either side of the bitumen surface to allow for construction and required infrastructure. Any vegetation that is not removed with these construction areas will be subsequently removed from the loss calculations and not require offsetting.

Isolated patches of native vegetation in the form of Habitat Zones, both Grassy Woodland and Grasslands should be protected and enhanced where they form biodiversity value. Six of the Habitat Zones on the site are endangered EVC's with very high conservation significance. This means that if removal of this vegetation is proposed (a likely scenario), the Victorian Minister for the Environment will need to provide approval if it can be demonstrated that the vegetation is unavoidable through the development process. The remaining Habitat Zones consist of High conservation significance native vegetation.

The offsetting of some losses of native vegetation can be suitably achieved across the precinct utilising the riparian corridor of Armstrong Creek and roadside vegetation along Airport Road and other proposed Reserves (providing DSE and COGG agree). These will require Native Vegetation Offset Management Plans incorporating weed and pest control. Any remaining native vegetation offset requirements in excess of the onsite offsets would need to be offset in an alternative manner such as bushbroker scheme.

4.3.3 The Armstrong Creek Urban Growth Plan/Framework Plan (2008)

The Armstrong Creek Urban Growth Plan (2008) was adopted as a reference document under the City of Greater Geelong Planning Scheme. The document sets out principles and provides guidance for the development of the seven precincts which make up the Urban Growth Area. It stipulates the development of a Precinct Structure Plan as the key document to implement the requirements of the Planning Scheme and the Armstrong Creek Growth Plan.

The Framework Plan nominates higher level open space, including a biodiversity corridor/passive parkland along the Armstrong Creek and its tributary, also incorporating areas of biodiversity values (vegetated areas) adjoining the creek. It is noted that the mapping undertaken as part of this study more accurately maps the location of patches of native vegetation, and as such, the areas of biodiversity open space shown on the Framework Plan may need to be revised during preparation of the PSP. For example, HZ28 is located further south than shown on the Framework Plan and is well separated from the riparian vegetation of the creek.

Additional creek crossings are likely to be required to facilitate an appropriate connector road network. Armstrong Creek is an ephemeral stream in this precinct, which is characterised as a chain of ponds of varying seasonal depths, with irregular flows. Road crossings of the creek, if designed and located sensitively to avoid these ponds and to maintain and improve tree canopy connectivity, will not greatly compromise the ecological values of the riparian corridor.

While final road design will be based on the needs of the precinct, consideration should be given to the following criteria to minimise ecological impacts on the riparian network.

- Avoiding removal of large trees;
- Avoiding fragmentation of the larger extant patches by targeting narrow and lower quality sections of riparian vegetation;
- Selecting crossing sites with shallow creek cross-section; and
- Development of innovative approaches to minimise the impact of fragmentation of the linear reserve (both terrestrial and aquatic).

4.3.4 Overlays

Several planning overlays are current on the precinct. It is considered that these overlays will need to be revised once the PSP is finalised. (Figure 4-1)

Figure 4-1 Current Environmental Planning Overlays

4.3.5 Roadsides

The Precinct is bound by some busy sealed roads: Surfcoast Highway, Boundary Rd and Ghazeepore Rds carrying commuter traffic to and from Geelong and Whites and Boundary Roads are currently used by Melbourne traffic to access the Surf Coast Highway. The current landuse is agricultural and rural living, as a result of the low population, the gravel roads are generally quiet and have some ecological value, particularly Airport Rd and Williams Roads, whilst Boundary, Feehans, Ghazeepore and Whites Roads are bitumen surfaced and also contain 'patch quality' vegetation. However, it is important to know that ongoing canopy management through lopping is required for vegetation beneath powerlines on Ghazeepore (west), Boundary (north), Whites (south) and Feehans (south) roads that has already and will continue to modify the canopy qualities of these native patches.

The City of Greater Geelong in 2001 (Ecology Australia 2006a) identified roadsides with conservation significance (high, medium, low) including ACUGA. The majority of these roadsides are included within a Vegetation Protection Overlay to the Planning Scheme. There are some roadsides of high conservation significance in the ACUGA. Within the Armstrong Creek West Precinct there are 8 stretches of roadsides classified as medium conservation significance in 2001. The majority of these roadsides are narrow and fragmented by adjoining surfaced roads and cleared agricultural land, and as such, the quality of the retained vegetation of these roadsides is slowly being modified unless those roadsides have improved management. If current ecological processes persist, vegetation quality and quantity will continue to decrease and the ecological values will become beyond effective restoration. The proposed urbanisation of the vicinity will greatly increase this rate of modification. Linking high quality patches of retained roadside vegetation to the proposed retained linear riparian network will slow this process of degradation. The framework Plan seeks to retain indigenous roadside vegetation and seeks opportunities to revegetate areas such as Airport Road and Armstrong Creek riparian corridor by offsetting losses in the remainder of the precinct.

The vegetation of the roadsides of Airport Road is partly modified and is of varying qualities with some areas of patch quality vegetation and other with barely scattered small trees and regrowth. The vegetation adjoins cleared agricultural land on one side and unsurfaced road on the other. Parts of the Boundary Road and Airport Road were assessed were assessed as having Medium vegetation conservation significance (Ecology Australia 2006).

Despite parts of the roadside being assessed as having Very High and High Conservation significance (DSE 2004) in this assessment, the ecological significance of the isolated patches is considered to be low due to the fragmentation where there is a lack of native vegetation. The isolated patches of indigenous roadside vegetation are relatively narrow and in their current state, lack the necessary ecological resilience to provide a sustainable contribution to biodiversity conservation. The achievement of long term ecological merit of these isolated patches will rely on creating effective vegetated linkages between the patches, augmenting the size of the patches and intensive on-going management. Despite this, the management of roadsides in this precinct should be consistent with the

approach taken over the entire Armstrong Creek area. Opportunities to form linkages by way of revegetation and retention are possible on Airport Road, Boundary Road other existing roadsides of the development.

Fragmented vegetation can provide some dispersal and movement of arboreal mammals and as 'Stepping Stones' for some species of birds. This provides some merit for retaining scattered trees, particularly in association with the Armstrong Creek riparian corridor.

5 Key Biodiversity Issues and Implications

The following recommendations are made with regard to conserving and enhancing the flora and fauna values within the Armstrong Creek West Precinct within an urban context:

- Avoid the removal of indigenous Eucalypts and Sheoaks where possible. Preference should be given to the retention of patches of large trees or trees adjacent to the riparian corridor, in preference to the retention of isolated trees. Opportunities for the retention of isolated scattered trees within the development should be explored;
- Incorporate a linear network of riparian and selected roadside vegetation that includes the majority of the remnant patches of higher quality native vegetation within the PSP design. It is recommended that Net Gain offsets are consolidated into selected conservation reserves associated with Armstrong Creek. The location of such offsets will need to consider other community uses;
- A series of wetlands associated with Armstrong Creek (preferably off-stream) could be used to create a permanent habitat for wetland dependant species;
- Although not present at the time of this assessment or during targeted assessments, the presence of habitat indicates that it is possible that the following species may utilise the riparian corridor:
  - Grey-headed Flying-fox;
  - Growling Grass Frog;
  - Yarra Pygmy Perch;
  - Dwarf Galaxias.
- Locate any creek crossings utilising the criteria listed above to minimise ecological impact; (See 4.3.3)
- A linear reserve network is highly vulnerable to invasion by pest plants and animals. Control of high threat weeds particularly Serrated Tussock, Gorse and Montpellier Broom in the early stages of the implementation of the PSP is recommended, with pest animal control programs to follow, in particular rabbits and foxes.

6 Conclusion

The majority of the Precinct is cleared agricultural land with linear remnants of native vegetation associated with the Armstrong Creek and Roadsides. Fragmented, modified remnant flora and fauna habitats remain mostly in association with Armstrong Creek and several roadsides with occasional grasslands recorded within grazed paddocks. Fifty-one Habitat Zones totalling In total, 46.4 hectares of patch quality remnant vegetation is located within fifty-one (51) Habitat Zones within the Armstrong Creek West Precinct. Six of these totalling 3.22 hectares (1.38 Habitat Hectares) are very high conservation significance representatives of the Endangered EVC 175 Grassy Woodland. The remaining patch quality Grassy Woodland amount to 38.59 hectares (9.68 Habitat Hectares) of high conservation significance. Another EVC, Riparian Woodland (EVC 641) covers 0.74 hectares (0.2 Habitat Hectares) of high conservation significance vegetation was also identified on the site. In addition, several native grasslands were identified during subsequent assessments in February-April 2011, of those deemed to be of 'patch quality' and fitted the description of EVC 132: Plains Grassland of the Victorian Volcanic Plain bioregion. In total, 3.38 hectares (0.63 Habitat Hectares) of High conservation significance of the endangered EVC 132 Plains Grassland were also recorded within the Armstrong Creek west precinct. Other areas (approximately 7.65 hectares) containing heavily modified/improved pasture grasses with Wallaby Grass or Kangaroo Grass of grassy woodland as the dominant native component were regarded as DTV and MTV respectively and have been recorded and mapped. The DTV, dominated by Wallaby grasses acting largely as a monoculture has a coverage of 6.81 hectares, whilst the MTV covers 0.84 hectares. The remainder of the site is either non-native grazed paddocks, roadside vegetation, gardens or plantations.

Scattered Trees are dominated by River Red Gums and Drooping Sheoaks across the site. In total, there are 26 VLOT's, 36 LOT's, 24 MOT's and 229 Small trees across the site that are not forming part of a Habitat Zone. Of this number, many LOT's and VLOT's are dead old trees, some of which form hollows and are habitat trees.

No threatened species of flora or fauna were recorded during this assessment or during targeted fauna assessment of the site (CPG 2011).

Areas of high and very high conservation significance along the Armstrong Creek linear corridor will need to be avoided where possible and incorporated into the Precinct Structure Plan as open space or conservation reserve to enhance the amenity of the site through provisions for a positive biodiversity linkage, and potentially a permanent wetland associated with water treatment. If avoidance of some native vegetation in the western precinct is not possible then offsets to provide a Net Gain for the approved vegetation losses will need to be identified and managed in perpetuity. The loss of vegetation in the Habitat Zones will need to be according to (DNRE 2002). These offsets could be consolidated into selected sites within the Armstrong Creek linear riparian reserve where an existing array of patches is present..

Although it was considered that some threatened species including Growling Grass Frog, Dwarf Galaxias, Yarra Pygmy Perch and Grey-headed Flying-fox may occupy the riparian areas of the site, targeted surveys for the aquatic threatened species of these did not locate any individuals, but identified some habitat for the species.

The area is bound to the north by urban development and it will be transformed from a rural landscape to an urban landscape through the implementation of the Armstrong Creek Urban Growth Plan over the next 20 years. This transformation will have major influence on the viability of fragmented patches of native vegetation. It is critical that the development of the Precinct Structure Plan and the supporting Native Vegetation Precinct Plan delivers the conservation of native vegetation which is resilient to this change in land use over the long term. Therefore, improving management of existing Grassy Woodland, Plains Grassland and Riparian Woodland patches will be beneficial in habitat zones identifying high biodiversity values through size and diversity of species. However, the retaining of very small isolated habitat zones and individual trees will provide little in conservation and habitat value.

Sustainable biodiversity outcomes are best achieved by the retention and management of substantial linear reserves associated with Armstrong Creek and Airport Road, incorporating the creek corridor and the adjacent, larger patches of Red Gum woodlands and grasslands if deemed to be of long-term biodiversity value.

The removal of native vegetation along roadsides is an inevitable requirement with increased traffic flow and to service through traffic. Generally, both Feehans and Whites Road have less biodiversity value on the southern side where powerlines exist and there has been ongoing vegetation management. In addition, road crossings of the creek and intersections will be required. Should road widening of Ghazeepore Road be required as part of the precinct development, the eastern side would be the preferable option even with powerlines running along the western side of the road.

Every practical effort should be made to avoid and minimise native vegetation removal during the plan of subdivision stage, however practical footprints for construction of infrastructure are essential during the Precinct Structure Plan phase of the project to ensure efficiencies are met.

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CPG

8 Appendices

Appendix A: Recorded (DSE 2009) and Observed (CPG 2009) Flora Species

	Species	Common Name	Conservation Status	Last recorded	Recorded on site
*	*Arctotheca calendula*	Cape Weed			O
	Acacia mearnsii	Black Wattle			O
	Acacia melanoxylon	Blackwood			O
	Acacia paradoxa	Hedge Wattle		1980-1989	O
	Acacia pycnantha	Golden Wattle		1980-1989	O
	Acaena echinata	Sheep's Burr		1980-1989	O
*	*Agrostis capillaris*	Brown-top Bent		2000-2010	O
	Alisma plantago-aquatica	Water Plantain		2000-2010	
*	*Allium vineale*	Crow Garlic		1990-1999	
	Allocasuarina verticillata	Drooping Sheoak		1980-1989	O
*	*Anthoxanthum odoratum*	Sweet Vernal Grass			O
*	*Anagallis arvensis*	Pimpernel		1980-1989	O
*	*Araujia sericifera*	White Bladder-flower		2000-2010	
	Arthropodium strictum	Chocolate Lily			O
*	*Asparagus asparagoides*	Bridal Creeper			O
*	*Asphodelus fistulosus*	Onion Weed		2000-2010	O
*	*Aster subulatus*	Aster-weed		2000-2010	
*	*Atriplex prostrata*	Hastate Orache		2000-2010	
	Atriplex semibaccata	Seaberry Saltbush		current	O
	Austrodanthonia caespitosa	Common Wallaby-grass			O
	Austrodanthonia sp.	Wallaby Grass		current	O
	Austrostipa	Tall Spear Grass			
	Austrostipa sp.	Spear Grass		current	O
	Avena fatua	Wild Oat			
	Azolla filiculoides	Pacific Azolla		2000-2010	
*	*Beta vulgaris*	Beet		2000-2010	
	Bossiaea prostrata	Creeping Bossiaea			O
*	*Briza maxima*	Large Quaking-grass		1980-1989	O
*	*Briza minor*	Lesser Quaking-grass			O
*	*Bromus catharticus*	Prairie Grass		2000-2010	O
	Burchardia umbellata	Milkmaids			O
	Bursaria spinosa subsp. Spinosa	Sweet Bursaria			O
	Calocephalus citreus	Lemon Beauty-heads		1980-1989	O
	Calystegia sepium subsp. Roseata	Large Bindweed		2000-2010	

	Species	Common Name	Conservation Status	Last recorded	Recorded on site
*	*Centaurium tenuiflorum*	Slender Centaury		1980-1989	O
*	*Chenopodium album*	Fat Hen			O
*	*Chenopodium murale*	Sowbane		2000-2010	
	Chloris truncata	Windmill Grass			O
	Chrysocephalum apiculatum	Common Everlasting		1980-1989	
*	*Cirsium vulgare*	Spear Thistle		2000-2010	O
*	*Conium maculatum*	Hemlock		2000-2010	O
	Convolvulus erubescens spp. Agg.	Pink Bindweed		1980-1989	O
*	*Coprosma repens*	Mirror Bush		2000-2010	O
*	*Cortaderia selloana*	Pampas Grass		2000-2010	
	Crassula helmsii	Swamp Crassula		2000-2010	O
*	*Crataegus monogyna*	Hawthorn			O
*	*Cupressus spp.*	Cypress			O
*	*Cynara cardunculus*	Artichoke Thistle		2000-2010	
	Cynodon dactylon	Couch		2000-2010	O
*	*Cynodon dactylon var. Dactylon*	Couch		2000-2010	O
	Cyperus spp.	Flat Sedge			O
*	*Dactylis glomerata*	Cocksfoot		2000-2010	O
	Danthonia s.l. spp.	Wallaby Grass			O
	Dianella revoluta s.l.	Black-anther Flax-lily		1980-1989	O
	Dichondra repens	Kidney-weed		1980-1989	O
	Distichlis distichophylla	Australian Salt-grass		2000-2010	
	Drosera peltata subsp. Auriculata	Tall Sundew			O
*	*Echium plantagineum*	Paterson's Curse		2000-2010	
*	*Ehrharta longiflora*	Annual Veldt-grass			O
	Einadia nutans subsp. Nutans	Nodding Saltbush			O
	Eleocharis acuta	Common Spike-sedge		2000-2010	O
	Eleocharis sphacelata	Tall spikerush			O
	Epilobium billardierianum	Variable Willow-herb		2000-2010	O
	Eucalyptus camaldulensis	River Red-gum		2000-2010	O
*	*Eucalyptus cladocalyx*	Sugar Gum			O
#	*Eucalyptus globulus*	Blue Gum			O
	Eucalyptus leucoxylon subsp bellarinensis	Bellarine Yellow Gum	e, L	2000-2010	
	Eucalyptus leucoxylon hybrid	Yellow Gum		current	O
	Eucalyptus ovata var. Ovata	Swamp Gum			O
	Exocarpos cupressiformis	Cherry Ballart			O
*	*Foeniculum vulgare*	Fennel		2000-2010	O

	Species	Common Name	Conservation Status	Last recorded	Recorded on site
*	*Fraxinus angustifolia*	Desert Ash		2000-2010	O
*	*Fumaria muralis subsp. Muralis*	Wall Fumitory		2000-2010	O
*	*Galenia pubescens var. Pubescens*	Galenia		2000-2010	O
*	*Galium aparine*	Cleavers		2000-2010	O
*	*Genista monspessulana*	Montpellier Broom			O
	Gonocarpus tetragynus	Common Raspwort		1980-1989	O
	Goodenia ovata	Hop Goodenia			O
*	*Helminthotheca echioides*	Ox-tongue		2000-2010	O
*	*Hirschfeldia incana*	Buchan Weed		2000-2010	O
*	*Holcus lanatus*	Yorkshire Fog			O
*	*Hordeum leporinum*	Barley-grass			O
*	*Hypericum perforatum subsp. Veronense*	St John's Wort		2000-2010	
*	*Hypochoeris radicata*	Cat's Ear		1980-1989	O
	Isolepis spp.	Club Sedge			O
	Juncus pallidus	Pale Rush			O
	Juncus sp.	Rush			O
	Lachnagrostis filiformis	Common Blown-grass		2000-2010	
	Leptorhynchos squamatus	Scaly Buttons		1980-1989	
*	*Lolium perenne*	Perennial Rye-grass			O
	Lomandra nana	Dwarf Mat-rush			O
	Lomandra spp.	Mat-rush			O
	Luzula meridionalis	Common Woodrush		1980-1989	
*	*Lycium ferocissimum*	African Box-thorn		2000-2010	O
*	*Malva nicaeensis*	Mallow of Nice			O
*	*Malva parviflora*	Small-flower Mallow		2000-2010	O
	Marsilea hirsuta	Short-fruit Nardoo			O
	Marsilea spp.	Nardoo			O
#	*Melaleuca armillaris subsp. Armillaris*	Giant Honey-myrtle			O
	Melaleuca sp.	Paperbarks (planted)		current	O
	Microlaena stipoides var. Stipoides	Weeping Grass			O
*	*Modiola caroliniana*	Red-flower Mallow		2000-2010	O
*	*Moraea flaccida*	One-leaf Cape-tulip		1990-1999	
	Muehlenbeckia florulenta	Tangled Lignum		2000-2010	
	Muellerina eucalyptoides	Creeping Mistletoe		2000-2010	O
	Myriophyllum crispatum	Upright Water-milfoil			O

	Species	Common Name	Conservation Status	Last recorded	Recorded on site
	Myriophyllum salsugineum	Lake Water-milfoil			O
	Myriophyllum spp.	Water-milfoil			O
#	*Myoporum insulare*	Common Boobialla			O
*	*Nassella neesiana*	Chilean Needle-grass		2000-2010	
*	*Nassella trichotoma*	Serrated Tussock		2000-2010	O
*	*Oxalis pes-caprae*	Soursob		2000-2010	O
	Oxalis spp.	Wood Sorrel			O
*	*Paraserianthes lophantha subsp. Lophantha*	Cape Wattle		2000-2010	
*	*Paspalum dilatatum*	Paspalum		2000-2010	O
*	*Pennisetum clandestinum*	Kikuyu		2000-2010	O
	Persicaria decipiens	Slender Knotweed		2000-2010	O
*	*Phalaris aquatica*	Toowoomba Canary-grass		2000-2010	O
	Phragmites australis	Common Reed		2000-2010	
*	*Phytolacca octandra*	Red-ink Weed		2000-2010	
	Pimelea humilis	Common Rice-flower			O
*	*Pinus radiata*	Radiata Pine			O
*	*Piptatherum miliaceum*	Rice Millet		2000-2010	O
#	*Pittosporum undulatum*	Sweet Pittosporum			O
*	*Plantago coronopus*	Buck's-horn Plantain		2000-2010	O
*	*Plantago lanceolata*	Ribwort		2000-2010	O
	Poa labillardieri	Common Tussock-grass			O
	Pomaderris halmaturina subsp	Glenelg Pomaderris	r	2000-2010	
	Ptilotus spathulatus f. Spathulatus	Pussy Tails		1980-1989	
*	*Raphanus raphanistrum*	Wild Radish		2000-2010	
*	*Romulea rosea*	Onion Grass		2000-2010	O
*	*Rosa rubiginosa*	Sweet Briar		2000-2010	O
*	*Rubus fruticosus spp. Agg.*	Blackberry		2000-2010	
	Rumex acetosella	Sorrel			O
	Rumex brownii	Swamp dock			O
*	*Rumex conglomeratus*	Clustered Dock			O
*	*Scabiosa atropurpurea*	Pincushion		1980-1989	
	Solanum nigrum	Black Nightshade			O
*	*Sonchus oleraceus*	Common Sow-thistle		2000-2010	O
*	*Taraxacum officinale spp. Agg.*	Garden Dandelion		2000-2010	O
	Themeda triandra	Kangaroo Grass		1980-1989	O
	Tricoryne elatior	Yellow Rush-lily		1980-1989	O
*	*Trifolium fragiferum var. Fragiferum*	Strawberry Clover		2000-2010	O

	Species	Common Name	Conservation Status	Last recorded	Recorded on site
	Triglochin procera s.l.	Water Ribbons			O
	Typha spp.	Bulrush			O
*	*Ulex europaeus*	Gorse		2000-2010	O
*	*Urtica urens*	Small Nettle			O
	Veronica persica	Creeping Speedwell			O
*	*Vicia sativa*	Common Vetch		2000-2010	O
*	*Watsonia meriana*	Wild Watsonia			O

Native but not indigenous, * Exotic- weed

Appendix B: Habitat Hectare Assessment of Habitat Zones

Habitat Zone			01	02	03	04	05	06
Bioregion			OP	OP	OP	OP	OP	OP
EVC #: Name			**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**
EVC Bioregional Conservation Status			E	E	E	E	E	E
		Max Score	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
Site Condition	Large Old Trees	10	3	0	3	10	7	4
	Canopy Cover	5	4	4	0	4	4	5
	Understorey	25	5	5	5	5	10	5
	Lack of Weeds	15	6	6	6	2	6	2
	Recruitment	10	5	5	3	3	10	3
	Organic Matter	5	5	5	5	0	5	5
	Logs	5	0	0	0	0	0	0
	Total Site Score	75	28	25	22	24	42	24
	EVC standardiser (e.g. 75/55) [1]		1	1	1	1	1	1
	Adjusted Site Score		28	25	22	24	42	24
Landscape value	Patch Size	10	1	1	1	1	1	1
	Neighbourhood	10	0	0	0	0	0	0
	Distance to Core	5	0	0	0	0	0	0
Habitat Score		**100**	**29**	**26**	**23**	**25**	**43**	**25**
Habitat points = #/100		**1**	**0.29**	**0.26**	**0.23**	**0.25**	**0.43**	**0.25**
Habitat Zone area (ha)		(#.#)	0.21	0.25	0.22	0.07	0.45	0.86
Habitat Hectares		(#.#)	0.06	0.07	0.05	0.02	0.19	0.22
Conservation Significance	**Conservation status x Habitat Score**		High	High	High	High	Very High	High
	Threatened Species Rating		Low	Low	Low	Low	Low	Low
	Other Site Attribute Rating		Low	Low	Low	Low	Low	Low
	Overall Conservation Significance (highest rating)		High	High	High	High	Very High	High
Net Outcome (removed)			0.06	0.07	0	0.01	0.01	0.04
Gain Target (Hha)			0.10	0.10	0	0.02	0.02	0.06
No. Of Large Old Trees to be removed in each Habitat Zone			-	-	-	2	5	-
Tree protection multiplier			-	-	-	*3	3*2,2*4	-
Large Old Trees to be protected			-	-	-	6	14	-

Habitat Zone			07	08	09	10	11	12
Bioregion			OP	OP	OP	OP	OP	OP
EVC #: Name			**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**
EVC Bioregional Conservation Status			E	E	E	E	E	E
		Max Score	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
Site Condition	Large Old Trees	10	9	0	0	0	9	3
	Canopy Cover	5	4	4	0	5	4	5
	Understorey	25	10	5	5	5	5	5
	Lack of Weeds	15	0	0	0	0	0	2
	Recruitment	10	3	5	3	3	3	5
	Organic Matter	5	4	2	2	2	4	4
	Logs	5	0	0	0	0	0	0
	Total Site Score	75	30	16	10	15	25	24
	EVC standardiser (e.g. 75/55) [1]		1	1	1	1	1	1
	Adjusted Site Score		30	16	11	15	25	24
Landscape value	Patch Size	10	1	1	1	1	1	2
	Neighbourhood	10	0	0	0	0	0	0
	Distance to Core	5	0	0	0	0	2	0
Habitat Score		**100**	**31**	**17**	**12**	**16**	**28**	**26**
Habitat points = #/100		**1**	**0.31**	**0.17**	**0.12**	**0.16**	**0.28**	**0.26**
Habitat Zone area (ha)		(#.#)	0.28	0.03	0.04	0.17	0.05	3.20
Habitat Hectares		(#.#)	0.09	0.01	0.004	0.03	0.01	0.83
Conservation Significance	**Conservation status x Habitat Score**		High	High	High	High	High	High
	Threatened Species Rating		Low	Low	Low	Low	Low	High
	Other Site Attribute Rating		Low	Low	Low	Low	Low	Low
	Overall Conservation Significance (highest rating)		High	High	High	High	High	High
Net Outcome (removed)			0.09	0.00	0.01	0.02	0.02	0.05
Gain Target (Hha)			0.14	0	0.02	0.03	0.03	0.08
No. Of Large Old Trees to be removed in each Habitat Zone			8	-	1	-	3	2
Tree protection multiplier			*2	-	*2	-	1*2, 2*4	*2
Large Old Trees to be protected			16	-	2	-	10	4

Habitat Zone			13	14	15	16	17	18
Bioregion			OP	OP	VVP	VVP	VVP	OP
EVC #: Name			**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**
EVC Bioregional Conservation Status			E	E	E	E	E	E
		Max Score	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
Site Condition	Large Old Trees	10	7	3	4	4	8	4
	Canopy Cover	5	5	5	5	5	5	3
	Understorey	25	5	5	15	15	5	5
	Lack of Weeds	15	2	2	6	9	6	6
	Recruitment	10	5	5	5	5	3	1
	Organic Matter	5	4	5	5	5	5	3
	Logs	5	0	0	0	0	0	0
	Total Site Score	75	28	25	40	43	32	22
	EVC standardiser (e.g. 75/55) [1]		1	1	1	1	1	1
	Adjusted Site Score		28	25	40	43	32	22
Landscape value	Patch Size	10	1	1	1	1	1	1
	Neighbourhood	10	0	0	0	0	0	0
	Distance to Core	5	0	0	0	0	0	0
Habitat Score		**100**	**29**	**26**	**41**	**44**	**33**	**23**
Habitat points = #/100		**1**	**0.29**	**0.26**	**0.41**	**0.44**	**0.33**	**0.23**
Habitat Zone area (ha)		(#.#)	1.33	0.78	1.04	0.50	1.00	1.41
Habitat Hectares		(#.#)	0.39	0.20	0.43	0.22	0.33	0.32
Conservation Significance	**Conservation status x Habitat Score**		High	High	Very High	Very High	High	High
	Threatened Species Rating		Low	Low	Low	High	Low	High
	Other Site Attribute Rating		Low	Low	Low	Low	Low	Low
	Overall Conservation Significance (highest rating)		High	High	Very High	Very High	High	High
Net Outcome (removed)			0.18	-	0.03	0	0.03	0.06
Gain Target (Hha)			0.27	-	0.07	0	0.04	0.08
No. Of Large Old Trees to be removed in each Habitat Zone			10	-	1	-	-	1
Tree protection multiplier			7*2, 3*4	-	*2	-	-	*2
Large Old Trees to be protected			26	-	2	-	-	2

Habitat Zone			19	20	21	22	23	24
Bioregion			VVP	VVP	VVP	OP	OP	VVP
EVC #: Name			**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**
EVC Bioregional Conservation Status			E	E	E	E	E	E
		Max Score	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
Site Condition	Large Old Trees	10	4	4	10	9	10	10
	Canopy Cover	5	5	5	5	2	5	5
	Understorey	25	15	5	0	0	0	0
	Lack of Weeds	15	2	2	2	2	0	0
	Recruitment	10	3	5	0	0	0	0
	Organic Matter	5	4	0	0	2	2	2
	Logs	5	0	0	0	0	0	0
	Total Site Score	75	33	21	17	15	17	17
	EVC standardiser (e.g. 75/55) [1]		1	1	1	1	1	1
	Adjusted Site Score		33	21	17	15	17	17
Landscape value	Patch Size	10	4	2	1	1	1	1
	Neighbourhood	10	0	0	0	0	0	0
	Distance to Core	5	0	0	0	0	0	0
Habitat Score		**100**	**37**	**23**	**18**	**16**	**18**	**18**
Habitat points = #/100		**1**	**0.37**	**0.23**	**0.18**	**0.16**	**0.18**	**0.18**
Habitat Zone area (ha)		(#.#)	5.88	2.10	0.15	0.12	1.0	0.21
Habitat Hectares		(#.#)	2.17	0.48	0.03	0.02	0.18	0.0
Conservation Significance	**Conservation status x Habitat Score**		High	High	High	High	High	High
	Threatened Species Rating		High	High	Low	High	High	High
	Other Site Attribute Rating		Low	Low	Low	Low	Low	Low
	Overall Conservation Significance (highest rating)		High	High	High	High	High	High
Net Outcome (removed)			0.15	0.06	0.01	0.01	0.09	0.02
Gain Target (Hha)			0.22	0.09	0.01	0.01	0.13	0.04
No. Of Large Old Trees to be removed in each Habitat Zone			4	9	2	4	10	2
Tree protection multiplier			*2	8*2, 1*4	*2	3*2, 1*4	8*2, 2*4	2*2
Large Old Trees to be protected			8	20	4	10	24	4

Habitat Zone			25	26	27	28	29	30	31
Bioregion			VVP	OP	VVP	VVP	VVP	VVP	VVP
EVC #: Name			**175 GW**	**175 GW**	**175 GW**	**641 RW**	**175 GW**	**175 GW**	**175 GW**
EVC Bioregional Conservation Status			E	E	E	E	E	E	E
		Max Score	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
Site Condition	Large Old Trees	10	10	2	1	3	4	10	6
	Canopy Cover	5	5	0	0	5	5	5	5
	Understorey	25	0	5	15	5	5	0	5
	Lack of Weeds	15	0	9	9	6	2	0	0
	Recruitment	10	3	3	6	3	3	0	3
	Organic Matter	5	2	3	5	5	2	2	4
	Logs	5	0	0	0	0	0	0	0
	Total Site Score	75	20	22	36	27	21	17	23
	EVC standardiser (e.g. 75/55) [1]		1	1	1	1	1	1	1
	Adjusted Site Score		20	22	36	27	21	17	23
Landscape value	Patch Size	10	1	4	1	1	2	1	1
	Neighbourhood	10	0	0	0	0	0	0	0
	Distance to Core	5	0	0	0	0	0	0	0
Habitat Score		**100**	**21**	**26**	**37**	**28**	**23**	**18**	**24**
Habitat points = #/100		**1**	**0.21**	**0.26**	**0.37**	**0.28**	**0.23**	**0.18**	**0.24**
Habitat Zone area (ha)		(#.#)	0.33	6.1	0.79	0.72	3.00	0.07	0.09
Habitat Hectares		(#.#)	0.07	1.59	0.29	0.20	0.69	0.01	0.02
Conservation Significance	**Conservation status x Habitat Score**		High	High	High	High	High	High	High
	Threatened Species Rating		High	High	High	High	High	Low	Low
	Other Site Attribute Rating		Low	Low	Low	Low	Low	Low	Low
	Overall Conservation Significance (highest rating)		High	High	High	High	High	High	High
Net Outcome (removed)			0	1.51	0.03	0.02	0.02	0.01	0.02
Gain Target (Hha)			0	2.27	0.04	0.02	0.03	0.02	0.03
No. Of Large Old Trees to be removed in each Habitat Zone			-	-	-	-	2	3	2
Tree protection multiplier			-	-	-	-	1*2,1*4	3*2	2*2
Large Old Trees to be protected			-	-	-	-	6	6	4

Habitat Zone			32	33	34	35	36	37
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP
EVC #: Name			**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**	**175 GW**
EVC Bioregional Conservation Status			E	E	E	E	E	E
		Max Score	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
Site Condition	Large Old Trees	10	8	0	9	10	9	7
	Canopy Cover	5	5	5	4	4	4	4
	Understorey	25	5	5	0	0	15	15
	Lack of Weeds	15	0	0	2	2	6	9
	Recruitment	10	3	3	0	0	10	10
	Organic Matter	5	4	2	2	2	5	5
	Logs	5	0	0	0	0	0	2
	Total Site Score	75	25	10	18	18	49	52
	EVC standardiser (e.g. 75/55) [1]		1	1	1	1	1	1
	Adjusted Site Score		25	15	18	18	49	52
Landscape value	Patch Size	10	1	1	1	1	1	1
	Neighbourhood	10	0	0	0	0	0	0
	Distance to Core	5	0	0	0	0	0	0
Habitat Score		**100**	**26**	**16**	**19**	**19**	**50**	**53**
Habitat points = #/100		**1**	**0.26**	**0.16**	**0.19**	**0.19**	**0.50**	**0.53**
Habitat Zone area (ha)		(#.#)	0.0.09	0.01	0.16	0.10	0.25	0.52
Habitat Hectares		(#.#)	0.02	0.00	0.03	0.02	0.13	0.28
Conservation Significance	**Conservation status x Habitat Score**		High	High	High	High	Very High	Very High
	Threatened Species Rating		Low	Low	Low	Low	Low	Low
	Other Site Attribute Rating		Low	Low	Low	Low	Low	Low
	Overall Conservation Significance (highest rating)		High	High	High	High	Very High	Very High
Net Outcome (removed)			0.02	0.01	0.03	0.02	0	0
Gain Target (Hha)			0.04	0.01	0.05	0.03	0	0
No. Of Large Old Trees to be removed in each Habitat Zone			2	-	3	4	-	-
Tree protection multiplier			2*2	-	2*3	2*4	-	-
Large Old Trees to be protected			4	-	6	8	-	-

Habitat Zone			38	39	40
Bioregion			VVP	VVP	VVP
EVC #: Name			**175 GW**	**175 GW**	**175 GW**
EVC Bioregional Conservation Status			E	E	E
		Max Score	**Score**	**Score**	**Score**
Site Condition	Large Old Trees	10	8	9	9
	Canopy Cover	5	4	4	4
	Understorey	25	5	5	15
	Lack of Weeds	15	0	2	2
	Recruitment	10	5	5	3
	Organic Matter	5	2	2	2
	Logs	5	0	0	0
	Total Site Score	75	24	27	35
	EVC standardiser (e.g. 75/55) [1]		1	1	1
	Adjusted Site Score		24	27	35
Landscape value	Patch Size	10	1	1	1
	Neighbourhood	10	0	0	0
	Distance to Core	5	0	0	0
Habitat Score		**100**	**25**	**28**	**36**
Habitat points = #/100		**1**	**0.25**	**0.28**	**0.36**
Habitat Zone area (ha)		(#.#)	0.07	0.20	0.28
Habitat Hectares		(#.#)	0.02	0.06	0.10
Conservation Significance	**Conservation status x Habitat Score**		High	High	High
	Threatened Species Rating		Low	Low	Low
	Other Site Attribute Rating		Low	Low	Low
	Overall Conservation Significance (highest rating)		High	High	High
Net Outcome (removed)			0	0	0
Gain Target (Hha)			0	0	0
No. Of Large Old Trees to be removed in each Habitat Zone			-	-	-
Tree protection multiplier			-	-	-
Large Old Trees to be protected			-	-	-

ne		W41	42	43	44	45	46	47	G1	48
		VVP	VVP	OtP	OtP	OtP	OtP	VVP	VVP	VVP
me		**175 GW**	**175 GW**	**175GW**	**175GW**	**175GW**	**175GW**	**175GW**	**132 PG**	**175GW**
gional Conservation Status		E	E	E	E	E	E	E	E	E
	Max Score	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
arge Old Trees	10	0	9	9	0	5	4	0	/	6
Canopy Cover	5	0	4	2	0	0	5	0	/	5
Understorey	25	5	5	15	15	15	5	5	10	15
ack of Weeds	15	4	6	0	0	4	4	4	2	9
Recruitment	10	5	3	10	10	10	10	3	0	5
Organic Matter	5	5	5	4	2	2	3	4	0	5
ogs	5	0	2	2	0	0	0	0	/	0
otal Site Score	75	0	34	42	27	36	31	16	12	45
EVC standardiser (e.g. 5/55) [1]		1	1	1	1	1	1	1	1.36	
djusted Site Score		19	34	42	27	36	31	16	16	
Patch Size	10	1	1	1	1	1	1	2	2	
Neighbourhood	10	0	0	0	0	0	0	0	0	0
Distance to Core	5	0	0	0	0	0	0	0	0	0
ore	**100**	**20**	**35**	**43**	**28**	**37**	**32**	**18**	**18**	**46**
ints = #/100	**1**	**0.20**	**0.35**	**0.43**	**0.28**	**0.37**	**0.32**	**0.18**	**0.18**	**0.46**
ne area (ha)	(#.#)	0.07	0.05	0.07	0.1	0.05	0.33	4.67	2.62	0.49
ctares	(#.#)	0.01	0.02	0.03	0.02	0.02	0.06	0.84	0.47	0.23
Conservation status x Habitat Score		High	High	Very High	High	High	High	High	High	Very High
Threatened Species Rating		High	High	High	High	High	High	High	High	High
Other Site Attribute Rating		Low	Low	Low	Low	Low	Low	Low	Low	Low
Overall Conservation Significance (highest rating)		High	High	Very High	High	High	High	High	High	Very High
me (removed)		0.01	0.02	0.03	0.02	0.02	0	0.04	0.47	0.25
et (Hha)		0.02	0.03	0.06	0.03	0.03	0	0.05	0.71	0.50
ge Old Trees to be removed in tat Zone		-	3	1	-	1	1	-	-	-
ction multiplier		-	2*2, 1*4	1*2	-	1*2	1*2	-	-	-
Trees to be protected		-	8	2	-	2	2	-	-	-

**Note: The net outcome losses in vegetation are rounded up to 2 decimal places within the avbove summary tables while calculations were made within a separate table. Therefore, required net gain targets have been calculated previously to entering within the above table and are correct to two decimal places.

Habitat Zone			G16
Bioregion			OtP
EVC #: Name			**132 PG**
EVC Bioregional Conservation Status			End
		Max Score	
Site Condition	Large Old Trees	10	/
	Canopy Cover	5	/
	Understorey	25	5
	Lack of Weeds	15	4
	Recruitment	10	3
	Organic Matter	5	3
	Logs	5	/
	Total Site Score	75	15
	EVC standardiser (e.g. 75/55) [1]		1.36
	Adjusted Site Score		20
Landscape value	Patch Size	10	1
	Neighbourhood	10	0
	Distance to Core	5	0
Habitat Score		**100**	**21**
Habitat points = #/100		**1**	**0.21**
Habitat Zone area (ha)		(#.#)	0.57
Habitat Hectares		(#.#)	0.12
Conservation Significance	**Conservation status x Habitat Score**		High
	Threatened Species Rating		Low
	Other Site Attribute Rating		Low
	Overall Conservation Significance (highest rating)		High
Net Outcome			0.12
Gain Target (Hha)			0.18
No. Of Large Old Trees to be removed in each Habitat Zone			-
Large Old Trees to be protected			

Appendix C: Armstrong Creek West Precinct Habitat Zones and Scattered Trees Aerial photograph (4 sets of aerials).

AREA NORTH

AREA WEST

AREA CENTRAL

AREA SOUTH

BOUNDARY ROAD

WHITES ROAD

WILLIAMS ROAD

KHANCOBAN ROAD

SURF COAST HWY

BARWARRE ROAD

STEWARTS ROAD

EVANS ROAD

MGA ZONE 55

Legend

- Precinct boundary
- HZ1 — Indicates indigenous vegetation of a high conservation significance
- G1 — Native Grassland Patch
- Weed
- Native scattered grass
- T1 — Large scattered tree
- M8 — Medium scattered tree
- S55 — Small scattered tree and understory
- S(G) — Small tree group
- Peer review identification number
- Review responses (Additions 23/3/2011)
- Internal verification required
- Additions to internal review
- Site not accessible
- Plantation or garden bed or wind break

Armstrong Creek West Precinct
Native Vegetation Context Cover Page
NTS

Date	JUNE 2011	Sheet	Cover
Drawing No.	136312FS01 REV 6		Version 6
CAD Ref.	G:\13\136312-ARMSTRONG CREEK WEST NATIVE VEGETATION\ACAD		
Drawn By	JD	Checked By	MA

REV	AMENDMENT	APPROVED	DATE
6	FOR CLIENT APPROVAL	MA	JUNE 2011

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Appendix D: Recorded (AVW) DSE 2004) and Observed (CPG 2009) Fauna Species

Scientific Name	Common Name	Last Record	Observed
**Acridotheres tristis*	Common Myna	2000-2010	O
**Alauda arvensis*	European Skylark	2000-2010	O
Anguilla australis	Shortfin eel	Targeted Species Survey	O
**Carduelis carduelis*	European Goldfinch	2000-2010	
**Carduelis chloris*	European Greenfinch	2000-2010	
**Passer domesticus*	House Sparrow	2000-2010	O
**Passer montanus*	Eurasian Tree Sparrow	2000-2010	
**Streptopelia chinensis*	Spotted Turtle-Dove	2000-2010	O
**Sturnus vulgaris*	Common Starling	2000-2010	O
**Turdus merula*	Common Blackbird	2000-2010	O
**Vulpes vulpes*	Red Fox	2000-2010	O
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	2000-2010	O
Acrocephalus stentoreus	Clamorous Reed Warbler	2000-2010	
Alisterus scapularis	Australian King-Parrot	1990-1999	
Anas superciliosa	Pacific Black Duck	2000-2010	O
Anthochaera carunculata	Red Wattlebird	2000-2010	O
Anthus novaeseelandiae	Australasian Pipit	2000-2010	
Ardea pacifica	White-necked Heron		O
Austrelaps superbus	Lowland Copperhead	1990-1999	
Bassiana duperreyi	Eastern Three-lined Skink	1990-1999	
Bos taurus	Cattle – Beef Angus		O
Cacatua galerita	Sulphur-crested Cockatoo		O
Cacomantis flabelliformis	Fan-tailed Cuckoo	1990-1999	
Callocephalon fimbriatum	Gang-gang Cockatoo	2000-2010	
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	2000-2010	O
Canis lupus familiaris	Dog –Maremma		O
Capra aegagrus hircus	Goats		O
Chroicocephalus novaehollandiae	Silver Gull	1990-1999	
Chrysococcyx basalis	Horsfield's Bronze-Cuckoo	2000-2010	
Cisticola exilis	Golden-headed Cisticola	2000-2010	
Colluricincla harmonica	Grey Shrike-thrush	1990-1999	O
Corvus mellori	Little Raven	2000-2010	O

Scientific Name	Common Name	Last Record	Observed
Cracticus torquatus	Grey Butcherbird	1990-1999	
Crinia signifera	Common Froglet		O
Cuculus pallidus	Pallid Cuckoo	1990-1999	
Egretta novaehollandiae	White-faced Heron	2000-2010	O
Elanus axillaris	Black-shouldered Kite	2000-2010	O
Eolophus roseicapilla	Galah	2000-2010	O
Falco berigora	Brown Falcon	2000-2010	O
Falco cenchroides	Nankeen Kestrel	2000-2010	
Falco longipennis	Australian Hobby	2000-2010	O
Galaxias maculates	Common galaxias	Targeted Species Survey	O
Galaxias truttaceus	Spotted galaxias	Targeted Species Survey	O
Gallinula tenebrosa	Dusky Moorhen	2000-2010	
Glossopsitta concinna	Musk Lorikeet	1990-1999	O
Grallina cyanoleuca	Magpie-lark	2000-2010	O
Gymnorhina tibicen	Australian Magpie	2000-2010	O
Haliastur sphenurus	Whistling Kite	2000-2010	O
Hirundo neoxena	Welcome Swallow	2000-2010	O
Lichenostomus penicillatus	White-plumed Honeyeater	2000-2010	
Limnodynastes dumerli	Pobblebonk	Targeted Species Survey	O
Limnodynastes peronii	Striped Marsh Frog		O
Limnodynastes tasmaniensis	Spotted Marsh Frog	2000-2010	O
Litoria ewingii	Southern Brown Tree Frog		O
Macropus giganteus	Kangaroo (tracks in creek side mud)		O
Malurus cyaneus	Superb Fairy-wren	2000-2010	O
Microcarbo melanoleucos	Little Pied Cormorant	2000-2010	
Mus musculus	House Mouse	current	O
Nannoperca australis	Southern Pygmy Perch	Targeted Species Survey	O
Neochmia temporalis	Red-browed Finch		O
Ocyphaps lophotes	Crested Pigeon		O
**Oryctolagus cuniculus*	European Rabbit		O
**Ovis aries*	Sheep		O
Pardalotus punctatus	Spotted Pardalote	1990-1999	O
Petroica boodang	Scarlet Robin	2000-2010	

Scientific Name	Common Name	Last Record	Observed
Phalacrocorax sulcirostris	Little Black Cormorant	2000-2010	
Phylidonyris novaehollandiae	New Holland Honeyeater	2000-2010	O
Platycercus elegans	Crimson Rosella		O
Platycercus eximius	Eastern Rosella		O
Porzana fluminea	Australian Spotted Crake	2000-2010	
Psephotus haematonotus	Red-rumped parrot	current	O
Rhipidura leucophrys	Willie Wagtail	2000-2010	O
Strepera graculina	Pied Currawong	1990-1999	
Threskiornis molucca	Australian White Ibis		O
Threskiornis spinicollis	Straw-necked Ibis	1990-1999	O
Trichoglossus haematodus	Rainbow Lorikeet		O
Tyto alba	Barn Owl	current	O
Vanellus miles	Masked Lapwing	1990-1999	O
**Vicugna pacos*	Alpaca		O
Zosterops lateralis	Silvereye	2000-2010	

* Exotic Species

Appendix E: Scattered Trees including MOTs LOTs and VLOTs
Note: Large and Very Large trees are coded T1-T102 which included some trees with Habitat Zones. These have been deleted from the following table, hence gaps in numbering. Medium trees are coded M and similarly to large trees have gaps in numbering accounted for by some located within habitat zones.

Scattered Tree No. Species	Size of Tree MOT, VLOT or LOT	Diameter @ Breast Height DBH (cm)	Easting	Northing
T1 Eucalyptus camaldulensis	VLOT	105	265729.913	5766445.670
T2 Eucalyptus camaldulensis	LOT	76	265910.497	5766079.945
T3 Eucalyptus camaldulensis	LOT	76	265939.421	5766040.757
T4 Eucalyptus camaldulensis	VLOT	157	266060.631	5765784.602
T5 Eucalyptus camaldulensis	LOT	79	266020.208	5765752.998
T6 Eucalyptus camaldulensis	VLOT	134	266059.929	5765709.759
T7 Eucalyptus camaldulensis	VLOT	116	266240.533	5765548.023
T8 Eucalyptus camaldulensis	LOT	91	266678.344	5765488.602
T9 Eucalyptus camaldulensis	LOT	73	266723.290	5765356.656
T10 Eucalyptus camaldulensis	VLOT	109	266793.111	5765433.802
T11 Eucalyptus camaldulensis	LOT	93	266750.943	5765120.159
T12 Eucalyptus camaldulensis	VLOT	113	266422.204	5765035.235
T13 Allocasuarina verticillata	LOT	49	266064.956	5764976.447
T14 Allocasuarina verticillata	LOT	44	266104.747	5764954.811
T15 Allocasuarina verticillata	VLOT	65	266130.894	5764953.973
T16 Eucalyptus camaldulensis	LOT	94	266181.278	5764837.214
T17 Eucalyptus camaldulensis	LOT	102	266485.425	5764806.604
T19 Eucalyptus camaldulensis	LOT	80	265423.871	5765049.824
T20 Allocasuarina verticillata	VLOT	62	265978.493	5765241.489
T21 Eucalyptus camaldulensis	VLOT	153	266206.726	5765296.704
T22 Eucalyptus camaldulensis	VLOT	105	265633.221	5765769.853
T23 Eucalyptus camaldulensis	VLOT	157	265524.940	5765901.322
T24 Allocasuarina verticillata	LOT	45	266626.721	5764910.373
T25 Allocasuarina verticillata	LOT	47	266638.520	5764906.349
T26 Dead stag to 8m	VLOT	111	266363.173	5765324.831
T27 Dead stag to 8m	VLOT	106	266325.046	5765346.563
T28 Dead stump to 6m	VLOT	127	266246.753	5765325.701
T29 Dead stag to 7m	VLOT	147	266177.765	5765391.174
T30 Dead stag to 7m	VLOT	112	266246.876	5765437.258
T31 Dead stag to10m habitat	VLOT	108	266293.857	5765488.027
T32 Dead stag to 6m habitat	LOT	93	266292.372	5765498.631
T33 Dead stag to 6m habitat	VLOT	112	266354.943	5765525.615

T34 Dead stag to 6m habitat	VLOT	111	266282.611	5765553.660
T39 Eucalyptus camaldulensis	LOT	72	265344.401	5766563.001
T40 Allocasuarina verticillata	LOT	42	265256.178	5765870.232
T41 Eucalyptus camaldulensis	LOT	85	265418.292	5765960.695
T45 Dead Allocasuarina verticillata (Feehans Rd)	VLOT	62	265948.107	5764124.282
T51 River Red Gum	LOT	90	266407.112	5765415.410
T61 River Red Gum	LOT	88	266389.764	5764924.947
T64 Allocasuarina verticillata	VLOT	92	266342.675	5764067.057
T65 River Red Gum	LOT	71	266066.608	5764962.616
T66 Wattle	LOT	32	265297.917	5765682.896
T67 River Red Gum	LOT	82	265339.256	5765436.994
T68 River Red Gum	LOT	89	265292.986	5765434.221
T69 Wattle	LOT	34	SW of HZ17	In plantation
T70 Wattle	LOT	31	SW of HZ17	In plantation
T71 Wattle	LOT	42	SW of HZ17	In plantation
T72 Allocasuarina verticillata	LOT	41	266026.958	5764979.038
T73 Wattle (dead)	LOT	32	265423.871	5765049.824
T74 wattle (potentially planted)	LOT	32	266557.247	5764162.293
T75 Black Wattle	VLOT	55	266492.901	5764067.938
T77 Black Wattle	LOT	30	266410.846	5765137.287
T78 Black Wattle	LOT	31	266390.893	5765113.994
T79 Allocasuarina verticillata	LOT	45	266026.412	5764611.474
T86 Allocasuarina verticillata	VLOT	68	265151.239	5766073.314
T87 Allocasuarina verticillata (dead stag)	VLOT	66	265178.982	5766097.991
T88 Allocasuarina verticillata (dead stag)	LOT	50	265184.076	5766096.937
T89 Allocasuarina verticillata (dead stag)	LOT	47	265184.449	5766094.654
T90 Allocasuarina verticillata (vpoor)	VLOT	71	265199.394	5766097.238
T92 Allocasuarina verticillata	VLOT	73	265229.735	5766092.374
T94 Allocasuarina verticillata	LOT	42	266124.987	5764969.103
T95 Allocasuarina verticillata	LOT	46	266093.878	5764957.022
M1 Yellow Gum (hybrid)	MOT	54	266430.28	5765412.57
M2 River Red Gum	MOT	53	266416.355	5765444.42
M3 River Red Gum	MOT	63	265233.081	5765694.564
M4 River Red Gum	MOT	57	265228.985	5765666.42
M5 River Red Gum	MOT	69	265293.235	5766179.754
M6 River Red Gum	MOT	65	265283.362	5766178.596
M7 River Red Gum	MOT	60	265283.798	5766167.852
M8 Allocasuarina verticillata	MOT	37	263655.390	5766393.806
M9 Allocasuarina verticillata	MOT	37	263658.295	5766388.736
M10 Allocasuarina verticillata	MOT	35	263613.287	5766035.887
M12 River Red Gum	MOT	59	266380.302	5764926.156
M16 River Red Gum	MOT	62	266374.163	5764927.227

M17 River Red Gum	MOT	53	266420.352	5764918.766
M18 River Red Gum	MOT	64	266470.329	5764913.836
M22 River Red Gum	MOT	64	265356.164	5766115.936
M23 River Red Gum	MOT	62	265350.974	5765560.324
M24 River Red Gum	MOT	59	265360.278	5765519.998
M25 River Red Gum	MOT	55	265199.694	5765081.819
M26 River Red Gum	MOT	57	266553.661	5764140.504
M27 River Red Gum	MOT	58	266013.468	5764964.264
M28 Wattle	MOT	27	266473.648	5764953.225
M29 Wattle	MOT	23	266496.23	5764953.141
M30 Swamp Gum	MOT	55	265986.257	5766581.054
M31 Eucalypt spp unknown	MOT	62	266198.671	5764593.231
M32 Sheoak (dead)	MOT	33	266191.441	5764510.449
M33 Allocasuarina verticillata	MOT	35	266199.563	5764508.072
M35 Acacia (dead) (previously 28)	MOT	27	266526.317	5765042.666
M36 Allocasuarina verticillata	MOT	36	266078.884	5764973.985
M37 River Red Gum	MOT	55	266040.829	5764978.733
M38 Acacia	MOT	24	265994.623	5764123.865
M39 Allocasuarina verticillata	MOT	34	265943.021	5764114.713
M40 Allocasuarina verticillata	MOT	34	265172.489.	5764087.063
M41 River Red Gum	MOT	64	265852.774	5764137.06

Patch vegetation has been deleted T-Trees (either LOTs or VLOTs)

M-Medium old Trees

Appendix F - Small trees

There were approximately 400 small trees across the site located outside habitat zones and plantations. The location of these trees is often in groups due to identification and scaling issues. Where the trees are not 10 years old and considered regrowth they have stated as regrowth and shown on map. The following table shows small trees and may be inclusive of habitat zones in some cases.. Small individual trees are coded S, unless in groups whereby they are coded G(X) and each DBH is recorded. These are colour coded on attached mapping.

Small Scattered Tree ID and Group ID	Individual or group	Diameter @ Breast Height DBH (cm)		Northing
14 River Red Gum	(G)x3	43	265984.28	5764969.167
River Red Gum	(G)	44		
River Red Gum	(G)	50		
15 Allocasuarina	(G)x3	27	266086.635	5764961.936
Allocasuarina	(G)	18		
Allocasuarina	(G)	32		
16 wattle	regrowth	15approx		
20 Allocasuarina	(G)X 25	19	266015.38	5764987.284
Allocasuarina	(G)	22		
Allocasuarina (dead)	(G)	17	(E-W)	
Allocasuarina (dead)	(G)	25		
River Red Gum	(G)	51		
River Red Gum	(G)	35		
River Red Gum	(G)	15		
River Red Gum	(G)	46		
River Red Gum	(G)	24		
River Red Gum	(G)	30		
Allocasuarina verticillata	(G)	12		
River Red Gum	(G)	42		
River Red Gum	(G)	44		
River Red Gum	(G)	33		
River Red Gum	(G)	29		
River Red Gum	(G)	33		
River Red Gum	(G)	35		
River Red Gum	(G)	42		
River Red Gum	(G)	20		
River Red Gum	(G)	22		
River Red Gum	(G)	16		
River Red Gum	(G)	51		
River Red Gum	(G)	8		

River Red Gum	(G)	44		
River Red Gum	(G)	39		
22(G) Acacia	(G)x 3	7	266369.821	5764065.382
Acacia	(G)	19		
Acacia	(G)	4		
23(G) Acacia	(G)x 3	15		
Acacia	(G)	21		
Acacia	(G)	7		
24 Allocasuarina verticillata	(G)x 7		265934.105	5764111.903
Allocasuarina verticillata	(G)	15		
Allocasuarina verticillata	(G)	8		
Allocasuarina verticillata	(G)	29		
Allocasuarina verticillata	(G)	29		
Allocasuarina verticillata	(G)	26		
Allocasuarina verticillata	(G)	5		
25 Swamp Gum	1	49	265391.672	5766391.04
26 Allocasuarina	1	15	264087.603	5766736.259
27 River Red Gum	(G)x3	24	265337.947	5766542.436
River Red Gum	(G)	25	265338.207	5766530.159
River Red Gum	(G)	29	265336.072	5766524.477
28 River Red Gum	(G)x7	42	265321.929	5766410.816
Red River Gum	(G)	8	265322.916	5766421.884
Red River Gum	(G)	12	265322.916	5766421.884
Red River Gum	(G)	14	265322.916	5766421.884
Red River Gum	(G)	11	265322.916	5766421.884
River Red Gum	(G)	29	265321.977	5766395.809
River Red Gum	(G)	12	265321.977	5766395.809
29 Wattle	1	10	265305.794	5765687.154
30 wattle dead	1	25	265299.656	5765674.542
31 River red Gum	1	14	265223.36	5765077.338
32 Wattle	1	12	265186.683	5765089.291
33 Acacia	(G)x33	20	265449.582	5765057.497
33 Acacia	(G)	18	(recorded E-W)	
33 Acacia (dead)	(G)	10		
33 Acacia (dead)	(G)	13		
33 Acacia (dead)	(G)	10		
33 Acacia	(G)	19		
33 Acacia (dead)	(G)	15		
33 Acacia (dead)	(G)	17		
33 Acacia (dead)	(G)	8		
33 Acacia (dead)	(G)	12		
33 Acacia (dead)	(G)	12		
33 Acacia (dead)	(G)	17		

33 Acacia (dead)	(G)	12		
33 Acacia (dead)	(G)	17		
33 Acacia (dead)	(G)	21		
33 Acacia (dead)	(G)	11		
33 Acacia (dead)	(G)	6*6		
33 Acacia (dead)	(G)	14		
33 Acacia (dead)	(G)	11		
33 Acacia (dead)	(G)	10		
33 Acacia (dead)	(G)	10*6		
33 Acacia (dead)	(G)	11		
33 Acacia (dead)	(G)	11		
33 Acacia (dead)	(G)	10		
33 Acacia (dead)	(G)	12		
33 Acacia (dead)	(G)	15		
33 Acacia (dead)	(G)	13		
33 Acacia (dead)	(G)	17		
33 Acacia	(G)	20		
33 Acacia (dead)	(G)	3*6		
33 Acacia (dead)	(G)	10		
33 Acacia (dead)	(G)	10		
33 Acacia (dead)	(G)	16		
34 River Red Gum	1	48		
35 Acacia	(G)x10		265363.24	5765064.491
Acacia	(G)	8		
Acacia	(G)	9		
Acacia	(G)	16		
Acacia	(G)	16		
Acacia	(G)	16		
Acacia	(G)	19		
Acacia	(G)	20		
River Red Gum	(G)	15		
River Red Gum	(G)	23		
36 River red Gum	1	37	265891.451	5764999.523
37 River red Gum	(G)x 4	13	265416.701	5765060.475
River red Gum	(G)	22		
River red Gum	(G)	25		
River red Gum	(G)	31		
38 Allocasuarina	(G)x22	14	265875.901	5764136.985
Allocasuarina	(G)	18		
Allocasuarina	(G)	19		
Allocasuarina	(G)	20		
Allocasuarina	(G)	19		
Allocasuarina	(G)	22		

Allocasuarina	(G)	19		
Allocasuarina	(G)	18		
Allocasuarina	(G)	24		
Allocasuarina	(G)	26		
Allocasuarina	(G)	8		
Allocasuarina	(G)	23		
Allocasuarina	(G)	16		
Yellow Gum (planted, or originated from planted)	(G)	20		
Allocasuarina	(G)	9		
Allocasuarina	(G)	11		
Allocasuarina	(G)	10		
Allocasuarina	(G)	11		
Allocasuarina	(G)	7		
Allocasuarina	(G)	13		
Allocasuarina	(G)	13		
Allocasuarina	(G)	12		
S39 Allocasuarina	1	34	266129.902	5769107.902
S40 Acacia	(G)x13	16	266183.014	5764106.261
Acacia	(G)	10		
Acacia	(G)	19		
Acacia	(G)	9		
Acacia Regrowth	(G)	<5		
Acacia	(G)	16		
Acacia	(G)	21		
Acacia	(G)	12		
Acacia	(G)	12		
Acacia	(G)	12		
Acacia	(G)	17		
Acacia	(G)	10		
Acacia	(G)	11		
S41 Allocasuarina	(G)x3	18	266505.463	5764070.183
Allocasuarina	(G)	18		
Allocasuarina	(G)	18		
S42 - Acacia	(G)x4	17	266368.342	5764089.315
Acacia	(G)	18		
Acacia	(G)	19		
Acacia	(G)	25		
Red River Gum	1	24	266487.455	5764962.667
Red River Gum	1	26	266525.136	5764975.059
Red River Gum	1	44	266494.153	5764980.383
Acacia	1	16	266468.23	5764977.891
Red River Gum	1	17	266457.64	5764963.742

Red River Gum	1	22	266456.23	5764981.752
Acacia	1	14	266461.666	5764994.264
Red River Gum	1	36	266437.324	5765002.252
Red River Gum	1	37	266431.224	5764990.754
45 River Red Gum	(G) X2	26	266641.523	5765015.738
River Red Gum	(G)	19		
46 River Red Gum (regrowth only)			266794.784	5765324.657
47 River Red Gum	1	47	266915.013	5766377.439
48 Acacia (regrowth)				
49 River Red Gum	1	45	264530.489	5766265.193
50 River Red Gum	1	45	264529.999	5766257.973
51 Acacia (regrowth)				
52 Planted Eucalypts	(G)			
53 Acacia understory	1	55	264113.202	5766162.293
54 Acacia understory	1	37	264132.243	5766170.655
55 Allocasuarina	1	16	265223.789	5766080.449
56 Allocasuarina	1	25	265229.833	5766102.241
57 (regrowth only Blackwoods				
58 River Red Gum	1	15	266071.408	5765855.7
59 River Red Gum (regrowth)	1	10	266646.344	5765024.934
60 River Red Gum (regrowth)	1	12	266558.492	5764925.754
61 River Red Gum + regrowth	1	23	266178.698	5764963.421
62 Acacia	1	18	266161.318	5764947.849
63 Acacia	(G)x 19	11	265506.461	5764756.505
63 Acacia	(G)	16		
63 Acacia	(G)	10		
63 Acacia	(G)	11		
63 Acacia	(G)	9		
63 Acacia	(G)	13		
63 Acacia	(G)	9		
63 Acacia	(G)	13		
63 Acacia	(G)	10		
63 Acacia	(G)	11		
63 Acacia dead	(G)	14		
63 Acacia dead	(G)	17		
63 Acacia	(G)	11		
63 Acacia	(G)	11		
63 Acacia	(G)	11		
63 Acacia dead	(G)	11		
63 Acacia	(G)	13		
63 Acacia	(G)	13		
63 Acacia	(G)	12		

S64 Acacia	1	20	265518.508	5764715.39
S65 Allocasuarina (regrowth?)	1	8	265518.415	5764708.17
S66 River Red Gum	1	42	265161.106	5766079.68
S67 River Red Gum	1	45	266245.447	5764937.097
S68 River Red Gum	1	48	266752.98	5764862.044

These are associated with the ring road