



Flora and Fauna Assessment: Ajax Road, Altona

DRAFT REPORT

Prepared for Axxcel Management Services

24 March 2014

Biosis offices

AUSTRALIAN CAPITAL TERRITORY

Canberra

Floor 1, Unit 3, 38 Essington Street
Mitchell ACT 2911

Phone: (02) 6241 2333
Fax: (03) 9646 9242
Email: canberra@biosis.com.au

NEW SOUTH WALES

Sydney

Unit 14 17-27 Power Avenue
Alexandria NSW 2015

Phone: (02) 9690 2777
Fax: (02) 9690 2577
Email: sydney@biosis.com.au

Wollongong

8 Tate Street
Wollongong NSW 2500

Phone: (02) 4229 5222
Fax: (02) 4229 5500
Email: wollongong@biosis.com.au

QUEENSLAND

Brisbane

Suite 4 First Floor, 72 Wickham Street
Fortitude Valley QLD 4006

Phone: (07) 3831 7400
Fax: (07) 3831 7411
Email: brisbane@biosis.com.au

VICTORIA

Ballarat

506 Macarthur Street
Ballarat VIC 3350

Phone: (03) 5331 7000
Fax: (03) 5331 7033
Email: ballarat@biosis.com.au

Melbourne (Head Office)

38 Bertie Street
Port Melbourne VIC 3207

Phone: (03) 9646 9499
Fax: (03) 9646 9242
Email: melbourne@biosis.com.au

Wangaratta

16 Templeton Street
Wangaratta VIC 3677

Phone: (03) 5721 9453
Fax: (03) 5721 9454
Email: wangaratta@biosis.com.au

Document information

Report to: Axxcel Management Services

Prepared by: Steve Mueck
Clare McCutcheon
Sally Koehler

Biosis project no.: 16344

File name: 16344.Ajax.Rd.FFA.DRA01.24032014 .docx

Citation: Biosis 2014. Flora and Fauna Assessment: Ajax Road, Altona. Report for Axxcel Management Services. Authors: S Mueck, C McCutcheon & S Koehler, Biosis Pty Ltd, Melbourne. Project No. 16344.

Document control

Version	Internal review	Date issued
Draft version 01	DCG	24/03/14
Final version 01		XX/03/14

Acknowledgements

Biosis Research acknowledges the contribution of the following people and organisations in undertaking this study:

- Axxcel Management Services: Nigel Sharp
- Department of Environment and Primary Industries for access to the Victorian Biodiversity Atlas

The following Biosis Research staff were involved in this project:

- Sally Mitchell for mapping
- Dan Gilmore for report review

© Biosis Pty Ltd

This document is and shall remain the property of Biosis Pty Ltd. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of the Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Disclaimer:

Biosis Pty Ltd has completed this assessment in accordance with the relevant federal, state and local legislation and current industry best practice. The company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report content or for any purpose other than that for which it was intended.

Contents

Summary	VI
1. Introduction	1
1.1 Project background.....	1
1.2 Scope of assessment.....	1
1.3 Location of study area.....	1
2. Methods	3
2.1 Literature and database review	3
2.2 Definitions of significance.....	3
2.2.1 Species and ecological communities.....	3
2.2.2 NaturePrint areas	4
2.3 Likelihood of presence for significant species	4
2.4 Site investigation.....	4
2.4.1 Flora assessment	4
2.4.2 Fauna assessment.....	6
2.4.3 Permits	7
2.5 Qualifications.....	7
2.6 Legislation and policy	10
2.7 Mapping.....	10
3. Results.....	11
3.1 Site Context.....	11
3.2 Vegetation	11
3.2.1 Species	18
3.3 Fauna.....	18
3.3.1 Habitats.....	18
3.3.2 Species	19
3.3.3 Striped Legless Lizard survey.....	19
3.3.4 Golden Sun Moth Survey	20
3.4 Significant species and ecological communities	20
3.4.1 EPBC Act, FFG Act & DSE Advisory listed species.....	20
3.4.2 Significant ecological communities.....	20
3.5 Other ecological values	22
3.6 Summary of biodiversity values of the site	22
4. Biodiversity Legislation and Government Policy	23
4.1 Commonwealth	23
4.1.1 Environment Protection and Biodiversity Conservation Act 1999	23

4.2 State.....	23
4.2.1 Flora and Fauna Guarantee Act 1988 (FFG Act)	23
4.2.2 Catchment and Land Protection Act 1994 (CaLP Act).....	25
4.2.3 Planning and Environment Act 1987 (incl. Planning Schemes)	25
4.2.4 Wildlife Act 1975 and associated Regulations	26
4.2.5 Environmental Effects Act.....	26
4.2.6 Water Act 1989	27
4.2.7 Environment Protection Act 1970: State Environmental Protection Policy (Waters of Victoria) 2003 27	
5. Victoria's Biodiversity Assessment Guidelines.....	28
5.1 Site based information.....	28
5.1.1 Habitat Hectares	29
5.2 Landscape scale information.....	29
5.2.2 Strategic biodiversity score.....	29
5.2.3 Habitat importance score	29
5.3 Proposed removal of native vegetation	29
5.3.2 Determining the risk-based pathway.....	31
5.4 Offsetting the loss of native vegetation.....	33
5.4.2 Specific-general offset test	33
5.4.3 Specific offsets.....	33
5.4.4 Suitability for On-site offsets.....	34
5.4.5 Offset Potential	34
6. Key Ecological Values and Recommendations.....	35
References.....	38
Appendices	40

List of Figures

Figure 1: Location of the study area within Lot H, Ajax Road, Altona, Victoria	2
Figure 2: Golden Sun Moth targeted survey effort, Ajax Road, Altona.	8
Figure 3: Location of Location of Striped Legless Lizard tile grids, Ajax Road, Altona.....	9
Figure 4: Ecological features within Lot H, Ajax Road, Altona.	12

List of Plates

Plate 1: Kangaroo Grass dominated Plains Grassland in Habitat Zone 6 (proposed for clearing)	14
Plate 2: Cotton Fireweed found in Plains Grassland Habitat Zone 5 (proposed for clearing)	14
Plate 3 Small-flower Mat-rush found in Plains Grassland Habitat Zone 7 (proposed for clearing)	15
Plate 4: Small-flower Flax-lily found in Plains Grassland Habitat Zone 7 (proposed for clearing)	15

Plate 5: Plains Grassland dominated by a combination of Coast Tussock-grass with Australian Salt-grass found in Habitat Zone 9 (area to be retained and protected)	16
Plate 6: Spiny Rice-flower found in Plains Grassland Habitat Zone 7 (proposed for clearing).....	16
Plate 7: Plains Grassy Wetland found in Habitat Zone 2 (proposed for clearing).....	17
Plate 8: Brackish Wetland found in Habitat Zone 10 (area to be retained and protected).....	17
Plate 9: Exotic vegetation dominated by Chilean Needle Grass and Artichoke Thistle adjacent to the southern boundary of Ajax Road (proposed for clearing).....	18

List of Tables

Table 1: Criteria for determining significance of species & ecological communities.....	3
Table 2: Striped Legless Lizard survey results.....	20
Table 3: Assessment of project in relation to the EPBC Act	24
Table 4: Habitat hectares of native vegetation within the study area	30
Table 5: Habitat importance scores for habitat zones proposed for clearing within the study area.....	31
Table 6: Summary of habitat hectares to be removed	31

Summary

Biosis Pty. Ltd. was commissioned by Axxcel Management Services to undertake a flora and fauna assessment of land at Lot H, Ajax Road, Altona. The land is proposed for a future development within this industrial estate.

The site is located approximately 15 km west south west of the Melbourne CBD in Altona, south of the Werribee Rail line. It covers 73.66 ha and includes most of Lot H (78.05 ha) of the Elfield Industrial Estate. It is currently zoned Special Use Zone 4 (SUZ4) which is designated for industrial development.

The site supports substantial areas of remnant native vegetation although areas in close proximity to the existing road network have generally been heavily disturbed and support largely exotic vegetation. The south western corner of the site is subject to inundation and supports brackish wetlands associated with the estuary of Laverton Creek.

Flora and Ecological Vegetation Classes

The study supports remnant native vegetation and disturbed industrial land dominated by exotic species. The areas of native vegetation are classified into three ecological vegetation classes including Plains Grassland, Plains Grassy Wetland and Brackish Wetland.

A total of 109 indigenous and 80 introduced plant species was recorded from the site. Previous surveys have recorded an additional 29 native and 22 weed species.

Systematic surveys were conducted for Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*. These surveys identified 489 individuals of Spiny Rice-flower. This places this population within the largest 10% of known populations for this species. These surveys also identified three individuals of Arching Flax-lily *Dianella* sp. aff. *longifolia* (Benambra) and three populations of Pale Spike-sedge *Eleocharis pallens*.

Two other species of State conservation significance including Creeping Rush *Juncus revolutus* and Salt Lawrencia *Lawrencia spicata*, are recorded by the existing data from the area of Brackish Wetland in the south west of the study area.

No other significant flora species were detected by the targeted surveys. Other threatened flora may be present although some, like Small Golden Moths *Diuris basaltica*, would probably only be detectable in the first spring after a fire.

Fauna

The site provides potential habitat for a small number of national and state significant fauna species, the most significant being the Golden Sun Moth *Synemon plana*. There is a record of Golden Sun Moth from within 100 metres of the study area on Ajax Road. Targeted survey between December 2010 and January 2011 did not detect the species; however, a population may still be present.

Surveys for Striped Legless Lizard *Delma impar* failed to detect the species and an important population of this reptile is unlikely to be present on the subject land. The state significant Tussock Skink *Pseudemoia pagenstecheri* was recorded under tiles during the targeted Striped Legless Lizard surveys.

Habitat for the state significant Altona Skipper Butterfly was identified within the area of Brackish Wetland in the south western corner of Lot H. Marginal habitat for the nationally significant Orange-bellied Parrot was also identified within this area.

Latham's Snipe (listed as migratory under the EPBC Act) was recorded adjacent to the study area. Areas of Plains Grassy Wetland and Brackish Wetland within the study area provides potential habitat for this species.

Vegetation Condition Assessment (Habitat Hectares)

A total of nine habitat zones were identified. Each habitat zone is assigned an overall habitat score, which is multiplied by its area to provide the number of habitat hectares present.

The study area contains a total of 34.9 hectares of native vegetation, which comprises 20.1 habitat hectares (hha). The habitat score for the habitat zones ranges from 0.39 to 0.72. Habitat Zones 9 and 10 represent the most intact areas of native vegetation.

Government legislation and policy

An assessment of the project in relation to key biodiversity legislation and policy is provided and summarised below.

Summary of legislative requirements for development within the study area

Legislation / Policy	Relevant Ecological Feature on site	Permit / Approval Required	Other Requirements/ Comments
EPBC Act	Threatened species, listed communities and migratory species (Spiny Rice-flower, Golden Sun Moth, Latham's Snipe, Natural Temperate Grassland of the Victorian Volcanic Plain).	Referral recommended prior to any development.	Threatened species and communities surveys completed. Provide offsets as determined under the referral process
FFG Act		Protected Flora Permit not required	Site is private land.
Planning & Environment Act (Hobsons Bay Council Planning Scheme)	Native vegetation, including patches of native vegetation, present.	Planning permit required, including permission to lop or remove native vegetation.	Native vegetation offsets required before development proceeds.
Victoria's Biodiversity Assessment Guidelines	Site supports 34.9 ha of remnant native vegetation assessable under the Guidelines.	DEPI would likely be a referral authority under any development proposal	Targeted threatened species surveys completed.

Permitted clearing of native vegetation: Biodiversity assessment guidelines (the Guidelines)

An assessment of the project against the Guidelines is provided below*:

Guidelines	Outcome	Notes
Location risk	Location A and C	Most of the site is within Location A with a small section of Habitat Zone 5 identified as Location C
Native vegetation removal extent	15.819 ha	Eight patches identified as 5 habitat zones
Risk-based pathway	High	Based on the impact on an area of Location C and the loss of any native vegetation within this category
Habitat hectares to be removed	7.885	Habitat Zones 2, 5, 6, 7 and 12
Strategic Biodiversity Score	0.574	As determined by DEPI (Appendix 3)
Modelled habitat for rare or threatened species	Salt Lawrenca <i>Lawrenca spicata</i> and Creeping Rush <i>Jucus revolutus</i>	These species are only known from Brackish Wetland south of the Altona rail line. This area would be retained and managed for conservation. Threatened species known from the area of proposed clearing site include Arching Flax-lily <i>Dianella sp. aff. longifolia</i> (Benambra) and Spiny Rice-flower <i>Pimelea spinescens</i> subsp. <i>spinescens</i> . Golden Sun Moth is also known from the local area. No modelled important habitat is noted by DEPI for these species.
Specific-general offset test result	The loss of native vegetation has a proportional impact above the specific offset threshold	Specific offsets required for Salt Lawrenca and Creeping Rush
General/Specific Biodiversity Equivalence Scores	Between 0.012 and 3.064	Specific biodiversity equivalence scores (SBES) for Salt Lawrenca identified for all habitat zones impacted while the impact to Creeping Rush is confined to Habitat Zone 5 with an SBES of 0.684 (Appendix 3)
Offset type	Specific	Directed at Salt Lawrenca and Creeping Rush
Offset risk factor	2	As prescribed by the guidelines for specific offsets
Offset amount: Specific Biodiversity Equivalence Units	12.760	11.391 for Salt Lawrenca and 1.369 for Creeping Rush
Offset Vicinity	Victoria	Specific offset may be sourced from any suitable habitat within the State
Offset minimum Strategic Biodiversity Score	Not defined	The offset need only provide habitat for the two nominated species as defined by the habitat importance map for that species

*outputs provided by DEPI native vegetation support team

Only part of the required specific offsets could be generated through management of native vegetation retained within the study area (south of the Altona rail line). This would be a 'first party' offset and would require the appropriate vegetation security agreements and a 10 year offset management plan. Alternatively, the applicant may seek to purchase 'third party' specific offset credits via an accredited trading scheme.

A total of 5.553 General Biodiversity Equivalence Units (GBEU) could be generated through management of vegetation on site. The site can also generate a number of Specific Biodiversity Equivalence Units (SBEU) including 2.552 SBEU for Salt Lawrencia and 0.230 SBEU for Creeping Rush. The shortfall of **8.839 SBEU** and **1.139 SBEU** for Salt Lawrencia and Creeping Rush will need to be secured off-site.

The proponent is responsible for sourcing and legal protection of offset sites in perpetuity and funding management of those sites for the initial 10 years.

Recommendations and Discussion

The results of this assessment should be incorporated into the project design, by adding the flora and fauna mapping information into the planning maps and investigating options to retain as much of the mapped vegetation/habitats as possible.

Future requirements for infrastructure and services must be forecast as much as possible at this time and allowance made outside any nominated reserves for all construction works. This includes road batters, footpaths, drainage and services (including optic fibre). All areas of vegetation/habitat nominated in the design plan as 'retained' are to be treated as no-go zones and are not to be encroached upon as development progresses.

Development design maintains a clear separation between the proposed development and the retained native vegetation. These two components are separated by the existing Altona rail line. Potential impacts associated with changes in local hydrology resulting from the proposed development need to consider the maintenance of wetland values on the southern side of the Altona rail line.

Vegetation losses are unavoidable for the development as proposed and offsets are required under the Biodiversity Assessment Guidelines (as summarised above).

While the proposed development will not have a direct or significant indirect impact on species otherwise restricted to the brackish wetland environment in the south west of the study area, DEPI habitat importance maps indicate the proposed clearing would have a significant impact on two rare species which are otherwise restricted to this protected habitat. The areas of Plains Grassland and Plains Grassy Wetland which would be impacted by the proposed development do not provide habitat for either of these species.

DEPI habitat models do not predict any significant impact to the endangered and Spiny Rice-flower and vulnerable Arching Flax-lily which were recorded from the proposed development site. Offsets for Spiny Rice-flower and Natural Temperate Grassland of the Victorian Volcanic Plain are likely to be required under any approval provided under the EPBC Act.

Given the very different habitats required to be protected by the State and Australian Government regulators, there will not be scope for any external offset requirements to be provided to satisfy both regulators concurrently.

1. Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by Axxcel Management Services to undertake a flora and fauna assessment of the majority of Lot H, Ajax Road, Altona. An industrial development is proposed for the site.

A due diligence level assessment of the site has previously been conducted for Axxcel Management Services (Biosis Research 2010).

1.2 Scope of assessment

The objectives of this investigation are to:

- Undertake a field inspection of the flora and fauna values on site;
- Describe the vascular flora (ferns, conifers, flowering plants) and terrestrial vertebrate fauna (mammals, birds, reptiles & frogs)
- Map native vegetation and other habitat features
- Conduct a vegetation quality assessment (habitat hectare assessment);
- Assess the potential for the site to support threatened species
- Review the implications of relevant biodiversity legislation and policy, including Victoria's Permitted clearing of native vegetation - Biodiversity assessment guidelines (DEPI 2013a)
- Identify potential implications of the proposed development and provide recommendations to assist with development design
- Identify the extent of threatened flora and fauna populations within the site through systematic survey.

1.3 Location of study area

The site is located approximately 15 km west south west of the Melbourne CBD in Altona, south of the Werribee Rail line (Figure 1). It covers 73.66 ha and includes about 95% of Lot H (78.05 ha) of the Elfield Industrial Estate, which is currently zoned Special Use Zone 4 (SUZ4).

The site is bounded to the north by the Werribee rail line and is traversed by the Altona rail line. The western boundary of the site abuts Kayes Drain while the eastern boundary includes an unnamed road linking Ajax Road and Slough Road, the southern boundary of Chester Road, and the western boundary of Galvin Street.

The study area is within the:

- Victorian Volcanic Plain bioregion
- Werribee River Basin
- Port Phillip and Westernport CMA
- City of Hobsons Bay

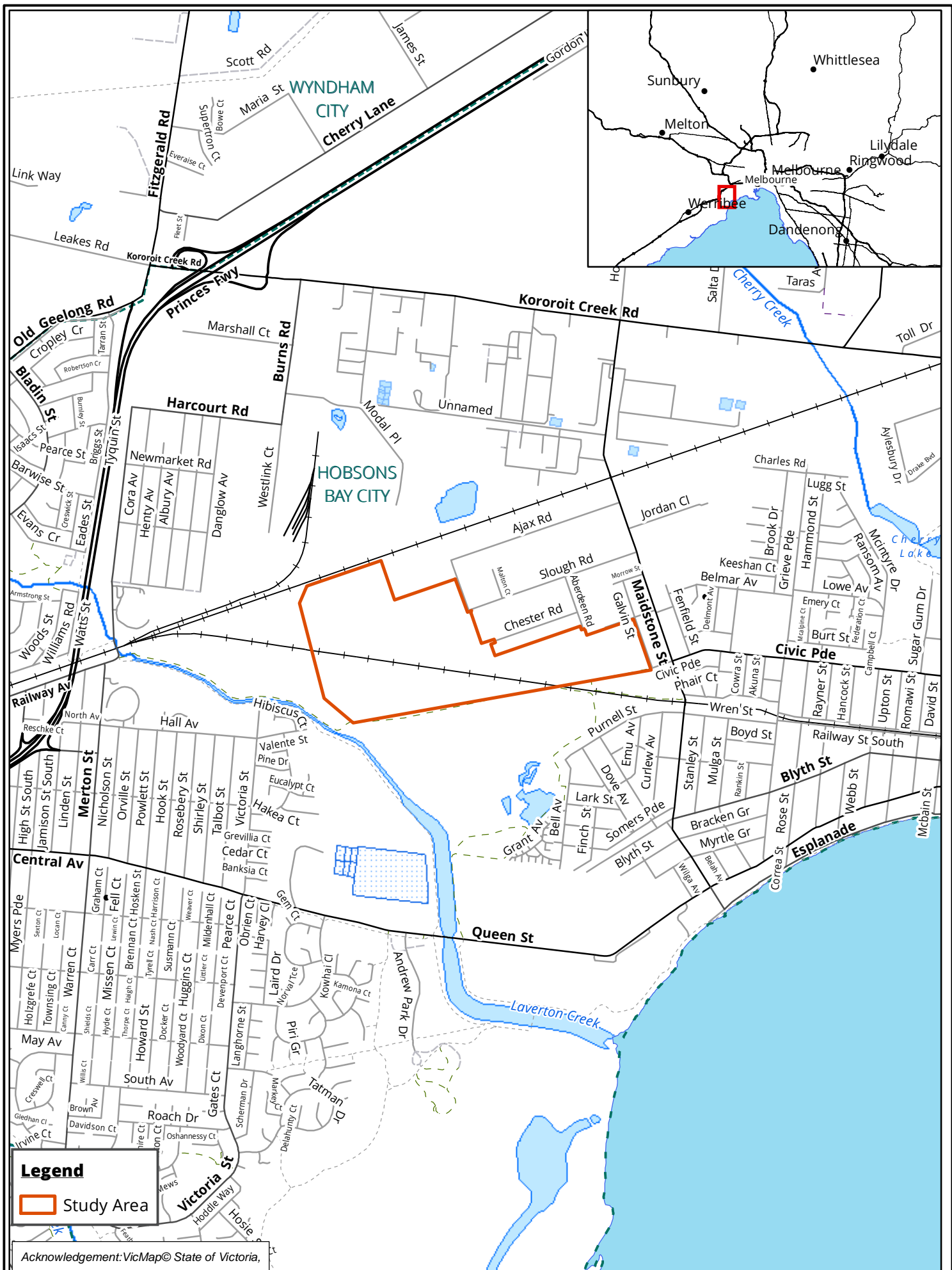


Figure 1: Location of the Study Area - Ajax Road, Altona, Victoria

2. Methods

2.1 Literature and database review

In order to provide a context for the study site, information about flora and fauna from within 5 km of the study area (the 'local area') was obtained from relevant public databases. . Records from the following databases were collated and reviewed:

- Flora Information System (FIS) which includes records from the Victorian Biodiversity Atlas 'VBA_FLORA25, FLORA100 & FLORA Restricted' August 2012 © The State of Victoria, Department of Environment and Primary Industries (DEPI). The contribution of the Royal Botanical Gardens Melbourne to the database is acknowledged
- Victorian Biodiversity Atlas 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' August 2012 © The State of Victoria
- DEPI Biodiversity Interactive Map (BIM)
- The Native Vegetation Information Management Tool (NVIM) provided by DEPI.
- BirdLife Australia, the New Atlas of Australian Birds 1998-2012 (BA)
- Protected Matters Search Tool of the Australian Department of the Environment for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

Other sources of biodiversity information:

- DEPI NaturePrint; accessed through the Biodiversity Interactive Map
- Biosis records that have been submitted to DSE but do not yet appear on the VBA, or FIS)

The site has been subject to ecological assessments in the past including Frood et al. (1997), Biosis Research (2006) and Biosis Research (2010). Relevant information from these reports was also reviewed and included as appropriate.

2.2 Definitions of significance

2.2.1 Species and ecological communities

The significance of a species or community is determined by its listing as rare or threatened under Commonwealth or State legislation / policy. The sources used to categorise significance of species and communities in this report are summarised below in Table 1.

Table 1: Criteria for determining significance of species & ecological communities

Significance	
National	Listed as threatened (critically endangered, endangered, vulnerable or conservation dependent) under the Environment Protection and Biodiversity Conservation Act 1999
State	Listed as threatened (critically endangered, endangered, vulnerable) or rare for flora species, in Victoria on a DEPI Advisory List (DSE 2005, 2013b) Listed as threatened under the Flora and Fauna Guarantee Act 1988

Fauna species listed as near threatened or data deficient are listed in Appendix 2, however in accordance with advice from DSE these fauna species are not considered to be at the same level of risk as higher categories of threat. These species are generally not discussed in detail in this report.

2.2.2 NaturePrint areas

Areas of conservation significance were formerly documented in the DSE Biodiversity Interactive Map as Biosites ranked as significant at national, state and regional levels. DEPI have advised that the Biosite reports are obsolete and their replacement layer on the Biodiversity Interactive Map is now NaturePrint which identifies the relative contribution of sites to protecting the full range of biodiversity values in Victoria.

2.3 Likelihood of presence for significant species

The models of advisory listed species (DSE 2005, DEPI 2013b) distribution produced by DEPI provide the basis for assessment of biodiversity importance when quantifying native vegetation that is proposed to be removed. The models are constructed using state-level explanatory variables and limitations with accuracy should be considered as such for site-level assessments.

The likelihood of species which are identified by the Protected Matters Search Tool (PMST) (i.e. EPBC Act listed species) or other EPBC Act listings either recorded or considered as having a high likelihood of presence within the site, is ranked as negligible, low, medium or high. The likelihood of occurrence is a broad categorisation used by Biosis to indicate the potential for a species to occur within the study area. It is based on expert opinion and implies the relative value of a site for a particular species. The rationale for the rank assigned is provided for each species in Appendix 1 (flora) and Appendix 2 (fauna).

Species which have at least medium likelihood of occurrence are given further consideration in this report. The need for targeted survey for these species is also considered.

Only those species listed under the EPBC Act or listed as threatened under the FFG Act (hereafter referred to as 'listed species') are assessed to determine their likelihood of occurrence. The habitat value for species listed on the DEPI Advisory Lists is calculated by the Habitat Importance Modelling produced by DEPI (DEPI 2013a). Where DEPI Advisory list species are recorded in the study area this is noted.

2.4 Site investigation

2.4.1 Flora assessment

The flora assessments were undertaken on 12 October 2010, 5 January and 2 March 2011 and 12 March 2014. All assessments were conducted by Stephen Mueck (DEPI Registration Number HH173).

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses' (Clause 72).

Victoria's Permitted clearing of native vegetation: Biodiversity assessment guidelines classify native vegetation into two categories (DEPI 2013a):

- A **remnant patch** of native vegetation (measured in hectares) is either:
 - *An area of native vegetation, with or without trees, where at least 25 percent of the total perennial understorey cover is native plants.*
 - *An area with three or more indigenous canopy trees where the tree canopy cover is at least 20 percent.*

Remnant patch vegetation is classified into ecological vegetation classes (EVCs). An EVC contains one or more floristic (plant) communities, and represents a grouping of broadly similar environments.

Definitions of EVCs and benchmarks (condition against which vegetation quality at the site can be compared) are determined by DEPI.

No **remnant trees** are present within the study area and therefore no assessments relating to remnant canopy trees was required.

A Vegetation Quality Assessment was undertaken for all remnant patch native vegetation identified in the study area. This assessment is consistent with DEPI's Habitat Hectare method (DSE 2004) and the Guidelines (DEPI 2013a). For the purposes of this assessment the limit of the resolution for the habitat hectare assessment process is taken to be 0.001 habitat hectares (Hha). That is, if native vegetation is present with sufficient cover but its condition and extent would not result in the identification of at least 0.001 habitat hectares, then that vegetation will not be mapped or assessed as a separate habitat zone.

The property was traversed on foot and 15 flora species checklists lists were collected to assist in the determination of understorey and weeds components of the habitat scores. These were collated into a single species list (#T2514100). Additional species recorded during targeted searches were added to the cumulative site list (Appendix 2). Vascular plants include all flowering plants, conifers, ferns and fern allies. Planted species have not been recorded unless they are naturalised.

This data will be submitted to DEPI for incorporation into the VBA.

The general condition of native vegetation was recorded as well as the effects of current seasonal conditions. Where relevant, notes were made on specific issues such as noxious weed infestations, evidence of management works, current land use impacts and the regeneration capacity of the vegetation.

Species nomenclature for flora follows the FIS. Classification of native vegetation is based on ecological vegetation classes (EVCs). An EVC contains one or more floristic (plant) communities, and represents a grouping of broadly similar environments. Definitions of EVCs and benchmarks (condition against which vegetation quality at the site can be compared) are as determined by DEPI.

Biosis Research (2010) noted populations of two threatened flora species including Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* and Arching Flax-lily *Dianella* sp. aff. *longifolia* (Benambra). A total of 32 other species of state and national conservation significance have medium or higher likelihood of occurrence within the site due to the presence of suitable habitat (Biosis Research 2010).

Of these 34 significant species, systematic searches were conducted for nine. The main target species of these searches was Spiny Rice-flower and Arching Flax-lily. However other target species included Small Golden Moths *Diuris basaltica*, Sunshine Diuris *D. fragrantissima*, Pale-flower Crane's-bill *Geranium* sp. 3, Small Milkwort *Comesperma polygaloides*, Tough Scurf-pea *Cullen tenax*, Basalt Podolepis *Podolepis* sp. 1 and Rye Beetle-grass *Tripogon loliiformis*.

The limited freshwater wetland habitat present was also examined for evidence of species such as River Swamp Wallaby-grass *Amphibromus fluitans*, Swollen Swamp Wallaby-grass *Amphibromus pithogastrus* and Pale Swamp Everlasting *Coronidium scorpioides* 'aff. *rutidolepis* (Lowland Swamp).

Searches were conducted in the Brackish Wetland in the south western corner of the study area. However the extent of surface water, the dense nature of the vegetation and extent of environmental weeds such as African Boxthorn *Lycium ferocissimum* and Spiny Rush *Juncus acutus* made the survey difficult and a significant portion of this vegetation could not be searched. This community is known to support populations of Creeping Rush *Juncus revolutus* and Salt Lawrenceia *Lawrenceia spicata* to the south of the study area (Biosis Research 2010). Other species such as Salt Fireweed *Senecio halophilus*, Shore Spleenwort *Asplenium obtusatum* subsp. *northlandicum*, Marsh Saltbush *Atriplex paludosa* subsp. *paludosa*, Tiny Arrowgrass *Triglochin minutissima* and Prickly Arrowgrass *Triglochin*

mucronata may be present. However given that this area subject to inundation, is unlikely to be developable and the occurrence of any of these species is unlikely to alter the conservation significance of this vegetation, this area was only subject to a general vegetation assessment.

Surveys were conducted under seasonal condition regarded as appropriate for identifying the range of species within the study area. Spiny Rice-Flower targeted surveys were undertaken while plants were not in flower although the unseasonal wet conditions meant that plants were generally larger and still actively growing, making them more conspicuous than they otherwise would in a normal dry summer. The main limitation to this survey would be the density of grassland encountered and the impact of this on the overall ability of an observer to detect individual plants.

Data collected included a GPS waypoint for every individual observed.

Targeted surveys were conducted by a minimum of two botanists walking in parallel transect lines approximately 5 m apart. Using this method, approximately 10 ha of habitat was searched per day (each 7.5–8.5 hours). Searches were not undertaken during poor weather conditions (heavy rain or high temperatures).

2.4.2 Fauna assessment

The study site was assessed to determine the values of the site for terrestrial fauna. The fauna habitat assessment was undertaken on 31 August 2010. All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This included direct observation, searching under rocks, examination of tracks and scats and identifying calls. Particular attention was given to searching for significant species and their habitats. Fauna species were recorded with a view to characterising the values of the site and were not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

The survey results are outlined in Appendix 2. Fauna records will be submitted to DEPI for incorporation into the VBA.

Aquatic fauna values were not determined as part of this assessment.

Targeted survey for Golden Sun Moth *Synemon plana*

Surveys for Golden Sun Moth were undertaken in accordance with protocols established by Commonwealth (DEWHA 2009).

Targeted survey was undertaken on the basis of a record of the species from 2007 and likely presence of the species identified in the due diligence assessment (Biosis Research 2010).

Survey for was conducted between 30 December 2010 and 25 January 2011. The commencement of the flight season was documented by Biosis Research and other consultants and DEPI by regularly checking sites with known populations. Prior to surveys being conducted at the study area, site(s) known to support a population (with access permitted) were visited to confirm whether the moths were flying on that day. Surveys took place when conditions were suitable for male flight (generally >20°C, bright, clear days, full sun, absence of rain and wind other than a light to moderate breeze) between 10:00 hrs and 15:00 hrs. Four surveys were conducted over five occasions at the site on 30 December 2010 and 4, 16, 20 & 25 January 2011. Survey continued into January as the moths continued flying into January. Survey to the 31 January was deemed to be appropriate by DEPI (Mark Winfield, pers. comm.).

Weather data for the survey days for the Laverton weather station (which is closest to the study area) is shown in Appendix 3. This data is sourced from the Bureau of Meteorology (BOM) www.bom.gov.au. The reference sites visited were private land on Grieve Parade, Altona (moths confirmed flying there on 30 December), private land at Manor Lakes and near Eynesbury (moths

confirmed flying at both sites on 4 January and at Eynesbury on 20 January), private land at Aurora, Epping North (moths confirmed flying there on 16 January) and private land at Donnybrook (moths confirmed flying there on 25 January). Reference sites were visited each morning prior to surveys being undertaken at the Altona study area.

Areas of potential habitat were surveyed by two observers using a transect method, which involved walking parallel transects across the site (spaced at 10-50 m intervals) and recording any individuals observed. Transect information was collected with a hand-held GPS to show coverage. The GPS transect tracks of the GSM observers for the survey days are shown in Figure 2. Appropriately qualified zoologists experienced in Golden Sun Moth identification and survey methods conducted all surveys for the species. I.

Targeted survey for Striped Legless Lizard *Delma impar*

Targeted survey for Striped Legless Lizard was conducted in accordance with Commonwealth guidelines for the Striped Legless Lizard (DSEWPac 2011):

- Surveys were undertaken by suitably qualified staff with demonstrated skill in Striped Legless Lizard survey.
- Artificial shelter sites (roof tiles) were installed during July, at least one month prior to the initial survey/checks.
- Ten arrays of 50 tiles were installed in areas of suitable habitat (Figure 3).
- Surveys were undertaken between September and December, during the primary season of activity for the species.
- Tiles were checked once per week during October and November, and twice per month during September and December. The 12 surveys were completed on 6 & 17 September, 4, 11, 17 & 24 October, 6, 12, 21 & 29 November and 5 & 11 December 2013.
- Weather conditions, start and finish times were recorded for each survey (Appendix 2). Tiles were only checked during suitable temperatures (not above 28°C ambient).

Tiles were removed at the conclusion of the survey.

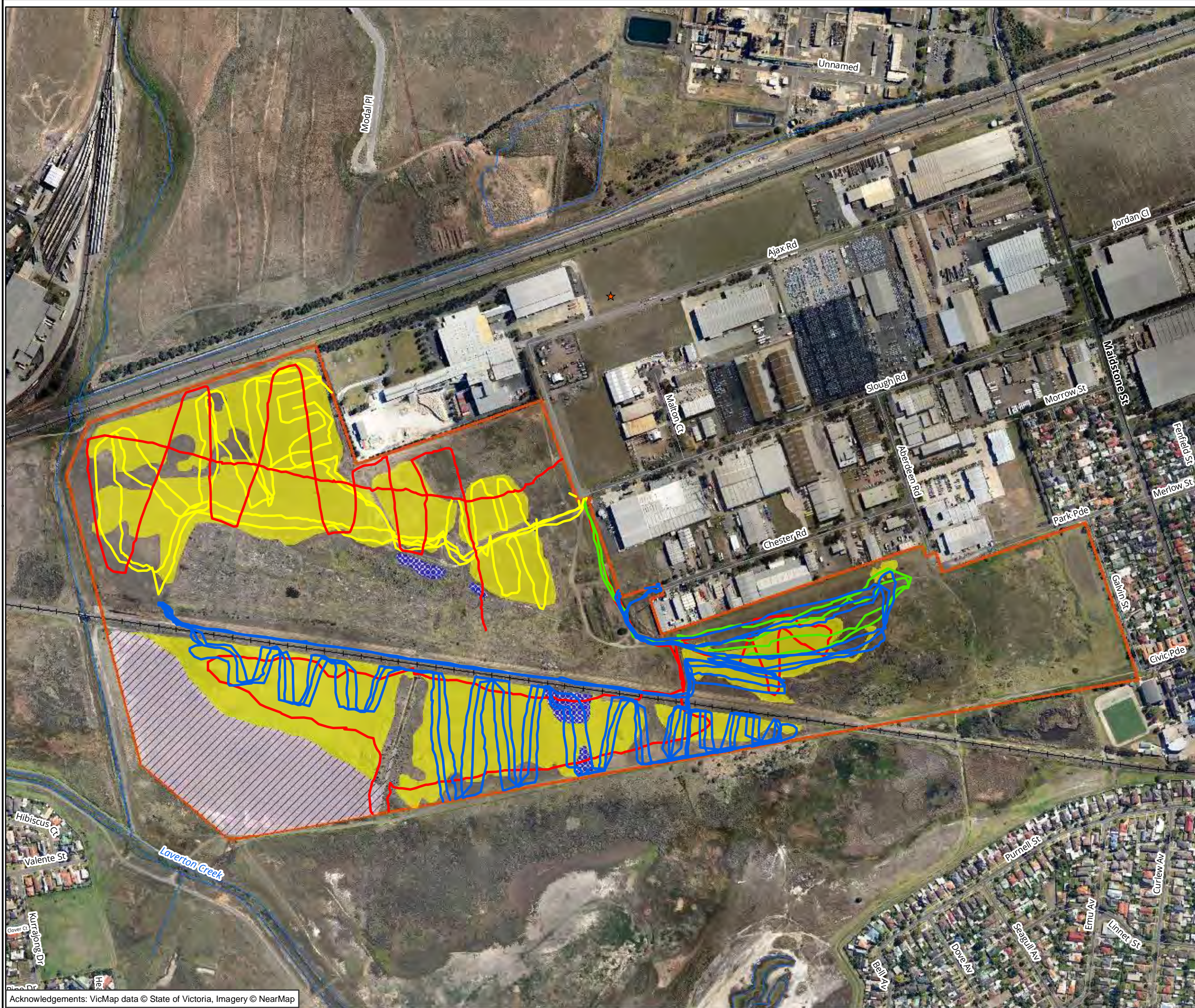
2.4.3 Permits

Biosis undertakes flora and fauna assessments under the following permits and approvals:

- Research Permit/Management Authorisation and Permit to Take Protected Flora & Protected Fish issued by the Department of Environment and Primary Industries under the *Wildlife Act 1975*, *Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975* (Permit number 10006240, expiry date 9 May 2015)
- Approvals 04.12 and 14.12 from the Wildlife and Small Institutions Animal Ethics Committee

2.5 Qualifications

Ecological surveys and assessments provide a sampling of the flora and fauna at a given time and season. It is always possible that some species or individuals of a targeted threatened species are not detected during survey. Some plant species are dormant and/or lack flowering or fruiting material at certain times of year (commonly in winter or late summer), making detection and/or identification difficult. Other environmental conditions such as drought, grazing, fire and mowing will also affect the survey results. In many cases, these factors do not present a significant limitation to assessing the overall biodiversity values of a site but can limit the detectability of some species.



Legend

- Study Area
- ★ Golden Sun Moth record (2007)

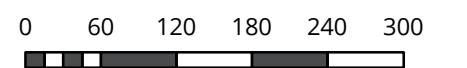
Survey transects by date

- 4/01/2011
- 16/01/2011
- 20/01/2011
- 25/01/2011

Ecological Vegetation Class

- Brackish Wetland
- Plains Grassy Wetland
- Plains Grassland

Figure 2: Golden Sun Moth targeted survey effort within Lot H, Ajax Road, Altona, Victoria



Metres
 Scale: 1:6,000 @ A3
 Coordinate System: GDA 1994 MGA Zone 55



Ballarat, Brisbane, Canberra, Melbourne, Sydney, Wangaratta & Wollongong

Matter: 16344,
 Date: 13 March 2014,
 Checked by: SGM, Drawn by: SKM, Last edited by: smitchell
 Location: P:\16300s\16344\Mapping\16344_F2_GSM



Legend

- Study Area
- Striped Legless Lizard tile grid

Figure 3: Location of Striped Legless Lizard tile grids within Lot H, Ajax Road, Altona, Victoria

0 60 120 180 240 300

Metres
 Scale: 1:6,000 @ A3
 Coordinate System: GDA 1994 MGA Zone 55



Ballarat, Brisbane, Canberra, Melbourne, Sydney, Wangaratta & Wollongong

Matter: 16344,
 Date: 13 March 2014,
 Checked by: SGM, Drawn by: SKM, Last edited by: smitchell
 Location: P:\16300s\16344\Mapping\16344_F3_SLL

The current flora and habitat hectare assessments were conducted in late spring and summer, which includes both optimal and suboptimal times for survey. Wetter than average conditions have also extended the ability of observers to more readily detect some species. Older assessments of the site by Biosis Research (now Biosis) provide some indication of other species which probably persist within the study area but can only be detected in more favourable seasonal conditions or after events such as a fire.

Golden Sun Moth survey was conducted during suitable conditions and at times when moths were observed flying at various reference sites. However, above average rainfall in 2010/11 may have influenced the emergence of moths on this site during this season. For example, moths were not observed at the reference site closest to the study area on Maidstone Street, Altona North, but were recorded at a site further east on Grieve Parade, Altona North in late December 2010 and January 2011.

Biodiversity Assessment Reports (BAR) and Biodiversity Impact Offset Requirement (BIOR) reports are prepared through DEPI's NVIM system or requested through DEPI's Native Vegetation Transitional Support team. Biosis supplies relevant site-based spatial information as inputs to DEPI. We are entirely reliant on DEPI's output reports for moderate and high risk pathway applications, and for low risk pathway applications with complex mapping requirements. Biosis makes every effort to ensure site and spatial information entered into the NVIM, or supplied to DEPI, is an accurate reflection of proposed native vegetation removal. The DEPI BOIR can be viewed in Appendix 3.

2.6 Legislation and policy

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- Matters listed under the EPBC Act; associated policy statements, significant impacts guidelines, listing advice and key threatening processes
- Threatened taxa, communities and threatening processes listed under Section 10 of the FFG Act; associated action statements and listing advice
- Victoria's Biodiversity Assessment Guidelines (DEPI 2013)
- *Planning and Environment Act 1987* – specifically Clauses 12.01-2, 52.17 and 66.02 and Overlays in the relevant Planning Scheme
- Noxious weeds and pest animals lists under the *Catchment and Land Protection Act 1994* (CaLP Act)
- *Wildlife Act 1975* and associated Regulations
- *Environmental Effects Act 1978*

2.7 Mapping

Mapping was conducted using hand-held (uncorrected) GPS units (WGS84) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files which contain our flora and fauna spatial data are available to incorporate into design concept plans. However this mapping may not be sufficiently precise for detailed design purposes.

3. Results

The ecological features of the study area are described below and mapped in Figure 4.

Species recorded during the flora and fauna assessment are listed in Appendix 1 (flora) and Appendix 2 (fauna). Unless of particular note, these species are not discussed further.

Significant species recorded or predicted to occur in the local area are also listed in the appendices, along with an assessment of the likelihood of each species occurring within the study area.

3.1 Site Context

The site is bounded to the north by the suburban railway (Werribee line), to the south by public land surrounding Truganina Swamp and the Mt. St. Joseph Wetlands, to the west by Kayes Drain and to the east by industrial development around Ajax Road, and factories on Slough Road, Chester road and Galvin Street and Park Parade.

The area of Brackish Wetland in the south east of the study area is part of a broader area of this vegetation associated with the estuary of Laverton Creek. This near coastal environment provides an unusual ecotone between native grasslands and coastal communities. As a result a number of species more typical of saline environments, such as Coast Tussock-grass *Poa poiformis* and Australian Salt-grass *Distichlis distichophylla*, occur in association with typical Plains Grassland flora such as Spiny Rice-flower.

The study area occurs within a broader matrix of industrial and residential land and remnant native vegetation within an urban context.

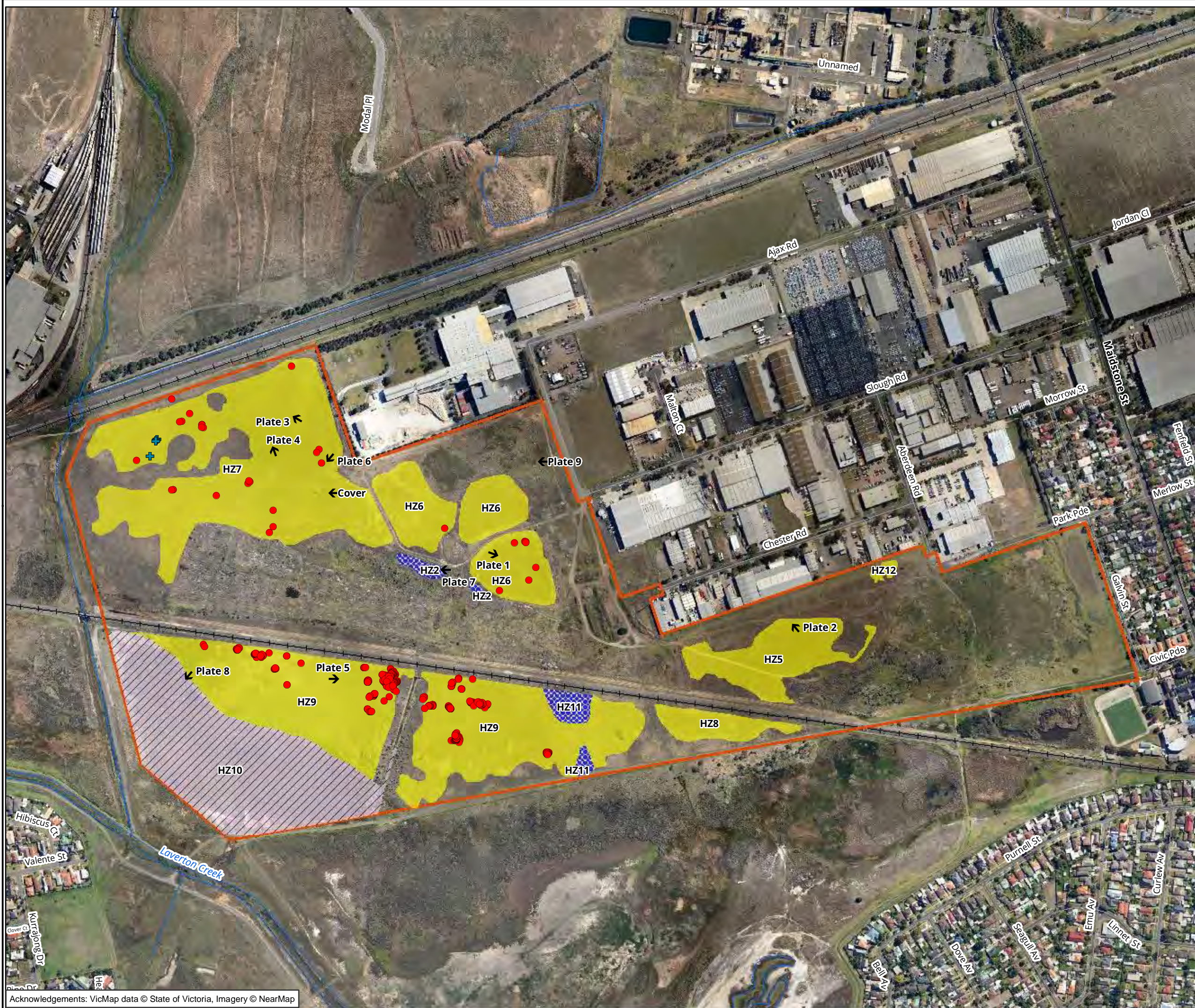
While the site itself does not support a Biosite, it is surrounded by Biosites to the north (Biosite 3494 of National significance), south (Biosite 4623 for Truganina Swamp which is of State significance) and east (Maidstone Road grassland which is listed as regional significance) (DSE 2005b).

3.2 Vegetation

The study area includes a matrix of remnant native vegetation and disturbed industrial land dominated by exotic species. Disturbed areas were dominated by bare ground and exotic grasses and herbs such as Kikuyu *Cenchrus clandestinus*, Galenia *Galenia pubescens*, Bearded Oat *Avena barbata*, Chilean Needle-grass *Nassella neesiana*, Serrated Tussock *N. trichotoma*, Toowoomba Canary-grass *Phalaris aquatica*, Barley-grass *Hordeum leporinum* and Wimmera Rye-grass *Lolium rigidum*.

Remnant native grasslands were variously dominated by Kangaroo Grass *Themeda triandra*, spear-grasses *Austrostipa* spp. and wallaby-grasses *Rytidosperma* spp.

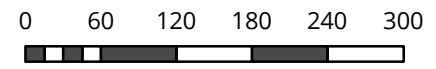
The study area supports three EVCs; Plains Grassland (EVC 132), Plains Grassy Wetland (EVC 125) and Brackish Wetland (EVC 656) (Figure 4). DEPI's existing and pre-1750 EVC mapping only identifies Plains Grassland and Coastal Saltmarsh (EVC 9) in this location but this mapping, at a scale of 1:100,000, is too coarse to identify these communities at the scale of this assessment. The EVCs on site are discussed in detail below.



Legend

- Study Area
- Significant flora record
 - + Arching Flax-lily
 - Spiny Rice-flower
- Ecological Vegetation Class
 - Brackish Wetland
 - Plains Grassy Wetland
 - Plains Grassland
- ↑ Photo point, arrow indicating view direction

Figure 4: Ecological features within Lot H, Ajax Road, Altona, Victoria



Metres
 Scale: 1:6,000 @ A3
 Coordinate System: GDA 1994 MGA Zone 55



Ballarat, Brisbane, Canberra, Melbourne, Sydney, Wangaratta & Wollongong

Matter: 16344,
 Date: 27 March 2014,
 Checked by: SGM, Drawn by: SKM, Last edited by: smitchell
 Location: P:\16300s\16344\Mapping\16344_F4_Veg

Plains Grassland EVC 132

This EVC is dominated by dense swards of Kangaroo Grass (Plate 1). Other common native grasses include wallaby-grasses, spear grasses. Common Wheat-grass *Anthosachne scabra*, Grey Tussock-grass *Poa sieberiana* and Rigid Panic *Walwhalleya prolata*. It contains scattered herbs and other graminoids including Lemon Beauty-heads *Calocephalus citreus*, bindweeds *Convolvulus* spp., Small St John's Wort *Hypericum gramineum*, Grassland Wood-sorrel *Oxalis perennans*, Cotton Fireweed *Senecio quadridentatus* (Plate 2), Small-flower Mat-rush *Lomandra micrantha* (Plate 3), Small-flower Flax-lily *Dianella brevicaulis* (Plate 4) and Yellow Rush-lily *Tricoryne elatior*.

An unusual form of Plains Grassland dominated by Coast Tussock-grass and including Australian Salt-grass dominated portions of land south of the Altona railway line (Plate 5). The composition of this grassland appears to be influenced by elevated levels of soil salinity and seasonally wet soil conditions.

Many of the 6 habitat zones of Plains Grassland identified also support a population of Spiny Rice-flower (Plate 6).

Plains Grassy Wetland EVC 125

This EVC is dominated by Brown-back Wallaby-grass *Rytidosperma duttonianum*, Common Blown-grass *Lachnagrostis filiformis*, Common Woodruff *Asperula conferta*, Flat Spike-sedge *Eleocharis pallens*, Prickfoot *Eryngium vesiculosum* and Raspwort *Haloragis heterophylla* (Plate 7).

This community is relatively disturbed and when dry is typically dominated by exotic grasses and other herbs such as Ribwort *Plantago lanceolata*, Wimmera Rye-grass, Squirrel-tail Fescue *Vulpia bromoides* and Hairy Hawkbit *Leontodon taraxacoides* subsp. *taraxacoides*.

Brackish Wetland EVC 656

This EVC is dominated by Chaffy Saw-sedge *Gahnia filum*. Other common species include Rounded Noon-flower *Disphyma crassifolium* subsp. *clavellatum*, Australian Salt-grass, Knobby Club-sedge *Ficinia nodosa*, Beaded Glasswort *Sarcocornia quinqueflora*, Small Loosestrife *Lythrum hyssopifolia*, Shiny Bog-sedge *Schoenus nitens* and Creeping Brookweed *Samolus repens* (Plate 8).

The most prominent weeds in this environment include African Box-thorn and Spiny Rush although their cover is relatively low.

Exotic Vegetation

The balance of the study area is dominated by exotic grasses and herbs (Figure 4, Plate 9). While the dominant exotic grass in these areas is Chilean Needle-grass other common exotic species include Cocksfoot *Dactylis glomerata*, African Box-thorn, Paspalum *Paspalum dilatatum*, Toowoomba Canary-grass *Phalaris aquatica*, Galenia *Galenia pubescens*, Artichoke Thistle *Cynara cardunculus*, Twiggy Turnip *Brassica fruticulosa* and Wimmera Rye-grass.



Plate 1: Kangaroo Grass dominated Plains Grassland in Habitat Zone 6 (proposed for clearing)



Plate 2: Cotton Fireweed found in Plains Grassland Habitat Zone 5 (proposed for clearing)



Plate 3 Small-flower Mat-rush found in Plains Grassland Habitat Zone 7 (proposed for clearing)



Plate 4: Small-flower Flax-lily found in Plains Grassland Habitat Zone 7 (proposed for clearing)



Plate 5: Plains Grassland dominated by a combination of Coast Tussock-grass with Australian Salt-grass found in Habitat Zone 9 (area to be retained and protected)



Plate 6: Spiny Rice-flower found in Plains Grassland Habitat Zone 7 (proposed for clearing)



Plate 7: Plains Grassy Wetland found in Habitat Zone 2 (proposed for clearing)



Plate 8: Brackish Wetland found in Habitat Zone 10 (area to be retained and protected)



Plate 9: Exotic vegetation dominated by Chilean Needle Grass and Artichoke Thistle adjacent to the southern boundary of Ajax Road (proposed for clearing)

3.2.1 Species

Records from the site

A total of 109 indigenous and 80 introduced plant species was recorded from the site (Appendix 2).

Frood et al. (1997)

This assessment documents 10 quadrats from within the study area, mainly from south of the Altona Railway. This data records an additional 29 native and 22 weed species, including the rare Creeping Rush *Juncus revolutus* from the area of Brackish Wetland. Many of these species are likely to persist in this environment.

3.3 Fauna

3.3.1 Habitats

Fauna habitats that occur within the site can be characterised according to vegetation communities and other features such as waterways, rock outcrops etc.

Plains Grassland

Plains grassland habitat is characterised by native perennial tussock grasses and herbs growing within inter-tussock spaces. Trees and woody shrubs are typically sparse to absent. Much of the Plains Grassland habitat on the site contains a combination of loose surface rock and embedded rock. Plains grassland provides habitat for a diverse range of terrestrial fauna, many of which are of national and state significance. There are a number of common bird species that forage within plains grassland habitat, such as Australasian Pipit *Anthus novaeseelandiae*, Stubble Quail *Coturnix pectoralis*,

and Willie-wagtail *Rhipidura leucophrys*. Raptors also forage over these open plains grassland areas, with species observed during the present assessment including Black-shouldered Kite *Elanus axillaris* and Brown Goshawk *Accipiter fasciatus*. Dense tussocks and rocky areas provide suitable habitat for a number of reptiles including Common Blue-tongue Lizard *Tiliqua scincoides* and Little Whip-Snake *Suta flagellum*. Plains grassland habitat within the study area also provides suitable habitat for the nationally significant Golden Sun Moth.

Planted trees and shrubs

A small number of planted trees and shrubs exist within the study area. These are likely to be used by common birds such as the Little Raven *Corvus mellori*, Magpie-lark *Grallina cyanoleuca* and introduced birds such as Common Starling *Sturnus vulgaris*. Flowering trees and shrubs planted within the site provide additional food resources and habitat for a number of nectar feeding birds such as Red Wattlebird *Anthochaera carunculata* and White-plumed Honeyeater *Lichenostomus penicillatus*. Some older planted trees may also provide foraging resources amongst fallen limbs, bark and leaf litter. These planted trees are unlikely to contain hollows.

Wetlands

Wetland habitats within the site include a small areas of plains grassy wetland either side of the Altona Railway and an area of brackish wetland in the south-west corner of Lot H that is associated with the Laverton Creek estuary. The areas of plains grassy wetland were dry at the time of assessment, but are prone to inundation during periods of high rainfall. When wet, these areas may provide potential habitat for common bird species such as Masked Lapwing *Vanellus miles* as well as state significant waterbirds such as Eastern Great Egret *Ardea modesta*. The brackish wetland includes a small fringe of saltmarsh vegetation but is otherwise dominated by Chaffy Saw-sedge. The area is contiguous with Truganina Swamp to the south-east, which is listed as a Biosite of State Significance (Biosite 4623). The brackish wetland provides habitat for waterbirds that prefer dense vegetation, such as Baillon's Crake *Porzana pusilla* and Australasian Bittern *Botaurus poiciloptilus*. Chaffy Saw-sedge also provides a food source for the larvae of the state significant Altona Skipper, which is likely to be present within the site.

Degraded treeless areas

This habitat type is characterised by exotic pasture grasses, weeds, dumped fill and other waste. Due to its highly disturbed and modified nature, this habitat type contains fewer resources for fauna and consequently species diversity is generally poor in these areas. There are large areas of dumped fill and rocky material, which provide refuge for introduced mammals such as Red Fox *Vulpes vulpes* and European Rabbit *Oryctolagus cuniculus*. Degraded treeless vegetation occurs immediately north of the Altona rail line and through much of the centre and south eastern corner of the site (Figure 4).

3.3.2 Species

A total of 30 indigenous and seven introduced fauna species were recorded from the site during the field assessment (Appendix 3).

3.3.3 Striped Legless Lizard survey

No Striped Legless Lizards were recorded during the 2013 survey.

Species recorded were Tussock Skink *Pseudemoia pagenstecheri* (vulnerable in Victoria; DEPI 2013), Tiger Snake *Notechis scutatus* and the introduced House Mouse *Mus musculus*.

A summary of species recorded at each tile grid is provided in Table 2 below.

Table 2: Striped Legless Lizard survey results

Grid #	Species *
1	Tussock Skink (17)
2	Tussock Skink (9), Tiger Snake (2)
3	Tussock Skink (10) , House Mouse (1)
4	Tussock Skink (6), Tiger Snake (5)
5	Tussock Skink (8)
6	Tussock Skink (12)
7	Tussock Skink (5)
8	Tussock Skink (11), House Mouse (1)
9	Tussock Skink (14), Tiger Snake (1)
10	Tussock Skink (10), Tiger Snake (3), House Mouse (1)

* numbers of records of each species in parentheses

3.3.4 Golden Sun Moth Survey

No Golden Sun Moths were recorded during the targeted surveys in 2010/11 despite the survey being undertaken in accordance with accepted protocols to maximise detection probability. Golden Sun Moth was recorded immediately adjacent to Ajax Road in 2007 and there are many more additional records of the species from the surrounding area. A second season of survey would provide greater certainty on whether a population is present but went undetected due to unusually wet conditions (when compared with the preceding 5 years of Golden Sun Moth surveys around Melbourne).

3.4 Significant species and ecological communities

3.4.1 EPBC Act, FFG Act & DSE Advisory listed species

Lists of significant species recorded or predicted to occur within 5 km of the study area are provided in Appendix 1 (flora) and Appendix 2 (fauna). An assessment of the likelihood of these species occurring in the study area and an indication of where within the site (i.e. which habitats or features of relevance to the species) is included. A summary of species recorded, subject to targeted survey or with a medium or higher likelihood of occurring in the study area is provided in Table 3.

3.4.2 Significant ecological communities

All of the vegetation communities (EVCs) present are rated by DEPI as endangered within the Victorian Volcanic Plain bioregion. Plains Grassland within the study area also corresponds to the Western (Basalt) Plains Grassland Community listed under the FFG Act.

The PMST identifies the potential for two listed communities, Grassy Eucalypt Woodland of the Victorian Volcanic Plain and Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP), to occur within the study area. Of these NTGVVP has been recorded and corresponds to the areas of Plains Grassland identified in Figure 4.

Table 3: Summary of significant species recorded or otherwise most likely to occur in the study area

Species name	Area of value within the study area
EPBC Act listed species	
Striped Legless Lizard	Grasslands, exotic and indigenous, within the study area provide potential habitat for this species. However targeted surveys did not record it. This suggests it is either absent or only present in low numbers.
Golden Sun Moth	Grasslands, exotic and indigenous, within the study area provide potential habitat for this species. However targeted surveys for this species did not record it. This suggests it may be absent or only present in low numbers.
Orange-bellied Parrot	Species may occasionally utilise habitat within the site, however habitat is marginal and unlikely to contain critical habitat for the species.
Small Golden Moth	Areas of Plains Grassland provide potential habitat for this orchid. It was recorded from similar environments within one to two kilometres north of this property. However, it is unlikely to be detectable within the study area due to the dense cover of Kangaroo Grass associated with most patches of Plains Grassland.
Spiny Rice-flower	This species has been recorded throughout the western two thirds of the study area. It is most common to the south of the Alton Rail Line where nearly 500 individuals have been recorded. The study area represents significant habitat for this species (Pimelea spinescens Recovery Team pers. comm.).
Listed Migratory Birds: Latham's Snipe	The brackish wetland in the south-west of Lot H is densely vegetated and does not contain optimal habitat for any listed migratory species except for Latham's Snipe. Plains Grassy Wetland habitat in the study area also provides smaller areas of habitat for Latham's Snipe.
FFG Act / DSE Advisory List species	
Arching Flax-lily	Recorded in small numbers from Habitat Zone 7. This large perennial species would have been observed by targeted surveys if it were present in larger numbers.
Tussock Skink	Recorded at a number of sites across the study area. Both native and exotic grasslands provide habitat for this species
Eastern Great Egret, Little Egret, Little Bittern, Royal Spoonbill	The brackish wetland in the south-west of the study area provides potential habitat for these wetland birds.
Altona Skipper	The brackish wetland in the south-west of the study area is dominated by <i>Gahnia filum</i> sedges and it is therefore likely that a population of Altona Skipper is present within this Brackish Wetland habitat.

Plains Grassy Wetland Habitat Zone 2 is too small to be classified as the EPBC Act listed community Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. However, Habitat Zone 11 satisfies the relevant size criteria (>0.1 ha) based on the position of these wetlands within a broader area of native vegetation (Figure 4).

3.5 Other ecological values

DEPI mapping of strategic natural values (NaturePrint) identifies part of the site as providing high contribution of natural values with most of the balance of the site providing a contribution in the second highest category of the scale provided.

DEPI models describing the habitat for rare or threatened species identify parts or all of the site as high contribution habitat for many of the rare or threatened species identified in Appendix 2. Interestingly, the study area is not noted as important habitat for a number of threatened species known from the site (i.e. Spiny Rice-flower) or from nearby (i.e. Golden Sun Moth).

3.6 Summary of biodiversity values of the site

Key values within the site include:

- High quality remnants of two nationally significant vegetation communities: Natural Temperate Grassland of the Victorian Volcanic Plain and Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains;
- Areas of Plains Grassland within the study area correspond to the FFG listed community Western (Basalt) Plains Grassland Community;
- A large population of one nationally threatened species, Spiny Rice-flower (489 plants);
- Populations of one species listed as vulnerable in Victoria, Arching Flax-lily (three plants) and one listed as poorly known Flat Spike-sedge (three populations);
- 34.9 ha of native vegetation;
- The native grasslands within the study area provide potential habitat for Striped Legless Lizard and Golden Sun Moth although neither species was detected by targeted surveys;
- Land to the south is within a Biosite (4623) for Truganina Swamp which is of State significance and provides habitat for a number of threatened fauna (Orange-bellied Parrot, Lewin's Rail, Baillon's Crake, Royal Spoonbill, Little Egret, Eastern Great Egret, Little Bittern, Australasian Bittern, and Altona Skipper)

4. Biodiversity Legislation and Government Policy

This section provides an assessment of the project in relation to key biodiversity legislation and government policy.

Where available, links to further information are provided. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on matters protected under the Act.

Before taking an action that could have a significant impact on a matter protected by the EPBC Act, a person must refer the proposed action to the Australian Government Minister for the Environment and Heritage (the Minister).

Table 3 provides an assessment of the project against the EPBC Act. Potential developments on this site have previously been referred to the Department of Environment (i.e. Referral 2013/6714) and identified as a controlled action subject to assessment by preliminary information. Referral of the proposed industrial subdivision is likely to be subject to the same assessment procedure.

On the basis of previous referrals under the EPBC Act referral of the proposed action to the Australian Government Minister for the Environment is considered essential.

4.2 State

4.2.1 Flora and Fauna Guarantee Act 1988 (FFG Act)

The FFG Act is Victorian legislation aimed at the conservation of threatened species and communities and for the management of potentially threatening processes. Under the FFG Act a permit is required from DSE to 'take' protected flora species from public land. A permit is generally not required for removal of protected flora from private land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish.

Link for further information: <http://www.dse.vic.gov.au/plants-and-animals/native-plants-and-animals/threatened-species-and-communities/flora-and-fauna-guarantee-act>

Native vegetation on site includes a listed community, and does support listed threatened flora and fauna species and habitat for them (Appendix 1).

The land is privately owned, is not declared 'critical habitat' for the purposes of the FFG Act, and the flora species are not being taken for the purpose of commercial sale. Therefore a protected flora permit is not required.

Table 3: Assessment of project in relation to the EPBC Act

Matter of NES	Project issues	Comments
<p>listed threatened species and communities</p>	<p>Spiny Rice-flower has been recorded and another five have potential habitat or predicted to occur in the project search area (Appendix 2).</p> <p>Golden Sun Moth has been recorded in close proximity to the study area (north of Ajax Road) and broader areas of suitable habitat associated with areas mapped as Plains Grassland</p> <p>Grassland habitat suitable for Striped Legless Lizard is present on site. There are recent records of this species from within 5 km of the site.</p> <p>Potential habitat for Orange-bellied Parrot exists on the fringes of the brackish wetland to the south-west of Lot H.</p> <p>The site supported remnants of two listed communities – Natural Temperate Grassland of the Victorian Volcanic Plain and Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains community.</p>	<p>A significant population of Spiny Rice-flower is present.</p> <p>Systematic survey did not detect Golden Sun Moth during the 2010/11 flight season. A population may still be present but it is not likely to be large. Habitat is considered to be poor in its current condition.</p> <p>The results of targeted surveys suggest this species is either absent or only present in small numbers and the site does not support an important population</p> <p>Species may occasionally utilise habitat within the site, however habitat is marginal and unlikely to contain critical habitat for the species</p> <p>The site has a long history of disturbance but the listed communities still occur within the site.</p>
<p>listed migratory species</p>	<p>A total of 66 migratory species are predicted to occur within 5 km of the site on the PMST database. A number of these species are largely coastal or pelagic species and would not make use the study area. The exception to this is Latham's Snipe which could occur in ecologically significant numbers in the south western corner of the site.</p>	<p>The brackish wetland in the south-west of Lot H is densely vegetated and does not contain optimal habitat for any listed migratory species except for Latham's Snipe. Plains Grassy Wetland habitat in the study area also provides smaller areas of habitat for Latham's Snipe.</p>
<p>wetlands of international importance (Ramsar sites)</p>	<p>The PMST identifies the site as being within the catchment of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site.</p>	<p>The Laverton Creek drains directly into Port Phillip Bay, and the site is located close to the Laverton Creek estuary. Subdivision and subsequent development may impact on this listed Ramsar site. Any potential impacts may be reduced by implementation of specific mitigation measures following a more detailed assessment in response to a finalised plan.</p>

4.2.2 Catchment and Land Protection Act 1994 (CaLP Act)

The CaLP Act identifies and classifies certain species as noxious weeds or pest animals, and provides a system of controls on noxious species.

Eight declared noxious weeds were identified in the study area and are listed in Appendix 1.

The proponent/land owner must take all reasonable steps to eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds, and prevent the spread of and as far as possible eradicate established pest animals. The State is responsible for eradicating State prohibited weeds from all land in Victoria.

Link for further information: <http://www.dpi.vic.gov.au/agriculture/pests-diseases-and-weeds/protecting-victoria-pest-animals-weeds/legislation,-policy-and-permits/legislation>

4.2.3 Planning and Environment Act 1987 (incl. Planning Schemes)

The *Planning and Environment Act 1987* controls the planning and development of land in Victoria, and provides for the development of planning schemes for all municipalities.

Reforms to the native vegetation permitted clearing regulations were gazetted on 20 December 2013 through planning scheme amendment VC105. The reforms made changes to the Victoria Planning Provisions including the State Planning Policy Framework (SPPF), Clause 52.16 and 52.17 of all planning schemes within Victoria.

Of particular relevance to the development proposed are controls relating to the removal, destruction or lopping of native vegetation contained within the Mornington Peninsula Planning Scheme (the Scheme), including permit requirements. The Scheme (Clause 72) defines 'native vegetation' as 'Plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. It is an objective of Clause 12.01-2 of the SPPF (Native Vegetation Management) that permitted clearing of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity. For more information on these reforms refer to www.depi.vic.gov.au/nativevegetation. An assessment of the proposed development in relation to the Guidelines is provided in Section 5.

Clause 52.17 (Native Vegetation) requires a planning permit to remove, destroy or lop native vegetation including some dead native vegetation. None of the exemptions identified in the relevant table of exemptions (Clause 52.17-6) apply to this site. Clause 52.17 does not apply if a Native Vegetation Precinct Plan corresponding to the land is incorporated in the Planning Scheme. This does not appear to be the case for this property.

Clause 65.02 requires consideration of native vegetation retention in a subdivision application and siting of open space areas.

Under Clause 66.02 a permit application to remove, destroy or lop native vegetation is required to be referred to DEPI as a recommending referral authority if the area of native vegetation to be removed is greater than 5 hectares, or the class of application is in the high risk-based pathway, or where a property vegetation precinct plan applies to the site, or the native vegetation is on Crown land occupied or managed by the Responsible Authority.

The need for a permit to remove native vegetation may also be triggered by the Environmental Significance Overlay within the Hobsons Bay Planning Scheme. The location of overlays in relation to the study area can be determined via the following link: <http://planningschemes.dpcd.vic.gov.au/index.html>. While a Land Subject to Inundation overlay applies to part of the study area, no biodiversity related overlays or overlays which would influence the proposed clearing of native vegetation are known.

Victoria's Biodiversity Assessment Guidelines

The Guidelines are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria (DEPI 2013a). These Guidelines replace the Victoria's Native Vegetation Management – A Framework for Action (NRE 2002).

The purpose of the Guidelines is to guide how impacts on biodiversity should be considered when assessing a permit application to remove, destroy or lop native vegetation. The objective for permitted clearing of native vegetation in Victoria is 'No net loss in the contribution made by native vegetation to Victoria's biodiversity'.

A detailed assessment of the implications for the project under the Guidelines is provided in Section 5 of this report. Under the Guidelines, there are three risk-based pathways for assessing an application for a permit to remove native vegetation:

- low risk
- moderate risk
- high risk

A detailed determination of the risk-based pathway for the planning application relevant to the proposed development is provided in Section 5.3.2. In summary, the planning application for removal of native vegetation must meet the requirements of, and be assessed in, the high risk based pathway. A biodiversity assessment report identifying the approximate area of native vegetation to be lost and the relevant details associated with the assessment pathway is provided in Appendix 3.

4.2.4 Wildlife Act 1975 and associated Regulations

The *Wildlife Act 1975* (Wildlife Act) is the primary piece of legislation in Victoria providing for protection and management of wildlife. The Wildlife Act does not apply to fish, as defined under the *Fisheries Act 1995*.

The Wildlife Regulations 2002 prescribe penalties for persons who wilfully damage, disturb or destroy any wildlife habitat without appropriate authorisation. DEPI advises that a planning permit (under the planning scheme) constitutes appropriate authorisation and therefore the habitat protection provisions under the Wildlife Regulations 2002 are not applicable once a planning permit has been granted for this project.

4.2.5 Environmental Effects Act

The *Environment Effects Act 1978* establishes a process to assess the environmental impacts of a project. If applicable, the Act requires that an Environment Effects Statement (EES) be prepared by the proponent. The EES is then submitted to the Minister for Planning to enable assessment of the potential environmental effects of the proposed development.

The general objective of the assessment process is *to provide for the transparent, integrated and timely assessment of the environmental effects of projects capable of having a significant effect on the environment* (DSE 2006).

The 'Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978' (DSE 2006a) provide a range of criteria that can be used to determine whether an EES may be required for a project. These criteria relate to individual potential environmental effects and a combination of (two or more) potential environmental effects. As the proposed loss of native vegetation is greater than 10 ha it is possible that the proposed development would be subject to an EES. However, the guidelines are not binding, and the decision as to whether an EES is required is ultimately at the discretion of the Minister for Planning.

The proposed development of Ajax Road as an industrial subdivision was referred to the Minister for Planning in December 2013. The Minister subsequently decided on 27 February 2014 that an EES was not required.

4.2.6 Water Act 1989

The primary purpose of the *Water Act 1989* is to provide a framework for the allocation and management of surface water and groundwater throughout Victoria. It provides a principal mechanism for maintenance of ecosystem functions including those of aquatic ecosystems. Under By-Laws created by the relevant Authority under the Act, the authorities regulate the works within and in the vicinity of waterways. In Melbourne Water's management area this applies to all waterways with a catchment area of 60 ha or more. These waterways are deemed to be Melbourne Water assets, while all smaller watercourses are deemed the responsibility of the local government.

The proposed development will involve construction or maintenance activities that may affect waterways through increased or decreased surface run off. Development within the study area will require a permit from Melbourne Water. Guidelines and application forms can be obtained from Melbourne Water's Asset Service team.

For developments within Melbourne Water's management area that entail the provision of new drainage infrastructure, approval for works on waterways is covered under the Agreement process set out in the Land Development Manual (<http://ldm.melbournewater.com.au/content/introduction/introduction.asp>).

4.2.7 Environment Protection Act 1970: State Environmental Protection Policy (Waters of Victoria) 2003

The Environment Protection Act underpins the State Environmental Protection Policy (SEPP) – Waters of Victoria which provides a legal framework for the protection and rehabilitation of Victoria's surface water environments.

The project may directly and/or indirectly impact upon a river and its aquatic ecosystems. The SEPP requires that aquatic ecosystem values be protected. Environmental quality objectives and indicators are defined to protect beneficial uses (i.e. the uses and values of the water environment) and an attainment program provides guidance on protection of the beneficial uses.

Impacts to surface water quality must not result in changes that exceed background levels and/or the water quality objectives specified for the Cleared Hills and Coastal Plains segment to protect surface water uses and values. The proponent needs to ensure that direct and indirect (e.g. runoff) impacts to surface water quality do not exceed the background levels and/or water quality objectives.

Link to further information: <http://www.epa.vic.gov.au/water/epa/wov.asp>.

5. Victoria's Biodiversity Assessment Guidelines

The Guidelines describe three strategies for ensuring the objective for permitted clearing of native vegetation is achieved at the permit level. These are:

- avoiding the removal of native vegetation that makes a significant contribution to Victoria's biodiversity
- minimising impacts to Victoria's biodiversity from the removal of native vegetation
- where native vegetation is permitted to be removed, ensuring it is offset in a manner that makes a contribution to Victoria's biodiversity that is equivalent to the contribution made by the native vegetation to be removed.

DEPI has provided biodiversity information tools to assist with determining the contribution that the native vegetation within the study area makes to Victoria's biodiversity.

The biodiversity information tools have two components:

- site based-information which is observable at a particular site
- landscape scale information which requires consideration of information beyond the site.

The following section assesses the contribution that the native vegetation within the study area makes to Victoria's biodiversity.

Note: a glossary of terms used in relation to the Guidelines and habitat hectares assessment is provided in Appendix 4. In addition any offset prescription identified in association with a permit that approves the clearing of native vegetation must be secured prior to the start of that development.

5.1 Site based information

The extent of native vegetation patches were mapped within the study area (Figure 4) and the condition was assessed in relation to standard methods (DSE 2004). The condition of native vegetation was assessed using the DSE Vegetation Quality Assessment Sheet (DSE 2004) and pre-determined EVC benchmarks: <http://www.dse.vic.gov.au/conservation-and-environment/ecological-vegetation-class-evc-benchmarks-by-bioregion>. The condition score of the patch is multiplied by the extent of the patch to give a value in habitat hectares.

For practicality, a standard condition score and extent is applied to each scattered tree based on the habitat hectares method. Scattered trees are defined as mature indigenous canopy trees that are in a location with little or no native understorey. A canopy tree is a mature tree that is greater than three metres in height and is normally found in the upper layer of a vegetation type. Ecological Vegetation Class (EVC) descriptions provide a list of the typical canopy species. As no scattered trees are present within the study area this component of the assessment process is not considered further.

For the purposes of this assessment the limit of the resolution for the habitat hectare assessment process is taken to be 0.01 habitat hectares (Hha). That is, if native vegetation is present with sufficient cover but its condition and extent would not result in the identification of at least 0.01 habitat hectares then that vegetation will not be mapped or assessed as a separate habitat zone. Areas of uniform quality for each EVC within the patches are termed 'habitat zones' and assessed separately.

5.1.1 Habitat Hectares

A total of nine habitat zones are identified (Figure 4). The results of the condition assessment are provided in Table 4, with the number of habitat hectares in each habitat zone.

Summary of habitat hectares within study area

The study area contains a total of 34.9 hectares of native vegetation, which comprises **20.146 habitat hectares**. The habitat score for the habitat zones ranges from 0.39 to 0.72. Habitat Zones 9 and 10 represent the most intact areas of native vegetation.

5.2 Landscape scale information

5.2.2 Strategic biodiversity score

The strategic biodiversity score is derived using a spatial prioritization tool that ranks locations in Victoria for their conservation priority on the basis of rarity and level of depletion of the EVC and species habitats, and the condition and connectivity of vegetation. The mean strategic biodiversity scores for the native vegetation within the study area was calculated by DEPI as 0.574. However as a specific offset is identified for this impact, the relevant habitat importance score will be used to calculate the offset requirements rather the strategic biodiversity scores.

5.2.3 Habitat importance score

Habitat importance score is a measure of the importance of a location in the landscape as habitat for a particular rare or threatened species in relation to other suitable habitat for that species (DEPI 2013a). Only species listed as threatened or rare under the DEPI Advisory lists (DSE 2005, 2007) are considered. The term 'threatened' is used to describe species that are classified as vulnerable, endangered or critically endangered. Species classified as data deficient or near threatened are not considered to be 'threatened' (DSE 2013). The term 'rare' has application for flora species only (DSE 2005).

Only native vegetation that is habitat for rare or threatened species is assigned a habitat importance score. The habitat is divided into two categories depending on area of occupancy: dispersed habitat, or highly localised habitat. The habitat importance score is calculated differently for each of these groups. Only habitat for dispersed species is relevant to this study area.

The score is generated by DEPI's Habitat importance mapping of the study area. The results are presented in Table 5. Note that the data standard for information supplied to DEPI requires each individual patch of native vegetation to be allocated a unique number. As Habitat Zones (HZ) defined by this assessment, such as HZ 2, HZ 6, HZ 9 and HZ 11, include more than one patch, the HZs for this assessment and the DEPI output **do not coincide**. Care needs to be taken to ensure the correct interpretation is made of the data provided. In addition DEPI define biodiversity class areas (BCA) to calculate the offset potential of native vegetation. These assessments are based on DEPI species habitat importance models and not the patches of native vegetation. As such the extent of any BCA may or may not relate to any specific Habitat Zone although the total extent of BCA's equals the extent of native vegetation within the proposed offset area.

5.3 Proposed removal of native vegetation

The proposed removal of native vegetation is assessed in accordance with the concept design provided (Figure 5). It is proposed to remove **15.82 ha** or 7.882 habitat hectares as shown in Table 6.

Table 4: Habitat hectares of native vegetation within the study area

Habitat Zone		2	5	6	7	8	9	10	11	12	TOTAL
Bioregion		Victorian Volcanic Plain									
EVC #: Name		PGWet 125	PG 132	PG 132	PG 132	PG 132	PG 132	BW 656	PGWet 125	PG 132	
	Max Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	
Site Condition	Large Old Trees	10	na	na	na	na	na	na	na	na	na
	Canopy Cover	5	na	na	na	na	na	na	na	na	na
	Lack of Weeds	15	13	2	6	7	4	9	7	7	2
	Understorey	25	10	15	15	15	15	15	25	10	15
	Recruitment	10	3	6	6	6	6	6	6	3	6
	Organic Matter	5	4	3	5	2	5	5	5	5	3
	Logs	5	na	na	na	na	na	na	na	na	na
	Total Site Score		30	26	32	30	30	35	43	25	26
	Standardised Site Score (x75/55)		40.91	35.45	43.63	40.91	40.91	47.73	58.64	34.1	35.45
Landscape Value	Patch Size	10	1	2	1	4	1	6	6	4	1
	Neighbourhood	10	2	2	4	3	2	4	4	4	0
	Distance to Core	5	3	3	3	3	3	3	3	3	3
	Total Landscape Score		6	7	8	10	6	13	13	11	4
HABITAT SCORE	100	47	42	52	51	47	61	72	45	39	
Habitat points = #/100	1	0.47	0.42	0.52	0.51	0.47	0.61	0.72	0.45	0.39	
Habitat Zone area (ha)		0.20	2.202	3.640	9.673	0.900	10.231	7.485	0.461	0.105	34.897
Habitat Hectares (Hha)		0.094	0.925	1.893	4.933	0.423	6.241	5.389	0.207	0.041	20.146
Clear or offset		Clear	Clear	Clear	Clear	Offset	Offset	Offset	Offset	Clear	
Number of Spiny Rice-flower present		0	0	8	25	0	456	0	0	0	

Table 5: Habitat importance scores for habitat zones proposed for clearing within the study area

Biosis Habitat Zone	Species Number	Species Name	Habitat importance score	Specific biodiversity equivalence score
2 (HZ 4 & 6 in Appendix 3)	501888	Salt Lawrencia	0.697 - 0.726	0.012 – 0.056
5 (HZ 7 in Appendix 3)	501839	Creeping Rush	0.740	0.684
5	501888	Salt Lawrencia	0.711	0.657
6	501888	Salt Lawrencia	0.723-0.756	0.425 - 0.542
7	501888	Salt Lawrencia	0.720	3.064

Table 6: Summary of habitat hectares to be removed

Source	Ecological Vegetation Class	Habitat hectares (Hha) to be removed
Habitat Zone 2	Plains Grassy Wetland	0.090
Habitat Zone 5	Plains Grassland	0.925
Habitat Zone 6	Plains Grassland	1.893
Habitat Zone 7	Plains Grassland	4.933
Habitat Zone 12	Plains Grassland	0.041
TOTAL		7.882

5.3.2 Determining the risk-based pathway

To determine the risk based pathway for the permit application, two factors are considered: **location risk** and **extent risk**.

Location risk has been pre-determined by DEPI for all locations in Victoria. The location of a particular site is determined using the *Native vegetation location risk map* available in the Native Vegetation Information Management (NVIM) system (<http://nvim.depi.vic.gov.au>).

Extent risk is based on the extent of native vegetation proposed to be removed and is determined with reference to:

- the area of any remnant patches of native vegetation proposed to be removed
- the number of any scattered trees proposed to be removed.

Subject to final design, the proposed development will require the removal of approximately **15.82 ha** of native vegetation, with the associated retention of **19.077 ha** of native vegetation. The study area is largely in Location A with a small area covered by Habitat Zone 12 mapped as Location C (Appendix 3). Because of the extent of vegetation proposed for removal, the application for removal of this native vegetation is likely to be assessed using the high risk-based pathway. These requirements are provided in Appendix 3.

The proposed removal of native vegetation is assessed in detail in Section 5.3 and summarised below.



Legend

- Study Area
- Conservation zone
- Rail transport node

Figure 5: Proposed development footprint within Lot H, Ajax Road, Altona, Victoria

0 60 120 180 240 300

Metres
 Scale: 1:6,000 @ A3
 Coordinate System: GDA 1994 MGA Zone 55



Ballarat, Brisbane, Canberra, Melbourne, Sydney, Wangaratta & Wollongong

Matter: 16344,
 Date: 13 March 2014,
 Checked by: SGM, Drawn by: SKM, Last edited by: smitchell
 Location: P:\16300s\16344\Mapping\16344_F5_Prop_develop

5.4 Offsetting the loss of native vegetation

In order to ensure a gain to Victoria's biodiversity that is equivalent to the loss resulting from permitted clearing of native vegetation, compensatory offsets are required. Losses and gains are measured in biodiversity equivalence scores or units.

Under the Guidelines any losses of vegetation within sites that are assessed under the low risk-based pathway can be offset by the provision of a 'general offset'. The specific-general offset test will determine if a general offset, specific offset or combination of both is required for moderate and high risk-based pathway applications.

Note that at this point in time offset prescriptions required under the moderate and high risk assessment pathways can only be provided by DEPI. The proposed development footprint submitted to DEPI for assessment is outlined in Figure 3. The DEPI generated Biodiversity Impact and Offset Requirements report and Offset Site report are provided in Appendix 3.

5.4.2 Specific-general offset test

As the risk-based pathway is high, and the vegetation to be removed provides habitat for rare or threatened species, the specific-general offset test must be applied. Where a site is habitat for a particular rare or threatened species, the specific-general offset test measures the proportion of a species habitat that will be lost if the removal of native vegetation is permitted.

The specific-general offset test is undertaken for each relevant species identified by the DEPI habitat importance models which cover the relevant patches of native vegetation. First the specific biodiversity equivalence score for each rare or threatened species that the native vegetation is habitat for is determined. The specific biodiversity equivalence score for a particular species is then divided by the sum of the specific biodiversity equivalence scores across all remaining habitat for that species. This gives the proportion of the remaining habitat for the species that is to be removed, weighted by its importance for that species.

When the native vegetation to be removed is a proportion of habitat for a rare or threatened species that is greater than the specific offset threshold, a specific offset is required for that species. A specific offset is required for a rare or threatened species when the proposed clearing exceeds the DEPI nominated impact threshold (nominally 0.005% of habitat).

For the proposed clearing at Ajax Road the specific-general offset test determined that the proposed removal of native vegetation will have a proportional impact on two rare species habitats above the specific offset threshold (0.005%). No general offsets are identified and therefore no discussion relating to general offsets is provided by this report.

5.4.3 Specific offsets

Specific offset requirements are calculated as the product of the biodiversity equivalence score and an 'offset risk factor'. The offset risk factor adjusts the offset to adequately accommodate the risk that an offset may fail to make the required contribution to Victoria's biodiversity. For high risk-based pathway assessments the offset risk factor is set at two (2).

The DEPI Biodiversity impact and offset requirements report (Appendix 3) identifies two rare species would be impacted above the specific offset threshold: Salt Lawrenzia and Creeping Rush. Therefore the specific offset requirement for the proposed removal of native vegetation is provided in specific biodiversity equivalence units for the habitat of these species.

The offset for high risk-based pathway applications must meet the following required attributes.

- **11.369** specific biodiversity equivalence units of habitat for Salt Lawrencia; and
- **1.369** specific biodiversity equivalence units of habitat for Creeping Rush.

Should a permit be granted to remove native vegetation, the offset requirement is for a total of **12.760** specific biodiversity equivalence units. No minimum strategic biodiversity score for the offset is defined but the offset site must provide habitat for the target species as defined by the relevant habitat importance model. Offsets may be located anywhere in Victoria identified as habitat by the relevant habitat importance model (DEPI 2013c).

5.4.4 Suitability for On-site offsets

The ability for retained native vegetation to provide some or all of the offset prescription is governed by a set of site eligibility criteria (DEPI 2013c). For all first party offsets (i.e. property within the same ownership as the development resulting in the offset prescription) the Responsible Authority will check and confirm a site's eligibility.

An area of native vegetation is eligible to be an offset if there are no current or future land use(s) identified that are incompatible with managing native vegetation for conservation. This includes requirements for bushfire suppression, infrastructure easements, road reserves, extractive industries works approvals etc. (DEPI 2013c). Land must also not have already been used to offset the clearance of native vegetation or species habitat required by Victorian regulations. Any other significant threats beyond the landowners control may also exclude a site from being eligible including dieback, erosion, salinity, significant infestations of pest animals etc. (DEPI 2013c: Section 3). Any offset area must be able to be secured for conservation by a legally enforceable agreement.

Land to the south of the Altona rail line is proposed to be utilised as an offset site for proposed clearing in association with the industrial subdivision to the north of this rail line (Figure 5). This area is private property and is not subject to any existing offsets **or agreements** to manage the site in a specific manner.

The proposed offset site is buffered to the north from the proposed development by the existing rail easement (approximately 40 m wide). The southern boundary of the proposed offset site is adjacent to an existing Melbourne Water reserve which supports a substantial area of indigenous wetland vegetation.

However the proposed offset site is completely encumbered with a drainage easement (identified as E6 on the title) in favour of Melbourne Water. Unless that easement is changed then the site cannot be utilised as an offset site. While there are also other sewer and drainage easements present within the proposed offset area, they are relatively narrow and linear and can easily be excluded from any offset site.

5.4.5 Offset Potential

If the abovementioned drainage easement can be localised within this portion of the title and excluded from a potential offset area, this land could then be protected and legally secured as an offset area. The extent and condition of this native vegetation was supplied to DEPI and the offset site report is provided in Appendix 3.

The native vegetation present within the proposed offset site has the potential to generate the following:

- 5.553 general biodiversity equivalence units
- 2.552 specific biodiversity equivalence units for Salt Lawrencia
- 0.230 specific biodiversity equivalence units for Creeping Rush.

It can also generate specific biodiversity equivalence units for a number of other rare or threatened flora and fauna.

6. Key Ecological Values and Recommendations

The biodiversity values identified in this flora and fauna assessment have been considered during the design phase of the project. The primary measure to minimise impacts to biodiversity values on the site is to minimise removal of native vegetation and habitats. To retain these values they need to be avoided in the design process and protected and managed in a designated reserve(s).

The proposed retention of land and the associated native vegetation to the south of the Altona rail line will retain a proportion of the native vegetation present. This area of retained vegetation is relatively isolated from the proposed development by the existing railway. It is also adjacent to existing areas of native vegetation currently managed by Melbourne Water and is bounded to the south by part of the Laverton Creek Walking Trail.

Retaining the area south of the railway line and using it as an offset site will protect areas of Brackish Wetland, Plains Grassy Wetland and Plains Grassland. This area also supports a substantial population of Spiny Rice-flower (456 individuals or 93% of the population within the study area). The area is contiguous with Truganina Swamp to the south-east, which is listed as a Biosite of State Significance (Biosite 4623).

Development of the area north of the Altona railway line will result in the loss of Plains Grassland, Plains Grassy Wetland, 33 known individuals of Spiny Rice-flower and all four known individuals of Arching Flax-lily. The offset requirements for these losses are outlined in Section 5.

Two rare species have been recorded from the Brackish Wetland in the south west of the study area. Creeping rush was recorded by Frood et al. (1997) while Salt Lawrenzia was recorded from the estuary of Laverton Creek in 1988 (FIS records). The proposed development will not have a direct or significant indirect impact on the Brackish Wetland environment in the south west of the study area. However, DEPI habitat importance models indicate the proposed clearing would have a significant impact on two rare species, Salt Lawrenzia and Creeping Rush which are restricted to this habitat.

The areas of Plains Grassland and Plains Grassy Wetland which would be impacted by the proposed development do provide habitat for threatened flora and potential habitat for threatened fauna, but not those identified by DEPI. None of the DEPI habitat importance models identify habitat for threatened flora and fauna either recorded from or otherwise considered most likely to occupy the native vegetation and habitat to be impacted by the proposed industrial subdivision. This includes Spiny Rice-flower, Arching Flax-lily, Golden Sun Moth and Striped Legless Lizard.

However, DEPI will not vary their analysis of rare and threatened species habitat based on the accurate ground survey information provided, despite the inaccuracy of their models at the scale of the proposed development. Offsets are therefore prescribed for the protection of saline wetland habitat for Salt Lawrenzia and Creeping Rush rather than for the endangered native grassland species which would actually be impacted.

Offsets for Spiny Rice-flower and Natural Temperate Grassland of the Victorian Volcanic Plain are likely to be required under any approval provided under the EPBC Act. Previously under Victoria's Native Vegetation Management Framework (the Framework - NRE 2002) state and federal government offset requirements often related to equivalent ecological units (i.e. Plains Grassland offsets were the same as offsets for Natural Temperate Grassland of the Victorian Volcanic Plain). State and federal offsets therefore often had substantial common ground and regulators permitted concurrent offsets for the same species or communities. Under the Framework, the proposed development at Ajax Road would have been able to take advantage of concurrent offsets (Biosis Research 2010). However, in this instance, the application of the

Biodiversity Assessment Guidelines provides very different offset habitat requirements to those which will be required by the Australian Government. Therefore there will be no scope for any external offset requirements to be provided concurrently.

Measures to minimise impacts of development on ecological values of the study area include:

Design and pre-construction

- Protect all areas to be retained. This would not require any works as the existing rail line would prevent any construction access to the retained vegetation.
- Retain fauna habitat linkages within the development and the local area e.g. Laverton Creek/Kayes Drain corridor.
- Salvage individuals of Spiny Rice-flower by translocating these plants into a secure location approved by DEPI.
- Salvage plant material from the proposed development footprint for use in rehabilitation works within the proposed offset area.
- Make allowance within the development footprint for all construction works (including construction vehicle access, road batters, footpaths and all services) so all areas outside the development area (particularly reserves) be treated as no-go zones.
- Incorporate relevant Water Sensitive Urban Design (WSUD) and Water Sensitive Road Design (WSRD) (Wong et al. 2000) elements such as porous pavements, swale drains, buffer strips, flow detention/retention by infiltration and treatment wetlands/ponds, wherever practical/appropriate.
- Design any stormwater treatment wetlands to provide fauna habitat. Suitable habitat features include shelter and basking sites (i.e. rocks and logs), fringing emergent aquatic vegetation and submerged aquatic vegetation. Stormwater treatment should also maintain the level and quality of any flows through culverts under the Altona rail line to ensure the persistence of Plains Grassy Wetlands on the south of the rail line.
- Monitor water quality within any constructed wetlands and within receiving waterways (Laverton Creek and Truganina Swamp) at a number of sites upstream and downstream of the discharge point. This should be conducted as part of an appropriate water quality monitoring program, developed with input from a specialist aquatic ecologist.
- Ensure all environmental constraints are clearly communicated to construction personnel and incorporated into the workforce induction program and a site Construction Management Plan.
- Carefully design any landscape plantings in the vicinity of any conservation reserves. Issues to consider include species' invasiveness, genetic pollution and shading of indigenous grasslands.

Construction

- Keep the construction footprint to a minimum.
- Protect areas of retained native vegetation and areas of environmental sensitivity. These areas should be fenced and treated as no-go zones.
- Prevent access to no-go zones – including vehicles, construction personnel, equipment and stockpiles.
- The construction zone should incorporate appropriate buffer distances from waterways or associated waterbodies (including floodplains) wherever practicable;

- Install effective sediment control measures to protect waterbodies, retained native vegetation and habitat.
- Manage construction works to minimise discharge of sediments and other pollutants. Suitable measures are provided in *Environmental Guidelines for Major Construction Sites* (EPA 1996, amended) and *Construction Techniques for Sediment Pollution Control* (EPA 1991) and *Guideline for Environmental Management. Doing it right on subdivisions. Temporary environmental protection measures for subdivision construction sites.* (EPA 2004).
- Refuelling of vehicles and storage of chemicals and other equipment should occur on stable surfaces and should not occur within 30-50 m of a waterway or associated waterbodies and should not occur within a floodplain or land subject to inundation;
- All protective fencing must be maintained in good repair throughout construction.
- All sediment control measures must be maintained in good repair and regularly inspected to ensure adequate performance throughout construction.
- Avoid operational discharges to waterways. If such discharges cannot be avoided they should be minimised through water re-use and recycling. Discharges should be monitored to assess the protection of beneficial uses.

Post-construction

- Develop and implement management plan to retain/enhance biodiversity values of conservation reserves.
- Site rehabilitation/revegetation.

Construction and post-construction management

Specific detail relating to preventing impacts to retained native vegetation and wetland habitat should be addressed in a site-specific Storm Water Management Plan. This will include issues relating to contractors such as environmental inductions, installation of temporary fencing/signage, drainage and sediment control.

An Ecological Management Plan should be prepared by an ecological consultant to provide detailed advice on the ongoing protection and long-term management of retained vegetation/ habitat, creation of linkages and other habitat features such as wetlands, if proposed.

Retained native vegetation will be subject to permanent legal protection and the implementation of an ecological management plan consistent with the requirements of DEPI (2013c – gain scoring manual).

References

- DEPI 2013a. Permitted clearing of native vegetation - Biodiversity assessment guidelines. Victorian Government Department of Environment and Primary Industries, Melbourne.
- DEPI 2013b. Advisory List of Threatened Vertebrate Fauna in Victoria – 2013. Victorian Government Department of Environment & Primary Industries, Melbourne.
- DEPI 2013c. Native vegetation gain scoring manual. Victorian Government Department of Environment and Primary Industries, Melbourne.
- Department of the Environment, Water, Heritage and the Arts (DEWHA) (2009). EPBC Act Policy Statement 3.12 - *Significant Impact Guidelines for the Critically Endangered Golden Sun Moth* (*Synemon plana*). [Online]. Canberra, ACT: Department of the Environment, Water, Heritage and the Arts. Available from: <http://www.environment.gov.au/resource/significant-impact-guidelines-critically-endangered-golden-sun-moth-synemon-plana>.
- DSE 2004. *Native Vegetation: Sustaining a living landscape. Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectares scoring method. Version 1.3*. Department of Sustainability and Environment, Melbourne.
- DSE 2005. Advisory List of Rare or Threatened Plants in Victoria – 2005. Victorian Government Department of Sustainability & Environment, East Melbourne.
- DSE 2006. Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978. Victorian Government Department of Sustainability and Environment, Melbourne.
- DSE 2007. *Native Vegetation - Guide for assessment of referred planning permit applications*. Victorian Government, Department of Sustainability and Environment, East Melbourne.
- DSE 2007. Native Vegetation – Guide for assessment of referred planning permit applications. Victorian Government Department of Sustainability & Environment, East Melbourne.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011). *Survey guidelines for Australia's threatened reptiles. EPBC Act survey guidelines 6.6*. [Online]. Canberra, ACT: DSEWPaC. Available from: <http://www.environment.gov.au/epbc/publications/threatened-reptiles.html>.
- EPA 2004. *Publication 960, Guideline for Environmental Management. Doing it right on subdivisions. Temporary environmental protection measures for subdivision construction sites*. Environment Protection Agency, Melbourne.
- EPA, 1991. *Construction Techniques for Sediment Pollution Control*. Publication 275, Environment Protection Authority Victoria, Melbourne.
- EPA, 1996. *Environmental Guidelines for Major Construction Sites*. Publication 480, Environment Protection Authority Victoria, Melbourne.
- Frood, D., Robertson, P. & Ellery W. 1997. *'Burns Road Environs. A Site Assessment for Flora and Fauna.'* Report to the Department of Natural Resources and Environment by Envirosol International Pty Ltd. May 1997.
- IUCN 2001. *IUCN Red List Categories and Criteria: Version 3.1*. IUCN Species Survival Commission, International Union for Conservation of Nature & Natural Resources, Gland, Switzerland and Cambridge, UK.
- NRE 2002. *Victoria's Native Vegetation Management: A Framework for Action*. Department of Natural Resources & Environment, Victoria.
- PPWCMA 2006. *Port Phillip and Westernport Native Vegetation Plan*. Port Phillip and Westernport Catchment Management Authority, Frankston, Victoria.
- PPWCMA, 2004. *Port Phillip and Westernport Regional Catchment Strategy*. Port Phillip and Westernport Catchment Management Authority

-
- Walsh, N.G. & Entwisle, V. 1996. *Flora of Victoria. Volume 3, Dicotyledons, Winteraceae to Myrtaceae*. Inkata Press, Melbourne.
- Walsh, N.G. & Entwisle, V. 1999. *Flora of Victoria. Volume 4, Dicotyledons, Cornaceae to Asteraceae*. Inkata Press, Melbourne.
- Walsh, N.G. & Stajsic, V. 2007. *A Census of the Vascular Plants of Victoria*. Eighth edition, Royal Botanic Gardens Melbourne.
- Walsh, N.G. & Stajsic, V. 2008. *A Census of the Vascular Plants of Victoria*. Eighth edition, Royal Botanic Gardens Melbourne.

Appendices

Appendix 1: Flora

Table A1.1. Flora species (109 Native, 81 weeds) recorded by Biosis from the study area

Notes to tables:

EPBC Act: CR - Critically Endangered EN - Endangered VU - Vulnerable	DSE 2005: e - endangered v - vulnerable r - rare
PMST – Protected Matters Search Tool	
# - Native species outside natural range (considered environmental weeds)	Noxious weed status: SP State prohibited species RP Regionally prohibited species RC Regionally controlled species RR Regionally restricted species

Status	Scientific name	Common name
Rare or Threatened species:		
v	<i>Dianella</i> sp. aff. <i>longifolia</i> (Benambra)	Arching Flax-lily
k	<i>Eleocharis pallens</i>	Pale Spike-sedge
Ce	<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower
ndigenous species:		
	<i>Acacia pycnantha</i>	Golden Wattle
	<i>Acaena echinata</i>	Sheep's Burr
	<i>Alisma plantago-aquatica</i>	Water Plantain
	<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass
	<i>Anthosachne scabra</i>	Common Wheat-grass
	<i>Apium annuum</i>	Annual Celery
	<i>Asperula conferta</i>	Common Woodruff
	<i>Atriplex semibaccata</i>	Berry Saltbush
	<i>Austrostipa bigeniculata</i>	Knead Spear-grass
	<i>Austrostipa curticoma</i>	Short-crown Spear-grass
	<i>Austrostipa gibbosa</i>	Spurred Spear-grass
	<i>Austrostipa oligostachya</i>	Fine-head Spear-grass
	<i>Bolboschoenus caldwellii</i>	Salt Club-sedge
	<i>Bothriochloa macra</i>	Red-leg Grass

Status	Scientific name	Common name
	<i>Brachyscome dentata</i>	Lobe-seed Daisy
	<i>Caesia calliantha</i>	Blue Grass-lily
	<i>Calocephalus citreus</i>	Lemon Beauty-heads
	<i>Calocephalus lacteus</i>	Milky Beauty-heads
	<i>Cassinia arcuata</i>	Drooping Cassinia
	<i>Cheilanthes austrotenuifolia</i>	Green Rock-fern
	<i>Chloris truncata</i>	Windmill Grass
	<i>Convolvulus angustissimus</i> var. <i>omnigracilis</i>	Blushing Bindweed
	<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula
	<i>Crassula sieberiana</i>	Sieber Crassula
	<i>Damasonium minus</i>	Star Fruit
	<i>Dianella brevicaulis</i>	Small-flower Flax-lily
	<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily
	<i>Dichelachne crinita</i>	Long-hair Plume-grass
	<i>Dichondra repens</i>	Kidney-weed
	<i>Dillwynia cinerascens</i>	Grey Parrot-pea
	<i>Disphyma crassifolium</i> subsp. <i>clavellatum</i>	Rounded Noon-flower
	<i>Distichlis distichophylla</i>	Australian Salt-grass
	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>	Sticky Hop-bush
	<i>Einadia nutans</i> subsp. <i>nutans</i>	Nodding Saltbush
	<i>Eleocharis pusilla</i>	Small Spike-sedge
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush
	<i>Eriochloa pseudoacrotricha</i>	Early Spring-grass
	<i>Eryngium ovinum</i>	Blue Devil
	<i>Eryngium vesiculosum</i>	Prickfoot
	<i>Euchiton collinus</i>	Creeping Cudweed
	<i>Euchiton involucratus</i>	Star Cudweed
	<i>Eutaxia microphylla</i> var. <i>microphylla</i>	Common Eutaxia
	<i>Ficinia nodosa</i>	Knobby Club-sedge
	<i>Gahnia filum</i>	Chaffy Saw-sedge
	<i>Geranium retrorsum</i>	Grassland Crane's-bill
	<i>Glycine tabicina</i>	Variable Glycine

Status	Scientific name	Common name
	<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia
	<i>Haloragis heterophylla</i>	Varied Raspwort
	<i>Halosarcia pergranulata</i>	Blackseed Glasswort
	<i>Hypericum gramineum</i>	Small St John's Wort
	<i>Hypoxis glabella</i> var. <i>glabella</i>	Tiny Star
	<i>Isolepis cernua</i> var. <i>cernua</i>	Nodding Club-sedge
	<i>Isolepis cernua</i> var. <i>platycarpa</i>	Nodding Club-sedge
	<i>Isolepis hookeriana</i>	Grassy Club-sedge
	<i>Isolepis victoriensis</i>	Victorian Club-sedge
	<i>Juncus amabilis</i>	Hollow Rush
	<i>Juncus bufonius</i>	Toad Rush
	<i>Juncus kraussii</i> subsp. <i>australiensis</i>	Sea Rush
	<i>Juncus subsecundus</i>	Finger Rush
	<i>Lachnagrostis aemula</i>	Purplish Blown-grass
	<i>Lachnagrostis filiformis</i>	Common Blown-grass
	<i>Linum marginale</i>	Native Flax
	<i>Lobelia irrigua</i>	Salt Pratia
	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
	<i>Lomandra micrantha</i>	Small-flower Mat-rush
	<i>Lomandra nana</i>	Dwarf Mat-rush
	<i>Lythrum hyssopifolia</i>	Small Loosestrife
	<i>Maireana decalvans</i>	Black Cotton-bush
	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
	<i>Oxalis perennans</i>	Grassland Wood-sorrel
	<i>Panicum decompositum</i> var. <i>decompositum</i>	Native Millet
	<i>Panicum effusum</i>	Hairy Panic
	<i>Phragmites australis</i>	Common Reed
	<i>Pimelea curviflora</i>	Curved Rice-flower
	<i>Pimelea glauca</i>	Smooth Rice-flower
	<i>Plantago gaudichaudii</i>	Narrow Plantain
	<i>Poa labillardierei</i> var. (Volcanic Plains)	Basalt Tussock-grass
	<i>Poa poiiformis</i>	Coast Tussock-grass

Status	Scientific name	Common name
	<i>Poa sieberiana</i> var. <i>sieberiana</i>	Grey Tussock-grass
	<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed
	<i>Ptilotus macrocephalus</i>	Feather Heads
	<i>Rhagodia candolleana</i> subsp. <i>candolleana</i>	Seaberry Saltbush
	<i>Rumex brownii</i>	Slender Dock
	<i>Rumex dumosus</i>	Wiry Dock
	<i>Rytidosperma auriculata</i>	Lobed Wallaby-grass
	<i>Rytidosperma caespitosa</i>	Common Wallaby-grass
	<i>Rytidosperma carphoides</i>	Short Wallaby-grass
	<i>Rytidosperma duttoniana</i>	Brown-back Wallaby-grass
	<i>Rytidosperma eriantha</i>	Hill Wallaby-grass
	<i>Rytidosperma fulva</i>	Copper-awned Wallaby-grass
	<i>Rytidosperma setacea</i>	Bristly Wallaby-grass
	<i>Samolus repens</i>	Creeping Brookweed
	<i>Sarcocornia quinqueflora</i>	Beaded Glasswort
	<i>Schoenus apogon</i>	Common Bog-sedge
	<i>Schoenus nitens</i>	Shiny Bog-sedge
	<i>Selliera radicans</i>	Shiny Swamp-mat
	<i>Senecio quadridentatus</i>	Cotton Fireweed
	<i>Solenogyne dominii</i>	Smooth Solenogyne
	<i>Stackhousia subterranea</i>	Plains Stackhousia
	<i>Suaeda australis</i>	Austral Seablite
	<i>Themeda triandra</i>	Kangaroo Grass
	<i>Tricoryne elatior</i>	Yellow Rush-lily
	<i>Velleia paradoxa</i>	Spur Velleia
	<i>Veronica gracilis</i>	Slender Speedwell
	<i>Wahlenbergia luteola</i>	Bronze Bluebell
	<i>Walwhalleya proluta</i>	Rigid Panic
	<i>Wilsonia rotundifolia</i>	Round-leaf Wilsonia
Introduced species:		
	<i>Acacia</i> spp.	Wattle (naturalised)
	<i>Agapanthus praecox</i> subsp. <i>orientalis</i>	Agapanthus

Status	Scientific name	Common name
	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
	<i>Arctotheca calendula</i>	Cape Weed
	<i>Aster subulatus</i>	Aster-weed
	<i>Atriplex prostrata</i>	Hastate Orache
	<i>Avena barbata</i>	Bearded Oat
	<i>Avena sterilis</i>	Sterile Oat
	<i>Berkheya rigida</i>	African Thistle
	<i>Brassica fruticulosa</i>	Twiggy Turnip
	<i>Briza maxima</i>	Large Quaking-grass
	<i>Briza minor</i>	Lesser Quaking-grass
	<i>Bromus catharticus</i>	Prairie Grass
	<i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>	Soft Brome
	<i>Catapodium rigidum</i>	Fern Grass
	<i>Cenchrus clandestinus</i>	Kikuyu
	<i>Centaurium erythraea</i>	Common Centaury
	<i>Centaurium tenuiflorum</i>	Slender Centaury
	<i>Cicendia quadrangularis</i>	Square Cicendia
	<i>Cirsium vulgare</i>	Spear Thistle
	<i>Conyza bonariensis</i>	Flaxleaf Fleabane
	<i>Cortaderia selloana</i>	Pampas Grass
RR	<i>Cynara cardunculus</i>	Artichoke Thistle
	<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch
	<i>Cyperus eragrostis</i>	Drain Flat-sedge
	<i>Dactylis glomerata</i>	Cocksfoot
RR	<i>Dittrichia graveolens</i>	Stinkwort
	<i>Ehrharta erecta</i> var. <i>erecta</i>	Panic Veldt-grass
	<i>Ehrharta longiflora</i>	Annual Veldt-grass
	<i>Erodium botrys</i>	Big Heron's-bill
	<i>Erodium malacoides</i>	Oval Heron's-bill
RR	<i>Foeniculum vulgare</i>	Fennel
	<i>Galenia pubescens</i> var. <i>pubescens</i>	Galenia
	<i>Galium murale</i>	Small Goosegrass

Status	Scientific name	Common name
RR	<i>Genista linifolia</i>	Flax-leaf Broom
	<i>Gladiolus</i> spp.	Gladiolus
	<i>Hedypnois cretica</i>	Cretan Hedypnois
	<i>Helminthotheca echioides</i>	Ox-tongue
	<i>Hypochoeris radicata</i>	Flatweed
RR	<i>Juncus acutus</i> subsp. <i>acutus</i>	Spiny Rush
	<i>Leontodon taraxacoides</i> subsp. <i>taraxacoides</i>	Hairy Hawkbit
	<i>Lilaea scilloides</i>	Lilaea
	<i>Lolium rigidum</i>	Wimmera Rye-grass
	<i>Lotus angustissimus</i>	Slender Bird's-foot Trefoil
RR	<i>Lycium ferocissimum</i>	African Box-thorn
	<i>Lysimachia arvensis</i>	Pimpernel
RR	<i>Marrubium vulgare</i>	Horehound
	<i>Medicago polymorpha</i>	Burr Medic
	<i>Melilotus indicus</i>	Sweet Melilot
	<i>Modiola caroliniana</i>	Red-flower Mallow
RR	<i>Moraea setifolia</i>	Thread Iris
R	<i>Nassella neesiana</i>	Chilean Needle-grass
RR	<i>Nassella trichotoma</i>	Serrated Tussock
RR	<i>Oxalis pes-caprae</i>	Soursob
	<i>Paspalum dilatatum</i>	Paspalum
	<i>Paspalum distichum</i>	Water Couch
	<i>Phalaris aquatica</i>	Toowoomba Canary-grass
	<i>Piptatherum miliaceum</i>	Rice Millet
	<i>Plantago coronopus</i>	Buck's-horn Plantain
	<i>Plantago lanceolata</i>	Ribwort
	<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed
	<i>Polygonum aviculare</i>	Hogweed
	<i>Rapistrum rugosum</i>	Giant Mustard
	<i>Romulea minutiflora</i>	Small-flower Onion-grass
	<i>Romulea rosea</i>	Onion Grass
RR	<i>Rosa rubiginosa</i>	Sweet Briar

Status	Scientific name	Common name
	<i>Rumex crispus</i>	Curled Dock
	<i>Setaria parviflora</i>	Slender Pigeon Grass
	<i>Solanum nigrum</i>	Black Nightshade
	<i>Sonchus asper</i>	Rough Sow-thistle
	<i>Sonchus oleraceus</i>	Common Sow-thistle
	<i>Spergularia media</i>	Greater Sea-spurrey
	<i>Sporobolus africanus</i>	Rat-tail Grass
	<i>Tribolium acutiflorum</i>	Crested Desmazeria
	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover
	<i>Trifolium campestre</i> var. <i>campestre</i>	Hop Clover
	<i>Trifolium dubium</i>	Suckling Clover
	<i>Trifolium glomeratum</i>	Cluster Clover
RR	<i>Ulex europaeus</i>	Gorse
	<i>Vicia sativa</i>	Common Vetch
	<i>Vulpia bromoides</i>	Squirrel-tail Fescue

Table A1.2. Flora species (109 Native, 81 weeds) recorded by Frood et al. 1995 from the study area

Status	Scientific name	Common name
Rare or Threatened species:		
	<i>Juncus revolutus</i>	Creeping Rush
	<i>Lachnagrostis filiformis</i> var. 2	Wetland Blown-grass
Indigenous species:		
	<i>Acaena ovina</i>	Australian Sheep's Burr
	<i>Apium prostratum</i> subsp. <i>prostratum</i>	Sea Celery
	<i>Asperula scoparia</i>	Prickly Woodruff
	<i>Austrostipa rudis</i>	Veined Spear-grass
	<i>Austrostipa setacea</i>	Corkscrew Spear-grass
	<i>Carex breviculmis</i>	Common Grass-sedge
	<i>Chrysocephalum apiculatum</i> s.l.	Common Everlasting
	<i>Cuscuta</i> spp.	Dodder
	<i>Eleocharis acuta</i>	Common Spike-sedge
	<i>Epilobium billardierianum</i> subsp. <i>billardierianum</i>	Smooth Willow-herb
	<i>Epilobium billardierianum</i> subsp. <i>intermedium</i>	Variable Willow-herb
	<i>Eragrostis parviflora</i>	Weeping Love-grass
	<i>Isolepis marginata</i>	Little Club-sedge
	<i>Juncus flavidus</i>	Gold Rush
	<i>Juncus holoschoenus</i>	Joint-leaf Rush
	<i>Lemna disperma</i>	Common Duckweed
	<i>Lepilaena cylindrocarpa</i>	Long-fruit Water-mat
	<i>Leptorhynchos squamatus</i>	Scaly Buttons
	<i>Lobelia pratioides</i>	Poison Lobelia
	<i>Malva</i> aff. <i>preissiana</i> (pink-flowered inland form)	Australian Hollyhock
	<i>Myriophyllum</i> spp.	Water-milfoil
	<i>Puccinellia stricta</i>	Australian Saltmarsh-grass
	<i>Ruppia polycarpa</i>	Many-fruit Tassel
	<i>Sebaea albidiflora</i>	White Sebaea
	<i>Senecio glomeratus</i>	Annual Fireweed
	<i>Sonchus hydrophilus</i>	Native Sow-thistle
	<i>Stuckenia pectinata</i>	Fennel Pondweed

Status	Scientific name	Common name
	<i>Triglochin striata</i>	Streaked Arrowgrass
	<i>Vittadinia gracilis</i>	Woolly New Holland Daisy
	<i>Wolffia australiana</i>	Tiny Duckweed
Introduced species:		
	<i>Aira caryophyllea</i>	Silvery Hair-grass
	<i>Avena fatua</i>	Wild Oat
	<i>Bromus diandrus</i>	Great Brome
	<i>Cotula coronopifolia</i>	Water Buttons
	<i>Hordeum leporinum</i>	Barley-grass
	<i>Hordeum marinum</i>	Sea Barley-grass
	<i>Hypochoeris glabra</i>	Smooth Cat's-ear
	<i>Juncus capitatus</i>	Capitate Rush
	<i>Lactuca saligna</i>	Willow-leaf Lettuce
	<i>Lactuca serriola</i>	Prickly Lettuce
	<i>Melilotus siculus</i>	Mediterranean Melilot
	<i>Parapholis incurva</i>	Coast Barb-grass
	<i>Parentucellia latifolia</i>	Red Bartsia
	<i>Phalaris paradoxa</i>	Paradoxical Canary-grass
	<i>Polypogon monspeliensis</i>	Annual Beard-grass
	<i>Puccinellia fasciculata</i>	Borrer's Saltmarsh-grass
	<i>Rumex conglomeratus</i>	Clustered Dock
	<i>Scorzonera laciniata</i>	Scorzonera
	<i>Tragopogon porrifolius</i>	Salsify
	<i>Trifolium scabrum</i>	Rough Clover
	<i>Trifolium striatum</i>	Knotted Clover
	<i>Trifolium subterraneum</i>	Subterranean Clover

Table A1.3. Flora of national or state significance recorded or predicted to occur within 5 km

The following table includes a list of the significant flora species that have potential to occur within the study area. The list of species is sourced from the Victorian Flora Information System and the Protected Matters Search Tool (DoE; accessed on 13.03.2014).

Scientific name	Common name	Aust. status	Vic. status	Most recent record	Likelihood of occurrence in study area
National significance:					
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	V	-	#	Negligible
<i>Asperula wimmerana</i>	Wimmera Woodruff	R	r	2009	Negligible
<i>Carex tasmanica</i>	Curly Sedge	VU	v/L	#	Negligible
<i>Dianella amoena</i>	Matted Flax-lily	EN	e/L	#	Low
<i>Diuris basaltica</i>	Small Golden Moths	EN	v/L	1996/#	Medium
<i>Diuris fragrantissima</i>	Sunshine Diuris	EN	e/L	#	Low
<i>Glycine latrobeana</i>	Clover Glycine	VU	v/L	2006/#	Low
<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower	CR	e	2009/#	Recorded
<i>Prasophyllum frenchii</i>	Maroon Leek-orchid	EN	e/L	#	Negligible
<i>Rutidosia leptorhynchoides</i>	Button Wrinklewort	EN	e/L	#	Negligible
<i>Senecio macrocarpus</i>	Large-fruit Fireweed	VU	e/L	#	Negligible
State significance:					
<i>Acacia rostriformis</i>	Bacchus Marsh Varnish Wattle		v	2010	Negligible
<i>Allocasuarina luehmannii</i>	Buloke		L	2010	Negligible
<i>Alternanthera</i> sp. 1 (Plains)	Plains Joyweed		k	2010	High
<i>Amyema linophylla</i> subsp. <i>orientale</i>	Buloke Mistletoe		v	2010	Negligible
<i>Austrostipa exilis</i>	Heath Spear-grass		r	1995	High
<i>Austrostipa hemipogon</i>	Half-bearded Spear-grass		r	2006	High
<i>Chenopodium desertorum</i> subsp. <i>desertorum</i>	Frosted Goosefoot		r	2008	High
<i>Clematis leptophylla</i>	Skeleton Vine		k	2010	Negligible
<i>Convolvulus angustissimus</i> subsp. <i>omnigracilis</i>	Slender Bindweed		k	2009	Recorded
<i>Cullen parvum</i>	Small Scurf-pea		e/L	2010	High

Appendix 2: Fauna

Table A2.1. Vertebrate fauna recorded from the study area (present assessment)

Notes to tables:

<p>EPBC Act: EX - Extinct CR - Critically Endangered EN - Endangered VU - Vulnerable CD - Conservation dependent</p> <p>PMST – Protected Matters Search Tool</p> <p>* - introduced species ** - pest species listed under the CaLP Act</p>	<p>DEPI 2013b: ex - extinct cr - critically endangered en - endangered vu - vulnerable nt - near threatened dd - data deficient rx - regionally extinct</p> <p>FFG Act: L - listed as threatened under FFG Act N - nominated for listing as threatened I - determined ineligible for listing</p>
---	--

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

Status	Scientific name	Common name
Birds		
	<i>Pelecanus conspicillatus</i>	Australian Pelican
	<i>Vanellus miles</i>	Masked Lapwing
	<i>Gallinago hardwickii</i>	Latham's Snipe
	<i>Threskiornis spinicollis</i>	Straw-necked Ibis
	<i>Anas superciliosa</i>	Pacific Black Duck
	<i>Accipiter fasciatus</i>	Brown Goshawk
	<i>Elanus axillaris</i>	Black-shouldered Kite
	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet
	<i>Hirundo neoxena</i>	Welcome Swallow
	<i>Rhipidura leucophrys</i>	Willie Wagtail
	<i>Grallina cyanoleuca</i>	Magpie-lark
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill
	<i>Cincloramphus cruralis</i>	Brown Songlark
	<i>Cisticola exilis</i>	Golden-headed Cisticola
	<i>Malurus cyaneus</i>	Superb Fairy-wren
	<i>Zosterops lateralis</i>	Silvereye
	<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater
	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater
	<i>Anthochaera carunculata</i>	Red Wattlebird

Status	Scientific name	Common name
	<i>Anthus novaeseelandiae</i>	Australasian Pipit
	<i>Gymnorhina tibicen</i>	Australian Magpie
	<i>Corvus mellori</i>	Little Raven
*	<i>Columba livia</i>	Rock Dove
*	<i>Streptopelia chinensis</i>	Spotted Turtle-Dove
*	<i>Turdus merula</i>	Common Blackbird
*	<i>Alauda arvensis</i>	European Skylark
*	<i>Passer domesticus</i>	House Sparrow
*	<i>Acridotheres tristis</i>	Common Myna
*	<i>Sturnus vulgaris</i>	Common Starling
Mammals		
*	<i>Mus musculus</i>	House Mouse
*	<i>Oryctolagus cuniculus</i>	European Rabbit
*	<i>Lepus europeaus</i>	European Hare
*	<i>Vulpes vulpes</i>	Red Fox
Reptiles		
	<i>Chelodina longicollis</i>	Common Long-necked Turtle
	<i>Tiliqua scincoides</i>	Common Blue-tongued Lizard
vu	<i>Pseudemoia pagenstecheri</i>	Tussock Skink
	<i>Notechis scutatus</i>	Tiger Snake
Frogs		
	<i>Crinia signifera</i>	Common Froglet

Table A2.2. Fauna of national or state significance recorded, or predicted to occur, within the local area (listed in taxonomic order)

The following table includes a list of the significant fauna species that have potential to occur within the study area. The list of species is sourced from the Victorian Biodiversity Atlas and the Protected Matters Search Tool (DoE; PMST accessed on 13.03.14).

Scientific Name	Common Name	Aust. status	Vic. status	Most recent record	Likelihood of occurrence in study area
EPBC listed					
<i>Pachyptila turtur</i>	Fairy Prion	VU	vu	1999	Negligible
<i>Thalassarche cauta</i>	Shy Albatross	VU	vu/L	#/1956	Negligible
<i>Rostratula australis</i>	Australian Painted Snipe	VU	cr/L	#/1985	Low
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	en/L	1997	Medium
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR	cr/L	2004/#	Medium
<i>Lathamus discolor</i>	Swift Parrot	EN	en/L	#	Low
<i>Anthochaera phrygia</i>	Regent Honeyeater	EN	cr/L	#	Negligible
<i>Diomedea exulans gibsoni</i>	Gibson's Albatross	VU		#	Negligible
<i>Macronectes giganteus</i>	Southern Giant-Petrel	EN	vu/L	#	Negligible
<i>Diomedea bulleri</i>	Buller's Albatross	VU	L	#	Negligible
<i>Macronectes halli</i>	Northern Giant-Petrel	VU	nt/L	#	Negligible
<i>Dasyurus maculatus</i>	Spot-tailed Quoll	EN	en/L	#	Negligible
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot	EN	nt	#	Negligible
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	vu/L	#	Low
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	VU	vu/L	#	Negligible
<i>Eubalaena australis</i>	Southern Right Whale	EN	cr/L	#	Negligible
<i>Megaptera novaeangliae</i>	Humpback Whale	VU	vu/L	2001/#	Negligible
<i>Arctocephalus tropicalis</i>	Subantarctic Fur Seal	VU		1989	Negligible
<i>Caretta caretta</i>	Loggerhead Turtle	EN		#	Negligible
<i>Dermodochelys coriacea</i>	Leathery Turtle	VU	cr/L	#	Negligible
<i>Delma impar</i>	Striped Legless Lizard	VU	en/L	2005/#	Low
<i>Tympanocryptis pinguicolla</i>	Grassland Earless Dragon	EN	cr/L	#	Low
<i>Litoria raniformis</i>	Growling Grass Frog	VU	en/L	2006/#	Low
<i>Prototroctes maraena</i>	Australian Grayling	VU	vu/L	#	Not assessed
<i>Galaxiella pusilla</i>	Dwarf Galaxias	VU	vu/L	#	Not assessed
<i>Carcharodon carcharias</i>	Great White Shark	VU	vu/L	#	Negligible
<i>Thalassarche salvini</i>	Salvin's Albatross	VU		#	Negligible
<i>Diomedea sanfordi</i>	Northern Royal Albatross	EN	vu	#	Negligible
<i>Synemon plana</i>	Golden Sun Moth	CR	cr/L	2007	Medium

Scientific Name	Common Name	Aust. status	Vic. status	Most recent record	Likelihood of occurrence in study area
State rare or threatened					
<i>Lewinia pectoralis</i>	Lewin's Rail		vu/L	1986	Medium
<i>Porzana pusilla</i>	Baillon's Crake		vu/L	1997	Medium
<i>Sula leucogaster</i>	Brown Booby		en/L	1965	Negligible
<i>Morus serrator</i>	Australasian Gannet		nt/L	2003	Negligible
<i>Gelochelidon nilotica</i>	Gull-billed Tern		en/L	1982	Low
<i>Hydroprogne caspia</i>	Caspian Tern		nt/L	2002	Low
<i>Sternula albifrons</i>	Little Tern		vu/L	2003/#	Negligible
<i>Sternula nereis</i>	Fairy Tern		en/L	1996	Negligible
<i>Charadrius mongolus</i>	Lesser Sand Plover		vu	1992	Negligible
<i>Numenius phaeopus</i>	Whimbrel		vu	#/1986	Low
<i>Limosa limosa</i>	Black-tailed Godwit		vu	#/1986	Low
<i>Tringa glareola</i>	Wood Sandpiper		vu	1994/#	Low
<i>Heteroscelus brevipes</i>	Grey-tailed Tattler		cr/L	2006/#	Low
<i>Actitis hypoleucos</i>	Common Sandpiper		vu	2000	Low
<i>Xenus cinereus</i>	Terek Sandpiper		en/L	1997	Low
<i>Calidris tenuirostris</i>	Great Knot		en/L	#/1982	Low
<i>Platalea regia</i>	Royal Spoonbill		vu	2006	Medium
<i>Egretta garzetta</i>	Little Egret		en/L	2006	Medium
<i>Ardea intermedia</i>	Intermediate Egret		cr/L	1999	Low
<i>Ardea modesta</i>	Eastern Great Egret		vu/L	2006/#	Medium
<i>Ixobrychus minutus</i>	Little Bittern		en/L	1980	Medium
<i>Anseranas semipalmata</i>	Magpie Goose		nt/L	2000	Low
<i>Anas rhynchos</i>	Australasian Shoveler		vu	2003	Low
<i>Stictonetta naevosa</i>	Freckled Duck		en/L	1985	Low
<i>Aythya australis</i>	Hardhead		vu	2003	Low
<i>Oxyura australis</i>	Blue-billed Duck		en/L	2002	Low
<i>Biziura lobata</i>	Musk Duck		vu	2003	Low
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		vu/L	1993/#	Low
<i>Falco subniger</i>	Black Falcon		vu	1990	Medium
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat		L	1993	Low
<i>Arctocephalus forsteri</i>	New Zealand Fur Seal		vu	#	Negligible
<i>Pseudemoia pagenstecheri</i>	Tussock Skink		Vu		Recorded
<i>Pseudophryne bibronii</i>	Brown Toadlet		en/L	1871	Low
<i>Bidyanus bidyanus</i>	Silver Perch		cr/L	1992	Not assessed

Scientific Name	Common Name	Aust. status	Vic. status	Most recent record	Likelihood of occurrence in study area
<i>Hesperilla flavescens flavescens</i>	Altona Skipper		vu/L	1988	High
Other conservation categories					
<i>Coturnix ypsilophora</i>	Brown Quail		nt	2003	High
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant		nt	2006	Low
<i>Phalacrocorax varius</i>	Pied Cormorant		nt	2006	Low
<i>Chlidonias hybridus</i>	Whiskered Tern		nt	2003	Low
<i>Thalaseus bergii</i>	Crested Tern		nt	2006	Negligible
<i>Larus pacificus pacificus</i>	Pacific Gull		nt	2006	Low
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		nt	2001	Negligible
<i>Pluvialis squatarola</i>	Grey Plover		nt	1992	Low
<i>Pluvialis fulva</i>	Pacific Golden Plover		nt	2006/#	Low
<i>Numenius madagascariensis</i>	Eastern Curlew		nt	1997/#	Low
<i>Calidris canutus</i>	Red Knot		nt	2000/#	Low
<i>Calidris alba</i>	Sanderling		nt	2000	Negligible
<i>Gallinago hardwickii</i>	Latham's Snipe		nt	2011/#	High
<i>Plegadis falcinellus</i>	Glossy Ibis		nt	1996	Medium
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		nt	1996	High
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose		nt	1999	Low
<i>Circus assimilis</i>	Spotted Harrier		nt	1985	Low
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo		nt	1987	Negligible
<i>Calidris melanotos X ferruginea</i>	Cox's Sandpiper		nt	1982	Low
<i>Balaenoptera edeni</i>	Bryde's Whale		dd	#	Negligible
<i>Calidris melanotos</i>	Pectoral Sandpiper		nt	#/1987	Low
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart		nt	2005	Medium

Table A2.3. Migratory species recorded, or predicted to occur, within 5 kilometres of the site.

Includes records from the following sources:

- DSE Victorian Fauna Database 2007 Version
 - DEWHA database (PMST accessed on 13.03.14)
 - Birds Australia data search
 - Current survey
- Search area is 5 km radius.

Most recent record:

species predicted to occur by the PMST (not recorded on other databases unless dated)
 Year recorded on databases listed above
 2010/2011 recorded during current survey

Scientific Name	Common Name	Most recent record
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater	2000
<i>Thalassarche cauta</i>	Shy Albatross	#/1956
<i>Hydroprogne caspia</i>	Caspian Tern	2002
<i>Sternula albifrons</i>	Little Tern	2003/#
<i>Stercorarius parasiticus</i>	Arctic Jaeger	2000
<i>Arenaria interpres</i>	Ruddy Turnstone	2006/#
<i>Pluvialis squatarola</i>	Grey Plover	1992
<i>Pluvialis fulva</i>	Pacific Golden Plover	2006/#
<i>Charadrius mongolus</i>	Lesser Sand Plover	1992
<i>Charadrius bicinctus</i>	Double-banded Plover	2006/#
<i>Numenius madagascariensis</i>	Eastern Curlew	1997/#
<i>Numenius phaeopus</i>	Whimbrel	#/1986
<i>Numenius minutus</i>	Little Curlew	#
<i>Limosa limosa</i>	Black-tailed Godwit	#/1986
<i>Limosa lapponica</i>	Bar-tailed Godwit	1997/#
<i>Tringa glareola</i>	Wood Sandpiper	1994/#
<i>Heteroscelus brevipes</i>	Grey-tailed Tattler	2006/#
<i>Actitis hypoleucos</i>	Common Sandpiper	2000
<i>Tringa nebularia</i>	Common Greenshank	2006
<i>Tringa stagnatilis</i>	Marsh Sandpiper	2006/#
<i>Xenus cinereus</i>	Terek Sandpiper	1997
<i>Calidris ferruginea</i>	Curlew Sandpiper	2006/#
<i>Calidris ruficollis</i>	Red-necked Stint	2006/#
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	2006/#
<i>Calidris canutus</i>	Red Knot	2000/#
<i>Calidris tenuirostris</i>	Great Knot	#/1982
<i>Calidris alba</i>	Sanderling	2000
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	#/1986

Scientific Name	Common Name	Most recent record
<i>Gallinago hardwickii</i>	Latham's Snipe	2011/#
<i>Rostratula australis</i>	Australian Painted Snipe	#/1985
<i>Plegadis falcinellus</i>	Glossy Ibis	1996
<i>Ardea modesta</i>	Eastern Great Egret	2006/#
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	1993/#
<i>Merops ornatus</i>	Rainbow Bee-eater	#
<i>Hirundapus caudacutus</i>	White-throated Needletail	2005/#
<i>Apus pacificus</i>	Fork-tailed Swift	#/1977
<i>Rhipidura rufifrons</i>	Rufous Fantail	#
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	#
<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	2001
<i>Diomedea exulans gibsoni</i>	Gibson's Albatross	#
<i>Tryngites subruficollis</i>	Buff-breasted Sandpiper	1962
<i>Macronectes giganteus</i>	Southern Giant-Petrel	#
<i>Diomedea bulleri</i>	Buller's Albatross	#
<i>Phalaropus lobatus</i>	Red-necked Phalarope	1992
<i>Philomachus pugnax</i>	Ruff	#/1988
<i>Macronectes halli</i>	Northern Giant-Petrel	#
<i>Sterna hirundo</i>	Common Tern	2001
<i>Calidris subminuta</i>	Long-toed Stint	#/1986
<i>Ardea ibis</i>	Cattle Egret	2005/#
<i>Calidris melanotos</i>	Pectoral Sandpiper	#/1987
<i>Eubalaena australis</i>	Southern Right Whale	#
<i>Caperea marginata</i>	Pygmy Right Whale	#
<i>Balaenoptera edeni</i>	Bryde's Whale	#
<i>Megaptera novaeangliae</i>	Humpback Whale	2001/#
<i>Lagenorhynchus obscurus</i>	Dusky Dolphin	#
<i>Tursiops aduncus</i>	Indian Ocean Bottlenose Dolphin	#
<i>Caretta caretta</i>	Loggerhead Turtle	#
<i>Dermochelys coriacea</i>	Leathery Turtle	#
<i>Carcharodon carcharias</i>	Great White Shark	#
<i>Diomedea sanfordi</i>	Northern Royal Albatross	#
<i>Thalassarche salvini</i>	Salvin's Albatross	#
<i>Gallinago megala</i>	Swinhoe's Snipe	#
<i>Gallinago stenura</i>	Pin-tailed Snipe	#
<i>Thalassarche impavida</i>	Campbell Albatross	#

Table A2.4a. Results of targeted Golden Sun Moth survey

Date	Reference site	GSM obs @ ref site	Start time	Finish time	Total survey time	Cloud cover	Wind speed	Temp	Transect width	Survey method	GSM observed
30/12/2010	Grieve Pde	Yes	10:30:00	12:30:00	2:00:00	25-50%	Slight breeze	20-25 C	50m	Walking	No
4/01/2011	Eynesbury & Manor Lakes	Yes	13:30:00	15:00:00	1:30:00	0-25%	Moderate wind	20-25 C	25m	Walking	No
16/01/2011	Aurora	Yes	13:50:00	15:00:00	1:10:00	25-50%	Moderate wind	25-30 C	10m	Walking	No
20/01/2011	Eynesbury	Yes	13:00:00	14:20:00	1:20:00	0-25%	Moderate wind	25-30 C	10m	Walking	No
20/01/2011	Eynesbury	Yes	14:30:00	15:00:00	0:30:00	0-25%	Moderate wind	25-30 C	10m	Walking	No
25/01/2011	Donnybrook	Yes	12:15:00	12:45:00	0:30:00	25-50%	Slight breeze	20-25 C	10m	Walking	No

Table A2.4b. Weather data from the Bureau of Meteorology

Data source: Bureau of Meteorology - Laverton weather station 80731

Data is presented in this table for the start and finish times (10:00 & 15:00) and mid-point (12:30) of GSM targeted survey period on each survey day.

Precipitation information is included for the two dates preceding each day of survey.

Date	Time	Precipitation since 9am (mm)	Air Temperature (°C)	Relative humidity (%)	Wind speed (km/h)	Wind direction	Speed of max windgust in last 10 mins (km/h)	Station level pressure (hPa)
28/12/2010	23:30	0						
29/12/2010	23:30	0						
30/12/2010	10:00	0	18.6	62	9	SE	13	1015.4
30/12/2010	12:30	0	20.5	60	13	SE	21	1014.8
30/12/2010	15:00	0	20.6	64	24	S	31	1014.1
2/01/2011	23:30	0						

Date	Time	Precipitation since 9am (mm)	Air Temperature (°C)	Relative humidity (%)	Wind speed (km/h)	Wind direction	Speed of max windgust in last 10 mins (km/h)	Station level pressure (hPa)
3/01/2011	23:30	0						
4/01/2011	10:00	0	17.3	60	9	S	15	1010.9
4/01/2011	12:30	0	20	53	21	S	30	1009.7
4/01/2011	15:00	0	19.9	55	24	S	31	1008.6
14/01/2011	23:30	13						
15/01/2011	23:30	0						
16/01/2011	10:00	0	22.9	75	4	SSW	13	1006.4
16/01/2011	12:30	0	23	78	22	S	31	1005.7
16/01/2011	15:00	0	21.5	79	21	S	35	1004.9
18/01/2011	23:30	0						
19/01/2011	23:30	0						
20/01/2011	10:00	0	20.3	66	5	NW	11	1009.7
20/01/2011	12:30	0	22.8	63	18	S	24	1008.1
20/01/2011	15:00	0	25.3	55	15	SSE	18	1007.1
23/01/2011	23:30	0						
24/01/2011	23:30	0.2						
25/01/2011	10:00	0	19.5	60	9	E	15	1005.6
25/01/2011	12:30	0	23.7	47	8	E	15	1004.7
25/01/2011	15:00	0	24	52	15	SSE	24	1004.4

Table A2.4c. Conditions during the Striped Legless Lizard surveys

Date	Observers	Start/Finish	Time	Air temp	Tile temp	Wind Speed	Wind direction	Humidity	Sun	Cloud	Rain	Striped Legless Lizard recorded?
6/09/2013	ADB/CPM	Start	1100	13.7	Cool	3.8	NW	75.4	Filtered	Patchy-heavy	Fine	No
6/09/2013	ADB/CPM	Finish	1400	14.7	Warm	4.6	NW	71.9	Filtered	Overcast	Fine	No
17/09/2013	ADB/CPM	Start	1213	17.8	Cool	2.7	NW	60	Filtered	Patchy-heavy	Fine	No
17/09/2013	ADB/CPM	Finish	1445	16.9	Warm	5.4	NW	68.9	Filtered	Overcast	Fine	No
4/10/2013	ADB/MFS	Start	1100	17.7	Warm	2.4	NW	58	Breaks	Patchy-light	Fine	No
4/10/2013	ADB/MFS	Finish	1500	18.4	Warm	3	NW	50	Breaks	Clear	Fine	No
11/10/2013	ADB/KC	Start	1045	15.6	Cool	13	E	53.1	Filtered	Patchy-heavy	Fine	No
11/10/2013	ADB/KC	Finish	1500	19.3	Warm	19	E	42.2	Breaks	Patchy-light	Fine	No
17/10/2013	KS/KC	Start	1000	13.8	Cool	15	W	41	Direct	Patchy-light	Fine	No
17/10/2013	KS/KC	Finish	1235	14.2	Warm	15	W	33.4	Breaks	Patchy-heavy	Fine	No
6/11/2013	KC/APS	Start	1100	26	Warm	35	N	23	Direct	Clear	Fine	No
6/11/2013	KC/APS	Finish	1300	26	Hot	35	N	23	Direct	Clear	Fine	No
12/11/2013	KC/MLC	Start	949	13.7	Cool	24	E	79	Filtered	Overcast	Fine	No
12/11/2013	KC/MLC	Finish	1250	13.7	Cool	24	E	81	Filtered	Overcast	Showers	No

Date	Observers	Start/Finish	Time	Air temp	Tile temp	Wind Speed	Wind direction	Humidity	Sun	Cloud	Rain	Striped Legless Lizard recorded?
21/11/2013	MFS/DM	Start	845	14.5	Cool	10	NW	87	Filtered	Overcast	Fine	No
21/11/2013	MFS/DM	Finish	1125	19.2	Warm	14	NNW	62	Filtered	Patchy-heavy	Fine	No
29/11/2013	ADB/APS	Start	1200	17	Warm	16	S	38	Breaks	Patchy-light	Fine	No
29/11/2013	ADB/APS	Finish	1400	16	Warm	8	S	43	Breaks	Patchy-heavy	Fine	No
5/12/2013	MFS/DM	Start	910	14.1	Warm	20.5	SW	60.2	Breaks	Patchy-heavy	Fine	No
5/12/2013	MFS/DM	Finish	1130	14	Warm	25	SW	61	Filtered	Overcast	Showers	No
11/12/2013	MFS/DM	Start	1100	18	Cool	9.4	W	55.2	Filtered	Overcast	Showers	No
11/12/2013	MFS/DM	Finish	1315	16.4	Warm	2.1	W	81.3	Breaks	Patchy-heavy	Showers	No

Appendix 3: Biodiversity Assessment Report

Biodiversity assessment report

Biodiversity information for applications for permits to remove native vegetation under clause 52.16 or 52.17 of the Victoria Planning Provisions

Date of issue: 13 March 2014

Time of issue: 12:48:41

Property address 37-77 AJAX ROAD ALTONA 3018

Summary of marked native vegetation

Risk-based pathway	High
Total extent	12.740 ha
Remnant patches	
1	2.171 ha
2	0.960 ha
3	7.482 ha
4	2.127 ha
Location risk	C

See Appendix 1 for risk-based pathway details

Offset requirements

If a permit is granted to remove the marked native vegetation the permit condition will include the requirement to obtain a native vegetation offset.

The biodiversity assessment tool does not currently calculate offset requirements for moderate and high risk-based pathway applications. Please contact DEPI to determine the offset requirements for your proposal.

Biodiversity assessment report

Next steps

This proposal to remove native vegetation must meet the application requirements of the high risk-based pathway and it will be assessed in the high risk-based pathway.

If you wish to remove the marked native vegetation you are required to apply for a permit from your local council.

The Biodiversity assessment report should be submitted with your application for a permit to remove native vegetation you plan to remove, lop or destroy.

The Biodiversity assessment report provides the following information that is required to be provided with your application for a permit to remove native vegetation:

- The location of the site where native vegetation is to be removed.
- The area of the patch of native vegetation and/or the number of any scattered trees to be removed.
- Maps or plans containing information set out in the *Permitted clearing of native vegetation - Biodiversity assessment guidelines*.
- The risk-based pathway of the application for a permit to remove native vegetation.



Additional information is required when submitting an application for a permit to remove native vegetation. Refer to the *Permitted clearing of native vegetation - Biodiversity assessment guidelines* for a full list of application requirements.

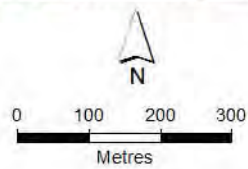
Biodiversity assessment report

Property view of marked native vegetation



Legend

-  Marked native vegetation
-  Property boundary



Department of Environment and Primary Industries 

See Appendix 2 for biodiversity information maps

© The State of Victoria Department of Environment and Primary Industries 2013
This publication is copyright. No part may be reproduced by any process except in accordance with the provisions of the *Copyright Act 1968*.

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DEPI Customer Service Centre 136 186

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

www.depi.vic.gov.au

Obtaining this publication does not guarantee that an application will meet the requirements of clauses 52.16 or 52.17 of the Victoria Planning Provisions or that a permit to remove native vegetation will be granted.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of clauses 52.16 or 52.17 of the Victoria Planning Provisions.

Department of Environment and Primary Industries 

Biodiversity assessment report

Appendix 1 - Risk-based pathway details

Risk-based pathway	High
Total extent	12.740 ha
Remnant patches	
1	2.171 ha
2	0.960 ha
3	7.482 ha
4	2.127 ha
Location risk	C

Why is the risk-based pathway high?

The following table explains how the risk-based pathway is determined:

Extent	Location A	Location B	Location C
< 0.5 hectares	Low	Low	High
≥ 0.5 hectares and < 1 hectares	Low	Moderate	High
≥ 1 hectares	Moderate	High	High

The marked native vegetation is located, either wholly or partly, within Location C and has a total extent of greater than or equal to 1 hectare.

At this location, native vegetation removal of this size is likely to have a significant impact on the habitat of one or more rare or threatened species. As a result, an application for the removal of this native vegetation must meet the requirements of, and will be assessed in, the high risk-based pathway.

For further information on location risk please see *Native vegetation location risk map factsheet*. For information on the determination of the risk-based pathway see *Permitted clearing of native vegetation – Biodiversity assessment guidelines*.

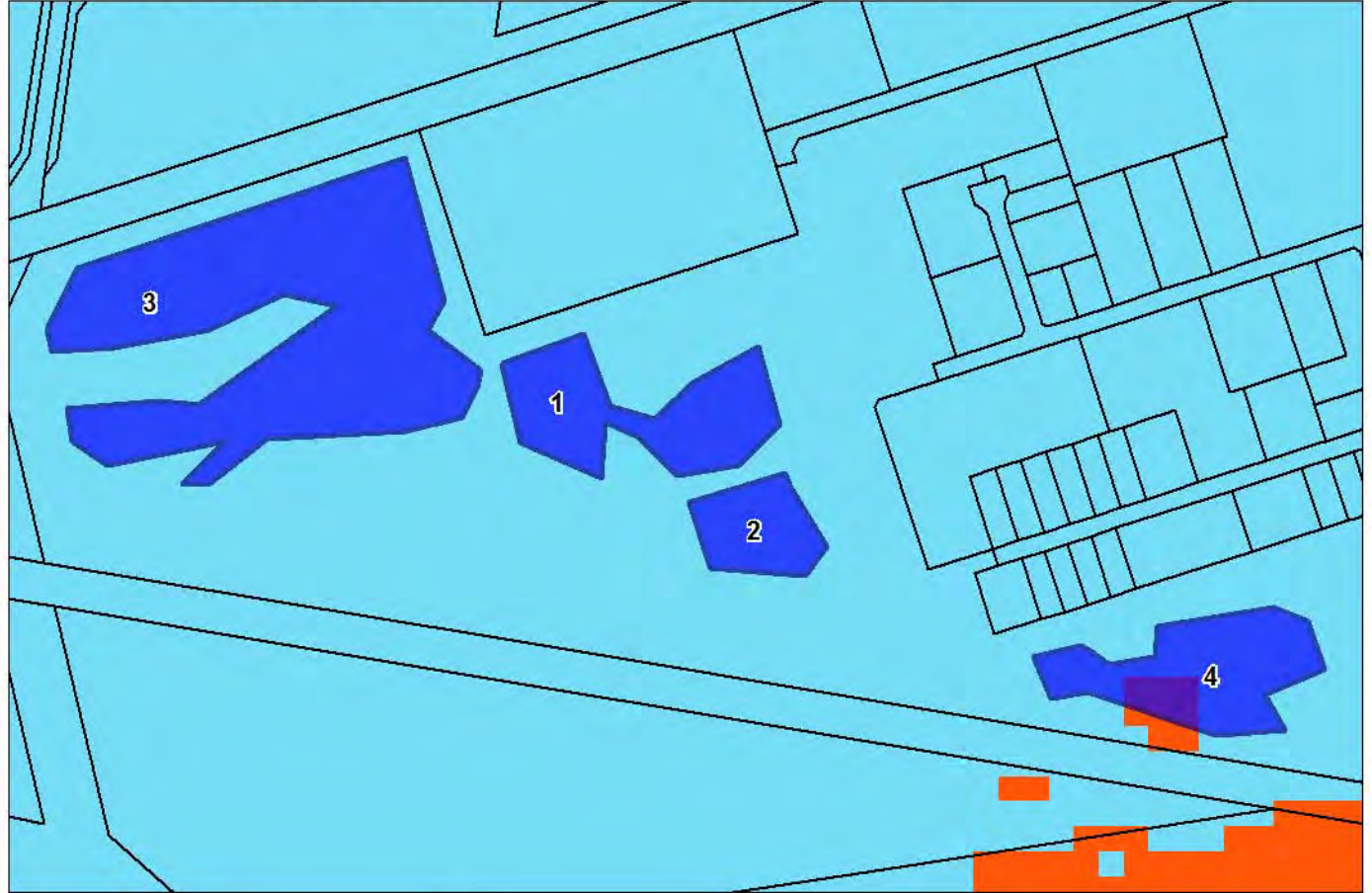
Have you received a planning permit to remove native vegetation in the last five years?

If you have undertaken any permitted clearing on your property within the last five years, the extent of this past clearing must be included in the total extent of your current permit application. The risk-based pathway for your application requirements and assessment pathway is determined using the combined extent of permitted clearing within the last five years and proposed clearing.

Biodiversity assessment report

Appendix 2 - Biodiversity information maps

Marked native vegetation and the *Native vegetation location risk map*

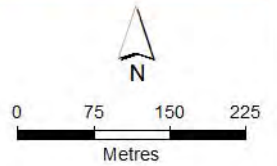


Legend

- Marked native vegetation
- Property boundary

Native vegetation location risk

- Location C
- Location B
- Location A



Biodiversity impact and offset requirements report

This report provides additional biodiversity information for moderate and high risk-based pathway applications for permits to remove native vegetation under clause 52.16 or 52.17 of the planning schemes in Victoria

Date of issue: 20/03/14

Time of issue: 10:45 pm

Project ID	AJAX RD EVCs
------------	--------------

Summary of marked native vegetation

Risk-based pathway	High
Total extent	15.819 ha
Remnant patches	15.819 ha
Scattered trees	0 trees
Location risk	C
Strategic biodiversity score of all marked native vegetation	0.574

Offset requirements if a permit is granted

If a permit is granted to remove the marked native vegetation, a requirement to obtain a native vegetation offset will be included in the permit conditions. The offset must meet the following requirements:

Offset type	Specific offset(s)
Specific offset amount (specific biodiversity equivalence units) and attributes	1.369 specific units of habitat for Creeping Rush 11.391 specific units of habitat for Salt Lawrenca

See Appendices 1 and 2 for details in how offset requirements were determined.

NB: values presented in tables throughout this document may not add to totals due to rounding

Biodiversity impact and offset requirements report

Next steps

This proposal to remove native vegetation must meet the application requirements of the high risk-based pathway and it will be assessed under the high risk-based pathway.

If you wish to remove the marked native vegetation you are required to apply for a permit from your local council. The biodiversity assessment report from NVIM and this biodiversity impact and offset report should be submitted with your application for a permit to remove native vegetation you plan to remove, lop or destroy.

The Biodiversity assessment report generated by the tool within NVIM provides the following information:

- The location of the site where native vegetation is to be removed.
- The area of the patch of native vegetation and/or the number of any scattered trees to be removed.
- Maps or plans containing information set out in the *Permitted clearing of native vegetation – Biodiversity assessment guidelines*
- The risk-based pathway of the application for a permit to remove native vegetation

This report provides the following information to meet application requirements for a permit to remove native vegetation:

- Confirmation of the risk-based pathway of the application for a permit to remove native vegetation
- The strategic biodiversity score of the native vegetation to be removed
- Information to inform the assessment of whether the proposed removal of native vegetation will have a significant impact on Victoria's biodiversity, with specific regard to the proportional impact on habitat for any rare or threatened species.
- The offset requirements should a permit be granted to remove native vegetation.

Additional application requirements must be provided with an application for a permit to remove native vegetation in the moderate or high risk-based pathways. These include:

- A habitat hectare assessment report of the native vegetation that is to be removed
- A statement outlining what steps have been taken to ensure that impacts on biodiversity from the removal of native vegetation have been minimised
- An offset strategy that details how a compliant offset will be secured to offset the biodiversity impacts of the removal of native vegetation.

Refer to the *Permitted clearing of native vegetation – Biodiversity assessment guidelines* and for a full list and details of application requirements.

© The State of Victoria Department of Environment and Primary Industries 2013
This publication is copyright. No part may be reproduced by any process except in accordance with the provisions of the *Copyright Act 1968*.

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DEPI Customer Service Centre 136 186

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Obtaining this publication does not guarantee that an application will meet the requirements of clauses 52.16 or 52.17 of the Victoria Planning Provisions or that a permit to remove native vegetation will be granted.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of clauses 52.16 or 52.17 of the Victoria Planning Provisions.

Biodiversity impact and offset requirements report

Appendix 1 – Biodiversity impact of removal of native vegetation

Habitat hectares

Habitat hectares are calculated for each habitat zone within your proposal using the extent and condition scores in the GIS data you provided.

Habitat zone	Site assessed condition score	Extent (ha)	Habitat hectares
HZ1	0.520	1.322	0.687
HZ2	0.520	1.004	0.522
HZ3	0.520	1.315	0.684
HZ4	0.470	0.037	0.018
HZ5	0.470	0.165	0.077
HZ6	0.390	0.105	0.041
HZ7	0.420	2.202	0.925
HZ8	0.510	9.671	4.932
TOTAL			7.885

Impacts on rare or threatened species habitat above specific offset threshold

The specific-general offset test was applied to your proposal. The test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the specific offset threshold. The threshold is set at 0.005 per cent of the total habitat for a species. When the proportional impact is above the specific offset threshold a specific offset for that species' habitat is required.

The specific-general offset test found your proposal has a proportional impact above the specific offset threshold for the following rare or threatened species' habitats.

Species number	Species common name	Species scientific name	Species type	Area of mapped habitat (ha)	Proportional impact (%)
501839	Creeping Rush	Juncus revolutus	Dispersed	2.202	0.014
501888	Salt Lawrencia	Lawrencia spicata	Dispersed	15.819	0.008

Biodiversity impact and offset requirements report

Clearing site biodiversity equivalence score(s)

Where a habitat zone requires specific offset(s), the specific biodiversity equivalence score(s) for each species in that habitat zone is calculated by multiplying the habitat hectares of the habitat zone by the habitat importance score for each species impacted in the habitat zone.

Habitat zone	Habitat hectares	Habitat for rare or threatened species				Specific biodiversity equivalence score (SBES)
		Species number	Species common name	Species scientific name	Habitat importance score	
HZ1	0.687	501888	Salt Lawrenzia	Lawrenzia spicata	0.732	0.503
HZ2	0.522	501888	Salt Lawrenzia	Lawrenzia spicata	0.756	0.395
HZ3	0.684	501888	Salt Lawrenzia	Lawrenzia spicata	0.723	0.494
HZ4	0.018	501888	Salt Lawrenzia	Lawrenzia spicata	0.697	0.012
HZ5	0.077	501888	Salt Lawrenzia	Lawrenzia spicata	0.726	0.056
HZ6	0.041	501888	Salt Lawrenzia	Lawrenzia spicata	0.670	0.027
HZ7	0.925	501839	Creeping Rush	Juncus revolutus	0.740	0.684
		501888	Salt Lawrenzia	Lawrenzia spicata	0.711	0.657
HZ8	4.932	501888	Salt Lawrenzia	Lawrenzia spicata	0.720	3.551

Mapped rare or threatened species' habitats on site

This table sets out the list of rare or threatened species' habitats mapped at the site beyond those species for which the impact is above the specific offset threshold. These species habitats do not require a specific offset according to the specific-general offset test.

Species number	Species common name	Species scientific name
10019	Red-chested Button-quail	Turnix pyrrhotorax
10045	Lewin's Rail	Lewinia pectoralis pectoralis
10050	Baillon's Crake	Porzana pusilla palustris
10111	Gull-billed Tern	Gelochelidon nilotica macrotarsa
10154	Wood Sandpiper	Tringa glareola
10170	Australian Painted Snipe	Rostratula benghalensis australis
10174	Bush Stone-curlew	Burhinus grallarius
10177	Brolga	Grus rubicunda
10185	Little Egret	Egretta garzetta nigripes
10186	Intermediate Egret	Ardea intermedia
10187	Eastern Great Egret	Ardea modesta
10195	Little Bittern	Ixobrychus minutus dubius
10197	Australasian Bittern	Botaurus poiciloptilus

Biodiversity impact and offset requirements report

Species number	Species common name	Species scientific name
10212	Australasian Shoveler	<i>Anas rhynchotis</i>
10214	Freckled Duck	<i>Stictonetta naevosa</i>
10215	Hardhead	<i>Aythya australis</i>
10216	Blue-billed Duck	<i>Oxyura australis</i>
10217	Musk Duck	<i>Biziura lobata</i>
10226	White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>
10230	Square-tailed Kite	<i>Lophoictinia isura</i>
10238	Black Falcon	<i>Falco subniger</i>
10598	Painted Honeyeater	<i>Grantiella picta</i>
12159	Striped Legless Lizard	<i>Delma impar</i>
12683	Glossy Grass Skink	<i>Pseudemoia rawlinsoni</i>
13207	Growling Grass Frog	<i>Litoria raniformis</i>
502776	Tough Scurf-pea	<i>Cullen tenax</i>
503455	Rye Beetle-grass	<i>Tripogon loliiformis</i>
504655	Pale Swamp Everlasting	<i>Coronidium scorpioides</i> 'aff. <i>rutidolepis</i> (Lowland Swamps)' variant
505337	Austral Crane's-bill	<i>Geranium solanderi</i> var. <i>solanderi</i> s.s.
528553	Black-tailed Godwit	<i>Limosa limosa</i>

Biodiversity impact and offset requirements report

Appendix 2 – Offset requirements detail

If a permit is granted to remove the marked native vegetation the permit condition will include the requirement to obtain a native vegetation offset.

To calculate the required offset amount required the biodiversity equivalence scores are aggregated to the proposal level and multiplied by the relevant risk multiplier.

Offsets also have required attributes:

- Specific offsets must be located in the same species habitat as that being removed, as determined by the habitat importance map for that species.

The offset requirements for your proposal are as follows:

Offset type	Clearing site biodiversity equivalence score	Risk multiplier	Offset requirements	
			Offset amount (biodiversity equivalence units)	Offset attributes
Specific	0.684 SBES	2	1.369 specific units	Offset must provide habitat for 501839, <i>Creeping Rush</i> , <i>Juncus revolutus</i>
Specific	5.696 SBES	2	11.391 specific units	Offset must provide habitat for 501888, <i>Salt Lawrenca</i> , <i>Lawrenca spicata</i>

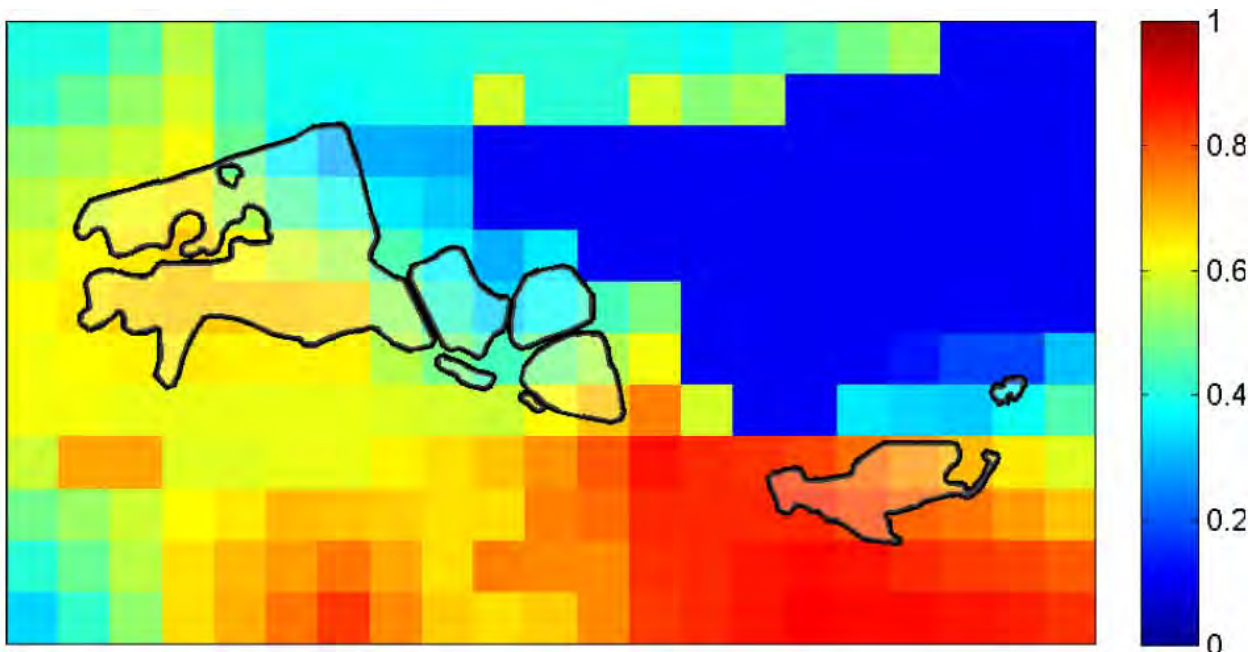
Biodiversity impact and offset requirements report

Appendix 3 – Images of marked native vegetation

Image 1. Native vegetation location risk map



Image 2. Strategic biodiversity score map



Biodiversity impact and offset requirements report

Image 3. Aerial photograph showing marked native vegetation



Biodiversity impact and offset requirements report

Image 4. Habitat importance map – 501839, Creeping Rush, *Juncus revolutus*

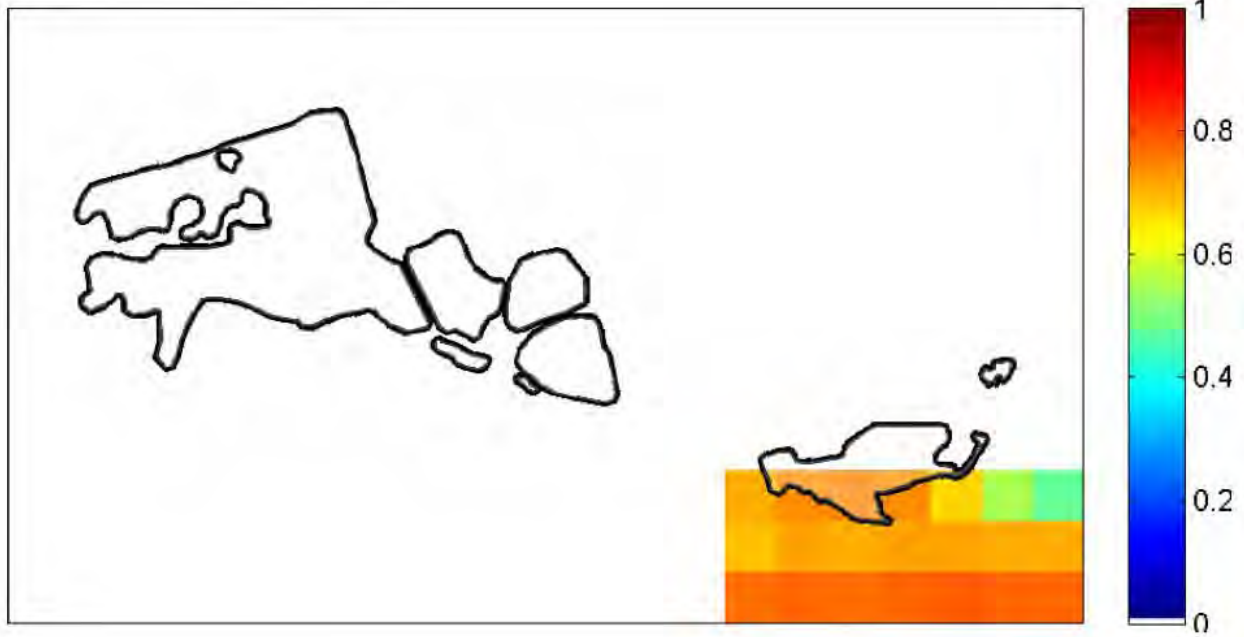
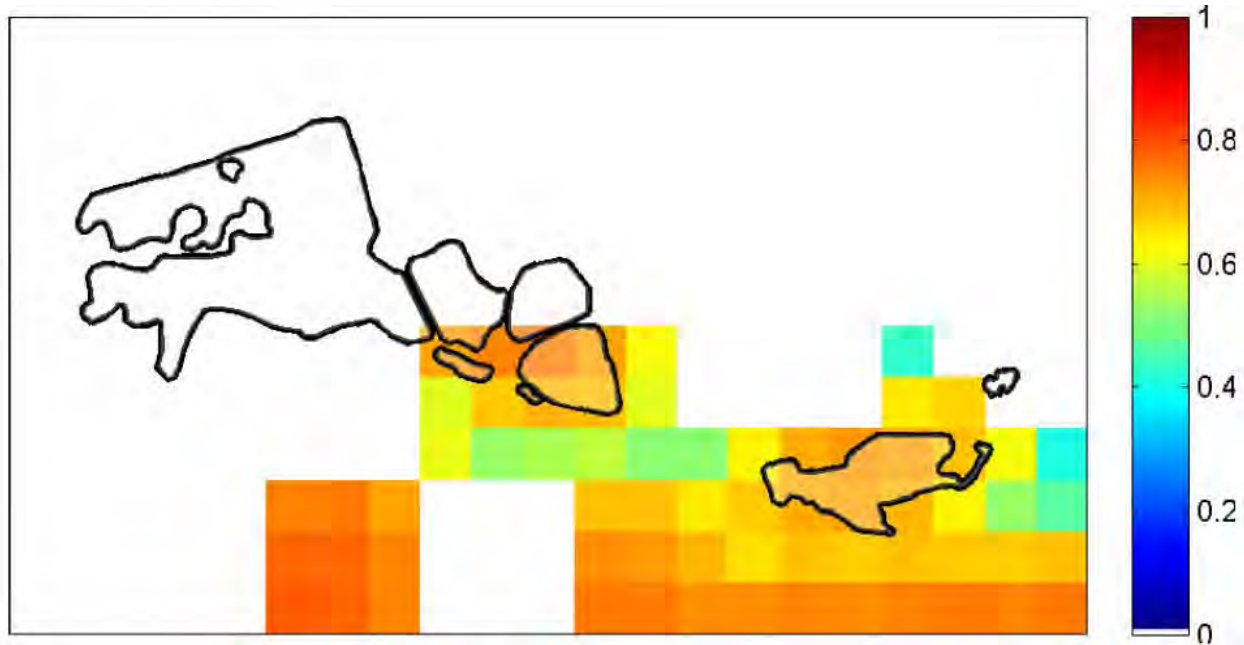


Image 5. Habitat importance map – 501888, Salt Lawrenzia, *Lawrenzia spicata*



Biodiversity impact and offset requirements report

Glossary

Condition score This is the site-assessed condition score for the native vegetation. Each habitat zone in the clearing proposal is assigned a condition score according to the habitat hectare assessment method. This information has been provided by or on behalf of the applicant in the GIS file.

Dispersed habitat A dispersed species habitat is a habitat for a rare or threatened species whose habitat is spread over a relatively broad geographic area greater than 2,000 hectares.

General biodiversity equivalence score The general biodiversity equivalence score quantifies the relative overall contribution that the native vegetation to be removed makes to Victoria's biodiversity. The general biodiversity equivalence score is calculated as follows:

$$\text{General biodiversity equivalence score} = \text{habitat hectares} \times \text{strategic biodiversity score}$$

General offset amount This is calculated by multiplying the general biodiversity equivalence score of the native vegetation to be removed by the risk factor for general offsets. This number is expressed in general biodiversity equivalence units and is the amount of offset that is required to be provided should the application be approved. This offset requirement will be a condition to the permit for the removal of native vegetation.

$$\text{Risk adjusted general biodiversity equivalence score} = \text{general biodiversity equivalence score clearing} \times 1.5$$

General offset attributes General offset must be located in the same Catchment Management Authority boundary or Municipal District (local council) as the clearing site. They must also have a strategic biodiversity score that is at least 80 per cent of the score of the clearing site.

Habitat hectares Habitat hectares is a site-based measure that combines extent and condition of native vegetation. The habitat hectares of native vegetation is equal to the current condition of the vegetation (condition score) multiplied by the extent of native vegetation. Habitat hectares can be calculated for a remnant patch or for scattered trees or a combination of these two vegetation types. This value is calculated for each habitat zone using the following formula:

$$\text{Habitat hectares} = \text{total extent (hectares)} \times \text{condition score}$$

Habitat importance score The habitat importance score is a measure of the importance of the habitat located on a site for a particular rare or threatened species. The habitat importance score for a species is a weighted average value calculated from the habitat importance map for that species. The habitat importance score is calculated for each habitat zone where the habitat importance map indicates that species habitat occurs.

Habitat zone Habitat zone is a discrete contiguous area of native vegetation that:

- is of a single Ecological Vegetation Class
- has the same measured condition.

Biodiversity impact and offset requirements report

Highly localised habitat	<p>A highly localised habitat is habitat for a rare or threatened species that is spread across a very restricted area (less than 2,000 hectares). This can also be applied to a similarly limited sub-habitat that is disproportionately important for a wide-ranging rare or threatened species. Highly localised habitats have the highest habitat importance score (1) for all locations where they are present.</p>
Minimum strategic biodiversity score	<p>The minimum strategic biodiversity score is an attribute for a general offset.</p> <p>The strategic biodiversity score of the offset site must be at least 80 per cent of the strategic biodiversity score of the native vegetation to be removed. This is to ensure offsets are located in areas with a strategic value that is comparable to, or better than, the native vegetation to be removed. Where a specific and general offset is required, the minimum strategic biodiversity score relates only to the habitat zones that require the general offset.</p>
Offset risk factor	<p>There is a risk that the gain from undertaking the offset will not adequately compensate for the loss from the removal of native vegetation. If this were to occur, despite obtaining an offset, the overall impact from removing native vegetation would result in a loss in the contribution that native vegetation makes to Victoria's biodiversity.</p> <p>To address the risk of offsets failing, an offset risk factor is applied to the calculated loss to biodiversity value from removing native vegetation.</p> <p style="text-align: center;"><i>Risk factor for general offsets = 1.5</i></p> <p style="text-align: center;"><i>Risk factor for specific offset = 2</i></p>
Offset type	<p>The specific-general offset test determines the offset type required.</p> <p>When the specific-general offset test determines that the native vegetation removal will have an impact on one or more rare or threatened species habitat above the set threshold of 0.005 per cent, a specific offset is required. This test is done at the permit application level.</p> <p>A general offset is required when a proposal to remove native vegetation is not deemed, by application of the specific-general offset test, to have an impact on any habitat for any rare or threatened species above the set threshold of 0.005 per cent. All habitat zones that do not require a specific offset will require a general offset.</p>
Proportional impact on species	<p>This is the outcome of the specific-general offset test. The specific-general offset test is calculated across the entire proposal for each species on the native vegetation permitted clearing species list. If the proportional impact on a species is above the set threshold of 0.005 per cent then a specific offset is required for that species.</p>
Specific offset amount	<p>The specific offset amount is calculated by multiplying the specific biodiversity equivalence score of the native vegetation to be removed by the risk factor for specific offsets. This number is expressed in specific biodiversity equivalence units and is the amount of offset that is required to be provided should the application be approved. This offset requirement will be a condition to the permit for the removal of native vegetation.</p>

$$\text{Risk adjusted specific biodiversity equivalence score} \\ = \text{specific biodiversity equivalence score clearing} \times 2$$

Biodiversity impact and offset requirements report

Specific offset attributes Specific offsets must be located in the modelled habitat for the species that has triggered the specific offset requirement.

Specific biodiversity equivalence score The specific biodiversity equivalence score quantifies the relative overall contribution that the native vegetation to be removed makes to the habitat of the relevant rare or threatened species. It is calculated for each habitat zone where one or more species habitats require a specific offset as a result of the specific-general offset test as follows:

$$\text{Specific biodiversity equivalence score} \\ = \text{habitat hectares} \times \text{habitat importance score}$$

Strategic biodiversity score This is the weighted average strategic biodiversity score of the marked native vegetation. The strategic biodiversity score has been calculated from the *Strategic biodiversity map* for each habitat zone .

The strategic biodiversity score of native vegetation is a measure of the native vegetation's importance for Victoria's biodiversity, relative to other locations across the landscape. The *Strategic biodiversity map* is a modelled layer that prioritises locations on the basis of rarity and level of depletion of the types of vegetation, species habitats, and condition and connectivity of native vegetation.

Total extent (hectares) for calculating habitat hectares This is the total area of the marked native vegetation in hectares. The total extent of native vegetation is an input to calculating the habitat hectares of a site and in calculating the general biodiversity equivalence score. Where the marked native vegetation includes scattered trees, each tree is converted to hectares using a standard area calculation of 0.071 hectares per tree. This information has been provided by or on behalf of the applicant in the GIS file.

Vicinity The vicinity is an attribute for a general offset. The offset site must be located within the same Catchment Management Authority boundary or Local Municipal District as the native vegetation to be removed.

A3.1 Offset Calculations

Source: DSE Net Gain Calculator

(<http://www.dse.vic.gov.au/DSE/nrence.nsf/LinkView/74DC19C326C445BECA2571AE00037FC0B32D42FB223C7345CA25712B0007130A>)

DSE Gain Calculator

Version 1.2, October 2008

[About DSE Gain Calculator](#)

STEP 1 Enter site details

NAME or EOI CODE:
 SITE CODE (number):
 SITE LOCATION/ADDRESS:
 PROPERTY SIZE:

STEP 2 Habitat zone code (a-z)
 Zone Type

STEP 3 Select bioregion

STEP 4 Select EVC BCS:
 If "Other" is selected: EVC: Standardiser:
 - enter EVC & Standardiser
 - enter assessed habitat scores manually under STEP 10, based on EVC BCS.

STEP 5 Enter size of habitat zone, to one decimal place ha
 (or revegetation area)

STEP 6 Select current land tenure

STEP 7 Select current planning controls

no entitlement to graze with domestic stock
 no entitlement to remove trees - alive
 no entitlement to remove trees - dead
 no entitlement to remove dead vegetation
 no entitlement to remove fallen timber
 requirement for regular fuel reduction
 other - please insert

Enter other:

STEP 8 Select proposal type

STEP 9 Select total patch size class - including adjoining zones

STEP 11 Choose the appropriate management options as required

(a) Exclude stock and ensure that weed cover does not increase beyond current levels*
 (b) Retain all standing trees - dead or alive
 (c) Retain all fallen timber/branches/leaf litter
 (d) Eliminate high threat woody weeds & control pest animals
 (e) Eliminate all identified high threat weeds & control pest animals
 (f) Supplementary planting
 (g)
 (h) Any additional site-specific management actions
 If (h) is selected, select management actions from below:

Ecological thinning
 Ecological burning
 Ecological flooding
 Other

*For Grassland type EVC's only
 Replace management option (a) above with

 * All grassland management actions must ensure no further weed spread

STEP 10
 Current Habitat Score

Attribute	Max	Default	Assessed	Comments
Large Trees	10	na		
Tree canopy cover	5	na		
Understorey	25	10	15	
Lack of weeds	15	7	4	
Recruitment	10	6		
Organic litter	5	3	5	
Logs	5	na		
Landscape context	25	10	6	
Standardised Habitat Score	100		47	

STEP 12
 Gain Scores for Remnant Management

Attribute	Maintenance Gain/ha		Improvement Gain/ha		Comments
	Calculated	Assessed	Calculated	Assessed	
Large Trees	na		na		
Tree canopy cover	na		na	Enter here:	
Understorey	7.5		1.25	Enter here:	
Lack of weeds	na		1		
Recruitment	3		1		
Organic litter	2.5		0		
Logs	na		na		
Total		13		3.25	

STEP 13 Choose security arrangement

Standardised Sum Main + Impr Gain/ha	22.10
Prior Mgt Gain/ha	4.7
Security Gain/ha	9.4
Total Gain/ha	36.20

Calculating the total gain
Total Gain (HHa) 0.33

STEP 14 User details

USER NAME:
 ORGANISATION:
 CONTACT TELEPHONE:
 CONTACT EMAIL:



DSE Gain Calculator

Version 1.2, October 2008

[About DSE Gain Calculator](#)

STEP 1 Enter site details

NAME or EOI CODE:
 SITE CODE (number):
 SITE LOCATION/ADDRESS:
 PROPERTY SIZE:

STEP 2 Habitat zone code (a-z)
 Zone Type

STEP 3 Select bioregion

STEP 4 Select EVC BCS:
 If "Other" is selected: EVC: Standardiser:
 - enter EVC & Standardiser
 - enter assessed habitat scores manually under STEP 10, based on EVC BCS.

STEP 5 Enter size of habitat zone, to one decimal place ha
 (or revegetation area)

STEP 6 Select current land tenure

STEP 7 Select current planning controls

no entitlement to graze with domestic stock
 no entitlement to remove trees - alive
 no entitlement to remove trees - dead
 no entitlement to remove dead vegetation
 no entitlement to remove fallen timber
 requirement for regular fuel reduction
 other - please insert

Enter other:

STEP 8 Select proposal type

STEP 9 Select total patch size class - including adjoining zones

STEP 11 Choose the appropriate management options as required

(a) Exclude stock and ensure that weed cover does not increase beyond current levels*
 (b) Retain all standing trees - dead or alive
 (c) Retain all fallen timber/branches/leaf litter
 (d) Eliminate high threat woody weeds & control pest animals
 (e) Eliminate all identified high threat weeds & control pest animals
 (f) Supplementary planting
 (g)
 (h) Any additional site-specific management actions
 If (h) is selected, select management actions from below:

Ecological thinning
 Ecological burning
 Ecological flooding
 Other

*For Grassland type EVC's only
 Replace management option (a) above with

 * All grassland management actions must ensure no further weed spread

STEP 10 Current Habitat Score

Attribute	Max	Default	Assessed	Comments
Large Trees	10	na		
Tree canopy cover	5	na		
Understorey	25	10	15	
Lack of weeds	15	7	9	
Recruitment	10	6		
Organic litter	5	3	5	
Logs	5	na		
Landscape context	25	10	13	
Standardised Habitat Score	100		61	

STEP 12 Gain Scores for Remnant Management

Attribute	Maintenance Gain/ha		Improvement Gain/ha		Comments
	Calculated	Assessed	Calculated	Assessed	
Large Trees	na		na		
Tree canopy cover	na		na	Enter here:	
Understorey	7.5		2.5	Enter here:	
Lack of weeds	na		2		
Recruitment	3		2		
Organic litter	2.5		0		
Logs	na		na		
Total		13		6.5	

STEP 13 Choose security arrangement

Standardised Sum Main + Impr Gain/ha	26.52
Prior Mgt Gain/ha	6.1
Security Gain/ha	12.2
Total Gain/ha	44.82

Calculating the total gain
Total Gain (HHa) 4.59

STEP 14 User details

USER NAME:
 ORGANISATION:
 CONTACT TELEPHONE:
 CONTACT EMAIL:



DSE Gain Calculator

Version 1.2, October 2008

[About DSE Gain Calculator](#)

STEP 1 Enter site details

NAME or EOI CODE:
 SITE CODE (number):
 SITE LOCATION/ADDRESS:
 PROPERTY SIZE:

STEP 2 Habitat zone code (a-z)
 Zone Type

STEP 3 Select bioregion

STEP 4 Select EVC BCS:
 If "Other" is selected:
 - enter EVC & Standardiser: EVC: Standardiser:
 - enter assessed habitat scores manually under STEP 10, based on EVC BCS.

STEP 5 Enter size of habitat zone, to one decimal place ha
 (or revegetation area)

STEP 6 Select current land tenure

STEP 7 Select current planning controls

no entitlement to graze with domestic stock
 no entitlement to remove trees - alive
 no entitlement to remove trees - dead
 no entitlement to remove dead vegetation
 no entitlement to remove fallen timber
 requirement for regular fuel reduction
 other - please insert

Enter other:

STEP 8 Select proposal type

STEP 9 Select total patch size class - including adjoining zones

STEP 11 Choose the appropriate management options as required

(a) Exclude stock and ensure that weed cover does not increase beyond current levels*
 (b) Retain all standing trees - dead or alive
 (c) Retain all fallen timber/branches/leaf litter
 (d) Eliminate high threat woody weeds & control pest animals
 (e) Eliminate all identified high threat weeds & control pest animals
 (f) Supplementary planting
 (g)
 (h) Any additional site-specific management actions
 If (h) is selected, select management actions from below:

Ecological thinning
 Ecological burning
 Ecological flooding
 Other

*For Grassland type EVC's only
 Replace management option (a) above with

 * All grassland management actions must ensure no further weed spread

STEP 10 Current Habitat Score

Attribute	Max	Default	Assessed	Comments
Large Trees	10	na		
Tree canopy cover	5	na		
Understorey	25	10	25	
Lack of weeds	15	7		
Recruitment	10	6		
Organic litter	5	3	5	
Logs	5	na		
Landscape context	25	10	13	
Standardised Habitat Score	100	71		

STEP 12 Gain Scores for Remnant Management

Attribute	Maintenance Gain/ha		Improvement Gain/ha		Comments
	Calculated	Assessed	Calculated	Assessed	
Large Trees	na		na		
Tree canopy cover	na		na	Enter here:	
Understorey	2.5		0	Enter here:	
Lack of weeds	na		4		
Recruitment	0.6		4		
Organic litter	0		0		
Logs	na		na		
Total	3.1		8		

STEP 13 Choose security arrangement

Standardised Sum Main + Impr Gain/ha	15.10
Prior Mgt Gain/ha	7.1
Security Gain/ha	14.2
Total Gain/ha	36.40

Calculating the total gain
Total Gain (HHa) 2.72

STEP 14 User details

USER NAME:
 ORGANISATION:
 CONTACT TELEPHONE:
 CONTACT EMAIL:



DSE Gain Calculator

Version 1.2, October 2008

[About DSE Gain Calculator](#)

STEP 1 Enter site details

NAME or EOI CODE:
 SITE CODE (number):
 SITE LOCATION/ADDRESS:
 PROPERTY SIZE:

STEP 2 Habitat zone code (a-z)
 Zone Type

STEP 3 Select bioregion

STEP 4 Select EVC BCS:
 If "Other" is selected:
 - enter EVC & Standardiser
 EVC: Standardiser:
 - enter assessed habitat scores manually under STEP 10, based on EVC BCS.

STEP 5 Enter size of habitat zone, to one decimal place ha
 (or revegetation area)

STEP 6 Select current land tenure

STEP 7 Select current planning controls

no entitlement to graze with domestic stock
 no entitlement to remove trees - alive
 no entitlement to remove trees - dead
 no entitlement to remove dead vegetation
 no entitlement to remove fallen timber
 requirement for regular fuel reduction
 other - please insert

Enter other:

STEP 8 Select proposal type

STEP 9 Select total patch size class - including adjoining zones

STEP 11 Choose the appropriate management options as required

(a) Exclude stock and ensure that weed cover does not increase beyond current levels*
 (b) Retain all standing trees - dead or alive
 (c) Retain all fallen timber/branches/leaf litter
 (d) Eliminate high threat woody weeds & control pest animals
 (e) Eliminate all identified high threat weeds & control pest animals
 (f) Supplementary planting
 (g)
 (h) Any additional site-specific management actions
 If (h) is selected, select management actions from below:

Ecological thinning
 Ecological burning
 Ecological flooding
 Other

*For Grassland type EVC's only
 Replace management option (a) above with
 High Productivity-Periodic biomass reduction at agreed timing/frequency.

* All grassland management actions must ensure no further weed spread

STEP 10 Current Habitat Score

Attribute	Max	Default	Assessed	Comments
Large Trees	10	na		
Tree canopy cover	5	na		
Understorey	25	10		
Lack of weeds	15	7		
Recruitment	10	6	3	
Organic litter	5	3	5	
Logs	5	na		
Landscape context	25	10	11	
Standardised Habitat Score	100		45	

STEP 12 Gain Scores for Remnant Management

Attribute	Maintenance Gain/ha		Improvement Gain/ha		Comments
	Calculated	Assessed	Calculated	Assessed	
Large Trees	na		na		
Tree canopy cover	na		na	Enter here:	
Understorey	1		5	Enter here:	
Lack of weeds	na		4		
Recruitment	0.3		4		
Organic litter	0		0		
Logs	na		na		
Total		1.3		13	

STEP 13 Choose security arrangement

Standardised Sum Main + Impr Gain/ha **19.45**
 Prior Mgt Gain/ha **4.5**
 Security Gain/ha **9.0**
Total Gain/ha 32.95

Calculating the total gain
Total Gain (HHa) 0.15

STEP 14 User details

USER NAME:
 ORGANISATION:
 CONTACT TELEPHONE:
 CONTACT EMAIL:



Offset site report

This report provides information about native vegetation offset sites in accordance with the *Permitted clearing of native vegetation – Biodiversity assessment guidelines*. The information in this report is based on spatial information and site gain in habitat hectares, provided by the offset provider (or their representative), about the offset site to DEPI. Any changes to this input information will change the amount of offsets available at the offset site and will require this report to be reissued.

This report should be read in conjunction with the *Native vegetation offset market fact sheet* that provides information on how offsets are measured and categorised, and how they can be used to satisfy conditions on permits to remove native vegetation and traded as credits in the offset market.

Date of issue: 13/03/14

Time of issue: 5:15 pm

Project ID	Ajax Rd
-------------------	---------

Summary of offset site

Total extent	19.073 ha
Remnant patches	19.073 ha
Revegetation	0 ha
Number of biodiversity class areas (BCAs)	6
Catchment Management Authority and Municipal district	Port Phillip and Westernport CMA, Hobson's Bay City Council

Summary of biodiversity equivalence units available at offset site

The offset site has the following general and specific biodiversity equivalence units.

General biodiversity equivalence units	5.553 general units*
Specific biodiversity equivalence units	5.313 specific units* of habitat for Gull-billed Tern 5.752 specific units* of habitat for Wood Sandpiper 5.572 specific units* of habitat for Australian Painted Snipe 5.592 specific units* of habitat for Little Egret 2.121 specific units* of habitat for Glossy Grass Skink 0.230 specific units* of habitat for Creeping Rush 2.552 specific units* of habitat for Salt Lawrencia 2.797 specific units* of habitat for Pale Swamp Everlasting

*Note that some biodiversity equivalence units may be alternates. The use of any biodiversity equivalence units of one type within a BCA will result in a proportional reduction in biodiversity equivalence units of other types within that BCA.

NB: Values presented in tables throughout this document may not add to totals due to rounding.

Offset site report

Offset site details

Biodiversity equivalence units available and attributes by BCA

The biodiversity equivalence units and attributes for each BCA are as follows:

BCA	Offset type	Biodiversity equivalence units	Offset attributes
1	General	2.214 general units	0.667 strategic biodiversity score Port Phillip and Westernport CMA or the local municipal district of the offset site
	Specific	2.209 specific units	Habitat for 10111, Gull-billed Tern, Gelocheidon nilotica macrotarsa
	Specific	2.400 specific units	Habitat for 10154, Wood Sandpiper, Tringa glareola
	Specific	2.324 specific units	Habitat for 10170, Australian Painted Snipe, Rostratula benghalensis australis
	Specific	2.345 specific units	Habitat for 10185, Little Egret, Egretta garzetta nigripes

BCA	Offset type	Biodiversity equivalence units	Offset attributes
2	General	0.283 general units	0.868 strategic biodiversity score Port Phillip and Westernport CMA or the local municipal district of the offset site
	Specific	0.216 specific units	Habitat for 10111, Gull-billed Tern, Gelocheidon nilotica macrotarsa
	Specific	0.226 specific units	Habitat for 10154, Wood Sandpiper, Tringa glareola
	Specific	0.217 specific units	Habitat for 10170, Australian Painted Snipe, Rostratula benghalensis australis
	Specific	0.224 specific units	Habitat for 10185, Little Egret, Egretta garzetta nigripes
	Specific	0.209 specific units	Habitat for 12683, Glossy Grass Skink, Pseudemoia rawlinsoni
	Specific	0.230 specific units	Habitat for 501839, Creeping Rush, Juncus revolutus
	Specific	0.221 specific units	Habitat for 501888, Salt Lawrenca, Lawrenca spicata

BCA	Offset type	Biodiversity equivalence units	Offset attributes
3	General	0.469 general units	0.643 strategic biodiversity score Port Phillip and Westernport CMA or the local municipal district of the offset site
	Specific	0.462 specific units	Habitat for 10111, Gull-billed Tern, Gelocheidon nilotica macrotarsa
	Specific	0.499 specific units	Habitat for 10154, Wood Sandpiper, Tringa glareola
	Specific	0.491 specific units	Habitat for 10170, Australian Painted Snipe, Rostratula benghalensis australis
	Specific	0.483 specific units	Habitat for 10185, Little Egret, Egretta garzetta nigripes
	Specific	0.458 specific units	Habitat for 504655, Pale Swamp Everlasting, Coronidium

Offset site report

BCA	Offset type	Biodiversity equivalence units	Offset attributes
			scorpioides 'aff. rutidolepis (Lowland Swamps)' variant

BCA	Offset type	Biodiversity equivalence units	Offset attributes
4	General	0.239 general units	0.763 strategic biodiversity score Port Phillip and Westernport CMA or the local municipal district of the offset site
	Specific	0.236 specific units	Habitat for 10111, Gull-billed Tern, Gelochelidon nilotica macrotarsa
	Specific	0.251 specific units	Habitat for 10154, Wood Sandpiper, Tringa glareola
	Specific	0.242 specific units	Habitat for 10170, Australian Painted Snipe, Rostratula benghalensis australis
	Specific	0.244 specific units	Habitat for 10185, Little Egret, Egretta garzetta nigripes
	Specific	0.235 specific units	Habitat for 12683, Glossy Grass Skink, Pseudemoia rawlinsoni
	Specific	0.219 specific units	Habitat for 504655, Pale Swamp Everlasting, Coronidium scorpioides 'aff. rutidolepis (Lowland Swamps)' variant

BCA	Offset type	Biodiversity equivalence units	Offset attributes
5	General	0.537 general units	0.688 strategic biodiversity score Port Phillip and Westernport CMA or the local municipal district of the offset site
	Specific	0.529 specific units	Habitat for 10111, Gull-billed Tern, Gelochelidon nilotica macrotarsa
	Specific	0.581 specific units	Habitat for 10154, Wood Sandpiper, Tringa glareola
	Specific	0.573 specific units	Habitat for 10170, Australian Painted Snipe, Rostratula benghalensis australis
	Specific	0.553 specific units	Habitat for 10185, Little Egret, Egretta garzetta nigripes
	Specific	0.581 specific units	Habitat for 501888, Salt Lawrenca, Lawrenca spicata
	Specific	0.534 specific units	Habitat for 504655, Pale Swamp Everlasting, Coronidium scorpioides 'aff. rutidolepis (Lowland Swamps)' variant

BCA	Offset type	Biodiversity equivalence units	Offset attributes
6	General	1.812 general units	0.779 strategic biodiversity score Port Phillip and Westernport CMA or the local municipal district of the offset site
	Specific	1.661 specific units	Habitat for 10111, Gull-billed Tern, Gelochelidon nilotica macrotarsa
	Specific	1.794 specific units	Habitat for 10154, Wood Sandpiper, Tringa glareola
	Specific	1.726 specific units	Habitat for 10170, Australian Painted Snipe, Rostratula benghalensis australis

Offset site report

BCA	Offset type	Biodiversity equivalence units	Offset attributes
	Specific	1.744 specific units	Habitat for 10185, Little Egret, <i>Egretta garzetta nigripes</i>
	Specific	1.677 specific units	Habitat for 12683, Glossy Grass Skink, <i>Pseudemoia rawlinsoni</i>
	Specific	1.751 specific units	Habitat for 501888, Salt Lawrencia, <i>Lawrencia spicata</i>
	Specific	1.587 specific units	Habitat for 504655, Pale Swamp Everlasting, <i>Coronidium scorpioides</i> 'aff. <i>rutidolepis</i> (Lowland Swamps)' variant

Site gain in habitat hectares

Site gain in habitat hectares is calculated for each biodiversity class area (BCA) in the offset site using the extent and site gain per hectare scores in the GIS data provided.

BCA	Site gain per hectare*	Extent (ha)	Site gain in habitat hectares
1	0.405	8.158	3.306
2	0.362	0.900	0.326
3	0.419	1.750	0.734
4	0.364	0.859	0.313
5	0.448	1.742	0.781
6	0.411	5.665	2.329
TOTAL			7.788

* This value has been calculated using the site gain per hectare values for each habitat zone as provided with the GIS file of the offset site. The site gain per hectare value for a BCA is calculated from the weighted average of site gain per hectare values for all habitat zones that intersect with the BCA.

Offset site report

Offset site biodiversity equivalence unit calculations by biodiversity class area

The general biodiversity equivalence units for the biodiversity class area are calculated by multiplying the site gain in habitat hectares by the strategic biodiversity score.

Where a BCA has specific units for one or more rare or threatened species, the specific biodiversity equivalence units for each BCA is calculated by multiplying the site gain in habitat hectares by the habitat importance score for each of these species.

BCA	Site gain in habitat hectares	Offset type	General offset attributes		Specific offset attributes		Biodiversity equivalence units*
			Strategic biodiversity score		Species number, Species common name, Species scientific name	Habitat importance score	
1	3.306	General	0.667				2.214 general units
		Specific		10111, Gull-billed Tern, <i>Gelochelidon nilotica macrotarsa</i>	0.672		2.209 specific units
		Specific		10154, Wood Sandpiper, <i>Tringa glareola</i>	0.730		2.400 specific units
		Specific		10170, Australian Painted Snipe, <i>Rostratula benghalensis australis</i>	0.706		2.324 specific units
		Specific		10185, Little Egret, <i>Egretta garzetta nigripes</i>	0.713		2.345 specific units
2	0.326	General	0.868				0.283 general units
		Specific		10111, Gull-billed Tern, <i>Gelochelidon nilotica macrotarsa</i>	0.663		0.216 specific units
		Specific		10154, Wood Sandpiper, <i>Tringa glareola</i>	0.693		0.226 specific units
		Specific		10170, Australian Painted Snipe, <i>Rostratula benghalensis australis</i>	0.667		0.217 specific units
		Specific		10185, Little Egret, <i>Egretta garzetta nigripes</i>	0.687		0.224 specific units
		Specific		12683, Glossy Grass Skink, <i>Pseudemoia rawlinsoni</i>	0.640		0.209 specific units
		Specific		501839, Creeping Rush, <i>Juncus revolutus</i>	0.707		0.230 specific units
Specific		501888, Salt Lawrenzia, <i>Lawrenzia spicata</i>	0.677		0.221 specific units		

Offset site report

BCA	Site gain in habitat hectares	Offset type	General offset attributes	Specific offset attributes		Biodiversity equivalence units*
			Strategic biodiversity score	Species number, Species common name, Species scientific name	Habitat importance score	
3	0.734	General	0.643			0.469 general units
		Specific		10111, Gull-billed Tern, <i>Gelochelidon nilotica macrotarsa</i>	0.632	0.462 specific units
		Specific		10154, Wood Sandpiper, <i>Tringa glareola</i>	0.682	0.499 specific units
		Specific		10170, Australian Painted Snipe, <i>Rostratula benghalensis australis</i>	0.670	0.491 specific units
		Specific		10185, Little Egret, <i>Egretta garzetta nigripes</i>	0.660	0.483 specific units
		Specific		504655, Pale Swamp Everlasting, <i>Coronidium scorpioides</i> 'aff. <i>rutidolepis</i> (Lowland Swamps)' variant	0.625	0.458 specific units
4	0.313	General	0.763			0.239 general units
		Specific		10111, Gull-billed Tern, <i>Gelochelidon nilotica macrotarsa</i>	0.753	0.236 specific units
		Specific		10154, Wood Sandpiper, <i>Tringa glareola</i>	0.803	0.251 specific units
		Specific		10170, Australian Painted Snipe, <i>Rostratula benghalensis australis</i>	0.773	0.242 specific units
		Specific		10185, Little Egret, <i>Egretta garzetta nigripes</i>	0.781	0.244 specific units
		Specific		12683, Glossy Grass Skink, <i>Pseudemoia rawlinsoni</i>	0.751	0.235 specific units
		Specific		504655, Pale Swamp Everlasting, <i>Coronidium scorpioides</i> 'aff. <i>rutidolepis</i> (Lowland Swamps)' variant	0.701	0.219 specific units
5	0.781	General	0.688			0.537 general units
		Specific		10111, Gull-billed Tern, <i>Gelochelidon</i>	0.677	0.529 specific units

Offset site report

BCA	Site gain in habitat hectares	Offset type	General offset attributes		Specific offset attributes		Biodiversity equivalence units*
			Strategic biodiversity score		Species number, Species common name, Species scientific name	Habitat importance score	
					nilotica macrotarsa		
		Specific			10154, Wood Sandpiper, Tringa glareola	0.744	0.581 specific units
		Specific			10170, Australian Painted Snipe, Rostratula benghalensis australis	0.733	0.573 specific units
		Specific			10185, Little Egret, Egretta garzetta nigripes	0.708	0.553 specific units
		Specific			501888, Salt Lawrencia, Lawrencia spicata	0.744	0.581 specific units
		Specific			504655, Pale Swamp Everlasting, Coronidium scorpioides 'aff. rutidolepis (Lowland Swamps)' variant	0.684	0.534 specific units
		General	0.779				1.812 general units
		Specific			10111, Gull-billed Tern, Gelocheidon nilotica macrotarsa	0.715	1.661 specific units
		Specific			10154, Wood Sandpiper, Tringa glareola	0.772	1.794 specific units
		Specific			10170, Australian Painted Snipe, Rostratula benghalensis australis	0.742	1.726 specific units
		Specific			10185, Little Egret, Egretta garzetta nigripes	0.750	1.744 specific units
		Specific			12683, Glossy Grass Skink, Pseudemoia rawlinsoni	0.721	1.677 specific units
		Specific			501888, Salt Lawrencia, Lawrencia spicata	0.753	1.751 specific units
		Specific			504655, Pale Swamp Everlasting, Coronidium scorpioides 'aff. rutidolepis (Lowland Swamps)' variant	0.682	1.587 specific units
6	2.329						

Offset site report

*Note that biodiversity equivalence units within a BCA are alternates. The use of any biodiversity equivalence units of one type within a BCA will result in a proportional reduction in biodiversity equivalence units of other types within that BCA.

Next steps

Offset sites must meet eligibility criteria as outlined in the *Native vegetation gain scoring manual, version 1* available on the DEPI website and any other relevant requirements. Eligible offset sites that are intended to be banked or sold as credits must be registered on the native vegetation credit register. A habitat hectare assessment is required to be undertaken before any offset can be registered on the credit register.

© The State of Victoria Department of Environment and Primary Industries
This publication is copyright. No part may be reproduced by any process except
in accordance with the provisions of the *Copyright Act 1968*.

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DEPI Customer Service Centre 136 186

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Appendix 1 – Images of marked native vegetation

Image 1. Aerial photograph showing marked native vegetation



Offset site report

Image 2. Strategic biodiversity score map

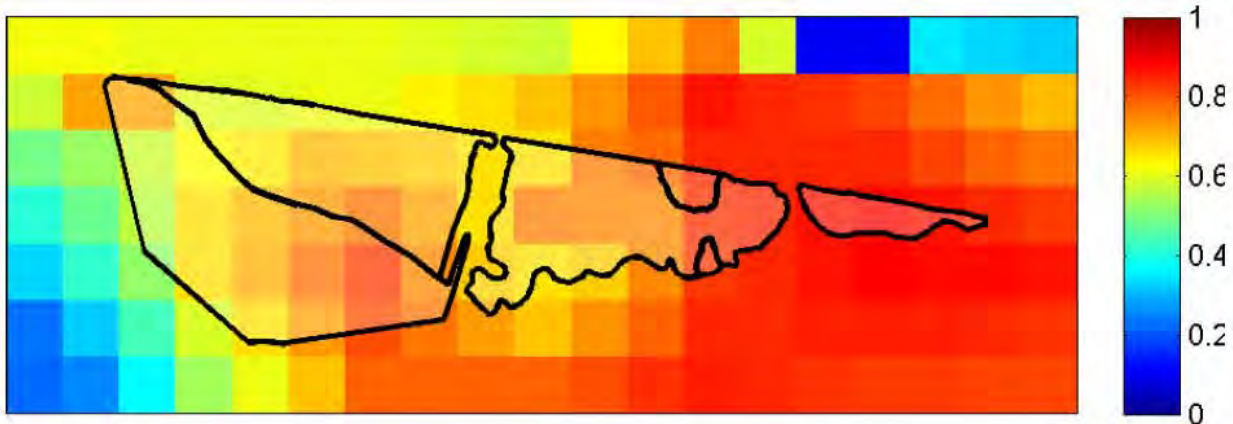


Image 3. Habitat importance map – 10111, Gull-billed Tern, *Gelochelidon nilotica macrotarsa*

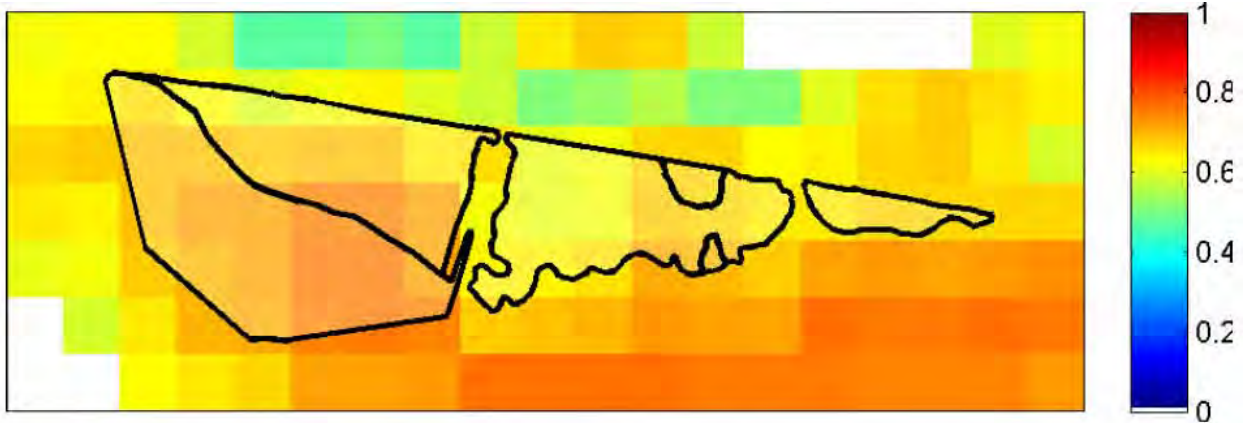
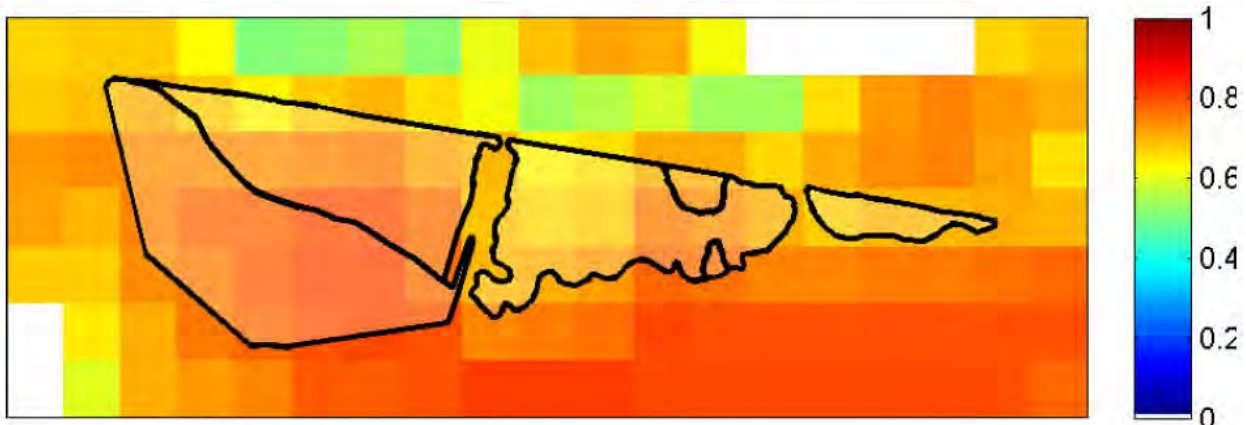


Image 4. Habitat importance map – 10154, Wood Sandpiper, *Tringa glareola*



Offset site report

Image 5. Habitat importance map – 10170, Australian Painted Snipe, *Rostratula benghalensis australis*

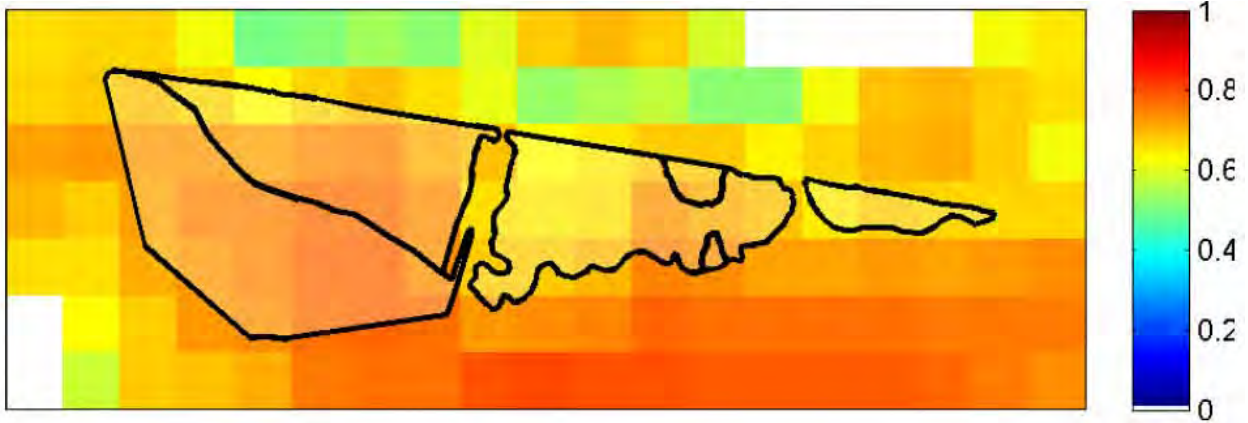


Image 6. Habitat importance map – 10185, Little Egret, *Egretta garzetta nigripes*

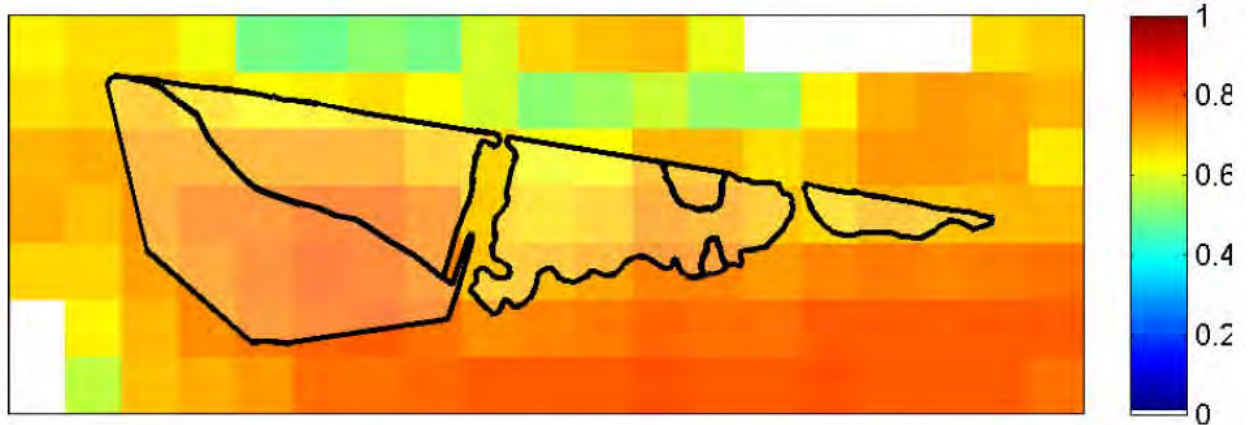
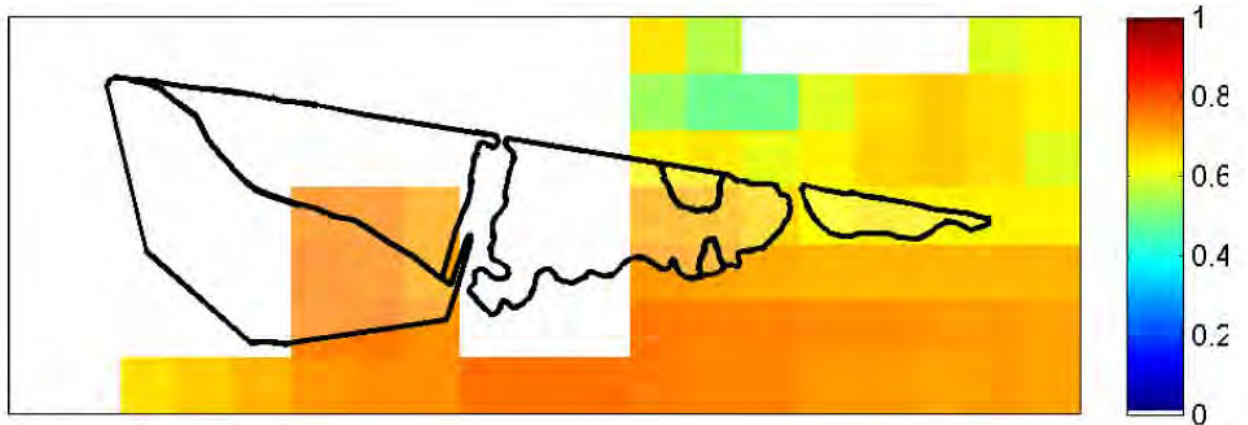


Image 7. Habitat importance map – 12683, Glossy Grass Skink, *Pseudemoia rawlinsoni*



Offset site report

Image 8. Habitat importance map – 501839, Creeping Rush, *Juncus revolutus*



Image 9. Habitat importance map – 501888, Salt Lawrenca, *Lawrenca spicata*

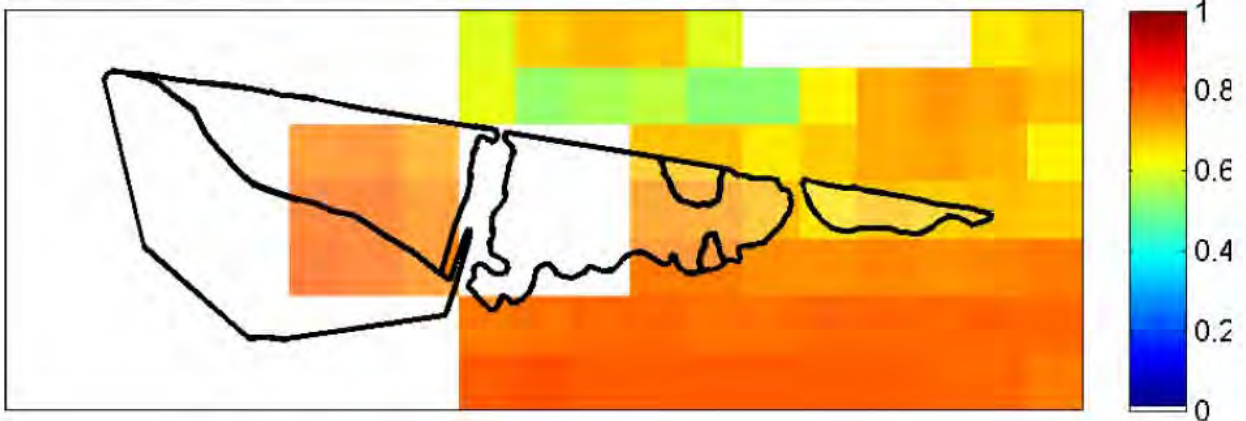
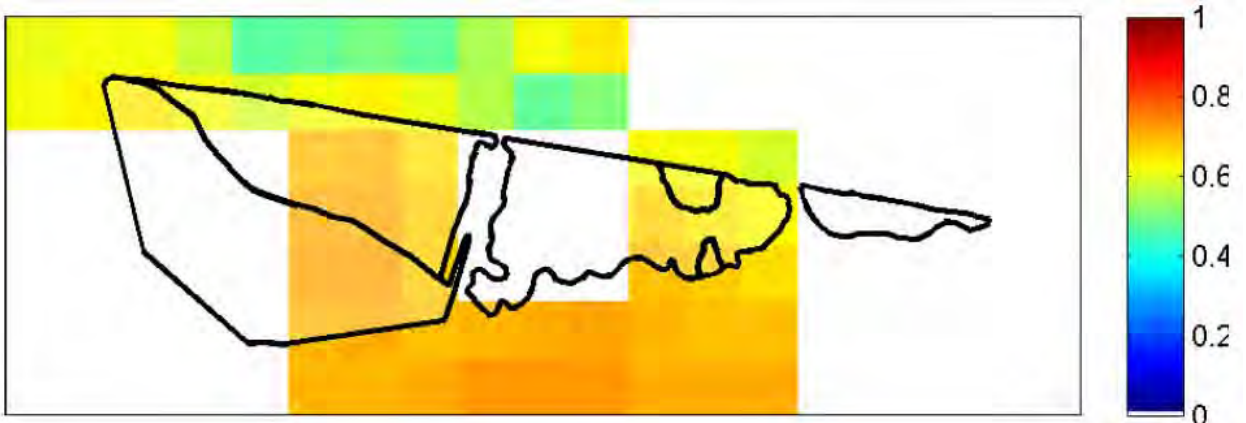


Image 10. Habitat importance map – 504655, Pale Swamp Everlasting, *Coronidium scorpioides* 'aff. *rutidolepis* (Lowland Swamps)' variant



Offset site report

Glossary

Alternate offset types	Offset types within a biodiversity class area (BCA) are alternates. The use of one offset type will result in the proportional reduction of all other offset types within the BCA. For example, in a BCA that has 1 general unit and 2 specific units for a particular rare or threatened species, if all of the general units are used (100 per cent) there will be no specific units remaining, as these specific units will also reduce by 100 per cent. Alternatively, if in this same BCA only half the general units were used (50 per cent) then there will be 0.5 general units and 1 specific units remaining, half the original values.
Biodiversity Class Area (BCA)	The BCA is the organisational unit of an offset site. BCAs are determined by the unique combination of general and specific biodiversity equivalence units calculated across the offset site.
Condition score	This is the site-assessed condition score for the native vegetation. Each habitat zone in the offset site is assigned a condition score according to the habitat hectare assessment method. This information has been provided by or on behalf of the applicant in the GIS file submitted for processing.
General biodiversity equivalence units (general units)	<p>The general biodiversity equivalence units (general units) quantify the relative overall contribution that the protection and management of native vegetation at the offset site makes to Victoria's biodiversity. The general biodiversity equivalence units is calculated as follows:</p> $\text{General biodiversity equivalence units} = \text{site gain in habitat hectares} \times \text{strategic biodiversity score}$
General offset attributes	The attributes of a general offset site must match those in an offset requirement that is a condition on a permit to remove native vegetation, in order for that offset site to be used to satisfy the permit condition. General offsets must be located in the same Catchment Management Authority boundary or Municipal District (local council) as the clearing site. They must also have a strategic biodiversity score that is at least 80 per cent of the clearing site. The strategic biodiversity score of a general offset is determined by the biodiversity class area the units are sold from.
Habitat importance score	The habitat importance score is a measure of the relative importance of the habitat located on a site for a particular rare or threatened species, compared to all other habitat for that species. The habitat importance score for a species is a weighted average value calculated from the habitat importance map for that species. The habitat importance score is calculated for each biodiversity class area where the habitat importance map indicates that species habitat occurs and where the protection of habitat across the offset agreement is greater than the threshold test.
Habitat zone	Habitat zone is a discrete contiguous area of native vegetation that: <ul style="list-style-type: none">• is of a single Ecological Vegetation Class• has the same measured condition.
Offset type	There are two types of offsets, general offset and specific offsets. All offset sites can be general offsets. Sites that are mapped as habitat for specific rare or threatened species can be specific offsets for those species habitat.

Offset site report

Site gain in habitat hectares Site gain in habitat hectares is a site-based measure that combines extent and site gain per hectare of native vegetation at an offset site. The site gain in habitat hectares measures both the current status of native vegetation at a site and the potential site gain from the protection and management of the native vegetation at that site. The condition of a site, or the gain in condition due to protection and management actions are multiplied by the extent (area in hectares) of native vegetation to calculate the site gain in habitat hectares value. For a biodiversity class area the site gain in habitat hectares is determined using the following formula:

$$\text{Site gain in habitat hectares} = \text{total extent (hectares)} \times \text{site gain per hectare}$$

Site gain per hectare This is the site-assessed gain per hectare for the native vegetation based on the agreed management and security commitments. Each habitat zone in the offset proposal is assigned a site gain per hectare according to the habitat hectare assessment and gain scoring methods. This is a number between 0 and 1. This information has been provided by or on behalf of the applicant in the GIS file. These values are aggregated to the level of the BCA in order to calculate offset amounts at the offset site.

Specific offset attributes The attributes of a specific offset site must match those in an offset requirement that is a condition on a permit to remove native vegetation, in order for that offset site to be used to satisfy the permit condition. Specific offsets must be located in the mapped habitat for the species that has triggered the specific offset requirement.

Specific biodiversity equivalence units (specific units) Specific biodiversity equivalence units (specific units) are associated with a particular rare or threatened species habitat. The specific biodiversity equivalence units quantifies the relative overall contribution that the protection and management of native vegetation at an offset site makes to the habitat of the relevant rare or threatened species. Specific units are calculated for each species in each biodiversity class area where the result of the threshold test is greater than 0.0025 per cent. Specific units are calculated as follows:

$$\text{Specific biodiversity equivalence units}_{\text{species } x} = \text{site gain in habitat hectares} \times \text{habitat importance score}_{\text{species } x}$$

Strategic biodiversity score This is the weighted average strategic biodiversity score of the marked native vegetation. The strategic biodiversity score has been calculated from the *Strategic biodiversity map* for each BCA. The strategic biodiversity score of native vegetation is a measure of the native vegetation's importance for Victoria's biodiversity, relative to other locations across the landscape. The *Strategic biodiversity map* is a modelled layer that prioritises locations on the basis of rarity and level of depletion of the types of vegetation, species habitats, and condition and connectivity of native vegetation.

Threshold test By default, a threshold test is applied to offset sites to limit the number of rare or threatened species for which specific biodiversity equivalence units are calculated. This is done to make organising and trading credits more manageable. The test determines if the offset site can generate specific habitat protection for any rare or threatened species above a threshold. The threshold is set at 0.0025 per cent of the total habitat for a species. When the proportion of habitat protected is above the threshold, specific biodiversity equivalence units are calculated for that species.

Offset site report

**Total extent
(hectares) for
calculating site
gain in habitat
hectares**

This is the total area of offset site native vegetation in hectares.

The total extent of native vegetation is an input to calculating the site gain in habitat hectares at a site and in calculating the total gain in general and specific biodiversity equivalence units.