



Port of Hastings: Flora and Fauna Assessment of Crown land and BlueScope Steel property (within SUZ1)

DRAFT REPORT

Prepared for AECOM and GHD Joint Venture

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In May 2016 the Special Minister of State asked Infrastructure Victoria to provide advice on the future capacity of Victoria's commercial ports. Specifically, the Minister has asked for advice on when the need for a second container port is likely to arise and which variables may alter this timeline. The Minister has also asked for advice on where a second container port would ideally be located and under what conditions, including the suitability of, and barriers to investing in, sites at the Port of Hastings and the Bay West location.

In undertaking this task, Infrastructure Victoria reviewed work that was completed as part of the Port of Hastings development project before it was cancelled in 2014. This document forms part of the initial work undertaken for the proposed port development at Hastings. Infrastructure Victoria considers that much of the previous Hastings work, although preliminary in nature, is relevant and suitable for informing a strategic assessment. Therefore, Infrastructure Victoria has made the reports previously commissioned for the development project part of the evidence base on which Infrastructure Victoria will use in providing the Minister with advice.

The opinions, conclusions and any recommendations in this document are based on conditions encountered and information reviewed at the date of preparation of the document and for the purposes of the Port of Hastings Development Project.

Infrastructure Victoria and its consultants have used the information contained in these reports as an input but have not wholly relied on all the information presented in these reports.

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Executive Summary

Biosis Pty Ltd was appointed by AECOM/GHD Joint Venture on behalf of the Port of Hastings Development Authority (the Authority) to undertake a flora and fauna assessment of land within BlueScope Steel and areas of Crown land within the Hastings Special Use Zone (SUZ1) for the Port of Hastings Development Project (the Project). This information is required to understand the condition, presence and extent of terrestrial biodiversity values within the study area to inform port design decisions and support future impact assessments and approvals.

The study area contains a range of ecological values on land that is largely occupied by native vegetation of varying quality. It is included within the Western Port Biosphere Reserve and the Western Port Ramsar Wetland site (in part). The Ramsar wetland includes permanent and semi-permanent saline wetlands, including intertidal mud and sand flats, and areas of saltmarsh and mangroves. The biosphere reserve was declared on the basis that it contains significant natural values including internationally important wetlands as well as nationally significant values.

Key ecological values

Key ecological values identified within the study area are as follows:

- approximately 330 ha of native vegetation including large, high quality, intact patches of woodland, and coastal EVCs, scattered remnant trees, and regionally significant coastal-inland ecosystem gradients
- shallow intertidal habitats, mangroves, saltmarsh and adjacent coastal land which form a significant component of the Western Port Ramsar wetland
- approximately 43.4 ha of the EPBC Act listed ecological community: Subtropical and Temperate Coastal Saltmarsh and approximately 3 ha of the EPBC Act listed community: Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains
- a population of the EPBC Act listed flora species River Swamp Wallaby-grass (*Amphibromus fluitans*), twelve State Advisory List species and three FFG Act listed fauna species
- potential presence of additional EPBC Act, State Advisory List and FFG Act listed species and suitable habitats for them.

High value areas

Large patches of contiguous native vegetation generally provide the highest flora and fauna values. Loss or fragmentation of such areas can be detrimental to the species and ecosystems they support. Relevant areas within the study area include:

- Crown land containing native heathy or grassy woodland and the coastal zone supporting saltmarsh and mangrove shrublands which form part of the Western Port Ramsar wetland.
- large intact areas of native woodland and coastal vegetation within the eastern part of the BlueScope Steel property.

Considerations for project design

Planning for project infrastructure layout from an ecological perspective (with respect to State and Commonwealth biodiversity legislation and policies) should give consideration to:

- design options which avoid or minimise direct or indirect impacts on the Western Port Ramsar site including its foreshore habitats
- design options that avoid or minimise removal of remnant native vegetation and scattered native trees, particularly larger areas of intact vegetation such as those within BlueScope Steel land, by locating infrastructure in previously cleared land or predominantly non-native vegetation (e.g. existing transport corridors, urban areas and non-native agricultural areas)
- design options that avoid fragmentation of native vegetation patches, and avoid severance of important vegetation and habitat linkages
- the potential challenges and costs associated with locating and securing sufficient offsets for biodiversity assets that cannot be protected on-site (as required to comply with relevant State and Commonwealth offset policies).

Further survey

The surveys reported here were undertaken in a season not suitable for detection of all target species. Further surveys are recommended for detection of Southern Toadlet in autumn, Orange-bellied Parrot between April and September inclusive and Green-striped Greenhood during August to early September.

The survey reported here is one of a number of investigations of biodiversity values planned to be undertaken for the Project. Other investigations yet to be undertaken may provide information that further refines understanding of aspects covered by this report.

1. Introduction

1.1 Project background

The Victorian Government has identified the Port of Hastings as a key area for port expansion.

An expanded Port of Hastings would increase capacity and competition in the container ports sector servicing Melbourne and Victoria helping to manage the expected growth in container trade.

The Port of Hastings Development Authority (the Authority) and its board were established in January 2012 under the *Transport Integration Act 2010*. The primary objectives of the Authority are to:

- manage and operate the Port of Hastings, and
- facilitate the development of the Port of Hastings as a viable alternative to the Port of Melbourne as a container port to increase capacity and competition in the container ports sector to accommodate future growth in trade, consistent with the vision statement and the transport system objectives.

Over the next three to four years, the Authority will be working to develop a business case for an expanded Port of Hastings and undertake comprehensive environmental assessment. This business case will include:

- preferred project design/scope (including transport connections)
- necessary environmental approvals (including impact assessment)
- preferred governance and delivery strategy.

In May 2014, the Port of Hastings Development Project (the Project) was declared a 'Major Transport Project' under the *Major Transport Project Facilitation Act 2009* (MTPF Act).

In July 2014, the then Minister for Ports, Mr David Hodgett, formally appointed the Authority as the Project Proponent under the MTPF Act.

1.2 Purpose and scope of this report

The purpose of this report is to present an assessment of the condition, presence and extent of terrestrial biodiversity values in BlueScope Steel and coastal Crown land within SUZ1, including threatened species. The assessment has been developed to:

- understand the significance of terrestrial and coastal biodiversity in accordance with State and Federal biodiversity legislation
- enable port design decisions to be informed by an understanding of terrestrial biodiversity values, their significance and location across the landscape
- obtain further information for potential inclusion in the EPBC referral and Project Proposal
- collect information to inform future impact assessments that will be carried out once the reference design has been developed.

The scope of this assessment is to:

- review the results of a desktop flora and fauna report prepared by Biosis (2014b)
- undertake mapping at 1:5,000 scale of Ecological Vegetation Classes, remnant scattered trees, EPBC Act listed ecological communities and FFG Act listed communities

- assess the condition of native vegetation
- undertake targeted surveys and habitat evaluation for threatened flora and fauna species (EPBC Act and FFG Act) that were determined in the desktop of having at least a medium likelihood of presence
- identify any other relevant ecological values.

The study area for this assessment is shown in Appendix A - Figure A1 and is confined within the Hastings SUZ1 component of the port landside development. Some areas within BlueScope and Crown land were not available to be assessed in the present investigation and it is recommended that they are included in any subsequent assessment(s). The operational area of BlueScope was not surveyed due to safety access requirements. The Gordon Rolfe Bushland Reserve, Yaringa, was assessed for flora but fauna surveys were not possible due to a feral animal control program at the time of survey.

The properties included in the scope of works for the present investigation cover a portion of the SUZ1. The entire SUZ1 area includes various land parcels under different tenures and land management from those covered here. Future investigations are proposed to investigate biodiversity values of these additional land parcels within SUZ1.

The scope for the present investigations excluded marine (refer Figure A1) and freshwater environments, other than consideration of vegetation and frogs of freshwater habitats.

Results of the assessment are presented variously in Appendices B (Flora), C (Fauna) and D (Photos). A glossary of terms is provided in Appendix E.

The contents of this document reflect the current position on the subject matter held by Biosis. It is provided for discussion or information purposes and is intended to be a guide only. The contents of this document should not be relied upon as representing the final position of Biosis on the subject matter, unless stated otherwise. Any views expressed by Biosis in this document may change as a consequence of Biosis undertaking further technical studies or specifications, or legislative, or procedure and regulatory developments. Any figures provided are indicative only and may be subject to change.

2. Biodiversity Legislation, Policy and Guidelines

This section provides a summary of relevant biodiversity legislation and government policies and guidelines. Legislation and policy are not described in detail and guidance provided here does not constitute legal advice. Prescriptions and guidance for flora and fauna survey and assessment methods are provided in a number of policies associated with relevant legislation.

Generally, biodiversity legislation aims to avoid or minimise impacts on important biodiversity values. In particular lists of rare or threatened species and ecological communities are provided with the aim of avoiding further fragmentation or loss of these values. The approvals process requires demonstration of efforts to optimise the design of developments to minimise these environmental impacts. Where impacts on biodiversity are unavoidable following an iterative design optimisation process, offsets may be sought to adequately compensate for residual adverse impacts. Both Commonwealth and State systems provide calculators to be used to determine offset size, type and location of offsets.

Offsets can only be secured however where they are available, and it is important to note that not in every case the required equivalent offsets for clearance of habitats or species are available. This is particularly relevant for large areas of listed threatened native vegetation communities or extensive areas of high quality habitat for threatened species, thus potentially providing a challenge to obtaining permission to remove those values from an area.

2.1 International

2.1.1 *Ramsar Convention on Wetlands of International Importance (Ramsar Convention)*

Australia became a signatory to the Ramsar Convention in 1974 and committed to designating sites for inclusion in the List of Wetlands of International Importance. A large portion of Western Port was designated in 1982. Australia has a number of obligations pertinent to the management of wetlands of international importance and is expected to manage Ramsar wetlands so as to maintain their ecological character, remain informed of any changes to their character, and notify the Ramsar Secretariat of any changes at the earliest opportunity.

National Guidelines for Ramsar Wetlands are currently being developed by the Department of Environment in consultation with the states and territories. The aim of the guidelines is to facilitate improved management of Ramsar sites in line with Australia's commitments under the Ramsar Convention and responsibilities under the Environment Protection and Biodiversity Conservation Act 1999 (below).

2.2 Commonwealth

2.2.1 *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The aim of the EPBC Act is to provide a legal framework to protect nationally and internationally important flora, fauna and ecological communities. These values are defined as matters of national environmental significance (MNES). The EPBC Act applies to developments and associated activities that have the potential to significantly impact MNES protected under the Act including Ramsar wetlands of international importance, nationally threatened species and communities and migratory species. The EPBC Act also relates to actions that affect Commonwealth land (DEWHA 2010). Actions that may have a 'significant impact' on MNES or

Commonwealth land are subject to approval by the Australian Government Minister for the Environment (DEWHA 2009a). Where significant impacts are deemed likely, measures to avoid and mitigation those impacts are required. As a final measure, offsets can be deemed to compensate for the residual adverse impacts of an action on the environment. The suitability of a proposed offset is considered as part of the decision to approve or not approve a proposed action under the EPBC Act.

The Authority is concurrently seeking agreement to accredit the assessment process under the MTPF Act for assessment of the impacts to MNES as listed under the EPBC Act.

2.3 State Legislation

2.3.1 *Major Transport Project Facilitation Act 2009 (MTPF Act)*

The Project has been declared under the MTPF Act. The Authority is preparing a Project Proposal as part of the decision-making and approval process under the MTPF Act to inform a decision by the Minister for Planning on the appropriate assessment pathway for the project. The primary State approvals required for the project, and that are capable of being granted under the MTPF Act, are called Applicable Approvals. At this stage of the Project development, the Applicable Approvals relevant to biodiversity that may be sought for the Project under the MTPF Act include:

- consent under the *Coastal Management Act 1995*
- planning scheme amendment under the *Planning and Environment Act 1987*
- licence to take and use water, and works on waterways licence under the *Water Act 1989*
- consent under the *Conservation, Forest and Lands Act 1987*.

Permits under the *Flora and Fauna Guarantee Act 1988* and the *Wildlife Act 1975* would be sought following the MTPF Act approval process as these require a more detailed level of design.

2.3.2 *Flora and Fauna Guarantee Act 1988 (FFG Act)*

The FFG Act is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. Under the FFG Act a permit is required from the Department of Environment, Land, Water and Planning (DELWP) to 'take' protected flora species from public land, which in this case would apply to the Crown land parcels. A permit is generally not required for removal of protected flora from private land.

2.3.3 *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.

The 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.

2.3.4 *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. This Act would be addressed under Applicable Approvals of the MTPF Act.

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 and introduced the Permitted clearing of native vegetation: Biodiversity Assessment Guidelines (DEPI 2013b).

Of particular relevance to the Project are controls relating to the removal, destruction or lopping of native vegetation contained within the Planning Scheme, including permit requirements. The Scheme 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 <http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/native-vegetation>.

Overlays in the planning scheme relevant to the study area and final development layout should also be reviewed to assist in the determination of whether a permit to remove native vegetation is required.

2.3.5 Victoria's Biodiversity Assessment Guidelines

The Guidelines are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria (DEPI 2013b). The purpose of the Guidelines is to guide how impacts to biodiversity should be considered when assessing a permit application to remove, destroy or lop native vegetation.

The Guidelines describe the following objective for permitted clearing of native vegetation in Victoria:

'No net loss in the contribution made by native vegetation to Victoria's biodiversity'.

This objective is to be achieved through Victoria's planning system using a risk-based approach that relies on strategic planning and the permit and offset system. The key strategies for achieving no net loss at the permit level 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.

Under the Guidelines, there are three risk-based pathways for assessing an application for a permit to remove native vegetation: low, moderate and high. A planning application for removal of native vegetation must meet the requirements of, and be assessed in, the appropriate risk pathway. Given the scale of the Project and requirements for native vegetation removal, it is likely to be assessed under the high risk-based pathway.

Consideration to the design and layout of the Project infrastructure would be required to avoid and minimise clearance of native vegetation and scattered trees as far as possible. Offsets for permitted native vegetation clearance would be required and can be calculated using the DELWP Native Vegetation Information Management (NVIM) system online tool once a development footprint is known. Various options can be submitted through the NVIM tool to establish the layout which results in the lowest impacts on biodiversity values.

2.3.6 State Advisory list of rare or threatened species

The State Advisory Lists (e.g. DEPI 2013a, DEPI 2013d) are intended to be used in a range of planning processes, although there are no direct legal requirements or consequences that flow from inclusion of a species in advisory lists. Some species in these advisory lists are also listed as threatened under the FFG Act.

To support decision making under the Guidelines, DELWP has produced models for Victoria describing the extent of habitat for most listed rare or threatened species. These models are called 'habitat importance models' and they assign a 'habitat importance score' to a location based on its importance in the landscape as habitat for a particular rare or threatened species relative to other suitable habitat for the species elsewhere in the State (DEPI 2013b).

Under the Guidelines, these models form the basis for determining the impact of potential native vegetation clearing on rare and threatened species where the proposal is considered to be on the moderate or high risk-based application pathways. The habitat importance scores are used to calculate the type and extent of biodiversity offsets required for native vegetation removal that impacts on individual rare or threatened species habitat for moderate or high risk application pathways.

3. Methods

3.1 Literature and database review

Information about flora and fauna was obtained from relevant public databases for the study area and from within 5 km of the study area (the 'local area'). These data provide an indication of species and ecosystems that may exist within the study area. Records from the following databases were collated and reviewed:

- Flora Information System which includes records from the Victorian Biodiversity Atlas 'VBA_FLORA25, FLORA100 & FLORA Restricted' August 2012 © The State of Victoria, 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
- DELWP Biodiversity Interactive Map (BIM)
- BirdLife Australia, the New Atlas of Australian Birds 1998–2012 (BA)
- Protected Matters Search Tool of the Australian Government Department of the Environment for MNES under the EPBC Act.

Other sources of biodiversity information:

- DELWP Native Vegetation Information Management (NVIM) system and BIM
- DELWP NaturePrint; accessed through the BIM
- DELWP Arthur Rylah Institute.

The following studies and consultant reports relating to the study area were reviewed in preparation of this report. The main focus in the review of these documents was to validate EVC distribution for the study area and to determine any implications of threatened species survey results:

- AECOM 2013. Western Port Highway Planning Study – Ballarto Road to Hodgins Road: Desktop Flora and Fauna Assessment. Report to VicRoads. Author: White, C. AECOM, Melbourne. Job No. 60308273.
- Biosis 2014a. Port of Hastings Development Authority: Flora and fauna assessment for the geophysical and geotechnical surveys. Report to Port of Hastings Development Authority. Authors: Mueck S. and Smales I. Biosis Pty Ltd, Melbourne. Project no. 17228
- Biosis 2014b. Port of Hastings: SUZ1 and Land Transport Corridor, Desktop Flora and Fauna Assessment. Report for AECOM and GHD Joint Venture. Authors: Dell M, Kay K and Gilmore D – Biosis; Harrow, S, Lind P. - GHD. Biosis Pty Ltd, Melbourne. Project no. 18568.
- Biosis Research 2012. Scoping framework for the terrestrial ecological assessment of the expansion of the Port of Hastings. Report to Major Projects Victoria. Author: Venosta, M. Biosis Research, Melbourne. Matter No. 14062.
- Biosis Research 2011. Port of Hastings Stage 1 Investigation Area: Threatened flora and fauna survey and habitat hectare assessment. Report to Port of Melbourne Corporation. Authors: Venosta, M., Mueck, S. and Bloink, C. Biosis Research Pty Ltd, Melbourne. Matter No. 11173.

- Biosis Research 2009. Flora and fauna assessment of Port of Hastings Stage One Investigation area, Victoria. Report to AECOM Pty Ltd. Authors: Venosta, M., Mueck, S. and Bloink, C. Biosis Research Pty Ltd, Melbourne. Project no. 7540 & 7930.
- DEPI 2014. Sub-regional Species Strategy for the Southern Brown Bandicoot. Victorian Government Department of Environment and Primary Industries, Melbourne.
- GHD 2013. Port of Hastings Development Authority, Port Container Expansion Project: Preliminary Ecological Assessment. Report to Port of Hastings Development Authority. Job No. 31/29838/06.
- Legg 2006. Flora and Fauna Survey and Management Prescriptions for Crib Point Stony Point Foreshore, Crib Point, October, 2005 to October, 2006. Report to Crib Point Stony Point Foreshore Committee of Management Inc. Author: Legg, M. Mal's Environmental and Ecological Services.

A catalogue of literature relating to the Western Port Biosphere Project was updated by Mungere (2008) which includes ecological studies and other literature (1800 references) (MPWPBRF 2014). A full list of literature used in preparation of this report is contained in the references section.

3.2 Definitions of significance

3.2.1 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 for categories of significance of species and communities 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 EPBC Act and/or a component of a Ramsar wetland.
State	Listed as threatened (critically endangered, endangered, vulnerable) or rare for flora species, in Victoria on a State Advisory List (DEPI 2013a, DEPI 2013d) Listed as threatened under the FFG Act.

Fauna species listed on State Advisory lists as near threatened or data deficient are listed in Appendix B, however in accordance with advice from DELWP 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.

3.3 Likelihood of occurrence

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 implies the relative value of a site for a particular species. The categorisation is based on documentary evidence for the presence of relevant species; the existence of suitable habitat within the study area; and, experience, particularly for species that are cryptic and have never been recorded in the study area or have not been recorded for a substantial period. Account is taken of the rigour, and effort of surveys for particular taxa and the time that has elapsed since field investigations were undertaken.

Likelihood of occurrence is assessed only for species listed under the EPBC Act or listed as threatened under the FFG Act (hereafter referred to as 'listed species'). The habitat value for species listed on the State Advisory

Lists is calculated by the Habitat Importance Modelling produced by the then DEPI (2013b). Where State Advisory List species are recorded in the study area this is noted in Appendix B1.1 and Appendix B2.1.

The likelihood of listed species occurring within the study area is ranked as negligible, low, medium or high.

Species which have medium or high likelihood of occurrence are given further consideration in this report.

3.4 Site investigation

3.4.1 Definition of native vegetation

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. Native vegetation is classified by Victoria's Biodiversity Assessment Guidelines into two categories (DEPI 2013b):

- 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 DELWP.

- A **scattered tree** is defined as (extent measured by number of trees):
 - *An indigenous canopy tree that does not form part of a remnant patch of native vegetation.*

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 descriptions provide a list of the typical canopy species. A condition score and extent is applied to each scattered tree based on information provided by DELWP's online Native Vegetation Information Management (NVIM) system.

Species nomenclature for flora follows the Victorian Flora Information System (FIS). The FIS and the Victorian Fauna Database (VFD) are fully-functional geographically-registered, relational databases of distribution and descriptive data on Victorian plants and animals. Together they contain over five million records of over 8000 species, sub-species, varieties, forms, hybrids and undescribed taxa of plants and animals from over 900,000 survey or collection sites (Viridans 2015).

3.5 Vegetation Mapping

The study area boundaries for the project were provided by the Authority and are shown in Figure A1.

Mapping reviewed for this assessment include:

- EVC mapping within Mornington Peninsula Shire, available at 1:10 000 scale (Sinclair et al. 2006)
- Victorian Saltmarsh Study (Boon et al. 2011), which entailed detailed mapping of saltmarsh communities and provides accurate information about the extent of intertidal EVCs
- EVC mapping within BlueScope Steel (Biosis 2014b) available at 1:10 000 scale
- DEPI modeled 2005 EVCs generally available at 1:25 000 scale (DELWP 2015).

Updated vegetation mapping was conducted in the field using hand-held (uncorrected) GPS units (WGS84) and aerial photo interpretation. The locations of EPBC Act listed species recorded during the current assessment are shown in Figure A2. 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 for the report 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.

3.6 Vegetation Quality Assessment

A Vegetation Quality Assessment was undertaken for all remnant patch native vegetation identified in the study area (Appendix A2 and Section 4.4). This assessment is consistent with the Habitat hectare methodology (DSE 2004) and the Biodiversity Assessment Guidelines (DEPI 2013b). The method involves the assessment of a number of site-based habitat and landscape components against a pre-determined 'benchmark' relevant to the vegetation type being assessed.

A Habitat Zone is a discrete area of native vegetation consisting of a single vegetation type (EVC) with an assumed similar averaged quality. This is the base spatial unit for conducting a habitat hectare assessment. Habitat Zones are illustrated on Figure A2.

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.

Where relevant, notes were made on specific issues such as noxious weed infestations, evidence of management works, current grazing impacts and the regeneration capacity of the vegetation.

3.7 Targeted species surveys

3.7.1 Flora

Targeted flora surveys were undertaken on 15, 16, 20–24, 29–31 October and 26–28 November 2014. Survey efforts focused on areas of native vegetation as determined by botanists who carried out the initial inspection. These areas were identified as having the highest habitat suitability for target threatened flora species. For each survey, the entire area was traversed on foot by two botanists. Survey lines were spaced 10 m apart and generally undertaken in an east-west orientation and the locations of any threatened species were recorded using a hand-held GPS unit (± 7 m accuracy). A brief description of the habitat was documented for areas found to be containing a threatened species.

Within vegetated portions of the study area grassy and heathy woodlands as well as freshwater wetlands were surveyed. Following surveys of vegetated areas, nearby farmland and non-operational areas of BlueScope were also searched for threatened flora. Some areas of non-native vegetation were surveyed if they were already known to contain threatened species. For example, ephemeral wetlands on farmland were targeted for the presence of River Swamp Wallaby-grass (*Amphibromus fluitans*).

Investigations were undertaken with the following species as primary targets, listed in order of threat significance:

- Matted Flax-lily *Dianella amoena* - EPBC Act listed as endangered. FFG Act listed
- Swamp Everlasting *Xerochrysum palustre* - EPBC Act listed as vulnerable. FFG Act listed
- River Swamp Wallaby-grass *Amphibromus fluitans* - EPBC Act listed as vulnerable
- Swamp Fireweed *Senecio psilocarpus* - EPBC Act listed as vulnerable
- Purple Diuris *Diuris punctata* var. *punctata* - FFG Act listed.

Biosis undertook a flora survey along the Esso Longford to Hastings pipeline easement in the north-west of the BlueScope Steel property in late spring 2013. No significant flora species additional to those recorded during the present survey were detected (Biosis 2013a).

The locations of State Advisory Listed species were not recorded as the planning requirements in relation to these species are restricted to the Biodiversity Assessment Guidelines and associated modelled data. However, occurrences of these species and their significance are recorded in Appendix B for reference.

3.7.2 Fauna

Targeted fauna surveys were undertaken on 23 October; 10–14 and 19–21 November; and 11 December 2014. Nocturnal surveys for frogs were undertaken on the nights of 12 and 13 November and 15 December. On each day and night two zoologists were on site.

Active searching and observation to detect fauna was carried out and all species of fauna detected during investigations of the site were recorded.

Investigations were undertaken with the following species as primary targets and specific survey methods used for particular species are detailed below. Species are listed in order of threat significance:

- Southern Brown Bandicoot *Isodon obesulus* - EPBC Act listed as endangered, FFG Act listed, DEPI (2013a) near threatened
- Growling Grass Frog *Litoria raniformis* - EPBC Act listed as vulnerable, FFG Act listed, DEPI (2013a) endangered
- New Holland Mouse *Pseudomys novaehollandiae* - EPBC Act listed as vulnerable, FFG Act listed, DEPI (2013a) vulnerable
- Lace Monitor *Varanus varius* - DEPI (2013a) endangered
- Swamp Skink *Lissolepis coventryi* - FFG Act listed, DEPI (2013a) vulnerable
- White-footed Dunnart *Sminthopsis leucopus* - FFG Act listed, DEPI (2013a) near threatened
- Glossy Grass Skink *Pseudemoia rawlinsoni* - DEPI (2013a) near threatened
- Latham's Snipe *Gallinago hardwickii* - EPBC Act listed as migratory, DEPI (2013a) near threatened.

A variety of survey techniques were used for their potential to detect different suites of species and for their capacity to detect particular species by more than one method.

Surveys targeted at detection of mammals, including species too large to enter Elliott traps, were undertaken using motion- and infra-red-sensitive remote cameras within areas identified as potentially suitable habitat for relevant species. Standard small bait was used as an attractant set in a bait-station on which each camera was focussed. A total of 20 cameras were deployed for between 20 and 22 days from 19 November to 11 December 2014. Cameras were deployed for a total of 410 camera-days/nights. All photographs were

viewed post-fieldwork to identify fauna recorded. Camera locations were selected with a view to the suitability of habitats for key species and to survey different vegetation communities. Locations of remote cameras are shown in Figure A3a. Cameras were deployed in the following EVCs:

- Estuarine Scrub: camera 1
- Damp Heathy Woodland: cameras 2, 3, 4, 5, 8, 19
- Damp Heathland: cameras 6, 7, 9, 10
- Grassy Woodland: cameras 11, 16, 17, 18, 20
- Damp Sands Herb-rich Woodland: cameras 12, 14
- Heathy Woodland: cameras 13, 15.

Surveys for threatened small mammals and skinks were carried out with nocturnal and diurnal deployment of Elliott traps. Trapping locations were selected with a view to the suitability of habitats for key species and to survey different vegetation communities and gradients through differing vegetation communities. Traps were baited with standard small mammal bait (targeting small mammals) or with sardines (targeting skinks). In total, trapping was carried out for 440 trap-days/nights from 10–14 November 2014 (inclusive). Traps were set out in transects of 25 traps. Locations of trap transects are shown in Figure A3b and were in the following EVCs:

- Damp Heathland transitioning into Damp Heathy Woodland: mammal trapline 1 (northern-most trapline)
- Estuarine Scrub transitioning into Damp Heathy Woodland: mammal trapline 2 (south of trapline 1)
- Grassy Woodland: mammal trapline 3 (north and south of Whitney's Rd)
- Damp Sands Herb-rich Woodland transitioning into Heathy Woodland and Grassy Woodland: mammal trapline 4 (southern-most trapline)
- Coastal Saltmarsh (at ecotone dominated by *Melaleuca*): skink traplines 5 and 6 (shown as dashed pale blue in Figure A3b).

Observational surveys for threatened reptiles entailed diurnal observational searches within Swamp Scrub, other damp terrestrial habitats and within woodland habitats.

Surveys for Growling Grass Frog entailed initial evaluation of freshwater wetlands for their suitability as habitat for the species. Eighteen wetlands were evaluated. Ten wetlands were considered to offer potential habitat (DEPI 2013c) and were then subject to nocturnal surveys entailing listening for characteristic calls of the species and the use of call playback and spotlight investigations. Locations of all wetlands evaluated and surveyed for Growling Grass Frogs are shown in Figure A3b. Surveys for this species were undertaken to comply with guidelines under a species-specific Commonwealth EPBC Act policy.

Biosis undertook fauna survey along the Esso Longford to Hastings pipeline easement in the north-west of the BlueScope Steel property in late spring 2013. Seven remote cameras and 60 Elliott traps were deployed to detect small mammals. The survey regime for both techniques was the same as that used in the current survey. No fauna species additional to those recorded during the present survey were detected (Biosis 2013a).

3.7.3 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

3.8 Limitations

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species that might be present will be detected at a site during survey, such as low abundance, patchy distribution, species dormancy, seasonal conditions, and migration and breeding behaviours. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

For individual species assessments, the disturbance history of the vegetation is given particular consideration. Many flora species may be present as underground storage organs or as viable seed in the soil. For such species, the disturbance regime of a site is typically a determining factor for detecting presence using standard survey methods e.g. targeted surveys for flowering material. Disturbance may include frequency and duration of inundation, frequency and intensity of fire, land clearing history, effects of domestic stock and fauna activity. Orchids in particular have irregular annual growth and flowering patterns which vary considerably in response to site disturbance, particularly fire. Success in detecting species varies between and within flowering seasons and according to factors such as time since fire and amount of rainfall leading into spring. For some species, competition with other plants in long-unburnt areas may prevent annual growth from underground tubers. This has been recorded in Dense Leek-orchid *Prasophyllum spicatum* which is capable of producing flowers in the absence of fire although dense understorey growth in healthy vegetation can inhibit flowering (Duncan 2010). In other *Prasophyllum* species, a more direct requirement for fire seems apparent, to stimulate abundant annual growth and flowering in the one or two seasons that follow. Such species may be present only as underground storage organs, awaiting fire for several decades. As such, the influence of disturbance history is assessed on a species by species basis. The shrub and woodland vegetation within most areas assessed showed little evidence of having been burnt in the last 20 years. Understorey vegetation was quite dense in many areas as a result. Grassy Woodland vegetation had a high cover of shrubs (particularly Hedge Wattle *Acacia paradoxa*) compared with what is typically expected in more frequently burnt examples elsewhere.

Some threatened fauna species that may utilise the site occur seasonally or are most readily detected at times of the year other than the spring/early summer period in which the present investigations were carried out. These include Orange-bellied Parrot *Neophema chrysogaster*, which is routinely not present on the Australian mainland at this time of year, and Southern Toadlet *Pseudophryne semimarmorata*, which is cryptic and best detected in autumn when males call. Future surveys for such species would be required during the appropriate seasons. Assessments in this report of the likelihood of occurrence for such species are preliminary and subject to change following future surveys.

The present investigation for fauna did not include birds that are wholly or substantially reliant on the waters of Western Port. We recognize that many of such species may utilize the terrestrial coastal environments included within the current study area and that the ecologies of such species are not exclusively 'marine' or 'terrestrial'. However, as this suite of birds is proposed to be investigated separately

(Biosis 2014c), survey for coastal and marine birds was not included in the current project and such species included in this report represent incidental observations only.

A bat survey was not undertaken as the present investigation was primarily focused on significant species and the study area is not considered likely to be inhabited by any threatened microbats. A survey for bats is proposed to be included in future fauna survey across the wider SUZ1 area.

Targeted investigations of freshwater environments, other than those for frogs, were not part of the scope of present investigations by Biosis.

Database records of flora and fauna species are vetted for authenticity by authorities responsible for their management. For the purposes of this assessment, the species identities and metadata associated with them are accepted at face value. Some of these records are historic but a paucity of recent records does not necessarily reflect the current local status of the species in question. It may simply be the result of a lack of recent survey for the species. This appears to be the case especially within the BlueScope Steel property where little flora and fauna investigation has been undertaken in recent decades.

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4. Results

The study area is located approximately 70 km to the south east of the Melbourne central business district on the Mornington Peninsula. It includes private land owned by BlueScope Steel and Crown land located within the Hastings SUZ1 (Figure A1).

The study area is within the:

- Gippsland Plain bioregion
- Management area of Melbourne Water and/or the Port Phillip and Western Port Catchment Management Authority (CMA)
- Mornington Peninsula Shire.

The ecological features of the study area are described below and mapped in Figure A2.

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

Species recorded or predicted to occur in the local area are also listed in the relevant appendices along with an assessment of the likelihood of each species occurring within the study area. Likelihood of occurrence for species in this list has been updated since the desktop assessment (Biosis 2014b) based on the findings of this flora and fauna assessment.

4.1 Landscape context

The study area borders part of the Western Port shoreline and coastal ecosystems within the Western Port Ramsar wetland. The Ramsar wetland includes the whole of Western Port with an arbitrary boundary line between Point Leo and Silverleaves, near Cowes (excluding the land area of French Island). It includes 26,272 ha of permanent and semi-permanent saline wetlands comprising marine sub-tidal aquatic beds, intertidal mud and sand flats, intertidal marshes (including saltmarshes) and intertidal forested wetlands (mangroves) (DSEWPac 2010). The status of Western Port as a Ramsar wetland of international importance is due to the ability of the area to support a large number of waterbirds and other key habitat features.

Land to the north, west and south of the study area includes farmland with modified pasture and some remnant native scrub, woodland and forest. To the north, native vegetation patches within the local area are remnants of the largely cleared Koo-wee-rup Swamp (Yugovic 2011) and retain some ecological connectivity with more elevated land around Cranbourne and Pakenham. The native vegetation remnants of the Koo-wee-rup Swamp contribute to a significant area of the lower Western Port catchment and support a number of significant ecological features including nationally threatened flora and fauna species. The linear network of vegetated and well-connected drains and roadsides in the Koo Wee Rup-Tooradin area are well known for their habitat value for fauna including Southern Brown Bandicoot and Swamp Skink. These species have persisted in areas of both native and substantially non-native vegetation along these linear corridors by virtue of their high level of landscape connectivity.

Land within 2 km of the study area has largely the same geomorphology as the study area. The Langwarrin Flora and Fauna Reserve to the northwest, includes a large area of native vegetation with a high diversity of native species. The landscape to the west has largely been cleared of native vegetation in lowland areas and extant native vegetation is mostly restricted to roadsides, waterways and smaller private and public reserves.

4.2 Vegetation & fauna habitat

The study area supports a large extent (330 ha) of native vegetation within BlueScope Steel and Crown land in reserves and the coastal zone. A large area of land within BlueScope is also leased for agricultural use.

Most of the native vegetation comprises coastal eucalypt woodland communities or areas of Swamp Scrub, Estuarine Shrub, Mangrove Shrubland and Coastal Saltmarsh. The study area supports a range of ecological features including large intact and high quality areas of native vegetation, native vegetation within conservation reserves, smaller patches of native vegetation in Crown land, the coastal zone, scattered trees and minor waterways. The coastal zone (within 0.5 km of the shoreline) comprises largely native vegetation and represents a high diversity of plant communities and associated fauna habitats which grade into other natural environments further inland. Extant native vegetation within the study area represents several different ecosystems within a relatively short distance along the coastal–inland gradient. There are few similar examples within the Port Phillip and Western Port region where this gradient is relatively contiguous and occupied by native vegetation of good quality. The BlueScope Steel property and adjoining areas represent one of the largest and most diverse, intact areas of native vegetation within the Port Phillip and Western Port coastal region.

These vegetation communities and fauna habitat features are described further in Table 2 and mapped in Figure A2. Photos of some EVCs and surveyed fauna are provided in Appendix D.

Table 2: Summary of vegetation and habitat types within the study area

Vegetation or habitat type	Description	Location	Mapped area	Significant values
Ecological Vegetation Classes				
Damp Sands Herb-rich Woodland EVC 3	<p>Damp Sands Herb-rich Woodland occurs inland on sandy substrates with a clayey upper horizon. This EVC is characterised by an overstorey containing Swamp Gum <i>Eucalyptus ovata</i> and may include as sub-dominant species Rough-barked Manna-gum <i>Eucalyptus viminalis</i> subsp. <i>pyroriana</i> and Narrow-leaf Peppermint. The ground layer is moderately rich in grass species and other herbs. Shrub species include Black Wattle <i>Acacia meamsii</i>, Scented Paperbark <i>Melaleuca squarrosa</i>, Snowy Daisy-bush <i>Olearia lirata</i> and Smooth Parrot-pea <i>Dillwynia glaberrima</i>.</p> <p>Understorey vegetation may be dominated by grasses, rushes and/or sedges in some examples including Zig-zag Bog-sedge <i>Schoenus brevifolius</i>, Common Scale-rush <i>Lepyrodia muelleri</i>, Knobby Club-sedge, Thatch Saw-sedge <i>Gahnia radula</i>, wallaby-grasses <i>Rytidosperma</i> spp. and spear-grasses <i>Austrostipa</i> spp. In such areas the combination of shrub species and dominant canopy tree determine the EVC.</p> <p>Along the primary dune of some sections of the Western Port coastline, a woodland community occurs which has the canopy species Coast Manna-gum. Its understorey composition includes a mix of species that are tolerant of saline condition from high tide seepage e.g. Knobby Club-sedge <i>Ficinia nodosa</i>, Sea Rush <i>Juncus kraussii</i> and Spiny-headed Mat-rush <i>Lomandra longifolia</i>. Shallow rooted glycophytes are also present. The composition of the understorey vegetation and the landscape context of this</p>	Spread throughout the BlueScope property.	62.6 ha	Appropriate habitat for Southern Brown Bandicoot and White-footed Dunnart. Habitat for Purple Diuris.

Vegetation or habitat type	Description	Location	Mapped area	Significant values
	community is unusual and make it worthy of separate EVC rank as it does not fit neatly into any extant EVC. It is most closely aligned with this community and as such is mapped as Damp Sands Herb-rich Woodland for the purposes of this report.			
Coastal Saltmarsh EVC 9	Occurs on coastal flats and estuaries which are subject to tidal flows. This EVC is treeless and commonly comprises a suite of halophytic herb and shrub species such as <i>Tecticornia arbuscula</i> Shrubby Glasswort, <i>Suaeda australis</i> Austral Seablite, Creeping Brookweed <i>Samolus repens</i> , Coast Saw-sedge <i>Gahnia filum</i> , Australian Salt-grass <i>Distichlis distichophylla</i> , Knobby Club-sedge <i>Ficinia nodosa</i> and Rounded Noon-flower <i>Disphyma crassifolium</i> .	A large contiguous area along the coastal edge of BlueScope as well as small areas to the north and south on Crown land.	39.3 ha	Habitat for Orange-bellied Parrot, Swamp Skink and migratory shorebirds.
Estuarine Wetland EVC 10	Estuarine Wetland occurs in upper and lower reaches of estuaries, where there is tidal influence. This EVC is treeless and is dominated by Chaffy Saw-sedge <i>Gahnia filum</i> and Coast Saw-sedge <i>Gahnia trifida</i> both of which provide relatively high cover. Other co-occurring species include a suite of halophytes typically found in Coastal Saltmarsh; these EVCs often occur in a mosaic.	Scattered along the coastal margin generally on the inland side of saltmarsh.	4.1 ha	Appropriate habitat for Orange-bellied Parrot and migratory shorebirds.
Heathy Woodland EVC 48	Heathy Woodland occurs inland on older sand dunes and elevated areas of more freely draining sandy soils. This EVC includes the dominant canopy species Coast Manna-gum <i>Eucalyptus viminalis</i> subsp. <i>pyroriana</i> . Common taller shrub species include Heath Tea-tree <i>Leptospermum myrsinoides</i> , Prickly Tea-tree <i>Leptospermum continentale</i> and Wedding Bush <i>Ricinocarpos pinifolius</i> . The ground flora may be rich in species and commonly include Prickly Guinea-flower <i>Hibbertia acicularis</i> , Showy Parrot-pea <i>Dillwynia sericea</i> , Horny Cone-bush <i>Isopogon ceratophyllus</i> ,	In the reserve off Yaringa Rd, with patches in the north and centre of BlueScope.	35.8 ha	Appropriate habitat for Southern Brown Bandicoot and White-footed Dunnart.

Vegetation or habitat type	Description	Location	Mapped area	Significant values
	spear grasses <i>Austrostipa</i> spp., wallaby grasses <i>Rytidosperma</i> spp. and Austral Bracken <i>Pteridium esculentum</i> .			
Swamp Scrub EVC 53	Swamp Scrub occurs throughout numerous drainage lines, floodplains, swamps and riparian zones where there is negligible influence of saline groundwater. This EVC is dominated by Swamp Paperbark <i>Melaleuca ericifolia</i> and may also include Blackwood <i>Acacia melanoxylon</i> , Black Wattle <i>Acacia mearnsii</i> and occasional eucalypts. Understorey components include Weeping Grass <i>Microlaena stipoides</i> , rushes <i>Juncus</i> spp. and Bracken <i>Pteridium esculentum</i> . Good quality examples are rare within the study area. The creekline to the south of Tyabb Waste Disposal Centre includes a high quality example of this EVC with a more natural understorey plant composition and few weed species. It also provided habitat for River Swamp Wallaby-grass where Swamp Paperbark canopy openings occur.	Scattered throughout BlueScope and Crown land along drainage lines.	9 ha	Appropriate habitat for Swamp Skink and Glossy Grass Skink. Habitat for River Swamp Wallaby-grass.
Wetland Formation EVC 74	A broad EVC that incorporates a range of freshwater wetlands, often of artificial origin. Occurs in topographic depressions associated with standing water ranging from permanent to ephemeral water bodies. Structurally, this EVC can consist of hermland, sedgeland and rushland elements and is characterised by the lack of woody plants (shrubs and trees). Wetland Formation is closely related to Sedge Wetland that dominates similar waterlogged sites in low rainfall areas of the Gippsland plains. The EPBC Act listed species River Swamp Wallaby-grass <i>Amphibromus fluitans</i> is present in this vegetation type.	In the northwest of BlueScope south of the Esso easement.	9.7 ha	Habitat for Southern Toadlet.

Vegetation or habitat type	Description	Location	Mapped area	Significant values
Swampy Riparian Woodland (SRW) EVC 83 / Swampy Woodland (SW) EVC 937	Occurs in low lying areas with often poorly drained seasonally waterlogged soils and in riparian zones of smaller waterways. The dominant canopy species is typically Swamp Gum <i>Eucalyptus ovata</i> and the understorey shrub Swamp Paperbark <i>Melaleuca ericifolia</i> is common. The ground flora is usually modified and includes Weeping Grass <i>Microlaena stipoides</i> , Common Tussock-grass <i>Poa labillardierei</i> , Shrubby Fireweed <i>Senecio minimus</i> , rushes and sedges. Swampy Riparian Woodland occurs in riparian zones and Swampy Woodland occurs on floodplains associated with waterways. As such, Swampy Woodland may occupy flats over larger areas and tends to therefore extend into agricultural land.	Generally occurs along edges of Swamp Scrub or Estuarine Scrub before <i>Melaleuca ericifolia</i> becomes dominant.	5.4 ha	Appropriate habitat for Swamp Skink and Glossy Grass Skink. Habitat for Southern Toadlet.
Plains Grassy Wetland EVC 125	The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas. The EPBC Act listed species River Swamp Wallaby-grass <i>Amphibromus fluitans</i> is present in several examples of this vegetation type.	South of Denham Road in BlueScope.	1.1 ha	Habitat for threatened and/or migratory wetland birds. Habitat for River Swamp Wallaby-grass, Swamp Fireweed and Swamp Everlasting.
Sedge Wetland EVC 136	Sedge Wetland occurs in seasonally inundated or permanent fresh waterbodies. This EVC typically includes few species where water is unable to recede but may include a suite of smaller herb in shallow water. Typical species include Common Spike-sedge <i>Eleocharis acuta</i> , Tall Spike-sedge <i>Eleocharis sphacelata</i> , twig-sedges <i>Baumea</i> spp., <i>Centella Centella cordifolia</i> , milfoils <i>Myriophyllum</i> spp., River Buttercup <i>Ranunculus inundatus</i> , rushes <i>Juncus</i> spp., Small Loosestrife <i>Lythrum hyssopifolia</i> and Running Marsh-flower <i>Villarsia reniformis</i> .	Occurs in very small patches throughout the BlueScope property.	0.7 ha	Habitat for Southern Toadlet. Habitat for River Swamp Wallaby-grass.

Vegetation or habitat type	Description	Location	Mapped area	Significant values
Mangrove Shrubland EVC 140	Mangrove Shrubland occurs on coastal mudflats and in estuaries. This EVC almost entirely comprises the shrub White Mangrove <i>Avicennia marina</i> subsp. <i>australasica</i> which usually is <2 m tall. Several halophytes species occur as minor components to this EVC. Where saltmarsh species make up 50% cover or more, this may be regarded as the EPBC Act community Subtropical and Temperate Coastal Saltmarsh.	A large strip along the coastal region of BlueScope and patches further south.	33.3 ha	Appropriate habitat for Swamp Skink and Glossy Grass Skink.
Grassy Woodland EVC 175	Occurs inland on loamy soils. The dominant canopy species Coast Manna Gum. The understorey is dominated by native grasses such as wallaby grasses <i>Rytidosperma</i> spp., spear grasses <i>Austrostipa</i> spp., plume grasses <i>Dichelachne</i> spp. and Kangaroo Grass <i>Themeda triandra</i> ; and it has scattered shrubs such as Hedge Wattle <i>Acacia paradoxa</i> , Black Sheoak <i>Allocasuarina littoralis</i> and Blackwood <i>Acacia melanoxylon</i> . Good quality examples occur within the BlueScope Steel land at Tyabb where common species included Coast Manna-gum, Hedge Wattle, Prickly Tea-tree, Bristly Wallaby-grass <i>Rytidosperma setaceum</i> , Slender Wallaby-grass <i>Rytidosperma racemosum</i> , Supple Spear-grass <i>Austrostipa mollis</i> , Veined Spear-grass <i>Austrostipa rudis</i> subsp. <i>rudis</i> , Pale Grass-lily <i>Caesia parviflora</i> , sun-orchids <i>Thelymitra</i> spp., onion-orchids <i>Microtis</i> spp., Long Purple Flag <i>Paterstonia occidentalis</i> , Milkmaids <i>Burchardia umbellata</i> and Chocolate Lily <i>Arthropodium strictum</i> .	Various patches in BlueScope and within smaller polygons along the coast.	33.3 ha	Appropriate habitat for Southern Brown Bandicoot and White-footed Dunnart.

Vegetation or habitat type	Description	Location	Mapped area	Significant values
Aquatic Hermland EVC 653	Occurs in shallow depression of black clays or peat, on floodplains and dune depression which are seasonally inundated. This EVC is treeless and typically contains the dominant species Water Ribbon Triglochin procera, Streaked Arrowgrass Triglochin striata, Swamp Lily Ottelia ovalifolia, Red Pondweed Potamogeton cheesemanii, White Purslane Montia australasica, Soft Twig-sedge Baumea rubiginosa, Water Plantain Alisma Plantago-aquatica, milfoils Myriophyllum spp., Common Reed Phragmites australis, Tall Sedge Carex appressa and rushes Juncus spp. The EPBC Act listed species River Swamp Wallaby-grass Amphibromus fluitans is present in this vegetation type.	Northern part of BlueScope.	0.4 ha	Habitat for threatened and/or migratory wetland birds. Habitat for River Swamp Wallaby-grass, Swamp Fireweed and Swamp Everlasting.
Damp Heathland EVC 710	Occurs in peaty sands in drainage lines amongst Damp Heathy Woodland. This EVC is a treeless vegetation type that is dominated by a number of shrub species and graminoids (grasses, sedges and rushes). Total vegetation cover is typically high (>50%) with shrubs to about 3 m tall and taller graminoid with few areas of open ground. Within the local area, this EVC typically includes the characteristic species Allocasuarina paludosa, Manuka Leptospermum scoparium, Silver Banksia Banksia marginata, Bare Twig-sedge Baumea juncea, Common Scale-rush Lepyrodia muelleri, Pithy Sword-sedge Lepidosperma longitudinale, Spreading Rope-rush Empodisma minus, Zig-Zag Bog-sedge Schoenus brevifolius and Slender Bog-sedge Schoenus lepidosperma.	Patches scattered through bushland in the north of BlueScope property south of Pikes Rd and west of Whitneys Rd.	9.1 ha	Potentially appropriate habitat for Southern Brown Bandicoot and White-footed Dunnart. High densities of small native mammals recorded during present investigations.

Vegetation or habitat type	Description	Location	Mapped area	Significant values
Damp Heathy Woodland EVC 793	Damp Heathy Woodland is a treed vegetation type that occurs on largely sandy-clay soils. It includes a moderately shrubby understorey with a usually dense cover of graminoids and low cover of forbs. Within the local area, this EVC typically includes the following floristics. The canopy is usually dominated by Narrow-leaf Peppermint and Swamp Gum <i>Eucalyptus ovata</i> may occur occasionally. The shrub layer typically includes Scrub Sheoak <i>Allocasuarina paludosa</i> and Silver Banksia and the ground flora is usually dominated by Thatch Saw-sedge <i>Gahnia radula</i> , Pithy Sword-sedge <i>Lepidosperma longitundinale</i> and other common sedges/rushes found in Damp Heathland. This EVC is generally distinguished from Damp Sands Herb-rich Woodland by having only sub-dominance of Swamp Gum and reliably including the characteristic species Scrub Sheoak. There are also fewer forbs in the ground layer, although ground flora composition varies within EVCs depending on micro-variation in soil composition. This EVC can usually be distinguished by the higher cover of sedges and rushes and a canopy that is dominated by Narrow-leaf Peppermint.	Found in the northern part of BlueScope as well as a portion of the vegetation south of Denham Road.	51.9 ha	Appropriate habitat for Southern Brown Bandicoot and White-footed Dunnart. Habitat for Purple Diuris.
Estuarine Scrub EVC 953	Estuarine Scrub usually in a coastal belt behind Coastal Saltmarsh, other low-statured coastal vegetation or a small primary dune woodland between saltmarsh and inland vegetation types. This EVC appears structurally as Swamp Scrub and has the same dominant shrubs species Swamp Paperbark <i>Melaleuca ericifolia</i> to about 6 m tall. The understorey vegetation includes a moderate diversity of halophytes as well as glycophytes which tolerate periodic exposure to saline conditions. Dominant understorey	A large extent of the community occurs within BlueScope between the coastal saltmarsh communities, as well as small patches in other	34.3 ha	Appropriate habitat for Swamp Skink and Glossy Grass Skink.

Vegetation or habitat type	Description	Location	Mapped area	Significant values
	species include <i>Gahnia filum</i> Chaffy Saw-sedge, Bare-twig Sedge <i>Baumea juncea</i> and nearer to the coast, ground cover species typical of Coastal Saltmarsh may dominate; in particular Knobby Club-sedge <i>Ficinia nodosa</i> , Rounded-Noon Flower <i>Disphyma crassifolium</i> and Australian Salt-grass <i>Distichlis distichophylla</i> . The ground may be dominated by leaf litter or bare soil (peats).	areas.		
Listed Ecological Communities				
EPBC Act Subtropical and Temperate Coastal Saltmarsh	<p>Areas which correspond with Coastal Saltmarsh EVC 9 and Estuarine Wetland EVC 10 qualify as the EPBC Act listed community on the basis of the definition threshold criteria.</p> <p>The listed ecological community (DSEWPaC 2013a) includes a range of low stature, plant communities with varying composition and structure. They include grassland dominated by Prickly Spear-grass <i>Austrostipa stipoides</i>, sedgeland dominated by saw-sedges <i>Gahnia</i> spp., rushland dominated by Sea Rush <i>Juncus kraussii</i> and halophyte shrubland dominated by glassworts <i>Tecticornia arbuscula</i> and <i>Sarcocornia</i> spp. The listed community includes areas that are ecotones with other communities provided that more than 50% of the ground cover is made up of saltmarsh community species. Patches may either be a single isolated patch >0.1 ha or multiple small patches within a mosaic of other vegetation where the mosaic is >0.1 ha. In the latter example, there should be <30 m distance between saltmarsh patches.</p>	<p>A large contiguous area along the coastal edge of BlueScope as well as small areas to the north and south on Crown land.</p>	43.4 ha	EPBC Act listed ecological community. Habitat for Orange-bellied Parrot, Swamp Skink and migratory shorebirds.
EPBC Act Seasonal Herbaceous Wetland (Freshwater) of the	The presence of these communities is determined by the size and distribution of wetland patches as well as the composition of species. Areas which correspond with	Scattered throughout BlueScope to the	3 ha	Habitat for threatened and/or migratory wetland birds. Habitat for River Swamp Wallaby-grass,

Vegetation or habitat type	Description	Location	Mapped area	Significant values
Temperate Lowland Plains / FFG Act Herb-rich Plains Grassy Wetland (West Gippsland)	Plains Grassy Wetland EVC 125 and Aquatic Herland EVC 653 and some higher quality areas of Wetland Formation EVC 74 qualify as both of these communities on the basis of the definition threshold criteria. Areas mapped as the threatened communities are indicated in Figure A2.	south of Pikes Road and south of Denham Road.		Swamp Fireweed and Swamp Everlasting.
Other habitat features				
Scattered trees	Scattered remnant and planted trees within the study area provide a foraging resource for mobile fauna species. Some of the trees contain hollows.	Throughout the study area.	-	Foraging and roosting habitat for microbat species.
Introduced pastures	These areas support grasslands dominated by indigenous and non-native grasses that are regularly grazed.	Agricultural land scattered throughout.	-	These areas have little value for significant flora and fauna species. Native bird species that typically occupy farmland areas may occasionally use introduced pastures for foraging.
Constructed dams	Several constructed dams occur within the study area. These vary in their plant composition with native species being dominant around the edges of some.	Scattered amongst disused and current agricultural land.	-	All will be used occasionally by significant waterbirds but none offer important or limiting resources to any such. Large, densely vegetated artificial wetlands on McKirdy's Creek may represent habitat suitable for Little Bittern and Australasian Bittern. Dams provide primary habitat for most frog species within the study area. Edges of dams provide habitat for River Swamp Wallaby-grass.
Other man-made structures	Other man-made structures are scattered through the study area. These also provide some habitat features for	A constructed levee occurs adjacent to	-	These structures contain naturally recruited or planted native species that in some

Vegetation or habitat type	Description	Location	Mapped area	Significant values
	terrestrial vertebrates.	the BlueScope plant site. Constructed open drains occur in some parts of the study area.		places formed incipient plant communities that are now naturalised and providing habitat for a range of fauna species. Due to their artificial context and recent development, their habitat values cannot be considered significant for the persistence of significant species within the study area.
Planted vegetation	Planted vegetation most commonly occurs in gardens in the vicinity of houses.	Scattered around domestic areas and along roadsides.	-	These areas generally contain few habitat values, as most indigenous fauna species in the area are adapted to open grassland environments. However, these gardens may support a range of common native and introduced bird species, particularly when in flower.
Introduced/Weedy vegetation	Large areas within the agricultural parts of BlueScope support infestations of Gorse and Blackberry. These areas form impenetrable thickets around the perimeter of native vegetation patches and along paddock boundaries.	Agricultural parts of BlueScope.	-	Appropriate habitat for Southern Brown Bandicoot and some common native mammals where contiguous with indigenous vegetation community that is also habitat for relevant species. Habitat for a suite of bird species.

4.3 Significant species and ecological communities

4.3.1 EPBC Act and FFG Act listed species

Lists of EPBC Act and FFG Act listed species recorded or predicted to occur within 5 km of the study area from database searches are provided in Appendix B (flora) and Appendix C (fauna). An assessment of the likelihood of each 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. The desktop assessment (Biosis 2014b) outlined a number of species that had a medium or high likelihood of occurrence within the study area. Targeted surveys for these species were undertaken within sample areas of the mapped native vegetation in the current study area and are described in Section 4.3.2 below.

A summary of species recorded during the survey or now still considered to have a medium or higher likelihood of occurring in the study area is provided in Table 3. Based on the conditions observed in the study area during the current surveys some of the species we previously thought to be present are now thought to be unlikely. Species in Table 3 are listed in order of status under the EPBC Act, FFG Act and State Advisory Lists.

Table 3: Summary of listed flora and fauna species most likely to occur in the study area

Species name	EPBC Act status	FFG Act status	State Advisory List	Habitats of value within the study area	Survey results
Flora					
Dense Leek-orchid	VU	L	e	Heathy Woodland	Not recorded
Green-striped Greenhood	VU	L	v	Heathy Woodland, Damp Heathy Woodland and Lowland Forest	Not recorded, however the surveys commenced near the end of the flowering period of this species.
River Swamp Wallaby-grass	VU			Grassy wetlands, Aquatic Herbland	Recorded at several locations (see Figure A2)
Fauna					
Australasian Bittern	EN	L	en	Densely vegetated freshwater and brackish wetlands	Not recorded
Southern Brown Bandicoot	EN	L	nt	Heathlands and heathy woodlands, other woodlands and forests, weedy areas affording abundant cover	Not recorded
Gull-billed Tern		L	en	Coastal zone in Western Port	Not recorded
Little Egret		L	en	Coastal zone in Western Port and freshwater wetlands	Not recorded

Species name	EPBC Act status	FFG Act status	State Advisory List	Habitats of value within the study area	Survey results
Lewin's Rail		L	vu	Densely vegetated wetlands	Recorded
Baillon's Crake		L	vu	Densely vegetated wetlands	Not recorded
Eastern Great Egret		L	vu	Coastal zone in Western Port and freshwater wetlands	Recorded
White-bellied Sea-Eagle		L	vu	Coastal zone in Western Port and freshwater wetlands	Not recorded
Swamp Skink		L	vu	Coastal Saltmarsh, damp woodlands and heathlands, Swamp Scrub, Estuarine Scrub	Not recorded
White-footed Dunnart		L	nt	Healthlands and heathy woodlands	Not recorded
Southern Toadlet			v	Low-lying damp areas including in woodlands	Survey season not appropriate for detection of this species
Glossy Grass Skink			nt	Damp areas with dense vegetation such as drainage lines and soaks. The fringes of coastal saltmarshes.	Not recorded
Latham's Snipe			nt	Grassy wetlands, Aquatic Herbland	Not recorded
Common Long-necked Turtle			dd	Natural and man-made waterbodies	Recorded

Notes to table:

EPBC Act:

CR - Critically Endangered
 EN - Endangered
 VU – Vulnerable

State Advisory List (Flora):

e - endangered
 v - vulnerable
 r - rare
 k - poorly known

FFG Act:

L - listed as threatened under FFG Act
 P - protected under the FFG Act (public land only)

State Advisory List (Fauna):

ex - extinct
 cr - critically endangered
 en - endangered
 vu - vulnerable
 nt - near threatened
 dd - data deficient
 rx - regionally extinct

4.3.2 Targeted survey results

The following provides a brief outline of species that were the focus of targeted surveys in the current survey. For each species the status code under the EPBC Act, FFG Act or the State Advisory List is provided in brackets.

Flora

- Dense Leek-orchid (VU, e) was not recorded during the current survey. The species typically occupies heathy vegetation. It is strongly dependant on an appropriate fire regime to stimulate growth of above ground parts. It typically flowers prolifically in spring following fire and then to a lesser extent in a small number of successive seasons. Given the absence of fire for several years from the heathy vegetation surveyed, it is not unexpected that this species was not detected. The vegetation can be regarded as providing optimal habitat for this species, and while this species was not recorded during the targeted surveys, the absence of individuals during the survey does not preclude its presence in the study area. The nearest records of this species are from Crib Point where several plants have been recorded. Following targeted surveys in areas of most suitable habitat, we consider there to be medium likelihood that Dense Leek-orchid inhabits part of the study area.
- Green-striped Greenhood (VU, L, v) was not recorded during the current survey. The species occupies a range of mostly forest and woodland vegetation types. The targeted surveys commenced towards the end of the flowering seasons for this species. Areas of Damp Heathy Woodland and some other vegetation can be regarded as suitable habitat. The nearest records are attributed to French Island although they have poor spatial accuracy. The fruiting material of a number of plants identified in the broader species group (*Pterostylis longifolia*) was observed in parts of the Heathy Woodland in BlueScope. The material was insufficient for an accurate determination of the species. We consider it possible that Green-striped Greenhood inhabits parts of the study area and survey is required at the appropriate time of year to determine this.
- River Swamp Wallaby-grass (VU) was recorded in a number of wetland areas within BlueScope including farm dams, open areas of Swamp Scrub and larger patches of Wetland Formation. This species was recorded by Biosis during surveys in BlueScope in 2014, but has otherwise been seldom recorded on the Mornington Peninsula.
- Purple Eyebright (EN, L, e) was not recorded during the current survey. The nearest record of this species is from approximately 10 km to the west where it was recorded in 1986. The majority of records for this species on the peninsula are from Greens Bush and Arthurs Seat. There are several areas of heathy and grassy vegetation within the study area where this species could be expected to occur. However, it is more readily detected following fire or other disturbance resulting in open, sun-lit vegetation (Murphy and Downe 2006). Most areas of native vegetation within the study area have not been subject to such disturbance for some time. The resulting closed structure of the vegetation prevents the detectability of this species. Following targeted surveys in areas of most suitable habitat, we consider it unlikely that Purple Eyebright inhabits the study area.
- Clover Glycine (VU, L, v) was not recorded during the current survey. It typically occupies grassy vegetation including grassland, grassy woodland and grassy forest (DoE 2014). Areas of Grassy Woodland within the study area are the most likely areas where this species would occur. In the absence of flowers it is easily overlooked due to its size and as it tends to grow amongst grass tussocks and other herbaceous plants. The closest record of this species (2009) occurs on the northwest corner of French Island. Following targeted surveys in areas of most suitable habitat, we consider it unlikely that Clover Glycine inhabits the study area.
- Matted Flax-lily (EN, L, e) was not recorded during the current survey. The species typically occupies grassy woodland vegetation. Plants can be difficult to detect amongst other graminoids and when

not flowering. Survey was undertaken during suitable conditions and at the appropriate time of year. The nearest records of this species are from VicTrack rail land in Clyde to the north of the study area, where they occur in Grassy Woodland. There are no historical records within the Hastings or Tyabb areas. Following targeted surveys in areas of most suitable habitat, we consider there to be low likelihood that Matted Flax-lily inhabits part of the study area.

- Swamp Everlasting (VU, L, v) was not recorded during the current survey. The species typically occupies grassy wetland areas, which are present within the study area. It is a relatively large herb with persistent yellow bracts at the base of its flower-heads. It is conspicuous where present and unlikely to be overlooked, particularly when flowering. The nearest records of this species are from VicTrack rail land in Clyde to the north of the study area. There are no historical records within the Hastings or Tyabb areas. Following targeted surveys in areas of most suitable habitat, we consider it unlikely that Swamp Everlasting inhabits the study area.
- Swamp Fireweed (VU, v) was not recorded during the current survey. The species typically occupies wetland vegetation. It is a relatively large forb which is usually conspicuous where present, when wetlands are sufficiently watered. The nearest records of this species are from VicTrack rail land in Clyde to the north of the study area. There are no historical records within the Hastings or Tyabb areas. Following targeted surveys in areas of most suitable habitat, we consider it unlikely that Swamp Fireweed inhabits the study area.
- Purple Diuris (L, v) was not recorded during the current survey. The species typically occupies Grassy Woodland and the study area provides suitable habitat for this species. When flowering it has large conspicuous purple flowers that are unlikely to be overlooked during survey. The nearest record of this species is at Crib Point. It may be found under a suitable disturbance regime. In particular the absence of fire in recent years may be contributing to it not being detected within the study area. Other records occur in the west of the Mornington Peninsula around Mt Martha and further to the north at Langwarrin. Following targeted surveys in areas of most suitable habitat, we consider it unlikely that Purple Diuris inhabits part of the study area.

Fauna

- Southern Brown Bandicoot (EN, L, nt) was not detected with certainty during the present investigation. Camera surveys were the primary mechanism used to survey for this species. Active observation for bandicoot diggings was also undertaken. A possible observation of a single Southern Brown Bandicoot was made during active searching involving turning of metal debris from an old car close to the location of camera 17 (see Map A4a), although the animal was not captured and its identity could not be verified. All EVCs throughout the study area appear to be suitable for the species and it has been recorded from the local area near Yaringa in recent years. Following targeted surveys in areas of suitable habitat, we consider there is still a high likelihood that Southern Brown Bandicoots inhabit parts of the study area.
- Growling Grass Frog (VU, L, en) was not detected during the present investigation, although survey conditions were ideal and a variety of other frog species was recorded. Habitat was evaluated at 18 wetlands. All were farm dams and no natural freshwater wetlands suitable for the species exist within the study area. Ten wetlands were considered to offer potential habitat for Growling Grass Frog and were subject to nocturnal surveys entailing listening for characteristic calls of the species and the use of call playback and spotlight investigations. There are two old records of the species that appear to be from, or close to, the north of the study area, but few previous records from the local area generally. Following targeted surveys in areas of suitable habitat, we consider there is a low likelihood that Growling Grass Frogs inhabit the study area.

- New Holland Mouse (VU, L, vu) was not detected during the present investigation. Elliott trapping was used to survey for New Holland Mice. It was recorded during the 1970s and early 1980s from heathy vegetation communities near Hastings, apparently including from the study area. Seebeck & Menkhorst (2000) considered that it had become extinct on the Mornington Peninsula within the preceding 15 years and it has been documented to have become locally extinct at a number of other Victorian locations. Vegetation communities within the study area are appropriate but appear to be too long unburnt to be suitable for the species. Following targeted surveys in areas of suitable habitat, we consider there is a low likelihood that the New Holland Mouse inhabits the study area.
- Swamp Skink (L, vu) and Glossy Grass Skink (nt) were not detected during the present investigation. Elliott trapping and active searching were used to survey for these skinks. There are multiple records of both species from the Hastings area and damp portions of EVCs throughout the study area, including saltmarsh communities, are suitable for these species. Following targeted surveys in areas of suitable habitat, we consider there is a high likelihood that both species inhabit the study area.
- Lace Monitor (vu) was not detected during the present investigation. Active searching in woodland EVCs was the primary survey technique for this species. There are very few records of the species from Mornington Peninsula or the former Koo-wee-rup Swamp catchment of Western Port. Whilst woodland communities within the study area appear suitable for Lace Monitors, the species may be naturally absent from the local area or now exist there at a very low density. Following surveys in areas of suitable habitat, we consider there is a low likelihood that Lace Monitors inhabit the study area.
- White-footed Dunnart (L, nt) was not detected during the present investigation. Camera surveys and Elliott trapping were used to survey for White-footed Dunnarts. All EVCs throughout the study area appear to be suitable, however it is possible that the long-unburnt advanced successional stage of the various vegetation communities does not meet the habitat requirements of the species. A population has been documented from the Somers, Crib Point and Stony Point area south of Hastings. The lack of previous records from the study area and its immediate vicinity may reflect a lack of survey effort. Following targeted surveys in areas of suitable habitat, we consider there is a medium likelihood that the White-footed Dunnart inhabits parts of the study area.
- Latham's Snipe (nt) was not detected during the present investigation however, Latham's Snipe are highly mobile and the area contains suitable habitat. Observations were made at multiple areas of low-lying pasture and in suitable vegetation around the margins of artificial wetlands. Following targeted surveys in areas of suitable habitat, we consider there is a high likelihood that this migratory species will occur in portions of the study area on occasions.

4.3.3 EPBC Act listed ecological communities

The study area contains two ecological communities listed under the EPBC Act: Subtropical and Temperate Coastal Saltmarsh, and Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains.

There are 43.4 ha of Subtropical and Temperate Coastal Saltmarsh (Figure A2 and Appendix D). This community is listed as vulnerable under the EPBC Act. The Coastal Saltmarsh ecological community corresponds with two EVCs that are limited to the coastal bioregions in Victoria (DSEWPac 2013a):

- EVC 9 Coastal Saltmarsh aggregate, and
- EVC 10 Estuarine Wetland.

EVC 9 is recognised to be an aggregate mapping unit that comprises a variety of shrubby to herbaceous to grassy/sedge vegetation.

The listed community within the study area is represented by a large contiguous patch around the tidal zone of Western Port's shoreline. There are few weed species in Victoria that succeed in saltmarsh vegetation and the examples within the study area are largely free of weeds. Due to their condition and size, areas of the EVCs Coastal Saltmarsh and Estuarine Wetland mapped in the study area have been used to determine the boundaries of the EPBC Act listed community Subtropical and Temperate Coastal Saltmarsh.

There are 3 ha of Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains (hereafter referred to as Seasonal Herbaceous Wetlands) in the study area located south of Denham Road within the BlueScope property (Figure A2). This community is listed as critically endangered under the EPBC Act. The ecological community corresponds with the EVC 125 Plains Grassy Wetland, parts of EVC 74 Wetland Formation and EVC 653 Aquatic Herbland.

Seasonal Herbaceous Wetlands are temporary freshwater wetlands that are inundated on a seasonal basis, typically filling after winter-spring rains, and then drying out. The vegetation is generally treeless and dominated by a herbaceous ground layer, often with a considerable graminoid component and with forbs present. The herbaceous species present are characteristic of wetter locations and are typically absent or uncommon in any adjoining dryland grasslands and woodlands (DSEWPac 2012).

Modifications to other types of wetland may result in the ecological community being present where it was formerly absent. These modified wetland sites are included as part of the national ecological community, if they remain a functional natural wetland and conform to the description of the ecological community.

The definition of the ecological community excludes the mapped EVC 135 Sedge Wetland.

4.3.4 FFG Act listed community

The areas of Seasonal Herbaceous Wetlands that occur within the study area would also meet the definition of the FFG Act listed community Herb-rich Plains Grassy Wetland (West Gippsland). This community typically occurs in shallow seasonal wetlands that fill in winter and spring and are dry by summer. Some may retain water for longer periods, but typically only have surface water for up to six months. The community contains a rich plant association of grasses, sedges and aquatic herbs.

This community is characterized by a strong zonation pattern from emergent sedges, grasses and amphibious herbs in the fringing/littoral zone, through to deeper water dominated by submergent species together with a few sedges. Within the study area species typical of the fringing zone, and subject to shallow inundation, include Common Tussock-grass (*Poa labillardierei*) and Common Spike-sedge (*Eleocharis acuta*). This zone also supports a suite of other species including Joint-leaf Rush (*Juncus holoschoenus*), Running Marsh-flower (*Villarsia reniformis*), Prickfoot (*Eryngium vesiculosum*), Floating Club-sedge (*Isolepis fluitans*), Small Loosestrife (*Lythrum hyssopifolia*), Poison Lobelia (*Lobelia pratoides*) and Small Spike-sedge (*Eleocharis pusilla*). The fringing zone may include Swamp Daisy (*Allitia cardiocarpa*). The central zone, when inundated, is dominated by Common Spike Sedge (*Eleocharis acuta*) in association with Australian Sweet-grass (*Glyceria australis*) and/or swamp wallaby grasses (*Amphibromus nervosus* and *A. fluitans*). Other plants that may be abundant in this zone include Water Purslane (*Neopaxia australasica*), Running Marsh-flower, Soft Twig-sedge (*Baumea arthropphylla*), pondweeds *Potamogeton* spp., Water Ribbons (*Triglochin procerum*), Buttercup (*Ranunculus* spp.) and Water-milfoil (*Myriophyllum* spp.).

Shrubs, where present, tend to be sparse and only on the fringe of the community. These may include Blackwood (*Acacia melanoxylon*), Swamp Paperbark (*Melaleuca ericifolia*) and Prickly Tea-tree (*Leptospermum continentale*).

4.4 Habitat hectares

The extent of native vegetation patches and the number of scattered trees were mapped within the study area (Figure A2) and the condition was assessed using standard methods provided by DSE (2004). The condition of native vegetation was assessed using the DSE Vegetation Quality Assessment Sheet (DSE 2004) and pre-determined EVC benchmarks.

Areas of uniform quality for each EVC within the patches are termed 'habitat zones' and are assessed separately. The condition score of the habitat zone is multiplied by the extent of the zone to give a value in Habitat hectares.

A total of 22 habitat zones were identified during surveys with a total of 258.7 habitat hectares recorded. The results of the condition assessment are provided in Table 4, with the number of habitat hectares in each habitat zone. The habitat zone identification numbers for each patch of vegetation are illustrated in Figure A2.

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

EVC #: Name	EVC 3: Damp Sands Herb-rich Woodland				EVC 9: Coastal Saltmarsh		EVC 10: Estuarine Wetland		EVC 48: Heathy Woodland		EVC 53: Swamp Scrub		EVC 74: Wetland Formation / EVC 136: Sedge Wetland		EVC 83: Swampy Riparian Woodland		EVC 125: Plains Grassy Wetland		EVC 140: Mangrove Shrubland		EVC 175: Grassy Woodland		EVC 653: Aquatic Herland		EVC 710: Damp Heathland		EVC 793: Damp Heathy Woodland		EVC 953: Estuarine Scrub		EVC 973: Swampy Woodland		Totals	
	1	2	7	16	18	5	11	12	15	17	19	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score		
Habitat Zone ID # (Figure A2)	Max. score	10	10	10	10	-	-	-	-	-	-	4	-	-	-	3	-	-	-	-	-	10	3	-	-	-	10	10	-	4	-	-	-	
		5	5	3	-	-	5	3	3	-	-	3	3	-	-	-	-	-	-	-	-	3	3	-	-	-	5	5	3	3	-	-	-	
	15	2	11	11	11	15	7	11	11	7	11	11	7	7	11	11	11	11	5	5	15	13	7	7	11	11	11	11	13	11	7	7	-	
	25	20	20	15	25	20	20	15	20	20	15	20	20	20	15	20	15	20	25	25	20	15	15	15	20	25	15	25	15	15	15	15	-	
	10	10	10	6	6	10	10	10	10	6	5	5	6	5	6	10	6	10	10	10	6	6	6	10	10	10	6	10	6	10	6	-		
	5	5	5	3	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	3	4	5	5	-		
	5	3	5	5	-	5	4	-	-	-	3	3	-	-	-	-	4	-	-	-	-	5	4	-	-	-	5	5	5	5	5	-	-	
	Site Condition	Total Site Score	55	66	59	45	42	70	49	44	49	46	46	42	45	68	49	33	44	71	61	55	52	33	33	33	71	61	55	52	33	33	33	-
		EVC Standardiser (x 75/55)	1	1	1	1.37	1.37	1	1	1.25	1.25	1.37	1	1.37	1.37	1	1	1.37	1.37	1.37	1.36	1	1.37	1	1.16	1	1	1	1.16	1	1.37	1	-	
		Adjusted Site Score	55	66	59	62	58	70	49	55	61	62	46	58	62	68	49	45	60	71	61	64	52	45	45	60	71	61	64	52	45	45	-	
Patch Size		10	8	8	8	8	8	8	8	4	8	8	8	1	8	1	8	4	8	8	8	8	8	8	8	8	8	8	8	8	4	4	-	
Landscape Value	Neighbourhood	10	3	5	6	5	3	5	5	4	5	5	8	5	1	5	4	5	5	5	4	4	4	4	5	5	5	5	5	4	4	4	-	
	Distance to Core	5	4	4	4	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-		
	Total Landscape Score	15	17	17	18	17	16	17	17	12	17	17	17	13	17	7	17	12	17	17	17	12	17	12	17	17	17	17	17	12	12	12	-	
HABITAT SCORE		70	83	76	80	76	86	72	73	76	63	63	71	79	75	66	57	77	88	78	81	69	57	57	57	88	78	81	69	57	57	57	-	
Habitat points = #/100		1	0.7	0.83	0.76	0.8	0.86	0.72	0.73	0.76	0.63	0.63	0.71	0.79	0.75	0.66	0.57	0.77	0.88	0.78	0.81	0.69	0.57	0.57	0.77	0.88	0.78	0.81	0.69	0.57	0.57	0.57	-	
Habitat Zone area (ha)		6.6	52.4	3.6	39.3	4.1	14	21.8	8.8	0.2	10.4	1.8	1.1	33.3	19.9	13.4	0.4	9.1	27.7	24.2	34.3	2.9	0.7	330	27.7	24.2	34.3	2.9	0.7	330	330	330	-	
Habitat hectares (Hha)		4.6	43.5	2.7	31.4	3.1	12	14.4	6.3	0.2	7.9	1.1	0.8	26.3	14.9	8.8	0.2	7	24.4	18.9	27.8	2	0.4	258.7	24.4	18.9	27.8	2	0.4	258.7	258.7	258.7	-	

4.5 Other ecological values

4.5.1 Western Port Ramsar wetland

In 1982, a large portion of Western Port was designated as a wetland of international importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). The site consists of large shallow intertidal areas and a narrow strip of adjacent coastal land within parts of Western Port.

The Ramsar wetland is recognised for its diversity of native flora and fauna, particularly for its ability to support diverse assemblages of waterbirds and wetland vegetation, including seagrass, saltmarsh and mangroves. Australia is obliged to manage Ramsar wetlands so as to maintain their ecological character, remain informed of any changes to their character, and notify the Ramsar Secretariat of any changes at the earliest opportunity.

The saltmarsh and mangrove communities of the study area and some adjacent coastal areas are located within the boundary of the Western Port Ramsar wetland (Figure A2) and adjacent to the site. Therefore assessment and efforts to minimise adverse impacts of the Project on the character of the Ramsar wetland would be required.

4.5.2 Locally or regionally significant flora species

A small number of species that were recorded during this assessment, whilst not considered state or nationally threatened, are notable for being uncommon locally or within the Port Philip and Western Port region, or for having biogeographic interest:

- *Allocasuarina paradoxa* Green Sheoke is a Victorian and South Australian species with disjunct sub-arid and coastal humid populations. Damp Heathland within BlueScope provides suitable habitat for this species. While it is well reserved to the north of Mornington Peninsula and on French Island, it is poorly represented on the peninsula.
- *Cassinia trinerva* Three-veined Cassinia is a species of ranges in the southern Great Dividing Range, Strzelecki Ranges and East Gippsland. It was recorded in a drainage line within the study area and extends the western most limit of its distribution within Victoria.
- *Entolasia stricta* Upright Panic is a sparsely distributed and largely coastal species. It is represented in the Western Port area by only a small number of records, mainly on the eastern side of the bay. Where recorded it forms spreading patches in peaty soils.
- *Eryngium vesiculosum* Prickfoot is a herbaceous species which typically grows in grassy wet areas on heavy clay soils. These habitats are more common around Melbourne to the north of the study area and on the coastal and basalt plains of western Victoria. There are very few records of this species on the Mornington Peninsula and Western Port area where its habitat is restricted to small isolated occurrences.
- *Leptoceras menziesii* Hare Orchid is represented by a small number of records on the Mornington Peninsula and Western Port, of which some are more than 20 years old. It was recorded within BlueScope land during the current assessment where a population of many individuals was found. This species typically flowers prolifically following fire.
- *Orthoceras strictum* Horned Orchid is sparsely distributed on the Mornington Peninsula and Westernport Bay areas. There are 10 existing records of which the most recent is from 2003 on French Island; all other records are more than 20 years old. The record taken during the current assessment

provides important information about a previously unreported population on the peninsula. It was recorded on disturbed soil and adjacent to saltmarsh vegetation.

- *Pultenaea daphnoides* Large-leaf Bush-pea was recorded on a levee to the east of the BlueScope plant site. This species is relatively common on French Island and Arthurs Seat, although otherwise uncommon on the Mornington Peninsula.
- *Thelymitra juncifolia* Rush-leaf Sun-orchid was recorded within BlueScope land. There are a small number of other records of this orchid on the Mornington Peninsula and several on French Island. The records from this assessment add to existing records at Crib Point for the broader Hastings area.
- *Xanthosia huegelii* Heath Xanthosia is distributed along the southern coast of the mainland. It is represented by only two records in the Port Phillip and Western Port areas.

The abovementioned species are worthy of planning consideration as the study area provides regionally important and high quality habitat for their ongoing persistence. These species whilst not listed under the EPBC Act or the FFG Act may need to be considered for a planning permit.

4.5.3 NaturePrint and Strategic Biodiversity Score

Within this flora and fauna assessment the values of the study area are assessed for their biodiversity values against standard criteria. These include the presence of listed species or communities that have statutory planning weight. Relevant State and Commonwealth government authorities also use other criteria to assess biodiversity value. A statewide assessment of biodiversity values, threatening processes and ecosystem function has been modelled and mapped for all parts of Victoria. The resulting product NaturePrint (<http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/natureprint>) considers threatened species habitat, vegetation condition and a range of other biodiversity variables to indicate the relative importance of a site in Victoria, compared to all other areas of the State. Its intent is to provide quantification of these values for strategic planning and assessment against other project values.

The majority of land within BlueScope is ranked as the second highest category of contribution to natural values in Victoria in NaturePrint. Many areas fringing the shoreline have the highest possible contribution for the state. Areas of native vegetation further inland fragmented by agricultural uses have moderate to low contribution, although most areas within the study area make some contribution to the state's biodiversity. A subset of variables from NaturePrint are used for Victoria's Strategic Biodiversity Map, which is another model explaining biodiversity importance, although more heavily weighted towards threatened species presence and habitat. The Strategic Biodiversity Score (a score between 0 and 1) requires consideration under all Victorian planning schemes where removal of native vegetation is proposed. The score from this model gives a similar view of the value of native vegetation within the study area. Within this model BlueScope and its surrounds have a score of >0.8 while more fragmented areas of the landscape have a score between 0.2 and 0.6.

NaturePrint provides a summary of the interaction of values and processes that are associated with an area of native vegetation. The terms of ecological and spatial values used in the model are complex and combine the richness of the vegetation, the size of patches, their connectivity in the landscape, their capacity to support significant species and their rarity within Victoria, amongst other things. The larger blocks of native vegetation within the study area have been modelled as significant within the State, or as having high strategic biodiversity value. Observations from the current field assessments endorse the output from these models.

The vegetation within BlueScope and other larger blocks are relatively intact examples of their constituent ecosystems. Their ranking is considered with regard to previous land use disturbance, present surrounding land use and a number of ecological considerations. Generally the vegetation types assessed have low

fertility and, for their area, have high plant species diversity. All but the immediate coastal fringe vegetation has a regeneration cycle which is fire driven. The capacity for fire of appropriate frequency and intensity to further improve the ecological value of the native vegetation is noted in the current assessment of biodiversity values.

The intact nature of the ecological communities in the study area and the absence of large-scale adverse disturbance processes make them resilient to natural disturbance and encroachment of introduced plant and animals. It is probable that past disturbance of the broader surrounding landscape may have caused the decline or loss of some fauna species (e.g. Southern Brown Bandicoot, Brown 2010) within BlueScope. However, high densities of some other native mammals, good bird diversity and presence of a range of habitat types indicate the persistence of other important ecological processes that are not retained in surrounding agricultural areas. Restricted access into BlueScope and some other areas of the study area has resulted in these areas showing few signs of disease such as tree dieback or fungal infections that lead to broad scale impacts on vegetation.

The BlueScope property and the adjoining areas of coastal vegetation within the study area can be regarded as one of the most important sites for biodiversity in the Port Phillip and Western Port area. Despite its much smaller area, the diversity of its vegetation types is comparable with that of French Island. It provides an important western range limit of the Western Port Biosphere including examples of communities that extend across French Island to other significant blocks that fringe the Biosphere; within the inlets of KooWeeRup Swamp, Holden Proving Ground, Grantville, and Adams Creek Nature Conservation Reserve.

4.6 Implications under State and Commonwealth Legislation

4.6.1 EPBC Act

The flora and fauna assessment results show that MNES listed under the EPBC Act exist or may sometimes utilise the habitats within the study area. These include listed threatened flora and fauna species, two ecological communities, listed migratory species (DEWHA 2009c) and the Western Port wetland of international importance (Ramsar).

The Project would therefore need to be referred under the EPBC Act to the Minister for Environment for a decision on whether the Project has the potential to impact MNES, and therefore constitute a controlled action. The Authority is anticipating that the Project will be declared a controlled action, as it is being proposed within a Ramsar wetland and is likely to substantially modify an area of the wetland among other terrestrial MNES.

The EPBC Act offset policy (DSEWPac 2013b) prescribes offsets as mitigation for residual impacts on MNES following actions to avoid or minimise impacts, and therefore offsets are likely to be required for the Project. It is recommended that calculations of likely offsets to be required to compensate for vegetation clearing as a result of the Project are made at an early stage, to ascertain whether offsets for the scale of impacts on a large area of high biodiversity values would be realistically achievable.

4.6.2 FFG Act

One FFG Act listed community, Herb-rich Plains Grassy Wetland (West Gippsland) has been identified within BlueScope in addition to listed fauna species. A permit under the FFG Act would therefore be required with respect to the Crown land parcels. A permit is generally not required for private land.

4.6.3 CaLP Act

Declared noxious weeds and established pest animals listed under the CaLP Act identified in the study area during the survey are listed in Appendices B (flora) and C (fauna). The 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.

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

One of the Applicable Approvals relevant to biodiversity that may be sought for the Project under the MTPF Act includes a planning scheme amendment under the *Planning and Environment Act 1987*.

In addition, Clause 52.17 (Native Vegetation) requires a planning permit to remove, destroy or lop native vegetation including some dead native vegetation. Under Clause 66.02 a permit application to remove, destroy or lop native vegetation is required to be referred to DELWP as a recommending referral authority if any of the following apply:

- the area of native vegetation to be removed is greater than 0.5 hectares
- the class of application is on the high risk-based pathway
- a property vegetation precinct plan applies to the site or
- the native vegetation is on Crown land occupied or managed by the Responsible Authority.

This assessment has identified approximately 330 ha of native vegetation within the study area. Due to the likely scale of the Project, it is considered that a permit under the Act would be required to remove native vegetation.

4.6.5 State Advisory list of rare or threatened species

For any proposal to remove native vegetation from the study area, habitat for one or more state threatened species is likely to be impacted. If the impact to that species at state level exceeds certain thresholds a 'specific offset' would be required in addition to 'general offsets' (refer Appendix E).

5. Conclusion

5.1 Key biodiversity values

Key ecological values identified within the study area are as follows:

- approximately 330 ha of native vegetation including large, high quality, intact patches of woodland, and coastal EVCs, scattered remnant trees, and regionally significant coastal-inland ecosystem gradients
- shallow intertidal habitats, mangroves, saltmarsh and adjacent coastal land which form a significant component of the internationally important Western Port Ramsar wetland
- approximately 43.4 ha of the EPBC Act listed ecological community: Subtropical and Temperate Coastal Saltmarsh and approximately 3 ha of the EPBC Act listed community: Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains
- a population of the EPBC Act listed flora species River Swamp Wallaby-grass (*Amphibromus fluitans*), twelve State Advisory List species and three FFG Act listed fauna species
- potential presence of additional EPBC Act, State Advisory List and FFG Act listed species and suitable habitats for them.

The highest value areas of native vegetation are the large, high quality, intact areas of woodland and coastal saltmarsh vegetation located in the northern and eastern parts of BlueScope as well as heathy woodland in the Gordon Rolfe Reserve. The contiguous woodland and estuarine scrub vegetation within BlueScope grades into extensive saltmarsh and mangrove habitats of Western Port which also form a significant part of ecological character of the Western Port Ramsar wetland.

This occurrence of a large intact area of native vegetation is rare on the Mornington Peninsula and provides habitat to a diverse range of flora and fauna, which is otherwise absent from parts of the Peninsula. This significance is also reflected in NaturePrint which ranks the majority of land within BlueScope in the second highest category of contribution to natural values in Victoria. Many areas fringing the shoreline have the highest possible contribution for the state.

The results of the assessment of native vegetation condition indicate that patches are in relatively high condition with a total of 258 habitat hectares calculated from the study area.

Cryptic and disturbance adapted species such as some of the listed orchid species were not recorded during the current study, however, habitat within the study area is suitable for these species and their presence cannot be discounted due to a long absence of fire from the study area.

5.2 Avoidance and minimisation of biodiversity impacts

The largest patches of native vegetation and those that are contiguous with other such patches both within the study area and beyond it offer the most significant flora and fauna values. Loss or fragmentation of such areas is likely to be detrimental to the species and ecosystems they support.

As a general principle, impacts on MNES (as defined under the EPBC Act) should firstly be avoided, then minimised and this must be demonstrated through the approval process. Residual adverse impacts that cannot be avoided must be offset in accordance with the EPBC Act Environmental Offsets Policy (DSEWPac 2013b). Biosis (2013b) provided an overview of the EPBC Act Offsets Policy as it may relate to the Project.

Similarly, the objective of Victoria's Biodiversity Assessment Guidelines is to achieve "*no net loss in the contribution made by native vegetation to Victoria's biodiversity*" and requires the implementation of key strategies as follows:

- 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.

5.3 Considerations for project design

The intention of this report is to document existing biodiversity values within the area assessed. At the time of preparation of this report a detailed port design is not available and an impact assessment is therefore not feasible. Nonetheless, planning for project infrastructure layout should give consideration to:

- design options which avoid or minimise direct or indirect impacts on the Western Port Ramsar site including its foreshore habitats
- design options that avoid or minimise removal of remnant native vegetation and scattered native trees, particularly larger areas of intact vegetation such as those within BlueScope Steel land, by locating infrastructure in previously cleared land or predominantly non-native vegetation (e.g. existing transport corridors, urban areas and non-native agricultural areas)
- design options that avoid fragmentation of native vegetation patches, and avoid severance of important vegetation and habitat linkages
- the potential challenges and costs associated with locating and securing sufficient offsets for biodiversity assets that cannot be protected on-site (as required to comply with relevant State and Commonwealth offset policies).

5.4 Further surveys

The surveys reported here were undertaken in a season not suitable for detection of all target species. Further surveys are recommended for detection of Southern Toadlet in autumn, Orange-bellied Parrot between April and September inclusive, and Green-striped Greenhood during August to early September.

The survey reported here is one of a number of field investigations planned to be undertaken for the project. Other investigations not yet undertaken include assessment of the biodiversity values of the balance of land within SUZ1 and the waterbirds of Western Port. These further studies may provide information that further refines understanding of aspects covered by the present report.

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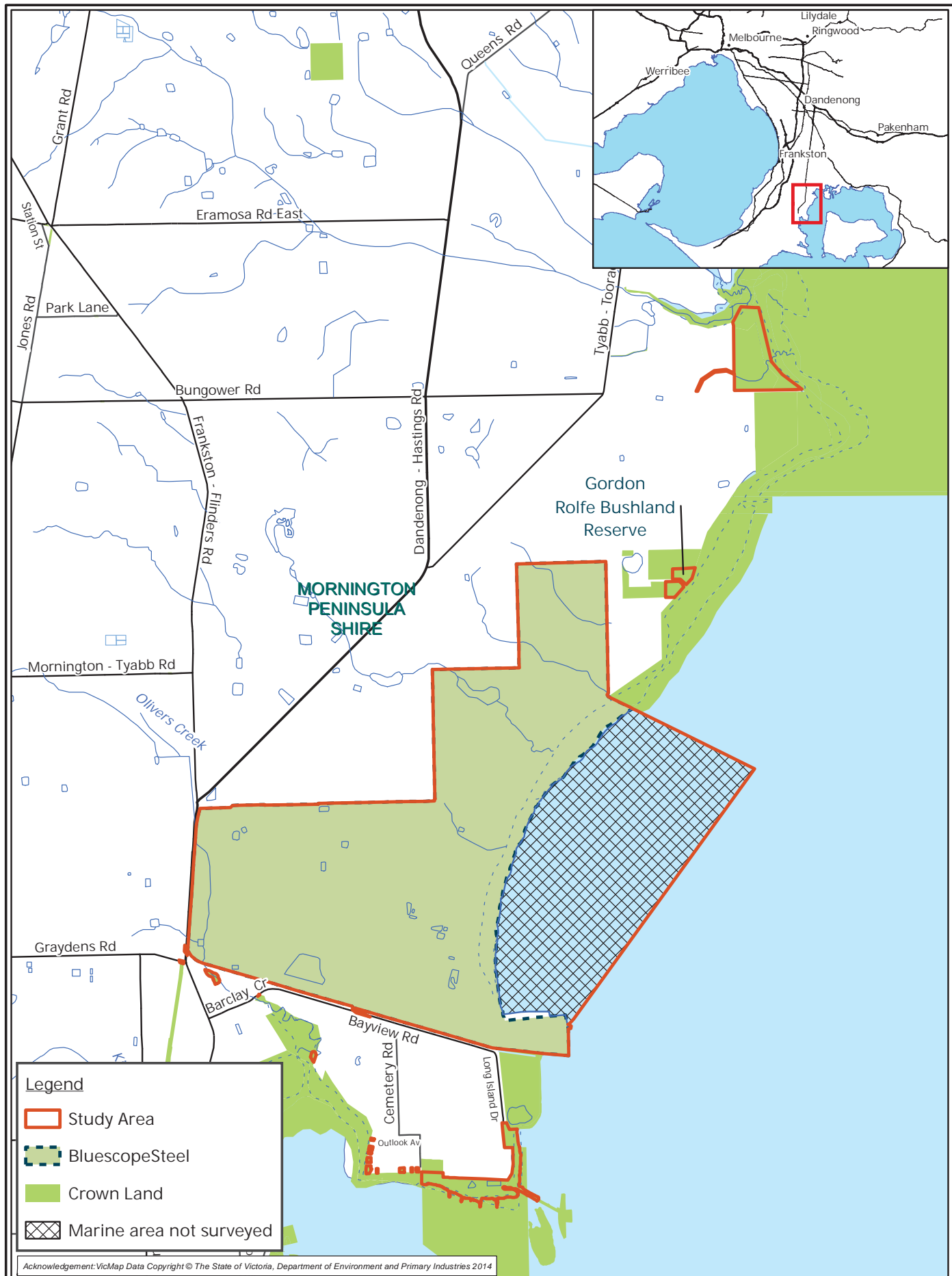
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Appendix A. Figures

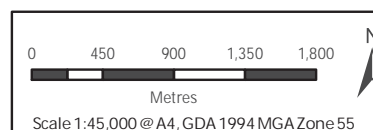
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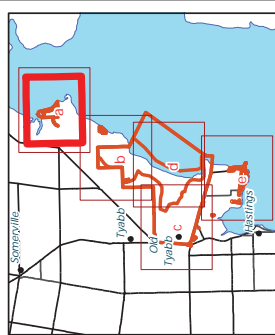


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Figure A1: Location of the Study Area - Hastings, Victoria

Matter: 19075,
Date: 25 February 2015,
Checked by: KJK, SGM, Drawn by: SKM, Last edited by: jshepherd
Location: P:\19000s\19075\Mapping\19075_A1_Locality.mxd





- Legend**
- Study area
 - RAMSAR boundary
 - Scattered trees
- Ecological Vegetation Class**
- 3 Damp Sands Herb-rich Woodland
 - 9 Coastal Saltmarsh
 - 48 Heathy Woodland
 - 53 Swamp Scrub
 - 140 Mangrove Shrubland
 - 175 Grassy Woodland
 - 953 Estuarine Scrub

Note: EVCs are labelled on map with Habitat Zone ID ("HZ#")

Figure A2a: Ecological Features of the study area



Scale: 1:10,000 @ A3

Coordinate System: WGS 1984 Web Mercator Auxiliary

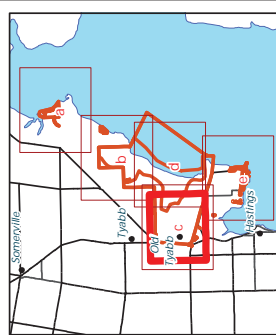


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Matter: 19075,
Date: 27 February 2015,
Location ID: 1900000119075 Map (v1)
19075-A2-EVCs



Acknowledgements: Imagery: Near Map 2014, VicMap Data. Copyright: © The State of Victoria, Department of Environment and Primary Industries 2014



Legend

Study area

RAMSAR boundary

Scattered trees

Ecological Vegetation Class

3 Damp Sands Herb-rich Woodland

48 Heathy Woodland

53 Swamp Scrub

175 Grassy Woodland

937 Swampy Woodland

Note: EVCs are labelled on map with Habitat Zone ID ("HZ#")

Figure A2c: Ecological Features of the study area



Scale: 1:10,000 @ A3

Coordinate System: WGS 1984 Web Mercator



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Mahrer, 19075

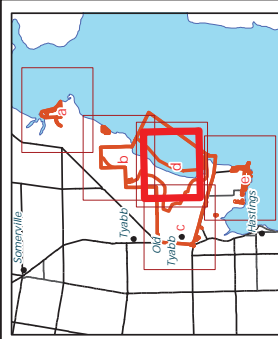
Date: 27 February 2015

Location ID: 190000119075 Mapping

19075-A2-EVCs



Aerial imagery: Imagery: Aerial Map 2014, Vector Map 2014, Vector Data: Copyright: © The State of Victoria, Department of Environment and Primary Industries 2014



Legend

- Study area
- RAMSAR boundary

- EPBC Act Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains / FFG Act Herb-rich Plains Grassy Wetland (West Gippsland)

- Significant Flora Species
- Amphibromus fluitans

- Scattered trees

- Ecological Vegetation Class

- 3 Damp Sands Herb-rich Woodland

- 9 Coastal Saltmarsh

- 10 Estuarine Wetland

- 48 Healthy Woodland

- 53 Swamp Scrub

- 74 Wetland Formation

- 125 Plains Grassy Wetland

- 136 Sedge Wetland

- 140 Mangrove Shrubland

- 175 Grassy Woodland

- 653 Aquatic Hermland

- 793 Damp Heathy Woodland

- 937 Swampy Woodland

- 953 Estuarine Scrub

Note: EVCs are labelled on map with Habitat Zone ID ("HZ#")

Figure A2d: Ecological Features of the study area



Metres

Scale: 1:10,000 @ A3

Coordinate System: WGS 1984 Web Mercator Auxiliary

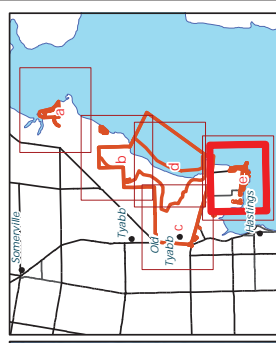


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Mather: 19075
Date: 27 February 2015
Drawn by: SKM
Location ID: 1900001 19075 Mapping
19075-A2-EVCs



Aerial imagery: Imagery: Map Map 2014, Vector Data: Copyright: © The State of Victoria, Department of Environment and Primary Industries 2014



Legend

Study area

RAMSAR boundary

Significant Flora Species

Limnium australe

Ecological Vegetation Class

3 Damp Sands Herb-rich Woodland

9 Coastal Saltmarsh

10 Estuarine Wetland

53 Swamp Scrub

140 Mangrove Shrubland

175 Grassy Woodland

937 Swampy Woodland

953 Estuarine Scrub

Note: EVCs are labelled on map with Habitat Zone ID ("HZ#")

Figure A2e: Ecological Features of the study area



Metres

Scale: 1:10,000 @ A3

Coordinate System: WGS 1984 Web Mercator Auxiliary



Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne,
Sydney, Wangaratta & Wollongong

Matter: 19075,
Date: 27 February 2015,
Location ID: 190000119075 Mapping
19075-A2-EVCs



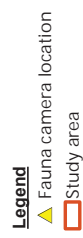


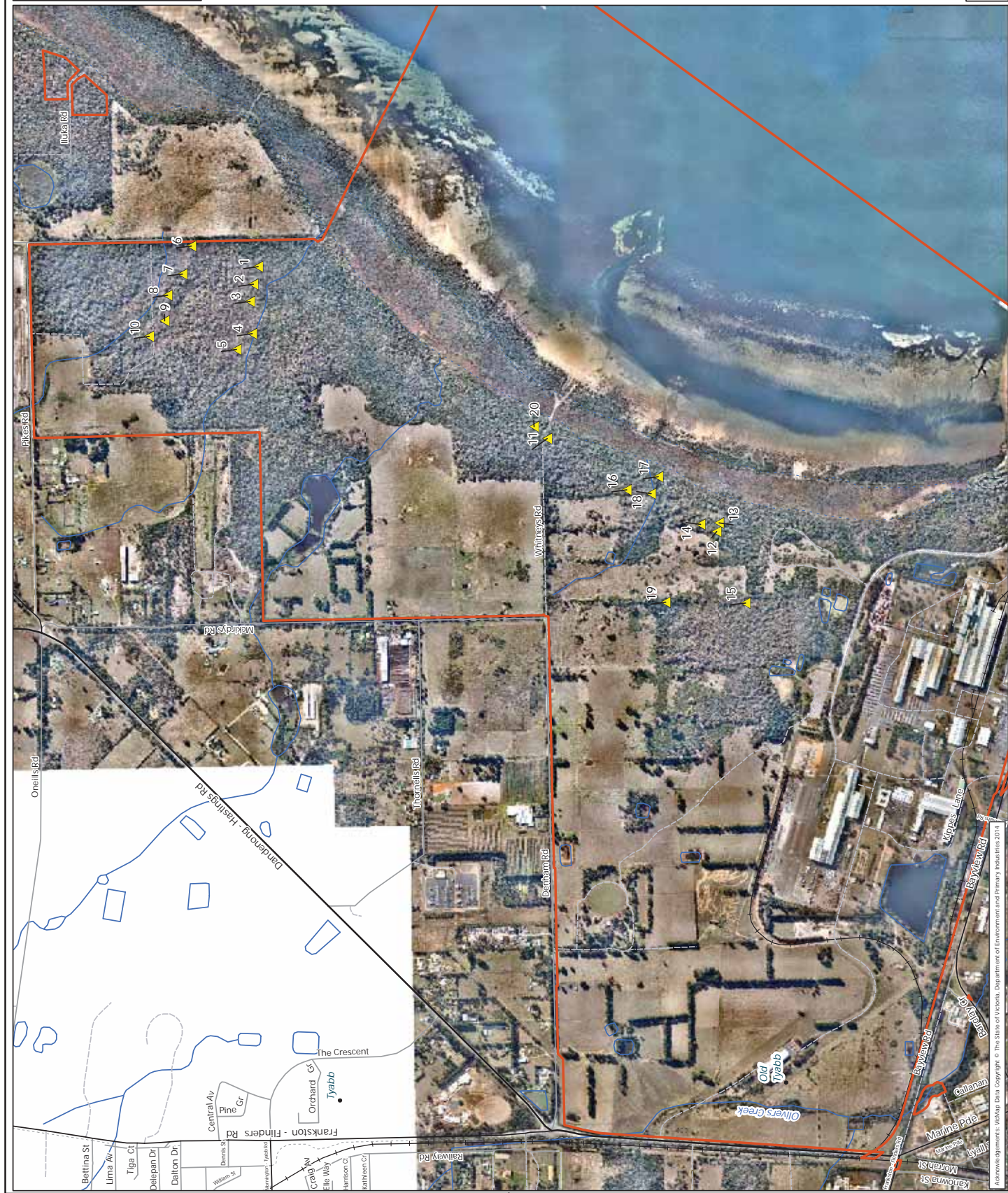
Figure A3a: Fauna Survey Locations, cameras



Metres
Scale: 1:15,000 @ A3

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

Matter: 19075/19076.
Date: 25 February 2015
Checked by: IS, Drawn by: [redacted]
Location: P:\19000s\19075_A3a_Camera.jpg





Appendix B. Flora

Notes to tables:

EPBC Act: CR - Critically Endangered EN - Endangered VU – Vulnerable PMST – Protected Matters Search Tool	State Advisory List: e - endangered v - vulnerable r - rare k - poorly known
FFG Act: L - listed as threatened under FFG Act P - protected under the FFG Act (public land only)	
Noxious weed status: SP - State prohibited species RP - Regionally prohibited species RC - Regionally controlled species RR - Regionally restricted species	# - Native species outside natural range

B.1 Flora species recorded in the study area during the current survey

Table B.1. Flora species recorded from the study area

Status	Scientific Name	Common Name
	Indigenous Species	
	<i>Acacia mearnsii</i>	Black Wattle
	<i>Acacia melanoxylon</i>	Blackwood
	<i>Acacia oxycedrus</i>	Spike Wattle
	<i>Acacia paradoxa</i>	Hedge Wattle
	<i>Acacia pycnantha</i>	Golden Wattle
	<i>Acacia suaveolens</i>	Sweet Wattle
	<i>Acacia verticillata</i>	Prickly Moses
	<i>Acaena agnipila</i>	Hairy Sheep's Burr
	<i>Acaena echinata</i>	Sheep's Burr
	<i>Acaena novae-zelandiae</i>	Bidgee-widgee
	<i>Acianthus caudatus</i>	Mayfly Orchid
	<i>Acianthus pusillus</i>	Small Mosquito-orchid
	<i>Acrotriche serrulata</i>	Honey-pots
	<i>Alisma plantago-aquatica</i>	Water Plantain
	<i>Allittia cardiocarpa</i>	Swamp Daisy
	<i>Allocasuarina littoralis</i>	Black Sheoak
	<i>Allocasuarina paludosa</i>	Scrub Sheoak
	<i>Allocasuarina paradoxa</i>	Green Sheoak
	<i>Amperea xiphoclada</i> var. <i>xiphoclada</i>	Broom Spurge
	<i>Amphibromus archeri</i>	Pointed Swamp Wallaby-grass
VU	<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass
	<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass
	<i>Amyema pendula</i>	Drooping Mistletoe
	<i>Angianthus preissianus</i>	Salt Angianthus
	<i>Anthosachne scabra</i> s.s.	Common Wheat-grass
	<i>Aotus ericoides</i>	Common Aotus
	<i>Aphelia gracilis</i>	Slender Aphelia
	<i>Apium prostratum</i> subsp. <i>prostratum</i>	Sea Celery
	<i>Apodasmia brownii</i>	Coarse Twine-rush
	<i>Arthropodium strictum</i> s.s.	Chocolate Lily
	<i>Asperula conferta</i>	Common Woodruff
	<i>Astroloma humifusum</i>	Cranberry Heath
	<i>Atriplex cinerea</i>	Coast Saltbush
r	<i>Atriplex paludosa</i> subsp. <i>paludosa</i>	Marsh Saltbush
	<i>Austrostipa mollis</i>	Supple Spear-grass
	<i>Austrostipa pubinodis</i>	Tall Spear-grass
r	<i>Austrostipa rudis</i> subsp. <i>australis</i>	Veined Spear-grass
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	Veined Spear-grass
	<i>Austrostipa semibarbata</i>	Fibrous Spear-grass

Status	Scientific Name	Common Name
r	<i>Austrostipa stipoides</i>	Prickly Spear-grass
	<i>Avicennia marina</i> subsp. <i>australasica</i>	Grey Mangrove
	<i>Azolla filiculoides</i>	Pacific Azolla
	<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coast Banksia
	<i>Banksia marginata</i>	Silver Banksia
	<i>Baumea acuta</i>	Pale Twig-sedge
	<i>Baumea arthropphylla</i>	Fine Twig-sedge
	<i>Baumea gunnii</i>	Slender Twig-sedge
	<i>Baumea juncea</i>	Bare Twig-sedge
	<i>Baumea rubiginosa</i> s.s.	Soft Twig-sedge
	<i>Baumea tetragona</i>	Square Twig-sedge
	<i>Billardiera mutabilis</i>	Common Apple-berry
	<i>Blechnum cartilagineum</i>	Gristle Fern
	<i>Blechnum nudum</i>	Fishbone Water-fern
	<i>Bossiaea cinerea</i>	Showy Bossiaea
	<i>Bossiaea prostrata</i>	Creeping Bossiaea
	<i>Brunonia australis</i>	Blue Pincushion
	<i>Burchardia umbellata</i>	Milkmaids
	<i>Bursaria spinosa</i>	Sweet Bursaria
	<i>Caesia calliantha</i>	Blue Grass-lily
	<i>Caesia parviflora</i>	Pale Grass-lily
	<i>Caladenia carnea</i> s.s.	Pink Fingers
	<i>Caladenia pusilla</i>	Tiny Pink-fingers
	<i>Caladenia transitoria</i>	Eastern Bronzeshood Orchid
k	<i>Callistemon</i> spp.	Bottlebrush
	<i>Calochilus robertsonii</i> s.s.	Western Beard-orchid
	<i>Cardamine tenuifolia</i>	Slender Bitter-cress
	<i>Carex appressa</i>	Tall Sedge
	<i>Carex breviculmis</i>	Common Grass-sedge
	<i>Carex inversa</i>	Knob Sedge
	<i>Cassinia aculeata</i>	Common Cassinia
	<i>Cassinia arcuata</i>	Drooping Cassinia
	<i>Cassinia trinerva</i>	Three-nerved Cassinia
	<i>Cassytha glabella</i> f. <i>dispar</i>	Slender Dodder-laurel
	<i>Cassytha melantha</i>	Coarse Dodder-laurel
	<i>Cassytha pubescens</i> s.s.	Downy Dodder-laurel
	<i>Centella cordifolia</i>	Centella
	<i>Centipeda elatinoidea</i>	Elatine Sneezeweed
	<i>Centrolepis aristata</i>	Pointed Centrolepis
	<i>Centrolepis fascicularis</i>	Tufted Centrolepis
	<i>Centrolepis strigosa</i> subsp. <i>strigosa</i>	Hairy Centrolepis
	<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	Blue Stars
	<i>Chiloglottis valida</i>	Common Bird-orchid

Status	Scientific Name	Common Name
k	<i>Clematis decipiens</i>	Slender Clematis
	<i>Clematis microphylla</i> s.s.	Small-leaved Clematis
	<i>Comesperma volubile</i>	Love Creeper
	<i>Coprosma quadrifida</i>	Prickly Currant-bush
	<i>Coronidium scorpioides</i> s.s.	Button Everlasting
	<i>Correa reflexa</i>	Common Correa
	<i>Corybas</i> spp.	Helmet Orchid
	<i>Cotula australis</i>	Common Cotula
	<i>Craspedia paludicola</i>	Swamp Billy-buttons
	<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula
	<i>Crassula sieberiana</i> s.l.	Sieber Crassula
	<i>Cryptostylis subulata</i>	Large Tongue-orchid
	<i>Deyeuxia quadriseta</i>	Reed Bent-grass
	<i>Dianella admixta</i>	Black-anther Flax-lily
	<i>Dianella brevicaulis</i>	Small-flower Flax-lily
	<i>Dianella</i> sp. aff. <i>longifolia</i> (Benambra)	Arching Flax-lily
	<i>Dichondra repens</i>	Kidney-weed
	<i>Dillwynia cinerascens</i> s.s.	Grey Parrot-pea
	<i>Dillwynia glaberrima</i>	Smooth Parrot-pea
	<i>Dillwynia sericea</i>	Showy Parrot-pea
	<i>Disphyma crassifolium</i> subsp. <i>clavellatum</i>	Rounded Noon-flower
	<i>Distichlis distichophylla</i>	Australian Salt-grass
	<i>Diuris sulphurea</i>	Tiger Orchid
	<i>Drosera aberrans</i>	Scented Sundew
	<i>Drosera peltata</i> s.l.	Pale Sundew
	<i>Drosera pygmaea</i>	Tiny Sundew
	<i>Dysphania</i> spp.	Pigweed
	<i>Eleocharis acuta</i>	Common Spike-sedge
k	<i>Eleocharis pusilla</i>	Small Spike-sedge
	<i>Eleocharis sphacelata</i>	Tall Spike-sedge
	<i>Empodisma minus</i>	Spreading Rope-rush
	<i>Entolasia stricta</i>	Upright Panic
	<i>Epacris impressa</i>	Common Heath
	<i>Epilobium billardierianum</i>	Variable Willow-herb
	<i>Epilobium hirtigerum</i>	Hairy Willow-herb
	<i>Eragrostis brownii</i>	Common Love-grass
	<i>Eryngium vesiculosum</i>	Prickfoot
	<i>Eucalyptus ovata</i> var. <i>ovata</i>	Swamp Gum
	<i>Eucalyptus radiata</i> subsp. <i>radiata</i>	Narrow-leaf Peppermint
	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	Coast Manna-gum
	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	Manna Gum
	<i>Euchiton involucratu</i> s.l.	Common Cudweed
	<i>Euchiton japonicus</i> s.s.	Creeping Cudweed

Status	Scientific Name	Common Name
	<i>Euchiton sphaericus</i>	Annual Cudweed
	<i>Exocarpos cupressiformis</i>	Cherry Ballart
	<i>Exocarpos strictus</i>	Pale-fruit Ballart
	<i>Ficinia nodosa</i>	Knobby Club-sedge
	<i>Gahnia filum</i>	Chaffy Saw-sedge
	<i>Gahnia radula</i>	Thatch Saw-sedge
	<i>Gahnia trifida</i>	Coast Saw-sedge
	<i>Galium binifolium</i>	Reflexed Bedstraw
	<i>Geranium retrorsum</i> s.s.	Grassland Crane's-bill
	<i>Geranium</i> sp. 2	Variable Crane's-bill
	<i>Geranium</i> sp. 5	Naked Crane's-bill
	<i>Geranium</i> spp.	Crane's Bill
	<i>Glossodia major</i>	Wax-lip Orchid
	<i>Glyceria australis</i>	Australian Sweet-grass
	<i>Glycine clandestina</i>	Twining Glycine
	<i>Gonocarpus humilis</i>	Shade Raspwort
	<i>Gonocarpus micranthus</i>	Creeping Raspwort
	<i>Gonocarpus tetragynus</i>	Common Raspwort
	<i>Goodenia geniculata</i>	Bent Goodenia
	<i>Goodenia gracilis</i>	Slender Goodenia
	<i>Goodenia humilis</i>	Swamp Goodenia
	<i>Goodenia lanata</i>	Trailing Goodenia
	<i>Goodenia ovata</i>	Hop Goodenia
	<i>Gratiola peruviana</i>	Austral Brooklime
	<i>Hakea nodosa</i>	Yellow Hakea
	<i>Hakea ulicina</i>	Furze Hakea
	<i>Haloragis heterophylla</i>	Varied Raspwort
	<i>Helichrysum luteoalbum</i>	Jersey Cudweed
	<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass
	<i>Hemichroa pentandra</i>	Trailing Hemichroa
	<i>Hibbertia acicularis</i>	Prickly Guinea-flower
	<i>Hibbertia fasciculata</i> var. <i>prostrata</i>	Bundled Guinea-flower
	<i>Hibbertia riparia</i>	Erect Guinea-flower
	<i>Hydrocotyle callicarpa</i>	Small Pennywort
	<i>Hydrocotyle hirta</i>	Hairy Pennywort
	<i>Hypericum gramineum</i> spp. agg.	Small St John's Wort
	<i>Hypolaena fastigiata</i>	Tassel Rope-rush
	<i>Hypoxis hygrometrica</i> var. <i>hygrometrica</i>	Golden Weather-glass
	<i>Hypoxis hygrometrica</i> var. <i>villosisepala</i>	Golden Weather-glass
	<i>Hypoxis vaginata</i>	Yellow Star
	<i>Isolepis cernua</i> var. <i>cernua</i>	Nodding Club-sedge
	<i>Isolepis cernua</i> var. <i>platycarpa</i>	Broad-fruit Club-sedge
	<i>Isolepis fluitans</i>	Floating Club-sedge

Status	Scientific Name	Common Name
	<i>Isolepis hookeriana</i>	Grassy Club-sedge
	<i>Isolepis inundata</i>	Swamp Club-sedge
	<i>Isopogon ceratophyllus</i>	Horny Cone-bush
	<i>Juncus amabilis</i>	Hollow Rush
	<i>Juncus bufonius</i>	Toad Rush
	<i>Juncus gregiflorus</i>	Green Rush
	<i>Juncus holoschoenus</i>	Joint-leaf Rush
	<i>Juncus kraussii</i> subsp. <i>australiensis</i>	Sea Rush
	<i>Juncus pallidus</i>	Pale Rush
	<i>Juncus planifolius</i>	Broad-leaf Rush
	<i>Juncus prismatocarpus</i> subsp. <i>prismatocarpus</i>	Branching Rush
	<i>Juncus procerus</i>	Tall Rush
r	<i>Juncus revolutus</i>	Creeping Rush
	<i>Juncus sarophorus</i>	Broom Rush
	<i>Juncus subsecundus</i>	Finger Rush
	<i>Kennedia prostrata</i>	Running Postman
	<i>Kunzea ericoides</i> spp. agg.	Burgan
	<i>Lachnagrostis aemula</i> s.s.	Leafy Blown-grass
	<i>Lachnagrostis billardierei</i> subsp. <i>billardierei</i>	Coast Blown-grass
	<i>Lachnagrostis filiformis</i> s.s.	Common Blown-grass
r	<i>Lachnagrostis robusta</i>	Salt Blown-grass
	<i>Lagenophora gracilis</i>	Slender Bottle-daisy
	<i>Lagenophora stipitata</i>	Common Bottle-daisy
	<i>Lepidosperma concavum</i>	Sandhill Sword-sedge
	<i>Lepidosperma filiforme</i>	Common Rapier-sedge
	<i>Lepidosperma gunnii</i>	Slender Sword-sedge
	<i>Lepidosperma laterale</i> var. <i>laterale</i>	Variable Sword-sedge
	<i>Lepidosperma laterale</i> var. <i>majus</i>	Variable Sword-sedge
	<i>Lepidosperma longitudinale</i>	Pithy Sword-sedge
	<i>Lepilaena preissii</i>	Slender Water-mat
	<i>Leptoceras menziesii</i>	Hare Orchid
	<i>Leptorhynchos squamatus</i>	Scaly Buttons
	<i>Leptorhynchos tenuifolius</i>	Wiry Buttons
	<i>Leptospermum continentale</i>	Prickly Tea-tree
	<i>Leptospermum lanigerum</i>	Woolly Tea-tree
	<i>Leptospermum myrsinoides</i>	Heath Tea-tree
	<i>Leptospermum scoparium</i>	Manuka
	<i>Lepyrodia muelleri</i>	Common Scale-rush
	<i>Leucopogon australis</i>	Spike Beard-heath
	<i>Leucopogon ericoides</i>	Pink Beard-heath
	<i>Leucopogon parviflorus</i>	Coast Beard-heath
	<i>Leucopogon virgatus</i> var. <i>virgatus</i>	Common Beard-heath

Status	Scientific Name	Common Name
r	<i>Limonium australe</i>	Yellow Sea-lavender
	<i>Lindsaea linearis</i>	Screw Fern
	<i>Lobelia anceps</i>	Angled Lobelia
	<i>Lomandra filiformis</i>	Wattle Mat-rush
	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
	<i>Lomandra nana</i>	Dwarf Mat-rush
	<i>Lotus</i> spp.	Trefoil
	<i>Luzula meridionalis</i>	Common Woodrush
	<i>Luzula</i> spp.	Woodrush
	<i>Lythrum hyssopifolia</i>	Small Loosestrife
	<i>Mazus pumilio</i>	Swamp Mazus
	<i>Melaleuca squarrosa</i>	Scented Paperbark
	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
	<i>Microtis parviflora</i>	Slender Onion-orchid
	<i>Microtis unifolia</i>	Common Onion-orchid
	<i>Monotoca scoparia</i>	Prickly Broom-heath
	<i>Montia australasica</i>	White Purslane
	<i>Muellerina eucalyptoides</i>	Creeping Mistletoe
	<i>Myriophyllum crispatum</i>	Upright Water-milfoil
	<i>Myriophyllum simulans</i>	Amphibious Water-milfoil
	<i>Olearia lirata</i>	Snowy Daisy-bush
	<i>Olearia phlogopappa</i>	Dusty Daisy-bush
	<i>Olearia ramulosa</i>	Twiggy Daisy-bush
	<i>Opercularia ovata</i>	Broad-leaf Stinkweed
	<i>Opercularia varia</i>	Variable Stinkweed
	<i>Orthoceras strictum</i>	Horned Orchid
	<i>Oxalis perennans</i>	Grassland Wood-sorrel
	<i>Ozothamnus ferrugineus</i>	Tree Everlasting
	<i>Pandorea pandorana</i> subsp. <i>pandorana</i>	Wonga Vine
	<i>Parietaria debilis</i> s.s.	Shade Pellitory
	<i>Patersonia fragilis</i>	Short Purple-flag
	<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	Long Purple-flag
	<i>Pelargonium rodneyanum</i>	Magenta Stork's-bill
	<i>Persicaria decipiens</i>	Slender Knotweed
	<i>Persoonia juniperina</i>	Prickly Geebung
	<i>Phragmites australis</i>	Common Reed
	<i>Pimelea glauca</i>	Smooth Rice-flower
	<i>Pimelea humilis</i>	Common Rice-flower
	<i>Pimelea octophylla</i>	Woolly Rice-flower
	<i>Plantago gaudichaudii</i>	Narrow Plantain
	<i>Platylobium formosum</i> spp. agg.	Handsome Flat-pea
	<i>Platylobium obtusangulum</i>	Common Flat-pea
	<i>Poa clelandii</i>	Noah's Ark

Status	Scientific Name	Common Name
	<i>Poa labillardierei</i>	Common Tussock-grass
	<i>Poa morrisii</i>	Soft Tussock-grass
	<i>Poa poiformis</i>	Coast Tussock-grass
	<i>Poa sieberiana</i> var. <i>sieberiana</i>	Grey Tussock-grass
	<i>Podolobium</i> spp.	Podolobium
	<i>Poranthera microphylla</i> s.s.	Small Poranthera
k	<i>Potamogeton perfoliatus</i>	Perfoliate Pondweed
	<i>Potamogeton tricarinatus</i> s.l.	Floating Pondweed
	<i>Pteridium esculentum</i>	Austral Bracken
	<i>Pterostylis concinna</i>	Trim Greenhood
	<i>Pterostylis melagramma</i>	Tall Greenhood
	<i>Pterostylis nana</i>	Dwarf Greenhood
	<i>Pterostylis nutans</i>	Nodding Greenhood
	<i>Pterostylis parviflora</i> s.s.	Tiny Greenhood
	<i>Pterostylis pedunculata</i>	Maroonhood
	<i>Pterostylis</i> spp.	Greenhood
	<i>Ptychomnion aciculare</i>	Paper Moss
	<i>Puccinellia stricta</i> s.s.	Australian Saltmarsh-grass
	<i>Pultenaea daphnoides</i>	Large-leaf Bush-pea
	<i>Pultenaea gunnii</i>	Golden Bush-pea
	<i>Ranunculus amphitrichus</i>	Small River Buttercup
	<i>Ranunculus inundatus</i>	River Buttercup
	<i>Ranunculus lappaceus</i>	Australian Buttercup
	<i>Ranunculus</i> spp.	Buttercup
	<i>Rhagodia candolleana</i> subsp. <i>candolleana</i>	Seaberry Saltbush
	<i>Ricinocarpos pinifolius</i>	Wedding Bush
	<i>Ruppia megacarpa</i>	Large-fruit Tassel
	<i>Ruppia</i> spp.	Tassel
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass
	<i>Rytidosperma fulvum</i>	Copper-awned Wallaby-grass
	<i>Rytidosperma geniculatum</i>	Kneed Wallaby-grass
	<i>Rytidosperma laeve</i>	Smooth Wallaby-grass
	<i>Rytidosperma penicillatum</i>	Weeping Wallaby-grass
	<i>Rytidosperma racemosum</i> var. <i>racemosum</i>	Slender Wallaby-grass
	<i>Rytidosperma semiannulare</i>	Wetland Wallaby-grass
	<i>Rytidosperma setaceum</i> var. <i>setaceum</i>	Bristly Wallaby-grass
	<i>Samolus repens</i> var. <i>repens</i>	Creeping Brookweed
	<i>Sarcocornia blackiana</i>	Thick-head Glasswort
	<i>Sarcocornia quinqueflora</i>	Beaded Glasswort
	<i>Schoenus apogon</i>	Common Bog-sedge
	<i>Schoenus brevifolius</i>	Zig-zag Bog-sedge
	<i>Schoenus lepidosperma</i>	Slender Bog-sedge
	<i>Schoenus nitens</i>	Shiny Bog-sedge

Status	Scientific Name	Common Name
	<i>Schoenus tesquorum</i>	Soft Bog-sedge
	<i>Selaginella uliginosa</i>	Swamp Selaginella
	<i>Selliera radicans</i>	Shiny Swamp-mat
	<i>Senecio bathurstianus</i>	Dissected Fireweed
	<i>Senecio glomeratus</i> subsp. <i>glomeratus</i>	Annual Fireweed
	<i>Senecio hispidulus</i>	Rough Fireweed
	<i>Senecio minimus</i>	Shrubby Fireweed
	<i>Senecio odoratus</i>	Scented Groundsel
	<i>Senecio pinnatifolius</i> var. <i>lanceolatus</i>	Lance-leaf Groundsel
	<i>Senecio quadridentatus</i>	Cotton Fireweed
	<i>Senecio tenuiflorus</i> spp. agg.	Slender Fireweed
	<i>Solanum laciniatum</i>	Large Kangaroo Apple
	<i>Spergularia</i> sp. 1	Native Sea-spurrey
	<i>Spergularia</i> spp.	Sand Spurrey
	<i>Spinifex sericeus</i>	Hairy Spinifex
	<i>Stackhousia viminea</i>	Slender Stackhousia
	<i>Stylidium graminifolium</i> s.s.	Grass Triggerplant
	<i>Suaeda australis</i>	Austral Seablite
	<i>Tecticornia arbuscula</i>	Shrubby Glasswort
	<i>Tecticornia arbuscula</i>	Shrubby Glasswort
	<i>Tetragonia implexicoma</i>	Bower Spinach
	<i>Tetradlea ciliata</i>	Pink-bells
	<i>Tetradlea pilosa</i>	Hairy Pink-bells
	<i>Thelionema caespitosum</i>	Tufted Lily
	<i>Thelymitra brevifolia</i>	Peppertop Sun-orchid
	<i>Thelymitra carnea</i>	Pink Sun-orchid
	<i>Thelymitra flexuosa</i>	Twisted Sun-orchid
	<i>Thelymitra holmesii</i> s.s.	Blue-star Sun-orchid
	<i>Thelymitra ixioides</i> s.s.	Spotted Sun-orchid
	<i>Thelymitra juncifolia</i>	Rush-leaf Sun-orchid
	<i>Thelymitra media</i> s.s.	Tall Sun-orchid
	<i>Thelymitra nuda</i>	Plain Sun-orchid
e	<i>Thelymitra pallidiflora</i>	Pallid Sun-orchid
	<i>Thelymitra pauciflora</i> s.s.	Slender Sun-orchid
	<i>Thelymitra peniculata</i>	Trim Sun-orchid
	<i>Thelymitra rubra</i>	Salmon Sun-orchid
	<i>Themeda triandra</i>	Kangaroo Grass
	<i>Thysanotus patersonii</i>	Twining Fringe-lily
	<i>Thysanotus tuberosus</i>	Common Fringe-lily
	<i>Trachymene composita</i>	Parsnip Trachymene
	<i>Tricoryne elatior</i>	Yellow Rush-lily
	<i>Triglochin procera</i> s.s.	Common Water-ribbons
	<i>Triglochin striata</i>	Streaked Arrowgrass

Status	Scientific Name	Common Name
	<i>Typha domingensis</i>	Narrow-leaf Cumbungi
	<i>Utricularia dichotoma</i> s.s.	Fairies' Aprons
	<i>Veronica gracilis</i>	Slender Speedwell
	<i>Villarsia exaltata</i>	Erect Marsh-flower
	<i>Villarsia reniformis</i>	Running Marsh-flower
	<i>Viminaria juncea</i>	Golden Spray
	<i>Viola cleistogamoides</i>	Hidden Violet
	<i>Viola hederacea</i> sensu Entwisle (1996)	Ivy-leaf Violet
	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell
	<i>Wahlenbergia stricta</i> subsp. <i>stricta</i>	Tall Bluebell
	<i>Xanthorrhoea minor</i> subsp. <i>lutea</i>	Small Grass-tree
	<i>Xanthosia dissecta</i> s.s.	Native Parsley
	<i>Xanthosia huegelii</i>	Heath Xanthosia
	Introduced Species	
	<i>Acacia baileyana</i>	Cootamundra Wattle
#	<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sallow Wattle
#	<i>Acacia longifolia</i> subsp. <i>sophorae</i>	Coast Wattle
	<i>Acacia saligna</i>	Golden Wreath Wattle
	<i>Acetosella vulgaris</i>	Sheep Sorrel
	<i>Agrostis capillaris</i> var. <i>capillaris</i>	Brown-top Bent
	<i>Agrostis stolonifera</i>	Creeping Bent
	<i>Aira caryophyllea</i> subsp. <i>caryophyllea</i>	Silvery Hair-grass
	<i>Aira cupaniana</i>	Quicksilver Grass
	<i>Aira elegantissima</i>	Delicate Hair-grass
	<i>Aira praecox</i>	Early Hair-grass
	<i>Aira</i> spp.	Hair Grass
RR	<i>Allium triquetrum</i>	Angled Onion
	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
	<i>Arctotheca calendula</i>	Cape Weed
	<i>Arrhenatherum elatius</i> var. <i>bulbosum</i>	False Oat-grass
RR	<i>Asparagus asparagoides</i>	Bridal Creeper
	<i>Asparagus scandens</i>	Asparagus Fern
	<i>Aster subulatus</i>	Aster-weed
	<i>Atriplex prostrata</i>	Hastate Orache
	<i>Avena barbata</i>	Bearded Oat
	<i>Billardiera heterophylla</i>	Bluebell Creeper
	<i>Brassica fruticulosa</i>	Twiggy Turnip
	<i>Brassica rapa</i>	White Turnip
	<i>Briza maxima</i>	Large Quaking-grass
	<i>Briza minor</i>	Lesser Quaking-grass
	<i>Bromus catharticus</i>	Prairie Grass
	<i>Bromus diandrus</i>	Great Brome
	<i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>	Soft Brome

Status	Scientific Name	Common Name
	<i>Cakile maritima</i> subsp. <i>maritima</i>	Sea Rocket
RP	<i>Calicotome spinosa</i>	Spiny Broom
	<i>Callitriche stagnalis</i>	Common Water-starwort
RC	<i>Carduus pycnocephalus</i>	Slender Thistle
	<i>Catapodium rigidum</i>	Fern Grass
	<i>Cenchrus clandestinus</i>	Kikuyu
	<i>Cenchrus clandestinus</i>	Kikuyu
	<i>Centaurium erythraea</i>	Common Centaury
	<i>Centaurium tenuiflorum</i>	Slender Centaury
	<i>Cerastium glomeratum</i> s.s.	Sticky Mouse-ear Chickweed
RC	<i>Chrysanthemoides monilifera</i>	Boneseed
	<i>Cicendia quadrangularis</i>	Square Cicendia
RC	<i>Cirsium vulgare</i>	Spear Thistle
	<i>Coryza bonariensis</i>	Flaxleaf Fleabane
	<i>Cortaderia selloana</i>	Pampas Grass
v, #	<i>Corymbia maculata</i>	Spotted Gum
	<i>Cotoneaster pannosus</i>	Velvet Cotoneaster
	<i>Cotula coronopifolia</i>	Water Buttons
	<i>Crassula natans</i> var. <i>minus</i>	Water Crassula
RC	<i>Crataegus monogyna</i>	Hawthorn
	<i>Cupressus macrocarpa</i>	Monterey Cypress
RC	<i>Cynara cardunculus</i> subsp. <i>flavescens</i>	Artichoke Thistle
	<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch
	<i>Cyperus eragrostis</i>	Drain Flat-sedge
	<i>Dactylis glomerata</i>	Cocksfoot
	<i>Danthonia decumbens</i>	Heath Grass
	<i>Daucus carota</i>	Carrot
RC	<i>Dittrichia graveolens</i>	Stinkwort
	<i>Ehrharta erecta</i> var. <i>erecta</i>	Panic Veldt-grass
	<i>Ehrharta longiflora</i>	Annual Veldt-grass
	<i>Erica lusitanica</i>	Spanish Heath
#	<i>Eucalyptus globulus</i>	Southern Blue-gum
	<i>Festuca arundinacea</i>	Tall Fescue
	<i>Festuca rubra</i> s.s.	Creeping Fescue
RR	<i>Foeniculum vulgare</i>	Fennel
	<i>Fraxinus angustifolia</i>	Desert Ash
	<i>Fumaria bastardii</i>	Bastard's Fumitory
	<i>Galium aparine</i>	Cleavers
	<i>Galium murale</i>	Small Goosegrass
	<i>Gamochaeta purpurea</i> s.s.	Spiked Cudweed
	<i>Gaudinia fragilis</i>	Fragile Oat
RC	<i>Genista linifolia</i>	Flax-leaf Broom
RC	<i>Genista monspessulana</i>	Montpellier Broom

Status	Scientific Name	Common Name
	<i>Geranium dissectum</i>	Cut-leaf Crane's-bill
	<i>Geranium molle</i>	Dove's Foot
	<i>Gladiolus tristis</i>	Evening-flower Gladiolus
	<i>Glyceria declinata</i>	Manna Grass
	<i>Hakea drupacea</i>	Sweet Hakea
	<i>Hedera helix</i>	English Ivy
	<i>Helminthotheca echioides</i>	Ox-tongue
	<i>Holcus lanatus</i>	Yorkshire Fog
	<i>Hordeum leporinum</i>	Barley-grass
RC	<i>Hypericum perforatum</i> subsp. <i>veronense</i>	St John's Wort
	<i>Hypochaeris glabra</i>	Smooth Cat's-ear
	<i>Hypochaeris radicata</i>	Flatweed
#	<i>Imperata cylindrica</i>	Blady Grass
	<i>Isolepis hystrix</i>	Awned Club-sedge
	<i>Isolepis levynsiana</i>	Tiny Flat-sedge
RC	<i>Jacobaea vulgaris</i>	Ragwort
RC	<i>Juncus acutus</i> subsp. <i>acutus</i>	Spiny Rush
	<i>Juncus articulatus</i> subsp. <i>articulatus</i>	Jointed Rush
	<i>Juncus capitatus</i>	Capitate Rush
	<i>Juncus microcephalus</i>	Tiny-headed Rush
	<i>Lactuca serriola</i>	Prickly Lettuce
	<i>Leontodon taraxacoides</i> subsp. <i>taraxacoides</i>	Hairy Hawkbit
	<i>Lepidium africanum</i>	Common Peppercross
#	<i>Leptospermum laevigatum</i>	Coast Tea-tree
	<i>Linaria pelisseriana</i>	Pelisser's Toad-flax
	<i>Linum trigynum</i>	French Flax
	<i>Lolium perenne</i>	Perennial Rye-grass
	<i>Lolium rigidum</i>	Wimmera Rye-grass
	<i>Lonicera japonica</i>	Japanese Honeysuckle
	<i>Lophopyrum ponticum</i>	Tall Wheat-grass
	<i>Lotus corniculatus</i>	Bird's-foot Trefoil
	<i>Lotus subbiflorus</i>	Hairy Bird's-foot Trefoil
	<i>Lysimachia arvensis</i>	Pimpernel
	<i>Lysimachia arvensis</i> (Blue-flowered variant)	Blue Pimpernel
	<i>Lysimachia arvensis</i> (Red-flowered variant)	Scarlet Pimpernel
	<i>Lythrum junceum</i>	Mediterranean Loosestrife
	<i>Malus pumila</i>	Apple
	<i>Malva parviflora</i>	Small-flower Mallow
	<i>Medicago polymorpha</i>	Burr Medic
	<i>Medicago sativa</i> subsp. <i>sativa</i>	Lucerne
r, #	<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Giant Honey-myrtle
#	<i>Melaleuca ericifolia</i>	Swamp Paperbark

Status	Scientific Name	Common Name
	<i>Melilotus indicus</i>	Sweet Melilot
	<i>Modiola caroliniana</i>	Red-flower Mallow
#	<i>Myoporum insulare</i>	Common Boobialla
	<i>Nasturtium officinale</i>	Watercress
	<i>Olea europaea</i>	Olive
	<i>Ornithopus pinnatus</i>	Sand Bird's-foot
RR	<i>Oxalis pes-caprae</i>	Soursob
	<i>Oxalis purpurea</i>	Large-flower Wood-sorrel
	<i>Papaver somniferum</i>	Opium Poppy
	<i>Parapholis incurva</i>	Coast Barb-grass
	<i>Paraserianthes lophantha</i> subsp. <i>lophantha</i>	Cape Wattle
	<i>Parentucellia viscosa</i>	Yellow Bartsia
	<i>Paspalum dilatatum</i>	Paspalum
	<i>Paspalum distichum</i>	Water Couch
	<i>Petrorhagia dubia</i>	Velvety Pink
	<i>Phalaris aquatica</i>	Toowoomba Canary-grass
	<i>Phoenix canariensis</i>	Canary Island Date-palm
	<i>Phytolacca octandra</i>	Red-ink Weed
	<i>Pinus radiata</i>	Radiata Pine
#	<i>Pittosporum undulatum</i>	Sweet Pittosporum
	<i>Plantago coronopus</i>	Buck's-horn Plantain
	<i>Plantago lanceolata</i>	Ribwort
	<i>Poa annua</i>	Annual Meadow-grass
	<i>Poa trivialis</i> subsp. <i>trivialis</i>	Rough Meadow-grass
	<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed
	<i>Polygala myrtifolia</i>	Myrtle-leaf Milkwort
	<i>Polygonum aviculare</i> s.s.	Hogweed
	<i>Polypogon monspeliensis</i>	Annual Beard-grass
	<i>Prunella vulgaris</i>	Self-heal
	<i>Prunus cerasifera</i>	Cherry Plum
	<i>Ranunculus muricatus</i>	Sharp Buttercup
	<i>Ranunculus repens</i>	Creeping Buttercup
	<i>Romulea rosea</i>	Onion Grass
RC	<i>Rosa rubiginosa</i>	Sweet Briar
RC	<i>Rubus fruticosus</i> spp. agg.	Blackberry
	<i>Rumex conglomeratus</i>	Clustered Dock
	<i>Rumex crispus</i>	Curled Dock
RC	<i>Senecio pterophorus</i>	African Daisy
	<i>Setaria parviflora</i>	Slender Pigeon Grass
	<i>Setaria pumila</i> subsp. <i>pumila</i>	Pale Pigeon-grass
	<i>Silene gallica</i>	French Catchfly
	<i>Sisyrinchium iridifolium</i>	Striped Rush-leaf
	<i>Solanum nigrum</i> s.s.	Black Nightshade

Status	Scientific Name	Common Name
	<i>Soliva sessilis</i>	Jo Jo
	<i>Sonchus asper</i> s.s.	Rough Sow-thistle
	<i>Sonchus oleraceus</i>	Common Sow-thistle
	<i>Sporobolus africanus</i>	Rat-tail Grass
	<i>Stellaria media</i>	Chickweed
	<i>Stenotaphrum secundatum</i>	Buffalo Grass
	<i>Taraxacum officinale</i> spp. agg.	Garden Dandelion
	<i>Tradescantia fluminensis</i>	Wandering Jew
	<i>Tragopogon porrifolius</i> subsp. <i>porrifolius</i>	Salsify
	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover
	<i>Trifolium arvense</i> var. <i>arvense</i>	Hare's-foot Clover
	<i>Trifolium campestre</i> var. <i>campestre</i>	Hop Clover
	<i>Trifolium dubium</i>	Suckling Clover
	<i>Trifolium glomeratum</i>	Cluster Clover
	<i>Trifolium repens</i> var. <i>repens</i>	White Clover
	<i>Trifolium striatum</i>	Knotted Clover
	<i>Trifolium subterraneum</i>	Subterranean Clover
RC	<i>Ulex europaeus</i>	Gorse
	<i>Ulmus</i> spp.	Elm
	<i>Vellereophyton dealbatum</i>	White Cudweed
	<i>Verbena bonariensis</i> var. <i>bonariensis</i> s.s.	Purple-top Verbena
	<i>Vicia hirsuta</i>	Tiny Vetch
	<i>Vicia sativa</i>	Common Vetch
	<i>Vicia tetrasperma</i>	Slender Vetch
	<i>Vulpia bromoides</i>	Squirrel-tail Fescue
	<i>Vulpia muralis</i>	Wall Fescue
	<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue
RC	<i>Watsonia meriana</i> var. <i>bulbillifera</i>	Bulbil Watsonia
	<i>Zantedeschia aethiopica</i>	White Arum-lily

B.2 Listed flora species from database searches

The following table includes the listed flora species that have potential to occur within the study area. The list of species is sourced from the FLS, Victorian Biodiversity Atlas and the Protected Matters Search Tool (DoE; accessed on 05.08.14), or added by Biosis on the basis of expert opinion.

Table B.2. Listed flora species recorded / predicted to occur within 5 km of the study area

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
National Significance								
Amphibromus fluitans	River Swamp Wallaby-grass	VU			2007	PMST	Swampy areas, mainly along the Murray River between Wodonga and Echuca with scattered records from southern Victoria.	Present – recorded in multiple locations within BlueScope, refer Figure A2.
Caladenia insularis	French Island Spider-orchid	VU	v	L	-		Dense, wet heath and heathy woodland (Jeanes and Backhouse 2006).	Low – while this species appears confined to French Island, its habitat is present with the study area and it conceivable that its range could extend into this area.
Caladenia orientalis	Eastern Spider-orchid	EN	e	L	-		Heath and heathy woodlands in coastal areas between the Mornington Peninsula and Wilsons Promontory.	Low – Habitat for this species is found within the study area although it has not been recorded within the Western Port area.
Caladenia robinsonii	Frankston Spider-orchid	EN	e	L	-		Coastal heathy woodland; only confirmed population is near Rosebud.	Negligible – associated vegetation types present although not recorded in the Western Port area.
Dianella amoena	Matted Flax-lily	EN	e	L	-		Lowland grassland and grassy woodland, on well-drained to seasonally waterlogged fertile sandy loam soils to heavy cracking clays (Carter 2010).	Low – associated vegetation types generally scarce.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Euphrasia collina</i> subsp. <i>muelleri</i>	Purple Eyebright	EN	e	L	1919		Grasslands and grassy woodlands; few populations are known to still exist (Murphy and Downe 2006).	Low – associated vegetation types generally scarce.
<i>Glycine latrobeana</i>	Clover Glycine	VU	v	L	2009	PMST	Grasslands and grassy woodlands, particularly those dominated by Themeda triandra.	Low – associated vegetation types generally scarce.
<i>Prasophyllum frenchii</i>	Maroon Leek-orchid	EN	e	L	-		Grassland and grassy woodland environments on sandy or black clay loam soils that are generally damp but well drained.	Low – associated vegetation types generally scarce.
<i>Prasophyllum spicatum</i>	Dense Leek-orchid	VU	e		-		Heathland and Heathy Woodlands.	Medium – associated vegetation types present. Found to the south of Hastings at Cribb Point.
<i>Pterostylis chlorogramma</i>	Green-striped Greenhood	VU	v	L	-		Heathy Woodland, Damp Heathy Woodland and Lowland Forest (Coates et al. 2002).	Medium – associated vegetation types present. Surveys have not been undertaken during the flowering season of this species.
<i>Pterostylis cucullata</i>	Leafy Greenhood	VU	v	L	-		Alkaline scrub dominated by tea tree, sheoak and other shrubs	Negligible – limited habitat present.
<i>Senecio psilocarpus</i>	Swamp Fireweed	VU	v		-		Seasonally-inundated herb-rich swamps, growing on peaty soils or volcanic clays	Low – may be found in wetland vegetation.
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	EN	e	L	-		Moist or dry sandy loams or loamy sands, primarily in coastal heaths, grasslands and woodlands, but also in similar communities at drier inland sites	Low – some habitat present although not recorded in the Western Port area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Thelymitra matthewsii</i>	Spiral Sun-orchid	VU		L	-		Heathy open forest and woodlands, on well-drained sand, gravel and clay loam soils	Low – habitat present although not recorded in the Western Port area.
<i>Xerochrysum palustre</i>	Swamp Everlasting	VU	v	L	-		Sedge-swamps and shallow freshwater marshes and swamps in lowlands, on black cracking clay soils (Carter and Walsh 2011)	Low – may be found in wetland vegetation.
State Significance								
<i>Acacia howittii</i>	Sticky Wattle		r		2006		Moist forest; Natural occurrences are confined to South Gippsland and Central Highlands	As per DELWP habitat model.
<i>Alternanthera</i> sp. 1 (Plains)	Plains Joyweed		k		2007		Clay or gilgai soils of the Riverina area and drier clay/clay-loam soils of the basalt plains west of Melbourne	As per DELWP habitat model.
<i>Atriplex paludosa</i> subsp. <i>paludosa</i>	Marsh Saltbush		r		1999		Boggy, saline soils on coastal or near-coastal saltmarshes and tidal-flats	As per DELWP habitat model.
<i>Avicennia marina</i> subsp. <i>australasica</i>	Grey Mangrove		r		2009		Low energy coastlines in the inter-tidal zone	As per DELWP habitat model.
<i>Caesia parviflora</i> var. <i>minor</i>	Pale Grass-lily		k		1977		Lowland grasslands and grassy woodlands, often in sites with poor drainage	As per DELWP habitat model.
<i>Caladenia aurantiaca</i>	Orange-tip Finger-orchid		r		1999		Lowland forest and heathy woodlands, typically near the coast	As per DELWP habitat model
<i>Caladenia dilatata</i> s.s.	Green-comb Spider-orchid		k		2006		Heathy Woodland, Damp Heathy Woodland and Lowland Forest	As per DELWP habitat model

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Caladenia mentiens</i>	Cryptic Pink-fingers		k		2003		Heathland and Heathy Woodland	As per DELWP habitat model
<i>Cardamine paucijuga</i> s.s.	Annual Bitter-cress		v		1998		Moist forests and riparian habitats	As per DELWP habitat model
<i>Chiloglottis X pescottiana</i>	Bronze Bird-orchid		r		1997		Lowland Forest	As per DELWP habitat model
<i>Chorizandra australis</i>	Southern Bristle-sedge		k		1995		Swamps and waterholes.	As per DELWP habitat model
<i>Correa reflexa</i> var. <i>lobata</i>	Powelltown Correa		r		1981		Heathland and Heathy Woodland	As per DELWP habitat model
<i>Corunastylis ciliata</i>	Fringed Midge-orchid		k		1965		Heath and heathy and grassy woodlands	As per DELWP habitat model
<i>Corymbia maculata</i>	Spotted Gum		v		2009		In Victoria naturally confined to a small population near Mt Tara in the east of the state	As per DELWP habitat model
<i>Craspedia canens</i>	Grey Billy-buttons		e	L	1920		Low altitude grasslands between Cranbourne and Traralgon	Negligible – no habitat present.
<i>Dianella</i> sp. aff. <i>longifolia</i> (Benambra)	Arching Flax-lily		v		2008		The habitat requirements of this species are poorly known	As per DELWP habitat model
<i>Diuris punctata</i> var. <i>punctata</i>	Purple Diuris		v	L	1997		Fertile, loamy soils and periodically wet areas in lowland grasslands, grassy woodlands, heathy woodlands and open heathlands	Low – associated vegetation types present. Recent records from nearby.
<i>Diuris subalpina</i>	Small Snake-orchid		e		1919		Various woodlands and forest	As per DELWP habitat model
<i>Entolasia stricta</i>	Upright Panic		k		2008		Damp Heathland	Present - recorded in BlueScope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Eucalyptus fulgens</i>	Green Scentbark		r		2006		Forests and woodlands of the Gippsland Plain and adjacent foothills	As per DELWP habitat model
<i>Eucalyptus X studleyensis</i>	Studley Park Gum		e		1994		Swampy Woodland and some other woodland / forests	As per DELWP habitat model
<i>Eucalyptus yarraensis</i>	Yarra Gum		r		2005		Valley flats and along stream on soils subject to periodic inundation or waterlogging	As per DELWP habitat model
<i>Exocarpos syrticola</i>	Coast Ballart		r		1988		Coastal areas	As per DELWP habitat model
<i>Juncus revolutus</i>	Creeping Rush		r		2008		Saltmarshes and other similarly saline inland habitats	As per DELWP habitat model
<i>Lachnagrostis perennis</i> spp. agg.	Perennial Blown-grass		k		1990		Wetlands	As per DELWP habitat model
<i>Lachnagrostis robusta</i>	Salt Blown-grass		r		2008		Marshy, estuarine habitats and moist sandy flats	As per DELWP habitat model
<i>Lawrencia spicata</i>	Salt Lawrencia		r		1991		Fringe habitats of coastal saltmarsh communities	As per DELWP habitat model
<i>Limonium australe</i>	Yellow Sea-lavender		r		2008		Margins of saltmarshes and other similarly saline inland habitats	Moderate – Recorded just outside the southern part of the study area at the end of Long Island Drive.
<i>Lotus australis</i> var. <i>australis</i>	Austral Trefoil		k		2003		Mostly coastal areas	As per DELWP habitat model
<i>Marsilea mutica</i>	Smooth Nardoo		k		1998		Wetlands	
<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Giant Honey-myrtle		r		2011		Near coastal heath/scrub, rocky coast and foothill outcrops	As per DELWP habitat model
<i>Prasophyllum lindleyanum</i>	Green Leek-orchid		v		1919		Fertile soils in woodland or scrubby heath	As per DELWP habitat model

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Pterostylis pedoglossa</i>	Prawn Greenhood		v		1997		Heath and heathy woodland near the coast	As per DELWP habitat model
<i>Pterostylis tunstallii</i>	Granite Greenhood		v		1960		Lowland and foothill forests, often on and around the base of large granite boulders	As per DELWP habitat model
<i>Ruppia maritima</i> s.s.	Water Tassel		k		1980		Waterways	As per DELWP habitat model
<i>Senecio glomeratus</i> subsp. <i>longifructus</i>	Annual Fireweed		r		1921		Areas adjacent to streams, swamps and saline flats	As per DELWP habitat model
<i>Sparganium subglobosum</i>	Floating Bur-reed		k		1954		Waterways	As per DELWP habitat model
<i>Thelionema umbellatum</i>	Clustered Lily		r		1988		Sandy, often poorly drained soils of heathy woodlands and heathlands	As per DELWP habitat model
<i>Thelymitra circumsepta</i>	Naked Sun-orchid		v		2007		In damp, shaded areas in heath, woodlands and forest	As per DELWP habitat model
<i>Thelymitra pallidiflora</i>	Pallid Sun-orchid		e		2008		Heathy Woodland	As per DELWP habitat model
<i>Triglochin minutissima</i>	Tiny Arrowgrass		r		2008		Scattered occurrences on damp saline soils near salt-lakes, and forming part of herbfields in coastal saltmarshes	As per DELWP habitat model
<i>Utricularia gibba</i>	Floating Bladderwort		v		1996		Aquatic Hermland	As per DELWP habitat model
<i>Utricularia uniflora</i>	Single Bladderwort		k		1980		Aquatic Hermland	As per DELWP habitat model

Appendix C. Fauna

Notes to tables:

EPBC Act: EX - Extinct CR - Critically Endangered EN - Endangered VU - Vulnerable CD - Conservation dependent	State Advisory List: ex - extinct cr - critically endangered en - endangered vu - vulnerable nt - near threatened dd - data deficient rx - regionally extinct
FFG Act: L - listed as threatened under FFG Act N - nominated for listing as threatened I - determined ineligible for listing	
Most recent database records are from the Victorian Biodiversity Atlas unless otherwise specified as follows # – Protected Matters Search Tool BA – Birds Australia	

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

C.1 Fauna species recorded from in the study area during the current survey

Table C.1. Vertebrate fauna recorded from the study area

Status	Scientific name	Common name
	INDIGENOUS SPECIES	
	Mammals	
	<i>Antechinus agilis</i>	Agile Antechinus
	<i>Petaurus breviceps</i>	Sugar Glider
	<i>Phascolarctos cinereus</i>	Koala
	<i>Pseudocheirus peregrinus</i>	Ringtailed Possum
	<i>Rattus lutreolus</i>	Swamp Rat
	<i>Tachyglossus aculeatus</i>	Short beaked Echidna
	<i>Trichosurus vulpecula</i>	Common Brushtailed Possum
	<i>Wallabia bicolor</i>	Black Wallaby
	Birds	
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill
	<i>Acanthiza pusilla</i>	Brown Thornbill
	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill
	<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler
	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar
	<i>Anas castanea</i>	Chestnut Teal
	<i>Anas gracilis</i>	Grey Teal
	<i>Anas superciliosa</i>	Pacific Black Duck
	<i>Anthochaera carunculata</i>	Red Wattlebird
	<i>Anthochaera chrysoptera</i>	Little Wattlebird
	<i>Anthus novaeseelandiae</i>	Australasian Pipit
	<i>Aquila audax</i>	Wedge-tailed Eagle
	<i>Artamus cyanopterus</i>	Dusky Woodswallow
vu	<i>Aythya australis</i>	Hardhead
	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo
	<i>Cacatua sanguinea</i>	Little Corella
	<i>Cacomantis flabelliformis</i>	Fantail Cuckoo
	<i>Calamanthus fuliginosus</i>	Striated Fieldwren

Status	Scientific name	Common name
	<i>Calyptorhynchus funereus</i>	Yellow-tailed Black Cockatoo
	<i>Chenonetta jubata</i>	Australian Wood Duck
	<i>Chroicocephalus novaehollandiae</i>	Silver Gull
	<i>Chrysococcyx lucidus</i>	Shining Bronze-Cuckoo
	<i>Circus approximans</i>	Swamp Harrier
	<i>Cisticola exilis</i>	Golden-headed Cisticola
	<i>Colluricincla harmonica</i>	Grey Shrike-thrush
	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike
	<i>Cormobates leucophaeus</i>	White-throated Treecreeper
	<i>Corvus mellori</i>	Little Raven
	<i>Coturnix pectoralis</i>	Stubble Quail
	<i>Cracticus tibicen</i>	Australian Magpie
	<i>Cracticus torquatus</i>	Grey Butcherbird
	<i>Cygnus atratus</i>	Black Swan
	<i>Dacelo novaeguineae</i>	Laughing Kookaburra
	<i>Dicaeum hirundinaceum</i>	Mistletoebird
	<i>Elanus axillaris</i>	Black-shouldered Kite
	<i>Eolophus roseicapillus</i>	Galah
	<i>Eopsaltria australis</i>	Eastern Yellow Robin
	<i>Epthianura albifrons</i>	White-fronted Chat
	<i>Falco berigora</i>	Brown Falcon
	<i>Falco cenchroides</i>	Nankeen Kestrel
	<i>Falco longipennis</i>	Australian Hobby
	<i>Falco peregrinus</i>	Peregrine Falcon
	<i>Falcunculus frontatus</i>	Crested Shrike-tit
	<i>Fulica atra</i>	Eurasian Coot
	<i>Grallina cyanoleuca</i>	Magpielark
	<i>Hirundo ariel</i>	Fairy Martin
	<i>Hirundo neoxena</i>	Welcome Swallow
nt, L	<i>Hydroprogne caspia</i>	Caspian Tern
nt	<i>Larus pacificus</i>	Pacific Gull
vu, L	<i>Lewinia pectoralis</i>	Lewin's Rail

Status	Scientific name	Common name
	<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater
	<i>Lichenostomus leucotis</i>	White-eared Honeyeater
	<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater
	<i>Malurus cyaneus</i>	Superb Fairy-wren
	<i>Manorina melanocephala</i>	Noisy Miner
	<i>Manorina melanophrys</i>	Bell Miner
	<i>Melithreptus lunatus</i>	White-naped Honeyeater
	<i>Morus serrator</i>	Australasian Gannet
	<i>Neochmia temporalis</i>	Red-browed Finch
	<i>Ocyphaps lophotes</i>	Crested Pigeon
en, L	<i>Oxyura australis</i>	Blue-billed Duck
	<i>Pachycephala pectoralis</i>	Golden Whistler
	<i>Pardalotus punctatus</i>	Spotted Pardalote
	<i>Pardalotus striatus</i>	Striated Pardalote
	<i>Pelecanus conspicillatus</i>	Australian Pelican
	<i>Phalacrocorax carbo</i>	Great Cormorant
	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant
nt	<i>Phalacrocorax varius</i>	Pied Cormorant
	<i>Phaps chalcoptera</i>	Common Bronzewing
	<i>Phaps elegans</i>	Brush Bronzewing
	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater
	<i>Platycercus elegans</i>	Crimson Rosella
	<i>Platycercus eximius</i>	Eastern Rosella
	<i>Podargus strigoides</i>	Tawny Frogmouth
	<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe
	<i>Porphyrio porphyrio</i>	Purple Swampphen
	<i>Porzana tabuensis</i>	Spotless Crake
	<i>Rhipidura albiscapa</i>	Grey Fantail
	<i>Rhipidura leucophrys</i>	Willie Wagtail
	<i>Sericornis frontalis</i>	White-browed Scrubwren
	<i>Strepera versicolor</i>	Grey Currawong
	<i>Tadorna tadornoides</i>	Australian Shelduck

Status	Scientific name	Common name
	<i>Thalaseus bergii</i>	Crested Tern
	<i>Todiramphus sanctus</i>	Sacred Kingfisher
	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet
	<i>Zoothera lunulata</i>	Bassian Thrush
	<i>Zosterops lateralis</i>	Silvereye
	Reptiles	
	<i>Amphibolurus muricatus</i>	Jacky Lizard
	<i>Austrelaps superbis</i>	Lowland Copperhead
dd	<i>Chelodina longicollis</i>	Common Long-necked Turtle
	<i>Lampropholis guichenoti</i>	Garden Skink
	<i>Notechis scutatus</i>	Mainland Tiger Snake
	<i>Tiliqua nigrolutea</i>	Blotched Blue-tongued Lizard
	Frogs	
	<i>Crinia signifera</i>	Common Froglet
	<i>Limnodynastes dumerilli</i>	Eastern Banjo Frog
	<i>Litoria peronii</i>	Peron's Tree Frog
	<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog
	<i>Limnodynastes peronii</i>	Striped Marsh Frog
	<i>Litoria verreauxii</i>	Whistling Tree Frog
	INTRODUCED SPECIES	
	Mammals	
	<i>Cervus unicolor</i>	Sambar
	<i>Lepus europeus</i>	Brown Hare
	<i>Mus musculus</i>	House Mouse
	<i>Oryctolagus cuniculus</i>	European Rabbit
	<i>Rattus rattus</i>	Black Rat
	<i>Vulpes vulpes</i>	Red Fox
	Birds	
	<i>Alauda arvensis</i>	European Skylark
	<i>Carduelis carduelis</i>	European Goldfinch
	<i>Passer domesticus</i>	House Sparrow
	<i>Streptopelia chinensis</i>	Spotted Turtle-dove

Status	Scientific name	Common name
	<i>Sturnus tristis</i>	Common Myna
	<i>Sturnus vulgaris</i>	Common Starling
	<i>Turdus merula</i>	Common Blackbird

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C.2 Listed fauna species from database searches

The following table includes a list of the listed 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; accessed on 05.08.14), or added by Biosis on the basis of expert opinion.

Table C.2: Listed fauna species recorded, or predicted to occur, within 5 km of the study area

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
Mammals								
Isodon obesulus obesulus	Southern Brown Bandicoot	EN	nt	L	2008	PMST	The species inhabits heathy woodlands and other vegetation communities of sandy soils. The presence of the species was not confirmed during the present investigation. It is known from the Hastings and Yaringa areas and habitats within the study area are suitable. The species is likely to occur there.	High
Potorous tridactylus tridactylus	Long-nosed Potoroo	VU	en	L	1978	PMST	Six populations of Long-nosed Potoroo occur in Victoria within a range of habitats from open forests to heathy woodlands. This species does not occur on the Mornington Peninsula or vicinity of Western Port.	Negligible
Pseudomys fumeus	Smoky Mouse	EN	cr	L	-	PMST	Disjunct Victorian distribution with populations in the Snowfields, Eastern Highlands, East Gippsland, Otway Range and the Grampians. This species does not occur on the Mornington Peninsula.	Negligible
Pseudomys novaehollandiae	New Holland Mouse	VU	vu	L	1984	PMST	The species is now considered to be confined to two localities in Victoria. It was recorded during the 1970s and early 1980s from heathy vegetation communities near Hastings and Crib Point. Seebeck & Menkhorst (2000) considered that it had apparently become extinct on Mornington Peninsula within the preceding 15 years. The species was not detected during the present investigation. Vegetation communities within the study area are appropriate but appear to be too-long unburnt to be suitable for the species (DSE 2003).	Low
Pteropus poliocephalus	Grey-headed Flying-fox	VU	vu	L	-	PMST	This species utilises a range of habitats from lowland rainforest in East Gippsland and coastal Stringybark forests to agricultural land and ornamental and fruiting trees, with permanentlv	Low

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Sminthopsis leucopus</i>	White-footed Dunnart		nt	L	1970		established colonies in Melbourne, Geelong and Mallacoota (Van Dyck and Strahan 2008). It is not likely to occur within the study area. This species inhabits diverse vegetation types but on the Gippsland Plain it is frequently associated with heathy vegetation communities. It was not detected during the present investigation. There are records of this species to the south of Hastings and suitable habitat occurs within the study area, although it is unlikely to inhabit the site.	Medium
Birds								
<i>Accipiter novaehollandiae</i>	Grey Goshawk		vu	L	2011		Reliant on mature forests for breeding. Not resident on Mornington Peninsula or vicinity of Western Port and extremely rarely documented from these areas.	Negligible
<i>Anas rhynchotis</i>	Australasian Shoveler		vu		2013		Prefers large, permanent lakes and swamps with abundant aquatic vegetation. Appropriate habitat for the species was identified at large artificial wetlands on McKirdy's Ck, east of McKirdy's Rd.	As per DELWP's habitat model
<i>Anseranas semipalmata</i>	Magpie Goose		nt	L	2008		Uses aquatic and terrestrial habitat, although most activity occurs on wetlands such as those associated with flood plains. Historically occurred in south-eastern Australia, but loss of wetland habitats meant the species became extinct in Victoria in the early 1900s. Re-introductions have resulted in some re-established populations. Rare records exist from the vicinity of Western Port.	Low
<i>Anthochaera phrygia</i>	Regent Honeyeater	EN	cr	L	-	PMST	Inhabits dry woodlands dominated by Box Ironbark eucalypts. Distribution in Victoria currently restricted to the Chiltern - Mt Pilot National Park in north-east of the state following severe range contraction and population decline. There are no recent records of the species from the vicinity of Western Port.	Negligible
<i>Ardea intermedia</i>	Intermediate Egret		cr	L	2001		Occupies a wide range of wetlands and typically prefers the shallows of wetlands for foraging activities. The species rarely visits southern Victoria.	Low

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Ardea modesta</i>	Eastern Great Egret		vu	L	2013	PMST	The species utilises a wide range of wetlands and prefers the shallows of wetlands for foraging activities. Uses estuarine mudflats as summer-autumn or drought refuges. It was recorded during the present investigation.	High
<i>Aythya australis</i>	Hardhead		vu		2013		A mainly aquatic species preferring large, deep freshwater environments with abundant aquatic vegetation. Occasionally in estuarine and littoral habitats and sheltered inshore waters. Recorded during the present investigation.	As per DELWP's habitat model
<i>Biziura lobata</i>	Musk Duck		vu		2010		A largely aquatic species preferring deep water of permanent wetlands, estuaries and protected bays. Appropriate habitat for the species was identified at large artificial wetlands on McKirdy's Ck, east of McKirdy's Rd.	As per DELWP's habitat model
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	en	L	2007	PMST	Occurs in permanent freshwater wetlands with tall, dense vegetation where it forages in shallow water. The species has previously been recorded in the local area. Appropriate habitat for the species was identified at large artificial wetlands on McKirdy's Ck, east of McKirdy's Rd.	High
<i>Ceyx azureus</i>	Azure Kingfisher		nt		2011		Associated with well vegetated freshwater wetlands and occasionally among mangroves in sheltered coastal areas. Rarely recorded from Western Port but habitat in parts of site are suitable.	As per DELWP's habitat model
<i>Chlidonias hybrida</i>	Whiskered Tern		nt		2006		A breeding migrant to Australia from September to March where it occurs at wetlands with submerged and emergent vegetation such as grasses, sedges, reeds and rushes. Some coastal areas of the site appear suitable for it.	High
<i>Chthonicola sagittata</i>	Speckled Warbler		vu	L	1909		Occurs in open forest and Box Ironbark Woodlands. Generally absent from higher rainfall areas of Victoria. There are no records of the species from Mornington Peninsula or vicinity of Western Port.	Negligible
<i>Cinclosoma punctatum</i>	Spotted Quail-thrush		nt		1929		Occurs in drier forests and woodlands of south eastern Australia. Mainly associated with hill country and very rarely recorded from vicinity of Western Port.	As per DELWP's habitat model

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Circus assimilis</i>	Spotted Harrier		nt		2013		Inhabits open and wooded country of inland and sub-inland Australia, where they hunt over flat or undulating country with low vegetation cover. Most common over the Murray Valley with occasional visits to coastal Victoria.	As per DELWP's habitat model
<i>Egretta garzetta</i>	Little Egret		en	L	2012		Occupies a wide range of wetlands and typically prefers the shallows of wetlands for foraging activities. Such areas in the site are suitable for the species.	High
<i>Excalfactoria chinensis</i>	King Quail		en	L	1981		The species has a preference for wet heath environments where they feed and nest on the ground, but have also been recorded in coastal heath. While there is a population on French Island in Western Port, there are no records of it on Mornington Peninsula and it is unlikely that a population exists there.	Low
<i>Falco subniger</i>	Black Falcon		vu		2008		Primarily occurs in arid and semi-arid zones in north and west of Victoria. Not resident on Mornington Peninsula or vicinity of Western Port and extremely rarely documented from these areas.	As per DELWP's habitat model
<i>Gallinago hardwickii</i>	Latham's Snipe		nt		2013	PMST	A migrant to Australia from July to April occurring in a wide variety of permanent and ephemeral wetlands and their margins. Such areas in the site are suitable for the species.	As per DELWP's habitat
<i>Gelochelidon nilotica</i>	Gull-billed Tern		en	L	2007		The species occurs on shallow terrestrial wetlands, less often using sheltered coastal environments. In Australia mainly breeds in inland areas following major flooding events.	High
<i>Geopelia cuneata</i>	Diamond Dove		nt	L	2012		This species is not indigenous to the Mornington Peninsula and records most likely relate to aviary escapees.	Negligible
<i>Grantiella picta</i>	Painted Honeyeater		vu	L	2012		A migratory species that breeds in southern Australia, it occupies dry open woodlands and forests primarily on the inland foothills of the Great Diving Range. There are no records of the species from the vicinity of Western Port.	Negligible
<i>Grus rubicunda</i>	Brolga		vu	L	1845		Prefers shallow marshland areas. Victorian populations are confined to the south-west and the Northern Plains. This species does not occur on the Mornington Peninsula.	Negligible

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		vu	L	2011	PMST	Occurs in marine habitats and large freshwater wetlands. A small resident population occupies Western Port area.	High
<i>Hydroprogne caspia</i>	Caspian Tern		nt	L	2011		Occurs on exposed ocean beaches or in sheltered coastal environments. Recorded during the present investigation.	High
<i>Hylacola pyrrhopygia</i>	Chestnut-rumped Heathwren		vu	L	2003		Occurs in shrubland and in dense scrubby areas of forests and woodlands. There are few records of the species from the local area but it is cryptic and may inhabit the study area.	Low
<i>Ixobrychus minutus dubius</i>	Little Bittern		en	L	2002		Inhabits freshwater wetlands, preferably with dense emergent vegetation. Potential habitat for the species was identified at large artificial wetlands on McKirdy's Ck, east of McKirdy's Rd.	Medium
<i>Larus pacificus</i>	Pacific Gull		nt		2013		Occurs along coasts usually in areas protected from ocean swells, such as bays estuaries and lagoons. Sometimes occurs up to 10 kilometres inland. Some portions of the site are suitable for it.	High
<i>Lathamus discolor</i>	Swift Parrot	EN	en	L	2011	PMST	Migrates from Tasmania to south-east mainland Australia during the winter months where it prefers Box Ironbark Forest in north-central Victoria. Also utilises flowering ornamental eucalypts. Rarely recorded from Mornington Peninsula where records are mostly from ornamental eucalypts.	Low
<i>Lewinia pectoralis</i>	Lewin's Rail		vu	L	2013		The species inhabits densely vegetated wetlands, including swamps, farm dams, saltmarshes, lakes and small pools that can range from fresh to saline water. It was recorded during the present investigation.	High (recorded on site)
<i>Melanodryas cucullata</i>	Hooded Robin		nt	L	2008		Occupies a range of open woodlands. Occasionally visits southern Victoria and rarely recorded from vicinity of Western Port.	Medium
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR	cr	L	1987	PMST	Annual migrant to coastal Victoria from breeding grounds in south-west Tasmania, appearing from March to October. Forages on coastal or near-coastal areas of saltmarsh and dunes. Records from Western Port, including close to study site, mostly from before early 1990s.	Low

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Neophema pulchella</i>	Turquoise Parrot		nt	L	1982		Occupies woodlands and open forests in the foothills of the Great Dividing Range. Not resident on Mornington Peninsula and extremely rarely documented from vicinity of Western Port.	Negligible
<i>Ninox connivens</i>	Barking Owl		en	L	2005		Prefers dry, open sclerophyll forests and woodlands. Not resident on Mornington Peninsula and extremely rarely documented from vicinity of Western Port.	Negligible
<i>Ninox strenua</i>	Powerful Owl		vu	L	2013		Prefers tall open sclerophyll forest and woodlands. Not resident on Mornington Peninsula and extremely rarely documented from vicinity of Western Port.	Negligible
<i>Nycticorax caledonicus hillii</i>	Nankeen Night Heron		nt		2013		Occupies a wide range of wetlands and typically prefers the shallows of wetlands for foraging activities. The species has been recently recorded in the study area.	As per DELWP's habitat
<i>Oxyura australis</i>	Blue-billed Duck		en	L	2013		Usually found on densely vegetated freshwater wetlands, including Melaleuca swamps. Appropriate habitat for the species was identified at large artificial wetlands on McKirdy's Ck, east of McKirdy's Rd.	High
<i>Pezoporus wallicus</i>	Ground Parrot		en	L	1845		Occurs in heathland, sedgeland or buttongrass plains of east Gippsland, Wilson's Promontory and far western Victoria. No records or suitable habitats near Western Port.	Negligible
<i>Phalacrocorax varius</i>	Pied Cormorant		nt		2011		The species is distributed along the Victorian coast. It was recorded from crown coastal land near the Esso facility. It is likely to use the entire coastal fringe of the study area.	High (recorded on site)
<i>Platalea regia</i>	Royal Spoonbill		vu		2013		Uses shallow freshwater wetlands and coastal habitats such as estuaries, inlets and intertidal mudflats. It was recorded during the present investigation.	As per DELWP's habitat model
<i>Plegadis falcinellus</i>	Glossy Ibis		nt		2006		Glossy Ibis are usually found foraging in wet pasture environments and low lying wetland areas. This species is only rarely recorded in Victoria.	As per DELWP's habitat model
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		en	L	2000		Typically occupies open forests and woodlands. Victorian population is now largely confined to areas north of the Great Dividing Range. A former population on Mornington Peninsula is considered to be extinct since approximately 2000.	Negligible

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
		EPBC	State List	FFG				
<i>Porzana pusilla</i>	Baillon's Crane		vu	L	2011		This species occurs in a variety of densely vegetated terrestrial and coastal wetlands. Some portions of the site appear suitable for it.	High
<i>Rostratula australis</i>	Australian Painted Snipe	EN	cr	L	-	PMST	Generally found in shallow, terrestrial freshwater wetlands with rank, emergent tussock vegetation. The species is a highly nomadic and is very rarely recorded in southern Victoria and is unlikely to occur at the site.	Low
<i>Stagonopleura guttata</i>	Diamond Firetail		vu	L	1908		Occurs mostly in grassy woodlands of the lowlands and foothills in the north of Victoria. There are no records of the species from the vicinity of Western Port.	Negligible
<i>Stictonetta naevosa</i>	Freckled Duck		en	L	2012		Usually found on densely vegetated freshwater wetlands. During dry conditions the birds move from ephemeral wetlands to large areas of permanent open water. Appropriate habitat for the species was identified at large artificial wetlands on McKirdy's Ck, east of McKirdy's Rd.	Medium
Reptiles								
<i>Chelodina longicollis</i>	Common Long-necked Turtle		dd		2014		Natural and man-made waterbodies and wetlands (Cogger 2014). Recorded in farm dams during this investigation.	As per DELWP's habitat model
<i>Lissolepis coventryi</i>	Swamp Skink		vu	L	2010		Occupies Swamp Scrub and saltmarsh communities particularly in near-coastal areas across southern Victoria. Much of the site supports suitable habitat and the species is known from such habitats close to the site. The species is certain to occur within the site.	High
<i>Pseudemoia rawlinsoni</i>	Glossy Grass Skink		nt		2000		Primarily associated with damp environments with dense vegetation like drainage lines, soaks and the margins of creeks. Habitat includes the fringes of coastal saltmarshes. Much of the site supports suitable habitat and the species is known from such habitats close to the site. The species is certain to occur within the site.	High
<i>Varanus varius</i>	Lace Monitor		vu		1973		Occurs in variety of wooded habitats, including woodlands. There are very few records of the species from the vicinity of Western Port.	As per DELWP's habitat model

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in Study Area
Amphibians		EPBC	State List	FFG				
Litoria raniformis	Growing Grass Frog	VU	en	L	1999	PMST	Occupies a variety of permanent and semi-permanent water bodies generally containing abundant submerged and emergent vegetation (DEWHA 2009b). The species was not detected by the present investigation. There are very few old records from the local area and the species is considered unlikely to occur at the site.	Low
Pseudophryne semimarmorata	Southern Toadlet		vu		2013		Occupies a variety of habitats in south-eastern Australia, such as open forests, lowland woodlands and heathlands where adults shelter beneath leaf litter and other debris in moist soaks and depressions. Much of the site supports suitable habitat and the species is known from such habitats close to the site. The species is highly likely to occur within the site.	As per DELWP's habitat model
Invertebrates								
Synemon plana	Golden Sun Moth	CR	cr	L	-	PMST	This diurnal moth inhabits native and some introduced grassland vegetation communities. There are no records of the species from Mornington Peninsula or the vicinity of Western Port and no suitable habitat occurs at the site.	Negligible

C.3 Migratory species (EPBC Act listed)

Table C.3. Migratory fauna species recorded or predicted to occur within 5 km of the study area.
N.B. species reliant on marine environments are not included in the present investigation.

Scientific Name	Common Name	Most recent record
<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	2013
<i>Apus pacificus</i>	Fork-tailed Swift	1986
<i>Bubulcus ibis</i>	Cattle Egret	2013
<i>Hirundapus caudacutus</i>	White-throated Needletail	2013
<i>Merops ornatus</i>	Rainbow Bee-eater	2011
<i>Monarcha melanopsis</i>	Black-faced Monarch	-
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	2013
<i>Rhipidura rufifrons</i>	Rufous Fantail	2010

Appendix D. Photos

DRAFT

Appendix E. Ecology Glossary

Avoid

Avoiding removing any native vegetation when undertaking a use or development. This can be either by not permitting or not going ahead with the use or development, or locating it elsewhere so that removing native vegetation is not required.

Biodiversity

The variety of all life forms, the different plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part.

Biodiversity Interactive Map (BIM)

Web based interactive map available on the DSE website that provides information on the biodiversity of Victoria and displays flora and fauna data from the Victorian Biodiversity Atlas.

Bioregion

Biogeographic areas that capture the patterns of ecological characteristics in the landscape or seascape, providing a natural framework for recognising and responding to biodiversity values. A landscape based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology and vegetation.

Canopy Tree

Is a mature tree greater than 3 m in height and is normally found in the upper layer of a vegetation type. Immature trees that are not yet able to flower and are less than three metres in height are considered part of the understorey (see definition of understorey).

Condition score

The score assigned to a habitat zone that indicates the quality of the vegetation relative to the ecological vegetation class benchmark, usually expressed as a percentage or on a scale of 0 to 1.

Ecological vegetation class (EVC)

A native vegetation type classified on the basis of a combination of its floristic, life form, environmental and ecological characteristics.

Forb

A herbaceous flowering plant that is not a graminoid (grass, sedge or rush).

General biodiversity equivalence score / units

Score or units used to quantify the relative overall contribution of a site to Victoria's biodiversity.

General offset

An offset that is required when a proposal to remove native vegetation is not deemed, by application of the specific-general offset test, to have a significant impact on habitat for any rare or threatened species.

Habitat importance map

A map that indicates the importance of locations as habitat for a particular rare or threatened species. This map is based on modelled data.

Habitat importance score

Measure of the importance of the habitat located on a site for a particular rare or threatened species.

Habitat zone

A discrete area of native vegetation consisting of a single vegetation type (EVC) within an assumed similar quality. This is the base spatial unit for conducting a Habitat hectare assessment. Separate *Vegetation Quality Assessments* (or Habitat hectare assessments) are conducted for each habitat zone within the designated assessment area.

Highly localised habitat

Habitat for rare or threatened species whose habitat is spread over a very restricted area (i.e. less than 2,000 ha). This can also be applied to a similarly limited sub-habitat that is disproportionately important for a wide-ranging rare or threatened species.

Incorporated document

A document that is included in the list of incorporated documents in a planning scheme. These documents affect the operation of the planning scheme.

Indigenous vegetation

The type of native vegetation that would have normally been expected to occur on the site prior to European settlement.

Landholder

An owner, occupier, proprietor or holder of land.

Landscape scale information

Mapped or modelled information based on data collected across the landscape rather than just on a particular site.

Listed species

A flora or fauna species listed under the Commonwealth *Environment Protection and Biodiversity Act 1999* or listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988*.

Local Planning Policy Framework

Framework outlining a Municipal Strategic Statement and the Local Planning Policies that apply to the local government area.

Location risk

The risk that removing native vegetation in a particular location will have an impact on the persistence of a rare or threatened species.

Loss

Loss in the contribution to Victoria's biodiversity when native vegetation is fully or partially removed, as measured in biodiversity equivalence scores or units.

Minimise

Locating, designing or managing a use or development to reduce the impacts on biodiversity from the removal of native vegetation.

Native (indigenous) vegetation

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

Native vegetation extent

Area of land covered by native vegetation or the number of scattered trees.

Native Vegetation Information Management (NVIM) system

An online tool used to access information about Victoria's native vegetation.

No net loss

An outcome where a particular gain in the contribution to Victoria's biodiversity is equivalent to an associated loss in the contribution to Victoria's biodiversity from permitted clearing.

Offset

Protection and management (including revegetation) of native vegetation at a site to generate a gain in the contribution that native vegetation makes to Victoria's biodiversity. An offset is used to compensate for the loss to Victoria's biodiversity from the removal of native vegetation.

Offset Management Plan (OMP)

A document which sets out the requirements for establishment, protection and management of an offset site.

On-site offset

An offset located on the same property as the clearing.

Particular Provisions

Provisions in the Victoria Planning Provisions that relate to specific activities (for example, native vegetation is a Particular Provision).

Patch (see Remnant Patch)**Permit**

A legal document that gives permission for a use or development on a particular piece of land.

Perennial

A plant that lives for more than two years. Perennials include species that are always visible e.g. shrubs and trees, but also include species that are not always visible above ground.

Permitted clearing

Removal of native vegetation for which a planning permit has been granted to remove native vegetation.

Permitted clearing regulations

The rules in the planning system that regulate permits for the removal of native vegetation.

Planning provisions – See Victoria Planning Provisions.

Planning scheme

Policies and provisions for the use, development and protection of land in a local government area.

Planning system

Victoria's land-use planning system that includes the Victoria Planning Provisions and each local government's planning scheme.

Protected species

A flora species protected under the *Victorian Flora and Fauna Guarantee Act 1988*.

Rare or threatened species

A species that is listed in:

- State Advisory List of Rare or Threatened Plants in Victoria as 'endangered', 'vulnerable', or 'rare', but does not include the 'poorly known' category
- State Advisory List of Threatened Vertebrate Fauna in Victoria as 'critically endangered', 'endangered' or 'vulnerable', but does not include 'near threatened' or 'data deficient' categories
- State Advisory List of Threatened Invertebrate Fauna in Victoria as 'critically endangered', 'endangered' or 'vulnerable', but does not include 'near threatened' or 'data deficient' categories.

Referral authority

An authority that a permit application is referred to for decision under Section 55 of the Planning and Environment Act 1987. All referral requirements are specified in Clause 66 of planning schemes.

Remnant patch of native vegetation

Either:

- an area of native vegetation, with or without trees, where at least 25 per cent of the total perennial understorey plant cover is native plants
- an area with three or more indigenous canopy trees where the tree canopy cover is at least 20 per cent.

Remnant vegetation

Native vegetation that is established or has regenerated on a largely natural landform. The species present are those normally expected in that vegetation community. Largely natural landforms may have been subject to some past surface disturbance such as some clearing or cultivation (or even the activities of the nineteenth century gold rushes) but do not include man-made structures such as dam walls and quarry floors.

Responsible authority

The authority charged with the responsibility for administering and enforcing particular aspects of a planning scheme.

Scattered tree

An indigenous canopy tree that does not form part of a remnant patch of native vegetation (see definition of remnant patch of native vegetation).

sp.

Species (one species).

spp.

Species (more than one species).

spp. agg.

Species aggregate

Specific biodiversity equivalence score / units

With reference to a specific species, a score or units used to quantify the relative contribution of a site to Victoria's biodiversity.

Specific offset

If the removal of native vegetation has a significant impact on habitat for a specific rare or threatened species, offsets must compensate for the removal of that particular species' habitat. This is referred to as a specific offset.

State Planning Policy Framework

A collection of clauses in the Victoria Planning Provisions that inform planning authorities and responsible authorities of those aspects of state planning policy which they are to take into account and give effect to in planning and administering their respective areas.

Strategic biodiversity map

A map that shows the relative value of a location in the landscape with regard to its condition, extent, connectivity and the support function it plays for species. The map is based on modelled data.

Strategic biodiversity score

A score that quantifies the relative value of a location in the landscape with regard to its condition, extent, connectivity and the support function it plays for species.

Taxon (plural taxa)

A term used to describe any taxonomic unit. This term is typically used when referring broadly to any scientifically recognised species, subspecies or variety.

Third-party offset

An offset located on a property owned by a person other than the landowner who incurs the native vegetation loss being offset.

Understorey

Understorey is all vegetation other than mature canopy trees – includes immature trees, shrubs, grasses, herbs, mosses, lichens and soil crust. It does not include dead plant material that is not attached to a living plant. More information on understorey life forms is set out in the Vegetation Quality Assessment Manual (DSE 2004).

Victoria Planning Provisions

A list of planning provisions that provides a standard template for individual planning schemes.

Zone

A zone in the Victoria Planning Provisions is a set of permitted uses of land which are defined spatially.