APA Transmission Pty Limited

# Flora and Fauna Assessment Crib Point Pakenham Pipeline Project

10 September 2018

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Experience | Collaboration | Certainty

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# EXECUTIVE SUMMARY

## 1. Background

APA Transmission Pty Limited, a wholly owned subsidiary of the APA Group (together referred to as APA) is proposing to construct and operate a high pressure gas pipeline which will connect AGL's proposed Gas Import Jetty at Crib Point to the Victorian Transmission System (VTS), near Pakenham.

Upon completion, APA transmission pipeline and AGL's Gas Import Jetty will increase energy security and supply stability to Victoria. In addition, the pipeline will present other long-term opportunities for the supply of gas to residential and industrial growth areas along the alignment and the potential for future power generation opportunities across the design life of the pipeline. The pipeline will also be designed in manner that will enable reverse flow from the main VTS connection at Pakenham to future customers connected to the pipeline.

Monarc Environmental (Parent company being LogiCamms Pty Ltd) was engaged by APA to undertake a flora and fauna survey and impact assessment of the project. The purpose of the assessment was to identify any risks to significant flora and fauna values within the construction footprint and provide a review against significant impact criteria under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and other relevant Victorian legislation. Management and mitigation recommendations to reduce impacts on native flora and fauna were also to be summarised.

The following terms are used to describe areas associated with the project in this report.

- Right of Way (ROW) - Corridor generally of 30m width centred on the alignment.
- Alignment - The centreline of the ROW
- Construction footprint - The area of land directly disturbed for construction of the project consisting of the ROW excluding areas where disturbance is avoided such as HDD locations, extra work spaces, temporary access tracks and any other ancillary facilities required to construct the pipeline.
- Study area - The area within and immediately adjacent to the Right of Way. The extent surveyed outside of the ROW included areas of habitat and remnant vegetation that were deemed important environmental features (e.g. large trees, vegetation patches or waterways) that may be impacted by the construction footprint.

## 2. Methods summary

Assessment methods used to detect flora, fauna and vegetation communities within and adjacent to the ROW included:

- A review of information from Victoria's Planning Schemes Online, including Planning Zones, Land Use, Overlays and topographic features.
- A review of public databases maintained by the Commonwealth Department of the Environment and Energy (DoEE) and the Victorian Department of Environment, Land Water and Planning (DELWP) to determine potential significant flora and fauna and vegetation communities in the area. These included a Protected Matters Search Tool (PMST) report, the Groundwater Dependent Ecosystem (GDE) Atlas, the Victorian Biodiversity Atlas (VBA) database and Victorian Nature Kit mapping.
- A review of publicly available reports relating to flora and fauna studies in the project area.

- Flora assessments of the project area, to identify native and non-native species, vegetation communities (EVCs) and possible threatened flora habitat and species.
- Fauna assessments of the project area, to identify the species present and suitable fauna habitat such as logs, debris, long grass, rocks, tree perches and waterways. The fauna assessments included targeted surveys for the Southern Brown Bandicoot (SBB), Growling Grass Frog, Southern Toadlet, Swamp Skink, aquatic surveys of 16 waterways and waterbodies, and a list of bird species observed.

## 3. Results

In general, extensive historical clearing associated with agriculture and horticulture has resulted in most of the construction footprint and surrounding land being largely devoid of remnant native vegetation.

**Flora**

Database searches indicated 57 rare or threatened flora species may be present within the construction footprint. This included 14 species listed on the EPBC Act, 18 listed as protected on the Victorian FFG Act and 33 additional species listed on the Advisory List of Rare or Threatened Plants in Victoria.

During field surveys, 201 flora species were recorded. This included 118 indigenous species, 13 non-indigenous natives and 70 introduced species.

One flora species listed as threatened under state and federal legislation was detected during field surveys. An individual Strzelecki Gum was recorded within the construction footprint at KP21, near Langwarrin Creek.

Three EPBC listed threatened flora species are considered to have a high likelihood of occurrence in the construction footprint, as follows:

- Dense Leek-orchid (Vulnerable - EPBC Act) in Damp Heathy Woodland between KP 1 to 2 as known populations exist in similar habitat nearby at Crib Point and Stony Point.
- Swamp Fireweed (Vulnerable - EPBC Act) in suitable habitat at KP 33.5 as known populations exist nearby at Muddy Gates Lane and Manks Road, and the South Gippsland Railway line.
- Swamp Everlasting (Vulnerable - EPBC Act) in suitable habitat along KP 33.5 as known populations exist nearby at Muddy Gates Lane and Manks Road, and the South Gippsland Railway line.

**Ecological Vegetation Classes (EVCs)**

The field assessments identified predominantly fragmented and largely degraded patches of native vegetation remaining within the construction footprint. These patches often contained a mixture of native and introduced weeds. The ROW was found to intersect 91 patches of remnant vegetation. Of these, 46 will be impacted by the construction footprint, and 45 patches will be avoided using Horizontal Directional Drilling (HDD) and other design modifications.

Clearing of the construction footprint will require removal of 6.802ha of remnant vegetation. Areas of remnant vegetation impacted by the construction footprint are as follows:

- 3.29ha of Endangered EVCs (Swamp Scrub, Swampy Riparian Woodland and Grassy Woodland)
- 2.444ha of Vulnerable EVCs (Damp Heathy Woodland)
- 1.098ha of Least Concern EVCs (Coastal Saltmarsh and Heathy Woodland)

Thirty seven scattered trees require removal within the construction footprint. The Victorian guidelines for the removal of native vegetation require conversion of scattered trees to be removed into an equivalent area of vegetation communities. This equates to an additional 1.457ha of vegetation clearing under the Victorian guidelines.

One EPBC Act community was recorded along the alignment during field surveys and vegetation quality assessments. The Subtropical and Temperate Coastal Saltmarsh ecological community was recorded between KP19 - 19.5, associated with Watson Creek. The construction footprint entirely avoids this community by using HDD to cross Watson Creek.

**Fauna**

The most common habitat types intersected by the construction footprint are: introduced grassland/pasture with occasional remnant native species, areas of vegetable production, remnant patches of native woodland, native forest, scattered trees and aquatic/riparian habitats provided by waterways and dams.

Introduced grassland/pasture and vegetable cropping areas are the most common habitat types, and are generally considered of low habitat value for native fauna. However, some of the native vegetation and introduced vegetation intersected by the construction footprint has been found to provide habitat for species or communities of conservation significance, such as the Southern Brown Bandicoot, Growling Grass Frog, Dwarf Galaxias and Australian Grayling.

Database searches indicated 12 threatened fauna species that have a "High" likelihood of occurrence within the construction footprint. Nine of these listed species were recorded during field surveys, these were: Growling Grass Frog, Southern Toadlet, Australasian Shoveler, Cattle Egret, Eastern Great Egret Hardhead, Lewin's Rail, Southern Brown Bandicoot and the Glossy Grass Skink.

- The Southern Brown Bandicoot (Endangered - EPBC Act) was recorded at eight locations and the species has been assumed to occur at a further 10 locations based on recent records. These 18 locations extend from the South Gippsland Highway (KP30.3) to the Princes Freeway (KP54.4)
- The Growling Grass Frog (Vulnerable - EPBC Act) was recorded at Cardinia Creek South – Bloomfield Lane (KP 40-40.3, site CPT105) but is also assumed present at Cardinia Creek, Ballarto Road (also KP 40-40.3, site CPT106) given both sites are hydrologically connected and in very close proximity.

A total of 3 Commonwealth and/or State listed fish species were identified from the desktop review to have the potential to be present, or their habitat to be present, at watercourses crossed by the alignment. None of these species, which are listed below, were recorded during field surveys:

- Australian Grayling (Vulnerable - EPBC Act) has a 'High' to 'Moderate' likelihood of occurring, due to nearby records, in Cardinia Creek.
- Dwarf Galaxias (Vulnerable - EPBC Act) has a 'High' to 'Moderate' likelihood of occurring in 11 watercourses crossed by the alignment, due to nearby records.
- Flatback Mangrove Goby (Not listed under the EPBC Act but listed under the FFG Act) has a 'High' likelihood of occurrence in the Western Outfall Drain and 'Moderate' likelihood in Watson Creek.

## 4. EPBC Impacts

The removal of a single Strzelecki Gum is not considered to be a significant impact to this species. There is also unlikely to be a significant impact to River Swamp Wallaby Grass, Dwarf Galaxias, Australian Grayling and Growling Grass Frogs with implementation of mitigation measures identified for the project.

The Swamp Fireweed, Dense Leek-orchid and Swamp Everlasting are assumed to occur within suitable habitat present within the construction footprint, however surveys during appropriate seasons have not yet been completed for these species. To mitigate potential impacts to these species it is proposed to undertake surveys during Spring 2018 and to avoid any detected populations by using HDD or by slight modifications to the construction alignment. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. With these measures in place the risk of a significant impact is considered low.

The Southern Brown Bandicoot population along the construction footprint will be subjected to a temporary impact of habitat fragmentation during construction. Implementation of a Construction EMP to control direct impacts and rehabilitation followed by the implementation of an Operational EMP to manage the construction footprint after construction will reduce the risk of significant impact to low.

The Subtropical and Temperate Coastal Saltmarsh ecological community recorded along the shoreline of Western Port Bay at KP19 - 19.5 will be avoided through HDD. As such, the project is not expected to result in a significant impact to this community.

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Threatened Fauna Species Locations

# 1 INTRODUCTION

## 1.1 Project Overview

APA Transmission Pty Limited, a wholly owned subsidiary of the APA Group (together referred to as APA) is proposing to construct and operate a high pressure gas pipeline which will connect AGL's proposed Gas Import Jetty at Crib Point to the Victorian Transmission System (VTS), near Pakenham.

Upon completion, APA transmission pipeline and AGL's Gas Import Jetty will increase energy security and supply stability to Victoria. In addition, the pipeline will present other long term opportunities for the supply of gas to residential and industrial growth areas along the alignment and the potential for future power generation opportunities across the design life of the pipeline. The pipeline will also be designed in manner that will enable reverse flow from the main VTS connection at Pakenham to future customers connected to the pipeline.

The proposed AGL gas importing jetty project will consist of a Floating Storage and Regasification Unit (FSRU) continuously moored at the existing Crib Point Jetty. The FSRU will vapourise the natural gas from a visiting Liquefied Natural Gas (LNG) carrier that will moor directly adjacent to the FSRU. The natural gas will then be transferred to APA's Crib Point Receiving Facility via a marine loading arm and jetty piping. The high pressure gas pipeline will transfer the generated gas from the Crib Point Receiving Facility to the APA Pakenham Delivery Facility where it is conditioned to maintain the operating parameters of the VTS before injection.

Construction is currently planned to commence at the Receiving and Delivering Facilities in June –July 2019 subject to obtaining relevant environmental approvals and granting of a Pipeline License. The pipeline construction is planned to commence in October 2019 with the pipeline system planned to be operational by March 2020. The exact timing is dependent on a number of factors including timing of the required approvals, access agreements with relevant stakeholders and weather conditions.

The construction schedule is driven by the Project objective to receive and transport gas from AGL's first LNG cargo scheduled for first quarter of 2020.

The following terms are used to describe areas associated with the project in this report.

- Right of Way (ROW) - Corridor generally of 30m width centred on the alignment.
- Alignment - The centreline of the ROW
- Construction footprint - The area of land directly disturbed for construction of the project consisting of the ROW excluding areas where disturbance is avoided such as HDD locations, extra work spaces, temporary access tracks and any other ancillary facilities required to construct the pipeline.
- Study area - The area within and immediately adjacent to the Right of Way. The extent outside of the ROW is dependent on the boundary of intersected habitats or environmental features (e.g. large trees, vegetation patches or waterways).

## 1.2 Project Description

The Crib Point Pakenham Pipeline project (the project) consists of the following components:

- Approximately 56km of high pressure gas transmission pipeline with a diameter of 600mm with a minimum cover of 1.2 m from ground level.
- Crib Point Receiving Facility situated at landside of the Crib Point Jetty managed by Port of Hastings Development Authority (PoHDA) which includes metering, pigging facility, nitrogen storage and injection, odourant plant, gas analysers and a vent stack.
- Pakenham Delivery Facility situated adjacent to the Pakenham East Rail Depot, which is within land owned by Public Transport Victoria and include a scraper station, filtration, metering, heating, pigging facility and a vent stack.
- Two mainline valves (MLVs) will be situated along the pipeline at kilometre point (KP)12 and KP40, subject to successfully obtaining tenure. MLVs are provided as a means to isolate the pipeline in segments for maintenance, repair, operation, and for the minimisation of gas loss in the event that pipeline integrity is lost. Once isolated, the gas from the relevant pipeline section may be vented prior maintenance taking place. A typical MLV site comprises of 10 m x 10 m fenced compound.
- Cathodic protection (CP) is to be provided via a combination of crossbonds to existing CP system and the installation of an impressed current system at either of the MLVs which will be determined during detailed design. The pipeline primary corrosion protection system shall be its external coating.

The total area of the construction footprint required for the project is approximately 153ha. Following construction, the easement for the Right of Way (ROW) for the pipeline will be approximately 74ha.

The Crib Point Pakenham pipeline has a design life of 60 years. The design life of other pipeline equipment and sub-systems ranges from 15 to 25 years, but with ongoing integrity management, and subject to appropriate commercial drivers, the operational life is expected to be longer.

## 1.3 Purpose of this report

Monarc Environmental (Parent company being LogiCamms Ltd) was engaged by APA to undertake a flora and fauna survey and impact assessment of the construction footprint. The purpose of the assessment was to identify any risks to significant flora and fauna values within the construction footprint and provide a review against significant impact criteria under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and other relevant Victorian legislation. Management and mitigation recommendations to reduce impacts on native flora and fauna were also to be summarised.

## 1.4 Study Area

An overview of the Study Area is provided in **Figure 1**. From the APA Crib Point Receiving Facility immediately north of the existing jetty facilities (KP0), the alignment generally follows existing oil and gas pipeline infrastructure corridors to the south of Hastings. These infrastructure corridors are followed for the first 5km of the alignment to Reid Parade, Hastings including a 1.7km crossing of Warringine Park, a local conservation reserve managed by the Mornington Peninsula Shire Council. Through Hastings, the alignment generally follows Frankston-Flinders Road, with the exception of where the Stony Point Rail Line corridor is wide enough to accommodate the pipeline for approximately 500m. Within Hastings where the pipeline is co-located with Frankston-Flinders Road, the alignment has been located within the adjacent service road of the main carriageway where possible.

From Graydens Road to the north of Hastings, the alignment is generally located within private property following the crossing of the Stony Point Rail Line and Frankston-Flinders Road (KP9.8). Between KP10.1 and KP29.9 the pipeline is generally co-located adjacent to the Esso Australia oil and gas pipeline corridor. In a number of instances, the alignment diverges from this existing linear infrastructure corridor to avoid social and environmental constraints or to facilitate the proposed construction methodology. The alignment is located to the south of the Western Port Highway and the townships of Tyabb and Pearcedale, with the crossing of Baxter-Tooradin Road at KP25.3. Through the area between KP13 to 25, the alignment is close to Western Port and the associated Ramsar Wetland and the Yaringa Marine National Park.

Following the crossing of Baxter-Tooradin Road (KP25.1), the pipeline is generally located in more open agricultural land and the pipeline diverges from the Esso Australia oil and gas pipeline corridor prior to the crossing of the South Gippsland Highway (KP30.4) to take a more direct route to the east of Pakenham. The pipeline crosses the dis-used Leongatha Rail Line at KP33.7. Between the South Gippsland Highway (KP30.4) and Pakenham South (approximately KP50), the pipeline traverses the low-lying Koo Wee Rup swamp area and several significant drainage features that are maintained by Melbourne Water. Western Contour Drain (KP31), Cardinia Creek (KP40.2), Deep and Toomuc Creeks (KP41.5) are three of the most significant drainage features that the pipeline crosses in between South Gippsland Highway and Pakenham South.

Towards Pakenham, the pipeline crosses the Gippsland Rail Line (KP54.2), prior to reaching the proposed Pakenham Delivery Facility. From this facility, the pipeline then follows Oakview Lane and Mt Ararat Road to reach the terminal point on the Longford-Dandenong Pipeline on the northern side of the Princes Highway. For this to occur there are two significant road crossings of both the Princes Freeway (KP54.9) and the Princes Highway (KP55.9).

**Pipeline construction footprint**

The construction footprint will comprise a 30m wide construction area, and extra work spaces for temporary facilities to support construction. These extra work spaces will include:

- Access tracks (upgrade of existing and construction of new)
- Additional work areas (turn-around points, additional work space for crossings, Horizontal Directional Drilling (HDD) rig set up and, if required, storage areas)

- Water supply tanks and temporary dams for storing water required for dust suppression and hydrostatic testing (pressure testing) of the pipeline.

The width of the construction footprint may be reduced in areas such as sensitive environments and/or water courses. In some cases due to the presence of high conservation value ecosystems or agricultural land, APA will implement a construction methodology such as Horizontal Directional Drilling (HDD) that will negate the need for a construction footprint.

APA is proposing to HDD 16 locations across the alignment. The HDD location and reasoning for the method is described in Table 1.

**Table 1: Location of HDD across the project**

| # | KP | Location of HDD | Feature Description | Max. Depth of HDD (mAHD) |
|---|---|---|---|---|
| **1** | 4 – 4.4 | Warringine Park | HDD to avoid significant flora | 14.5 |
| **2** | 4.6-5 | Warringine Creek | HDD under Warringine Creek | 12 |
| **3** | 7.25 – 7.75 | Kings Creek | HDD under Kings Creek and Hastings Leisure Centre Reserve – Significant vegetation avoidance | 8.5 |
| **4** | 8.9-9 | Craydens Road | HDD under Road crossing Craydens Road to avoid a number of essential services | 6 |
| **5** | 9.9-10.4 | BlueScope Properties | HDD under Bluescope Properties to avoid ESSO underground pipelines | 11 |
| **6** | 14.6-15.2 | Significant Flora | HDD under Significant habitat and vegetation | 12.5 |
| **7** | 17.1- 17.4 | Whitneys Road | HDD under Whitneys Road and avoidance of private infrastructure | 10 |
| **8** | 18.7- 19.6 | Watson Creek | HDD under Ramsar Wetland and EPBC listed salt marsh vegetation community | 14 |
| **9** | 22.7-23.1 | Vowell Road Wetland | HDD under significant aquatic habitat | 14 |
| **10** | 26.8 – 27.3 | Fisheries Road crossing | HDD under Fisheries Road and avoidance of large trees | 6 |
| **11** | 29.7 – 30.3 | South Gippsland Hwy and high value agricultural land | HDD to avoid high value farm land and safely cross under South Gippsland Hwy dual carriage. | 16 |
| **12** | 40 -40.3 | Cardinia Creek | HDD under significant ecosystem | 17 |
| **13 & 14** | 41.45 – 41.9 | Deep Creek and Toomuc Creek – Ballarto Road | HDD under MW asset and significant aquatic habitat | 16 |
| **15** | 54.4 – 54.7 | Princes Fwy Crossing | HDD under Princes Fwy dual carriage | 14 |
| **16** | 55.1 - 55.4 | Princes Hwy Crossing | HDD under Princes Hwy dual carriage | 12 |

**Watercourse Crossing**

Four watercourse crossings proposed to be open-cut (Oliver Creek, Langwarrin Creek, Rutherford Creek, Western Outfall Drain) may have the potential for low water-flow during the proposed construction period. Some of the construction mitigation measures that would be implemented through the CEMP for these features include:

- Installation of flume pipes across access tracks to allow flow and minimise damage to the bed and banks of the waterway;
- Installation of steel plates to block the flow across the water crossing together with high or low flow pumps to maintain flow during the installation of the pipeline. A grate, mesh or similar will be installed over the pump head to reduce the potential for vegetation disturbance or fish to travel into the pipe;
- Salvage of aquatic fauna after plates have been installed and prior to construction or excavation;
- Divert water to a dam or back to the waterway through a filtration system to prevent turbidity and sedimentation (e.g. rock drain or drain lined in geofabric).
- Implementation of suitable sedimentation control measures (such as silt curtains) where appropriate to minimise impacts to water quality; and
- Reinstate works area and re-establish vegetation as soon as possible.

The use of these measures is considered on a case-by-case basis appropriate to the requirements of the waterway and in consultation between environmental and construction site personnel. All waterway crossings will be restored after pipe installation. Restoration of these crossings may use a range of methods to ensure the area is stabilised after construction is complete and the reinstated works are in accordance with any requirements of Melbourne Water as the relevant Catchment Management Authority.

The design of the pipeline is such that its alignment and depth will not impact on the hydrology of the catchment. The remaining risks are limited to the construction phase, thus will be at a local scale and temporarily limited.

Timing the construction to coincide with the times of the year where the waterway crossing points are dry, or have very low flows, will be expected to result in minimal environmental impact during construction. The impact to stream flows is short-term as excavation works for open cut crossing are completed between three to six weeks. The excavation depth is generally to 2.7m to prevent long term erosion impacts and integrity.

The construction footprint and all temporary facilities, temporary access tracks and extra work areas will be progressively decommissioned and reinstated on completion of the construction phase.

Following construction of the pipeline, landowners will be able to resume use of the land. Excavating or erecting permanent structures or buildings over the buried pipeline will be prohibited in accordance with the requirements under the relevant legislation and pursuant to agreements with the landowners. Pipeline markers will be provided at fences, road crossings and other locations as required by Australian Standard 2885 Pipelines - Gas and Liquid Petroleum (AS 2885).


APA Transmission Pty Limited- 31-02984.00

# Crib Point Pakenham Pipeline Project
## Figure 1: Overview of Pipeline Alignment

WORK REQUEST NUMBER: 31-02984.00

DATA SOURCES:
Service Layer Credits: Reference/World_Boundaries_and_Places: Esri, HERE, Garmin
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World_Imagery: Earthstar Geographics, CNES/Airbus DS

| ISSUE DATE | AUTHOR | QA CHECK | APPROVED | MAP REV. | REVISION NOTE |
|---|---|---|---|---|---|
| 20/08/2018 | AB | JH | MV | B | Issued for Review |
| 09/07/2018 | KH | JH | CC | A | Issued for Review |

LEGEND

Pipeline Alignment

monarc ENVIRONMENTAL

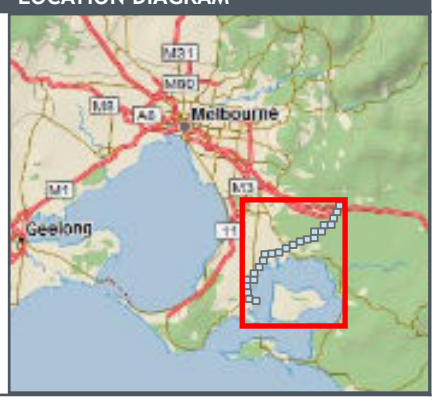
apa

0 1 2
Kilometres

1:120,000

(A3) GDA 1994 MGA Zone 55

LOCATION DIAGRAM




Path: L:\Monarc\ESRI\Clients\APAGasnet\Crib Point to Pakenham\Ecological Assessments\FloraFaunaReport.aprx

## 1.5 Scope of Works

Monarc was commissioned to prepare a consolidated flora and fauna report for the project that included:

- A desktop assessment of ecological values within the construction footprint,
- Field surveys and results for flora and fauna within the construction footprint,
- A summary of targeted species survey results that had been prepared for the construction footprint,
- A permitted native vegetation clearing assessment under Victorian legislation and policy
- An assessment of impacts against the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 significant impact guidelines for Matters of National Environmental Significance,
- A summary of potential mitigation actions to reduce impacts on native flora and fauna.

# 2 METHODS

This Section provides detail on the assessment methods used to detect flora, fauna and vegetation communities within the construction footprint.

## 2.1 Desktop Assessment

Literature relevant to this assessment was reviewed prior to field assessments to guide active searing for native flora and fauna. This literature review accessed publicly available databases and on-line information that included:

- Planning Zones, Land Use, Overlays and topographic features along the construction footprint from Victoria's Planning Schemes Online (www.planning-schemes.delwp.vic.gov.au).
- Public databases such as those maintained by the Commonwealth Department of the Environment and Energy (DoEE) and the Victorian Department of Environment, Land Water and Planning (DELWP) to determine potential significant flora and fauna and vegetation communities in the area. Databases included:
    - A Protected Matters Search Tool (PMST) report was generated in relation to species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) with a buffer of 5km either side of the alignment for listed species and vegetation communities that may occur in the construction footprint.
    - A review of the Groundwater Dependent Ecosystem (GDE) Atlas (http://www.bom.gov.au/water/groundwater/gde/map.shtml) hosted by the Australian Bureau of Meteorology was undertaken to inform the presence or otherwise of GDEs along the construction footprint.
    - The Victorian Biodiversity Atlas (VBA) database (including a buffer of 5km either side of the alignment) was searched and a list of flora and fauna species previously recorded was generated. The VBA database records sightings of all species reported to DELWP (including the locality and date of sighting) along the species conservation status under Commonwealth and Victorian legislation.
    - The Victorian Nature Kit mapping that records and highlights recorded and modelled native vegetation in the form of Ecological Vegetation Classes (EVCs) was searched (http://maps.biodiversity.vic.gov.au/viewer/?viewer=NatureKit).
- Public reports relating to flora and fauna studies of the project area.
- Discussion with Mornington Peninsula Shire council officers and other relevant authorities, such as DELWP officers to determine potential environmental sensitivities of the area such as significant species or land parcels.

## 2.2 Flora Assessment

A preliminary survey was undertaken on 20 December 2017 to gain an understanding of the type and variability of vegetation and habitats from publicly accessible areas and roadside. Flora assessments were then conducted over 10 days between the 21 February 2018 and the 7 March 2018 to identify native and non-native species, vegetation communities (EVCs) and possible threatened flora habitat and species. The approximately 56km alignment was walked where entry to properties was accessible (see Section 2.5 for limitations). All species recorded and vegetation communities mapped. Habitat Hectare assessments of present EVCs were undertaken in line with DELWPs Vegetation Quality Assessment Guidelines (DSE, 2004).

### 2.2.1 Likelihood of Flora Occurrence Method

Habitat requirements of significant flora species previously recorded within 5km of the alignment, or that may potentially occur within the construction footprint, were assessed to determine their likelihood of occurrence within the construction footprint. The likelihood of a species occurring within the construction footprint was then ranked as Negligible, Low, Moderate or High.

Only those species listed under the EPBC Act, listed under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) or considered endangered or vulnerable on the DELWP Advisory Lists (DEPI 2014; DSE 2013; DSE 2009) were assessed to determine their likelihood of occurrence. Descriptions of criteria utilised by Monarc to rank the likelihood of occurrence of flora and fauna within the construction footprint are summarised in **Table 2**. Species that area assessed as having a High likelihood of occurrence were then addressed in the impact assessment.

An assessment of impacts of the project to EPBC or FFG listed threatened species assessed as having a High or Moderate likelihood of occurrence were then undertaken. This assessment followed the EPBC significant impact assessment guidelines (DoE, 2013). The Victorian FFG Act does not have associated significant impact guidelines to refer to for consideration of impact. In these cases, a permit application process is followed for impacts to FFG Act listed or protected species present on public land.

**Table 2: The Likelihood of Occurrence Criteria for Threatened Flora Species**

| Likelihood of Occurrence | Criteria |
|---|---|
| High | Recent reputable records of the species in the local vicinity (i.e. within the last 10 years) e.g. VBA |
| | Known resident in the area based on site observations, database records or expert advice and/or the construction footprint contains high quality habitat |
| Moderate | Previous reputable records of the species in the local vicinity (e.g. VBA); and/or the construction footprint contains moderate quality habitat |
| Low | Limited previous records of the species in the local vicinity; and/or, the construction footprint contains poor or limited habitat. May also be considered low if other environmental factors, such as the fragmented or isolated nature of the habitat, are present |
| Negligible | No suitable habitat and/or outside species range within construction footprint |

## 2.3 Fauna Assessment

A preliminary survey was undertaken on the 20 December 2017 to gain an understanding of the type and variability of fauna and habitats within and adjacent to the construction footprint. General fauna assessments were conducted by foot along the alignment over 10 days between the 21 February 2018 and the 7 March 2018 to identify species. Suitable fauna habitat such as logs, debris, long grass, under rocks, tree perches and waterways within the construction footprint were actively searched. A list of observed bird species was also documented.

### 2.3.1 Likelihood of Fauna Occurrence Method

Habitat requirements of significant fauna species previously recorded within 5km of the alignment, or that may potentially occur within the construction footprint, were assessed to determine their likelihood of occurrence within the construction footprint. The likelihood of a species occurring within the construction footprint will then ranked as Negligible, Low, Moderate or High.

Only those species listed under the EPBC Act, listed under the FFG Act or considered endangered or vulnerable on the DELWP Advisory Lists (DEPI 2014; DSE 2013; DSE 2009) were assessed to determine their likelihood of occurrence. Descriptions of criteria utilised by Monarc to rank the likelihood of occurrence of fauna within the construction footprint are summarised in **Table 3**. These categories are then used in Appendix G and Section 3.3 to determine likelihood of occurrence.

An assessment of impacts of the project to EPBC or FFG listed threatened species assessed as having a High or Moderate likelihood of occurrence were then undertaken. This assessment followed the EPBC significant impact assessment guidelines (DoE, 2013). The Victorian FFG Act does not have associated significant impact guidelines to refer to for consideration of impact. In these cases, a permit application process is followed for impacts to FFG Act listed or protected species present on public land.

**Table 3: The Likelihood of Occurrence Criteria for Threatened Fauna Species**

| Likelihood of Occurrence | Code | Criteria |
|---|---|---|
| High | H1 | Known resident in the area based on site observations, database records or expert advice |
| | H2 | Recent reputable records (within 5 years) of the species in the local area e.g. VBA |
| | H3 | The construction footprint contains the species' preferred habitat |
| Moderate | M1 | The species is likely to visit the area regularly (i.e. at least seasonally) |
| | M2 | Previous reputable records of the species in the local area e.g. VBA |
| | M3 | The construction footprint contains some characteristics of the species' preferred habitat |
| Low | L1 | The species is likely to visit the area occasionally or opportunistically whilst en-route to more suitable sites |
| | L2 | There are only limited or historical records of the species in the local area (i.e. more than 20 years old) |
| | L3 | The construction footprint contains few or no characteristics of the species' preferred habitat |
| Negligible | N1 | No previous records of the species in the local area; or |

| Likelihood of Occurrence | Code | Criteria |
|---|---|---|
| | N2 | Previous records of the species in the local area (eg VBA) but >30 years |
| | N3 | The species may fly over the area when moving between areas of more suitable habitat |
| | N4 | Out of the species' range |
| | N5 | No suitable habitat present within construction footprint |
| | N6 | Species regionally extinct |

### 2.3.2 Targeted surveys

Targeted fauna surveys for threatened species listed under the EPBC Act, FFG Act or the DELWP Advisory Lists was directed by first determining the presence of suitable habitat for such species (See Section 3.3) and then combined with the assessment of species that have a moderate to high likelihood of occurrence. This resulted in targeted surveys being undertaken for the following species:

- Southern Brown Bandicoot (*Isoodon obesulus*), (Endangered - EPBC Act, Listed – FFG Act, Advisory List – Near threatened)
- Growling Grass Frog (*Litoria raniformis*), (Vulnerable - EPBC Act, Listed – FFG Act, Advisory List – Endangered)
- Southern Toadlet (*Pseudophryne semimarmorata*), (Advisory List – Vulnerable)
- Swamp Skink (*Lissolepis coventryi*), (Listed – FFG Act, Advisory List – Vulnerable)
- Various aquatic fauna such as Dwarf Galaxia (*Galaxiella pusilla*).

Specific methods used to detect these species is provided in the below sub-sections.

#### 2.3.2.1 Southern Brown Bandicoot

Surveys for the Southern Brown Bandicoot (SBB) were conducted in accordance with the Commonwealth's EPBC Act guidelines for surveying threatened mammals (DSEWPaC, 2011; DoEE, 2018a). Surveys were undertaken through February, March, April, May-June, July and August of 2018. Surveys consisted of:

- Daytime searches for potentially suitable habitat, such as areas with a dense understorey and thick ground-cover.
- Daytime searches for signs of activity, including tracks, scats, nests and diggings.
- Baited camera traps using one camera per 5 ha in affected areas greater than 30ha (DoEE, 2018a). A minimum of two surveys, each of 14-day duration was conducted, timed at least one month apart and one undertaken following significant rainfall.
- The survey effort presented in this report equates to 35 cameras and 134 survey weeks within the 153ha construction footprint. Based on this area, the DoEE (2018a) recommended survey effort would be 33 cameras (1 per 5ha) and 132 survey weeks.

Further detail can be found in the Southern Brown Bandicoot Targeted Survey Report (Monarc, 2018a).

#### 2.3.2.2 Growling Grass Frog

Growling Grass Frog surveys were undertaken in accordance with Commonwealth EPBC Act Policy Statement 3.14 – Significant Impact Guidelines for the vulnerable Growling Grass Frog (Commonwealth Guidelines) (DEWHA 2009a) which include the following survey condition requirements:

- Nocturnal surveys are to be undertaken between November and March (calling primarily takes place between November and December however the frogs may still be active in March);
- Daytime temperatures prior to survey are to be greater than 15oC with moderate to no wind;
- Night temperatures during survey are to be greater than 12oC with moderate to no wind.
- A minimum of two nights of survey under ideal conditions.

Surveys were conducted at suitable locations along the construction footprint between 2100hrs and 0200 hrs on the 15 March 2018, 16 March 2018, 19 March 2018, 20 March 2018, 23 March 2018, 24 March 2018, 27 March 2018, 28 March 2018. Standard methods including using a combination of active searching with spotlights in appropriate habitat, call recording and call playback (using the advertising call of the male) and a search of banks and emergent vegetation where appropriate. The number of nocturnal surveys undertaken was increased to four to increase chances of detection since March 2018 was at the tail end of the recommended survey period for the species (Heard et al. 2010). Further detail can be found in the Growling Grass Frog Targeted Survey Report (Monarc, 2018b).

#### 2.3.2.3 Southern Toadlet

Southern Toadlet surveys were undertaken in accordance with the methodology prescribed in the Biodiversity Precinct Structure Planning Kit (DSE 2010) which include the following survey condition requirements:

- Survey from March to July.
- Survey techniques include listening for calls/call-playback/active searching/spotlighting.
- Survey two areas for 90 minutes in areas of suitable habitat.

Experienced field zoologists and ecologists from Monarc Environmental conducted nocturnal surveys within the study area on 23 May and 24 May 2018 at eight locations containing suitable habitat. Surveys were conducted between 5:30pm and 01:00am using a combination of listening, call playback (using the advertising calls of male Southern Toadlet), recording and active searching with spotlights in appropriate habitat. This included a search of banks and emergent vegetation where appropriate. Further detail can be found in the Targeted Southern Toadlet Survey Report (Monarc, 2018c).

#### 2.3.2.4 Swamp Skink

The Biodiversity Precinct Structure Planning Kit (DSE 2010) recommends Swamp Skink surveys are undertaken between October and March and that the use of baited Elliott traps should occur over a five-day period.

Targeted surveys for Swamp Skink were conducted from late February to mid-March 2018 using both infra-red, motion sensing cameras and Elliott Traps in three locations. Two of the locations were within Warringine Park at Hastings (a known location for this species) while the third was a strip of swamp scrub adjacent to a coastal environment. Further detail can be found in the Targeted Swamp Skink Report (Monarc 2018d).

### 2.3.3 Aquatic Assessment

Aquatic surveys were undertaken using a combination of visual observation dip-netting, bait traps, fyke netting and electrofishing (backpack) targeting for species such as Dwarf Galaxia (*Galaxiella pusilla*) and the Australian Grayling (*Prototroctes maraena*). Surveys were undertaken on the 16 and 17 April 2018, 14 and 15 May 2018, and the 25, 26, 27 June 2018. The following 16 waterways and waterbodies were surveyed:

- Warringine Creek KP4.98;
- Watson Creek KP19.12;
- Pearcedale South Creek KP19.5;
- Langwarrin Creek KP21.08;
- Lachies Marsh KP21.21;
- Farm Dam and connected drainage channel KP21.65;
- Vowell Drive KP23.0 – 1st Constructed Wetland to the north of Vowell Drive;
- Vowell Drive KP23.0 – 2nd Constructed Wetland to the north of Vowell Drive;
- Craigs Lane KP23.95 – drainage channel;
- Rutherford Creek KP29.78;
- Western Outfall Drain KP31.06;
- Cardinia Creek KP40. 1st location (Ballarto Road);
- Cardinia Creek KP40. 2nd location (Bloomfield Lane);
- Toomuc Creek KP41.45;
- Deep Creek KP41.5;
- Pakenham Creek KP48.2.

Further detail can be found in the Aquatic Assessment Report (Monarc, 2018e).

## 2.4 Permitted Clearing Assessment (the Guidelines)

This section describes the Victorian permitted clearing guidelines and methods of applying those guidelines.

Note: The *Pipelines Act 2005* provides an exemption for clearing native vegetation under the *Planning and Environment Act 1987* but does require the principles of sustainable development (being 'biological diversity should be protected and ecological integrity maintained) to be applied (Clause 4(2)c). This is discussed further in Section 6.4.2.1. Given this link back to sustainable development in the *Pipelines Act 2005*, the Victorian permitted clearing guidelines were still applied to this project.

### 2.4.1 Risk-based Pathway

In Victoria, a permit is required to remove, destroy or lop native vegetation under Clause 52.17 of the Victorian Planning Provisions (VPP) empowered by the Victorian *Planning and Environment Act 1987*. These provisions are outlined in various guidelines discussed below.

In December 2017, the Victorian State Government released a set of reforms to replace the former Permitted clearing of native vegetation – Biodiversity assessment guidelines (DEPI 2013a). The new Guidelines use risk-based pathways, based on the extent of vegetation removed and the location risk, to regulate the approval and conditions association with vegetation clearing.

The *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines) outline how impacts on Victoria's biodiversity are assessed and the appropriate risk based pathway when an application to remove native vegetation is lodged (DELWP 2017a). The Guidelines are an incorporated document in all Victorian Planning Schemes and are applied alongside other requirements of the planning scheme when an application for a permit to remove native vegetation is considered by the responsible authority.

The risk based pathway approach categorises an application into one of three pathways. Taken from DELWP 2017a:

- Basic – limited impacts on biodiversity.
- Intermediate – could impact on large trees, endangered EVCs, and sensitive wetlands and coastal areas.
- Detailed – could impact on large trees, endangered EVCs, sensitive wetlands and coastal areas, and could significantly impact on habitat for rare or threatened species.

The location of the vegetation removal is then assessed in terms of significance for biodiversity. Three location categories have been assigned by DELWP (2007a) and in terms of importance include:

- Location 3 – includes locations where the removal of less than 0.5 hectares of native vegetation could have a significant impact on habitat for a rare or threatened species.
- Location 2 – includes locations that are mapped as endangered EVCs and/or sensitive wetlands and coastal areas (section 3.2.1) and are not included in Location 3.
- Location 1 – includes all remaining locations in Victoria.

Once the risk pathway and the location significance are known the application assessment pathway can be determined using Table 4.

Table 4: Native vegetation removal pathway

| Extent of native vegetation to be removed | Location category | | |
|---|---|---|---|
| | Location 1 | Location 2 | Location 3 |
| Less than 0.5 hectares and not including any large trees | Basic | Intermediate | Detailed |
| Less than 0.5 hectares and including one or more large trees | Intermediate | Intermediate | Detailed |
| 0.5 hectares or more | Detailed | Detailed | Detailed |

The vegetation removal pathway then determines the level of assessment and information required in an application to remove, lop or destroy native vegetation. Under the Detailed pathway a site vegetation assessment would be required as outlined in Section 2.4.2.

### 2.4.2 Vegetation Assessment

From the desktop assessment, Monarc ecologists determined that the construction footprint would be likely to have greater than 0.5ha of native vegetation and that the detailed assessment pathway (Section 2.4.1) would be triggered. Therefore, vegetation was assessed in accordance with the methods outlined in this section.

Native vegetation along the construction footprint was defined under two categories in accordance with the Vegetation Quality Assessment Manual (DSE, 2004) and the Assessors Handbook for assessing applications to remove, destroy or lop native vegetation (DELWP, 2017a). These forms were either as 'remnant patch of native vegetation' or as a 'scattered tree'.

Patches are further defined (DELWP 2017a) as:

- an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or
- any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or
- any mapped wetland included in the current wetlands layer available in NVIM and other DELWP systems.

A scattered tree is defined as

- a native canopy tree that does not form part of a patch.
- Scattered trees have two sizes, small and large:
    - a small scattered tree is less than the large tree benchmark for the species in the relevant EVC
    - a large tree is equal to or greater than the large tree benchmark for the species in the relevant EVC

- a standing dead tree that does not form part of a patch is treated as a large scattered tree if it has a trunk diameter of 40 centimetres or more at a height of 1.3 metres above the ground.

Recorded patches of remnant native vegetation and native scattered trees are described in Section 3.2, Existing Conditions.

### 2.4.3 Avoid and Minimise

Efforts to avoid and minimise removal of remnant native vegetation are a priority under the assessment Guidelines (DELWP 2017a). In accordance with these Guidelines an Avoid and Minimise Statement is required that:

- describes any efforts to avoid the removal of, and minimise the impacts on the biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value.
- The statement should include a description of the following:
    - Strategic level planning – any regional or landscape scale strategic planning process that the site has been subject to that avoided and minimised impacts on native vegetation across a region or landscape
    - Site level planning – how the proposed use or development has been sited or designed to avoid and minimise impacts on native vegetation.
    - That no feasible opportunities exist to further avoid and minimise impacts on native vegetation without undermining the key objectives of the proposal.

Efforts to avoid and minimise removal of remnant native vegetation and scattered native trees is addressed in Section 4.

### 2.4.4 Offset

Native vegetation permitted to be cleared may be offset with approval of Responsible Authority by planting, protection and management of other native vegetation. Under the new Guidelines, these offsets are required to be secured before clearing is approved either:

- Via a security agreement for the offset site that includes an onsite management plan.
- Evidence of a secured third-party offset, such as an allocated credit register extract from the native vegetation credit register.

### 2.4.5 Biodiversity Impact and Offset Requirements (BIOR) Report

Permits for the removal of native vegetation will include conditions from the Responsible Authority that outline any offset requirements. The Offset requirements are determined by DELWPs Environmental Systems Modelling platform (EnSym), and reported in a Biodiversity Impact and Offset Requirements (BIOR) Report. A draft ENSYM report has been prepared for the construction footprint and is discussed in Section 4.2.

## 2.5 Limitations

LogiCamms Consulting Pty Ltd t/a Monarc Environmental (Monarc) has prepared this report on behalf of APA for the Crib Point and Pakenham pipeline project.

The report includes a review of certain information that was obtained from the sources and contacts noted by methods described in the report, including information obtained from APA.

Land access was not available for seven properties (CPT046 & 047, CPT049, CPT075, CPT088, CPT128 & CPT129.), which comprise ~5km of the approximately 56km alignment. Modelled native vegetation available in NatureKit (DELWP 2018b) was utilised to determine native vegetation in these properties.

Surveys provide a sampling of flora at a given time only (February to August in this case). Different seasonal conditions may provide more flora species. While every effort has been taken to identify the significant species that may be expected to occur in the area and, subsequently, to examine parts of the alignment at times appropriate to the flowering of the significant species identified, some other flora species may not have been visible due to dormancy (e.g. orchids or certain herbaceous species which leaf and flower during certain periods of the year but remain underground at other times) or their presence during the survey period as seeds only (e.g. annuals whose life cycle is completed within one season). Targeted surveys for spring flowering orchids identified as having a moderate to high likelihood of occurrence will occur in spring 2018.

Monarc has exercised care in checking and interpreting the data and information referred to in this report. The report program has been designed and managed in good faith and in a manner that seeks to confirm the information available and test its accuracy and completeness. However, Monarc cannot guarantee the accuracy or completeness of that data and information. Accordingly, while our conclusions are based on the information available to us during our assessment of the work area, some of those conclusions could be different if the information upon which they are based is determined to be inaccurate or incomplete.

This report has been prepared specifically for APA for the purpose of understanding their environmental obligations relating to flora and fauna values associated with the Crib Point Pakenham Pipeline project. Any other persons seeking to rely upon this report should only do so after seeking approval from APA and independent expert advice from an Environmental Auditor accredited by DELWP or other appropriately qualified person.

Therefore, any representation, statement, opinion or advice expressed or implied in this report is made in good faith but on the basis, that Monarc, its agents and employees are not liable to any other person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above.

Monarc disclaims any obligation to update the report for events taking place or information becoming available or known to us, after the preparation of this report.

# 3 RESULTS

This section provides information gathered through the desktop reviews and site assessments. Information on natural values including flora, native vegetation communities and fauna is provided along with any relevant conservation status of these values. Appendix H provides detailed figures and mapping of ecological values found along the construction footprint.

## 3.1 Vegetation communities

This section describes the vegetation communities modelled along and recorded within the construction footprint in terms of Victorian Ecological Vegetation Classes, FFG Act listed communities and EPBC Act listed communities.

### 3.1.1 Ecological Vegetation Classes

#### 3.1.1.1 Pre-1750 Ecological Vegetation Classes

DELWP pre-1750 modelled EVC mapping (Table 6) for the Gippsland Plains Bioregion shows that the construction footprint and the immediate surrounds would have originally been dominated by Swamp Scrub (EVC_53) from approximately KP30.0 onwards. In the Western Port area, a variety of EVC's existed to varying extents with Grassy Woodland (EVC_175), Heathy Woodland (EVC_48) and Damp Sands Herb-rich Woodland (EVC_3) having the largest extent. Swampy Riparian Woodland (EVC_83) occurred along the various water courses while Coastal Saltmarsh (EVC_9) was found close to the coast in areas of tidal influence. Lowland Forest (EVC-16) had extensive areas to the west of Hastings and two small areas towards Crib Point. These vegetation types are summarised below in Table 5 (DELWP 2018c). The last 1200m of the alignment is within the Highlands-Southern Fall Bioregion and modelled as Swampy Woodland (EVC_937).

Due to extensive clearing for agriculture and the draining of swamps, historic EVC classes have been vastly reduced in size, distribution and quality, resulting in habitat fragmentation and loss of biodiversity. Extant (2005) EVC mapping shows most of the alignment has been cleared of remnant vegetation and remaining vegetation patches are primarily Heathy Woodland with occurrences of Swamp Scrub (DELWP 2018c).

**Table 5: DELWP modelled pre-1750 Ecological Vegetation Classes within the local area.**

| Bioregion | EVC Number and Name | DELWP Status | Occurrence |
|---|---|---|---|
| Gippsland Plain | 3 Damp Sands Herb-rich Woodland | Vulnerable | Common |
| | 9 Coastal Saltmarsh | Least Concern | Common |
| | 16 Lowland Forest | Vulnerable | Common |
| | 48 Heathy Woodland | Least Concern | Common |
| | 53 Swamp Scrub | Endangered | Common |
| | 83 Swampy Riparian Woodland | Endangered | Common |
| | 175 Grassy Woodland | Endangered | Common |
| | 793 Damp Heathy Woodland | Vulnerable | Naturally Restricted |

| Bioregion | EVC Number and Name | DELWP Status | Occurrence |
|---|---|---|---|
| Highlands-Southern Fall | 937 Swampy Woodland | Endangered | Naturally Restricted |

#### 3.1.1.2 Recorded Ecological Vegetation Classes

The field assessments identified predominantly fragmented and largely degraded patches of native vegetation that remain along the construction footprint and these often contained a mixture of native and introduced weeds.

In general, extensive historical clearing associated with agriculture and horticulture has resulted in most of the construction footprint and surrounding land largely devoid of remnant native vegetation. However, during the field surveys the construction footprint was found to intersect many small patches of remnant vegetation, 91 individual patches were recorded (See Appendix C).

Of the 91 patches, 46 will be impacted by the construction footprint, as 45 patches will be avoided through the use of HDD and other design modifications. Clearing of 6.832 ha of remnant vegetation will be required for the construction footprint comprised of:

- 3.29ha of Endangered EVCs
- 2.444ha of Vulnerable EVCs
- 1.098ha of Least Concern EVCs

This remnant vegetation is summarised in **Table 6** and presented in detailed maps in Appendix H.

**Table 6: Remnant patches of native vegetation identified during the field assessments.**

| Bioregion | EVC Number and Name | DELWP Status | Area within construction footprint (ha) |
|---|---|---|---|
| Gippsland Plain | 9 Coastal Saltmarsh** | Least Concern | 0 |
| | 48 Heathy Woodland | Least Concern | 1.098 |
| | 53 Swamp Scrub | Endangered | 2.615 |
| | 83 Swampy Riparian Woodland | Endangered | 0.264 |
| | 175 Grassy Woodland | Endangered | 0.412 |
| | 793 Damp Heathy Woodland | Vulnerable | 2.444 |

** EPBC Act listed community Subtropical and Temperate Coastal Saltmarsh is included to show there is no impact

The presence of these EVC's was determined based on vegetation composition, soil types and location. The larger areas of remnant vegetation occurred in the reserves (eg Warringine Park, Western Port Coastal Park) and two private properties towards the southern end of the alignment. The remaining remanent patches largely occurred within roadside vegetation and along creek lines and low-lying areas.

Many indigenous scattered trees were also identified either on the alignment, or near the edge of the alignment.

A description of each recorded EVC is provided below.

**EVC_9: Coastal Saltmarsh:**

Coastal Saltmarsh within the *Gippsland Plain Bioregion* is described as occurring on and immediately above marine and estuarine tidal flats and contains distinct floristic communities as bands or zones in the same location, depending on the positioning of the various floristic communities in relation to the saline environment. This EVC consists of a range of life forms including succulent herbs, low succulent shrubs, rushes and sedges (DELWP 2018c).

The occurrence of Coastal Saltmarsh was confined to tidal creeks, especially Watson Creek (KP19.1). The Coastal Saltmarsh at Watson Creek (CPT052) was characterised by Shrubby Glasswort *Tecticornia arbuscular*, a shrubby succulent, Beaded Glasswort *Sarcocornia quinqueflora,* Marsh Saltbush *Atriplex paludosa* subsp. *paludosa*, Sea Rush *Juncus krausii,* Rounded Noon-flower *Disphyma crassifolium* ssp. *clavellatum*, Shiny Swamp-mat *Selliera radicans*, Prickly Spear-grass *Austrostipa stipoides,* and Australian Salt-grass *Distichlis distichophylla*.

**EVC_48: Heathy Woodland:**

Heathy Woodland within the *Gippsland Plain Bioregion* is described spanning a variety of geologies but is generally associated with nutrient-poor soils including deep uniform sands (aeolian or outwash) and Tertiary sand/clay which has been altered to form quartzite gravel. Eucalypt-dominated low woodland to 10 m tall lacking a secondary tree layer and generally supporting a diverse array of narrow or ericoid-leaved shrubs except where frequent fire has reduced this to a dense cover of bracken. Geophytes and annuals can be quite common but the ground cover is normally fairly sparse (DELWP 2018c).

A large contiguous patch of Heathy Woodland was assessed on private property (CPT044 – CPT045) centred around KP15.00. This patch consisted of an overstorey Narrow-leaf Peppermint *Eucalyptus radiata* and Coast Manna Gum *E. viminalis* ssp. *pryoriana*. The understorey of this patch is comparatively intact with a large portion of indigenous understorey species present including Common Heath *Epacris impressa*, Prickly Tea-tree *Leptospermum continentale*, Common Correa *Correa reflexa,* Red-fruit Saw-sedge *Gahnia sieberiana,* Spiny-headed Mat-rush *Lomandra longifolia,* Small Grass Tree *Xanthorrhoea minor*, Small Mosquito-orchid *Acianthus pusillus* and Weeping Grass *Microlaena stipoides*. Weed species in this patch included Radiata Pine *Pinus radiata,* Bluebell Creeper *Billardieria heterophylla,* Bridal Creeper *Asparagus asparagoides* and Boneseed *Chrysanthemoides monilifera*.

**EVC_53: Swamp Scrub:**

Swamp Scrub within the *Gippsland Plain Bioregion* is a closed scrub to 8 m tall at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The EVC is dominated by Swamp Paperbark *Melaleuca ericifolia* (or sometimes Woolly Tea-tree *Leptospermum lanigerum*) which often forms a dense thicket, out-competing other species. Occasional emergent eucalypts may be present. Where light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy / herbaceous ground layer (DELWP 2018c).

Swamp Scrub was mapped at many locations across the alignment, varying in both age and quality between Warringine Park (KP3.2) to approximately KP52.3, on private property. (Appendix D3). The best examples of Swamp Scrub in all its forms were from Warringine Park. Dense, mature Swamp Scrub, with limited understorey except for areas of sun penetration, can be found around KP4.0 – KP4.3 while lower, more open areas supporting a variety of groundcover species are nearby. In the mature stands, logs were common, and the soil showed signs of inundation. The more open areas contained a variety of woody and non-woody species including Prickly Currant-bush *Coprosma quadrifida,* Angled Lobelia *Lobelia anceps,* Shiny Swamp-mat *Selliera radicans,* Swamp Crassula *Crassula helmsii,* Tall Rush *Juncus procerus* and Common Reed *Phragmites australis*.

In some patches, there was a moderate to high coverage of weeds including Sweet Pittosporum *Pittosporum undulatum,* Bridal Creeper, Spear Thistle *Cirsium vulgare,* Blackberry *Rubus fruticosus* agg. and a mixture of pasture grasses. This was especially relevant to linear strips of Swamp Scrub along roadsides and adjacent to paddocks used for grazing livestock.

The presence of Swamp Scrub and a coastal environment can highlight the potential for the FFG Act threatened community of Coastal Moonah Woodland to be present in the area. This community is dominated by Moonah (*Melaleuca lanceolata subsp. lanceolata*) and is thought to have once occupied over 12,500ha on the Mornington Peninsula pre-European settlement but is now restricted to less than 1000ha for its entire Victorian distribution (DSE, 2003). Field surveys did not record the key indicator species of this community within the alignment so it has been determined not to be present.

**EVC_83: Swampy Riparian Woodland:**

Swampy Riparian Woodland within this bioregion is described as woodland to 15 m tall generally occupying low energy streams of the foothills and plains. The lower strata are variously locally dominated by a range of large and medium shrub species on the stream levees in combination with large tussock grasses and sedges in the ground layer (DELWP 2018c).

Most of the remnants of this EVC were of a small size, however one large patch totalling approximately 0.7ha in size was assessed in the northern part of Warringine Park (KP4.7), centring on Warringine Creek southwards towards the fire access track.

This example had an overstorey of Swamp Gum *Eucalyptus ovata* with understorey trees of Swamp Paperbark and a mixture of shrubs including Sweet Bursaria *Bursaria spinosa* and Prickly Tea-tree. The ground layer was a mixture of graminoids including Tall Rush, Kangaroo Grass *Themeda triandra, Austrostipa* spp., Wattle Mat-rush *Lomandra filiformis* and Weeping Grass. Austral Bracken *Pteridium esculentum* was also present in some areas. This patch had been burnt recently leading to cover of medium shrubs being around 200% of benchmark cover for this lifeform.

**EVC_175: Grassy Woodland:**

Grassy Woodland within the *Gippsland Plain* is a variable open eucalypt woodland to 15 m tall or occasionally Sheoak woodland to 10 m tall over a diverse ground layer of grasses and herbs. The shrub component is usually sparse. It occurs on sites with moderate fertility on gentle slopes or undulating hills on a range of geologies (DELWP 2018c).

Remnant vegetation most attributable to this EVC was found in many locations across the construction footprint, including parts of the Frankston Flinders Road reserve. The best example of this community was identified in the northern part of Warringine Park (KP5.0), north of Warringine Creek. This patch,

nearly half a hectare in size, had an overstorey of Eucalypts with Cherry Ballart *Exocarpos cupressiformis,* Black Wattle *Acacia mearnsii* and Black Sheoak *Allocasuarina littoralis* being the characteristic understorey tree species. The shrub layer made up 40% of the cover, being over the benchmark for this community, most probably due in part to recent fire history and being ecotonal with the Swampy Riparian Woodland along Warringine Creek. The shrub species recorded included Hedge Wattle *Acacia paradoxa*, Common Cassinia *Cassinia aculeata*, Cranberry Heath *Astroloma humifusum*, Honey-pots *Acrotriche serrulata* and Prickly Tea-tree. All of these are typical for this community. Groundcovers of herbs and graminoids were also present including Common Raspwort *Gonocarpus tetragynus*, Spiny-headed and Wattle Mat-rushes, Thatch Saw-sedge *Gahnia radula*, Kangaroo Grass, Weeping Grass, Austral Bracken and Apple-berry *Billardiera* sp. Again, these ground cover species are typical of this vegetation community.

Weeds within this patch included the "High Threat" Sweet Vernal Grass *Anthoxanthum odoratum* and other grasses like the Large Quaking Grass *Briza maxima* and Paspalum *Paspalum dilatatum*.

**EVC_793: Damp Heathy Woodland:**

Damp Heathy Woodland within this bioregion is described as woodland to 10 m tall with tall dense heathy understorey which becomes tall scrub if long unburnt in high rainfall areas. The ground layer consists of grasses, herbs, small shrubs and tough-leaved monocots. Developed on sandy soils of moderate to low fertility, typically wet in winter due to impeding layer in soil and dry in summer (DELWP 2018c).

This community was identified in a small number of locations, with all the patches within the first 2.5km of the construction footprint. These patches had Swamp Gum in the overstorey, where an overstorey was present, Prickly Tea-tree, Burgan *Kunzea* sp. and several other shrub species in the understorey. The ground layer had typically characteristic species including Common Raspwort, Scented Sun-dew *Drosera aberrans*, Kangaroo Grass, Sword-sedge *Lepidosperma* sp. and the scrambler, Slender Dodder-laurel *Cassytha glabella*.

Weeds across these areas included Sweet Vernal Grass, Kikuyu *Cenchrus clandestinus,* blackberry and invasive non-indigenous natives like Sweet Pittosporum and Coast Wattle *Acacia longifolia* subsp. *sophorae*.

#### 3.1.1.3 Scattered Indigenous Trees

The construction footprint was found to contain 37 scattered indigenous trees (Table 7). Of the 37 scattered indigenous trees, 11 were large, the remaining were small scattered trees. Each scattered tree is given a tree protection zone in hectares of the EVC the tree would have once contributed towards. This area is then used to calculate the associated offset along with the number of scattered trees proposed for removal. The tree protection zone area of the 37 scattered trees was equal to 1.418ha consisting of:

- 0.874ha of an Endangered EVC
- 0.14ha of a Vulnerable EVC
- 0.404ha of a Least Concern EVC

Table 7: Scattered Tree Results

| Identifier | Type | BioEVC | BioEVC Conservation Status | Large trees | Partial Removal | Condition Score | Polygon Extent | Extent without overlap. Equivalent removal (ha) |
|---|---|---|---|---|---|---|---|---|
| 3-CPP-ST | Scattered Tree | gipp0048 | Least Concern | 1 | no | 0.2 | 0.07 | 0.0700 |
| 4-CPP-ST | Scattered Tree | gipp0048 | Least Concern | 1 | no | 0.2 | 0.07 | 0.0700 |
| 5-CPP-ST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.2 | 0.031 | 0.0000 |
| 6-CPP-ST | Scattered Tree | gipp0049 | Least Concern | 0 | no | 0.2 | 0.031 | 0.0000 |
| 8-CPP-ST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.2 | 0.031 | 0.0310 |
| 9-CPP-ST | Scattered Tree | gipp0048 | Least Concern | 1 | no | 0.2 | 0.07 | 0.0700 |
| 11-KOJH-ST | Scattered Tree | gipp0049 | Least Concern | 1 | no | 0.2 | 0.07 | 0.0700 |
| 18-KOJH-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0310 |
| 28-CPP-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0310 |
| 29-CPP-ST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.2 | 0.07 | 0.0560 |
| 29- KOJH-ST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.2 | 0.07 | 0.0560 |
| 30-KOJH-ST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.2 | 0.07 | 0.0700 |
| 31-KOJH-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0310 |
| 32-KOJH-ST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.2 | 0.07 | 0.0700 |
| 44-KOJH-ST | Scattered Tree | gipp0083 | Endangered | 0 | no | 0.2 | 0.031 | 0.0260 |
| 45-KOJH-ST | Scattered Tree | gipp0083 | Endangered | 0 | no | 0.2 | 0.031 | 0.0260 |
| 56-KOJH-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0290 |
| 57-KOJH-ST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.2 | 0.07 | 0.0550 |
| 58-KOJH-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0100 |
| 59-KOJH-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0310 |
| 60-KOJH-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0310 |
| 65-CPP-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0310 |
| 67-CPP-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0270 |
| 68-CPP-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0270 |
| 69-CPP-ST | Scattered Tree | gipp0003 | Vulnerable | 1 | no | 0.2 | 0.07 | 0.0700 |
| 75-CPP-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0290 |
| 79-CPP-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0290 |
| 80-CPP-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0280 |
| 81-CPP-ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.2 | 0.031 | 0.0280 |
| 82-CPP-ST | Scattered Tree | gipp0003 | Vulnerable | 1 | no | 0.2 | 0.07 | 0.0700 |
| 96-CPP-ST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.2 | 0.031 | 0.0310 |
| 100-CPP-ST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.2 | 0.031 | 0.0310 |
| 141-CPP-ST | Scattered Tree | hsf_0937 | Endangered | 0 | no | 0.2 | 0.031 | 0.0310 |
| 142-CPP-ST | Scattered Tree | hsf_0937 | Endangered | 0 | no | 0.2 | 0.031 | 0.0300 |

| Identifier | Type | BioEVC | BioEVC Conservation Status | Large trees | Partial Removal | Condition Score | Polygon Extent | Extent without overlap. Equivalent removal (ha) |
|---|---|---|---|---|---|---|---|---|
| 143-CPP-ST | Scattered Tree | hsf_0937 | Endangered | 0 | no | 0.2 | 0.031 | 0.0300 |
| 144-CPP-ST | Scattered Tree | hsf_0937 | Endangered | 0 | no | 0.2 | 0.031 | 0.0310 |
| 146-CPP-ST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.2 | 0.031 | 0.0310 |
| **Total** | | | | **11** | | | | **1.418** |

#### 3.1.1.4 Planted Native Vegetation

Planted native vegetation was recorded at various locations along the construction footprint. Offsets associated with the removal of planted native vegetation, if required, will be determined by APA in consultation with relevant landowners and DELWP.

#### 3.1.1.5 Non-native Vegetation

Under the CaLP Act, landholders have a duty to prevent the growth and spread of regionally controlled weeds (non-native vegetation) on their property and on adjoining roadsides and to eradicate regionally prohibited weeds. Declaration and management of weed issues within these catchments are undertaken by PPWCMA.

The field surveys noted the prevalence of opportunistic weed infestations throughout the proposed construction footprint and surrounding areas, particularly in agricultural properties. These include common and widely distributed weed species like Plantain *Plantago* spp. and Sheep Sorrel *Acetosella vulgaris*. Declared noxious weeds (Agriculture Victoria, 2018) such as Blackberry *Rubus fruticosa* agg, Gorse *Ulex europaeus* and Spear Thistle *Cirsium vulgare* were also present. These weeds are listed as regionally controlled within the Port Phillip and Western Port catchment (**Table 8** below). Other species may be used as pasture but considered a weed species outside of these areas, such examples include Phalaris *Phalaris* spp. and Oats *Avena* spp. which have invaded many roadside areas with remnant native vegetation. The success of invasive weed species is expected to persist with current land use.

**Table 8: Summary of Declared Noxious Weeds occurring in construction footprint**

| Scientific Name | Common Name | Declared Noxious Weed Status PPWCMA |
|---|---|---|
| *Allium triquetrum* | Angled Onion | Regionally Restricted |
| *Asparagus asparagoides* | Bridal Creeper | Regionally Restricted |
| *Chrysanthemoides monilifera* | Boneseed | Regionally Controlled |
| *Cirsium vulgare* | Spear Thistle | Regionally Controlled |
| *Crataegus monogyna* | Hawthorn | Regionally Controlled |
| *Cysticus scoparius* | English Broom | Regionally Controlled |
| *Genista linifolia* | Flax-leafed Broom | Regionally Controlled |
| *Genista monspessulana* | Cape Broom | Regionally Controlled |

| Scientific Name | Common Name | Declared Noxious Weed Status PPWCMA |
|---|---|---|
| *Lycium ferocissimum* | African Boxthorn | Regionally Controlled |
| *Oxalis pes-caprae* | Soursob | Regionally Restricted |
| *Rosa rubiginosa* | Sweet Briar | Regionally Controlled |
| *Rubus fruticosa* spp. agg. | Blackberry | Regionally Controlled |
| *Salix* sp. | Willow | Regionally Restricted |
| *Ulex europeus* | Gorse | Regionally Controlled |
| *Watsonia meriana* var *bulbilifera* | Wild Watsonia | Regionally Controlled |
| *Xanthium spinosum* | Bathurst Burr | Regionally Controlled |

Four of the above noxious weeds are also identified as Weeds of National Significance (WoNS) (DOEE 2018). These are Bridal Creeper, Boneseed, Blackberry and Gorse.

Weeds can impact on both agricultural productivity and biodiversity. Appropriate measures to manage the potential spread or introduction of weeds during construction will be required and included in the Construction Environment Management Plan to be prepared for the project.

### 3.1.2 FFG Act listed communities

One FFG Act listed community was identified with the potential to occur within the ROW. This community is known as:

**Herb rich Plains Grassy Wetland (West Gippsland) Community**

The Herb rich Plains Grassy West Gippsland) Community typically occurs in shallow (less than 50cm deep) 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.

It is estimated that less than 70 ha of this community still exists, including degraded areas. Remnants occur at Barnbam Swamp at Lyndhurst, along the fringe of the former Carrum Carrum Swamp, on private land at Braeside Park, and along rail reserves between Dandenong and Cranbourne, Dandenong and Berwick and Clyde and Tooradin. The Clyde to Tooradin rail reserve crosses Manks Road and Muddy Gates Lane at the point where the pipeline crosses at KP33.5.

The site assessment of the alignment within the rail reserve between Muddy Gates Lane and Manks Road found this area of the construction footprint to be almost exclusively Phalaris, Common Reed, blackberries and a mixture of pasture grasses.

However, adjacent to and North of the construction footprint, and south of the rail line, there is a shallow depression that held water at the time of the last site visit. It is likely this area that is outside the construction footprint may be Herb rich Plains Grassy Wetland.

One of the characteristic species, Water Ribbons *Triglochin procerum,* of this community was observed to be present during a brief visit in early August 2018. The presence of Herb rich Plains Grassy Wetland

West Gippsland) Community will be confirmed or when the additional flora surveys are undertaken in Spring 2018.

### 3.1.3 EPBC Act listed communities

Three EPBC Act listed communities have potential to occur along the construction footprint based on the EPBC Act Protected Matters Search Tool (Appendix B). These are:

- Natural Damp Grassland of the Victorian Coastal Plains – Critically Endangered
- Subtropical and Temperate Coastal Saltmarsh - Vulnerable
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland - Critically Endangered

One of these communities, Subtropical and Temperate Coastal Saltmarsh, was detected during field surveys and vegetation quality assessments, using the thresholds provided in the relevant Policy document (DSEWPaC 2013b).

The description of each of the EPBC Act listed communities used to assess presence or absence is provided below.

**Natural Damp Grassland of the Victorian Coastal Plains:**

The Natural Damp Grassland of the Victorian Coastal Plains is a type of grassland dominated by tussock grasses, typically with a sparse presence of trees and shrubs. It is generally found at elevations less than 100 metres above sea level, on heavy grey silty-loamy soils that are poorly draining, often damp and sometimes waterlogged. The ecological community is limited to southern Victoria, and has a disjunct distribution on the coastal plains. There are known occurrences in south Gippsland, the head of Western Port Bay, Philip Island, Mornington Peninsula and the Bellarine Peninsula. The Natural Damp Grassland of the Victorian Coastal Plain corresponds to EVC 132_62 Plains Grassland (South Gippsland) Community (FFG Act).

The grassland generally is dominated by tussock grasses, notably *Themeda triandra* (kangaroo grass) on drier sites, or *Poa labillardierei* (tussock grass) on wetter sites. The range of grasses and forbs present includes species associated with damp sites. (DoE 2015c). The diagnostic tussock grasses were not recorded along the ROW in a density that represents Natural Damp Grassland of the Victorian Coastal Plains.

**Subtropical and Temperate Coastal Saltmarsh:**

The Subtropical and Temperate Coastal Saltmarsh ecological community occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coasts. It is typically found on sandy or muddy substrate and may include coastal clay pans or similar areas. It occurs in places with at least some tidal connection, including rarely-inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences. The ecological community may also include areas that have groundwater connectivity to tidal water bodies.

The ecological community consists of dense to patchy areas of mainly salt-tolerant vegetation (halophytes) including: grasses, herbs, sedges and shrubs that may also include bare sediment as part of the mosaic). Characteristic plant species include *Gahnia filum*, *G. trifida*, *Juncus kraussii*, *Samolus*

*repens*, *Sarcocornia quinqueflora*, *Sporobolus virginicus*, *Suaeda australis*, *Tecticornia pergranulata*, *T. arbuscula*, *Triglochin striata*, *Wilsonia backhousei* and *W. rotundifolia*.

Succulent herbs, shrubs and grasses generally dominate and vegetation is generally of less than 0.5 m height (with the exception of some reeds and sedges). Many species of non-vascular plants are also found in saltmarsh including epiphytic algae, diatoms and cyanobacterial mats.

The ecological community is inhabited by a wide range of fauna such as prawns, fish and water birds. The dominant marine residents are benthic invertebrates, including molluscs and crabs.

The Subtropical and Temperate Coastal Saltmarsh ecological community corresponds with two EVCs (EVC 9 Coastal Saltmarsh aggregate & EVC 10 Estuarine Wetland) that are limited to the coastal bioregions in Victoria (DoE 2018). This community exists along the shoreline of Western Port Bay at KP 19.0- 19.5 where it will be avoided through the use of HDD.

**White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland:**

This listed community can occur either as woodland or grassland from which the trees have been removed. It has a ground layer dominated by native tussock grasses and herbs (that is, greater than 50%) and a sparse, scattered shrub layer (less than 30%). White Box (*Eucalyptus albens*), Yellow Box (*E. melliodora*) or Blakely's Red Gum (*E. blakelyi*) dominate the community where a tree layer still occurs (DEH 2006a).

In Victoria, the community tends to occur on the slopes and tablelands on the northern side of the Great Dividing Range (GDR). The EVCs that may correspond to this community include Valley Grassy Forest (EVC 47) and Grassy Woodland (EVC 175).

## 3.2 Flora

Database searches identified a total of 67 rare or threatened flora species of relevance to the construction footprint. These comprised 14 species listed on the EPBC Act, 18 listed as protected on the Victorian FFG Act and 33 species listed on the Advisory List of Rare or Threatened Plants in Victoria.

A total of 201 flora species were recorded during field surveys. These comprised of 118 indigenous species, 13 non-indigenous natives and 70 introduced species.

One threatened flora species was recorded during field surveys. A single *Eucalyptus strzeleckii* was recorded within the construction footprint at KP21 near Langwarrin Creek.

Flora surveys were undertaken during Summer, Autumn and Winter 2018. This timing and some delayed access to properties were not ideal to detect the EPBC Act listed Dense Leek-orchid, Swamp Fire Weed, Swamp Everlasting or FFG Act listed Merran's Sun Orchid. These species are considered to have a high likelihood of occurrence in the construction footprint at the following locations:

- Dense Leek-orchid (Vulnerable - EPBC Act) in Damp Heathy Woodland between KP 1 to 2 as known populations exist in similar habitat nearby at Crib Point and Stony Point.
- Swamp Fireweed (Vulnerable - EPBC Act) in suitable habitat at KP 33.5 as known populations exist nearby at Muddy Gates Lane and Manks Road, and the South Gippsland Railway line.

- Swamp Everlasting (Vulnerable - EPBC Act) in suitable habitat along KP 33.5 as known populations exist nearby at Muddy Gates Lane and Manks Road, and the South Gippsland Railway line.
- Merran's Sun Orchid (Listed FFG Act) in Damp Heathy Woodland between KP 1 to 2 as known populations exist in similar habitat nearby at Crib Point.

Further surveys for these species in areas of suitable habitat are proposed to be undertaken:

- November – March for Swamp Fire Weed and Swamp Everlasting
- September – November for Dense Leek-orchid and Merran's Sun Orchid

A detailed list of all flora species identified by database searches and recorded during field surveys is provided in **Appendix C**.

The likelihood of occurrence assessment identified 15 rare or threatened flora species with high or moderate likelihood of occurring within the construction footprint, as listed in **Table 9**. A detailed analysis of the likelihood of rare or threatened species occurrence is provided in **Appendix D**.

**Table 9: Threatened Flora identified as having a "High" to "Moderate" likelihood of occurrence in the construction footprint.**

| Common Name | Scientific Name | Status |
|---|---|---|
| | | EPBC/FFG/DELWP |
| River Swamp Wallaby-grass | *Amphibromus fluitans* | VU |
| Marsh Saltbush | *Atriplex paludosa ssp paludosa* | r |
| Grey Mangrove | *Avicennia marina* | r |
| Creeping Rush | *Juncus revolutus* | r |
| Salt Lawrencia | *Lawrencia spicata* | r |
| Dense Leek-orchid | *Prasophyllum spicatum* | VU / en |
| Swamp Fireweed | *Senecio psilocarpus* | VU / vu |
| Marsh Sun-orchid | *Thelymitra longiloba* | en |
| Hoary Sun-orchid | *Thelymitra orientalis* | vu |
| Pallid Sun-orchid | *Thelymitra pallidiflora* | en |
| Crested Sun-orchid | *Thelymitra X irregularis* | r |
| Crimson Sun-orchid | *Thelymitra X macmillanii* | vu |
| Merran's Sun-orchid | *Thelymitra X merraniae* | L / en |
| Swamp Everlasting | *Xerochrysum palustre* | VU/ L / en |
| Strzelecki Gum* | *Eucalyptus strzeleckii* | VU / L / vu |

**Legend:**
*recorded
**EPBC Act**: CE = critically endangered, EN = endangered, VU = vulnerable

**FFG Act**: L = Listed, X = rejected, N = nominated
**Victorian Rare or Threatened list (VROT)**: en = endangered, r = rare, vu = vulnerable, ex = presumed extinct

## 3.3 Fauna

The construction footprint is considered to support six broad habitat types: introduced grassland/pasture with occasional remnant native species, areas of vegetable production, remnant patches of native woodland (Heathy Woodland, Grassy Woodland and Damp Heathy Woodland), scattered trees and aquatic/riparian habitats (Coastal Saltmarsh, Swamp Scrub and Swampy Riparian Woodland) provided by waterways and dams (See Table 6 for areas within the construction footprint).

Introduced grassland/pasture and vegetable cropping areas are the most common habitat in the construction footprint and are generally considered of low habitat value for native fauna. However, some of the native vegetation and introduced vegetation intersected by the construction footprint has been found to provide habitat for species or communities of conservation significance such as the Southern Brown Bandicoot.

Database searches identified a total of 42 rare or threatened fauna species of relevance to the construction footprint. These comprised 16 species listed on the EPBC Act, 20 listed as protected on the Victorian FFG Act and 6 species listed on the Victorian Advisory List of Threatened Vertebrate Fauna.

A total of 145 fauna species were recorded during field surveys. This included two macroinvertebrates, eight amphibians, 101 birds, 10 fish, 19 mammals and five reptiles. Twenty-three of the recorded fauna species were introduced species.

A detailed list of all fauna species identified by database searches and recorded during field surveys is provided in **Appendix E**.

The likelihood of occurrence assessment, determined by the suitability of habitat and recent records, identified 16 rare or threatened fauna species with high or moderate likelihood of occurring within the construction footprint, as listed in Table 10. A detailed analysis of the likelihood of rare or threatened species occurrence is provided in **Appendix F**.

**Table 10: Threatened Fauna identified as having "High" or "Moderate" likelihood of occurrence or occurred in the construction footprint.**

| Common Name | Scientific Name | Recorded in the construction footprint | Conservation Status | | |
|---|---|---|---|---|---|
| | | | EPBC | FFG | VTVF |
| Australasian Shoveler | *Anas rhynchotis* | Y | | | vu |
| Australian Grayling | *Prototroctes maraena* | | VU | L | vu |
| Baillons Crake | *Porzana pusilla palustris* | | Mr | L | vu |
| Blue-billed Duck | *Oxyura australia* | | | L | en |
| Cattle Egret | *Ardea ibis* | Y | Mr | | |
| Dwarf Galaxis | *Galaxiella pusilla* | | VU | L | en |
| Eastern Great Egret | *Ardea modesta* | Y | Mr | L | vu |
| Glossy Grass Skink | *Pseudemoia rawlinsoni* | Y | | | vu |

| Common Name | Scientific Name | Recorded in the construction footprint | Conservation Status | | |
|---|---|---|---|---|---|
| | | | EPBC | FFG | VTVF |
| Growling Grass Frog | *Litoria raniformis* | Y | VU | L | en |
| Hardhead | *Aythya australis* | Y | | | vu |
| Latham's Snipe | *Gallinago hardwickii* | | M, Mr | | nt |
| Lewin's Rail | *Lewinia pectoralis pectoralis* | Y | | L | vu |
| Southern Brown Bandicoot | *Isoodon obesulus obesulus* | Y | EN | L | nt |
| Southern Toadlet | *Pseudophryne semimarmorata* | Y | | | vu |
| Swamp Skink | *Lissolepis coventryi* | | | L | vu |
| White-throated Needletail | Hirundapus caudacutus | | M, Mr | | vu |

**Legend:**
Y = recorded during survey,
**EPBC Act:** CE = critically endangered, EN = endangered, VU = vulnerable, M = migratory, Mr = marine
**FFG Act:** L = Listed, X = rejected, N = nominated
**Victorian Advisory List of Threatened Vertebrate Fauna (VTVF):** en = endangered, r = rare, vu = vulnerable, ex = presumed extinct, nt = near threatened

## 3.4 Targeted Threatened Fauna Surveys

This section describes the results of the Targeted fauna surveys along the construction footprint.

### 3.4.1 Southern Brown Bandicoot

Southern Brown Bandicoots were recorded at eight of the 35 locations were camera surveys were undertaken. In addition, presence of the species has been assumed at a further eight locations based on recent records. These 16 locations extend from the South Gippsland Highway (KP30.3) to the Princes Freeway (KP54.4) (See Table 11). Two of the assumed present sites, East of Koo Wee Rup Road (near KP 46.5) and McDonalds Drain Road Reserve (near KP 48.5), are outside of the ROW.

**Table 11: Southern Brown Bandicoot Survey Results**

| Easement Number | KP | Location | Brief Description | Presence |
|---|---|---|---|---|
| CPT085 | 33.4 | Muddy Gates Drain | A mixture of exotic and native grasses | A |
| Road reserve | 33.4 | Muddy Gates Lane(adjacent to CPT086) | Under a thick Cypress Hedge | A |
| CPT087 | 33.5 | South Gippsland Railway Line (inactive) | A mixture of exotic and native grasses | A |
| CPT088 | 34.6 | Adjacent to Manks Road | Planted Vegetation along fenceline | R |
| CPT091 | 35.4 | Adjacent to Tooradin Station Road | Fallen pine tree in a heavily grassed roadside plantation | R |

| Easement Number | KP | Location | Brief Description | Presence |
|---|---|---|---|---|
| CPT097 | 37.1 | Tooradin Inlet Drain | Blackberries and Phalaris on top of drain bank | R |
| CPT098 | 37.5 | Adjacent to Ridgeways Drain | Hawthorn hedge with blackberries | A |
| CPT106 | 40.0 | Cardinia Creek (Bloomfield Lane) | Heavily planted creek embankment | R |
| CPT105 | 40.4, 40.8, 41.3 | Lower Scrub Gum Creek east of and adjacent to the construction footprint | Heavily planted creek embankment | R |
| CPT108 | 41.6 | Deep Creek | The heavily grassed area adjacent to a watercourse | R |
| CPT 111 | 43.0 | Paddock drain (adjacent on the southern boundary of CPT111, south of Soldiers Road) | A narrow strip dense vegetation along a paddock drain. | R |
| CPT118 | 46.25 | Hagelthornes Drain | Dense phalaris beside drain with Phragmites and blackberries | A |
| CPT120 (1) | 46.3 | East of Koo Wee Rup Rd (#1) | Adjacent to Swamp Scrub in the road reserve | R |
| CPT120 (2) | 46.5 | East of Koo Wee Rup Rd (#2) | Adjacent the dense phalaris and Phragmites and **outside of the ROW**. | A |
| CPT125 | 48.4 | Pakenham Creek | On levee bank of creek amongst gorse and swamp scrub | A |
| Road reserve | 48.4 | McDonalds Drain Road (Adjacent to CPT126) | In road reserve amongst blackberries and **outside of ROW** | A |

Key: R = recorded, A = assumed present

Habitat where the Southern Brown Bandicoot was recorded or is likely to occur in variable habitat ranging from intact native vegetation to highly disturbed patches in agricultural or semi-urban areas, where weeds dominate the vegetation.

Further detail can be found in the Targeted Southern Brown Bandicoot Survey Report (Monarc 2018a).

### 3.4.2 Growling Grass Frog

Growling Grass Frog was recorded at Cardinia Creek South – Bloomfield Lane (KP 40-40.3, site CPT105) but is also assumed present at Cardinia Creek, Ballarto Road (also KP 40-40.3, site CPT106) given both sites are hydrologically connected and in very close proximity. These sites will be avoided from impact using Horizontal Directional Drilling (HDD) techniques.

Growling Grass Frogs tend to be associated with permanent still or slow flowing waterbodies such as streams, farm dams and billabongs. They can also use temporarily inundated waterbodies for breeding purposes, provided that they contain water over the breeding season. Typically, the species prefers well vegetated water bodies that support extensive areas of emergent, submerged and floating vegetation as these provide both basking sites and protection from predators as well as areas for egg deposition (DEWHA 2009b). Growling Grass Frogs were not recorded but may be present at the following locations which provide suitable habitat for the species:

- KP 20.32
- KP 23.05 – avoided by HDD
- KP 31.1
- KP 41.5 – avoided by HDD
- KP 48.55

Further detail can be found in the Targeted Growling Grass Frog Survey Report (Monarc 2018b).

### 3.4.3 Southern Toadlet

The Southern Toadlet was observed under leaf litter on the western side of the pond at CPT009 (KP2.25) and is outside of the construction footprint (See map 2 of24). The pond at this location was devoid of aquatic vegetation, however, shrubby vegetation such as Swamp Paperbark and Hedge Wattle, adjacent to the pond, supplied leaf litter on the pond's edge.

Further detail can be found in the Targeted Southern Toadlet Survey Report (Monarc 2018c).

### 3.4.4 Swamp Skink

Swamp Skink was not physically recorded during the targeted survey. However, recent records from the VBA indicate that Swamp Skinks have been recorded within 300m of the construction footprint as recently as January 2018. Suitable habitat includes wetlands or swampy heaths with dense vegetation, including both freshwater and saltmarsh habitats (Clemann, Chapple & Wainer 2004) or swamp margins, tea-tree thickets and even tidal saltmarshes (Wilson & Swan 2013).

Further detail can be found in the Targeted Swamp Skink Survey Report (Monarc 2018d).

### 3.4.5 Aquatic Survey

A total of 3 Commonwealth and/or State listed fish species were identified from the desktop review to have the potential to be present, or their habitat to be present, in the region that the crossings were located.

- Australian Grayling (Vulnerable - EPBC Act) has a 'High' to 'Moderate' likelihood of occurring, due to nearby records, in Cardinia Creek (Ballarto Road and Bloomfield Lane ends)
- Dwarf Galaxias (Vulnerable - EPBC Act) has a 'High' to 'Moderate' likelihood of occurring, due to nearby records.
- Flatback Mangrove Goby (Not listed under the EPBC Act but listed under the FFG Act) has a 'High' likelihood of occurrence in the Western Outfall Drain (recent records) and 'Moderate' likelihood in Watson Creek (possible regular visitor).

None of these species were recorded during the surveys, however, all three are relatively cryptic, difficult to survey and the timing of the surveys did not necessarily fall within the optimal time for detection.

Dwarf Galaxias (Vulnerable - EPBC Act) has a "High' to 'Moderate' likelihood of occurrence, due to either being a known resident, having recent records (<5 years) or there being suitable habitat in the 10 watercourses listed below. Note that impacts to five watercourses are avoided by HDD:

- KP 4.98 - Warringine Creek – avoided by HDD
- KP 19.12 – Watson Creek* - avoided by HDD
- KP 19.5 - Pearcedale South Creek
- KP 21.08 - Langwarrin Creek
- KP 21.21 CPT 60 (dam and Lachies Marsh)
- KP 23.95 - Craigs Lane Drain
- KP 31.06 - Western Outfall Drain
- KP 40 - Cardinia Creek (Ballarto Road and Bloomfield Lane ends) – avoided by HDD
- KP 41.45 - Toomuc Creek – avoided by HDD
- KP 41.5 - Deep Creek - avoided by HDD
- KP 48.2 - Pakenham Creek

*The likelihood of occurrence of Dwarf Galaxia in Watson Creek is likely to be low. However, considering the Dwarf Galaxia Action Statement (DELWP 2015c) refers to historical records in Watson Creek as an important population, it has been included in this list for the low probability that it may be present during construction of the pipeline. Nonetheless, impact on this species will be avoided by HDD.

The surveys of the waterbodies resulted in the identification of 17 species including;

The surveys of the waterbodies resulted in the identification of 17 species including;

- 6 species of indigenous native freshwater fish
- 1 native, but not indigenous species of fish (i.e. introduced and indigenous to Qld/NSW)
- 1 species of estuarine/marine fish
- 7 species of introduced fish including 2 species that are listed as noxious under Section 75 of the Fisheries Act (European Carp and Gambusia)
- 2 species of common freshwater crustacean (shield and glass shrimp)
- 1 species of common estuarine/marine crustacean (crab)
- Likely 1 species of native aquatic mammal (as determined by the identification of an active and likely native water rat burrow)

The greatest numbers of fish retrieved were all introduced species, with Gambusia being collected from nine waterways and waterbodies. No Commonwealth or State listed species were recorded.

The presence of predatory and competitive fish such as Gambusia and Redfin Perch may impact on the likely presence of native species. It should be noted that several waterways were dry at the time of surveys and they weren't investigated or surveyed for signs of habitat characteristics that may suit Dwarf Galaxias (i.e. crayfish burrows). Being dry does not significantly reduce the likelihood of Dwarf Galaxias occurring or utilising these sites during wetter times of the year. The watercourses include:

- KP 33.4 - Muddy Gates Drain
- KP 45.01 - Hagelthornes Drain
- KP 37.1 - Tooradin Inlet Drain.

## 3.5 Ramsar Wetlands

The EPBC Act Protected Matters Search Tool (Appendix A) identifies the presence of the Western Port Ramsar site adjacent to the construction footprint. The boundary of the Western Port Ramsar site has been identified by the Victorian Government (DEPI 2013) and largely follows the landward boundary of the Saltmarsh, and mudflats of Western Port Bay. Neither of these communities are subject to removal as part of this project. This Ramsar boundary is within 20-50m to the construction footprint near Crib Point but the construction footprint doesn't intrude into the Ramsar site.

At KP18.7-19.6 the alignment intersects Watson Creek that feeds into the Ramsar wetland. At this location Watson Creek is proposed to be crossed using a HDD technique to avoid impacts to the wetland.

## 3.6 Groundwater Dependent Ecosystems

There were no known subterranean Groundwater Dependent Ecosystems found along the construction footprint. The groundwater dependent ecosystem mapping which is supported by the Bureau of Meteorology, shows aquatic and terrestrial GDE's across much of Australia, however only Queensland and Tasmania have been mapped for subterranean GDE's.

Aquatic and Terrestrial Groundwater Dependent Ecosystems were identified along the construction footprint however these GDEs are not listed on the EPBC Act.

# 4 PERMITTED CLEARING ASSESSMENT

This section is based on Victorian vegetation clearing policy.

## 4.1 Risk-based Pathway

Calculation of the extent of native vegetation removal equates to 8.259ha and 43 Large Trees. Note that the 43 Large Trees was the total generated by EnSym after integrating the Large Tree components of the habitat patches to be removed, in addition to the 37 Scattered Trees identified within the construction footprint (Appendix G). The construction footprint is within Location 3, which refers to:

> The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species. The native vegetation is also in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map); and a wetland designated under the Convention on Wetlands of International Importance (the Ramsar Convention); and an internationally important site for Migratory Shorebirds of the East Asian-Australasian Flyway

Therefore, the Detailed Assessment Pathway is required.

## 4.2 Offset Targets

The detailed Scenario test – native vegetation removal (EnSym) report is found in Appendix G with a summary in **Table** 12. Detail on the individual scattered tree and remnant patch offsets are provided.

This EnSym report provides information for internal testing of different proposals to remove native vegetation and is not the formal application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria. A report will be obtained from the Department of Environment, Land, Water and Planning (DELWP) for the final alignment.

**Table 12: Summary of EnSym results for the alignment.**

| EnSym calculations | |
|---|---|
| **General offset amount** | **0.577 general habitat units** |
| **Vicinity** | **Port Phillip and Western Port Catchment Management Authority (CMA) or Cardinia Shire, Mornington Peninsula Shire Council** |
| **Minimum strategic biodiversity value score** | **0.340** |
| **Large trees*** | **22 large trees** |
| **Species offset amount** | **3.423 species units of habitat for Coast Fescue, *Poa billardierei***<br>**4.853 species units of habitat for Coast Twin-leaf, *Zygophyllum billardierei*** |

| | |
|---|---|
| | **4.669 species units of habitat for Coast Wirilda, *Acacia uncifolia***<br>**4.515 species units of habitat for Coast Bitter-bush, *Adriana quadripartita*** |
| **Large trees*** | **21 trees** |
| *** The total number of large trees that the offset must protect** | **43 large trees to be protected in either the general, species or combination across all habitat units protected** |

The EnSym calculations include species offset amounts for most of the scattered tree offsets. Discussion with DELWP is recommended as many of these scattered trees are within disturbed road reserves and paddocks that contain pasture and the species offset amounts may not apply.

# 5 POTENTIAL IMPACTS

This section identifies the potential impacts of the project on the biodiversity values of the study area (Section 1.4) and construction footprint.

## 5.1 Impacts summary

The direct impacts outlined in Table 13 are expected to occur because of the project, following measures to avoid and minimise impacts on biodiversity values have already been implemented through eight versions of route selection.

**Table 13: Summary of direct impact to biodiversity values**

| Biodiversity Values | Level of Direct Impact |
|---|---|
| Native vegetation | Removal of 6.823 hectares comprising 4 EVCs (remnant patches and areas of scattered trees) within the project construction footprint, as follows:<br>• 3.29ha of Endangered EVCs<br>• 2.444ha of Vulnerable EVCs<br>• 1.098ha of Least Concern EVCs<br>• 11 Large Scattered Trees<br>• 26 Small Scattered Trees |
| **TECs listed under the Commonwealth EPBC Act** | No direct impacts to TECs listed under the EPBC Act have been determined for the construction footprint. |
| **EBPC Act listed flora species** | Removal of 1 Strzelecki Gum. |
| **EBPC Act listed fauna species** | Removal of habitat for the following EPBC act listed species:<br>• Southern Brown Bandicoot<br>• Growling Grass Frog<br>• Dwarf Galaxias<br>• Australian Grayling |
| **Aquatic habitats** | Short-term localised impact of trenching to banks and beds of waterways not crossed by HDD. |

**Table 14** provides a summary of the indirect impacts on biodiversity values considered likely to occur because of the project.

Table 14: Summary of indirect impact to biodiversity values

| Biodiversity Values | Level of Indirect Impact |
|---|---|
| **Native vegetation and fauna habitat** | Removal of 6.832ha of native vegetation that potentially provides habitat for threatened and non-threatened mobile fauna species either now or into the future. |
| **Unexpected threatened species** | Potential impacts on threatened species not recorded during the field surveys. Further targeted surveys at specific locations are proposed to assess impacts to certain threatened species, as described in section 3.2 and include:<br>• Dense Leek-orchid – listed as Vulnerable, EPBC Act<br>• Swamp Fireweed – listed as Vulnerable, EPBC Act<br>• Swamp Everlasting – listed as Vulnerable, EPBC Act<br>CEMP measures should be developed to mitigate potential impacts on Dwarf Galaxias in the locations identified in Section 3.4.5. |
| **Landscape connectivity** | The project will result in disturbance of a 153ha construction footprint and maintenance of a 30m wide ROW to exclude re-growth of trees along a 56.2Km alignment through the Peri-urban East of Melbourne and the Peninsula of Western Port Bay, Victoria. In areas, this will reduce landscape connectivity and increase fragmentation and isolation for less mobile species especially in more heavily vegetated areas at:<br>• KP1 to KP2<br>• KP3 to KP 5<br>Short term Impacts to Southern Brown Bandicoot habitat connectivity will occur between:<br>• KP 30.3 to 54.4<br>Short term impacts to Growling Grass Frog habitat connectivity will occur at locations where HDD is not planned:<br>• KP20.32<br>• KP31.1<br>• KP48.55<br>Short term impacts to Dwarf Galaxias habitat connectivity will be avoided in many locations due to the use of HDD but may still occur at the waterways and drainage lines identified in Section 3.4.5 that are not proposed for HDD:<br><br>Short term impacts to Australian Grayling habitat connectivity will be avoided by using HDD at the Cardinia Creek, KP40-40.3: |
| **Waterways** | Potential short term increase in sediment levels of waterways during trenching works preventable through installation of standard erosion and sedimentation controls. |
| **Weed, pests and soil pathogens** | Potential introduction and spread of weeds, pests and new pathogens across the landscape preventable through proper implementation of hygiene principles. |
| **Native fauna** | Injury and/or mortality to native fauna utilising the habitat provided by vegetation to be removed, or caught in the trench. These impacts can be mitigated through the presence of spotter/catchers during clearing works and for regular trench inspections.<br>Temporary increases in noise and dust levels from construction equipment, leading to disturbance of fauna, especially during breeding seasons. |

# 6 OFFSET AND MITIGATION MEASURES

A brief discussion of offset and mitigation is provided in this section

## 6.1 Offsets for Impacts

Offsets under Commonwealth legislation may, and State environmental legislation, will, apply to this project so are discussed below.

### 6.1.1 Federal (EPBC Act)

Any required offsets under the EPBC Act will be determined in consultation between APA and DoE.

### 6.1.2 State (The Guidelines)

Offsets will be required to achieve the gains outlined in the EnSYM report discussed in Section 4.2 and Appendix G. Achieving the required species offset amount will require negotiation with DELWP to ascertain the best way forward for this project.

## 6.2 Mitigation Measures

Detailed mitigation measures will be addressed in the Construction Environmental Management Plan and Operational Environmental Management Plan prepared by APA. To mitigate impacts on flora and fauna the following principles apply:

1. Clearing of woody vegetation will be undertaken with a suitably qualified spotter/catcher present to:
    a. Inspect habitat in advance of clearing and remove fauna.
    b. Advise on clearing techniques that will minimise fauna impact.
    c. Keep records of all fauna interactions, listing the species concerned, the nature of the interaction and its GPS coordinates.
2. Vegetation along the construction footprint will be cleared to create a scalped area that is unfavorable for native animal foraging during construction works. A bund consisting of the cleared soil and vegetation will be placed on each side of the construction footprint to act as a barrier to animal entrance into the construction footprint.
3. Potential for fauna mortality due to entrapment within the pipeline trench will be minimised by:
    a. Minimising to the extent practicable the period of time the trench is open.
    b. Provide opportunities for fauna to egress the trench such as trench plugs or other appropriate mechanisms.

c. Regular surveys of open trenches, by suitably qualified personnel to remove trapped fauna as required.

4. A suitably qualified animal catcher shall be on call to remove and treat injured animals in accordance with appropriate ethics approval. Injured animals shall be treated by a qualified carer or vet.

5. A targeted survey will be undertaken during Spring and early Summer 2018 to determine if Dense Leek-orchid *Prasophyllum spicatum*, Swamp Everlasting *Xerochrysum palustre*, and Swamp Fireweed *Senecio psilocarpus* are present in the construction footprint, at the locations identified in Section 3.2. If the species is found to be present during field surveys, impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring.

6. Induction of employees and contractors prior to the commencement of works to highlight ecological and water quality issues which may be encountered during construction.

7. If construction in or near a waterway cannot be avoided (i.e. open trenching),

    a. Stage construction so that works in the vicinity of waterways are undertaken during the drier time of year (typically December to March), where practicable.

    b. Pre-clearance fish and other aquatic fauna salvage should be undertaken in all waterways and waterbodies discussed in this report, where they have standing water or flows, and where they will be open cut during construction.

    c. While the construction ROW is being dewatered, an ecologist will also salvage aquatic fauna trapped in any instream structures (i.e. coffer dams) and release them downstream of the work area (at designated locations).

    d. For any near-waterway or temporary works/structures, erosion and sediment controls are to be in place to minimise the amount of sediment transport during construction.

    e. Reinstate works areas and re-establish vegetation immediately after completion of temporary or permanent works near waterways.

8. All fuel, oil and chemicals are to be stored 50m away from waterways and in a suitably bunded and protected location.

9. All refilling of vehicles, machinery and equipment are to be filled 50m away from the waterway.

10. Any fixed machinery/plant located near a waterway are to be bunded to contain any spilt fuel/oil.

11. Ensure emergency response/s are in place in the event of a significant rainfall event and/or incident that impacts water quality or aquatic habitat (e.g. a spill or sediment release).

# 7 LEGISLATIVE AND POLICY IMPLICATIONS

This section of the report provides a review of project impacts against relevant Commonwealth and Victorian flora and fauna legislation and policy. Appendix H provides detailed figures and mapping of ecological values including threatened species found along the alignment and construction footprint.

## 7.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

This section of the report provides an assessment of potential impacts from the construction footprint to Matters of National Environmental Significance. **Table 15** below is a summary of relevant MNES to the project while the succeeding sections details the significant impact assessment of specific MNES. This table has been generated from the Protected Matters Search Tool results in Appendix A.

**Table 15: List of MNES categories and their relevance to the project.**

| Matters of National Environmental Significance | Comments |
|---|---|
| World Heritage Properties | Not present in the construction footprint |
| National Heritage Places | Not present in the construction footprint |
| Wetlands of International Importance | Western Port Ramsar wetland adjacent to the construction footprint |
| Great Barrier Reef Marine Park | Not present in the construction footprint |
| Commonwealth Marine Area | Not present in the construction footprint |
| Listed Threatened Ecological Communities | 3 communities assessed for likelihood of occurrence and then under significant impact guidelines in the following sub-sections. |
| Listed Threatened Species | 64 species assessed for likelihood of occurrence and then under significant impact guidelines in the following sub-sections. |
| Listed Migratory Species | 59 species assessed for likelihood of occurrence and then under significant impact guidelines in the following sub-sections. |

### 7.1.1 Ramsar Wetlands of International Significance

An assessment against Ramsar Significant Impact Guidelines (DoE 2013) is provided in **Table 16**. Significant impacts to the Western Port Ramsar wetland are considered unlikely if all proposed construction methods such as HDD, CEMPs, and OEMPs are effectively developed and then implemented.

Table 16: Significant impact assessment for Ramsar wetlands.

| Criteria | Comment |
|---|---|
| 1. areas of the wetland being destroyed or substantially modified | The alignment is adjacent to the western boundary of the Western Port Ramsar site between KP0 and KP4, where it follows an existing oil and gas pipeline infrastructure corridor. The alignment traverses the Western Port Ramsar site between KP4.0 and KP4.3, again following the existing oil and gas infrastructure corridor, and KP19.0 to KP19.3 at Watson Creek. Horizontal directional drilling (HDD) will be employed from approximately KP3.9 to KP4.4 and KP18.6 to KP19.5 so that surface disturbance of the Western Port Ramsar site is entirely avoided. |
| 2. a substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland | No substantial or measurable changes to the water quality of the Western Port Wetland are considered likely to occur. Watson Creek is the closest the construction footprint will be to the wetland and HDD will be used to go under the creek at this location and avoid impacts. |
| 3. the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected | Australian Grayling rely upon the Western Port Wetland for migration between fresh, estuarine and marine waters as part of their life cycles (DELWP 2017d). Impacts to this species will be avoided through using HDD under the Cardinia Creek KP40-40.3.<br><br>Two species, seasonally reliant upon the Western Port Wetland and surrounding terrestrial habitats for occasional foraging, were recorded during surveys:<br>• Cattle Egret was sighted at KP23 (Vowell Road Wetland, protected by HDD) and near KP 26 (near Fisheries Road crossing large eucalypts, protected by HDD)<br>• The Eastern Great Egret was sighted at KP23 (Vowell Road Wetland, protected by HDD) and near KP30, (agricultural paddocks and planted trees).<br><br>Significant impacts to these species will be avoided through the use of HDD techniques at areas of higher quality habitat. |
| 4. a substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health, or | No substantial or measurable changes to the water quality of the Western Port Wetland are considered likely to occur. The alignment is adjacent to the western boundary of the Western Port Ramsar site between KP0 and KP4, where it follows an existing oil and gas pipeline infrastructure corridor. The alignment traverses the Western Port Ramsar site between KP4.0 and KP4.3, again following the existing oil and gas infrastructure corridor, and KP19.0 to KP19.3 at Watson Creek. Horizontal directional drilling (HDD) will be employed from approximately KP3.9 to KP4.4 and KP18.6 to KP19.5 so that surface disturbance of the Western Port Ramsar site is entirely avoided. Along the construction footprint construction activities and control of runoff will be directed using a Construction EMP. The construction footprint will then be rehabilitated in line with an Operational EMP. |
| 5. an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland. | Impacts from invasive species directly impacting on the ecological character of the wetland will be avoided along the construction footprint using standard pipeline construction biosecurity measures to be outlined in a Construction EMP. The construction footprint will then be rehabilitated in line with an Operational EMP. |

### 7.1.2 Threatened species and ecological communities

As reported in Section 3, 10 EPBC Act listed species and/or communities were recorded within or adjacent to the construction footprint or are considered to have a high likelihood of occurrence within the construction footprint, as presented in **Table 17** below.

**Table 17: EPBC Act listed species and communities recorded within or adjacent to the construction footprint, or with a high likelihood of occurrence within the construction footprint.**

| Species/Community | Location |
|---|---|
| *Subtropical and Temperate Coastal Saltmarsh community* | Recorded within the ROW but outside of the construction footprint at KP 19-19.5 |
| Strzelecki Gum | Single individual recorded within the construction footprint at KP21 near Langwarrin Ck. |
| River Swamp Wallaby Grass | High likelihood of occurrence in suitable habitat near KP 13.5 – KP 15, approximately 200m outside of the construction footprint. |
| Dense Leek-orchid | High likelihood of occurrence within the construction footprint in Damp Heathy Woodland between KP 1 to 2 as known populations exist in similar habitat nearby at Crib Point and Stony Point. |
| Swamp Fireweed | High likelihood of occurrence within the construction footprint in suitable habitat at KP 33.5 as known populations exist nearby at Muddy Gates Lane and Manks Road, and the South Gippsland Railway line. |
| Swamp Everlasting | High likelihood of occurrence within the construction footprint in suitable habitat at KP 33.5 as known populations exist nearby at Muddy Gates Lane and Manks Road, and the South Gippsland Railway line. |
| Southern Brown Bandicoot | Recorded at 8 locations – Manks Rd (KP 34.4), Tooradin Station RD (KP 35.5), Tooradin Inlet Drain (KP 37.1), Cardinia Ck (two locations) - Bloomfield Lane (KP40.1), Toomuc Ck/Lower Gum Scrub Ck (KP 41.5), Soldiers Rd (KP 43.9), East of Koo Wee Rup Rd (KP 46.4). Likely to occur in 10 more locations from where to where? |
| Growling Grass Frog | Recorded at KP 40.1, Cardinia Creek (Bloomfield Lane). Likely to occur at KP 20.32, KP 23.05, KP 31.1, and KP 48.55. |
| Dwarf Galaxias | Likely to occur in 11 waterways where the species is a known resident or has recently been recorded: Warringine Ck, Watson Ck, Pearcedale South Ck, Langwarrin Ck, Lachies Marsh and nearby private farm dam, Craigs Lane Drain, Western Outfall Drain, Cardinia Ck, Toomuc Ck, Deep Ck, Pakenham Ck |
| Australian Grayling | Likely to occur in Cardinia Creek where the species has recently been recorded. |

To determine if the project is likely to cause a significant impact on a matter of National Environmental Significance under the EPBC Act, an assessment against the significant impact criteria was undertaken. This assessment is provided below and follows the order present in the points directly above.

***Communities***

The *Subtropical and Temperate Coastal Saltmarsh* ecological community was recorded in the ROW but will be avoided in the construction footprint through the use of HDD. This community is listed as Vulnerable under the EPBC Act. Advice on determining significant impacts on vulnerable communities is provided in the Matters of National Environmental Significance - Significant Impact Guidelines 1.1 and states on page 8:

"Species in the extinct and conservation dependant categories of species listed under the EPBC Act, and listed ecological communities in the vulnerable category of ecological communities listed under the EPBC Act, are not matters of national environmental significance for the purposes of Part 3 of the EPBC Act (requirements for environmental approvals)." (DoE, 2013)

Therefore, formal assessment and Referral of impacts on this community are not required under the EPBC Act. It should be noted that no removal of *Subtropical and Temperate Coastal* Saltmarsh is associated with pipeline construction within the construction footprint.

***Species - Endangered:***

One Endangered species was recorded along the construction footprint, the Southern Brown Bandicoot. A twostep approach is required to determine if a Referral is required and the level of impact to this species. The first step is to assess the project against the Draft Referral Guidelines for the endangered Southern Brown Bandicoot (DSEWPaC 2011). These referral guidelines are a series of yes/no questions to guide the assessor through a decision tree. This yes/no assessment is presented in **Table 18**. These guidelines then refer the assessor to the Significant Impact Guidelines 1.1. (DoE 2013). This further assessment is presented in **Table 19**.

**Table 18: Assessment against the Referral guidelines for Southern Brown Bandicoot.**

| **Decision Criteria from the Draft Referral Guidelines for the endangered Southern Brown Bandicoot** | |
|---|---|
| 1. Could the impacts of your action occur within the modelled distribution of the Southern Brown Bandicoot | The impacts of the project will occur within the modelled distribution of the Southern Brown Bandicoot.<br><br>Yes, progress to step 2. |
| 2. Could the impacts of your action affect any southern brown bandicoot habitat | The impacts of the project will affect Southern Brown Bandicoot habitat.<br><br>Yes, progress to step 3. |
| 3. Have you surveyed for southern brown bandicoot using the recommended methods | Surveys for Southern Brown Bandicoots using the recommended methods confirmed presence of this species in the construction footprint.<br><br>Yes, progress to step 4. |
| 4. Could your action impact the southern brown bandicoot | Yes.<br><br>Assess impacts against the Significant impact criteria. See Table 12. |

| | |
|---|---|
| 5. Could your action require a referral to the Commonwealth environment minister for significant impacts on southern brown bandicoot | Arising from Table 12, The project is unlikely to cause a significant impact for the Southern Brown Bandicoot. |

**Table 19: Significant impact assessment for the Southern Brown Bandicoot.**

| Significant Impact Criteria – Critically Endangered or Endangered | Comment |
|---|---|
| Lead to a long-term decrease in the size of a population | The population of Southern Brown Bandicoots present or adjacent to the construction footprint will be subject to temporary and staged habitat removal. Habitat, excluding trees, will be reinstated along the construction footprint to as close to its former condition as practicable following construction. The Construction EMP will include mitigation measures to reduce direct impacts on this species prior to and during construction works. As such the project is not expected to lead to a long-term decrease in the size of a population of the southern brown bandicoot. |
| Reduce the area of occupancy of the species | The construction works will temporarily remove habitat along a 24Km section of the construction footprint. This will result in a short term impact during construction and until the footprint has been rehabilitated. Following rehabilitation, the project is not expected to reduce the area of occupancy of the southern brown bandicoot. |
| Fragment an existing population into two or more populations | The construction activity along the construction footprint will temporarily (October 2019 to March 2020) fragment the existing population. The species can disperse up to 2.5km and foraging habitat will remain untouched outside of the construction footprint. This will result in a short term impact during construction and until the footprint has been rehabilitated. Following rehabilitation, the project is not expected to fragment the existing population of the southern brown bandicoot. |
| Adversely affect habitat critical to the survival of a species | As per the National Recovery Plan "The critical habitat components required by the species are currently not fully understood and require further investigation. As a result, it is not possible at this stage to identify habitat critical to the survival of the species." (Brown and Main 2010). |
| Disrupt the breeding cycle of a population | The breeding season for Southern Brown Bandicoot is variable but the peak breeding season is thought to occur between spring and mid-summer (Brown and Main, 2010). The species is known to have a high reproductive output in response to favorable seasonal and food availability conditions. In the long term, the construction activities are unlikely to disrupt the breeding cycle of a population but an impact to breeding may occur during construction at those locations. |
| Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | The population of Southern Brown Bandicoots present or adjacent to the construction footprint will be subject to temporary and staged habitat removal. Habitat, excluding trees, will be reinstated along the construction footprint to its former condition prior to construction. The Construction EMP will include mitigation measures to reduce direct impacts on this species prior to and during construction works. The construction activities are unlikely to have a long-term impact that would lead to the species decline. There will be a short-term impact resulting in |

| Significant Impact Criteria – Critically Endangered or Endangered | Comment |
|---|---|
| | modification, destruction and removal of habitat but not to the extent that the species is likely to decline. |
| Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat | The Construction EMP will include measures to mitigate the risk of invasive species being introduced during construction works. An Operational EMP will be implemented to manage pest animals and weeds post construction works. These mitigation measures once implemented will reduce the potential for an invasive species resulting from the construction activities to become established in the southern brown bandicoot habitat within and adjacent to the ROW. |
| Introduce disease that may cause the species to decline, or | The Construction EMP will include measures to mitigate the risk of invasive species, including diseases, being introduced during construction works An Operational EMP will be implemented to manage pest animals and weeds post construction works. These mitigation measures once implemented should reduce the potential for an introduced disease associated with construction activities to cause species decline. |
| Interfere with the recovery of the species | The construction within the footprint will occur over a short period and be followed by rehabilitation. A detailed Construction EMP and Operational EMP will be used to control any direct impacts on bandicoots and any indirect impacts from invasive species or disease. As such, the project is not considered likely to interfere with the recovery of the species. |

Arising from the assessment of the construction footprint against the significant impact criteria for Southern Brown Bandicoots the action should not lead to the long-term modification of suitable habitat or reduce its suitability for Southern Brown Bandicoots to survive in the ROW. Southern Brown Bandicoots in the Westernport Region are found within a variety of habitats including degraded pasture, blackberry patches, car bodies, degraded remnant vegetation and quality remnant vegetation (rare in the region). The project is considered unlikely to cause a significant impact for the Southern Brown Bandicoot.

***Species - Vulnerable:***

Species considered in this assessment of significant impacts to vulnerable species include:

- Strzelecki Gum – listed as Vulnerable, and recorded in the construction footprint
- River Swamp Wallaby Grass – listed as Vulnerable
- Dense Leek-orchid – listed as Vulnerable
- Swamp Fireweed – listed as Vulnerable
- Swamp Everlasting – listed as Vulnerable
- Growling Grass Frog – listed as Vulnerable
- Dwarf Galaxias – listed as Vulnerable

- Australian Grayling - listed as Vulnerable

Given the range of species this assessment is separated into an assessment for flora species and one for fauna species. The Flora species assessment of significant impact is provided in **Table 20**. An assessment of significant impacts to Dwarf Galaxias and Australian Grayling are provided in **Table 21** and the Growling Grass Frog in **Table 22**.

**Table 20: Significant impact assessment for vulnerable flora species**

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| lead to a long-term decrease in the size of an important population of a species | **Strzelecki Gum**: One tree was recorded on the edge of the construction footprint at KP21. This individual is not considered to be an important population as no other adult or juvenile Strzelecki Gums were present in the immediate area. The closest stand is near the mouth of the Bass River into Westernport (DSE 2008).<br><br>**River Swamp Wallaby Grass**: There is a known population on the ESSO easement, adjacent (200m away) to the construction footprint between KP13.5 and KP15. This area will not be impacted by the construction footprint. Other suitable habitat within the construction footprint near this point will be HDD to avoid impacts. As such, the project is not likely to lead to a long-term decrease in the size of an important population of a species.<br><br>**Dense Leek-orchid**: The construction footprint follows existing oil and gas pipeline infrastructure corridors in the Crib Point and Stony Point area but also goes through Damp Heathy Woodland, which provides suitable habitat for this species, at KP1.5. The species is known from 8 locations in Australia, including at Stony Point and Crib Point. The locations at Stony Point and Crib Point contribute to 27% of the total population. As such, if Dense Leek-orchid was found in the construction footprint it would be considered part of an important population.<br><br>A targeted survey is planned at this location for Spring 2018 to determine if the species is present. If the species is found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to lead to a long-term decrease in the size of an important population of a species.<br><br>**Swamp Fireweed and Swamp Everlasting**: Swamp Fireweed is known from approximately 14 sites with the recorded population in the Westernport being one of the most easterly recorded (DEWHA 2008). Swamp Everlasting is known from about 35 populations with an estimated abundance of over 10,000 plants (Carter and Walsh 2011). Any plants found within the construction footprint would be considered an important population.<br><br>Both species are known from a population near Muddy Gates Lane, Manks Road, and the South Gippsland Railway line, KP 33.5. A targeted survey is planned at this location for Spring and early Summer 2018 to determine if the species are present. If they are found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| | If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to lead to a long-term decrease in the size of an important population of a species. |
| reduce the area of occupancy of an important population | **Strzelecki Gum**: The single tree within the construction footprint is not considered an important population. As such, the project will not reduce the area of occupancy of an important population of this species.<br><br>**River Swamp Wallaby Grass**: The recorded population will not be impacted by the construction footprint. Other suitable habitat within the construction footprint near this point will be HDD to avoid impacts. As such, the project is not expected to reduce the area of occupancy of an important population of this species.<br><br>The construction footprint follows existing oil and gas pipeline infrastructure corridors in the Crib Point and Stony Point area but also goes through Damp Heathy Woodland, which provides suitable habitat for this species, at KP1.5. The species is known from 8 locations in Australia, including at Stony Point and Crib Point. The locations at Stony Point and Crib Point contribute to 27% of the total population. As such, if Dense Leek-orchid was found in the construction footprint it would be considered part of an important population.<br><br>A targeted survey is planned at this location for Spring 2018 to determine if the species is present. If the species is found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to lead to a long-term reduction in the area of occupancy of an important population of the species.<br><br>**Swamp Fireweed and Swamp Everlasting**: Swamp Fireweed is known from approximately 14 sites with the recorded population in the Westernport being one of the most easterly recorded (DEWHA, 2008) and would be considered an important population. Swamp Everlasting is known from about 35 populations with an estimated abundance of over 10,000 plants (Carter and Walsh, 2011).<br><br>Both species are known from a population near Muddy Gates Lane, Manks Road, and the South Gippsland Railway line, KP33.5. A targeted survey is planned at this location for Spring and early Summer 2018 to determine if the species are present. If they are found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint.<br><br>If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to lead to a long-term reduction in the area of occupancy of an important population of the species. |
| fragment an existing important population into two or more populations | **Strzelecki Gum**: The single tree within the construction footprint is not considered an important population. As such, the project will not fragment an important population of this species.<br><br>**River Swamp Wallaby Grass**: The recorded population will not be impacted by the construction footprint. Other suitable habitat within the construction footprint near this point will be HDD to avoid impacts. As such, the project is not expected to fragment an existing important population of this species. |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| | The construction footprint follows existing oil and gas pipeline infrastructure corridors in the Crib Point and Stony Point area but also goes through Damp Heathy Woodland, which provides suitable habitat for this species, at KP1.5. The species is known from 8 locations in Australia, including at Stony Point and Crib Point. The locations at Stony Point and Crib Point contribute to 27% of the total population. As such, if Dense Leek-orchid was found in the construction footprint it would be considered part of an important population.<br><br>A targeted survey is planned at this location for Spring 2018 to determine if the species is present. If the species is found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to lead to fragmentation of an important population.<br><br>**Swamp Fireweed and Swamp Everlasting**: Swamp Fireweed is known from approximately 14 sites with the recorded population in the Westernport being one of the most easterly recorded (DEWHA 2008) and would be considered an important population. Swamp Everlasting is known from about 35 populations with an estimated abundance of over 10,000 plants (Carter and Walsh 2011).<br><br>Both species are known from a population near Muddy Gates Lane, Manks Road, and the South Gippsland Railway line, KP33.5. A targeted survey is planned at this location for Spring and early Summer 2018 to determine if the species are present. If they are found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint.<br><br>If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to fragment an important population of the species. |
| adversely affect habitat critical to the survival of a species | **Strzelecki Gum**: The single tree within the construction footprint is not considered critical habitat for the survival of this species.<br><br>**River Swamp Wallaby Grass**: The recorded population will not be impacted by the construction footprint. Other suitable habitat within the construction footprint near this point will be HDD to avoid impacts. As such, the project is not expected to adversely affect habitat critical to the survival of a species.<br><br>The construction footprint follows existing oil and gas pipeline infrastructure corridors in the Crib Point and Stony Point area but also goes through Damp Heathy Woodland, which provides suitable habitat for this species, at KP1.5. The species is known from 8 locations in Australia, including at Stony Point and Crib Point. The locations at Stony Point and Crib Point contribute to 27% of the total population. As such, if Dense Leek-orchid was found in the construction footprint it would be considered part of an important population.<br><br>A targeted survey is planned at this location for Spring 2018 to determine if the species is present. If the species is found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to adversely affect habitat critical to the survival of a species. |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| | **Swamp Fireweed and Swamp Everlasting**: Swamp Fireweed is known from approximately 14 sites with the recorded population in the Western Port being one of the most easterly recorded (DEWHA 2008) and would be considered an important population. Swamp Everlasting is known from about 35 populations with an estimated abundance of over 10,000 plants (Carter and Walsh 2011).<br><br>Both species are known from a population near Muddy Gates Lane, Manks Road, and the South Gippsland Railway line, KP 33.5. A targeted survey is planned at this location for Spring and early Summer 2018 to determine if the species are present. If they are found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint.<br>If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to adversely affect habitat critical to the survival of a species. |
| disrupt the breeding cycle of an important population | **Strzelecki Gum**: The single tree within the construction footprint is not considered too from part of an important population.<br><br>**River Swamp Wallaby Grass**: The recorded population will not be impacted by the construction footprint. Other suitable habitat within the construction footprint near this point will be HDD to avoid impacts. As such, the project is not expected to disrupt the breeding cycle of an important population.<br><br>The construction footprint follows existing oil and gas pipeline infrastructure corridors in the Crib Point and Stony Point area but also goes through Damp Heathy Woodland, which provides suitable habitat for this species, at KP1.5. The species is known from 8 locations in Australia, including at Stony Point and Crib Point. The locations at Stony Point and Crib Point contribute to 27% of the total population. As such, if Dense Leek-orchid was found in the construction footprint it would be considered part of an important population.<br><br>A targeted survey is planned at this location for Spring 2018 to determine if the species is present. If the species is found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to adversely disrupt the breeding cycle of an important population.<br><br>**Swamp Fireweed and Swamp Everlasting**: Swamp Fireweed is known from approximately 14 sites with the recorded population in the Westernport being one of the most easterly recorded (DEWHA 2008) and would be considered an important population. Swamp Everlasting is known from about 35 populations with an estimated abundance of over 10,000 plants (Carter and Walsh 2011).<br><br>Both species are known from a population near Muddy Gates Lane, Manks Road, and the South Gippsland Railway line, KP 33.5. A targeted survey is planned at this location for Spring and early Summer 2018 to determine if the species are present. If they are found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint.<br><br>If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to adversely disrupt the breeding cycle of an important population. |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | **Strzelecki Gum**: This tree will be removed during construction works but this is not likely to isolate or decrease habitat to the extent that the species is likely to decline.<br><br>**River Swamp Wallaby Grass**: The recorded population will not be impacted by the construction footprint. Other suitable habitat within the construction footprint near this point will be HDD to avoid impacts. As such, the project is not expected to decrease the availability or quality of habitat to the extent that the species is likely to decline.<br>The construction footprint follows existing oil and gas pipeline infrastructure corridors in the Crib Point and Stony Point area but also goes through Damp Heathy Woodland, which provides suitable habitat for this species, at KP1.5. The species is known from 8 locations in Australia, including at Stony Point and Crib Point. The locations at Stony Point and Crib Point contribute to 27% of the total population. As such, if Dense Leek-orchid was found in the construction footprint it would be considered part of an important population.<br><br>A targeted survey is planned at this location for Spring 2018 to determine if the species is present. If the species is found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to adversely modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.<br><br>**Swamp Fireweed and Swamp Everlasting**: Swamp Fireweed is known from approximately 14 sites with the recorded population in the Westernport being one of the most easterly recorded (DEWHA 2008) and would be considered an important population. Swamp Everlasting is known from about 35 populations with an estimated abundance of over 10,000 plants (Carter and Walsh 2011).<br><br>Both species are known from a population near Muddy Gates Lane, Manks Road, and the South Gippsland Railway line, KP 33.5. A targeted survey is planned at this location for Spring and early Summer 2018 to determine if the species are present. If they are found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint.<br><br>If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to adversely modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. |
| result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | **Strzelecki Gum**: The Construction EMP will include measures to mitigate the risk of invasive species being introduced during construction works. An Operational EMP will be implemented to manage pest animals and weeds post construction works. Given this approach, the project is not expected to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat<br><br>**River Swamp Wallaby Grass**: The recorded population will not be impacted by the construction footprint. Other suitable habitat within the construction footprint near this point will be HDD to avoid impacts. As such, the project is |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| | not expected to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.<br><br>**Dense Leek-orchid**: The Construction EMP will include measures to mitigate the risk of invasive species being introduced during construction works. An Operational EMP will be implemented to manage pest animals and weeds post construction works. Given this approach, the project is not expected to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat<br><br>**Swamp Fireweed and Swamp Everlasting**: The Construction EMP will include measures to mitigate the risk of invasive species being introduced during construction works. An Operational EMP will be implemented to manage pest animals and weeds post construction works. Given this approach, the project is not expected to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat |
| introduce disease that may cause the species to decline, or | **Strzelecki Gum**: The Construction EMP will include measures to mitigate the risk of invasive species, including diseases, being introduced during construction works. An Operational EMP will be implemented to further manage disease post construction works. Given this approach, the project is not expected to result in introducing disease that may cause the species to decline.<br><br>**River Swamp Wallaby Grass**: The Construction EMP will include measures to mitigate the risk of invasive species, including diseases, being introduced during construction works. An Operational EMP will be implemented to further manage disease post construction works. Given this approach, the project is not expected to result in introducing disease that may cause the species to decline.<br><br>**Dense Leek-orchid**: The Construction EMP will include measures to mitigate the risk of invasive species, including diseases, being introduced during construction works. An Operational EMP will be implemented to further manage disease post construction works. Given this approach, the project is not expected to result in introducing disease that may cause the species to decline.<br><br>**Swamp Fireweed and Swamp Everlasting**: The Construction EMP will include measures to mitigate the risk of invasive species, including diseases, being introduced during construction works. An Operational EMP will be implemented to further manage disease post construction works. Given this approach, the project is not expected to result in introducing disease that may cause the species to decline. |
| interfere substantially with the recovery of the species | **Strzelecki Gum**: Removal of a single tree is not considered likely to interfere substantially with the recovery of the species.<br><br>**River Swamp Wallaby Grass**: The recorded population will not be impacted by the construction footprint. Other suitable habitat within the construction footprint near this point will be HDD to avoid impacts. As such, the project is not expected to interfere substantially with the recovery of the species.<br><br>**Dense Leek-orchid**:<br><br>A targeted survey is planned in potential habitat for this species for Spring 2018 to determine if the species is present. If the species is found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| | translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to interfere substantially with the recovery of the species.<br><br>**Swamp Fireweed and Swamp Everlasting**:<br><br>A targeted survey is planned in potential habitat for these species for Spring and Summer 2018 to determine if the species is present. If the species is found to be present during field surveys impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring. Given this approach, the project is not expected to interfere substantially with the recovery of the species. |

An assessment of significant impacts to Dwarf Galaxias and Australian Grayling are provided in **Table 21**.

**Table 21: Significant impact assessment for vulnerable fauna species**

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| lead to a long-term decrease in the size of an important population of a species | **Dwarf Galaxias**: No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. An important population is unlikely to occur in this location. Three of the 10 waterbodies won't be impacted as HDD will be used. Impacts on the remaining waterways will be mitigated through a Construction EMP and Operational EMP.<br><br>Given this approach, the project is not expected to lead to a long-term decrease in the size of an important population of a species.<br><br>**Australian Grayling**: The critical waterway for Australian Grayling movement is the Cardinia Creek (KP40-40.3). At this location HDD will be used to bore under the creek and avoid impacts of connectivity and populations. Given this approach, the project is not expected to lead to a long-term decrease in the size of an important population of a species. |
| reduce the area of occupancy of an important population | **Dwarf Galaxias**: No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. An important population is unlikely to occur in this location. Three of the 10 waterbodies won't be impacted as HDD will be used. Impacts on the remaining waterways will be mitigated through a Construction EMP and Operational EMP.<br><br>Given this approach, the project is not expected to reduce the area of occupancy of an important population.<br><br>**Australian Grayling**: The critical waterway for Australian Grayling movement is the Cardinia Creek (KP40-40.3). At this location HDD will be used to bore under the creek and avoid impacts of connectivity and populations. The activity is considered unlikely to reduce the area of occupancy of an important population. |
| fragment an existing important population into two or more populations | **Dwarf Galaxias**: No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. An important |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| | population is unlikely to occur in this location. Three of the 10 waterbodies won't be impacted as HDD will be used. The construction footprint may have a temporary impact on the waterbody but this action would not fragment an existing important population into two or more populations.<br><br>**Australian Grayling**: The critical waterway for Australian Grayling movement is the Cardinia Creek (KP40-40.3). At this location HDD will be used to bore under the creek and avoid impacts of connectivity and populations. The activity would not fragment an existing important population into two or more populations. |
| adversely affect habitat critical to the survival of a species | **Dwarf Galaxias**: No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. Critical habitat to the survival of the species does not occur in this location. Three of the 10 waterbodies won't be impacted as HDD will be used. Impacts on the remaining waterways will be mitigated through a Construction EMP and Operational EMP. The construction footprint may have a temporary impact on habitat used for movement between other habitats for Dwarf Galaxias during construction.<br><br>Given this approach, the project is not expected to adversely affect habitat critical to the survival of a species.<br><br>**Australian Grayling**: The critical waterway for Australian Grayling movement is the Cardinia Creek (KP40-40.3). At this location HDD will be used to bore under the creek and avoid impacts of connectivity and populations. The activity is considered unlikely to adversely affect habitat critical to the survival of a species. |
| disrupt the breeding cycle of an important population | **Dwarf Galaxias**: No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. An important population is unlikely to occur in this location. Three of the 10 waterbodies won't be impacted as HDD will be used. Impacts on the remaining waterways will be mitigated through a Construction EMP and Operational EMP. Given this approach, the project is not expected to disrupt the breeding cycle of an important population.<br><br>**Australian Grayling**: The critical waterway for Australian Grayling movement is the Cardinia Creek (KP40-40.3). At this location HDD will be used to bore under the creek and avoid impacts of connectivity and populations. The activity is considered unlikely to cause a significant impact on the species breeding cycle. |
| modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | **Dwarf Galaxias**: No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. However, a precautionary approach is being taken in assuming the species is present within waterways outlined in Section 3.4.5. Three of the 10 waterbodies won't be impacted as HDD will be used. Impacts on the remaining waterways will be mitigated through a Construction EMP and Operational EMP to rehabilitate habitat.<br><br>Given this approach, the project is not expected to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.<br><br>**Australian Grayling**: The critical waterway for Australian Grayling movement is the Cardinia Creek (KP40-40.3). At this location HDD will be used to bore under the creek and avoid impacts to habitat. Given this approach, the project is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | **Dwarf Galaxias**: No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. However, a precautionary approach is being taken in assuming the species is present within waterways outlined in Section 3.4.5. Three of the 10 waterbodies won't be impacted as HDD will be used. Impacts on the remaining waterways will be mitigated through a Construction EMP and Operational EMP that will control invasive species introduction.<br><br>Given this approach, the project is not expected to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.<br><br>**Australian Grayling**: The critical waterway for Australian Grayling movement is the Cardinia Creek (KP40-40.3). At this location HDD will be used to bore under the creek and avoid impacts of connectivity and populations. The activity is considered unlikely to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. |
| introduce disease that may cause the species to decline, or | **Dwarf Galaxias**: No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. However, a precautionary approach is being taken in assuming the species is present within waterways outlined in Section 3.4.5. Three of the 10 waterbodies won't be impacted as HDD will be used. Impacts on the remaining waterways will be mitigated through a Construction EMP and Operational EMP that will control disease introduction.<br><br>Given this approach, the project is not expected to introduce disease that may cause the species to decline.<br><br>**Australian Grayling**: The critical waterway for Australian Grayling movement is the Cardinia Creek (KP40-40.3). At this location HDD will be used to bore under the creek and avoid impacts of connectivity and populations. The activity is considered unlikely to introduce disease that may cause the species to decline. |
| interfere substantially with the recovery of the species | **Dwarf Galaxias**: No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. However, a precautionary approach is being taken in assuming the species is present within waterways outlined in Section 3.4.5. Three of the 10 waterbodies won't be impacted as HDD will be used. Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that includes rehabilitation. The activity is considered unlikely to interfere substantially with the recovery of the species.<br><br>**Australian Grayling**: The critical waterway for Australian Grayling movement is the Cardinia Creek (KP40-40.3). At this location HDD will be used to bore under the creek and avoid impacts of connectivity and populations. The activity is considered unlikely to interfere substantially with the recovery of the species. |

Assessing significant impacts from the construction footprint to the Growling Grass Frog requires determination against the ssignificant impact guidelines for the vulnerable growling grass frog (DEWHA, 2009). This assessment is provided in **Table 22** and relevant definitions provided below the table.

Table 22: Significant impact criteria for the Vulnerable Growling Grass Frog

| Significant Impact Criteria | Comment |
|---|---|
| Habitat degradation in an area supporting an important population | Growling Grass Frog was present or is likely to be present, taking a precautionary approach, at seven surveyed locations along the construction footprint. Any viable population that can interact with nearby other populations is considered an important population (DEWHA 2009). Therefore, the populations at these seven locations are considered important populations.<br><br>Impacts at four of these locations (Either side of Cardinia Creek – KP40-40.3, KP 23.05, and KP 41.5) will be avoided using HDD. Suitable habitat at KP 20.32, KP 31.1 and KP 48.55 will be directly impacted with mitigation developed through a Construction EMP and Operational EMP. Predatory fish were located at these four sites so the degree of habitat quality is reduced. The construction footprint will require removal of terrestrial habitat (restricted to the width of the construction footprint, less than 30m wide) within 200m of the water body at the four locations. Given the removal of degraded habitat were the species is only presumed to be present, a significant impact is considered unlikely if the Construction EMPs and Operational EMPs are implemented. |
| Isolation and fragmentation of populations | Connectivity of waterbodies will be temporarily affected by impacting on three sites of suitable habitat during construction that will not be HDD, but not significantly when compared to the existence of the waterway and creek network in the Region. Permanent physical barriers will not be installed. Aquatic fringing habitat of creeks being crossed will be reinstated under the Operational EMP. Note: no trees or tall shrubs can be installed in the construction footprint.<br><br>Given the removal of degraded habitat were the species is only presumed to be present, a significant impact is considered unlikely if the Construction EMPs and Operational EMPs are implemented. |

**Growling Grass Frog Impact Definitions (DEWHA 2009)**

**Habitat degradation in an area supporting an important population:**

Permanent removal or degradation of terrestrial habitat (for example between ponds, drainage lines or other temporary/permanent habitat) within 200 metres of a water body in temperate regions, or 350 metres of a water body in semi-arid regions, that results in the loss of dispersal or overwintering opportunities for an important population. Alteration of aquatic vegetation diversity or structure that leads to a decrease in habitat quality. Alteration to wetland hydrology, diversity and structure (for example any changes to timing, duration or frequency of flood events) that leads to a decrease in habitat quality. Introduction of predatory fish and/or disease agents.

**Isolation and fragmentation of populations**:

Net reduction in the number and/or diversity of water bodies available to an important population. Removal or alteration of available terrestrial or aquatic habitat corridors (including alteration of connectivity during flood events). Construction of physical barriers to movement between water bodies, such as roads or buildings.

An assessment of the potential for significant impact on the Growling Grass Frog is provided in **Table 23**.

Table 23: Significant impact assessment for vulnerable Growling Grass Frog

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| lead to a long-term decrease in the size of an important population of a species | One Growling Grass Frog was recorded during the survey but the species is presumed present at 7 locations along the alignment. Four of these are outside of the construction footprint (**Table 17**). Any viable population that can interact with nearby other populations is considered an important population (DEWHA 2009). Therefore, the populations at these seven locations are considered important populations.<br><br>Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that will include land rehabilitation and wildlife handling protocols.<br><br>Given this approach, the project is not expected to lead to a long-term decrease in the size of an important population of a species. |
| reduce the area of occupancy of an important population | One Growling Grass Frog was recorded during the survey but the species is presumed present at 7 locations along the alignment. Four of these are outside of the construction footprint (**Table 17**). Any viable population that can interact with nearby other populations is considered an important population (DEWHA 2009). Therefore, the populations at these seven locations are considered important populations.<br><br>Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that will include land rehabilitation and wildlife handling protocols.<br><br>Given this approach, the project is not expected to reduce the area of occupancy of an important population. |
| fragment an existing important population into two or more populations | One Growling Grass Frog was recorded during the survey but the species is presumed present at 7 locations along the alignment. Four of these are outside of the construction footprint (**Table 17**). Any viable population that can interact with nearby other populations is considered an important population (DEWHA 2009). Therefore, the populations at these seven locations are considered important populations.<br><br>Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that will include land rehabilitation and wildlife handling protocols.<br><br>Given this approach, the project is not expected to fragment an existing important population into two or more populations. |
| adversely affect habitat critical to the survival of a species | One Growling Grass Frog was recorded during the survey but the species is presumed present at 7 locations along the alignment. Four of these are outside of the construction footprint (**Table 17**).<br><br>Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that will include land rehabilitation and wildlife handling protocols.<br><br>The small area of waterway and habitat impacted by the construction footprint is not considered critical habitat.<br><br>Given this approach, the project is not expected to adversely affect habitat critical to the survival of a species. |
| disrupt the breeding cycle of an important population | One Growling Grass Frog was recorded during the survey but the species is presumed present at 7 locations along the alignment. Four of these are outside of the construction footprint (**Table 17**). Any viable population that can |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| | interact with nearby other populations is considered an important population (DEWHA 2009). Therefore, the populations at these seven locations are considered important populations.<br><br>Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that will include land rehabilitation and wildlife handling protocols.<br><br>The small area of waterway and habitat impacted and the temporary nature of the works combined with rehabilitation is unlikely to disrupt the breeding cycle of an important population. |
| modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | One Growling Grass Frog was recorded during the survey but the species is presumed present at 7 locations along the alignment. Four of these are outside of the construction footprint (**Table 17**).<br><br>Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that will include land rehabilitation and wildlife handling protocols.<br><br>The small area of waterway and habitat impacted by the construction footprint is also not considered critical habitat.<br><br>Given this approach, the project is not expected modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. |
| result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | One Growling Grass Frog was recorded during the survey but the species is presumed present at 7 locations along the alignment. Four of these are outside of the construction footprint (**Table 17**).<br><br>Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that will control invasive species introduction.<br><br>Given this approach, the project is not expected to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. |
| introduce disease that may cause the species to decline, or | One Growling Grass Frog was recorded during the survey but the species is presumed present at 7 locations along the alignment. Four of these are outside of the construction footprint (**Table 17**).<br><br>Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that will control disease introduction.<br><br>Given this approach, the project is not expected to result in diseases that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. |
| interfere substantially with the recovery of the species | One Growling Grass Frog was recorded during the survey but the species is presumed present at 7 locations along the alignment. Four of these are outside of the construction footprint (**Table 17**).<br><br>Impacts on the remaining waterways will be temporary and mitigated through a Construction EMP and Operational EMP that will include land rehabilitation and wildlife handling protocols.<br><br>The small area of waterway and habitat impacted by the construction footprint is not considered critical habitat important in the recovery of the species. |

| Significant Impact Criteria - Vulnerable | Comment |
|---|---|
| | Given this approach, the project is not expected to interfere substantially with the recovery of the species. |

### 7.1.3 Migratory species

As discussed in Section 3.3 the Latham's Snipe and the White-throated Needletail are the only migratory species identified as having "High" or "Moderate" likelihood of occurrence within the construction footprint. An assessment of impacts to these migratory species is provided **Table 24** with a brief habitat description below:

- The White-throated Needletail is widespread in eastern and south-eastern Australia, where the species is a non-breeding summer (October-April) visitor. The species is almost exclusively aerial in Australia, and has been recorded above most types of terrestrial habitat including woodlands, farmland, heathland and mudflats. (http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=682). The range of the White-throated Needletail in Australia extends from Cape York to Tasmania along the eastern seaboard, and inland to central NSW and western Victoria. The most recent records of the species near the project area were at Woolleys Beach and Warringine Park, Bittern in 2006 and 2007, respectively (Atlas of Living Australia). However, important habitat for the White-throated Needletail is not considered to occur within or proximal to the construction footprint of the project. Whilst the construction footprint will require removal of degraded pasture and some wooded vegetation, which provides moderate quality potential foraging/roosting habitat for the species, it is considered implausible that this will seriously disrupt the lifecycle of an ecologically significant proportion of the population.

- Latham's Snipe occur in single, widely dispersed non-breeding population in South-eastern Australia http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=863. The species differ to other shorebirds in preferring open freshwater or brackish wetlands with cover nearby, particularly areas of wet tussock grassland and other dense ground vegetation (SWIFFT 2018). Important habitat for Latham's snipe is defined under the EPBC Act Policy Statement 3.21 as areas that have previously been identified as internationally important for the species, or areas that support at least 18 individuals of the species. The site of international significance identified within Australia is Cedar Hill and Hexham Swamp in NSW (Bamford et al. 2008). This site is at least 800 km from the nearest point of the alignment. The species is considered to be an irregular visitor to the Western Port Ramsar site with a frequency of occurrence of 3% in annual surveys (Hale 2016). The most recent records of the species near the project area was ~420m from the alignment at the corner of Graydens Rd and Marine Parade, Hastings in 2013 (Atlas of Living Australia). Whilst the construction footprint will require removal of degraded pasture, which provides moderate quality habitat for the species, it is considered implausible that the construction footprint could support 18 individuals.

Table 24: Significant impact assessment for EPBC Act migratory species

| Significant Impact Criteria - Migratory Species | Comment |
|---|---|
| substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species | Although foraging habitat for the White-throated Needletail and Latham's Snipe is present in the ROW in a degraded form, areas of important habitat are not found within the construction footprint.<br><br>Impacts on the degraded habitat present will be largely temporary and mitigated through a Construction EMP and Operational EMP that will include land rehabilitation.<br><br>Given this approach, the project is considered unlikely to impact an area of important habitat for a migratory species. |
| result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or | Impacts on the degraded habitat for White-throated Needletail and Latham's Snipe will be largely temporary and mitigated through a Construction EMP and Operational EMP that will include invasive species control.<br><br>Given this approach, the project is considered unliklely to result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species. |
| seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species. | Impacts on the degraded habitat for White-throated Needletail and Latham's Snipe will be largely temporary and mitigated through a Construction EMP and Operational EMP that will include land rehabilitation.<br><br>Given this degraded habitat and approach, the project is considered unlikely to seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species. |

## 7.2 Flora and Fauna Guarantee Act 1988

The assessment has noted the following species that have a moderate or high likelihood of occurrence within the construction footprint and therefore may require inclusion in an FFG Act permit:

- Lewin's Rail observation at KP3.9;
- Eastern Great Egret observation at KP23.0 and KP31.1;
- Baillon's Crake
- Blue-billed Duck observed at KP23.0;
- Swamp Skink
- Growling Grass Frog, as described in Section 3.4.2;
- Southern Brown Bandicoot, as described in Section 3.4.1.

The FFG Act applies to all Crown Land and permits are required under the FFG Act for the taking of listed species in these areas. A permit is also required where non-threatened flora that is protected on Crown Land requires clearance. Therefore, a permit will be required where clearance of native vegetation or habitat is required on areas such as roadsides and Crown Land reserves. Based on the flora survey the permit will need to include the above species and those genera listed in Table 10:

- Asteraceae - Daisies - all species.
- Epacridaceae - Heaths - all species
- Orchidaceae - Orchids - all species
- Acacia - Wattles - excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon, Acacia paradoxa*
- Correa - Correas - all species

Nine threatening processes listed under the FFG Act could be applicable to the project if the Construction and Operational EMPs were not implemented to manage impacts:

- Degradation of native riparian vegetation along Victorian waterways and streams.
- Prevention of passage of aquatic biota as a result of the presence of instream structures.
- Increase in sediment input into Victorian waterways and streams due to human activities.
- Input of petroleum and related products into Victorian marine and estuarine environments.
- The discharge of human-generated marine debris into Victorian marine or estuarine waters.
- Infection of amphibians with Chytrid fungus resulting in chytridiomycosis.
- Habitat fragmentation as a threatening process for fauna in Victoria.
- Invasion of native vegetation by 'environmental weeds'.
- Loss of biodiversity as a result of the spread of Coast Wattle (*Acacia longifolia* subsp. *sophorae*) and Sallow Wattle (*Acacia longifolia* subsp. *longifolia*) into areas outside its natural range

A desktop review and field survey confirmed suitable habitat for Dwarf Galaxias, Australian Grayling and Flatback Mangrove Goby, all listed on the FFG Act. These species were located on Crown Land. Given the construction footprint intersects Crown Land on several publicly managed watercourses, an FFG Act permit will be required for construction activities.

## 7.3 Fisheries Act 1995

The Fisheries Act 1995 (Fisheries Act) provides a legislative framework for the regulation, management and conservation of Victorian fisheries, including aquatic habitats.

A person must not take, injure, damage, destroy, possess, keep or release into Victorian waters any protected aquatic biota without a permit or unless authorised to do so. Protected aquatic biota includes any taxon of fish or aquatic invertebrate listed under the FFG Act.

This act is relevant if there is a likelihood that land development will impact on fish habitat and aquatic ecological processes.

Similar to the FFG Act, action statements must outline the process that will be implemented to ensure the long-term protection of fish habitat and/or specific species

A permit will be required under the Fisheries Act for works in a waterway that may require the salvage and relocation (i.e. handing) of threatened and common fish species and threatened aquatic invertebrates.

## 7.4 Marine and Coastal Act 2018

Section 65(1) of the *Marine and Coastal Act 2018* requires the consent of the responsible Minister for the use and development of coastal Crown land, including Crown land in Victorian waters and 200 metres inland of the high-water mark.

Based on the desktop environmental assessment, three sections of construction footprint appear to fall under jurisdiction of the Act, the start of the route at Crib Point Jetty (KP0), the southern end of Warringine Park (approximately KP4.5) Watson Creek at KP 19.2 and a section just south of Langwarrin Creek (KP21.5) will require consent to undertake construction.

Consultation with DELWP to confirm areas of project corridor that fall under the Act and to determine consent requirements is needed.

## 7.5 Planning and Environment Act 1987

In Victoria, onshore natural gas pipelines with an operating pressure above 1,050kPa require licensing under the Pipelines Act 2005 (Pipeline Act), which is administered by DEWLP together with Energy Safe Victoria. Section 85 of the Pipeline Act provides that a pipeline issued with a licence under the Act is exempt from the requirements for a permit in a planning scheme under the Planning and Environment Act 1987 (P&E Act). As a matter of practice DEWLP administers the Pipeline Act as if the vegetation removal protection apply as outlined in the P&E Act.

## 7.6 Wildlife Act 1975 and Wildlife Regulations 2002

The main legislation for protecting and managing fauna in Victoria is the *Wildlife Act*. This covers indigenous vertebrate species (except declared pest species), invertebrate species listed under the FFG Act and some introduced game species but does not apply to fish, these are defined under the *Fisheries Act 1995*.

A Management Authorization permit will be required under the Act if salvage and relocation of fauna are to be undertaken as part of any mitigation measures for the project.

## 7.7 Catchment and Land Protection Act 1994

The *Catchment and Land Protection Act* (CaLP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals. The Act also provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to:

- Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner.
- Protect water resources.
- Conserve soil.
- Eradicate regionally prohibited weeds.
- Prevent the growth and spread of regionally controlled weeds.
- Prevent the spread of, and as far as possible eradicate, established pest animals.

The construction footprint contains several noxious weeds listed as regionally controlled within the PPWCMA region. Appropriate weed control and hygiene measures should be outlined in the Construction and Operational EMPs.

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# 9 APPENDICES

| | |
|---|---|
| Appendix A: | EPBC PMST 5km buffer |
| Appendix B: | List of Flora Recorded from the Alignment and Database Search Area |
| Appendix C: | Flora Likelihood of occurrence |
| Appendix D: | Vegetation Quality Assessment Results |
| Appendix E: | List of Fauna Recorded from the Alignment and Database Search Area |
| Appendix F: | Fauna Likelihood of occurrence |
| Appendix G: | EnSym Draft Assessment |
| Appendix H: | Detailed figures of ecological values found along the construction footprint. |
| | Growling Grass Frog Targeted Survey Location Map |
| | Southern Brown Bandicoot Mitigation Area |
| | Threatened Fauna Species Locations |

# Appendix A: EPBC PMST 5km buffer

Australian Government
Department of the Environment and Energy

# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

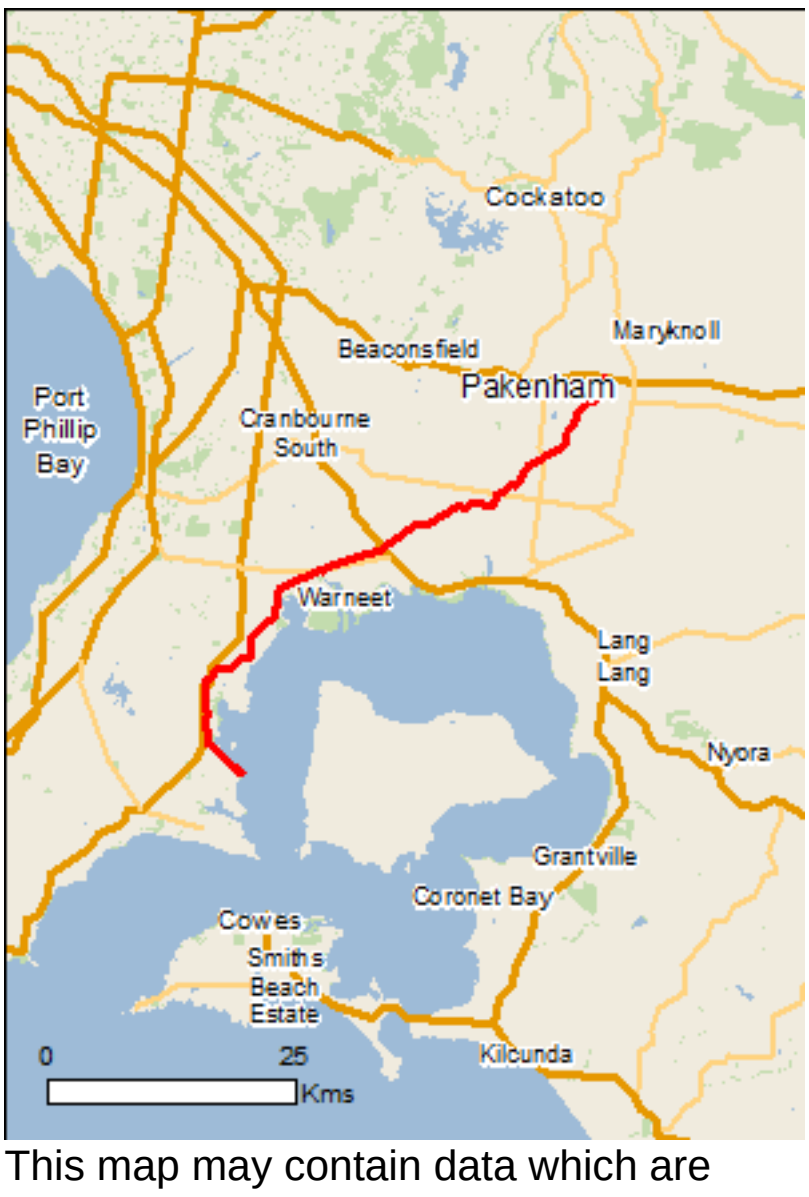
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 06/07/18 12:25:29


Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

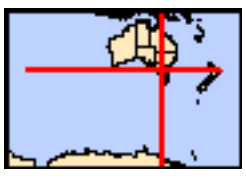
Caveat
Acknowledgements


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 5.0Km



# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

| | |
|---|---|
| World Heritage Properties: | None |
| National Heritage Places: | None |
| Wetlands of International Importance: | 1 |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 3 |
| Listed Threatened Species: | 64 |
| Listed Migratory Species: | 59 |

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

| | |
|---|---|
| Commonwealth Land: | 1 |
| Commonwealth Heritage Places: | 2 |
| Listed Marine Species: | 68 |
| Whales and Other Cetaceans: | 7 |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Australian Marine Parks: | None |

## Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

| | |
|---|---|
| State and Territory Reserves: | 13 |
| Regional Forest Agreements: | 1 |
| Invasive Species: | 49 |
| Nationally Important Wetlands: | 1 |
| Key Ecological Features (Marine) | None |

# Details

## Matters of National Environmental Significance

### Wetlands of International Importance (Ramsar) [ Resource Information ]

| Name | Proximity |
|---|---|
| Western port | Within Ramsar site |

### Listed Threatened Ecological Communities [ Resource Information ]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

| Name | Status | Type of Presence |
|---|---|---|
| Natural Damp Grassland of the Victorian Coastal Plains | Critically Endangered | Community likely to occur within area |
| Subtropical and Temperate Coastal Saltmarsh | Vulnerable | Community likely to occur within area |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland | Critically Endangered | Community likely to occur within area |

### Listed Threatened Species [ Resource Information ]

| Name | Status | Type of Presence |
|---|---|---|
| Birds | | |
| Anthochaera phrygia<br>Regent Honeyeater [82338] | Critically Endangered | Species or species habitat likely to occur within area |
| Botaurus poiciloptilus<br>Australasian Bittern [1001] | Endangered | Species or species habitat known to occur within area |
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat known to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris tenuirostris<br>Great Knot [862] | Critically Endangered | Roosting known to occur within area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Roosting known to occur within area |
| Charadrius mongolus<br>Lesser Sand Plover, Mongolian Plover [879] | Endangered | Roosting known to occur within area |
| Diomedea antipodensis<br>Antipodean Albatross [64458] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Diomedea antipodensis  gibsoni<br>Gibson's Albatross [82270] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Diomedea epomophora<br>Southern Royal Albatross [89221] | Vulnerable | Foraging, feeding or related behaviour likely |

| Name | Status | Type of Presence |
|---|---|---|
| | | to occur within area |
| Diomedea exulans<br>Wandering Albatross [89223] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Diomedea sanfordi<br>Northern Royal Albatross [64456] | Endangered | Foraging, feeding or related behaviour likely to occur within area |
| Fregetta grallaria  grallaria<br>White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438] | Vulnerable | Species or species habitat likely to occur within area |
| Grantiella picta<br>Painted Honeyeater [470] | Vulnerable | Species or species habitat likely to occur within area |
| Lathamus discolor<br>Swift Parrot [744] | Critically Endangered | Species or species habitat known to occur within area |
| Limosa lapponica  baueri<br>Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380] | Vulnerable | Species or species habitat known to occur within area |
| Limosa lapponica  menzbieri<br>Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432] | Critically Endangered | Species or species habitat may occur within area |
| Macronectes giganteus<br>Southern Giant-Petrel, Southern Giant Petrel [1060] | Endangered | Species or species habitat may occur within area |
| Macronectes halli<br>Northern Giant Petrel [1061] | Vulnerable | Species or species habitat may occur within area |
| Neophema chrysogaster<br>Orange-bellied Parrot [747] | Critically Endangered | Migration route likely to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat known to occur within area |
| Pachyptila turtur  subantarctica<br>Fairy Prion (southern) [64445] | Vulnerable | Species or species habitat known to occur within area |
| Phoebetria fusca<br>Sooty Albatross [1075] | Vulnerable | Species or species habitat likely to occur within area |
| Pterodroma leucoptera  leucoptera<br>Gould's Petrel, Australian Gould's Petrel [26033] | Endangered | Species or species habitat may occur within area |
| Rostratula australis<br>Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area |
| Sternula nereis  nereis<br>Australian Fairy Tern [82950] | Vulnerable | Breeding likely to occur within area |
| Thalassarche bulleri<br>Buller's Albatross, Pacific Albatross [64460] | Vulnerable | Species or species habitat may occur within area |
| Thalassarche bulleri  platei<br>Northern Buller's Albatross, Pacific Albatross [82273] | Vulnerable | Species or species habitat may occur within area |
| Thalassarche cauta  cauta<br>Shy Albatross, Tasmanian Shy Albatross [82345] | Vulnerable | Foraging, feeding or |

| Name | Status | Type of Presence |
|---|---|---|
| | | related behaviour likely to occur within area |
| Thalassarche cauta  steadi<br>White-capped Albatross [82344] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Thalassarche chrysostoma<br>Grey-headed Albatross [66491] | Endangered | Species or species habitat may occur within area |
| Thalassarche impavida<br>Campbell Albatross, Campbell Black-browed Albatross [64459] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Thalassarche melanophris<br>Black-browed Albatross [66472] | Vulnerable | Species or species habitat may occur within area |
| Thalassarche salvini<br>Salvin's Albatross [64463] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Fish | | |
| Galaxiella pusilla<br>Eastern Dwarf Galaxias, Dwarf Galaxias [56790] | Vulnerable | Species or species habitat known to occur within area |
| Prototroctes maraena<br>Australian Grayling [26179] | Vulnerable | Species or species habitat known to occur within area |
| Frogs | | |
| Litoria raniformis<br>Growling Grass Frog, Southern Bell Frog,  Green and Golden Frog, Warty Swamp Frog [1828] | Vulnerable | Species or species habitat known to occur within area |
| Insects | | |
| Synemon plana<br>Golden Sun Moth [25234] | Critically Endangered | Species or species habitat may occur within area |
| Mammals | | |
| Antechinus minimus  maritimus<br>Swamp Antechinus (mainland) [83086] | Vulnerable | Species or species habitat likely to occur within area |
| Dasyurus maculatus  maculatus (SE mainland population)<br>Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184] | Endangered | Species or species habitat may occur within area |
| Eubalaena australis<br>Southern Right Whale [40] | Endangered | Species or species habitat known to occur within area |
| Isoodon obesulus  obesulus<br>Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050] | Endangered | Species or species habitat known to occur within area |
| Mastacomys fuscus  mordicus<br>Broad-toothed Rat (mainland), Tooarrana [87617] | Vulnerable | Species or species habitat likely to occur within area |
| Megaptera novaeangliae<br>Humpback Whale [38] | Vulnerable | Species or species habitat may occur within area |
| Petauroides volans<br>Greater Glider [254] | Vulnerable | Species or species habitat likely to occur within area |
| Potorous tridactylus  tridactylus<br>Long-nosed Potoroo (SE mainland) [66645] | Vulnerable | Species or species habitat likely to occur |

| Name | Status | Type of Presence |
|---|---|---|
| | | within area |
| [Pseudomys fumeus](#)<br>Smoky Mouse, Konoom [88] | Endangered | Species or species habitat likely to occur within area |
| [Pteropus poliocephalus](#)<br>Grey-headed Flying-fox [186] | Vulnerable | Roosting known to occur within area |
| **Plants** | | |
| [Amphibromus fluitans](#)<br>River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215] | Vulnerable | Species or species habitat likely to occur within area |
| [Caladenia orientalis](#)<br>Eastern Spider Orchid [83410] | Endangered | Species or species habitat may occur within area |
| [Dianella amoena](#)<br>Matted Flax-lily [64886] | Endangered | Species or species habitat known to occur within area |
| [Glycine latrobeana](#)<br>Clover Glycine, Purple Clover [13910] | Vulnerable | Species or species habitat likely to occur within area |
| [Pomaderris vacciniifolia](#)<br>Round-leaf Pomaderris [4256] | Critically Endangered | Species or species habitat may occur within area |
| [Prasophyllum frenchii](#)<br>Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid, Swamp Leek-orchid [9704] | Endangered | Species or species habitat likely to occur within area |
| [Prasophyllum spicatum](#)<br>Dense Leek-orchid [55146] | Vulnerable | Species or species habitat likely to occur within area |
| [Pterostylis chlorogramma](#)<br>Green-striped Greenhood [56510] | Vulnerable | Species or species habitat likely to occur within area |
| [Pterostylis cucullata](#)<br>Leafy Greenhood [15459] | Vulnerable | Species or species habitat may occur within area |
| [Senecio psilocarpus](#)<br>Swamp Fireweed, Smooth-fruited Groundsel [64976] | Vulnerable | Species or species habitat likely to occur within area |
| [Thelymitra epipactoides](#)<br>Metallic Sun-orchid [11896] | Endangered | Species or species habitat may occur within area |
| [Xerochrysum palustre](#)<br>Swamp Everlasting, Swamp Paper Daisy [76215] | Vulnerable | Species or species habitat known to occur within area |
| **Reptiles** | | |
| [Caretta caretta](#)<br>Loggerhead Turtle [1763] | Endangered | Species or species habitat known to occur within area |
| [Chelonia mydas](#)<br>Green Turtle [1765] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| [Dermochelys coriacea](#)<br>Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Species or species habitat known to occur within area |
| **Sharks** | | |

| Name | Status | Type of Presence |
|---|---|---|
| [Carcharodon carcharias](#)<br>White Shark, Great White Shark [64470] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |

## Listed Migratory Species [ Resource Information ]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

| Name | Threatened | Type of Presence |
|---|---|---|
| Migratory Marine Birds | | |
| [Apus pacificus](#)<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| [Ardenna carneipes](#)<br>Flesh-footed Shearwater, Fleshy-footed Shearwater [82404] | | Foraging, feeding or related behaviour likely to occur within area |
| [Diomedea antipodensis](#)<br>Antipodean Albatross [64458] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| [Diomedea epomophora](#)<br>Southern Royal Albatross [89221] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| [Diomedea exulans](#)<br>Wandering Albatross [89223] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| [Diomedea sanfordi](#)<br>Northern Royal Albatross [64456] | Endangered | Foraging, feeding or related behaviour likely to occur within area |
| [Macronectes giganteus](#)<br>Southern Giant-Petrel, Southern Giant Petrel [1060] | Endangered | Species or species habitat may occur within area |
| [Macronectes halli](#)<br>Northern Giant Petrel [1061] | Vulnerable | Species or species habitat may occur within area |
| [Phoebetria fusca](#)<br>Sooty Albatross [1075] | Vulnerable | Species or species habitat likely to occur within area |
| [Sternula albifrons](#)<br>Little Tern [82849] | | Species or species habitat may occur within area |
| [Thalassarche bulleri](#)<br>Buller's Albatross, Pacific Albatross [64460] | Vulnerable | Species or species habitat may occur within area |
| [Thalassarche cauta](#)<br>Tasmanian Shy Albatross [89224] | Vulnerable* | Foraging, feeding or related behaviour likely to occur within area |
| [Thalassarche chrysostoma](#)<br>Grey-headed Albatross [66491] | Endangered | Species or species habitat may occur within area |
| [Thalassarche impavida](#)<br>Campbell Albatross, Campbell Black-browed Albatross [64459] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| [Thalassarche melanophris](#)<br>Black-browed Albatross [66472] | Vulnerable | Species or species habitat may occur within area |
| [Thalassarche salvini](#)<br>Salvin's Albatross [64463] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Thalassarche steadi | | |
| White-capped Albatross [64462] | Vulnerable* | Foraging, feeding or related behaviour likely to occur within area |
| **Migratory Marine Species** | | |
| Balaena glacialis  australis | | |
| Southern Right Whale [75529] | Endangered* | Species or species habitat known to occur within area |
| Caperea marginata | | |
| Pygmy Right Whale [39] | | Foraging, feeding or related behaviour may occur within area |
| Carcharodon carcharias | | |
| White Shark, Great White Shark [64470] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| Caretta caretta | | |
| Loggerhead Turtle [1763] | Endangered | Species or species habitat known to occur within area |
| Chelonia mydas | | |
| Green Turtle [1765] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| Dermochelys coriacea | | |
| Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Species or species habitat known to occur within area |
| Lagenorhynchus obscurus | | |
| Dusky Dolphin [43] | | Species or species habitat may occur within area |
| Lamna nasus | | |
| Porbeagle, Mackerel Shark [83288] | | Species or species habitat likely to occur within area |
| Megaptera novaeangliae | | |
| Humpback Whale [38] | Vulnerable | Species or species habitat may occur within area |
| **Migratory Terrestrial Species** | | |
| Hirundapus caudacutus | | |
| White-throated Needletail [682] | | Species or species habitat known to occur within area |
| Monarcha melanopsis | | |
| Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Motacilla flava | | |
| Yellow Wagtail [644] | | Species or species habitat likely to occur within area |
| Myiagra cyanoleuca | | |
| Satin Flycatcher [612] | | Breeding known to occur within area |
| Rhipidura rufifrons | | |
| Rufous Fantail [592] | | Species or species habitat known to occur within area |
| **Migratory Wetlands Species** | | |
| Actitis hypoleucos | | |
| Common Sandpiper [59309] | | Species or species habitat known to occur within area |
| Arenaria interpres | | |
| Ruddy Turnstone [872] | | Roosting known to occur within area |
| Calidris acuminata | | |
| Sharp-tailed Sandpiper [874] | | Roosting known to occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat known to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat known to occur within area |
| Calidris ruficollis<br>Red-necked Stint [860] | | Roosting known to occur within area |
| Calidris tenuirostris<br>Great Knot [862] | Critically Endangered | Roosting known to occur within area |
| Charadrius bicinctus<br>Double-banded Plover [895] | | Roosting known to occur within area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Roosting known to occur within area |
| Charadrius mongolus<br>Lesser Sand Plover, Mongolian Plover [879] | Endangered | Roosting known to occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Roosting may occur within area |
| Gallinago megala<br>Swinhoe's Snipe [864] | | Roosting likely to occur within area |
| Gallinago stenura<br>Pin-tailed Snipe [841] | | Roosting likely to occur within area |
| Limicola falcinellus<br>Broad-billed Sandpiper [842] | | Roosting known to occur within area |
| Limosa lapponica<br>Bar-tailed Godwit [844] | | Species or species habitat known to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat known to occur within area |
| Numenius minutus<br>Little Curlew, Little Whimbrel [848] | | Roosting likely to occur within area |
| Numenius phaeopus<br>Whimbrel [849] | | Roosting known to occur within area |
| Pandion haliaetus<br>Osprey [952] | | Species or species habitat likely to occur within area |
| Pluvialis fulva<br>Pacific Golden Plover [25545] | | Roosting known to occur within area |
| Pluvialis squatarola<br>Grey Plover [865] | | Roosting known to occur within area |
| Tringa brevipes<br>Grey-tailed Tattler [851] | | Roosting known to occur within area |
| Tringa glareola<br>Wood Sandpiper [829] | | Roosting known to occur within area |
| Tringa incana<br>Wandering Tattler [831] | | Roosting known to occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Tringa nebularia | | |
| Common Greenshank, Greenshank [832] | | Species or species habitat known to occur within area |
| Tringa stagnatilis | | |
| Marsh Sandpiper, Little Greenshank [833] | | Roosting known to occur within area |
| Xenus cinereus | | |
| Terek Sandpiper [59300] | | Roosting known to occur within area |

## Other Matters Protected by the EPBC Act

### Commonwealth Land [ Resource Information ]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

| Name |
|---|
| Defence - HMAS CERBERUS |

### Commonwealth Heritage Places [ Resource Information ]

| Name | State | Status |
|---|---|---|
| Natural | | |
| HMAS Cerberus Marine and Coastal Area | VIC | Listed place |
| Historic | | |
| HMAS Cerberus Central Area Group | VIC | Listed place |

### Listed Marine Species [ Resource Information ]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

| Name | Threatened | Type of Presence |
|---|---|---|
| Birds | | |
| Actitis hypoleucos | | |
| Common Sandpiper [59309] | | Species or species habitat known to occur within area |
| Apus pacificus | | |
| Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Ardea alba | | |
| Great Egret, White Egret [59541] | | Species or species habitat known to occur within area |
| Ardea ibis | | |
| Cattle Egret [59542] | | Species or species habitat may occur within area |
| Arenaria interpres | | |
| Ruddy Turnstone [872] | | Roosting known to occur within area |
| Calidris acuminata | | |
| Sharp-tailed Sandpiper [874] | | Roosting known to occur within area |
| Calidris canutus | | |
| Red Knot, Knot [855] | Endangered | Species or species habitat known to occur within area |
| Calidris ferruginea | | |
| Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur |

| Name | Threatened | Type of Presence |
|---|---|---|
| | | within area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat known to occur within area |
| Calidris ruficollis<br>Red-necked Stint [860] | | Roosting known to occur within area |
| Calidris tenuirostris<br>Great Knot [862] | Critically Endangered | Roosting known to occur within area |
| Charadrius bicinctus<br>Double-banded Plover [895] | | Roosting known to occur within area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Roosting known to occur within area |
| Charadrius mongolus<br>Lesser Sand Plover, Mongolian Plover [879] | Endangered | Roosting known to occur within area |
| Charadrius ruficapillus<br>Red-capped Plover [881] | | Roosting known to occur within area |
| Diomedea antipodensis<br>Antipodean Albatross [64458] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Diomedea epomophora<br>Southern Royal Albatross [89221] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Diomedea exulans<br>Wandering Albatross [89223] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Diomedea gibsoni<br>Gibson's Albatross [64466] | Vulnerable* | Foraging, feeding or related behaviour likely to occur within area |
| Diomedea sanfordi<br>Northern Royal Albatross [64456] | Endangered | Foraging, feeding or related behaviour likely to occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Roosting may occur within area |
| Gallinago megala<br>Swinhoe's Snipe [864] | | Roosting likely to occur within area |
| Gallinago stenura<br>Pin-tailed Snipe [841] | | Roosting likely to occur within area |
| Haliaeetus leucogaster<br>White-bellied Sea-Eagle [943] | | Species or species habitat known to occur within area |
| Heteroscelus brevipes<br>Grey-tailed Tattler [59311] | | Roosting known to occur within area |
| Heteroscelus incanus<br>Wandering Tattler [59547] | | Roosting known to occur within area |
| Himantopus himantopus<br>Black-winged Stilt [870] | | Roosting known to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | | Species or species habitat known to occur within area |
| Lathamus discolor<br>Swift Parrot [744] | Critically Endangered | Species or species habitat known to occur |

| Name | Threatened | Type of Presence within area |
|---|---|---|
| Limicola falcinellus<br>Broad-billed Sandpiper [842] | | Roosting known to occur within area |
| Limosa lapponica<br>Bar-tailed Godwit [844] | | Species or species habitat known to occur within area |
| Macronectes giganteus<br>Southern Giant-Petrel, Southern Giant Petrel [1060] | Endangered | Species or species habitat may occur within area |
| Macronectes halli<br>Northern Giant Petrel [1061] | Vulnerable | Species or species habitat may occur within area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat likely to occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Breeding known to occur within area |
| Neophema chrysogaster<br>Orange-bellied Parrot [747] | Critically Endangered | Migration route likely to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat known to occur within area |
| Numenius minutus<br>Little Curlew, Little Whimbrel [848] | | Roosting likely to occur within area |
| Numenius phaeopus<br>Whimbrel [849] | | Roosting known to occur within area |
| Pachyptila turtur<br>Fairy Prion [1066] | | Species or species habitat known to occur within area |
| Pandion haliaetus<br>Osprey [952] | | Species or species habitat likely to occur within area |
| Phoebetria fusca<br>Sooty Albatross [1075] | Vulnerable | Species or species habitat likely to occur within area |
| Pluvialis fulva<br>Pacific Golden Plover [25545] | | Roosting known to occur within area |
| Pluvialis squatarola<br>Grey Plover [865] | | Roosting known to occur within area |
| Puffinus carneipes<br>Flesh-footed Shearwater, Fleshy-footed Shearwater [1043] | | Foraging, feeding or related behaviour likely to occur within area |
| Recurvirostra novaehollandiae<br>Red-necked Avocet [871] | | Roosting known to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Rostratula benghalensis (sensu lato)<br>Painted Snipe [889] | Endangered* | Species or species habitat likely to occur within area |
| Sterna albifrons<br>Little Tern [813] | | Species or species habitat may occur within area |
| Thalassarche bulleri<br>Buller's Albatross, Pacific Albatross [64460] | Vulnerable | Species or species habitat may occur within area |
| Thalassarche cauta<br>Tasmanian Shy Albatross [89224] | Vulnerable* | Foraging, feeding or related behaviour likely to occur within area |
| Thalassarche chrysostoma<br>Grey-headed Albatross [66491] | Endangered | Species or species habitat may occur within area |
| Thalassarche impavida<br>Campbell Albatross, Campbell Black-browed Albatross [64459] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Thalassarche melanophris<br>Black-browed Albatross [66472] | Vulnerable | Species or species habitat may occur within area |
| Thalassarche salvini<br>Salvin's Albatross [64463] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Thalassarche sp. nov.<br>Pacific Albatross [66511] | Vulnerable* | Species or species habitat may occur within area |
| Thalassarche steadi<br>White-capped Albatross [64462] | Vulnerable* | Foraging, feeding or related behaviour likely to occur within area |
| Tringa glareola<br>Wood Sandpiper [829] | | Roosting known to occur within area |
| Tringa nebularia<br>Common Greenshank, Greenshank [832] | | Species or species habitat known to occur within area |
| Tringa stagnatilis<br>Marsh Sandpiper, Little Greenshank [833] | | Roosting known to occur within area |
| Xenus cinereus<br>Terek Sandpiper [59300] | | Roosting known to occur within area |
| Mammals | | |
| Arctocephalus forsteri<br>Long-nosed Fur-seal, New Zealand Fur-seal [20] | | Species or species habitat may occur within area |
| Arctocephalus pusillus<br>Australian Fur-seal, Australo-African Fur-seal [21] | | Species or species habitat likely to occur within area |
| Reptiles | | |
| Caretta caretta<br>Loggerhead Turtle [1763] | Endangered | Species or species habitat known to occur within area |
| Chelonia mydas<br>Green Turtle [1765] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| Dermochelys coriacea<br>Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Species or species |

| Name | Threatened | Type of Presence |
|---|---|---|
| | | habitat known to occur within area |

## Whales and other Cetaceans [ Resource Information ]

| Name | Status | Type of Presence |
|---|---|---|
| Mammals | | |
| [Caperea marginata](#)<br>Pygmy Right Whale [39] | | Foraging, feeding or related behaviour may occur within area |
| [Delphinus delphis](#)<br>Common Dophin, Short-beaked Common Dolphin [60] | | Species or species habitat may occur within area |
| [Eubalaena australis](#)<br>Southern Right Whale [40] | Endangered | Species or species habitat known to occur within area |
| [Lagenorhynchus obscurus](#)<br>Dusky Dolphin [43] | | Species or species habitat may occur within area |
| [Megaptera novaeangliae](#)<br>Humpback Whale [38] | Vulnerable | Species or species habitat may occur within area |
| [Tursiops aduncus](#)<br>Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418] | | Species or species habitat likely to occur within area |
| [Tursiops truncatus s. str.](#)<br>Bottlenose Dolphin [68417] | | Species or species habitat may occur within area |

# Extra Information

## State and Territory Reserves [ Resource Information ]

| Name | State |
|---|---|
| Bittern B.R. | VIC |
| Crib Point G228 B.R. | VIC |
| Crib Point G229 B.R. | VIC |
| Nar-Nar-Goon G74 B.R | VIC |
| Nar-Nar-Goon G75 B.R | VIC |
| Nar-Nar-Goon G76 B.R | VIC |
| North Western Port N.C.R. | VIC |
| Olivers Creek B.R. | VIC |
| Tyabb B.R. | VIC |
| Warneet Balaka St B.R. | VIC |
| Warneet Iluka St B.R. | VIC |
| Warneet N.F.R. | VIC |
| Warrengine Creek SS.R. | VIC |

## Regional Forest Agreements [ Resource Information ]

Note that all areas with completed RFAs have been included.

| Name | State |
|---|---|
| [Central Highlands RFA](#) | Victoria |

## Invasive Species

[ Resource Information ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

| Name | Status | Type of Presence |
|---|---|---|
| **Birds** | | |
| Acridotheres tristis<br>Common Myna, Indian Myna [387] | | Species or species habitat likely to occur within area |
| Alauda arvensis<br>Skylark [656] | | Species or species habitat likely to occur within area |
| Anas platyrhynchos<br>Mallard [974] | | Species or species habitat likely to occur within area |
| Carduelis carduelis<br>European Goldfinch [403] | | Species or species habitat likely to occur within area |
| Carduelis chloris<br>European Greenfinch [404] | | Species or species habitat likely to occur within area |
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803] | | Species or species habitat likely to occur within area |
| Passer domesticus<br>House Sparrow [405] | | Species or species habitat likely to occur within area |
| Passer montanus<br>Eurasian Tree Sparrow [406] | | Species or species habitat likely to occur within area |
| Pycnonotus jocosus<br>Red-whiskered Bulbul [631] | | Species or species habitat likely to occur within area |
| Streptopelia chinensis<br>Spotted Turtle-Dove [780] | | Species or species habitat likely to occur within area |
| Sturnus vulgaris<br>Common Starling [389] | | Species or species habitat likely to occur within area |
| Turdus merula<br>Common Blackbird, Eurasian Blackbird [596] | | Species or species habitat likely to occur within area |
| Turdus philomelos<br>Song Thrush [597] | | Species or species habitat likely to occur within area |
| **Mammals** | | |
| Bos taurus<br>Domestic Cattle [16] | | Species or species habitat likely to occur within area |
| Canis lupus familiaris<br>Domestic Dog [82654] | | Species or species habitat likely to occur within area |
| Capra hircus<br>Goat [2] | | Species or species habitat likely to occur within area |

| Name | Status | Type of Presence |
|---|---|---|
| Felis catus<br>Cat, House Cat, Domestic Cat [19] | | Species or species habitat likely to occur within area |
| Feral deer<br>Feral deer species in Australia [85733] | | Species or species habitat likely to occur within area |
| Lepus capensis<br>Brown Hare [127] | | Species or species habitat likely to occur within area |
| Mus musculus<br>House Mouse [120] | | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus<br>Rabbit, European Rabbit [128] | | Species or species habitat likely to occur within area |
| Rattus norvegicus<br>Brown Rat, Norway Rat [83] | | Species or species habitat likely to occur within area |
| Rattus rattus<br>Black Rat, Ship Rat [84] | | Species or species habitat likely to occur within area |
| Sus scrofa<br>Pig [6] | | Species or species habitat likely to occur within area |
| Vulpes vulpes<br>Red Fox, Fox [18] | | Species or species habitat likely to occur within area |
| Plants | | |
| Alternanthera philoxeroides<br>Alligator Weed [11620] | | Species or species habitat likely to occur within area |
| Anredera cordifolia<br>Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643] | | Species or species habitat likely to occur within area |
| Asparagus aethiopicus<br>Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425] | | Species or species habitat likely to occur within area |
| Asparagus asparagoides<br>Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473] | | Species or species habitat likely to occur within area |
| Asparagus scandens<br>Asparagus Fern, Climbing Asparagus Fern [23255] | | Species or species habitat likely to occur within area |
| Austrocylindropuntia spp.<br>Prickly Pears [85132] | | Species or species habitat likely to occur within area |
| Carrichtera annua<br>Ward's Weed [9511] | | Species or species habitat may occur within area |
| Chrysanthemoides monilifera<br>Bitou Bush, Boneseed [18983] | | Species or species habitat may occur within area |
| Chrysanthemoides monilifera subsp. monilifera<br>Boneseed [16905] | | Species or species habitat likely to occur within area |

| Name | Status | Type of Presence |
|---|---|---|
| Chrysanthemoides monilifera subsp. rotundata<br>Bitou Bush [16332] | | Species or species habitat likely to occur within area |
| Cytisus scoparius<br>Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934] | | Species or species habitat likely to occur within area |
| Eichhornia crassipes<br>Water Hyacinth, Water Orchid, Nile Lily [13466] | | Species or species habitat likely to occur within area |
| Genista linifolia<br>Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800] | | Species or species habitat likely to occur within area |
| Genista monspessulana<br>Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126] | | Species or species habitat likely to occur within area |
| Genista sp. X Genista monspessulana<br>Broom [67538] | | Species or species habitat may occur within area |
| Lycium ferocissimum<br>African Boxthorn, Boxthorn [19235] | | Species or species habitat likely to occur within area |
| Nassella neesiana<br>Chilean Needle grass [67699] | | Species or species habitat likely to occur within area |
| Nassella trichotoma<br>Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884] | | Species or species habitat likely to occur within area |
| Olea europaea<br>Olive, Common Olive [9160] | | Species or species habitat may occur within area |
| Opuntia spp.<br>Prickly Pears [82753] | | Species or species habitat likely to occur within area |
| Rubus fruticosus aggregate<br>Blackberry, European Blackberry [68406] | | Species or species habitat likely to occur within area |
| Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii<br>Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497] | | Species or species habitat likely to occur within area |
| Senecio madagascariensis<br>Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624] | | Species or species habitat likely to occur within area |
| Ulex europaeus<br>Gorse, Furze [7693] | | Species or species habitat likely to occur within area |

| Nationally Important Wetlands | [ Resource Information ] |
|---|---|
| Name | State |
| Western Port | VIC |

# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods.  Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc).  In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

# Coordinates

-38.34832 145.21734,-38.34768 145.21532,-38.3448 145.21362,-38.34426 145.21264,-38.34416 145.20859,-38.32863 145.19192,-38.32638 145.18615,-38.31632 145.18602,-38.31613 145.18394,-38.30813 145.18376,-38.30777 145.18537,-38.30308 145.18535,-38.30308 145.18379,-38.28055 145.18365,-38.28053 145.1882,-38.27642 145.18991,-38.27265 145.19486,-38.27262 145.20857,-38.26566 145.21605,-38.26567 145.22468,-38.25318 145.22467,-38.24359 145.23332,-38.24218 145.2375,-38.23864 145.24231,-38.23732 145.24739,-38.22266 145.24826,-38.22187 145.24974,-38.21586 145.25093,-38.21561 145.25162,-38.20364 145.28665,-38.20402 145.29122,-38.20367 145.29308,-38.20061 145.29414,-38.19254 145.33119,-38.19022 145.34086,-38.16982 145.37493,-38.17085 145.38358,-38.15793 145.41437,-38.15875 145.4206,-38.1551 145.42459,-38.15786 145.44538,-38.14909 145.44721,-38.14722 145.45146,-38.14285 145.46139,-38.14315 145.46392,-38.12867 145.47707,-38.11659 145.50435,-38.11288 145.50931,-38.10621 145.51124,-38.10049 145.51872,-38.09322 145.52025,-38.08549 145.52824,-38.08336 145.5287,-38.08112 145.54321,-38.06553 145.54671,-38.06515 145.54377,-38.06515 145.54377

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-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

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Please feel free to provide feedback via the Contact Us page.


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# Appendix B: List of Flora Recorded from the Alignment and Database Search Area

**Legend**:
X = recorded during survey, * = Weed, # = non-indigenous native, C = regionally controlled weed, R = regionally restricted weed
**EPBC Act**: CE = critically endangered, EN = endangered, VU = vulnerable
**FFG Act**: L = Listed, X = rejected, N = nominated
**Victorian Rare or Threatened list (VROT)**: en = endangered, r = rare, vu = vulnerable, ex = presumed extinct

| Scientific Name | Common Name | Recorded in the construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VROT |
| *Acacia aculeatissima* | Thin-leaf Wattle | X | | | | |
| *Acacia howittii* | Sticky Wattle | | # | | | r |
| *Acacia longifolia subsp. sophorae* | Coast Wattle | X | # | | | |
| *Acacia mearnsii* | Black Wattle | X | | | | |
| *Acacia melanoxylon* | Blackwood | X | | | | |
| *Acacia paradoxa* | Hedge Wattle | X | | | | |
| *Acacia verticillata* | Prickly Moses | X | | | | |
| *Acaena novae-zelandiae* | Bidgee-widgee | X | | | | |
| *Acaena ovina* | Australian Sheep's Burr | X | | | | |
| *Acetosella vulgaris* | Sheep Sorrel | X | * | | | |
| *Acianthus pusillus* | Small Mosquito-orchid | X | | | | |
| *Acrotriche serrulata* | Honey-pots | X | | | | |
| *Adiantum diaphanum* | Filmy Maidenhair | | | | L | en |
| *Agapanthus praecox subsp. orientalis* | Agapanthus | X | * | | | |
| *Agrostis capillaris* | Brown-top Bent | X | * | | | |
| *Allium triquetrum* | Angled Onion | X | *R | | | |
| *Allocasuarina littoralis* | Black Sheoak | X | | | | |
| *Allocasuarina verticillata* | Drooping Sheoak | X | | | | |
| *Amaranthus spp.* | Amaranth | X | * | | | |
| *Amphibromus fluitans* | River Swamp Wallaby-grass | | | VU | X | |
| *Amyema pendula* | Drooping Mistletoe | X | | | | |
| *Anthoxanthum odoratum* | Sweet Vernal-grass | X | * | | | |
| *Arctotheca calendula* | Cape weed | X | * | | | |
| *Asparagus asparagoides* | Bridal Creeper | X | *R | | | |

| Scientific Name | Common Name | Recorded in the construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VROT |
| *Astroloma humifusum* | Cranberry Heath | X | | | | |
| *Atriplex paludosa* subsp. *paludosa* | Marsh Saltbush | X | | | | r |
| *Austrostipa densiflora* | Dense Spear-grass | X | | | | |
| *Austrostipa rudis* | Veined Spear-grass | X | | | | r |
| *Austrostipa* spp. | Spear Grass | X | | | | |
| *Austrostipa stipoides* | Prickly Spear-grass | X | | | | |
| *Avicennia marina* subsp. *australasica* | Grey Mangrove | X | | | | r |
| *Azolla filiculoides* | Pacific Azolla | X | | | | |
| *Banksia integrifolia* subsp. *integrifolia* | Coast Banksia | X | | | | |
| *Banksia marginata* | Silver Banksia | X | | | | |
| *Banksia serrata* | Saw Banksia | X | | | | |
| *Banksia spinulosa* var. *cunninghamii* | Hairpin Banksia | | | | N | |
| *Betula* spp. | Birch | X | * | | | |
| *Billardiera heterophylla* | Bluebell Creeper | X | * | | | |
| *Billardiera scandens* | Common Apple-berry | X | | | | |
| *Bossiaea prostrata* | Creeping Bossiaea | X | | | | |
| *Briza maxima* | Large Quaking-grass | X | * | | | |
| *Bromus diandrus* | Great Brome | X | * | | | |
| *Bursaria spinosa subsp. spinosa* | Sweet Bursaria | X | | | | |
| *Caladenia orientalis* | Eastern Spider Orchid | | | EN | L | en |
| *Carex appressa* | Tall Sedge | X | | | | |
| *Carex breviculmis* | Common Grass-sedge | X | | | | |
| *Carpobrotus rossii* | Karkalla | X | | | | |
| *Cassinia aculeata subsp. aculeata* | Common Cassinia | X | | | | |
| *Cassytha* spp. | Dodder Laurel | X | | | | |
| *Cenchrus clandestinus* | Kikuyu | X | * | | | |
| *Centaurium erythraea* | Common Centaury | X | * | | | |
| *Cerastium glomeratum* | Common Mouse-ear Chickweed | X | * | | | |
| *Chenopodium album* | Fat Hen | X | * | | | |
| *Chloris* spp. | Windmill Grass | X | * | | | |
| *Chrysanthemoides monilifera* | Boneseed | X | *c | | | |
| *Cirsium vulgare* | Spear Thistle | X | *c | | | |
| *Coprosma quadrifida* | Prickly Currant-bush | X | | | | |

| Scientific Name | Common Name | Recorded in the construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VROT |
| *Coprosma repens* | Mirror Bush | X | * | | | |
| *Coronidium gunnianum* | Pale Swamp Everlasting | | | | | vu |
| *Correa reflexa* | Common Correa | X | | | | |
| *Corymbia citriodora* | Lemon-scented Gum | X | ## | | | |
| *Corymbia maculata* | Spotted Gum | X | # | | | vu |
| *Cotoneaster pannosus* | Velvet Cotoneaster | X | * | | | |
| *Cotula coronopifolia* | Water Buttons | X | * | | | |
| *Craspedia canens* | Grey Billy-buttons | | | | L | en |
| *Crassula helmsii* | Swamp Crassula | X | | | | |
| *Crataegus monogyna* | Hawthorn | X | *C | | | |
| *Cynodon dactylon* | Couch | X | | | | |
| *Cytisus scoparius* | English Broom | X | *C | | | |
| *Dactylis glomerata* | Cocksfoot | X | * | | | |
| *Daucus carota* | Carrot | X | * | | | |
| *Daucus glochidiatus* | Australian Carrot | X | | | | |
| *Dianella admixta* | Black-anther Flax-lily | X | | | | |
| *Dianella amoena* | Matted Flax-lily | | | EN | L | en |
| *Dianella revoluta* | Black-anther Flax-lily | X | | | | |
| *Dianella* sp. aff. *longifolia (Benambra)* | Arching Flax-lily | | | | | vu |
| *Dichondra repens* | Kidney-weed | X | | | | |
| *Dillwynia* spp. | Parrot Pea | X | | | | |
| *Disphyma crassifolium* subsp. *clavellatum* | Rounded Noon-flower | X | | | | |
| *Distichlis distichophylla* | Australian Salt-grass | X | | | | |
| *Diuris punctata* | Purple Diuris | | | | L | vu |
| *Drosera aberrans* | Scented Sundew | X | | | | |
| *Ehrharta erecta* var. *erecta* | Panic Veldt-grass | X | * | | | |
| *Ehrharta longiflora* | Annual Veldt-grass | X | * | | | |
| *Epacris impressa* | Common Heath | X | | | | |
| *Epilobium billardierianum* | Variable Willow-herb | X | | | | |
| *Erica lusitanica* | Spanish Heath | X | * | | | |
| *Erigeron bonariense* | Flaxleaf Fleabane | X | * | | | |
| *Eucalyptus botryoides* | Southern Mahogany | X | # | | | |
| *Eucalyptus camaldulensis* | River Red-gum | X | | | | |
| *Eucalyptus cladocalyx* | Sugar Gum | X | # | | | |

| Scientific Name | Common Name | Recorded in the construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VROT |
| *Eucalyptus crenulata* | Buxton Gum | | # | | L | en |
| *Eucalyptus fulgens* | Green Scentbark | | | | | r |
| *Eucalyptus globulus* | Blue-gum | X | # | | | r |
| *Eucalyptus globulus subsp. globulus* | Southern Blue-gum | | # | | | r |
| *Eucalyptus leucoxylon* | Yellow Gum | X | # | | | |
| *Eucalyptus leucoxylon* subsp. *megalocarpa* | Large-fruit Yellow-gum | | # | | L | en |
| *Eucalyptus ovata* | Swamp Gum | X | | | | |
| *Eucalyptus pauciflora* subsp. *pauciflora* | White Sallee | X | # | | | |
| *Eucalyptus radiata* | Narrow-leaf Peppermint | X | | | | |
| *Eucalyptus sideroxylon* subsp. *sideroxylon* | Mugga | | | | | r |
| *Eucalyptus* spp. | Eucalypt | X | # | | | |
| *Eucalyptus viminalis* | Manna Gum | X | | | | |
| *Eucalyptus viminalis* subsp. *pryoriana* | Coast Manna-gum | X | | | | |
| *Eucalyptus willisii* s.s. | Promontory Peppermint | | | | | r |
| *Eucalyptus X studleyensis* | Studley Park Gum | | | | | en |
| *Eucalyptus strzeleckii* | Strzelecki Gum | | | VU | L | vu |
| *Euchiton japonicus* | Creeping Cudweed | X | | | | |
| *Euryomyrtus ramosissima* subsp. *prostrata* | Nodding Baeckea | | | | | r |
| *Exocarpos cupressiformis* | Cherry Ballart | X | | | | |
| *Exocarpos* spp. | Ballart | X | | | | |
| *Exocarpos syrticola* | Coast Ballart | | | | | r |
| *Ficinia nodosa* | Knobby Club-sedge | X | | | | |
| *Freesia leichtlinii* | Freesia | X | * | | | |
| *Gahnia radula* | Thatch Saw-sedge | X | | | | |
| *Gahnia sieberiana* | Red-fruit Saw-sedge | X | | | | |
| *Gahnia spp.* | Saw Sedge | X | | | | |
| *Genista linifolia* | Flax-leaf Broom | X | *C | | | |
| *Genista monspessulana* | Montpellier Broom | X | *C | | | |
| *Geranium solanderi* var. *solanderi* s.s. | Austral Crane's-bill | | | | | vu |
| *Gladiolus* spp. | Gladiolus | X | * | | | |
| *Gladiolus undulatus* | Wild Gladiolus | X | * | | | |
| *Glycine latrobeana* | Clover Glycine, Purple Clover | | | VU | L | vu |

| Scientific Name | Common Name | Recorded in the construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VROT |
| *Gonocarpus tetragynus* | Common Raspwort | X | | | | |
| *Goodenia humilis* | Swamp Goodenia | X | | | | |
| *Goodenia ovata* | Hop Goodenia | X | | | | |
| *Hakea drupacea* | Sweet Hakea | X | # | | | |
| *Hedera helix* | English Ivy | X | * | | | |
| *Helichrysum luteoalbum* | Jersey Cudweed | X | | | | |
| *Helminthotheca echioides* | Ox-tongue | X | * | | | |
| *Holcus lanatus* | Yorkshire Fog | X | * | | | |
| *Hordeum leporinum* | Barley-grass | X | * | | | |
| *Hydrocotyle* spp. | Pennywort | X | | | | |
| *Hypericum gramineum* | Small St John's Wort | X | | | | |
| *Hypochaeris radicata* | Flatweed | X | * | | | |
| *Hypochaeris* spp. | Cat's Ear | X | * | | | |
| *Imperata cylindrica* | Blady Grass | X | # | | | |
| *Isolepis inundata* | Swamp Club-sedge | X | | | | |
| *Isolepis* spp. | Club Sedge | X | | | | |
| *Isopogon ceratophyllus* | Horny Cone-bush | X | | | | |
| *Juncus kraussii* subsp. *australiensis* | Sea Rush | X | | | | |
| *Juncus procerus* | Tall Rush | X | | | | |
| *Juncus revolutus* | Creeping Rush | | | | | r |
| *Juncus* spp. | Rush | X | | | | |
| *Juncus subsecundus* | Finger Rush | X | | | | |
| *Kennedia prostrata* | Running Postman | X | | | | |
| *Kunzea ericoides* | Burgan | X | | | | |
| *Lachnagrostis punicea* subsp. *filifolia* | Purple Blown-grass | | | | L | r |
| *Lachnagrostis punicea* subsp. *punicea* | Purple Blown-grass | | | | | r |
| *Lachnagrostis robusta* | Salt Blown-grass | | | | | r |
| *Lawrencia spicata* | Salt Lawrencia | | | | | r |
| *Lepidosperma elatius* | Tall Sword-sedge | X | | | | |
| *Lepidosperma laterale* | Variable Sword-sedge | X | | | | |
| *Leptospermum continentale* | Prickly Tea-tree | X | | | | |
| *Leptospermum laevigatum* | Coast Tea-tree | X | # | | | |
| *Leucopogon* spp. | Beard Heath | X | | | | |
| *Limonium australe* var. *australe* | Yellow Sea-lavender | | | | | r |

| Scientific Name | Common Name | Recorded in the construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VROT |
| *Limonium australe* var. *baudinii* | Tasmanian Sea-lavender | | | VU | | ex |
| *Lobelia anceps* | Angled Lobelia | X | | | | |
| *Lolium* spp. | Rye Grass | X | * | | | |
| *Lomandra filiformis* | Wattle Mat-rush | X | | | | |
| *Lomandra longifolia* | Spiny-headed Mat-rush | X | | | | |
| *Lycium ferocissimum* | African Box-thorn | X | *C | | | |
| *Lythrum hyssopifolia* | Small Loosestrife | X | | | | |
| *Malus spp.* | Apple | X | * | | | |
| *Melaleuca armillaris* subsp. *armillaris* | Giant Honey-myrtle | | # | | | r |
| *Melaleuca ericifolia* | Swamp Paperbark | X | | | | |
| *Microlaena stipoides* var. *stipoides* | Weeping Grass | X | | | | |
| *Microseris scapigera* s.s. | Plains Yam-daisy | | | | | vu |
| *Microtis* spp. | Onion Orchid | X | | | | |
| *Myoporum insulare* | Common Boobialla | X | | | | |
| *Olearia lirata* | Snowy Daisy-bush | X | | | | |
| *Olearia tenuifolia* | Scented Daisy-bush | | | | | r |
| *Oxalis corniculata* | Yellow Wood-sorrel | X | | | | |
| *Oxalis pes-caprae* | Soursob | X | *R | | | |
| *Oxalis purpurea* | Large-flower Wood-sorrel | X | * | | | |
| *Paspalum dilatatum* | Paspalum | X | * | | | |
| *Patersonia occidentalis* var. *occidentalis* | Long Purple-flag | X | | | | |
| *Persicaria decipiens* | Slender Knotweed | X | | | | |
| *Phalaris aquatica* | Toowoomba Canary-grass | X | * | | | |
| *Phragmites australis* | Common Reed | X | | | | |
| *Phytolacca octandra* | Red-ink Weed | X | * | | | |
| *Pimelea humilis* | Common Rice-flower | X | | | | |
| *Pinus radiata* | Radiata Pine | X | * | | | |
| *Pittosporum undulatum* | Sweet Pittosporum | X | # | | | |
| *Plantago coronopus* | Buck's-horn Plantain | X | * | | | |
| *Plantago lanceolata* | Ribwort | X | * | | | |
| *Plantago* spp. | Plantain | X | * | | | |
| *Platylobium obtusangulum* | Common Flat-pea | X | | | | |
| *Poa labillardierei* | Common Tussock-grass | X | | | | |
| *Poa sieberiana* | Grey Tussock-grass | X | | | | |

| Scientific Name | Common Name | Recorded in the construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VROT |
| *Poa* spp. | Tussock Grass | X | | | | |
| *Polygonum arenastrum* | Wireweed | X | | | | |
| *Pomaderris vacciniifolia* | Round-leaf Pomaderris | | | CE | L | en |
| *Populus* spp. | Poplar | X | * | | | |
| *Poranthera microphylla* | Small Poranthera | X | | | | |
| *Prasophyllum frenchii* | Maroon Leek-orchid | | | EN | L | en |
| *Prasophyllum lindleyanum* | Green Leek-orchid | | | | X | vu |
| *Prasophyllum spicatum* | Dense Leek-orchid | | | VU | | en |
| *Pteridium esculentum* | Austral Bracken | X | | | | |
| *Pterostylis chlorogramma* | Green-striped Greenhood | | | VU | L | vu |
| *Pterostylis cucullata* | Leafy Greenhood | | | VU | L | en |
| *Pterostylis grandiflora* | Cobra Greenhood | | | | | r |
| *Pterostylis* spp. | Greenhood | X | | | | |
| *Pterostylis X toveyana* | Mentone Greenhood | | | | | vu |
| *Rhagodia candolleana* subsp. *candolleana* | Seaberry Saltbush | X | | | | |
| *Romulea rosea* | Onion Grass | X | * | | | |
| *Rosa rubiginosa* | Sweet Briar | X | *C | | | |
| *Rubus fruticosus* spp. agg. | Blackberry | X | *C | | | |
| *Rumex* spp. | Dock (naturalised) | X | * | | | |
| *Rytidosperma* spp. | Wallaby Grass | X | | | | |
| *Salix* spp. | Willow | X | *R | | | |
| *Sarcocornia quinqueflora* | Beaded Glasswort | X | | | | |
| *Schoenus apogon* | Common Bog-sedge | X | | | | |
| *Selliera radicans* | Shiny Swamp-mat | X | | | | |
| *Senecio glomeratus* subsp. *longifructus* | Annual Fireweed | | | | | r |
| *Senecio psilocarpus* | Swamp Fireweed | | | VU | | vu |
| *Senecio* spp. | Groundsel | X | * | | | |
| *Solanum aviculare* | Kangaroo Apple | X | | | | |
| *Solanum nigrum* | Black Nightshade | X | * | | | |
| *Sonchus oleraceus* | Common Sow-thistle | X | * | | | |
| *Sporobolus africanus* | Rat-tail Grass | X | * | | | |
| *Tecticornia arbuscula* | Shrubby Glasswort | X | | | | |
| *Thelymitra epipactoides* | Metallic Sun-orchid | | | EN | L | en |
| *Thelymitra longiloba* | Marsh Sun-orchid | | | | L | en |

| Scientific Name | Common Name | Recorded in the construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VROT |
| *Thelymitra orientalis* | Hoary Sun-orchid | | | | | vu |
| *Thelymitra pallidiflora* | Pallid Sun-orchid | | | | | en |
| *Thelymitra reflexa* | Gaping Sun-orchid | | | | | en |
| *Thelymitra* spp. | Sun Orchid | X | | | | |
| *Thelymitra X irregularis* | Crested Sun-orchid | | | | | r |
| *Thelymitra X macmillanii* | Crimson Sun-orchid | | | | | vu |
| *Thelymitra X merraniae* | Merran's Sun-orchid | | | | L | en |
| *Themeda triandra* | Kangaroo Grass | X | | | | |
| *Thysanotus patersonii* | Twining Fringe-lily | X | | | | |
| *Thysanotus tuberosus* | Common Fringe-lily | X | | | | |
| *Tricoryne elatior* | Yellow Rush-lily | X | | | | |
| *Triglochin minutissima* | Tiny Arrowgrass | | | | | r |
| *Triglochin* spp. | Arrowgrass | X | | | | |
| *Typha domingensis* | Narrow-leaf Cumbungi | X | | | | |
| *Typha* spp. | Bulrush | X | | | | |
| *Ulex europaeus* | Gorse | X | *C | | | |
| *Urtica dioica* | Giant Nettle | X | * | | | |
| *Vicia sativa* | Common Vetch | X | * | | | |
| *Viminaria juncea* | Golden Spray | X | | | | |
| *Viola hederacea sensu* | Ivy-leaf Violet | X | | | | |
| *Vulpia* spp. | Fescue | X | * | | | |
| *Wahlenbergia gracilis* | Sprawling Bluebell | X | | | | |
| *Watsonia meriana* var. *bulbillifera* | Bulbil Watsonia | X | *C | | | |
| *Xanthium spinosum* | Bathurst Burr | X | *C | | | |
| *Xanthorrhoea minor* | Small Grass-tree | X | | | | |
| *Xanthosia tasmanica* | Southern Xanthosia | | | | | r |
| *Xerochrysum palustre* | Swamp Everlasting | | | VU | L | vu |
| *Zantedeschia aethiopica* | White Arum-lily | X | * | | | |

# Appendix C: Flora Likelihood of occurrence

Note: Legend provided in Appendix C is relevant to this table.

| Scientific Name | Common Name | Status | Source | Potential Habitat | #Likelihood of occurrence (Assessment based) | Notes |
|---|---|---|---|---|---|---|
| | | EPBC/FFG/ VROT | | | | |
| *Acacia howittii* | Sticky Wattle | r | VBA | Likely to be cultivated or introduced into the area | Low | |
| *Adiantum diaphanum* | Filmy Maidenhair | L / e | VBA | Swamp Scrub | Low | |
| *Amphibromus fluitans* | River Swamp Wallaby-grass | VU | VBA, PMST | Swamp Scrub, Plains Grassy Woodland | **High** | Known Population on ESSO easement, adjacent (200m away) to the construction footprint between KP13.5 and KP15. |
| *Atriplex paludosa* subsp. *paludosa* | Marsh Saltbush | r | VBA | Mangrove Shrubland, Coastal Saltmarsh, Swamp Scrub, Heathy Woodland | **High** | In areas where alignment crosses Coastal Saltmarsh or other areas that have tidal influence. |
| *Austrostipa rudis* subsp. *australis* | Veined Spear-grass | r | VBA | Swampy Riparian Woodland, Grassy Woodland, Heathy Woodland | Low | |
| *Avicennia marina* subsp. *australasica* | Grey Mangrove | r | VBA | Coastal Saltmarsh, Mangrove Shrubland, Swamp Scrub | **High** | In areas where alignment crosses Coastal Saltmarsh or other areas that have tidal influence |
| *Banksia spinulosa var. cunninghamii* | Hairpin Banksia | | VBA | Heathy Woodland | Negligible | Outlier - unlikely |
| *Caladenia orientalis* | Eastern Spider Orchid | EN / L / e | PMST | Sand Heathland/Wet Heathland Mosaic | Low | Wilsons Prom main population with outliers Wonthaggi, Traralgon, Walkerville |
| *Coronidium gunnianum* | Pale Swamp Everlasting | v | VBA | Plains Grassy Wetland, Swamp Scrub | Negligible | Closest record north of Eastlink or east of South Gippsland Highway |

| Scientific Name | Common Name | Status | Source | Potential Habitat | #Likelihood of occurrence (Assessment based) | Notes |
|---|---|---|---|---|---|---|
| | | EPBC/FFG/ VROT | | | | |
| *Corymbia maculata* | Spotted Gum | v | VBA | Lowland Forest, Grassy Woodland, Damp Sands Herb-rich Woodland | Low | Distribution appears to be along the western side of the coastal line, common. It's used as a street tree |
| *Craspedia canens* | Grey Billy-buttons | L/ e | VBA | Grassy Woodland, Plains Grassy Woodland | Low | |
| *Dianella amoena* | Matted Flax-lily | EN / L / e | VBA, PMST | Grassy Woodland, Plains Grassy Woodland, Swamp Scrub | Low | Recorded from approximately 5km East of Fiveways in 1994. Co-ordinates place the record in Swamp Scrub associated with the rail reserve at Pakenham where the rail reserve crosses the Princes Freeway, East of Ryan Road. Approximately 500m West of KP53. |
| *Dianella* sp. aff. *longifolia (Benambra)* | Arching Flax-lily | v | VBA | Plains Grassy Woodland, Swampy Woodland | Negligible | Closest record other side of PPB (St Leonards) or east of Pakenham |
| *Diuris punctata* | Purple Diuris | L / v | VBA | Grassy Woodland, Heathy Woodland, Swampy Woodland | Low | |
| *Eucalyptus crenulata* | Buxton Gum | EN / L / e | VBA | Swampy Woodland | Negligible | Closest record in Pakenham |
| *Eucalyptus fulgens* | Green Scentbark | r | VBA | Valley Heathy Forest, Valley Grassy Forest | Negligible | Closet record is Box Hill |
| *Eucalyptus globulus* subsp. *globulus* | Southern Blue-gum | r | VBA | Swampy Riparian Woodland, Grassy Woodland, Plains Grassy Woodland | Low | |
| *Eucalyptus leucoxylon* subsp. *megalocarpa* | Large-fruit Yellow-gum | L / e | VBA | Near Nelson is the eastern most past of the mainly South Australian coastal distribution. | Negligible | Closest record in Melbourne. Widely planted for its pink to red flowers |
| *Eucalyptus sideroxylon* subsp. *sideroxylon* | Mugga | r | VBA | Heathy Dry Forest, Valley Grassy Forest | Negligible | In Victoria confined to the Chiltern area, northern warby range and south of Winton |

| Scientific Name | Common Name | Status | Source | Potential Habitat | #Likelihood of occurrence (Assessment based) | Notes |
|---|---|---|---|---|---|---|
| | | EPBC/FFG/ VROT | | | | |
| *Eucalyptus strzeleckii* | Strzelecki Gum | VU / L / v | recorded | | **Present** | Not specifically known from this location however an isolated tree was recorded within the construction footprint. |
| *Eucalyptus willisii* s.s. | Promontory Peppermint | r | VBA | Granitic Hills Woodland, wet Rocky Outcrop Scrub | Negligible | Closest population Wilsons Prom |
| *Eucalyptus X studleyensis* | Studley Park Gum | e | VBA | Plains Grassland/Plains Grassy Woodland | Low | Closest record Carrum Downs |
| *Euryomyrtus ramosissima* subsp. *prostrata* | Nodding Baeckea | r | VBA | Heathy Woodland | Low | One record at Stony Point near railway line. Main cluster at Anglesea |
| *Exocarpos syrticola* | Coast Ballart | r | VBA | Swamp Scrub | Low | One record at Hasting, remaining Phillip Island, Wonthaggi etc |
| *Geranium solanderi* var. *solanderi* s.s. | Austral Crane's-bill | v | VBA | Swamp Scrub, Damp Heathy Woodland | Low | Closest record Pakenham |
| *Glycine latrobeana* | Clover Glycine | VU / L / v | PMST | Herb-rich Foothill Forest, Lowland Forest, Grassy Woodland | Low | Records south around Rosebud and north at Pakenham |
| *Juncus revolutus* | Creeping Rush | r | VBA | Coastal Saltmarsh, Swamp Scrub, Heathy Woodland | Moderate | Records appear to hug the coast from Hastings to Tooradin and French Island |
| *Lachnagrostis punicea* subsp. *filifolia* | Purple Blown-grass | L / r | VBA | Plains Grassy Wetland, Swamp Scrub, Swampy Riparian Woodland. | Low | Scattered records north of Frankston and Tooradin northward |
| *Lachnagrostis punicea* subsp. *punicea* | Purple Blown-grass | r | VBA | Plains Grassy Woodland, Plains Grassland, Coastal Banksia Woodland | Low | Scattered records on peninsula, mostly along the western coast. Main pop west of Melbourne |
| *Lachnagrostis robusta* | Salt Blown-grass | r | VBA | Coastal Saltmarsh | Low | Closest record east of Tooradin. Distribution mostly west of PPB. |
| *Lawrencia spicata* | Salt Lawrencia | r | VBA | Coastal Saltmarsh, Swamp Scrub | Moderate | Scattered records Hastings, Warneet and Tooradin |

| Scientific Name | Common Name | Status | Source | Potential Habitat | #Likelihood of occurrence (Assessment based) | Notes |
|---|---|---|---|---|---|---|
| | | EPBC/FFG/ VROT | | | | |
| *Limonium australe* var. *australe* | Yellow Sea-lavender | r | VBA | Coastal Saltmarsh, Swamp Scrub, Mangrove Shrubland | Low | Records (several in area from south of Hastings north) hug the east coastline |
| *Limonium australe* var. *baudinii* | Tasmanian Sea-lavender | VU / x | VBA | Coastal Saltmarsh, Swamp Scrub, Mangrove Shrubland | Negligible | No records showing on NatureKit |
| *Melaleuca armillaris* subsp. *armillaris* | Giant Honey-myrtle | r | VBA | Grassy Woodland, Plains Swampy Woodland, Heathy Woodland | Low | Several records in the vicinity (most likely planted), Naturally occurring populations LOW likelihood. |
| *Microseris scapigera* s.s. | Plains Yam-daisy | v | VBA | Plains Grassy Wetland, Swamp Scrub | Low | Closet record is Lyndhurst and east of Fiveways |
| *Olearia tenuifolia* | Scented Daisy-bush | r | VBA | Shrubby Damp Forest, Shrubby Dry Forest | Negligible | Records in the Avon Wilderness Park |
| *Pomaderris vacciniifolia* | Round-leaf Pomaderris | CR / L / e | PMST | Grassy Dry Forest, Shrubby Foothill Forest | Negligible | Records in the Warrandyte/Kinglake area |
| *Prasophyllum frenchii* | Maroon Leek-orchid | EN / L / e | VBA, PMST | Swamp Scrub | Low | Closest records east of Five-ways & Clyde North |
| *Prasophyllum lindleyanum* | Green Leek-orchid | X / v | VBA | Mangrove Shrubland, Lowland Forest | Low | Cluster of records Crib Point edge of water, low acc/old records Safety Beach, Mt Eliza and Frankston. |
| *Prasophyllum spicatum* | Dense Leek-orchid | VU / e | VBA, PMST | Mangrove Shrubland, Sand Heathland, Grassy Woodland | **High** | Cluster of recent records from Stony Point Rail Reserve, Unreserved Crown Land at Crip Point and the Bittern Bushland Group reserve at Crib Point. |
| *Pterostylis chlorogramma* | Green-striped Greenhood | VU / L / v | PMST | Heathy Woodland | Low | Recent record near Baxter, other closest at Tonimbuk & French Is. |
| *Pterostylis cucullata* | Leafy Greenhood | L / e | PMST | Coastal Alkaline Scrub | Low | Recent closest records around Rosebud/Cape Schanck and westward |

| Scientific Name | Common Name | Status | Source | Potential Habitat | #Likelihood of occurrence (Assessment based) | Notes |
|---|---|---|---|---|---|---|
| | | EPBC/FFG/ VROT | | | | |
| *Pterostylis grandiflora* | Cobra Greenhood | r | VBA | Herb-rich Foothill Forest, Grassy Forest, Lowland Forest | Low | Scattered records to the south (Main Ridge), most records further north (Beaconsfield) |
| *Pterostylis X toveyana* | Mentone Greenhood | v | VBA | Heathy Dry Forest | Negligible | Only scattered records, closest is 1926 at Frankston, then 1916 Moorabbin |
| *Senecio glomeratus subsp. longifructus* | Annual Fireweed | r | VBA | Plains Grassy Forest, Swamp Scrub | Negligible | Closest record in Heidelberg. Only scattered records |
| *Senecio psilocarpus* | Swamp Fireweed | VU / v | VBA, PMST | Swamp Scrub | **High** | Muddy Gates Lane/ South Gippsland Railway line |
| *Thelymitra epipactoides* | Metallic Sun-orchid | EN /L / e | PMST | Heathy Woodland | Low | Limited records, old (1980), closest Moorabbin & Doveton |
| *Thelymitra longiloba* | Marsh Sun-orchid | e | VBA | Grassy Woodland, Heathy Woodland, Sand Heathland | Moderate | 1988 record Crib Point, others French Is & Blind Bight |
| *Thelymitra orientalis* | Hoary Sun-orchid | v | VBA | Swamp Scrub, Sand Heathland | Moderate | Recent record at Crib Point, other points on French Is. |
| *Thelymitra pallidiflora* | Pallid Sun-orchid | e | VBA | Heathy Woodland | Moderate | Three records Crib Point, remaining at Anglesea |
| *Thelymitra reflexa* | Gaping Sun-orchid | e | VBA | | Low | No records showing on NatureKit |
| *Thelymitra X irregularis* | Crested Sun-orchid | r | VBA | Grassy Woodland, Damp Sands Herb-rich Woodland | Moderate | Scattered records, a couple from Crib Point, one from Rosebud and also French Island |
| *Thelymitra X macmillanii* | Crimson Sun-orchid | v | VBA | Sand Heathland, Grassy Woodland | Moderate | Good records at Crib Point, nearest then is near Baluk Willum |
| *Thelymitra X merraniae* | Merran's Sun-orchid | L / e | VBA | Heathy Woodland, Swamp Scrub | Moderate | Two old and low account records Crib Point, closest then is near Rhyll |
| *Triglochin minutissima* | Tiny Arrowgrass | r | VBA | Coastal Saltmarsh | Low | One record 1991 Western Port Coastal Reserve, more records other side of bay, east of Geelong |

| Scientific Name | Common Name | Status | Source | Potential Habitat | #Likelihood of occurrence (Assessment based) | Notes |
|---|---|---|---|---|---|---|
| | | EPBC/FFG/ VROT | | | | |
| *Xanthosia tasmanica* | Southern Xanthosia | r | VBA | Heathy Woodland, Lowland Forest, Sand Heathland, Damp Heathy Woodland | Low | Bulk of pop in Anglesea, scattered old points Rosebud, French Is, Sandringham |
| *Xerochrysum palustre* | Swamp Everlasting | VU / L/ v | VBA, PMST | Sand Heathland, Swamp Scrub, Plains Grassy Wetland | **High** | 2005 record Muddy Gates Lane-Manks Road |

## Appendix D: Vegetation Quality Assessment Results

| | Habitat Zone | | KOJH1 | KOJH2 | KOJH3 | K0JH5 | KOJH6 | KOJH10 | KOJH13 | KOJH14 | KOJH15 | KOJH16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bioregion | | GP | GP | GP | GP | GP | GP | GP | GP | GP | GP |
| | EVC number | | 793 | 793 | 793 | 48 | 83 | 53 | 53 | 53 | 53 | 83 |
| | EVC Conservation Status | | V | V | V | LC | E | E | E | E | E | E |
| | | Max Score | | | | | | | | | | |
| Site Condition | Large Old Trees | 10 | 0 | 0 | 7 | 0 | 5 | N/A | N/A | N/A | N/A | 2 |
| | Canopy Cover | 5 | 0 | 0 | 4 | 0 | 4 | N/A | N/A | 4 | N/A | 2 |
| | Lack of Weeds | 15 | 6 | 6 | 9 | 7 | 4 | 6 | 9 | 9 | 9 | 7 |
| | Understorey | 25 | 5 | 5 | 15 | 5 | 5 | 10 | 15 | 20 | 15 | 10 |
| | Recruitment | 10 | 5 | 5 | 10 | 1 | 0 | 6 | 6 | 3 | 6 | 10 |
| | Organic Litter | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| | Logs | 5 | 5 | 0 | 5 | 0 | 5 | N/A | N/A | N/A | N/A | 2 |
| | Standardiser | N/A | N/A | N/A | N/A | N/A | N/A | 1.25 | 1.25 | 1.25 | 1.25 | N/A |
| | Subtotal | 75 | 26 | 21 | 55 | 18 | 28 | 34 | 44 | 51 | 44 | 38 |
| Landscape Context | Patch Size | 10 | 1 | 1 | 8 | 8 | 2 | 8 | 8 | 8 | 8 | 8 |
| | Neighbourhood | 10 | 1 | 1 | 1 | 1 | 0 | 2 | 2 | 3 | 3 | 3 |
| | Distance to Core Area | 5 | 4 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 |
| | Subtotal | 25 | 6 | 5 | 14 | 13 | 5 | 14 | 14 | 15 | 15 | 15 |
| | Habitat Points | 100 | 32 | 26 | 68 | 31 | 33 | 48 | 58 | 65 | 59 | 53 |
| | Habitat Score | 1 | 0.32 | 0.32 | 0.68 | 0.31 | 0.33 | 0.48 | 0.58 | 0.65 | 0.59 | 0.53 |
| | Habitat Zone Area (ha) | | 0.01 | 0.05 | 0.14 | 0.06 | 0.14 | 0.88 | 0.73 | 2.56 | 2.19 | 0.69 |
| | Habitat Hectares | | 0.00 | 0.01 | 0.10 | 0.02 | 0.05 | 0.42 | 0.43 | 1.66 | 1.29 | 0.37 |

| | | Habitat Zone | KOJH19 | KOJH21 | KOJH23 | KOJH24 | KOJH27 | KOJH28 | KOJH30 | KOJH31A | KOJH33A | KOJH33B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bioregion | GP | GP | GP | GP | GP | GP | GP | GP | GP | GP |
| | | EVC number | 83 | 175 | 175 | 83 | 83 | 53 | 53 | 53 | 53 | 53 |
| | | EVC Conservation Status | E | E | E | E | E | E | E | E | E | E |
| | | Max Score | | | | | | | | | | |
| Site Condition | Large Old Trees | 10 | 7 | 2 | 9 | 9 | 0 | N/A | N/A | N/A | N/A | N/A |
| | Canopy Cover | 5 | 2 | 4 | 4 | 4 | 5 | 2 | 0 | 0 | 0 | 0 |
| | Lack of Weeds | 15 | 7 | 6 | 7 | 4 | 4 | 4 | 0 | 0 | 0 | 0 |
| | Understorey | 25 | 5 | 15 | 15 | 10 | 5 | 15 | 5 | 5 | 5 | 5 |
| | Recruitment | 10 | 5 | 10 | 6 | 3 | 3 | 6 | 5 | 3 | 5 | 5 |
| | Organic Litter | 5 | 3 | 3 | 4 | 5 | 5 | 5 | 3 | 3 | 5 | 5 |
| | Logs | 5 | 5 | 4 | 2 | 5 | 4 | N/A | N/A | N/A | N/A | N/A |
| | Standardiser | N/A | N/A | N/A | N/A | N/A | N/A | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| | Subtotal | 75 | 34 | 44 | 47 | 40 | 26 | 40 | 16 | 14 | 19 | 19 |
| Landscape Context | Patch Size | 10 | 1 | 8 | 8 | 8 | 1 | 1 | 1 | 1 | 8 | 8 |
| | Neighbourhood | 10 | 0 | 2 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 0 |
| | Distance to Core Area | 5 | 1 | 4 | 4 | 4 | 4 | 3 | 1 | 0 | 4 | 4 |
| | Subtotal | 25 | 2 | 14 | 13 | 15 | 6 | 5 | 2 | 1 | 12 | 12 |
| | | Habitat Points | 100 | 36 | 58 | 60 | 55 | 32 | 45 | 18 | 15 | 31 | 31 |
| | | Habitat Score | 1 | 0.36 | 0.58 | 0.6 | 0.55 | 0.32 | 0.45 | 0.18 | 0.15 | 0.31 | 0.31 |
| | | Habitat Zone Area (ha) | | 0.09 | 0.51 | 0.06 | 0.21 | 0.09 | 0.21 | 0.06 | 0.05 | 0.10 | 0.03 |
| | | Habitat Hectares | | 0.03 | 0.30 | 0.04 | 0.11 | 0.03 | 0.10 | 0.01 | 0.01 | 0.03 | 0.01 |

| | | Habitat Zone | KOJH33C | KOJH34 | KOJH35 | KOJH36 | KOJH37 | KOJH38 | KOJH39 | KOJH40 | KOJH41 | KOJH42 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bioregion | GP | GP | GP | GP | GP | GP | GP | GP | GP | GP |
| | | EVC number | 53 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 53 |
| EVC Conservation Status | | | E | E | E | E | E | E | E | E | E | E |
| | | Max Score | | | | | | | | | | |
| Site Condition | Large Old Trees | 10 | N/A | 9 | 9 | 9 | 0 | 0 | 0 | 9 | 3 | N/A |
| | Canopy Cover | 5 | 0 | 2 | 2 | 4 | 2 | 4 | 4 | 2 | 3 | 0 |
| | Lack of Weeds | 15 | 0 | 9 | 9 | 9 | 7 | 7 | 11 | 4 | 4 | 0 |
| | Understorey | 25 | 5 | 5 | 15 | 5 | 5 | 15 | 5 | 5 | 5 | 5 |
| | Recruitment | 10 | 5 | 1 | 3 | 0 | 0 | 3 | 0 | 3 | 0 | 6 |
| | Organic Litter | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 |
| | Logs | 5 | N/A | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | N/A |
| | Standardiser | N/A | 1.25 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.25 |
| | Subtotal | 75 | 19 | 33 | 45 | 32 | 19 | 36 | 25 | 28 | 20 | 18 |
| Landscape Context | Patch Size | 10 | 8 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Neighbourhood | 10 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Distance to Core Area | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |
| | Subtotal | 25 | 12 | 5 | 5 | 5 | 23 | 4 | 4 | 4 | 4 | 2 |
| Habitat Points | | 100 | 31 | 38 | 50 | 37 | 23 | 40 | 29 | 32 | 24 | 20 |
| Habitat Score | | 1 | 0.31 | 0.38 | 0.5 | 0.37 | 0.23 | 0.4 | 0.29 | 0.32 | 0.24 | 0.2 |
| Habitat Zone Area (ha) | | | 0.03 | 0.11 | 0.33 | 0.23 | 0.01 | 0.28 | 0.01 | 0.04 | 0.06 | 0.07 |
| Habitat Hectares | | | 0.01 | 0.04 | 0.16 | 0.00 | 0.00 | 0.11 | 0.00 | 0.01 | 0.02 | 0.01 |

| | | Habitat Zone | KOJH43 | KOJH44 | KOJH45 | KOJH46 | KOJH47 | KODC1 | KODC3 | KODC3A | KODC3B | KODC3C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bioregion | GP | GP | GP | GP | GP | GP | GP | GP | GP | GP |
| | | EVC number | 53 | 175 | 175 | 175 | 175 | 83 | 53 | 53 | 53 | 53 |
| EVC Conservation Status | | | E | E | E | E | E | E | E | E | E | E |
| | | Max Score | | | | | | | | | | |
| Site Condition | Large Old Trees | 10 | N/A | 9 | 9 | 0 | 0 | 8 | N/A | N/A | N/A | N/A |
| | Canopy Cover | 5 | 0 | 4 | 4 | 4 | 2 | 4 | 0 | 0 | 0 | 0 |
| | Lack of Weeds | 15 | 0 | 0 | 0 | 4 | 4 | 6 | 4 | 4 | 4 | 4 |
| | Understorey | 25 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 |
| | Recruitment | 10 | 6 | 0 | 3 | 1 | 0 | 0 | 5 | 5 | 5 | 5 |
| | Organic Litter | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 3 | 3 |
| | Logs | 5 | N/A | 2 | 0 | 5 | 0 | 0 | N/A | N/A | N/A | N/A |
| | Standardiser | N/A | 1.25 | N/A | N/A | N/A | N/A | N/A | 1.25 | 1.25 | 1.25 | 1.25 |
| | Subtotal | 75 | 20 | 25 | 26 | 24 | 16 | 28 | 15 | 15 | 15 | 15 |
| Landscape Context | Patch Size | 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Neighbourhood | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Distance to Core Area | 5 | 3 | 3 | 3 | 3 | 3 | 1 | 0 | 0 | 0 | 0 |
| | Subtotal | 25 | 4 | 4 | 4 | 4 | 4 | 2 | 1 | 1 | 1 | 1 |
| | | Habitat Points | 100 | 24 | 29 | 30 | 28 | 20 | 30 | 16 | 16 | 16 | 16 |
| | | Habitat Score | 1 | 0.24 | 0.29 | 0.3 | 0.28 | 0.2 | 0.3 | 0.16 | 0.16 | 0.16 | 0.16 |
| | | Habitat Zone Area (ha) | | 0.27 | 0.02 | 0.14 | 0.06 | 0.02 | 0.06 | 0.00 | 0.01 | 0.01 | 0.00 |
| | | Habitat Hectares | | 0.06 | 0.01 | 0.04 | 0.02 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | Habitat Zone | CCCT4 | CCCT10 | CCCT52 | CCCT53 | JHCC1 | JHCC2 | JHCC49 | JHCC50 | JHCC55 | JHCC56 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bioregion | GP | GP | GP | GP | GP | GP | GP | GP | GP | GP |
| | | EVC number | 83 | 53 | 83 | 83 | 53 | 53 | 53 | 53 | 48 | 83 |
| EVC Conservation Status | | | E | E | E | E | E | E | E | E | LC | E |
| | | Max Score | | | | | | | | | | |
| Site Condition | Large Old Trees | 10 | 0 | N/A | 0 | 0 | N/A | N/A | N/A | N/A | 5 | 9 |
| | Canopy Cover | 5 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 4 |
| | Lack of Weeds | 15 | 4 | 6 | 6 | 9 | 2 | 4 | 2 | 4 | 4 | 7 |
| | Understorey | 25 | 5 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 15 | 15 |
| | Recruitment | 10 | 1 | 3 | 3 | 1 | 3 | 1 | 1 | 1 | 6 | 3 |
| | Organic Litter | 5 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 |
| | Logs | 5 | 0 | 2 | 5 | 4 | N/A | N/A | N/A | N/A | 3 | 5 |
| | Standardiser | N/A | 0 | 1.25 | N/A | N/A | 1.25 | 1.25 | 1.25 | 1.25 | N/A | N/A |
| | Subtotal | 75 | 14 | 23 | 26 | 21 | 19 | 15 | 13 | 15 | 37 | 46 |
| Landscape Context | Patch Size | 10 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 8 | 8 |
| | Neighbourhood | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 |
| | Distance to Core Area | 5 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 4 | 4 | 4 |
| | Subtotal | 25 | 1 | 1 | 1 | 1 | 3 | 2 | 6 | 6 | 14 | 14 |
| Habitat Points | | 100 | 16 | 24 | 27 | 22 | 22 | 17 | 19 | 21 | 51 | 60 |
| Habitat Score | | 1 | 0.16 | 0.24 | 0.27 | 0.22 | 0.22 | 0.17 | 0.19 | 0.21 | 0.51 | 0.6 |
| Habitat Zone Area (ha) | | | 0.16 | 0.05 | 0.04 | 0.02 | 0.32 | 0.32 | 0.03 | 0.10 | 0.49 | 0.11 |
| Habitat Hectares | | | 0.03 | 0.01 | 0.01 | 0.00 | 0.07 | 0.05 | 0.00 | 0.02 | 0.25 | 0.07 |

| | | Habitat Zone | JHCC57 | JHCC58 | JHCC61 | JHCC62 | JHCC64 | JHCC67 | JHCC68 | JHCC69 | JHCC70 | JHMV1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bioregion | GP | GP | GP | GP | GP | GP | GP | GP | GP | GP |
| | | EVC number | 48 | 48 | 793 | 793 | 48 | 175 | 175 | 48 | 53 | 48 |
| EVC Conservation Status | | | LC | LC | V | V | LC | E | E | LC | E | LC |
| | | Max Score | | | | | | | | | | |
| Site Condition | Large Old Trees | 10 | 9 | 3 | 3 | 7 | 0 | 0 | 7 | 9 | N/A | 0 |
| | Canopy Cover | 5 | 4 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 0 | 0 |
| | Lack of Weeds | 15 | 6 | 7 | 9 | 6 | 9 | 9 | 9 | 7 | 6 | 4 |
| | Understorey | 25 | 20 | 20 | 20 | 5 | 5 | 5 | 5 | 5 | 5 | 15 |
| | Recruitment | 10 | 6 | 3 | 6 | 1 | 0 | 0 | 0 | 0 | 1 | 6 |
| | Organic Litter | 5 | 5 | 2 | 5 | 2 | 4 | 3 | 3 | 2 | 2 | 4 |
| | Logs | 5 | 5 | 5 | 0 | 0 | 0 | 2 | 3 | 5 | N/A | 2 |
| | Standardiser | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.25 | N/A |
| | Subtotal | 75 | 55 | 43 | 45 | 23 | 22 | 23 | 31 | 32 | 18 | 31 |
| Landscape Context | Patch Size | 10 | 8 | 8 | 8 | 8 | 8 | 1 | 1 | 1 | 1 | 1 |
| | Neighbourhood | 10 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 0 | 2 |
| | Distance to Core Area | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 0 | 4 |
| | Subtotal | 25 | 14 | 14 | 14 | 14 | 14 | 5 | 5 | 7 | 1 | 7 |
| Habitat Points | | 100 | 69 | 57 | 59 | 37 | 36 | 28 | 36 | 39 | 19 | 38 |
| Habitat Score | | 1 | 0.69 | 0.57 | 0.59 | 0.37 | 0.36 | 0.28 | 0.36 | 0.39 | 0.19 | 0.38 |
| Habitat Zone Area (ha) | | | 0.70 | 1.73 | 2.40 | 0.09 | 0.06 | 0.04 | 0.08 | 0.05 | 0.02 | 0.71 |
| Habitat Hectares | | | 0.49 | 0.98 | 1.41 | 0.33 | 0.02 | 0.01 | 0.03 | 0.02 | 0.00 | 0.27 |

| | | Habitat Zone | JHMV3 | JHCC77 | JHCC76 | JHCC75 | JHCC74A | JHCC74B | JHCC74C | JHCC78 | JHCC79 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bioregion | GP | GP | GP | GP | GP | GP | GP | GP | GP |
| | | EVC number | 48 | 48 | 48 | 53 | 9 | 9 | 9 | 48 | 48 |
| | | EVC Conservation Status | LC | LC | LC | E | LC | LC | LC | LC | LC |
| | | Max Score | | | | | | | | | |
| Site Condition | Large Old Trees | 10 | 2 | 10 | 10 | N/A | NA | NA | N/A | 10 | 9 |
| | Canopy Cover | 5 | 2 | 5 | 5 | 3 | 0 | 0 | 0 | 5 | 2 |
| | Lack of Weeds | 15 | 4 | 6 | 4 | 9 | 15 | 15 | 15 | 6 | 6 |
| | Understorey | 25 | 15 | 5 | 5 | 5 | 10 | 10 | 10 | 5 | 5 |
| | Recruitment | 10 | 5 | 6 | 3 | 10 | 6 | 6 | 6 | 1 | 1 |
| | Organic Litter | 5 | 5 | 3 | 3 | 3 | 5 | 5 | 5 | 2 | 3 |
| | Logs | 5 | 4 | 5 | 5 | N/A | N/A | N/A | N/A | 5 | 2 |
| | Standardiser | N/A | N/A | N/A | N/A | 1.25 | 1.25 | 1.25 | 1.25 | N/A | N/A |
| | Subtotal | 75 | 37 | 45 | 35 | 38 | 45 | 45 | 45 | 34 | 28 |
| Landscape Context | Patch Size | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 1 | 1 |
| | Neighbourhood | 10 | 2 | 5 | 5 | 5 | 5 | 5 | 5 | 1 | 1 |
| | Distance to Core Area | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 1 | 1 |
| | Subtotal | 25 | 16 | 15 | 20 | 20 | 20 | 20 | 20 | 3 | 3 |
| | | Habitat Points | 100 | 53 | 60 | 55 | 58 | 65 | 65 | 65 | 37 | 31 |
| | | Habitat Score | 1 | 0.53 | 0.6 | 0.55 | 0.58 | 0.65 | 0.65 | 0.65 | 0.37 | 0.31 |
| | | Habitat Zone Area (ha) | | 0.91 | 0.55 | 0.34 | 0.13 | 0.21 | 0.09 | 0.26 | 0.13 | 0.14 |
| | | Habitat Hectares | | 0.47 | 0.33 | 0.19 | 0.08 | 0.14 | 0.06 | 0.17 | 0.05 | 0.04 |

| | | Habitat Zone | JHCC80 | JHCC81 | JHCC82 |
|---|---|---|---|---|---|
| | | Bioregion | GP | GP | GP |
| | | EVC number | 53 | 53 | 48 |
| EVC Conservation Status | | | E | E | LC |
| | | Max Score | | | |
| Site Condition | Large Old Trees | 10 | N/A | N/A | 9 |
| | Canopy Cover | 5 | 0 | 0 | 2 |
| | Lack of Weeds | 15 | 6 | 4 | 6 |
| | Understorey | 25 | 5 | 5 | 5 |
| | Recruitment | 10 | 6 | 1 | 1 |
| | Organic Litter | 5 | 0 | 1 | 3 |
| | Logs | 5 | N/A | N/A | 2 |
| | Standardiser | N/A | 1.25 | 1.25 | N/A |
| | Subtotal | 75 | 21 | 13 | 28 |
| Landscape Context | Patch Size | 10 | 1 | 1 | 1 |
| | Neighbourhood | 10 | 1 | 1 | 1 |
| | Distance to Core Area | 5 | 1 | 1 | 1 |
| | Subtotal | 25 | 3 | 3 | 3 |
| | Habitat Points | 100 | 24 | 16 | 31 |
| | Habitat Score | 1 | 0.24 | 0.16 | 0.31 |
| | Habitat Zone Area (ha) | | 0.03 | 0.03 | 0.12 |
| | Habitat Hectares | | 0.01 | 0.01 | 0.04 |

# Appendix E: List of Fauna Recorded from the Alignment and Database Search Area

Legend:
Y = recorded during survey, * = exotic,
**EPBC Act**: CE = critically endangered, EN = endangered, VU = vulnerable, M = migratory, Mr = marine
**FFG Act**: L = Listed, X = rejected, N = nominated
**Victorian Advisory List of Threatened Vertebrate Fauna (VTVF)**: en = endangered, r = rare, vu = vulnerable, ex = presumed extinct, nt = near threatened

| Scientific Name | Common Name | Recorded in construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VTVF |
| **Aquatic invertebrate** | | | | | | |
| *Lepidurus apus viridis* | Shield Shrimp | Y | | | | |
| *Paratya australiensis* | Australian Paratya | Y | | | | |
| **Amphibians** | | | | | | |
| *Chelodina longicollis* | Eastern Snake-necked Turtle | | | | | dd |
| *Crinia signifera* | Common Froglet | Y | | | | |
| *Limnodynastes dumerilii* | Pobblebonk Frog | Y | | | | |
| *Limnodynastes peronii* | Striped Marsh Frog | Y | | | | |
| *Limnodynastes tasmaniensis* | Spotted Marsh Frog | Y | | | | |
| *Litoria ewingii* | Southern Brown Tree Frog | Y | | | | |
| *Litoria raniformis* | Growling Grass Frog | y | | VU | L | en |
| *Litoria verreauxii verreauxii* | Verreaux's Tree Frog | Y | | | | |
| *Pseudophryne semimarmorata* | Southern Toadlet | y | | | | vu |
| **Birds** | | | | | | |
| *Acanthiza chrysorrhoa* | Yellow-rumped Thornbill | Y | | | | |
| *Acanthiza pusilla* | Brown Thornbill | Y | | | | |
| *Acanthorhynchus tenuirostris* | Eastern Spinebill | Y | | | | |
| *Accipiter fasciatus* | Brown Goshawk | Y | | | | |
| *Acridotheres tristis* | Common Myna | y | * | | | |
| *Acrocephalus australis* | Australian Reed-warbler | Y | | | | |
| *Actitis hypoleucos* | Common Sandpiper | | | M, Mr | | vu |
| *Alauda arvensis* | European Skylark | y | * | | | |
| *Alisterus scapularis* | Australian King-Parrot | Y | | | | |
| *Anas castanea* | Chestnut Teal | Y | | | | |
| *Anas gracilis* | Grey Teal | Y | | | | |
| *Anas rhynchotis* | Australasian Shoveler | y | | | | vu |
| *Anas superciliosa* | Pacific Black Duck | Y | | | | |
| *Anhinga novaehollandiae* | Darter | Y | | | | |
| *Anseranas semipalmata* | Magpie Goose | | | | L | nt |
| *Anthochaera carunculata* | Red Wattlebird | Y | | | | |
| *Anthochaera chrysoptera* | Little Wattlebird | Y | | | | |

| Scientific Name | Common Name | Recorded in construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VTVF |
| *Anthus novaeseelandiae* | Australasian Pipit | Y | | | | |
| *Aquila audax* | Wedge-tailed Eagle | Y | | | | |
| *Ardea ibis* | Cattle Egret | Y | | Mr | | |
| *Ardea modesta* | Eastern Great Egret | y | | Mr | L | vu |
| *Artamus cyanopterus* | Dusky Woodswallow | Y | | | | |
| *Aythya australis* | Hardhead | y | | | | vu |
| *Biziura lobata* | Musk Duck | | | | | vu |
| *Botaurus poiciloptilus* | Australasian Bittern | | | EN | L | en |
| *Cacatua galerita* | Sulphur-crested Cockatoo | Y | | | | |
| *Cacatua tenuirostris* | Long-billed Corella | Y | | | | |
| *Calidris ferruginea* | Curlew Sandpiper | | | CR | | en |
| *Calidris melanotos* | Pectoral Sandpiper | | | M,Mr | | nt |
| *Callocephalon fimbriatum* | Gang-gang Cockatoo | Y | | | | |
| *Calyptorhynchus funereus* | Yellow-tailed Black-Cockatoo | Y | | | | |
| *Carduelis carduelis* | European Goldfinch | y | * | | | |
| *Cereopsis novaehollandiae* | Cape Barren Goose | Y | | | | |
| *Chenonetta jubata* | Australian Wood Duck | Y | | | | |
| *Chlidonias hybridus javanicus* | Whiskered Tern | | | | | nt |
| *Chroicocephalus novaehollandiae* | Silver Gull | Y | | | | |
| *Chrysococcyx basalis* | Horsfield's Bronze-Cuckoo | Y | | | | |
| *Cisticola exilis* | Golden-headed Cisticola | Y | | | | |
| *Colluricincla harmonica* | Grey Shrike-thrush | Y | | | | |
| *Columba livia* | Rock Dove | y | * | | | |
| *Coracina novaehollandiae* | Black-faced Cuckoo-shrike | Y | | | | |
| *Corvus coronoides* | Australian Raven | Y | | | | |
| *Corvus mellori* | Little Raven | Y | | | | |
| *Cracticus torquatus* | Grey Butcherbird | Y | | | | |
| *Cygnus atratus* | Black Swan | Y | | | | |
| *Dacelo novaeguineae* | Laughing Kookaburra | Y | | | | |
| *Egretta novaehollandiae* | White-faced Heron | Y | | | | |
| *Elanus axillaris* | Black-shouldered Kite | Y | | | | |
| *Elseyornis melanops* | Black-fronted Dotterel | Y | | | | |
| *Eolophus roseicapillus* | Galah | Y | | | | |
| *Eopsaltria australis* | Eastern Yellow Robin | Y | | | | |
| *Epthianura albifrons* | White-fronted Chat | Y | | | | |
| *Erythrogonys cinctus* | Red-kneed Dotterel | Y | | | | |
| *Falco berigora* | Brown Falcon | Y | | | | |
| *Falco cenchroides* | Nankeen Kestrel | Y | | | | |
| *Falco subniger* | Black Falcon | | | | N | vu |
| *Fulica atra* | Eurasian Coot | Y | | | | |

| Scientific Name | Common Name | Recorded in construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VTVF |
| *Gallinago hardwickii* | Latham's Snipe | | | M, Mr | | nt |
| *Gallinula tenebrosa* | Dusky Moorhen | Y | | | | |
| *Gallirallus philippensis* | Buff-banded Rail | Y | | | | |
| *Glossopsitta concinna* | Musk Lorikeet | Y | | | | |
| *Grallina cyanoleuca* | Magpie-lark | Y | | | | |
| *Gymnorhina tibicen* | Australian Magpie | Y | | | | |
| *Haliaeetus leucogaster* | White-bellied Sea-Eagle | | | Mr | L | vu |
| *Haliastur sphenurus* | Whistling Kite | Y | | | | |
| *Hirundapus caudacutus* | White-throated Needletail | | | M, Mr | | vu |
| *Hydroprogne caspia* | Caspian Tern | | | | L | nt |
| *Hypseleotris galii* | Firetail Gudgeon | Y | | | | |
| *Larus pacificus pacificus* | Pacific Gull | y | | | | nt |
| *Lewinia pectoralis pectoralis* | Lewin's Rail | y | | | L | vu |
| *Lichenostomus chrysops* | Yellow-faced Honeyeater | Y | | | | |
| *Lichenostomus leucotis* | White-eared Honeyeater | Y | | | | |
| *Lichenostomus penicillatus* | White-plumed Honeyeater | Y | | | | |
| *Limosa lapponica* | Bar-tailed Godwit | | | VU | | |
| *Macronectes giganteus* | Southern Giant-Petrel | | | EN | L | vu |
| *Malurus cyaneus* | Superb Fairy-wren | Y | | | | |
| *Manorina melanocephala* | Noisy Miner | Y | | | | |
| *Megalurus gramineus* | Little Grassbird | Y | | | | |
| *Melithreptus brevirostris* | Brown-headed Honeyeater | Y | | | | |
| *Melithreptus lunatus* | White-naped Honeyeater | Y | | | | |
| *Microcarbo melanoleucos* | Little Pied Cormorant | Y | | | | |
| *Neophema pulchella* | Turquoise Parrot | | | | L | nt |
| *Numenius madagascariensis* | Eastern Curlew | | | CR | | vu |
| *Nycticorax caledonicus hillii* | Nankeen Night Heron | | | | | nt |
| *Ocyphaps lophotes* | Crested Pigeon | Y | | | | |
| *Oxyura australis* | Blue-billed Duck | y | | | L | en |
| *Paratya australiensis* | Australian Paratya | Y | | | | |
| *Pardalotus punctatus punctatus* | Spotted Pardalote | Y | | | | |
| *Pardalotus striatus* | Striated Pardalote | Y | | | | |
| *Passer domesticus* | House Sparrow | y | * | | | |
| *Pelecanus conspicillatus* | Australian Pelican | Y | | | | |
| *Petrochelidon neoxena* | Welcome Swallow | Y | | | | |
| *Petrochelidon nigricans* | Tree Martin | Y | | | | |
| *Petroica phoenicea* | Flame Robin | Y | | | | |
| *Phalacrocorax carbo* | Great Cormorant | Y | | | | |
| *Phalacrocorax fuscescens* | Black-faced Cormorant | | | | | nt |
| *Phalacrocorax sulcirostris* | Little Black Cormorant | Y | | | | |

| Scientific Name | Common Name | Recorded in construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VTVF |
| *Phalacrocorax varius* | Pied Cormorant | | | | | nt |
| *Phaps chalcoptera* | Common Bronzewing | Y | | | | |
| *Phaps elegans* | Brush Bronzewing | Y | | | | |
| *Phylidonyris novaehollandiae* | New Holland Honeyeater | Y | | | | |
| *Platalea regia* | Royal Spoonbill | y | | | | nt |
| *Platycercus elegans* | Crimson Rosella | Y | | | | |
| *Platycercus eximius* | Eastern Rosella | Y | | | | |
| *Pluvialis fulva* | Pacific Golden Plover | | | M, Mr | | vu |
| *Poliocephalus poliocephalus* | Hoary-headed Grebe | Y | | | | |
| *Porphyrio porphyrio* | Purple Swamphen | Y | | | | |
| *Pseudaphritis urvillii* | Congolli | Y | | | | |
| *Rhipidura albiscarpa* | Grey Fantail | Y | | | | |
| *Rhipidura leucophrys* | Willie Wagtail | Y | | | | |
| *Sericornis frontalis* | White-browed Scrubwren | Y | | | | |
| *Sternula nereis nereis* | Fairy Tern | | | VU | L | en |
| *Strepera graculina* | Pied Currawong | Y | | | | |
| *Streptopelia chinensis* | Spotted Turtle-Dove | y | * | | | |
| *Sturnus vulgaris* | Common Starling | y | * | | | |
| *Tachybaptus novaehollandiae* | Australasian Grebe | Y | | | | |
| *Thalassarche cauta* | Shy Albatross | | | VU | L | vu |
| *Thalassarche melanophris melanophris* | Black-browed Albatross | | | VU | | vu |
| *Threskiornis molucca* | Australian White Ibis | Y | | | | |
| *Threskiornis spinicollis* | Straw-necked Ibis | Y | | | | |
| *Trichoglossus haematodus* | Rainbow Lorikeet | Y | | | | |
| *Tringa nebularia* | Common Greenshank | | | | | vu |
| *Turdus merula* | Common Blackbird | y | * | | | |
| *Vanellus miles* | Masked Lapwing | Y | | | | |
| *Zosterops lateralis* | Silvereye | Y | | | | |
| **Fish** | | | | | | |
| *Anguilla australis* | Southern Shortfin Eel | Y | | | | |
| *Carassius auratus* | Goldfish | y | * | | | |
| *Cyprinus carpio* | European Carp | y | * | | | |
| *Eubalaena australis* | Southern Right Whale | | | EN | L | cr |
| *Galaxias maculatus* | Common Galaxias | Y | | | | |
| *Galaxiella pusilla* | Dwarf Galaxis | | | VU | L | en |
| *Gambusia holbrooki* | Eastern Gambusia | y | * | | | |
| *Maccullochella peelii* | Murray Cod | | | VU | L | vu |
| *Macquaria australasica* | Macquarie Perch | | | EN | L | en |
| *Nannoperca australis* | Southern Pygmy Perch | Y | | | | |
| *Perca fluviatilis* | Redfin | y | * | | | |

| Scientific Name | Common Name | Recorded in construction footprint | Origin | Conservation Status | | |
|---|---|---|---|---|---|---|
| | | | | EPBC | FFG | VTVF |
| *Philynodon grandiceps* | Flathead Gudgeon | Y | | | | |
| *Prototroctes maraena* | Australian Grayling | | | VU | L | vu |
| *Salmo trutta* | Brown Trout | | * | | | |
| *Tetractenos spp.* | Toadfish | Y | | | | |
| **Mammals** | | | | | | |
| *Arctocephalus pusillus doriferus* | Australian Fur Seal | | | X | | |
| *Antechinus agilis* | Agile Antechinus | Y | | | | |
| *Bos taurus* | Cattle (feral) | Y | * | | | |
| *Canis lupus* | Dingo & Dog (feral) | | * | | | |
| *Canis lupus familiaris* | Dog | Y | * | | | |
| *Capra hircus* | Goat (feral) | Y | * | | | |
| *Cervus unicolor* | Sambar | Y | | | | |
| *Felis catus* | Cat | y | * | | | |
| *Isoodon obesulus obesulus* | Southern Brown Bandicoot | y | | EN | L | nt |
| *Lepus europeaus* | European Hare | Y | * | | | |
| *Mus musculus* | House Mouse | y | * | | | |
| *Oryctolagus cuniculus* | European Rabbit | y | * | | | |
| *Petaurus breviceps* | Sugar Glider | Y | | | | |
| *Pseudocheirus peregrinus* | Common Ringtail Possum | Y | | | | |
| *Pseudomys novaehollandiae* | New Holland Mouse | | | VU | L | vu |
| *Rattus lutreolus* | Swamp Rat | Y | | | | |
| *Rattus rattus* | Black Rat | y | * | | | |
| *Tachyglossus aculeatus* | Short-beaked Echidna | Y | | | | |
| *Trichosurus vulpecula* | Brushtailed possum | Y | | | | |
| *Trichosurus vulpecula* | Common Brushtail Possum | Y | | | | |
| *Tadarida australis* | White-striped Freetail Bat | Y | | | | |
| *Vulpes vulpes* | Red Fox | y | * | | | |
| *Wallabia bicolor* | Black Wallaby | Y | | | | |
| **Reptiles** | | | | | | |
| *Austrelaps superbus* | Lowland Copperhead | Y | | | | |
| *Lampropholis guichenoti* | Garden Skink | Y | | | | |
| *Liopholis whitii* | White's Skink | Y | | | | |
| *Lissolepis coventryi* | Swamp Skink | | | | L | vu |
| *Pseudemoia rawlinsoni* | Glossy Grass Skink | y | | | | vu |
| *Tiliqua nigrolutea* | Blotched Blue-tongued Lizard | Y | | | | |

# Appendix F: Fauna Likelihood of Occurrence

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Foothill Burrowing Crayfish | *Engaeus victoriensis* | | | Endangered | VBA | Pakenham | 1911 | | Negligible | N2 |
| Michelea Species 5256 | *Michelea microphylla* | | Listed | Vulnerable | VBA | | 1965 | | Negligible | N2, N5 |
| Ghost Shrimp | *Pseudocalliax tooradin* | | Listed | Vulnerable | VBA | | 1965 | | Negligible | N2, N5 |
| Great White Shark | *Carcharodon carcharias* | Vulnerable / BonnA1, A2S | Listed | Vulnerable | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Mackerel Shark | *Lamna nasus* | BonnA2S | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N5 |
| Macquarie Perch | *Macquaria australasica* | Endangered | Listed | Endangered | VBA | | 1976 | | Negligible | N2 |
| Murray Cod | *Maccullochella peelii* | Vulnerable | Listed | Vulnerable | VBA | | 1970 | | Negligible | N2 |
| **Dwarf Galaxis** | ***Galaxiella pusilla*** | **Vulnerable** | **Listed** | **Endangered** | **DoEE/VBA** | **Hastings Road Pearcedale** | **1964** | **Species or species habitat known to occur within area** | **Moderate to High** | **M2, M3** |
| **Australian Grayling** | ***Prototroctes maraena*** | **Vulnerable** | **Listed** | **Vulnerable** | **DoEE/VBA** | **Cardinia Creek, Ballarto Road, Cardinia** | **2001** | **Species or species habitat known to occur within area** | **Moderate to High** | **M2, M3** |
| Flatback Mangrove Goby | *Mugilogobius platynotus* | | Listed | Vulnerable | VBA | embayment, 150 m ESE of Long Island Drive, Hastings | 2009 | | Low | M2, M3 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Green and Golden Bell Frog | *Litoria aurea* | Vulnerable | | Vulnerable | DoEE/VBA | Western Port | 1962 | | Negligible | N2 |
| **Growling Grass Frog** | ***Litoria raniformis*** | **Vulnerable** | **Listed** | **Endangered** | **DoEE/VBA** | Dam adjacent to Toomuc Creek. Also presumed present at Cardinia Creek KP40, KP 20.32, KP 23.05 - avoided by HDD, KP 31.1, KP 41.5 - avoided by HDD, KP 48.55 | **2016** | **Species or species habitat known to occur within area** | **High** | **H1, H2** |
| Southern Toadlet | *Pseudophryne semimarmorata* | | | Vulnerable | VBA | Quail Island, 1 km SW of Warneet, Western Port Bay | 2016 | | **Moderate to High** | M2, M3 |
| Loggerhead Turtle | *Caretta caretta* | Endangered / BonnA1, A2S / Marine | | | DoEE | | | Species or species habitat known to occur within area | Negligible | N1, N5 |
| Green Turtle | *Chelonia mydas* | Vulnerable / BonnA1, A2S / Marine | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Leatherback Turtle | *Dermochelys coriacea* | Endangered / Marine | Listed | Critically Endangered | DoEE/VBA | Western Port Bay | 2017 | Species or species habitat known to occur within area | Negligible | H2, N5 |
| **Swamp Skink** | ***Lissolepis coventryi*** | | **Listed** | **Vulnerable** | **VBA** | **Warringine Park, Hastings** | **2018** | | **High** | **H1, H2** |
| **Glossy Grass Skink** | ***Pseudemoia rawlinsoni*** | | | **Vulnerable** | **VBA** | **Warringine Park, Hastings** | **2018** | | **High** | **H1, H2** |
| Grey Goshawk | *Accipiter novaehollandiae novaehollandiae* | | Listed | Vulnerable | VBA | Nar Nar Goon | 1978 | | Low | M3, N2 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Common Sandpiper | *Actitis hypoleucos* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | Vulnerable | DoEE / PersObs | Hastings Foreshore | 2018 | Roosting known to occur within area | Low | H2, N5 |
| **Australian Shoveller** | ***Anas rhynchotis*** | | | **Vulnerable** | **VBA** | **Rutherford Inlet** | **2011** | | **High** | **H1, H2** |
| Magpie Goose | *Anseranas semipalmata* | | Listed | Near threatened | VBA | Blind Bight | 1994 | | Low | L2, L3 |
| Regent Honeyeater | *Anthocaera phrygia* | Critically Endangered | Listed | Critically Endangered | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Fork-tailed Swift | *Apus pacificus* | CAMBA / JAMBA / ROKAMBA / Marine | | | DoEE / eBird | Nar Nar Goon | 2018 | Species or species habitat likely to occur within area | Low | H2, L1 |
| **Cattle Egret** | ***Ardea ibis*** | **Marine** | | | **DoEE / PersObs** | **Baxter-Tooradin Road** | **2018** | **Species or species habitat may occur within area** | **High** | **M1, H2** |
| Intermediate Egret | *Ardea intermedia* | Marine | Listed | Endangered | VBA | Long Island Point | 1981 | | Negligible | N2, M3 |
| **Eastern Great Egret** | ***Ardea modesta*** | **Marine** | **Listed** | **Vulnerable** | **DoEE/VBA** | | **2015** | **Species or species habitat known to occur within area** | **High** | **H2, H3** |
| Flesh-footed Shearwater | *Ardenna carneipes* | JAMBA / ROKAMBA | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Ruddy Turnstone | *Arenaria interpres* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | Vulnerable | DoEE / VBA | Chilcot Rocks | 1992 | Roosting known to occur within area | Negligible | N2, N5 |
| **Hardhead** | ***Aythya australis*** | | | **Vulnerable** | **VBA** | | **2007** | | **High** | **H1, H2** |
| Musk Duck | *Biziura lobata* | | | Vulnerable | eBird | Pakenham Sewage Lagoons | 2017 | | Low | H2, L3 |
| Australasian Bittern | *Botaurus poiciloptilus* | Endangered | Listed | Endangered | VBA | Site 5 Quail Island. | 2011 | Species or species habitat known to occur within area | Low | M2, L1 |
| Sharp-tailed Sandpiper | *Calidris acuminata* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | eBird | Pakenham Sewage Lagoons | 2009 | Roosting known to occur within area | Negligible | N1, N5 |
| Red Knot | *Calidris canutus* | Endangered CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | Endangered | DoEE | | 1992 | Species or species habitat known to occur within area | Negligible | N1, N5 |
| Curlew Sandpiper | *Calidris ferruginea* | Critically Endangered CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | Listed | Endangered | DoEE / VBA | Hanns Inlet, Crib Point | 2014 | Species or species habitat known to occur within area | Negligible | H2, N5 |
| Pectoral Sandpiper | *Calidris melanotos* | ROKAMA/ JAMBA / BonnA2H / Marine | | Near threatened | VBA | Pakenham Sewage Lagoons | 1998 | Species or species habitat known to occur within area | Negligible | L2, N5 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Red-necked Stint | *Calidris ruficollis* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE / eBird | Hastings Jetty | 2016 | Roosting known to occur within area | Negligible | H2, N5 |
| Great Knot | *Calidris tenuirostris* | Critically Endangered CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | Listed | Endangered | DoEE | | | Roosting known to occur within area | Negligible | N1, N5 |
| Double-banded Plover | *Charadrius bicinctus* | BonnA2H / Marine | | | DoEE | | | Roosting known to occur within area | Negligible | N1, N5 |
| Greater Sand Plover | *Charadrius leschenaultii* | Vulnerable CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE | | | Roosting known to occur within area | Negligible | N1, N5 |
| Lesser Sand Plover | *Charadrius mongolus* | Endangered CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE | Watson Inlet | 1977 | Roosting known to occur within area | Negligible | N1, N5 |
| Red-capped Plover | *Charadrius ruficapillus* | Marine | | | DoEE / eBird | South of Hastings | 2015 | Roosting known to occur within area | Low | H2, N5 |
| King Quail | *Coturnix chinensis victoriae* | | Listed | Endangered | VBA | Watson Inlet | 1977 | | Negligible | N1, M3 |
| Antipodean Albatross | *Diomedea antipodensis* | Vulnerable / BonnA2S / Marine | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Gibson's Albatross | *Diomedea antipodensis gibsoni* | Vulnerable / BonnA2S / Marine | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Southern Royal Albatross | *Diomedea epomophora* | Vulnerable / BonnA2S / Marine | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Wandering Albatross | *Diomedea exulans* | Vulnerable / BonnA2S / Marine | Listed | Endangered | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Northern Royal Albatross | *Diomedea sanfordi* | Endangered / BonnA2S / Marine | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Little Egret | *Egretta garzetta nigripes* | Marine | Listed | Endangered | eBird | Stony Point jetty carpark | 2016 | | Low | H2, L3 |
| Black Falcon | *Falco subniger* | | Nominated | Vulnerable | VBA | Rutherford Inlet | 2011 | | Low | H2, L1 |
| White-bellied Storm-Petrel | *Fregetta grallaria grallaria* | Vulnerable / Marine | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N4 |
| Latham's Snipe | *Gallinago hardwickii* | JAMBA / ROKAMBA / BonnA2H / Marine | | Near threatened | VBA | Latham's Snipe is a mobile species that often inhabit open wetlands with low dense vegetation. Warringine Park, Hastings | 2007 | Roosting known to occur within area | Moderate | M2, M3 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Swinhoe's Snipe | *Gallinago megala* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE | | | Roosting known to occur within area | Negligible | N1, N4 |
| Pin-tailed Snipe | *Gallinago stenura* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE | | | Roosting known to occur within area | Negligible | N1, N4 |
| Gull-billed Tern | *Gelochelidon nilotica macrotarsa* | CAMBA / Marine | Listed | Endangered | VBA | Pioneer Bay, Western Port | 2007 | | Negligible | M2, N3 |
| Painted Honeyeater | *Grantiella picta* | Vulnerable | Listed | Vulnerable | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N4 |
| White-bellied Sea-Eagle | *Haliaeetus leucogaster* | CAMBA / Marine | Listed | Vulnerable | DoEE / eBird | Hastings | 2016 | Species or species habitat known to occur within area | Low | H2, N5 |
| Black-winged Stilt | *Himantopus himantopus* | Marine | | | eBird | Pakenham Sewage Lagoons | 2018 | Roosting known to occur within area | Low | H2, L3 |
| White-throated Needletail | *Hirundapus caudacutus* | CAMBA / JAMBA / ROKAMBA / Marine | | Vulnerable | VBA | The White-throated Needletail is considered aerial in Australia but may forage above woodlands, farmland, heathland and mudflats | 2015 | Species or species habitat known to occur within area | Moderate | H2, M1 |
| Caspian Tern | *Hydroprogne caspia* | JAMBA / Marine | Listed | Near threatened | ebird | Woolley's Beach Reserve | 2017 | | Low | H2, N5 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Swift Parrot | *Lathamus discolor* | Critically Endangered / Marine | Listed | Endangered | DoEE / eBird | Crofters Hill, Somerville | 2015 | Species or species habitat known to occur within area | Low | H2, L1 |
| **Lewin's Rail** | ***Lewinia pectoralis pectoralis*** | | **Listed** | **Vulnerable** | **VBA** | | **2015** | | **High** | **H1, H2** |
| Broad-billed Sandpiper | *Limicola falcinellus* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE | | | Roosting known to occur within area | Negligible | N1, N5 |
| Bar-tailed Godwit (baueri) | *Limosa lapponica baueri* | Vulnerable CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE / VBA | | 2007 | Species or species habitat known to occur within area | Negligible | M2, N5 |
| Bar-tailed Godwit (menzbieri) | *Limosa lapponica menzbieri* | Critically Endangered CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE | | | Species or species habitat may occur within area | Negligible | N1, N5 |
| Southern Giant-Petrel | *Macronectes giganteus* | Endangered / BonnA2S | Listed | Vulnerable | DoEE / VBA | between Stony Point & French Island | 1988 | Species or species habitat may occur within area | Negligible | N2, N5 |
| Northern Giant Petrel | *Macronectes halli* | Vulnerable / A2S | | | DoEE | | | Species or species habitat may occur within area | Negligible | N1, N5 |
| Hooded Robin | Melanodryas cucullata cucullata | | Listed | Near threatened | VBA | Nar Nar Goon | 1980 | | Negligible | N1, N6 |
| Rainbow Bee-eater | *Merops ornatus* | Marine | | | DoEE | | | Species or species habitat may occur within area | Negligible | N1, L3 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Black-faced Monarch | *Monarcha melanopsis* | BonnA2H / Marine | | | DoEE | | | Species or species habitat known to occur within area | Negligible | N1, N5 |
| Yellow Wagtail | *Motacilla flava* | CAMBA / JAMBA / ROKAMBA / Marine | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N5 |
| Satin Flycatcher | *Myiagra cyanoleuca* | BonnA2H / Marine | | | DoEE | | | Breeding known to occur within area | Negligible | N1, L3 |
| Orange-bellied Parrot | *Neophema chrysogaster* | Critically Endangered / Marine | | | DoEE / VBA | Tyabb | 1987 | Migration route likely to occur within area | Low | N2, M3 |
| Turquoise Parrot | *Neophema pulchella* | | Listed | Near threatened | VBA | 5' Block containing Cannon Creek | 1982 | | Negligible | N1, N4 |
| Barking Owl | *Ninox connivens connivens* | | Listed | Endangered | VBA | Watson Inlet | 1978 | | Negligible | N1, N6 |
| Powerful Owl | *Ninox strenua* | | Listed | Vulnerable | VBA | Mornington Peninsula | 2013 | | Low | H2, L3 |
| Eastern Curlew | *Numenius madagascariensis* | Critically Endangered CAMBA / JAMBA / ROKAMBA / BonnA1 / Marine | | Vulnerable | VBA | West coast near Chilcott Rocks | 2016 | Species or species habitat known to occur within area | Negligible | H2, N5 |
| Little Curlew | *Numenius minutus* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE | | | Roosting known to occur within area | Negligible | N1, N5 |
| Whimbrel | *Numenius phaeopus* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | Vulnerable | DoEE / eBird | Hanns Inlet, Crib Point | 2010 | Roosting known to occur within area | Negligible | M2, N5 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| **Blue-billed Duck** | ***Oxyura australis*** | | **Listed** | **Endangered** | **eBird** | **Pakenham Sewage Lagoons** | **2018** | | **High** | **H1** |
| Fairy Prion | *Pachyptila turtur subantarctica* | Vulnerable / Marine | | Vulnerable | DoEE / VBA | Hanns Inlet, Crib Point | 1975 | Species or species habitat known to occur within area | Negligible | N1, N5 |
| Osprey | *Pandion haliaetus* | BonnA2S / Marine | | | DoEE / eBird | Somerville | 2012 | Species or species habitat likely to occur within area | Negligible | H2, N3 |
| Sooty Albatross | *Phoebetria fusca* | Vulnerable / BonnA2S / Marine | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N5 |
| Pacific Golden Plover | *Pluvialis fulva* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | Vulnerable | DoEE / VBA | Warnete | 1990 | Roosting known to occur within area | Low | L1, L2 |
| Grey Plover | *Pluvialis squatarola* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | Endangered | DoEE / VBA | Watson I nlet | 1977 | Roosting known to occur within area | Negligible | N1, N5 |
| Grey-crowned Babbler | *Pomatostomus temporalis temporalis* | | Listed | Endangered | VBA | Stumpy Gully Rd Balnarring | 2000 | | Negligible | M2, N6 |
| Baillon's Crake | *Porzana pusilla palustris* | Marine | Listed | Vulnerable | VBA | Farm dam N of Greenhill Rd and W of McGregor Rd | 2003 | | Moderate | M2, M3 |
| Gould's Petrel | *Pterodroma leucoptera leucoptera* | Endangered / Marine | | | DoEE | | | Species or species habitat may occur within area | Negligible | N1, N5 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Red-necked Avocet | *Recurvirostra novaehollandiae* | Marine | | | DoEE / eBird | Hanns Inlet, Crib Point | 2018 | Roosting known to occur within area | Low | H2, N5 |
| Rufous Fantail | *Rhipidura rufifrons* | BonnA2H / Marine | | | DoEE / ebird | Moonlit Sanctuary, Pearcedale | 2016 | Species or species habitat known to occur within area | Low | H2, L1 |
| Australian Painted Snipe | *Rostratula australis* | Endangered / Marine | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N5 |
| Diamond Firetail | *Stagonopleura guttata* | | Listed | Near threatened | VBA | Site 6 Blind Bight Foreshore Reserve. | 2011 | | Low | H2, L1 |
| Little Tern | *Sternula albifrons* | JAMBA / ROKAMBA / BonnA2S / Marine | | | DoEE | | | Species or species habitat may occur within area | Negligible | N1, N5 |
| Australian Fairy Tern | *Sternula nereis nereis* | Vulnerable / Marine | Listed | Endangered | DoEE / VBA | Chilcot Rocks | 1992 | Breeding likely to occur within area | Negligible | N1, N5 |
| Freckled Duck | *Stictonetta naevosa* | | Listed | Endangered | VBA | Nar Nar Goon | 1980 | | Low | N2, M3 |
| Buller's Albatross | *Thalassarche bulleri* | Vulnerable / BonnA2S / Marine | | | DoEE | | | Species or species habitat may occur within area | Negligible | N1, N5 |
| Northern Buller's Albatross | *Thalassarche bulleri platei* | Vulnerable / BonnA2S / Marine | | | DoEE | | | Species or species habitat may occur within area | Negligible | N1, N5 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Shy Albatross | *Thalassarche cauta cauta* | Vulnerable / BonnA2S / Marine | | | DoEE / VBA | 5' Block Containing Sandy Point | 1981 | Foraging, feeding or related behaviour likely to occur within area | Negligible | N2, N5 |
| White-capped Albatross | *Thalassarche cauta steadi* | Vulnerable / BonnA2S / Marine | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Grey-headed Albatross | *Thalassarche chrysostoma* | Endangered / BonnA2S / Marine | | | DoEE | | | Species or species habitat may occur within area | Negligible | N1, N5 |
| Campbell Albatross | *Thalassarche impavida* | Vulnerable / BonnA2S / Marine | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Black-browed Albatross | *Thalassarche melanophris melanophris* | Vulnerable / BonnBonnA2S / Marine | | Vulnerable | DoEE / VBA | 5' Block Containing Sandy Point | 1981 | Species or species habitat may occur within area | Negligible | N2, N5 |
| Salvin's Albatross | *Thalassarche salvini* | Vulnerable / BonnA2S / Marine | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Hooded Plover | *Thinornis rubricollis rubricollis* | | Listed | Vulnerable | VBA | Hanns Inlet, Crib Point | 1974 | | Negligible | N1, N5 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Grey-tailed Tattler | *Tringa brevipes* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | Listed | Critically Endangered | DoEE / VBA | Warneet, Western Port | 1992 | Roosting known to occur within area | Negligible | N2, N5 |
| Wood Sandpiper | *Tringa glareola* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | | DoEE | | | Roosting known to occur within area | Negligible | N1, N5 |
| Wandering Tattler | *Tringa incana* | JAMBA / BonnA2H / Marine | | | DoEE | | | Roosting known to occur within area | Negligible | N1, N5 |
| Common Greenshank | *Tringa nebularia* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | Vulnerable | VBA | | 2010 | Species or species habitat known to occur within area | Low | H2, N5 |
| Marsh Sandpiper | *Tringa stagnatilis* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | | Vulnerable | DoEE / VBA | Hanns Inlet, Crib Point | 1992 | Roosting known to occur within area | Negligible | N2, N5 |
| Terek Sandpiper | *Xenus cinereus* | CAMBA / JAMBA / ROKAMBA / BonnA2H / Marine | Listed | Endangered | DoEE / VBA | Hastings | 1979 | Roosting known to occur within area | Negligible | N2, N5 |
| New Holland Mouse | *Pseudomys novaehollandiae* | Vulnerable | Listed | Vulnerable | VBA | Roughly 6km NW of Esso-BHP Fractionation Plant | 1972 | | Negligible | N2, N6 |
| Southern Right Whale | *Eubalaena australis* | Endangered/ BonnA1 | Listed | Critically Endangered | DoEE / VBA | Western Port Bay | 2009 | Species or species habitat known to occur within area | Negligible | M2, N5 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Pygmy Right Whale | *Caperea marginata* | BonnA2S | | | DoEE | | | Foraging, feeding or related behaviour likely to occur within area | Negligible | N1, N5 |
| Dusky Dolphin | *Lagenorhynchus obscurus* | BonnA2S | | | DoEE | | | Species or species habitat may occur within area | Negligible | N1, N5 |
| Swamp Antechinus | *Antechinus minimus maritimus* | Vulnerable | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N5 |
| Spot-tailed Quoll | *Dasyurus maculatus maculatus* | Endangered | | | DoEE | | | Species or species habitat may occur within area | Negligible | N2, N6 |
| Broad-toothed Rat | *Mastacomys fuscus mordicus* | Vulnerable | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N5 |
| Humpback Whale | *Megaptera novaeangliae* | Vulnerable / BonnA1 | Listed | Vulnerable | DoEE / VBA | Westenport Bay | 2013 | Species or species habitat may occur within area | Negligible | H2, N5 |
| Greater Glider | *Petauroides volans* | Vulnerable | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N4 |

| Common Name | Scientific Name | Conservation Status DELWP | | | Record Source | Location | Latest Date | Likelihood of occurrence (PMST) | #Likelihood of occurrence | Assessment Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPBC | FFG | Advisory List | | | | | | |
| Long-nosed Potoroo | *Potorous tridactylus tridactylus* | Vulnerable | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N4 |
| White-footed Dunnart | *Sminthopsis leucopus* | | Listed | Near threatened | VBA | Bittern | 1970 | | Negligible | N2, N5 |
| Smoky Mouse | *Pseudomys fumeus* | Endangered | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N4 |
| Grey-headed Flying-fox | *Pteropus poliocephalus* | Vulnerable | Listed | Vulnerable | DoEE / VBA | 5' Block containing Nar Nar Goon | 1982 | Roosting known to occur within area | Negligible | N1, L1 |
| Long-nosed Fur-seal | *Arctocephalus forsteri* | Marine | | Vulnerable | DoEE / VBA | Sawtells Inlet | 1977 | Species or species habitat may occur within area | Negligible | N2, N5 |
| Australian Fur-seal | *Arctocephalus pusillus* | Marine | | | DoEE | | | Species or species habitat likely to occur within area | Negligible | N1, N5 |
| **Southern Brown Bandicoot** | ***Isoodon obesulus obesulus*** | **Endangered** | **Listed** | **Near threatened** | **DoEE / VBA** | **Warneet, Western Port** | **2017** | **Species or species habitat known to occur within area** | **High** | **H1, H2** |

# Appendix G: EnSym Draft Assessment

# Scenario test – native vegetation removal

This report provides offset requirements for internal testing of different proposals to remove native vegetation. **This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.** A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

**Date of issue:** **17/08/2018**
**Time of issue:** **5:48 pm**

**Report ID: Scenario Testing**

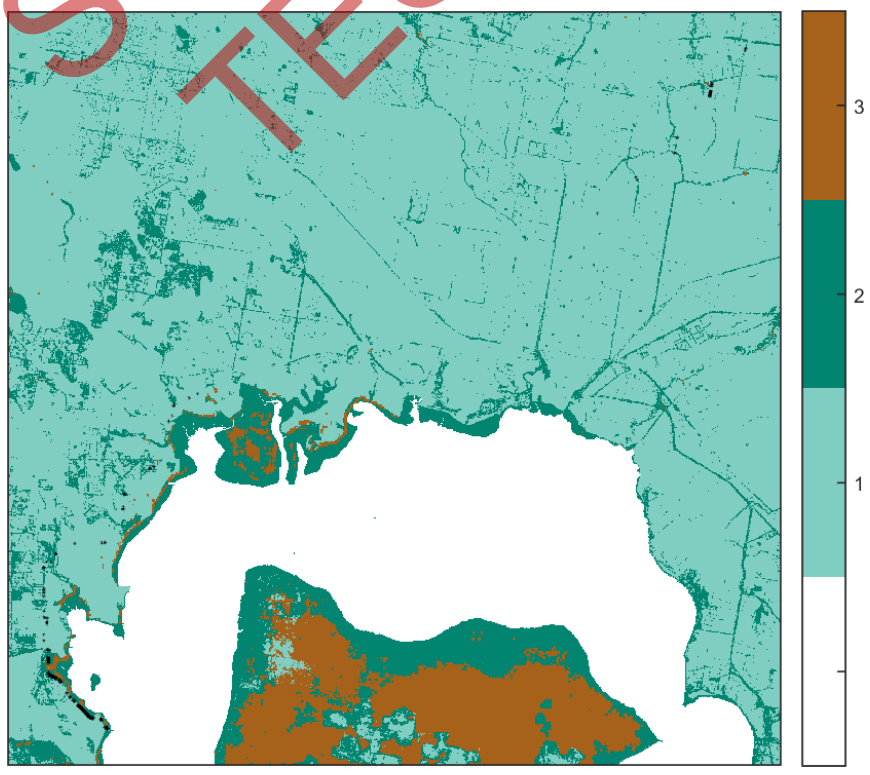
| **Project ID** | ENSYM_Data_180817 |
|---|---|

## Assessment pathway

| **Assessment pathway** | **Detailed Assessment Pathway** |
|---|---|
| Extent including past and proposed | 8.259 ha |
| Extent of past removal | 0.000 ha |
| Extent of proposed removal | 8.259 ha |
| No. Large trees proposed to be removed | 43 |
| Location category of proposed removal | Location 3<br>The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species.The native vegetation is also in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map); and a wetland designated under the Convention on Wetlands of International Importance (the Ramsar Convention); and an internationally important site for Migratory Shorebirds of the East Asian-Australasian Flyway. |



**1. Location map**



# Scenario test – native vegetation removal

## Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

| | |
|---|---|
| **General offset amount**[1] | 0.577 general habitat units |
| Vicinity | Port Phillip and Westernport Catchment Management Authority (CMA) or Cardinia Shire, Casey City, Mornington Peninsula Shire Council |
| Minimum strategic biodiversity value score[2] | 0.340 |
| Large trees* | 22 large trees |
| **Species offset amount**[3] | 3.423 species units of habitat for Coast Fescue, *Poa billardierei*<br>4.853 species units of habitat for Coast Twin-leaf, *Zygophyllum billardierei*<br>4.669 species units of habitat for Coast Wirilda, *Acacia uncifolia*<br>4.515 species units of habitat for Coast Bitter-bush, *Adriana quadripartita* |
| Large trees* | 21 trees |
| *** The total number of large trees that the offset must protect** | 43 large trees to be protected in either the general, species or combination across all habitat units protected |

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps



1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

3 The species offset amount(s) required is the sum of all species habitat units in Appendix 1.

# Scenario test – native vegetation removal

## Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

**This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.**

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).

# Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

*Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)*

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

*General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)*

The general offset amount required is the sum of all general habitat units per zone.



## Native vegetation to be removed

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Zone** | **Type** | **BioEVC** | **BioEVC conservation status** | **Large tree(s)** | **Partial removal** | **Condition score** | **Polygon Extent** | **Extent without overlap** | **SBV score** | **HI score** | **Habitat units** | **Offset type** |
| 3-CPP ST | Scattered Tree | gipp0048 | Least Concern | 1 | no | 0.200 | 0.070 | 0.070 | 0.779 | 0.640 | 0.023 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.626 | 0.023 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.626 | 0.023 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.626 | 0.023 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 4-CPP ST | Scattered Tree | gipp0048 | Least Concern | 1 | no | 0.200 | 0.070 | 0.070 | 0.740 | 0.640 | 0.023 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.637 | 0.023 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.637 | 0.023 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.637 | 0.023 | 504755 Coast Bitter-bush *Adriana quadripartita* |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| 5-CPPST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.200 | 0.031 | 0.000 | | | 0.000 | |
| 6-CPPST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.200 | 0.031 | 0.000 | 0.730 | 0.640 | 0.000 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.640 | 0.000 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.640 | 0.000 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.640 | 0.000 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 8-CPPST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.200 | 0.031 | 0.031 | 0.425 | 0.660 | 0.010 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.591 | 0.010 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.591 | 0.010 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.591 | 0.010 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 9-CPPST | Scattered Tree | gipp0048 | Least Concern | 1 | no | 0.200 | 0.070 | 0.070 | 0.420 | 0.470 | 0.021 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.470 | 0.021 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.470 | 0.021 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 11-KOJHST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.200 | 0.070 | 0.070 | 0.100 | | 0.012 | General |
| 18-KOJHST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.140 | | 0.005 | General |
| 28-CPPST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.130 | | 0.005 | General |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| 29-CPPST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.200 | 0.070 | 0.056 | 0.150 | | 0.010 | General |
| 30-KOJHST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.200 | 0.070 | 0.056 | 0.150 | | 0.010 | General |
| 30-KOJHST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.200 | 0.070 | 0.070 | 0.150 | | 0.012 | General |
| 31-KOJHST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.135 | | 0.005 | General |
| 32-KOJHST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.200 | 0.070 | 0.070 | 0.130 | | 0.012 | General |
| 44-KOJHST | Scattered Tree | gipp0083 | Endangered | 0 | no | 0.200 | 0.031 | 0.026 | 0.190 | | 0.005 | General |
| 45-KOJHST | Scattered Tree | gipp0083 | Endangered | 0 | no | 0.200 | 0.031 | 0.026 | 0.190 | | 0.005 | General |
| 56-KOJHST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.029 | 0.562 | | 0.007 | General |
| 57-KOJHST | Scattered Tree | gipp0175 | Endangered | 1 | no | 0.200 | 0.070 | 0.055 | 0.630 | | 0.014 | General |
| 58-KOJHST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.010 | 0.630 | | 0.002 | General |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Zone** | **Type** | **BioEVC** | **BioEVC conservation status** | **Large tree(s)** | **Partial removal** | **Condition score** | **Polygon Extent** | **Extent without overlap** | **SBV score** | **HI score** | **Habitat units** | **Offset type** |
| 59-KOJ HST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.220 | | 0.006 | General |
| 60-KOJ HST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.950 | 0.510 | 0.009 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.510 | 0.009 | 504210 Coast Wirilda *Acacia uncifolia* |
| 65-CPP ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.470 | 0.420 | 0.009 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| 67-CPP ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.027 | 0.470 | 0.420 | 0.008 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| 68-CPP ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.027 | 0.690 | 0.420 | 0.008 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| 69-CPP ST | Scattered Tree | gipp0003 | Vulnerable | 1 | no | 0.200 | 0.070 | 0.070 | 0.538 | | 0.016 | General |
| 75-CPP ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.029 | 0.360 | | 0.006 | General |
| 79-CPP ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.029 | 0.360 | | 0.006 | General |
| 80-CPP ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.028 | 0.400 | | 0.006 | General |
| 81-CPP ST | Scattered Tree | gipp0175 | Endangered | 0 | no | 0.200 | 0.031 | 0.028 | 0.400 | | 0.006 | General |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| 82-CPPST | Scattered Tree | gipp0003 | Vulnerable | 1 | no | 0.200 | 0.070 | 0.070 | 0.240 | | 0.013 | General |
| 96-CPPST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.200 | 0.031 | 0.031 | 0.650 | | 0.008 | General |
| 100-CPPST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.200 | 0.031 | 0.031 | 0.440 | | 0.007 | General |
| 141-CPPST | Scattered Tree | hsf_0937 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.440 | | 0.007 | General |
| 142-CPPST | Scattered Tree | hsf_0937 | Endangered | 0 | no | 0.200 | 0.031 | 0.030 | 0.440 | | 0.006 | General |
| 143-CPPST | Scattered Tree | hsf_0937 | Endangered | 0 | no | 0.200 | 0.031 | 0.030 | 0.440 | | 0.006 | General |
| 144-CPPST | Scattered Tree | hsf_0937 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.440 | | 0.007 | General |
| 146-CPPST | Scattered Tree | gipp0048 | Least Concern | 0 | no | 0.200 | 0.031 | 0.031 | 0.140 | | 0.005 | General |
| 1-KOJH | Patch | gipp0793 | Vulnerable | 0 | no | 0.320 | 0.001 | 0.001 | 0.660 | 0.630 | 0.001 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.630 | 0.001 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.630 | 0.001 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 2-KOJH | Patch | gipp0793 | Vulnerable | 0 | no | 0.260 | 0.055 | 0.055 | 0.760 | 0.650 | 0.023 | 501361 Coast Fescue *Poa billardierei* |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| | | | | | | | | | | 0.602 | 0.023 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.602 | 0.023 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.602 | 0.023 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 3-KOJH | Patch | gipp0793 | Vulnerable | 4 | no | 0.700 | 0.042 | 0.042 | 0.766 | 0.680 | 0.049 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.682 | 0.050 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.682 | 0.050 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.682 | 0.050 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 5-KOJH | Patch | gipp0048 | Least Concern | 0 | no | 0.310 | 0.012 | 0.012 | 0.990 | 0.720 | 0.006 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.720 | 0.006 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.720 | 0.006 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.720 | 0.006 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 4-CCCT | Patch | gipp0083 | Endangered | 0 | no | 0.160 | 0.075 | 0.075 | 0.460 | | 0.013 | General |
| 10-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.480 | 0.438 | 0.438 | 0.548 | 0.562 | 0.328 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.578 | 0.331 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.578 | 0.331 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.578 | 0.331 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 13-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.580 | 0.450 | 0.450 | 0.760 | 0.649 | 0.430 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| | | | | | | | | | | 0.649 | 0.430 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.611 | 0.430 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 14-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.650 | 0.223 | 0.223 | 0.796 | 0.687 | 0.244 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.687 | 0.244 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.687 | 0.244 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 15-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.590 | 0.385 | 0.385 | 0.768 | 0.740 | 0.395 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.740 | 0.395 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.107 | 0.404 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 10-CCCT | Patch | gipp0053 | Endangered | 0 | no | 0.240 | 0.034 | 0.034 | 0.448 | | 0.009 | General |
| 21-KOJH | Patch | gipp0175 | Endangered | 1 | no | 0.580 | 0.238 | 0.238 | 0.250 | 0.570 | 0.216 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| 23-KOJH | Patch | gipp0175 | Endangered | 1 | no | 0.600 | 0.004 | 0.004 | 0.557 | 0.640 | 0.004 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.312 | 0.004 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.312 | 0.004 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 28-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.450 | 0.089 | 0.089 | 0.230 | 0.422 | 0.057 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.323 | 0.057 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.241 | 0.056 | 504755 Coast Bitter-bush *Adriana quadripartita* |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| 30-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.180 | 0.004 | 0.004 | 0.390 | | 0.001 | General |
| 11-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.150 | 0.008 | 0.008 | 0.470 | | 0.001 | General |
| 31-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.150 | 0.003 | 0.003 | 0.469 | | 0.001 | General |
| 32-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.170 | 0.014 | 0.014 | 0.450 | | 0.003 | General |
| 12-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.170 | 0.006 | 0.006 | 0.450 | | 0.001 | General |
| 38-KOJH | Patch | gipp0175 | Endangered | 0 | no | 0.400 | 0.020 | 0.020 | 0.190 | | 0.007 | General |
| 39-KOJH | Patch | gipp0175 | Endangered | 0 | no | 0.290 | 0.003 | 0.003 | 0.130 | | 0.001 | General |
| 40-KOJH | Patch | gipp0175 | Endangered | 1 | no | 0.320 | 0.045 | 0.045 | 0.370 | | 0.015 | General |
| 43-KOJH | Patch | gipp0053 | Endangered | 0 | no | 0.240 | 0.228 | 0.228 | 0.566 | | 0.064 | General |
| 41-KOJH | Patch | gipp0175 | Endangered | 1 | no | 0.240 | 0.063 | 0.063 | 0.221 | | 0.014 | General |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| 47-KOJH | Patch | gipp0175 | Endangered | 0 | no | 0.200 | 0.016 | 0.016 | 0.190 | | 0.003 | General |
| 24-KOJH | Patch | gipp0083 | Endangered | 5 | no | 0.550 | 0.002 | 0.002 | 0.250 | 0.570 | 0.002 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| 16-KOJH | Patch | gipp0083 | Endangered | 1 | no | 0.530 | 0.113 | 0.113 | 0.870 | 0.664 | 0.099 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.664 | 0.099 | 504210 Coast Wirilda *Acacia uncifolia* |
| 6-KOJH | Patch | gipp0083 | Endangered | 1 | no | 0.330 | 0.045 | 0.045 | 0.630 | | 0.018 | General |
| 1-JHCC | Patch | gipp0053 | Endangered | 0 | no | 0.210 | 0.247 | 0.247 | 0.757 | | 0.068 | General |
| 2-JHCC | Patch | gipp0053 | Endangered | 0 | no | 0.200 | 0.360 | 0.360 | 0.415 | | 0.076 | General |
| 52-CCCT | Patch | gipp0083 | Endangered | 0 | no | 0.270 | 0.019 | 0.019 | 0.450 | | 0.006 | General |
| 53-CCCT | Patch | gipp0083 | Endangered | 0 | no | 0.220 | 0.010 | 0.010 | 0.450 | | 0.002 | General |
| 49-JHCC | Patch | gipp0053 | Endangered | 0 | no | 0.190 | 0.024 | 0.024 | 0.470 | 0.170 | 0.005 | 504210 Coast Wirilda *Acacia uncifolia* |
| 50-JHCC | Patch | gipp0053 | Endangered | 0 | no | 0.210 | 0.060 | 0.060 | 0.740 | | 0.017 | General |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Zone** | **Type** | **BioEVC** | **BioEVC conservation status** | **Large tree(s)** | **Partial removal** | **Condition score** | **Polygon Extent** | **Extent without overlap** | **SBV score** | **HI score** | **Habitat units** | **Offset type** |
| 64-JHCC | Patch | gipp0048 | Least Concern | 0 | no | 0.360 | 0.055 | 0.055 | 0.980 | 0.710 | 0.034 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.710 | 0.034 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.710 | 0.034 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.710 | 0.034 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 55-JHCC | Patch | gipp0048 | Least Concern | 5 | no | 0.510 | 0.050 | 0.050 | 0.728 | | 0.033 | General |
| 56-JHCC | Patch | gipp0083 | Endangered | 2 | no | 0.610 | 0.000 | 0.000 | 0.700 | | 0.000 | General |
| 61-JHCC | Patch | gipp0793 | Vulnerable | 3 | no | 0.590 | 2.259 | 2.259 | 0.724 | 0.734 | 2.312 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.678 | 2.237 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.678 | 2.237 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.678 | 2.237 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 62-JHCC | Patch | gipp0793 | Vulnerable | 1 | no | 0.370 | 0.087 | 0.087 | 0.740 | 0.346 | 0.043 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.346 | 0.043 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.346 | 0.043 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.346 | 0.043 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 68-JHCC | Patch | gipp0175 | Endangered | 1 | no | 0.360 | 0.023 | 0.023 | 0.371 | | 0.008 | General |

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Zone** | **Type** | **BioEVC** | **BioEVC conservation status** | **Large tree(s)** | **Partial removal** | **Condition score** | **Polygon Extent** | **Extent without overlap** | **SBV score** | **HI score** | **Habitat units** | **Offset type** |
| 69-JHCC | Patch | gipp0048 | Least Concern | 3 | no | 0.390 | 0.017 | 0.017 | 0.400 | | 0.007 | General |
| 70-JHCC | Patch | gipp0053 | Endangered | 0 | no | 0.190 | 0.004 | 0.004 | 0.460 | | 0.001 | General |
| 1-JHMV | Patch | gipp0048 | Least Concern | 0 | no | 0.380 | 0.702 | 0.702 | 0.980 | 0.579 | 0.421 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.433 | 0.421 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.433 | 0.421 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.433 | 0.421 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 3-JHMV | Patch | gipp0048 | Least Concern | 0 | no | 0.530 | 0.167 | 0.167 | 0.980 | 0.681 | 0.149 | 501361 Coast Fescue *Poa billardierei* |
| | | | | | | | | | | 0.289 | 0.149 | 503615 Coast Twin-leaf *Zygophyllum billardierei* |
| | | | | | | | | | | 0.289 | 0.149 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.289 | 0.149 | 504755 Coast Bitter-bush *Adriana quadripartita* |
| 79-JHCC | Patch | gipp0048 | Least Concern | 2 | no | 0.310 | 0.095 | 0.095 | 0.540 | 0.450 | 0.043 | 504210 Coast Wirilda *Acacia uncifolia* |
| 80-JHCC | Patch | gipp0053 | Endangered | 0 | no | 0.240 | 0.014 | 0.014 | 0.540 | 0.450 | 0.005 | 504210 Coast Wirilda *Acacia uncifolia* |
| 81-JHCC | Patch | gipp0053 | Endangered | 0 | no | 0.160 | 0.024 | 0.024 | 0.370 | 0.230 | 0.005 | 504210 Coast Wirilda *Acacia uncifolia* |
| | | | | | | | | | | 0.230 | 0.005 | 504755 Coast Bitter-bush *Adriana quadripartita* |

# Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

| Species common name | Species scientific name | Species number | Conservation status | Group | Habitat impacted | % habitat value affected |
|---|---|---|---|---|---|---|
| Coast Twin-leaf | *Zygophyllum billardierei* | 503615 | Rare | Dispersed | Habitat importance map | 0.0082 |
| Coast Wirilda | *Acacia uncifolia* | 504210 | Rare | Dispersed | Habitat importance map | 0.0066 |
| Coast Bitter-bush | *Adriana quadripartita* | 504755 | Vulnerable | Dispersed | Habitat importance map | 0.0056 |
| Coast Fescue | *Poa billardierei* | 501361 | Rare | Dispersed | Habitat importance map | 0.0052 |
| Coast Helmet-orchid | *Corybas despectans* | 500836 | Vulnerable | Dispersed | Habitat importance map | 0.0049 |
| Creeping Rush | *Juncus revolutus* | 501839 | Rare | Dispersed | Habitat importance map | 0.0038 |
| Coast Fescue | *Poa billardierei* | 501361 | Rare | Dispersed | Top ranking map | 0.0031 |
| Marsh Saltbush | *Atriplex paludosa subsp. paludosa* | 500326 | Rare | Dispersed | Habitat importance map | 0.0027 |
| Dune Wood-sorrel | *Oxalis rubens* | 502390 | Rare | Dispersed | Habitat importance map | 0.0022 |
| King Quail | *Coturnix chinensis victoriae* | 10012 | Endangered | Dispersed | Habitat importance map | 0.0019 |
| Tiny Arrowgrass | *Triglochin minutissima* | 503446 | Rare | Dispersed | Top ranking map | 0.0019 |
| Grey Mangrove | *Avicennia marina subsp. australasica* | 500345 | Rare | Dispersed | Habitat importance map | 0.0013 |
| Salt Lawrencia | *Lawrencia spicata* | 501888 | Rare | Dispersed | Habitat importance map | 0.0011 |
| Dense Leek-orchid | *Prasophyllum spicatum* | 504506 | Endangered | Dispersed | Habitat importance map | 0.0011 |
| Dune Poa | *Poa poiformis var. ramifer* | 504826 | Rare | Dispersed | Habitat importance map | 0.0011 |
| Glossy Grass Skink | *Pseudemoia rawlinsoni* | 12683 | Vulnerable | Dispersed | Habitat importance map | 0.0009 |
| Veined Spear-grass | *Austrostipa rudis subsp. australis* | 504940 | Rare | Dispersed | Habitat importance map | 0.0009 |
| Pacific Golden Plover | *Pluvialis fulva* | 10137 | Vulnerable | Dispersed | Habitat importance map | 0.0006 |
| Tiny Arrowgrass | *Triglochin minutissima* | 503446 | Rare | Dispersed | Habitat importance map | 0.0006 |
| Green Leek-orchid | *Prasophyllum lindleyanum* | 502702 | Vulnerable | Dispersed | Habitat importance map | 0.0006 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Annual Fireweed | *Senecio glomeratus subsp. longifructus* | 507144 | Rare | Dispersed | Habitat importance map | 0.0006 |
| Growling Grass Frog | *Litoria raniformis* | 13207 | Endangered | Dispersed | Habitat importance map | 0.0005 |
| Leafy Twig-sedge | *Cladium procerum* | 500786 | Rare | Dispersed | Habitat importance map | 0.0005 |
| Swamp Skink | *Lissolepis coventryi* | 12407 | Vulnerable | Dispersed | Habitat importance map | 0.0005 |
| Golden Cowslips | *Diuris behrii* | 501061 | Vulnerable | Dispersed | Habitat importance map | 0.0005 |
| Parsley Xanthosia | *Xanthosia leiophylla* | 504562 | Rare | Dispersed | Habitat importance map | 0.0005 |
| Purple Blown-grass | *Lachnagrostis punicea subsp. punicea* | 504206 | Rare | Dispersed | Habitat importance map | 0.0005 |
| Lewin's Rail | *Lewinia pectoralis pectoralis* | 10045 | Vulnerable | Dispersed | Habitat importance map | 0.0004 |
| Rough Blown-grass | *Lachnagrostis rudis subsp. rudis* | 500159 | Endangered | Dispersed | Habitat importance map | 0.0003 |
| Australian Mudfish | *Neochanna cleaveri* | 4703 | Critically endangered | Dispersed | Habitat importance map | 0.0002 |
| Coast Bush-pea | *Pultenaea canaliculata* | 502839 | Rare | Dispersed | Habitat importance map | 0.0002 |
| Clover Glycine | *Glycine latrobeana* | 501456 | Vulnerable | Dispersed | Habitat importance map | 0.0002 |
| Common Bent-wing Bat (eastern ssp.) | *Miniopterus schreibersii oceanensis* | 61342 | Vulnerable | Dispersed | Habitat importance map | 0.0002 |
| Grey Goshawk | *Accipiter novaehollandiae novaehollandiae* | 10220 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Elegant Parrot | *Neophema elegans* | 10307 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Chestnut-rumped Heathwren | *Calamanthus pyrrhopygius* | 10498 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Hooded Plover | *Thinornis rubricollis rubricollis* | 10138 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Mauve-tuft Sun-orchid | *Thelymitra malvina* | 503374 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Southern Toadlet | *Pseudophryne semimarmorata* | 13125 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Black Falcon | *Falco subniger* | 10238 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Ruddy Turnstone | *Arenaria interpres* | 10129 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Grey Plover | *Pluvialis squatarola* | 10136 | Endangered | Dispersed | Habitat importance map | 0.0000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| White-throated Needletail | *Hirundapus caudacutus* | 10334 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| White-bellied Sea-Eagle | *Haliaeetus leucogaster* | 10226 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Strzelecki Gum | *Eucalyptus strzeleckii* | 504558 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Leafy Greenhood | *Pterostylis cucullata subsp. cucullata* | 505911 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Australasian Bittern | *Botaurus poiciloptilus* | 10197 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Little Egret | *Egretta garzetta nigripes* | 10185 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Purple Diuris | *Diuris punctata* | 501084 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Lesser Sand Plover | *Charadrius mongolus* | 10139 | Critically endangered | Dispersed | Habitat importance map | 0.0000 |
| Green Scentbark | *Eucalyptus fulgens* | 505175 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Intermediate Egret | *Ardea intermedia* | 10186 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Eastern Great Egret | *Ardea modesta* | 10187 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Grey Billy-buttons | *Craspedia canens* | 504643 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Australasian Shoveler | *Anas rhynchotis* | 10212 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Freckled Duck | *Stictonetta naevosa* | 10214 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Baillon's Crake | *Porzana pusilla palustris* | 10050 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Blue-billed Duck | *Oxyura australis* | 10216 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Musk Duck | *Biziura lobata* | 10217 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Sticky Wattle | *Acacia howittii* | 500044 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Hardhead | *Aythya australis* | 10215 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Green-striped Greenhood | *Pterostylis chlorogramma* | 504728 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Curlew Sandpiper | *Calidris ferruginea* | 10161 | Endangered | Dispersed | Top ranking map ; special site | 0.0000 |
| Yarra Gum | *Eucalyptus yarraensis* | 501326 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Naked Sun-orchid | *Thelymitra circumsepta* | 503383 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Swamp Everlasting | *Xerochrysum palustre* | 503763 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Maroon Leek-orchid | *Prasophyllum frenchii* | 502709 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Swamp Fireweed | *Senecio psilocarpus* | 504659 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Sand Brome | *Bromus arenarius* | 500497 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Winter Sun-orchid | *Thelymitra hiemalis* | 505006 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Plains Yam-daisy | *Microseris scapigera s.s.* | 504657 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Matted Flax-lily | *Dianella amoena* | 505084 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Cobra Greenhood | *Pterostylis grandiflora* | 502798 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Floodplain Fireweed | *Senecio campylocarpus* | 507136 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Salt Blown-grass | *Lachnagrostis robusta* | 504223 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Pale Swamp Everlasting | *Coronidium gunnianum* | 504655 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Purple Blown-grass | *Lachnagrostis punicea subsp. filifolia* | 504222 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Spurred Helmet-orchid | *Corybas aconitiflorus* | 500835 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Hoary Rapier-sedge | *Lepidosperma canescens* | 501915 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Tufted Club-sedge | *Isolepis wakefieldiana* | 501789 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Lace Monitor | *Varanus varius* | 12283 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Slender Stylewort | *Levenhookia sonderi* | 501998 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Curlew Sandpiper | *Calidris ferruginea* | 10161 | Endangered | Dispersed | Habitat importance map ; special site | 0.0000 |
| Whimbrel | *Numenius phaeopus* | 10150 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Great Knot | *Calidris tenuirostris* | 10165 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Red Knot | *Calidris canutus* | 10164 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Common Sandpiper | *Actitis hypoleucos* | 10157 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Masked Owl | *Tyto novaehollandiae novaehollandiae* | 10250 | Endangered | Dispersed | Habitat importance map | 0.0000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Greater Sand Plover | *Charadrius leschenaultii* | 10141 | Critically endangered | Dispersed | Habitat importance map | 0.0000 |
| Eastern Curlew | *Numenius madagascariensis* | 10149 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Gull-billed Tern | *Gelochelidon nilotica macrotarsa* | 10111 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Common Greenshank | *Tringa nebularia* | 10158 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Black-tailed Godwit | *Limosa limosa* | 528553 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |

**Habitat group**

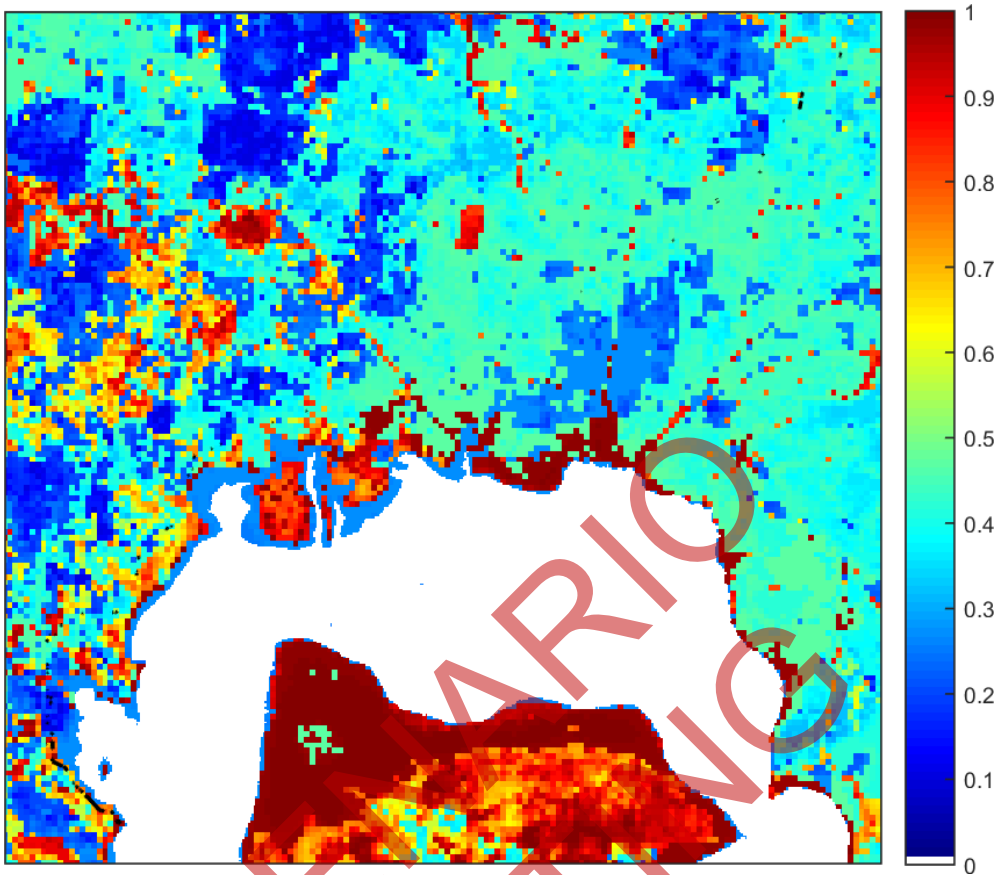
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

**Habitat impacted**

- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

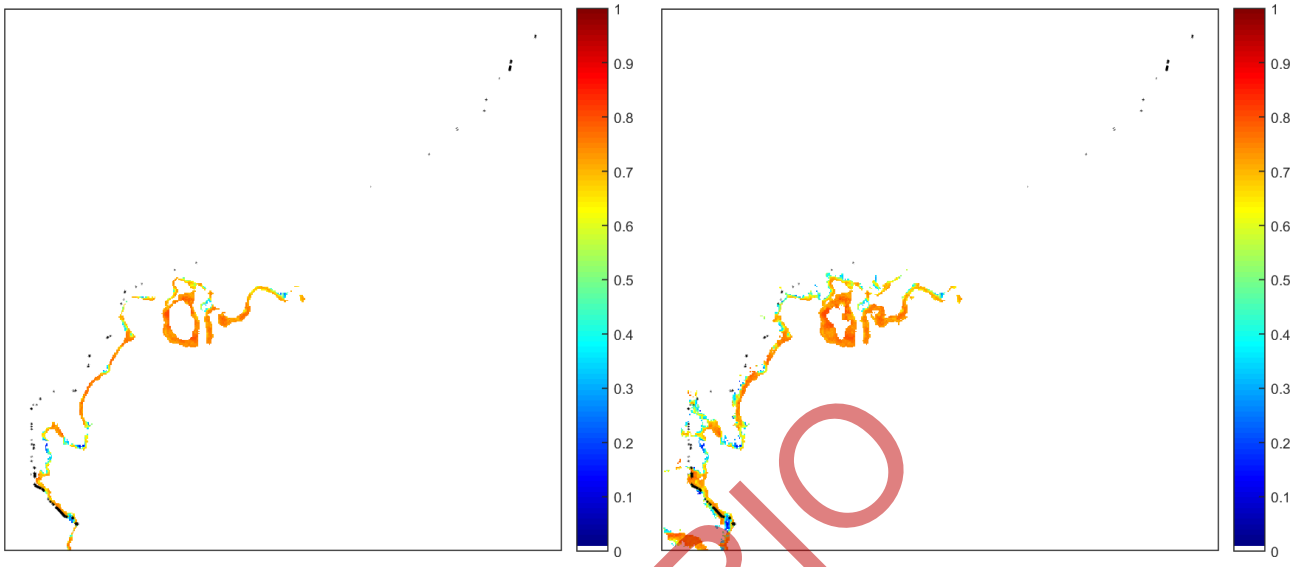
# Appendix 3 – Images of mapped native vegetation

**2. Strategic biodiversity values map**



### 3. Habitat importance maps

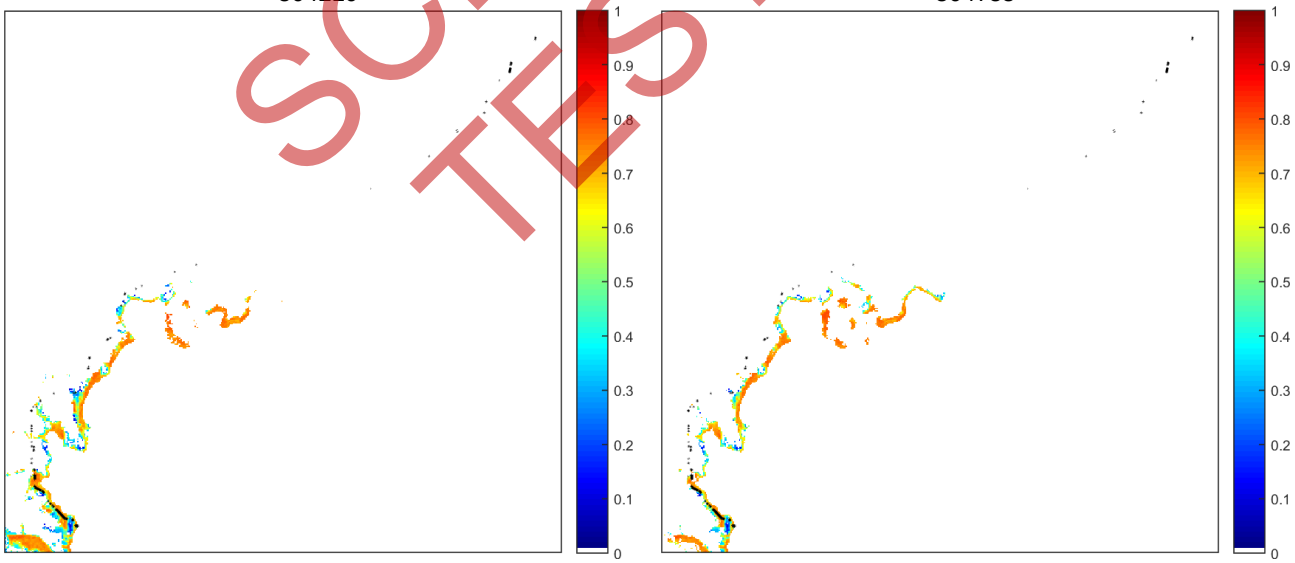
Coast Fescue
*Poa billardierei*
501361




Coast Twin-leaf
*Zygophyllum billardierei*
503615




Coast Wirilda
*Acacia uncifolia*
504210




Coast Bitter-bush
*Adriana quadripartita*
504755

# Appendix H: Detailed figures of ecological values found along the construction footprint.

Growling Grass Frog Targeted Survey Location Map

Southern Brown Bandicoot Mitigation Area

Threatened Fauna Species Locations

KP1
JHCC62
JH CC 61
KP0.5
Planted Moonah
JHCC64
JHMV 3
JHMV 2
JH CC 72
KP0

APA Transmission Pty Limited - 31-02984.00

# Crib Point Pakenham Pipeline Project
## Listed Flora and Fauna
## Page 1 of 24

WORK REQUEST NUMBER: 31-02984.00

DATA SOURCES:
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LEGEND

- Kilometre Points
- Large Scattered Trees
- Small Scattered Trees
- Other Scattered Trees
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- Fauna Survey Site

Listed Fauna
- Listed Avian Fauna
- FFG Listed Aquatic Fauna
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- Growling Grass Frog
- Southern Brown Bandicoot
- Southern Toadlet

- Water Course
- Crib Point Pakenham Alignment
- Construction Footprint
- Water Body

Vegetation Patch
- Endangered
- Vulnerable
- Least Concern
- Planted
- EPBC Listed Subtropical and Temperate Coastal Saltmarsh

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| 04/09/2018 | AB | JH | MV | B | Issued for Review |
| 14/08/2018 | AB | JH | CC | A | Issued for Review |

monarc ENVIRONMENTAL
apa

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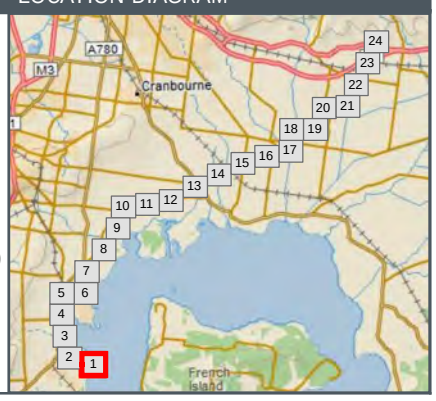
Metres
1:8,500
(A3) GDA 1994 MGA Zone 55

LOCATION DIAGRAM

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KOJH 15
KOJH 14
KP4
KOJH 13
KP3.5
KOJH10
KOJH9
KP3
KOJH8
CPPST009
KP2.5
CPPST008
1. CPPST004
2. CPPST005
CPPST007
1
2
CPPST006
CPPST003
CPPST002
KOJH3
KOJH4
CPPST001
KP2
KOJH2
KOJH5
Planted
KOJH1
Woolleys Rd
KP1.5
JH CC 61
KP1

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monarc ENVIRONMENTAL
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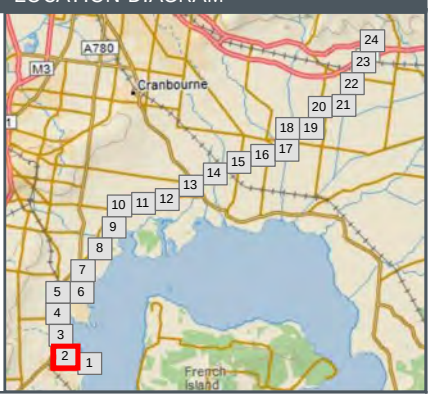
1:8,500
(A3) GDA 1994 MGA Zone 55

LOCATION DIAGRAM

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CPPST030
CPPST030
CPPST029
CPPST028
KP6.5
Planted veg
Planted veg
High st
CPPST027
KOJH 37
KP6
1. CPPST024
2. CPPST023
3. CPPST022
4. CPPST021
5. CPPST020
6. CPPST011
CPPST019
CPPST018
CPPST017
CPPST016
CPPST015
CPPST014
CPPST013
CPPST012
KOJH 36
Frankston-Flinders Rd
KP5.5
Planted Palm tree
KOJH 35
Planted Eucalypts
Planted Pine Tree
KOJH34
CPPST184
Reid Pde
KP5
KOJH 24
KOJH 21
KOJH16
WARRINGINE CREEK
KOJH 23
CPPST010
KOJH 18
KOJH 15
KP4.5
KOJH 14
KP4
KOJH 13
KP3.5
KOJH10
KOJH9

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LOCATION DIAGRAM

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Graydens Rd
KP9
CPPST054
CPPST053
CPPST051
CPPST050
CPPST049
Frankston-Flinders Rd
KOJH 44
KOJH 45
CPPST048
CPPST047
CPPST046
KOJH 46
KP8.5
CPPST045
CPPST044
KOJH 47
KOJH 41
Planted Eucalypts
Planted eucalypts
KP8
KOJH 40
Planted Eucalypts
Frankston-Flinders Rd
CPPST043
CPPST042
CPPST039
CPPST038
CPPST037
CPPST036
CPPST035
CPPST034
CPPST033
KP7.5
Planted Eucalypts
Planted Eucalypts
Hodgins Rd
KOJH 38
1. CPPST052
2. CPPST040
3. CPPST041
4. CPPST021
5. CPPST023
6. CPPST024
7. CPPST020
8. CPPST022
9. CPPST027
KP7
CPPST032
KOJH 39
Cool Store Rd
CPPST031
CPPST030
CPPST030
CPPST029
CPPST028
KP6.5
Planted veg
Planted veg
High st
KOJH 37
KP6
CPPST019
CPPST018
CPPST017

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## Page 4 of 24

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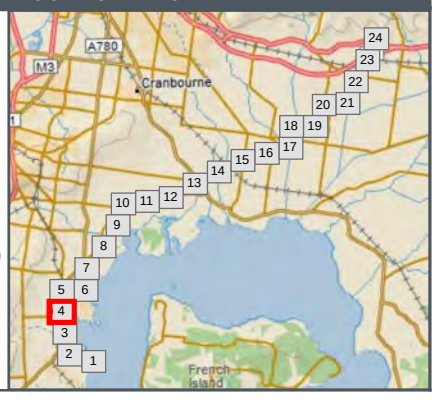


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Den
KP11
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KP10.5
CPPST068
CPPST067
CPPST065
CPPST066
Frankston-Flinders Rd
KP10
KP9.5
CPPST059
CPPST060
KOJH 27
Planted Grevillea
CPPST063
CPPST064
1. CPPST061
2. CPPST062
3. CPPST056
KOJH 6
CPPST057
CPPST058
CPPST055
Planted
Eucalypts
KP9
Graydens Rd
CPPST054
CPPST053
CPPST051
CPPST052
CPPST050
CPPST049
KOJH 44
KOJH 45
CPPST047
CPPST048
CPPST046
KOJH 46
KP8.5
CPPST045
CPPST044
KOJH 47

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## Page 5 of 24

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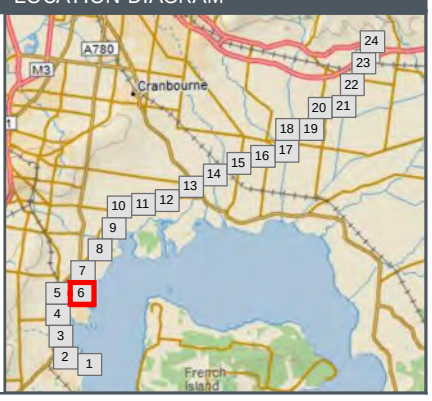


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KP16
Pikes Rd
KOJH 43
KP15.5
JHCC 82
JH CC 55
KP15
JH CC 56
JH CC 57
EPBC listed
River Swamp
Wallaby Grass
JHCC60
CPPST073
JH CC 59
JH CC
58A
JH CC
58B
Mckirdys Rd
KP14.5
KP14
KP13.5
Thornells Rd
CPPST071
CPPST070
CPPST072
CPPST155
Planted
Eucalypts
Planted
eucalypts and
pine trees
Planted native
Bunya Pine
CPPST156
CPPST157
CPPST158
1. CPPST162
2. CPPST159
3. CPPST161
4. CPPST160
KP13
JHCC 78
KP12.5
JHCC 81
JHCC 80
JHCC 79
Whitneys Rd
m Rd
KP12

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## Listed Flora and Fauna
## Page 7 of 24

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Vegetation Patch
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monarc ENVIRONMENTAL
apa

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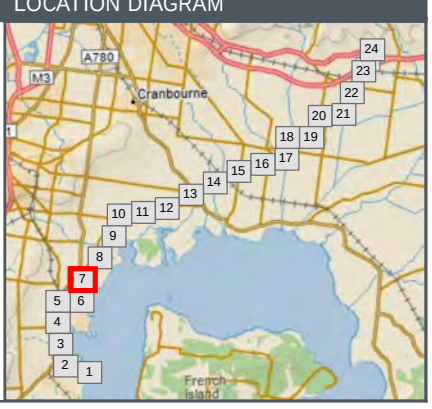
Metres
1:8,500
(A3) GDA 1994 MGA Zone 55

LOCATION DIAGRAM

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## Listed Flora and Fauna
## Page 8 of 24

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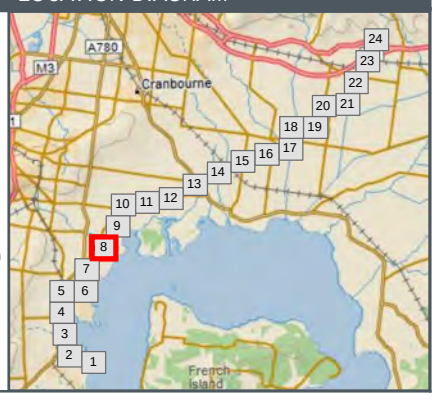


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KP22.5
CPPST148
2 1
KP22
1. CPPST147
2. CPPST146
CPPST145
CCJH69
KP21.5
Farm Dam
LANGWARREN CREEK
Callanans Ln
Planted Eucalypts under government funding
CPPST154
CCAJ 2 Planted
KP21
JHCC80
CCAJ 1 Planted
Lachies Marsh
CPPST082
KP20.5
JHCC49
Planted Eucalypt
S Boundary Rd E
KOJH7
KOJH 28
KP20
Planted native vegetation
CCMV65
Planted Eucalypts
Planted Eucalypts
Bembridge Rd
PEARCEDALE SOUTH CREEK
KP19.5
JHCC 74C
CCDC66
WATSON CREEK
JHCC 74B
JHCC 74A
JHCC48
JHCC 75
JHCC51
KP19
JHCC 76
JHCC 77

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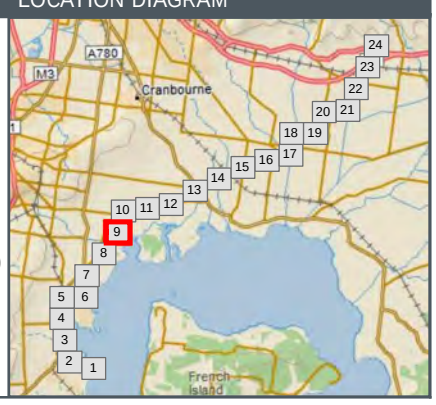


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Baxter-Tooradin Rd
Vowell Dr
LANGWARREN CREEK
Callanans Ln
Planted Eucalypts under government funding
Farm Dam
Constructed Wetland 2
Constructed Wetland 1
Farm Dam
Lachies Marsh
KP23
KP22.5
KP22
KP21.5
KP21
CPPST148
CPPST145
CCJH69
JHCC50
CPPST082
8. CPPST094
9. CPPST095
10. CPPST093
11. CPPST092
12. CPPST089
1. CPPST083
2. CPPST088
3. CPPST084
4. CPPST086
5. CPPST147
6. CPPST146
7. CPPST154

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KP25.5
Planted Eucalypts
Planted Eucalypts
Planted Eucalypts
Baxter-Tooradin Rd
CPPST096
CPPST097
KP25
Planted Acacia
KP24.5
Planted Eucalypts
KP24
CRAIGSLANE DRAINAGE CHANNEL
KP23.5
Craigs Ln
Constructed Wetland 1

APA Transmission Pty Limited - 31-02984.00

# Crib Point Pakenham Pipeline Project
## Listed Flora and Fauna
## Page 11 of 24

WORK REQUEST NUMBER: 31-02984.00

DATA SOURCES:
Service Layer Credits: Copyright:© 2018 Garmin
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- Kilometre Points
- Large Scattered Trees
- Small Scattered Trees
- Other Scattered Trees
- Flora Survey Site
- Fauna Survey Site

Listed Fauna
- Listed Avian Fauna
- FFG Listed Aquatic Fauna
- Glossy Grass Skink
- Growling Grass Frog
- Southern Brown Bandicoot
- Southern Toadlet

- Water Course
- Crib Point Pakenham Alignment
- Construction Footprint
- Water Body

Vegetation Patch
- Endangered
- Vulnerable
- Least Concern
- Planted
- EPBC Listed Subtropical and Temperate Coastal Saltmarsh

| ISSUE DATE | AUTHOR | QA CHECK | APPROVED | MAP REV. | REVISION NOTE |
|---|---|---|---|---|---|
| 04/09/2018 | AB | JH | MV | B | Issued for Review |
| 14/08/2018 | AB | JH | CC | A | Issued for Review |

0 100 200
Metres
1:8,500
(A3) GDA 1994 MGA Zone 55

LOCATION DIAGRAM

Path: L:\Consult\GIS\GIS_WR\Monarc\CribPtToPakenham\ListedFloraFauna_RevB.mxd

Fisheries Rd

Planted Exotics and various shrubs. Plus 2 bluegums planted

Planted Eucalypts

Planted Eucalypt

KP28

KP27.5

Planted eucalypts in shelter belt

KP27

KOJH 42

Baxter-Tooradin Rd

KP26.5

CPPST102

KP26

CPPST100

CPPST101

CPPST098

CPPST099

APA Transmission Pty Limited - 31-02984.00

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## Listed Flora and Fauna
## Page 12 of 24

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Metres
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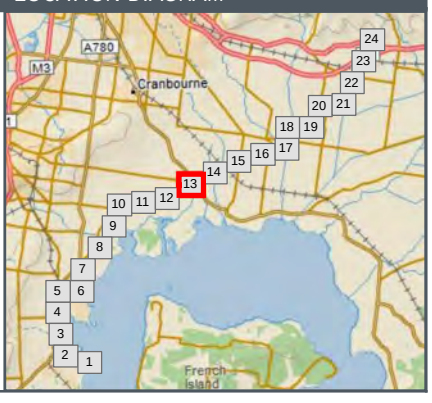


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# Crib Point Pakenham Pipeline Project
## Listed Flora and Fauna
## Page 14 of 24

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## Listed Flora and Fauna
## Page 15 of 24

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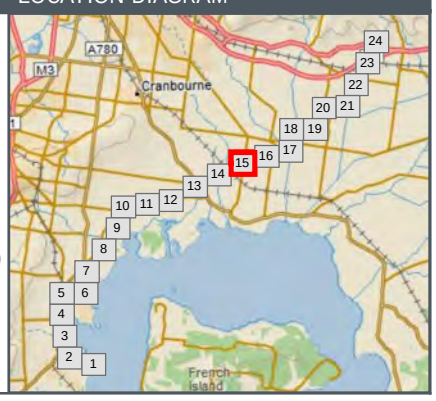


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## Page 16 of 24

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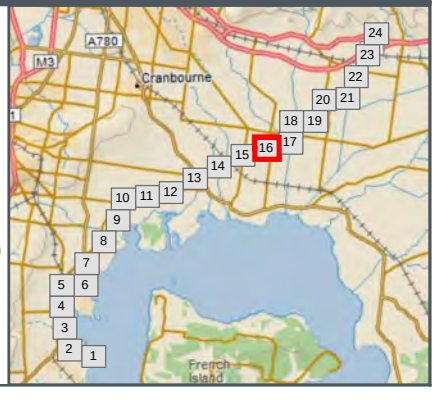


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KP42
KP41.5
Ballarto Rd
CARDINA CREEK
CARDINA CREEK
KP41
Planted Eucalypts under government funding
KP39.5
Planted Eucalypts
KP40
Bloomfield Lane
TOOMUC CREEK
DEEP CREEK
KP40.5

APA Transmission Pty Limited - 31-02984.00

# Crib Point Pakenham Pipeline Project
## Listed Flora and Fauna
## Page 17 of 24

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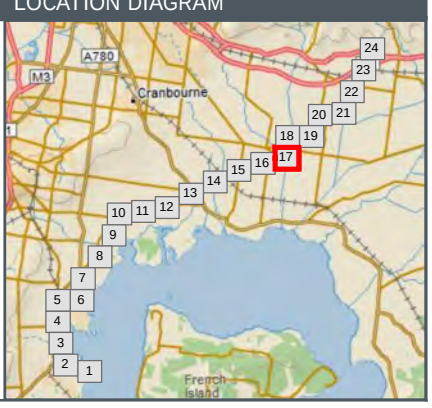
monarc ENVIRONMENTAL
apa

0 100 200
Metres
1:8,500
(A3) GDA 1994 MGA Zone 55

LOCATION DIAGRAM

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## Page 18 of 24

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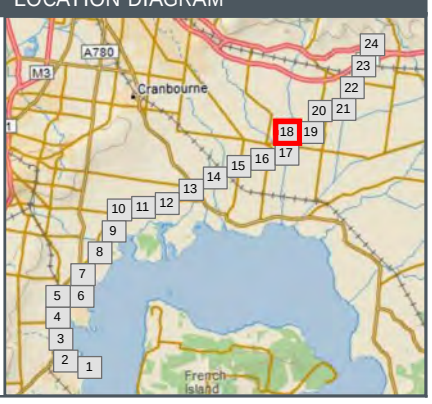


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KP45.5
KP45
KP44.5
KP44
KP43.5
KP43
KOJH 32a
KOJH32b
KODC3
KODC 3A
KODC 3B
KODC 3C
Soldiers Rd
HAGELTHORNES DRAIN
HAGELTHORNES DRAIN
McGregor Rd
Koo Wee Rup Rd

APA Transmission Pty Limited - 31-02984.00

# Crib Point Pakenham Pipeline Project
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## Page 19 of 24

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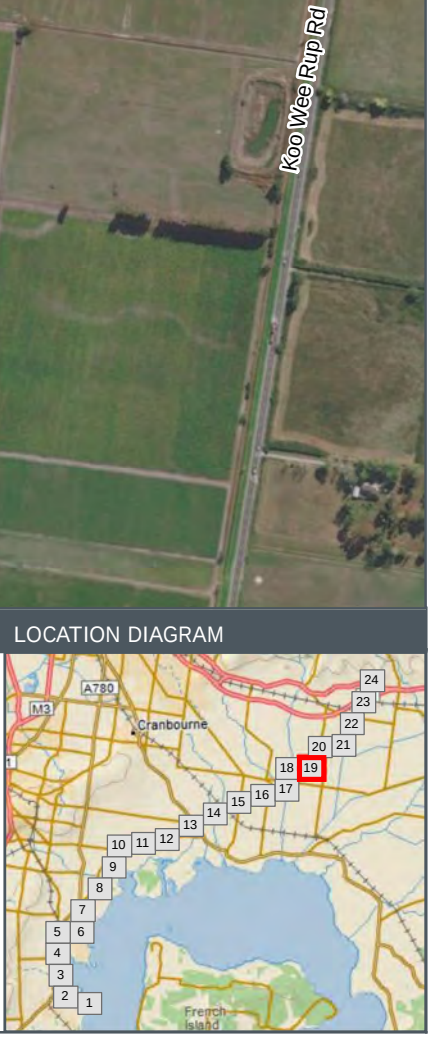


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KP47
KP46.5
KP46
KP45.5
KP45
KP44.5
Watson Rd
Koo Wee Rup Rd
Hall Rd
KOJH 31a
KOJH 31b
Planted Cypress tree

APA Transmission Pty Limited - 31-02984.00

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## Page 20 of 24

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CPPST182
CCCT53
CCCT10
CCCT52
Bourke Rd
CPPST136
CPPST135
CPPST134
KP49
CCCT2
CCCT3
KP48.5
PAKENHAM CREEK
CCCT4
Planted eucalypts
KP48
Planted eucalyptus
KP47.5
Planted Eucalypts
Mcdonalds Drain Rd West
Mcdonalds Drain Rd East

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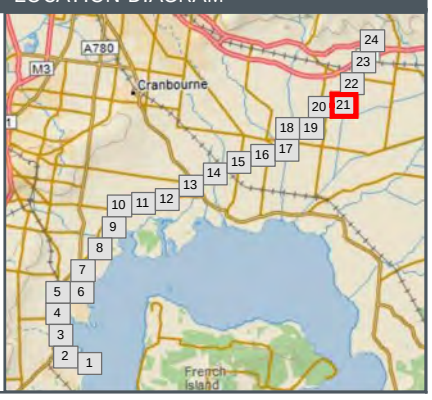


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KP52.5
JHCC02
KP52
Bald Hill Rd
CPPST183
KP51
KOJH30
KP51.5
KP50.5
Planted Eucalypts
Planted Eucalypts
Planted Eucalypts
Coop Rd
KP50
CPPST164
CPPST165
CPPST163
CPPST166
Mcdonalds Drain Rd
CPPST167
KP49.5
1. CPPST171
2. CPPST170
3. CPPST169
4. CPPST172
5. CPPST177
6. CPPST174
7. CPPST178
8. CPPST176
9. CPPST180
10. CPPST135
CPPST168
CPPST173
CPPST175
CPPST179
CPPST181
CPPST182
CCCT53
CCCT10
CCCT52
Bourke Rd
CPPST136
CPPST134
KP49
CCCT2
CCCT3
PAKENHAM CREEK
KP48.5
PAKENHAM CREEK
CCCT4

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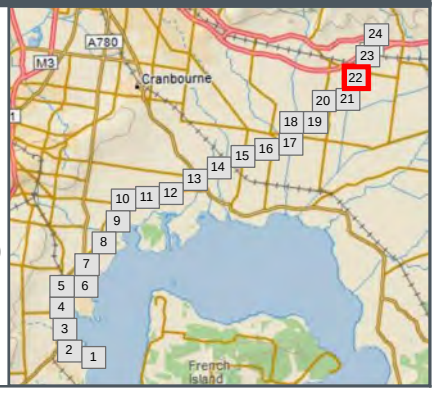


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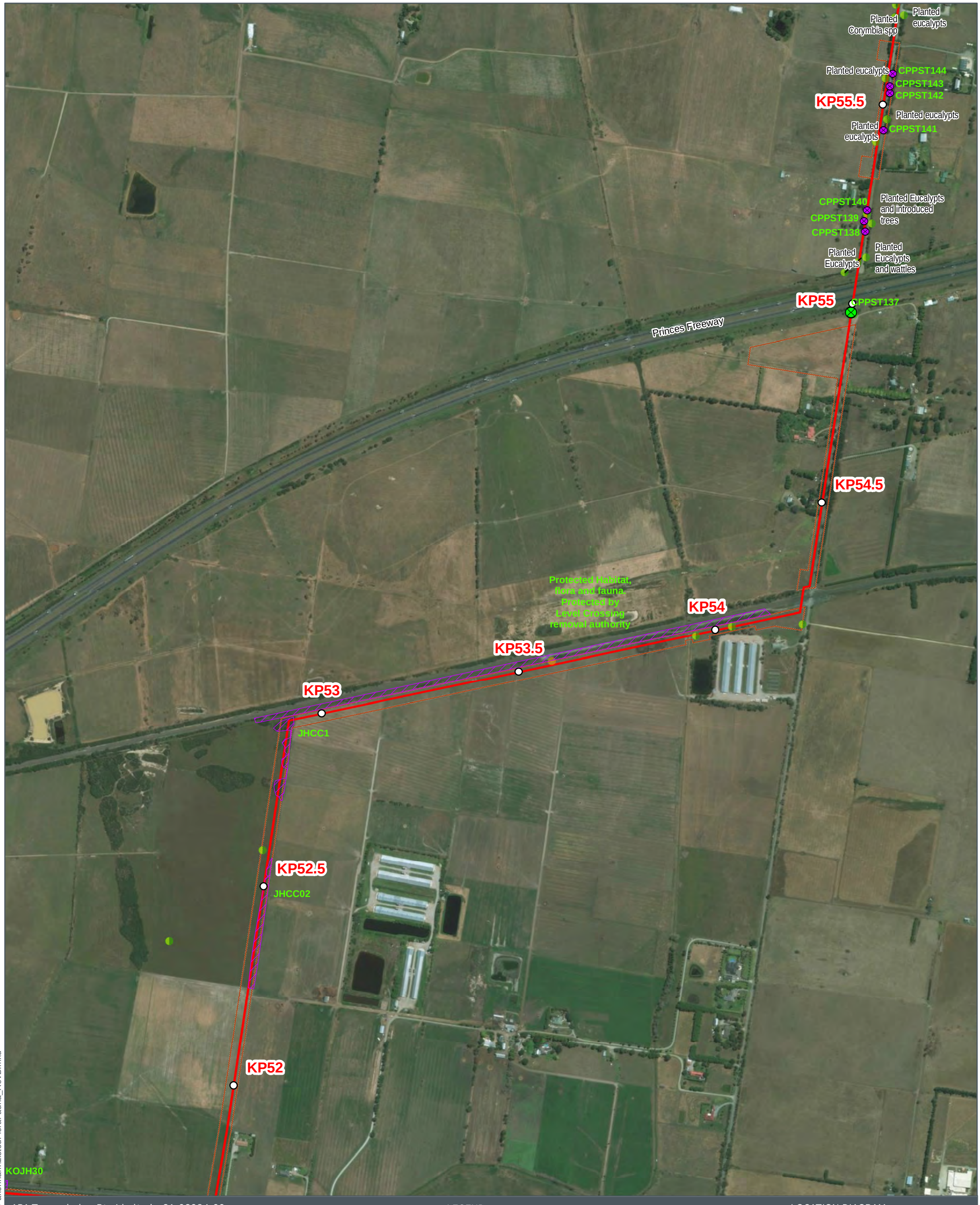


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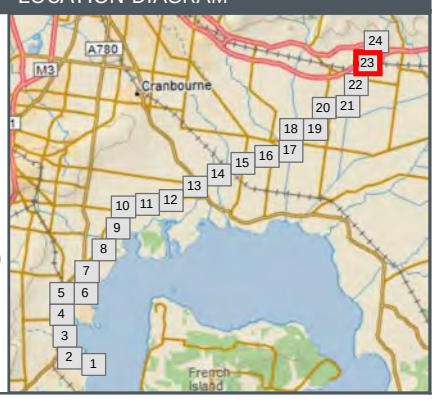

Mount Ararat North Rd
Princes Highway
KP56.2
KP56
Planted Indigenous trees
Planted introduced trees
Planted Indigenous trees
Planted Indigenous trees
Planted Corymbia spp
Planted Corymbia spp
Planted eucalypts
Planted eucalypts
CPPST144
CPPST143
CPPST142
KP55.5
Planted eucalypts
Planted eucalypts
CPPST141
CPPST140
Planted Eucalypts and introduced trees
CPPST139
CPPST138
Planted Eucalypts
Planted Eucalypts and wattles
KP55
CPPST137
Princes Freeway

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# Crib Point Pakenham Pipeline Project
## Listed Flora and Fauna
## Page 24 of 24

WORK REQUEST NUMBER: 31-02984.00

DATA SOURCES:
Service Layer Credits: Copyright:© 2018 Garmin
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- Kilometre Points
- Large Scattered Trees
- Small Scattered Trees
- Other Scattered Trees
- Flora Survey Site
- Fauna Survey Site

Listed Fauna
- Listed Avian Fauna
- FFG Listed Aquatic Fauna
- Glossy Grass Skink
- Growling Grass Frog
- Southern Brown Bandicoot
- Southern Toadlet

- Water Course
- Crib Point Pakenham Alignment
- Construction Footprint
- Water Body

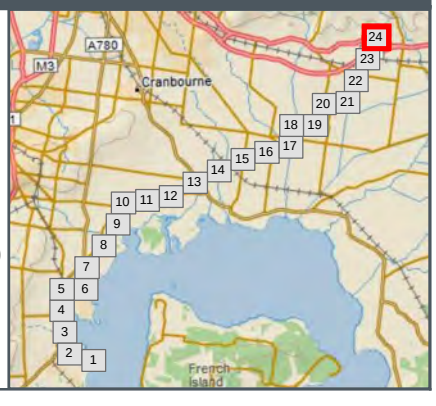
Vegetation Patch
- Endangered
- Vulnerable
- Least Concern
- Planted
- EPBC Listed Subtropical and Temperate Coastal Saltmarsh

| ISSUE DATE | AUTHOR | QA CHECK | APPROVED | MAP REV. | REVISION NOTE |
|---|---|---|---|---|---|
| 04/09/2018 | AB | JH | MV | B | Issued for Review |
| 14/08/2018 | AB | JH | CC | A | Issued for Review |

monarc ENVIRONMENTAL
apa

0 100 200
Metres
1:8,500
(A3) GDA 1994 MGA Zone 55

LOCATION DIAGRAM

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# Crib Point Pakenham Pipeline Project
# Figure 2: Growling Grass Frog Targeted Survey Location Map

WORK REQUEST NUMBER: 31-02984.00

DATA SOURCES:
Service Layer Credits: Reference/World_Boundaries_and_Places: Esri, HERE, Garmin
DeLorme World Basemap: Copyright:© 2018 Garmin
World_Imagery: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and

| ISSUE DATE | AUTHOR | QA CHECK | APPROVED | MAP REV. | REVISION NOTE |
|---|---|---|---|---|---|
| 21/08/2018 | AB | JH | MV | B | Issued for Review |
| 09/07/2018 | KH | JH | CC | A | Issued for Review |

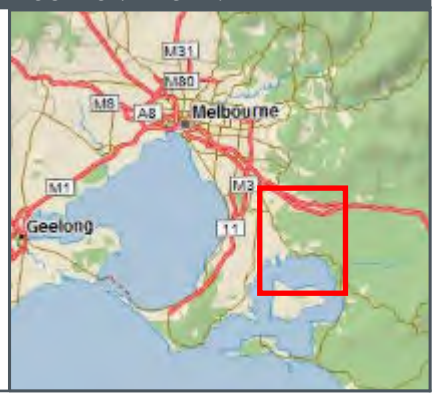
LEGEND

Targeted Survey Locations
- GGF present
- GGF absent
- Pipeline Alignment

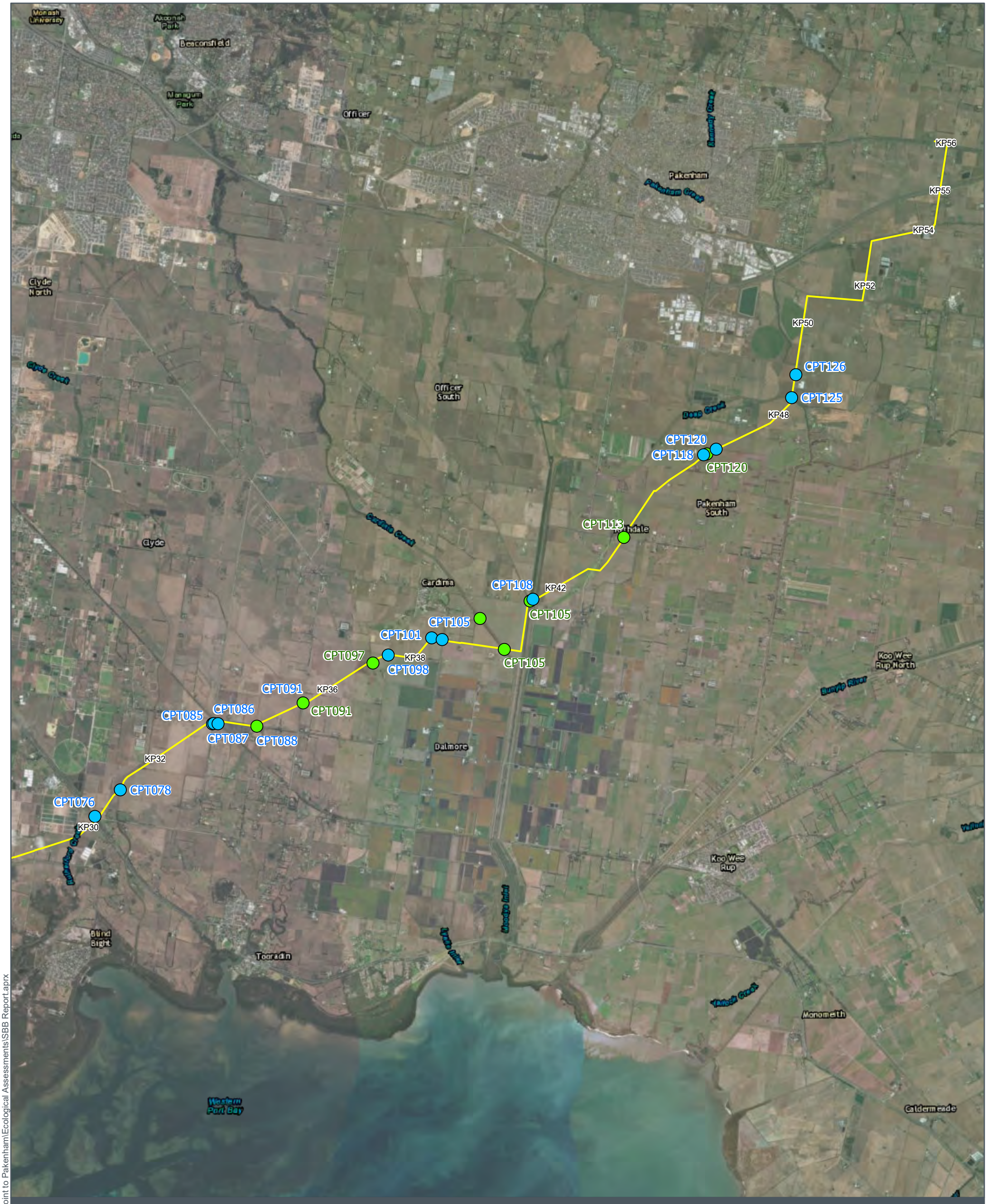
monarc ENVIRONMENTAL
apa

0 1 2
Kilometres
1:100,000
(A3) GDA 1994 MGA Zone 55

LOCATION DIAGRAM




Path: L:\Monarc\ESRI\Clients\APAGasnet\Crib Point to Pakenham\Ecological Assessments\GGF_Report.aprx

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**LEGEND**

**LOCATION DIAGRAM**


# Crib Point Pakenham Pipeline Project
# Figure 3: Southern Brown Bandicoot Mitigation Area
# - KP30 to KP55.6

WORK REQUEST NUMBER: 31-02984.00

DATA SOURCES:
Service Layer Credits: Reference/World_Boundaries_and_Places: Esri, HERE, Garmin
DeLorme World Basemap: Copyright:© 2018 Garmin
World_Imagery: Earthstar Geographics, CNES/Airbus DS

Targeted Survey Locations
- SBB present
- SBB absent
- Pipeline Alignment

| ISSUE DATE | AUTHOR | QA CHECK | APPROVED | MAP REV. | REVISION NOTE |
|---|---|---|---|---|---|
| 20/08/2018 | AB | JH | MV | B | Issued for Review |
| 30/07/2018 | KH | JH | CC | A | Issued for Review |
| | | | | | |

monarc ENVIRONMENTAL
apa

N

0 1
Kilometres
1:70,000
(A3) GDA 1994 MGA Zone 55

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**KP 23.0 Threatened Species:**
- Australasian Shoveler
- Blue-billed Duck
- Cattle Egret
- Eastern Great Egret
- Hardhead

**KP 40.1 Threatened Species:**
- Growling Grass Frog
- Southern Brown Bandicoot

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# Crib Point Pakenham Pipeline Project
## Figure 4: Threatened Fauna Species Locations

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DATA SOURCES:
Service Layer Credits: Reference/World_Boundaries_and_Places: Esri, HERE, Garmin
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World_Imagery: Earthstar Geographics, CNES/Airbus DS

LEGEND

Threatened Amphibians
- Growling Grass Frog
- Southern Toadlet

Threatened Reptiles
- Glossy Grass Skink

Threatened Birds
- Australasian Shoveler
- Blue-billed Duck
- Cattle Egret
- Eastern Great Egret
- Hardhead
- Lewin's Rail

Threatened Mammals
- Southern Brown Bandicoot

Pipeline Alignment

| ISSUE DATE | AUTHOR | QA CHECK | APPROVED | MAP REV. | REVISION NOTE |
|---|---|---|---|---|---|
| 20/08/2018 | AB | JH | MV | B | Issued for Review |
| 09/07/2018 | KH | JH | CC | A | Issued for Review |

0 1 2 Kilometres
1:120,000
(A3) GDA 1994 MGA Zone 55

LOCATION DIAGRAM

Path: L:\Monarc\ESRI\Clients\APAGasnet\Crib Point to Pakenham\Ecological Assessments\FloraFaunaReport.aprx