Boundary Road Quarry - Flora and Fauna Report

Hillview Quarries Pty Ltd

Preliminary Assessment

IS209400.RPT.A | Rev D

20 March 2018

Boundary Road Quarry - Flora and Fauna Report

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Client Name:	Hillview Quarries Pty Ltd
Project Manager:	Deb Neumann
Author:	David Endersby, Andrew Stephens
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Jacobs Group (Australia) Pty Limited
ABN 37 001 024 095
Floor 11, 452 Flinders Street
Melbourne VIC 3000
PO Box 312, Flinders Lane
Melbourne VIC 8009 Australia
T +61 3 8668 3000
F +61 3 8668 3001
www.jacobs.com

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A	28/11/2017	Draft	D Endersby	A Stephens	S Tuck
B	16/01/2018	Edits to Draft	S Tuck	D Endersby	S Tuck
C	20/02/2018	For client review	D Neumann	D Endersby	D Endersby
D	20/03/2018	Incorporate client review	S Harle	A Stephens	D. Neumann

Contents

Executive summary

This report of the proposed Boundary Road quarry site in Dromana, south east of Melbourne, provides a preliminary assessment of existing flora and fauna attributes for the site, specifically as they relate to approval triggers in relation to native vegetation and threatened species requirements.

From the review of data managed by State and Commonwealth environmental departments, and that available from the Mornington Peninsula Shire Council, it appears the site of the Boundary Road Quarry contains local, regional, state and commonwealth environmental values.

From the local perspective, the area retains a large vegetated area, composed largely of native vegetation. The area of native vegetation is considered important in the local/regional scale given the limited extent of native vegetation remaining on the Mornington Peninsula.

The native vegetation present is characterised by Ecological Vegetation Classes (EVCs) that have been subject to significant removal in the bioregion, which is reflected in their Bioregional Conservation Significance ratings of Vulnerable and/or Endangered.

The results of the site assessment and vegetation mapping confirmed the findings of the desktop assessment in terms of the presence of high and moderate quality native vegetation and habitat across portions of the site as well as lower quality degraded areas of vegetation subject to disturbance over time.

Given the character and conservation listing of the EVCs present on site, native vegetation offsets will reflect the conservation significance of the vegetation present, the limited availability of relevant vegetation and registered credits in the region. Native vegetation offsets associated with the removal of native vegetation are significant with eleven species requiring specific offsets. A number of these species require up to 40 specific habitat units.

A number of threatened species are considered relevant to the site, based on recent records in the local area and habitat present on site. Twenty-four (24) species listed on the Victorian Advisory List are considered relevant to the site. While the Victorian Advisory List does not require specific permits or further assessment, conservation management is recommended to avoid further loss of the species and/or their habitat. Native vegetation offsets required pursuant to the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a) include offsets specific to 11 Victorian Advisory List species.

Ten (10) potential species listed under the FFG Act potentially utilise the site. As the land is privately owned specific permits or assessment under the FFG Act issues is not required.

There are four (4) potential species listed under the Environment Protection and Biodiversity Conservation Act 19999 (EPBC) that are considered to have a likelihood of occurrence at the site. This is based on habitat present and modelling undertaken by the Commonwealth Department of Environment and Energy (DoEE) or have been previously recorded in the vicinity of the site.

Field work has been undertaken to:

1) Confirm the quality and extent of habitat on site and revise the threatened species likelihood determinations and further assessment requirements.
2) Where threatened species likelihood determinations remain “Moderate” or “High”, further targeted assessments will be required to substantiate the significance of the populations or habitats at the site.
3) Map native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a) to determine the Habitat Hectares present and resulting offset.
4) Consider the vegetation communities present to determine whether any of the vegetation present is relevant to listed or protected communities under the FFG or EPBC Acts.

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to assess the flora and fauna values and potential impact of the Boundary Road Quarry development in accordance with the scope of services set out in the contract between Jacobs and Hillview Quarries Pty. Ltd.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by Hillview Quarries Pty. Ltd. and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

This report has been prepared on behalf of, and for the exclusive use of, Hillview Quarries Pty. Ltd., and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and Hillview Quarries Pty. Ltd. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party or beyond the specific scope of this assessment.

This report has been prepared primarily to inform required permit applications and other environmental approvals. As such the report assumes the reader is familiar with the legislation and policy referred to in this report.

Information from the desktop assessment is based on existing data only and is, therefore, only as reliable as the number of surveys previously undertaken (i.e. an area where many surveys have been taken in the past, will, most likely, have a more extensive list of species than areas where very little survey work has been undertaken).

In addition to the number of previous surveys undertaken, there are other reasons why species, including threatened species, may not have previously been recorded. For example, at the time of historical site visits some plant species may not have been flowering and therefore not identified as being present within the area surveyed. Also, the data collected is likely to consist of opportunistic observations only, and, therefore, listed fauna species moving in and out of the area may not have been observed or recorded.

Spatial data layers assessed were the most current available at the time of assessment. Any changes to these layers may require this report to be updated. Calculations and figures are based on design details available at the time of writing. Where design details change the outcomes of this report may require updating.

1. Introduction

This report provides a preliminary ecological assessment of the Boundary Road Quarry site at Dromana (the site), south east of Melbourne, Victoria on the Mornington Peninsula (Figure 1.1). The site consists of the land at 115 and 121 Boundary Road, Dromana.

1.1 Study objective

The purpose of this assessment is to determine the ecological attributes potentially present within the Boundary Road Quarry site and determine whether these represent a potential constraint to the project area or proposed land use within the site. The specific objectives of this report are to:

- Conduct a desktop assessment to determine the potential ecological values present on the site
- Undertake a site visit and preliminary field survey to map and assess the quality of native vegetation present and consider the likelihood of the presence of habitat for threatened species
- Undertake a review of likely requirements under State and Commonwealth legislation and policies in relation to ecological issues
- Provide recommendations as to further assessments that may need to be carried out and the assessments and approvals that may be required.

1.2 The Project site

The 84 ha site includes the properties of 115 and 121 Boundary Road (Figure 1.1). It is located directly to the west of Arthurs Seat and is bound by Boundary Road to the north and private properties adjoining the ridge line associated with Arthurs Seat Road to the south. The Arthurs Seat State Park adjoins the site to the east and west.

Biogeographically, the site is situated within the Gippsland Plain bioregion. This bioregion is characterised by flat to gently undulating terrain with a mix of low lying alluvial and coastal plains. Vegetation types typical to this bioregion include Heathy Woodlands and Damp Sands Herb-rich Woodlands. The site occurs on elevated areas of granite of Devonian origin (GeoVic3 2018), with a northern aspect and drainage.

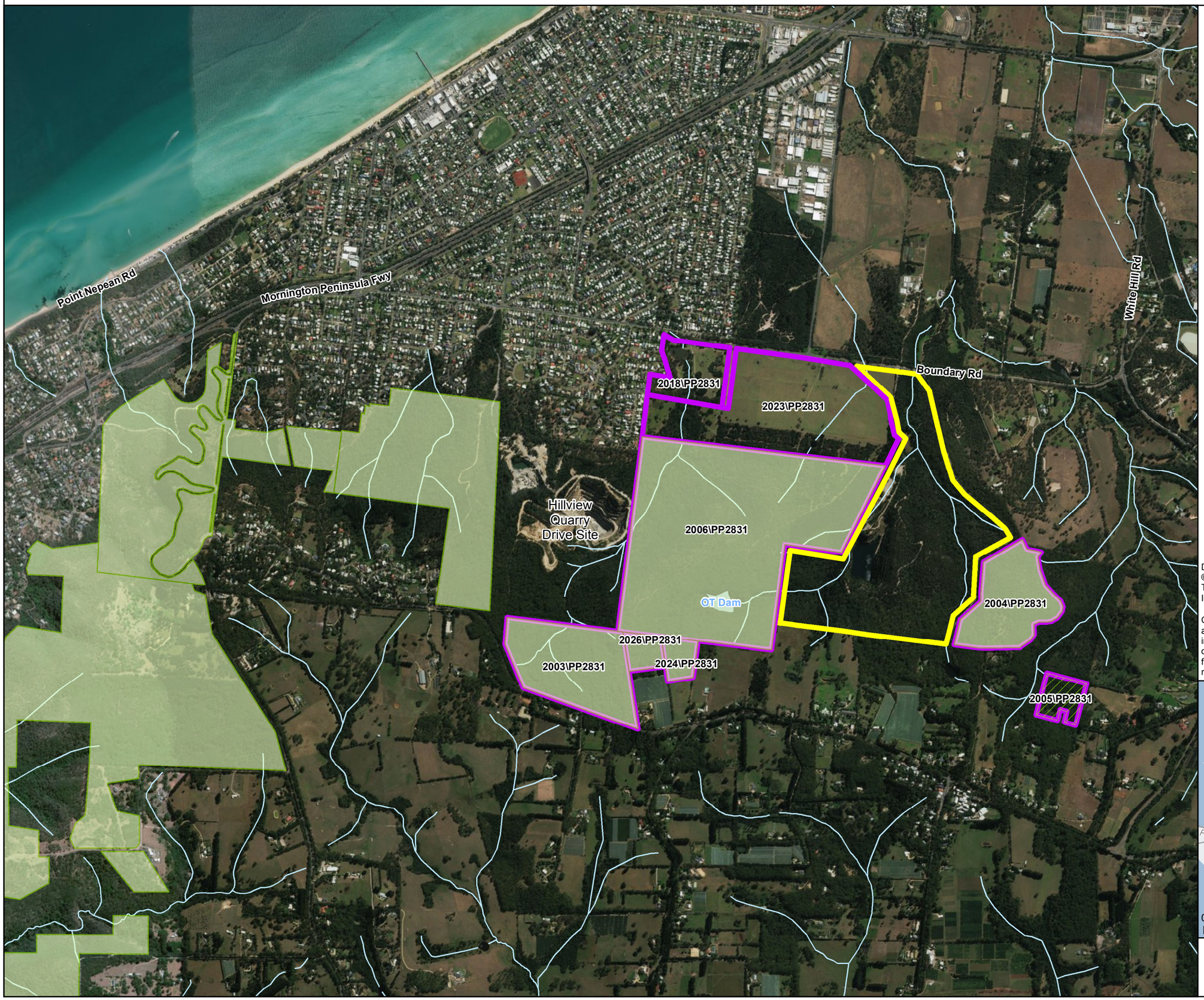
The Project site is located within the Shire of Mornington Peninsula and the Port Phillip and Western Port Catchment Management Authority operational area.

1.3 Project proposal

Part of the site was previously utilised as a granite quarry. It is proposed to recommence the quarrying operations and update the workplan and extraction footprint. Figure 1.2 provides an overview of the proposed site layout. A Plant and Stockpiling area of 7.07 ha is proposed in areas that were mostly impacted by previous quarry works. Stage 1 of the Quarry is a 25.95 ha area that includes the old quarry pit and expands into bushland to the south and west. Stage 2 is 13.83 ha which occurs to the east of Stage 1. It is noted that these areas are subject to refinement following further assessment.

Figure 1.1 Location Map

Boundary Road Quarry Site



Legend

- Boundary Road Quarry Site - 83.59ha (115 & 121 Boundary Rd, Dromana (Jacobs, 31/01/2018)
- Crown land in immediate vicinity of the Project Site (incl. Parcel SPI)

Parks

- Arthur's Seat State Park
- Holmes Road Reserve

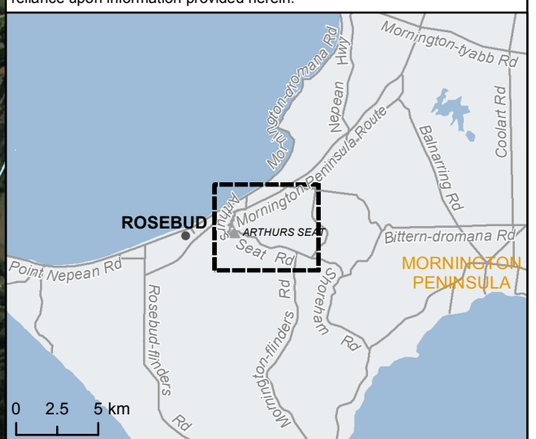
N

IS209400

GDA 1994 MGA Zone 55

0 0.5 1
Kilometers

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) 2006 Geodata.
Topo 250k Series 3; Vicmap Data © State of Victoria 2017.
Imagery: @ESRI Basemap, 2018.



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Date Published: 09 Mar 2018

Figure 1.2 Site Proposal

Boundary Road Quarry Site

	AMG Coordinates	
Id	x	y
1	144.99	-38.36
2	145.00	-38.36
3	144.99	-38.35
4	144.99	-38.35
5	145.00	-38.35
6	144.99	-38.35
7	144.99	-38.35
8	144.99	-38.35
9	144.99	-38.35
10	145.00	-38.36
11	145.00	-38.36
12	145.00	-38.36

Legend

- Existing Access
- Stage 1 - 25.05ha
- Stage 2 - 13.83ha
- Plant & Stockpiling Area - 7.07ha
- Boundary Road Quarry Site - 83.59ha (Jacobs, 31/01/2018)
- Work Authority 380
- Cadastre
- Watercourse

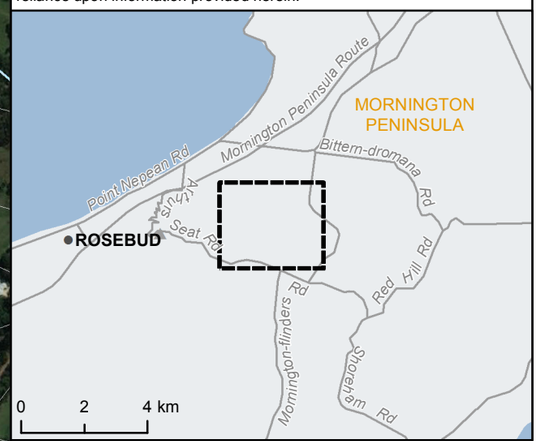
N

0 200 400 Metres

GDA 1994 MGA Zone 55

IS209400

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Vicmap Data © State of Victoria 2017. @ESRI Basemap, 2018.



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Date Published: 13 Mar 2018

2. Method

2.1 Desktop assessment

A review of the following databases was undertaken to provide information on potential threatened flora and fauna species and vegetation communities previously identified or modelled to occur within 5 km of the Project site:

- NatureKit (DELWP 2017b): This database comprises large scale mapping and classification of native vegetation across Victoria. It also classifies areas of mapped native vegetation according to importance to biodiversity.
- Victorian Biodiversity Atlas: The Victorian Biodiversity Atlas (VBA) database comprises historical records of flora and fauna species from across the state. Records are added opportunistically, as flora and fauna surveys are conducted within Victoria for a variety of purposes. Records from a 5 km radius of the site have been assessed for this report (DELWP 2017c).
- Protected Matters Search Tool: The Protected Matters Search Tool (PMST) highlights any Matters of National Environmental Significance (MNES) relevant to the EPBC Act that are considered likely to occur within an area (DEE 2017a).

The following flora and fauna assessments that have been previously undertaken within the study area were reviewed:

- *Ecological Impact Assessment 115 & 121 Boundary Road Dromana May 2013* (ERM 2013)
- *Fish fauna investigation for the Peninsula Landfill October 2013* (McGuckin 2013)
- *Proposed Peninsula Landfill: Assessment of the Status of Threatened Nocturnal Birds* (McNabb and Dewar-McNabb 2013)
- *Targeted Flora and Fauna Survey: Old Pioneer Quarry, 121 Boundary Road, Dromana, November 2014* (Ecocentric 2014)
- *Preliminary Review: Pioneer Quarry biodiversity considerations (Ecocentric 2015)*

2.2 Field assessment

A field assessment of the Project site was conducted by two Jacobs ecologists from the 3 - 5 January 2018. The purpose of the field assessment was to identify the location and quality of native vegetation and fauna habitat based on the findings of an initial desktop assessment.

Native vegetation was mapped in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a) as either:

Patch/Habitat Zone:

- 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 map, available in DELWP systems and tools.

Scattered tree:

- a native canopy tree that does not form part of a remnant patch. A native canopy tree is a mature tree (i.e. it is able to flower) that is greater than 3m in height and is normally found in the upper layer of the relevant vegetation type.

2.3 Potentially occurring threatened taxa

An assessment of the likelihood of threatened fauna and flora species occurring within and adjacent to the project site has been made based on species' preferred habitat (as described in relevant literature) in comparison to the habitat available at the Project site and the frequency, timing and location of previous recordings. The criteria listed in Table 2.1 have been used to document the likelihood of each species being present on the Project site.

Table 2.1 : Criteria for determining the likelihood of threatened species being present at the project site

Likelihood	Criteria
High	• Recent records of species from DELWP databases • Review of aerial photography indicates potential habitat on site • Review of habitat and distribution literature indicates the project site is appropriate for this species
Moderate	• Historic records of species from DELWP databases • Review of habitat and distribution literature indicates the project site is appropriate for this species • Review of aerial photography indicates limited habitat on site
Low	• Species has not been previously recorded within DELWP databases • Review of aerial photography indicates that no available habitat is present • Review of literature regarding habitat and distribution indicates the project site is unlikely to be utilised by this species

2.4 Summary of legislation and policies

A brief summary of legislation and policies referred to throughout the document is provided in Table 2.2 below.

Table 2.2 : Description of relevant legislation, and its application to the project

Policy/legislation	Description	Project relevance
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act has significant implications for natural resource and environmental management in Australia. This Act provides for the listing of threatened species, threatened ecological communities and key threatening processes. It also relates to actions likely to have a significant impact on Matters of National Environmental Significance (MNES). There are nine MNES, of which the following are relevant to this site: • Nationally threatened species and ecological communities • Migratory species	Determine whether any MNES are likely to be impacted by the proposed works. It is recommended that further assessment is undertaken where required, such as targeted surveys. Where MNES may be impacted, recommend mitigation measures to avoid and reduce impacts. If impacts cannot be avoided, the project will need to be referred to the Commonwealth Department of the Environment and Energy (DEE).
State		
Environment Effects Act 1978 (EE Act)	The EE Act provides for the assessment of actions that are capable of having a significant environmental effect. Actions which might have a significant environmental effect should be referred to the Victorian Minister for Planning, who decides if an Environment Effects Statement (EES) is required.	Determine whether the extent of removal of native vegetation and habitat for threatened species of state significance will trigger the need for a referral under the EE Act. It is recommended that further assessment is undertaken where required as part of an EES under this act, such as targeted surveys.

Policy/legislation	Description	Project relevance
Flora and Fauna Guarantee Act 1988 (FFG Act)	The FFG Act provides a framework for biodiversity conservation in Victoria. Threatened species and communities of flora and fauna, as well as threatening processes, are listed under this Act. A number of non-threatened flora species are also listed as protected under the FFG Act. A Permit to Take is required to remove these species from public land.	As the site is private land and not listed under the act as Critical Habitat, the FFG Act is not applicable.
DELWP (formally DEPI) Victorian Advisory List (VicAdv)	The DELWP Victorian Advisory Lists (VicAdv) are not a statutory list of threatened species, but rather list of species for which conservation management is recommended by DELWP. The VicAdv lists are comprised of the Advisory List of Rare or Threatened Plants in Victoria – 2014 (DEPI, 2014), the Advisory List of Threatened Vertebrate Fauna in Victoria – 2013 (DSE, 2013), and the Advisory List of Threatened Invertebrate Fauna in Victoria – 2009 (DSE, 2009). The presence of habitat for a species listed on the VicAdv lists is used to determine whether species specific habitat is required to be offset and for other project sustainability measures.	Determine if any species present are listed on the VicAdv lists and likely to be affected by the proposed works within the Project site. It is recommended that further assessment be undertaken where required, such as targeted surveys. Where listed flora and fauna species are identified, recommend mitigation measures to avoid and reduce impacts. The need for species offsets for listed taxa is considered under the native vegetation regulations.
Planning and Environment Act 1987	Proposals to remove, destroy, or lop native vegetation in Victoria are subject to the approvals requirements of local planning schemes. Planning schemes contain exemptions for the removal of native vegetation however if not exempt, planning approval for the removal of native vegetation is required to be sought.	Determine whether native vegetation is present and will require removal. Where native vegetation is present within the Project site, recommend mitigation measures to avoid and minimise the removal of native vegetation and the appropriate approvals and offsets provided.
Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017a)	The planning permit assessment process and offset requirements for impacts to native vegetation associated with Clause 52.17 of the planning scheme are undertaken in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a). The Guidelines guide how impacts on biodiversity should be considered, including whether a permit should be granted when assessing an application.	
Relevant Overlays (Mornington Peninsula Planning Scheme)	In addition to Clause 52.17 of the planning scheme, a number of overlays apply to the site consider the removal of native vegetation. These include: • Environmental Significance Overlay (ESO8, 17, 24 & 28) • Erosion Management Overlay (EMO1) • Significant Landscape Overlay (SLO1 & 6) • Vegetation Protection Overlay (VPO2)	Consideration of the relevant schedules that apply to each overlay and associated application requirements. These require a detailed flora and fauna investigation and justification for native vegetation removal and appropriate measure to minimise impacts.

Policy/legislation	Description	Project relevance
Catchment and Land Protection Act 1994 (CaLP Act)	The CaLP Act defines requirements to: • Avoid land degradation; • Conserve soil: • Protect water resources; and • Eradicate and prevent the spread and establishment of noxious weed and pest animal species. The CaLP Act defines four categories of noxious weeds: State Prohibited Weeds, Regionally Prohibited Weeds, Regionally Controlled Weeds and Restricted Weeds. The categorisation of Noxious weeds species is specific to individual CMA regions.	Determine whether any pest plants or animal species are present on the Project site. Mitigation measures to control pest plant and animal species and to prevent any increase in the population of the species as a result of proposed works.

2.5 Assumptions and limitations

Information from the desktop assessment is based on existing data only and is, therefore, only as reliable as the number of surveys previously undertaken and records entered into the Victorian Biodiversity Atlas[1] (DELWP 2017c). The accuracy of past surveys is also variable and point locations can be out by up to 1 km.

Similarly, the field survey conducted was a survey conducted over three days and is not intended to be a detailed inventory of flora and fauna. The main focus was on the mapping and quality assessment (i.e. habitat hectare assessment) of native vegetation. During this process flora species that were incidentally observed and readily identifiable were recorded. The main consideration with regards to fauna was the identification of suitable habitat for rare or threatened species.

[1] An area where many surveys have been taken in the past, will, most likely, have a more extensive list of species than areas where very little survey work has been undertaken

3. Desktop results

The following figures provide relevant DELWP map layers that show ecological attributes for the site.

3.1 Native vegetation

3.1.1 Modelled native vegetation extent

The DELWP modelled extent of native vegetation is provided in Figure 3.1.The modelling indicates that native vegetation covers most of the project site.

3.1.2 Modelled Threated Ecological Communities listed under the EPBC Act

Threatened Ecological Communities (TEC) are defined under the EPBC Act, and modelled through the Protected Matters Search Tool (PMST) for consideration against site ecological characteristics.

The PMST (refer to Appendix E) lists the Critically Endangered Natural Damp Grasslands of the Victorian Coastal Plains as ‘may occur in the area’.

Natural Damp Grassland of the Victorian Coastal Plains are associated with fertile clay soils of the Quaternary period. The vegetation community occurs below 100m in areas of higher rainfall. The local form would be characterised by closed tussock grassland to open tussocked grassy woodlands, shrubs are associated with minor depressions or drainage lines. Ground cover is variable from kangaroo grass in drier lower saline sites through to common tussock grass dominated in more saline sites (TSSC 2015).

3.1.3 Modelled Threatened Communities listed under the FFG Act

Plains Grassland (South Gippsland) Community, synonymous with the EPBC Natural Damp Grassland of the Victorian Coastal Plains and EVC 175 Grassy Woodlands may be relevant to the site, depending on specific attributes present.

The Plains Grassland (South Gippsland) Community has a similar composition to that listed in Section 3.1.2.

3.1.4 Modelled Ecological Vegetation Class (EVC) distribution

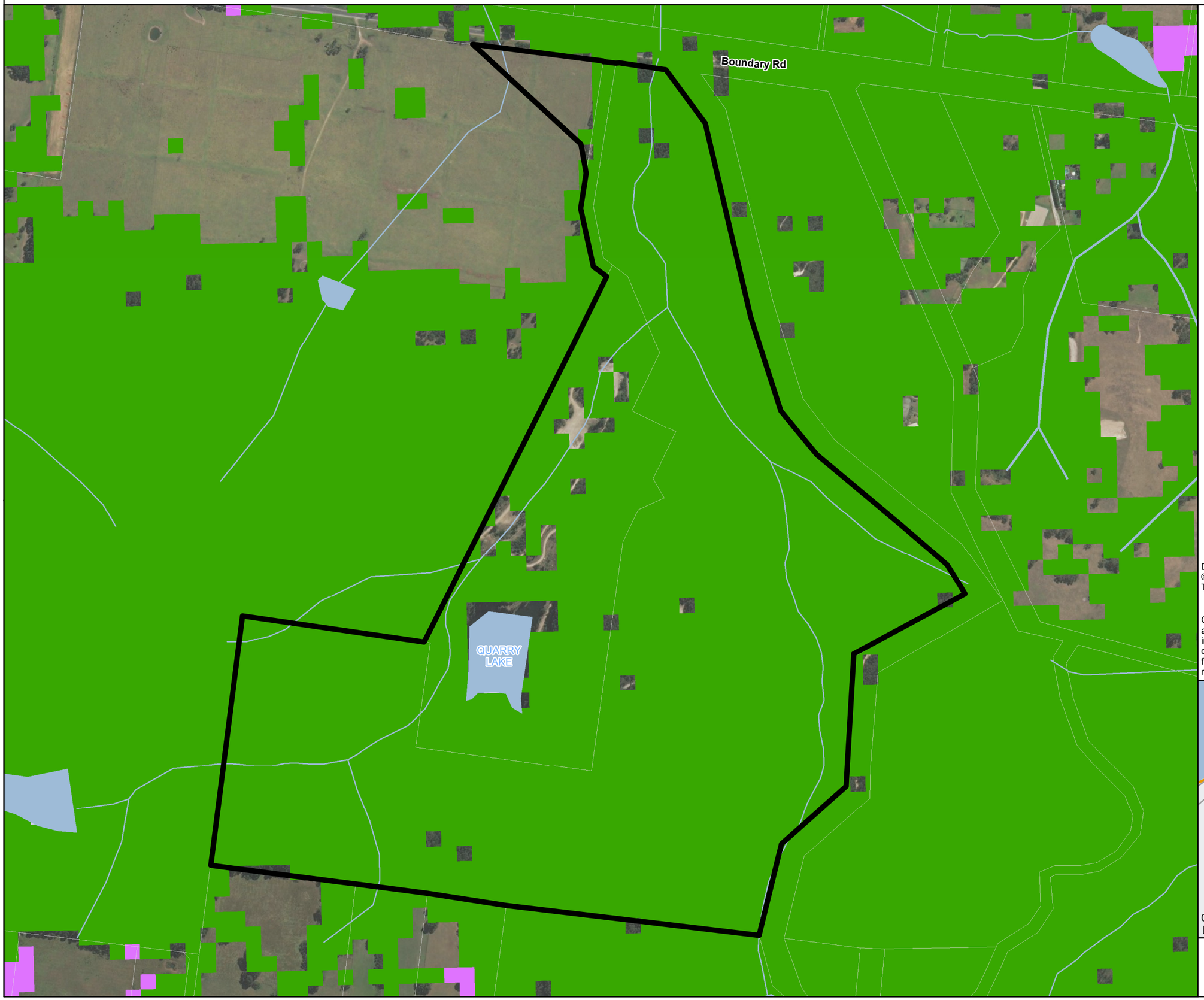
Table 3.1 lists the EVCs DELWP modelled to occur in close proximity to the site and Figure 3.2 shows their modelled distribution.

Table 3.1 Modelled native vegetation present in close proximity to the site as EVC

EVC Name	EVC Number	Bioregional Conservation Significance (refer Appendix A for criteria)
Lowland Forest	16	Vulnerable
Herb-rich Foothill Forest	23	Vulnerable
Swamp Scrub	53	Endangered
Grassy Woodland	175	Endangered
Damp Heathy Woodland	793	Vulnerable

Figure 3.1 Native Vegetation Extent Map

Boundary Road Quarry Site



Legend

- Boundary Road Quarry Site
- Cadastre
- Watercourse River
- Watercourse Stream
- Waterbody

NV 2010 Extent

- Exotic largely treeless
- Exotic tree cover
- Native vegetation cover
- Natural waterbodies

N

IS209400

GDA 1994 MGA Zone 55

0 200 400

Metres

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Vicmap Data © State of Victoria 2017.

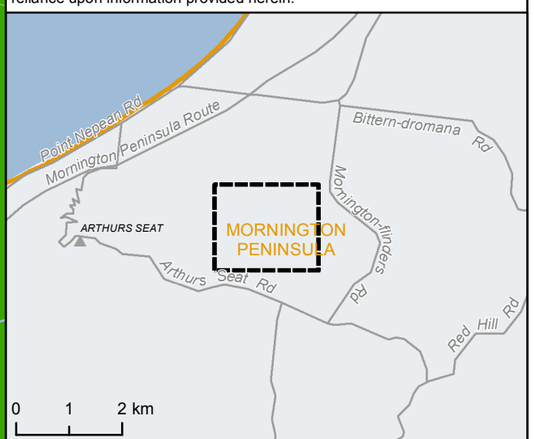


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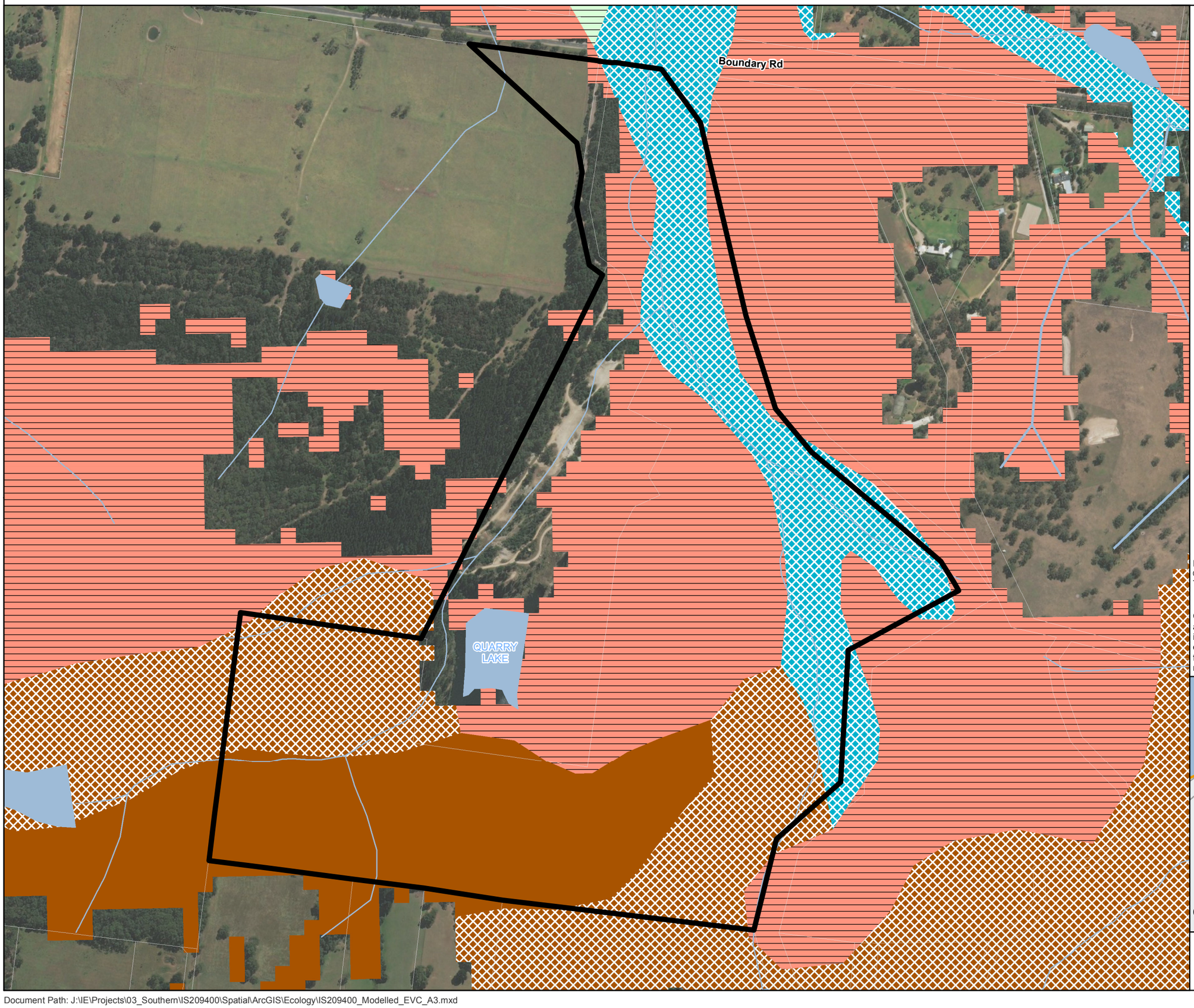
Figure 3.2 Modelled EVC Distribution

Boundary Road Quarry Site



Legend

- Boundary Road Quarry Site - 83.59ha (Jacobs, 31/01/2018)

EVC 2005

- 16, Lowland Forest
- 23, Herb-rich Foothill Forest
- 53, Swamp Scrub
- 175, Grassy Woodland
- 793, Damp Heathy Woodland
- Cadastre
- Watercourse River
- Watercourse Stream
- Waterbody

N

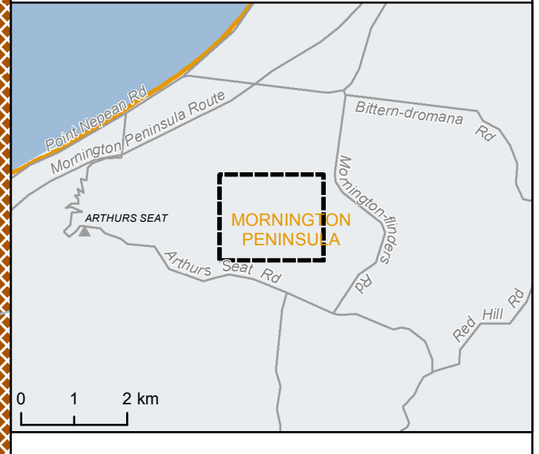
IS209400

GDA 1994 MGA Zone 55

0 200 400

Metres

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Vicmap Data © State of Victoria 2017.



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3.2 Location Category

The Location Category relates to the assessment pathway for native vegetation permit applications through the Planning Scheme. The site contains all three location categories

3.3 Site Condition Score

Site Condition Score is the modelled quality of native vegetation. As shown in Figure 3.4, the Project site is indicated to contain native vegetation of moderate to high quality

3.4 Strategic Biodiversity Value

The Strategic Biodiversity Value provides an indication of landscape value for biodiversity in relation to the rest of Victoria. The higher the score the more strategically significant the biodiversity values. The site has moderate to high Strategic Biodiversity Value scores.

3.5 Threatened Species

An assessment of threatened species records provided by State and Commonwealth environment agencies has been undertaken. This includes species modelled to potentially occur close to the site and existing records in the vicinity (5 km) of the site. These species are detailed in Appendix C and Appendix D and further discussed in Section 4 of this report where the field survey informed the process of determining the likelihood of these species occurring on-site and potential project impacts.

While the list of species previously recorded in the vicinity of the site provides a relatively comprehensive list of relevant species, there are still reasons why these records should not be considered definitive. For instance, it is unlikely that the full range of habitats in the area have been assessed for full species assemblages, and it is unlikely that targeted surveys for functional groups such as bats could be considered comprehensive given the limited targeted ecological surveys undertaken locally.

Figure 3.3 Location Category Map

Boundary Road Quarry Site

Boundary Rd

White Hill Rd

QUARRY LAKE

Legend

NVR 2017

- Location 1
- Location 2
- Location 3
- Watercourse River
- Watercourse Stream
- Waterbody

N

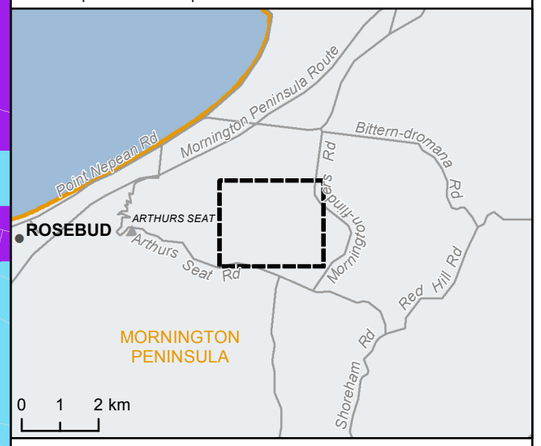
IS209400

GDA 1994 MGA Zone 55

0 200 400

Metres

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Vicmap Data © State of Victoria 2017.



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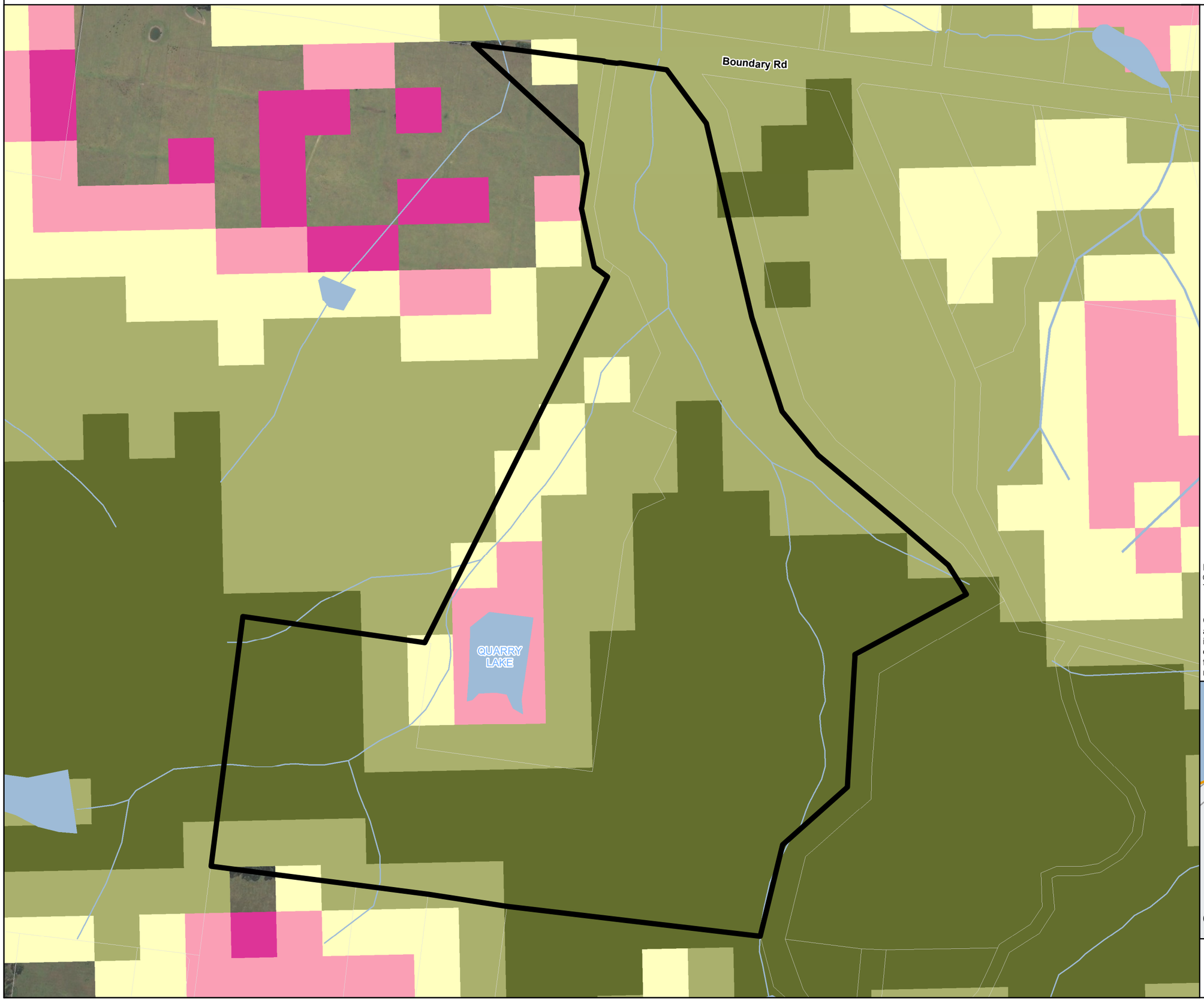
Date Published: 20 Mar 2018

Figure 3.4 Modelled Site Condition Map

Boundary Road Quarry Site



Legend

- Boundary Road Quarry Site
- Cadastre
- Watercourse River
- Watercourse Stream
- Waterbody

NVR2017 Site Condition

- 0.81 - 1.00
- 0.61 - 0.80
- 0.41 - 0.60
- 0.21 - 0.40
- 0.01 - 0.20

N

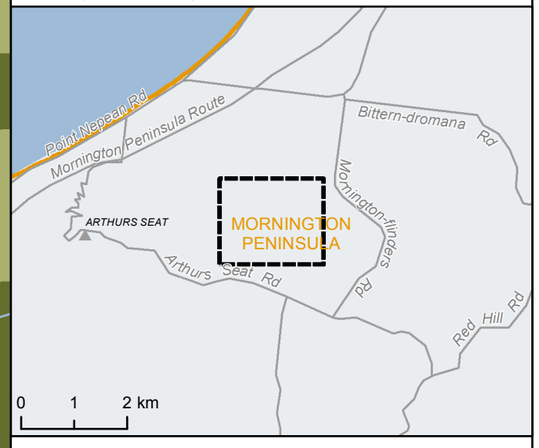
IS209400

GDA 1994 MGA Zone 55

0 200 400

Metres

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Vicmap Data © State of Victoria 2017.



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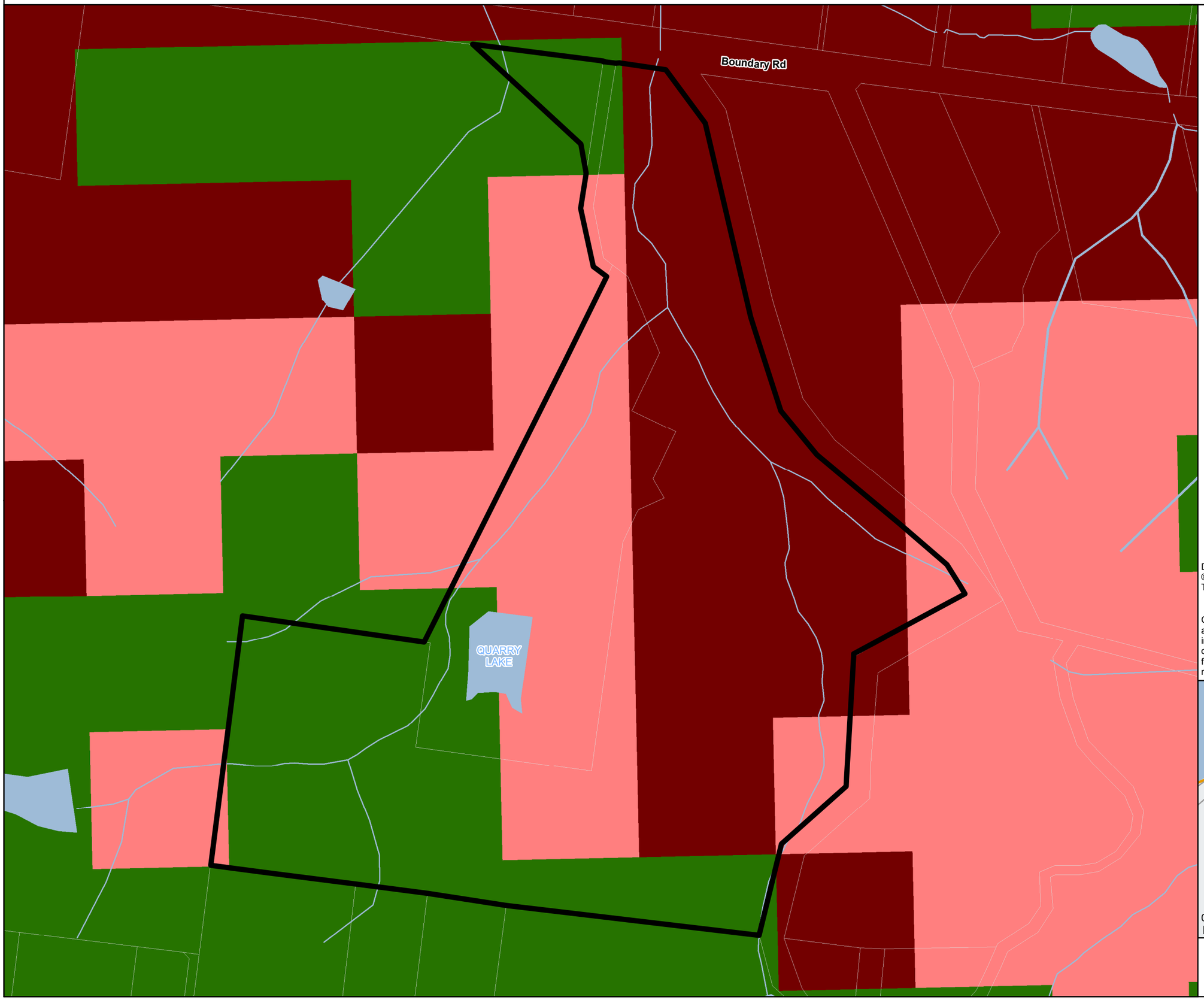
Date Published: 20 Mar 2018

Figure 3.5 Strategic Biodiversity Value

Boundary Road Quarry Site



Legend

- Boundary Road Quarry Site
- Cadastre
- Watercourse River
- Watercourse Stream
- Waterbody

Strategic Biodiversity Value

- 0.81 - 1.00
- 0.61 - 0.80
- 0.41 - 0.60

N

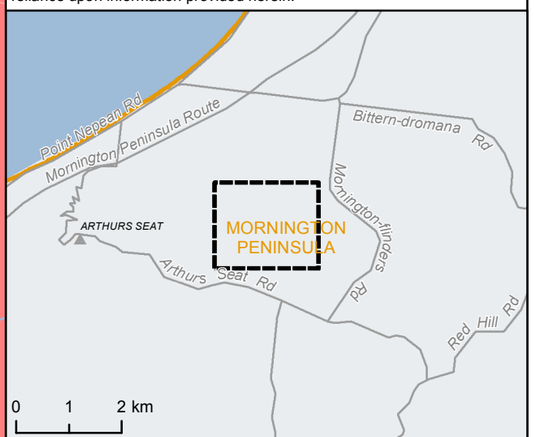
IS209400

GDA 1994 MGA Zone 55

0 200 400

Metres

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Vicmap Data © State of Victoria 2017.



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Date Published: 20 Mar 2018

4. Field assessment

A field assessment was conducted by two Jacobs ecologists from the 3rd to 5th January 2018. The purpose of the field assessment was to identify the location and quality of native vegetation and fauna habitat based on the findings of the initial desktop assessment.

4.1 Native vegetation

4.1.1 Ecological Vegetation Classes

A total of seven Ecological Vegetation Classes (EVCs) were identified and mapped within the Project site (Figure 4.1). These EVCs, along with their area and conservation significance are listed in Table 4.1 and summarised below. The core area at 121 Boundary Road has been impacted by historical quarry works. This area contains scattered patches of native vegetation and scattered trees; at present one indicative Habitat Zone has been mapped for this area and further field survey is required to more accurately map and document these values.

Table 4.1 : Summary of size and conservation status for each Ecological Vegetation Class mapped

EVC #	EVC Name	Area (ha)	Conservation significance
16	Lowland Forest	45.528*	Vulnerable
23	Herb-Rich Foothills Forest	9.139	Vulnerable
53	Swamp Scrub	3.617	Endangered
59	Riparian Thicket	0.703	Vulnerable
136	Sedge Wetland	0.523	Vulnerable
175	Grassy Woodland	11.282	Endangered
793	Damp Heathy Woodland	3.060	Vulnerable

*Includes old quarry works area that requires more detailed survey.

Figure 4.1 EVCs and Habitat Zones

Boundary Road Quarry Site

EVC Legend

- Habitat zones

EVC Field Data (Jacobs, 11/01/2018)

- 793, Damp Heathy Woodland
- 175, Grassy Woodland
- 136, Sedge Wetland
- 59, Riparian Thicket
- 53, Swamp Scrub
- 23, Herb-rich Foothill Forest
- 16, Lowland Forest/NNV

HZ1, HZ2, HZ3, HZ4, HZ5, HZ6, HZ7, HZ8, HZ9, HZ10, HZ11A, HZ11B, HZ12, HZ13, HZ14, HZ15, HZ16, HZ17, HZ18, HZ19, NNV

Boundary Road, Sheepwash Creek, West Branch Creek, Sheepwash, Eatons Cutting, OT Dam

Legend

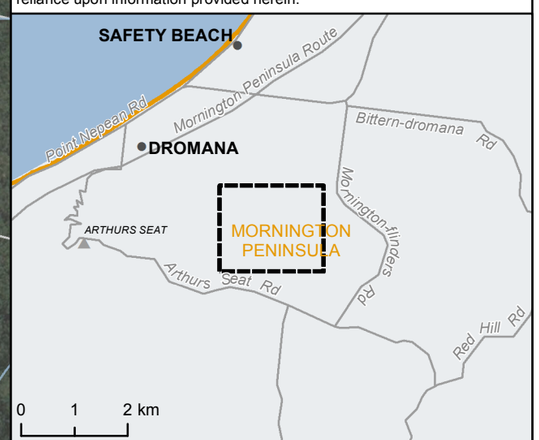
- Scattered Trees
- Boundary Road Quarry Site - 83.59ha (Jacobs, 31/01/2018)
- Further survey required
- Quarry Floor
- Quarry Wall
- Watercourse
- Cadastre

N

IS209400
GDA 1994 MGA Zone 55

0 200 400
Metres

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Vicmap Data © State of Victoria 2017; Department of Environment, Land, Water and Planning 23/04/2017. Imagery: ESRI Basemap, 2018.



JACOBS

Document Path: J:\IE\Projects\03_Southern\IS209400\Spatial\ArcGIS\Ecology\IS209400_EVC.mxd

Date Published: 27 Feb 2018

EVC 16: Lowland Forest

Lowland Forest (EVC 16) is the dominant EVC throughout on the project site. It occurs on the mid- and upper slopes. It occupies the ecological space between the highest and drier areas that support Grassy Woodland and the more sheltered slopes that contain Herb-rich Foothill Forest.

The canopy is dominated by Messmate *Eucalyptus obliqua,* but also contains other eucalypts including Mealy Stringybark *Eucalyptus cephalocarpa,* Narrow-leaf Peppermint *E. radiata* and Manna Gum *E. viminalis*. The groundstorey is often dominated by Wiry Spear-grass *Austrostipa muelleri.* The shrub layer ranges from sparse to dense with sclerophyllous species including the genera *Acacia*, *Leptospermum*, and *Hakea*.

Seven different Habitat Zones (HZ) were identified based on the variation in quality observed on the site. The quality was generally quite high with an intact groundstorey and low weed cover. In locations where the weed cover was high, this was due to woody weeds. One zone of lower quality (HZ 13) is partially dominated by Radiata Pine *Pinus radiata*. The presence of Large Trees varies across this EVC and is often a limiting factor in habitat quality. In some areas of the site, the eucalypt dieback is significant. Part of the old quarry works area is included in this zone. It generally contains low quality native vegetation that has regenerated since quarry operations ceased. Further detailed survey of this zone is required to more accurately map and assess this vegetation.

Figure 4.2 : Lowland forest within Habitat Zone 15, south westerly corner of Project site

EVC 23: Herb-rich Foothills Forest

Herb-rich Foothills Forest (EVC 23) occurs on the lower and sheltered slopes of the Project site and has been mapped across three Habitat Zones (HZ8, 12 & 14).

The tree canopy is variously dominated by Manna Gum, Messmate and Narrow-leaf Peppermint. The understorey contains a high diversity of herbs, a small tree layer and in places, a dense shrub layer. Areas along the Sheepwash Creek West Branch in the far south -west of the study area are ecotonal with Damp Forest and contain an understorey dense with ferns including Austral Bracken *Pteridium esculentum*, False Bracken *Calochlaena dubia* and Rough Tree-fern *Cyathea australis*.

Vegetation quality is mixed for this EVC across the three patches. HZ 12 is a four-hectare area that has been subject to significant past disturbance and is now dominated by Radiata Pine. The other two patches of this EVC (HZ 8 and HZ 14) are of significantly higher quality, with high floristic diversity and weeds generally limited to woody weeds.

Figure 4.3 : Herb-rich Foothills Forest within Habitat Zone 14, the western corner of Project site

EVC 53: Swamp Scrub

Swamp Scrub (EVC 53) occurs on the flat swampy ground along Sheepwash Creek in the northern section of the Project site and extends along the Sheepwash Creek East Branch. Three habitat zones have been mapped for this EVC.

The most intact areas (HZ's 2 and 7) are dominated by a canopy of Swamp Paperbark *Melaleuca ericifolia* over a diverse groundstorey that is variously dominated by forbs, ferns and sedges. The northern-most section of this EVC shows evidence of being affected by changes in the hydrological regime associated with the quarry; presumably the increased flows at times have caused contraction of the canopy layer. The northern-most patch (HZ 4) is lacking in diversity with a very sparse and limited groundstorey, suggesting some other past physical disturbance. Around the junction of the branches of Sheepwash Creek, there has been past disturbance associated with channel construction. In the north of this Habitat Zone (HZ 2), vegetation has been densely invaded by the weed Grey Willow **Salix cinerea*. Further upstream of this junction, the eastern tributary of Sheepwash Creek (HZ 7) contains high quality Swamp Scrub with limited weed invasion and a high floristic diversity.

Figure 4.4 : A section of Swamp Scrub dominated by ferns in the understorey in Habitat Zone 7.

EVC 59: Riparian Thicket

Riparian Thicket (EVC59) generally occurs in areas of quicker water flow than Swamp Scrub. It is found in the southern section of the Project site along a tributary high up in the catchment of the Sheepwash Creek west branch (HZ17).

The overstorey is dominated by Scented Paperbark *Melaleuca squarrosa* with the understorey dominated by ferns and sedges. As seen in Figure 4.5, Scrambling Coral Fern *Gleichenia microphylla* often forms a dense thicket.

Figure 4.5 : Riparian Thicket in the southern section of the Project site (Habitat Zone 17).

EVC 136: Sedge Wetland

Sedge Wetland (EVC 136) is present along Sheepwash Creek in the northern section of the Project site. It is found in one Habitat Zone (HZ 3) and occurs in a mosaic with Swamp Scrub in areas where high water levels limit the growth of woody plants and sedges are dominant.

The occurrence and extent of this EVC may be associated with disturbance to the hydrological regime of Sheepwash Creek associated with the quarry upstream. In some areas, the weed Grey Willow has significantly invaded this EVC.

Figure 4.6 : Sedge Wetland in Habitat Zone 3 shown in the foreground and Swamp Scrub in the background.

EVC 175: Grassy Woodland

A large patch (HZ10) of Grassy Woodland (EVC 175) occurs on the highest and steepest portion of the project site, where the soil is gravelly and shallow and surface rock is common. It is only found on the site in this one Habitat Zone.

The eucalypt canopy is apparently naturally absent in the areas where soils are shallowest. In other areas it has suffered from more recent die-back with standing dead eucalypt trees still evident. The dominant canopy species is Black Sheoak *Allocasuarina littoralis.* The ground layer is dominated by grasses and herbs, but can be sparse; shrub cover is generally low. The patch has been extensively dissected and disturbed by mountain bike trails. Portions of this area have been subject to considerable past disturbance such that vegetation quality appears moderate in comparison to other higher quality areas of the study area. Woody weed cover is substantial.

Figure 4.7 : Grassy Woodland in Habitat Zone 10

EVC 793: Damp Heathy Woodland

Damp Heathy Woodland (EVC 793) occurs in the northern section of the Project site up-slope from the Swamp Scrub that surrounds Sheepwash Creek. The eastern side of the creek (HZ1) is in better condition than the western side (HZ 7) and contains a high quality patch.

In HZ1, the open canopy is mostly dominated by Mealy Stringybark and the understorey is a dense heathy scrub (Figure 1.7). Floristic diversity is high and weeds are generally limited to woody weeds. A fire (perhaps within the last decade) has resulted in a strong recruitment response to provide a vigorous and diverse understorey. To the west of Sheepwash Creek in HZ7, disturbance is evident and vegetation quality is lower. The eucalypt canopy is sparse to absent over much of the zone, floristic diversity is reduced and weed invasion is substantial in places.

Figure 4.8 : Damp Heathy Woodland, adjacent to Eatons Cutting in Habitat Zone 7.

4.1.2 Vegetation quality assessment

Vegetation quality was assessed in accordance with the Habitat Hectare methodology (DSE 2004). The results are presented in Table 4.2 and Figure 4.9 below and presented as High (>0.69), Medium (0.59 to 0.69) and Low (<0.59). There is considerable variation across zones, with scores ranging from 53 to 83. Large Old Trees and weed cover often scored poorly and other elements generally scored moderate to high. Further detail on the quality of each Habitat Zone is provided in the EVC descriptions provided above.

Table 4.2 : Habitat Hectare assessment

Habitat Zone			1	2	3	4	5	6	7	8	9
Bioregion			GP	GP	GP	GP	GP	GP	GP	GP	GP
EVC #: Name			793 DHW	53 SS	136 SW	53 SS	793 DHW	16 LF	53 SS	23 HrFF	16 LF
Conservation Status		Max Score	V	E	V	E	V	V	E	V	V
Site Condition	Large Old Trees	10	5	n/a	n/a	n/a	5	3	n/a	7	4
	Canopy Cover	5	4	3	n/a	5	2	4	5	2	2
	Understorey	25	20	20	20	20	15	20	25	20	20
	Lack of Weeds	15	7	4	7	7	7	7	7	4	7
	Recruitment	10	10	6	10	10	6	10	10	10	6
	Organic Litter	5	5	3	5	5	5	5	5	5	5
	Logs	5	5	n/a	n/a	n/a	4	4	n/a	5	5
	Standardiser	n/a	1	1.25	1.36	1.25	1	1	1.25	1	1
	Total	75	56	45	57.12	58.75	44	53	65	53	49
Landscape Context	Patch size	10	8	8	8	8	8	8	8	8	8
	Neighbourhood	10	4.8	5.4	5.4	4.8	3.4	5.4	5.4	5.4	5.4
	Distance to Core	5	4	4	4	4	4	4	4	4	4
	Total	25	16.8	17.4	17.4	16.8	15.4	17.4	17.4	17.4	17.4
Habitat Score		**100**	**72.8**	**62.4**	**74.52**	**75.55**	**59.4**	**70.4**	**82.4**	**70.4**	**66.4**
Habitat points = #/100		1	0.73	0.62	0.75	0.76	0.59	0.70	0.82	0.70	0.66
Habitat Zone area (ha)		(#.###)	1.924	0.582	0.523	1.161	1.135	9.681	1.161	2.611	6.894
Habitat Hectares		(#.###)	1.401	0.363	0.390	0.877	0.674	6.815	0.957	1.838	4.578

Table 4.2 : Habitat Hectare assessment continued:

Habitat Zone			10	11A	11B	12	13	14	15	16	17
Bioregion			GP	GP	GP	GP	GP	GP	GP	GP	GP
EVC #: Name			175 GW	16 LF	16 LF	23 HrFF	16 LF	23 HrFF	16 LF	16 LF	59 RT
Conservation Status		Max Score	E	V	V	V	V	V	V	V	V
Site Condition	Large Old Trees	10	1	7	5	2	2	7	7	1	n/a
	Canopy Cover	5	3	5	5	0	2	2	5	0	5
	Understorey	25	20	20	20	15	15	25	20	20	25
	Lack of Weeds	15	7	11	11	4	4	7	7	7	7
	Recruitment	10	10	6	6	10	3	10	6	6	6
	Organic Litter	5	5	5	5	4	5	5	5	5	3
	Logs	5	5	5	5	4	5	5	5	5	n/a
	Standardiser	n/a	1	1	1	1	1	1	1	1	1.25
	Total	75	51	59	57	39	36	61	55	44	57.5
Landscape Context	Patch size	10	8	8	8	8	8	8	8	8	8
	Neighbourhood	10	5.4	5.4	5.4	5.4	5.4	5.4	4.8	4.8	5.4
	Distance to Core	5	4	4	4	4	4	4	4	4	4
	Total	25	17.4	17.4	17.4	17.4	17.4	17.4	16.8	16.8	17.4
Habitat Score		**100**	**68.4**	**76.4**	**74.4**	**56.4**	**53.4**	**78.4**	**71.8**	**60.8**	**74.9**
Habitat points = #/100		1	0.68	0.76	0.74	0.56	0.53	0.78	0.72	0.61	0.75
Habitat Zone area (ha)		(#.###)	10.242	10.66	1.969	4.035	2.05	2.492	2.865	1.259	0.703
Habitat Hectares		(#.###)	7.006	8.144	1.465	2.276	1.095	1.954	2.057	0.765	0.527

*Note Habitat Zone 18 and 19 still require assessment.

4.1.3 Scattered Trees

Scattered Trees occur where there is no connecting native vegetation. Scattered Trees are mapped in an area of non-native vegetation immediately north of the old quarry area (Figure 4.1). It is anticipated that there are many more scattered trees in the vicinity of the old quarry including the area identified as HZ 19, which is an area of native vegetation patches, scattered trees and areas of non-native vegetation that requires further detailed mapping and assessment. ERM (2013) detailed 76 indigenous scattered trees within this area, however due to the inaccessibility of the quarry walls this figure is considered approximate. Further survey of this area is required to confirm the current condition of these trees.

Figure 4.9 Vegetation Quality

Boundary Road Quarry Site

Legend

- Cadastre
- Boundary Road Quarry Site (Jacobs, 31/01/2018)
- Waterbody
- Watercourse
- Sheepwash Creek Piped Area
- Habitat Zones (HZ)
- Scattered Trees

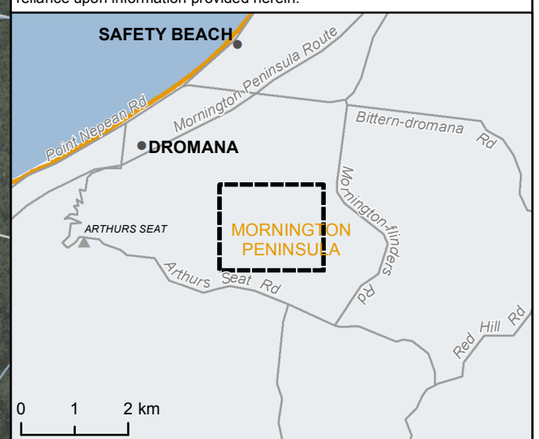
Vegetation Quality

- High (>0.69)
- Moderate (0.59 to 0.69)
- Low (<0.59)
- Non-native vegetation (NNV) (0)

N

IS209400
GDA 1994 MGA Zone 55

0 200 400
Metres



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4.2 Threatened ecological communities

4.2.1 EPBC threatened communities

Threatened Ecological Communities (TEC) are defined under the EPBC Act, and modelled through the Protected Matters Search Tool (PMST) for consideration against site ecological characteristics. The PMST (refer to Appendix E) lists the Critically Endangered Natural Damp Grasslands of the Victorian Coastal Plains as 'may occur in the area'.

Natural Damp Grassland of the Victorian Coastal Plains are associated with fertile clay soils of the Quaternary period. The vegetation community occurs below 100m in areas of higher rainfall. The local form would be characterised by closed tussock grassland to open tussocked grassy woodlands, shrubs are associated with minor depressions or drainage lines. Ground cover is variable from kangaroo grass in drier lower saline sites through to common tussock grass dominated in more saline sites (Threatened Species Scientific Committee, 2015).

Field survey confirmed this community does not occur on-site.

4.2.2 FFG Act threatened communities

Plains Grassland (South Gippsland) Community is synonymous with the EPBC Natural Damp Grassland of the Victorian Coastal Plains. The Plains Grassland (South Gippsland) Community has a similar composition to that listed in Section 4.2.1.

Field survey confirmed this community does not occur on-site.

4.3 Flora

A list of flora observed during the course of the preliminary field-work is provided in Appendix A, this builds on the flora recorded previously by ERM (2013) and Ecocentric (2014).

4.3.1 EPBC Act threatened flora

A Protected Matters Search Report (DEE 2017a) using the EPBC Protected Matter Search Tool (PMST) was undertaken to assesses species modelled to occur close to the site. Consideration of the flora species listed in the Protected Matters Report and consideration against the conditions observed on site is summarised in Appendix C.1 and the full report is provided in Appendix E.

Following consideration of habitat requirements, existing local records and on-site vegetation conditions, no species are considered to have a high likelihood of occurring onsite, however there are two species that have some potential to occur and warrant further field survey:

- Purple Eyebright *Euphrasia collina* subsp. *muelleri*
- Clover Glycine *Glycine latrobeana.*

These species potentially occur in the higher quality areas of native vegetation. Details of the habitat requirements are provided in Appendix D.2.

4.3.2 FFG Act and Victoria Advisory Lists flora

Review of the Victorian Biodiversity Atlas (DELWP 2017c) for FFG Act and VicAdv listed flora previously recorded within 5 km of the project area is presented in Appendix C.2. This review gives consideration to the vegetation conditions observed during the field survey. Twenty-two species are considered; of these two have been identified to have a high potential to occur on the site, both of which are not listed as threatened:

- Green-comb Spider-orchid *Caladenia dilatata* s.s. (VicAdv: poorly known)
- Tasman Triggerplant *Stylidium dilatatum* (syn. *armeria* subsp. *armeria*) (VicAdv: poorly known).

Seven other species are considered to have a moderate potential of significant impact associated with the project; two of these are FFG listed taxa. Potentially occurring FFG Act and VicAdv listed flora are detailed in Table 4.3. A more detailed field survey of the area to be disturbed is recommended during appropriate seasonal conditions (e.g. spring) to further consider potential impacts to these species.

Table 4.3 : Potentially occurring FFG Act and VicAdv listed flora

Name (Scientific/Common)	Status	Likelihood of Presence
Stylidium dilatatum *(syn. S. armeria* subsp. *armeria)* Tasman Triggerplant	**Vic.Adv.** Poorly known	**High** – possible component of woodland/forest areas.
Caladenia dilatata s.s. Green-comb Spider-orchid	**Vic.Adv.** Poorly known	**High** – suitable habitat present on the site.
Geranium solanderi var. solanderi s.s. Austral Crane's-bill	**Vic.Adv.** Vulnerable	**Moderate** – suitable habitat present in forested areas adjoining drainage line on the site, but limited local records.
Lachnagrostis rudis subsp. rudis Rough Blown-grass	**Vic.Adv.** Rare	**Moderate** – may adjoin drainage line habitat in forested areas on the site.
Oxalis rubens Dune Wood-sorrel	**Vic.Adv.** Rare	**Moderate** – potential habitat is present on the site.
Prasophyllum lindleyanum Green Leek-orchid	**Vic.Adv.** Vulnerable	**Moderate** – possible component of woodland/forest areas.
Pteris comans Netted brake	**Vic.Adv.** Rare	**Moderate** – may occur in shaded fern-rich gullies.
Euphrasia collina subsp. muelleri Purple Eyebright	**EPBC** Endangered **FFG** **Vic.Adv.** Endangered	**Moderate** – marginal habitat is present on site, the species generally occurs drier heathlands than present on-site, but still some potential to occur.
Glossostigma diandrum Spoon-leaf Mud-mat	**Vic.Adv.** Vulnerable	**Moderate-Low** – may occur in swampy areas in the lower section of Sheepwash Creek
Desmodium varians Slender Tick-trefoil	**Vic.Adv.** Poorly known	**Moderate-Low** – parts of the site present suitable habitat for the species but limited records
Glycine latrobeana Clover Glycine	**EPBC** Vulnerable **FFG** **Vic.Adv.** Vulnerable	**Low-Moderate** – possible component of woodland/forest areas but not optimum habitat and limited nearby records.

4.4 Fauna and fauna habitat

With regards to fauna the focus of the field investigation was to assess fauna habitat that may potentially support threatened fauna.

High quality fauna habitat occurs across the study area, including:

- large old trees with hollows
- intact scrub and forest vegetation with dense understoreys, diverse midstoreys and a canopy layer
- dense gullies with a fern dominated understorey
- areas of She-oak with a sparse grassy understorey
- swampy areas including forest, scrub and sedge dominated areas; and
- flowing water and open water bodies.

These intact and diverse habitats provide potential for a diverse range of fauna to utilise the site.

4.4.1 EPBC Act threatened fauna

A Protected Matters Report (DEE 2017a) using the EPBC Protected Matter Search Tool (PMST) was undertaken to assesses species modelled to occur close to the site. Consideration of the fauna species listed in the Protected Matters Report and consideration against the conditions observed on site is summarised in Appendix D.1 and the full report is provided in Appendix E.

Two species have been identified as requiring further investigation given suitable habitat was observed onsite and the species are known to occur nearby:

- Southern Brown Bandicoot *Isoodon obesulus obesulus* is considered to have a moderate potential of being significantly impacted. Further field survey for this species is recommended.
- Swift Parrot *Lathamus discolor* is considered to have a moderate to low likelihood of being significantly impacted. At this stage further consultation with authorities about these species is recommended to confirm if further survey is necessary.

4.4.2 FFG Act and Victoria Advisory Lists fauna

Review of the Victorian Biodiversity Atlas (DELWP 2017c) for FFG Act and VicAdv listed fauna previously recorded within 5 km of the project area, in relation to habitat conditions observed during the field survey, is presented in Appendix D.2. Thirteen of these species are potentially impacted by the project, these species are listed in Table 4.4. More field survey within the area to be disturbed is recommended to further consider potential impacts to these species.

Table 4.4 : Potentially impacted FFG and VicAdv listed fauna species

Name (Scientific/Common)	Status	Likelihood of Significant Impact
Accipiter novaehollandiae novaehollandiae Grey Goshawk	**FFG** **Vic.Adv.** Vulnerable	**High** – Records exist on elevated ridge line, potentially associated with breeding site.
Ninox strenua Powerful Owl	**FFG** **Vic.Adv.** Vulnerable	**High** – The proposal will impact high quality breeding roosts utilised by the species.
Lissolepis coventryi Swamp Skink	**FFG** **Vic.Adv.** Vulnerable	**High-** While prime habitat on-site is not proposed to be impacted, further up the catchment potential habitat such as HZ17 is expected to be impacted
Pseudemoia rawlinsoni Glossy Grass Skink	**Vic.Adv.** Vulnerable	**High-** While prime habitat on-site is not proposed to be impacted, further up the catchment, potential habitat such as HZ17 is expected to be impacted.
Pseudophryne semimarmorata Southern Toadlet	**Vic.Adv.** Vulnerable	**High** – Species is likely to be present in forested habitat on the site.
Dromaius novaehollandiae Emu	**Vic.Adv.** Near threatened	**Moderate** – habitat loss would fragment the wider vegetated landscape, reducing the foraging capability for the species in the area.
Haliaeetus leucogaster White-bellied Sea-Eagle	**FFG** **Vic.Adv.** Vulnerable	**Moderate** – Home range likely to encompass wider vegetated area that takes in the adjoining state park.
Isoodon obesulus obesulus Southern Brown Bandicoot	**EPBC** Endangered **FFG** **Vic.Adv.** Near threatened	**Moderate** – Potential to occur on site.
Hirundapus caudacutus White-throated Needletail	**Vic.Adv.** Vulnerable	**Moderate** – Species likely to make use of the site and other vegetated ridge tops present in the vicinity of the site.
Sminthopsis leucopus White-footed Dunnart	**FFG** **Vic.Adv.** Near threatened	**Moderate-Low –** Species potentially occurs on site.
Ninox connivens connivens Barking Owl	**FFG** **Vic.Adv.** Endangered	**Moderate-Low** – Barking Owl appears unlikely to make significant use of the site.
Varanus varius Lace Monitor	**Vic.Adv.** Endangered	**Moderate-Low -** Site constitutes suitable habitat.
Lathamus discolour Swift Parrot	**EPBC** Critically Endangered **FFG** **Vic.Adv.** Endangered	**Moderate-Low** - While vegetation on site does not constitute breeding habitat, vegetation is within the migration corridor which may provide roosting areas to support the species.

5. Overview of potential impacts

The Project site was previously utilised as a granite quarry. It is proposed to recommence the quarrying operations and update the workplan and extraction footprint. Figure 5.1 provides an overview of how the proposed site layout potentially affects the mapped native vegetation. A Plant and Stockpiling area of 7.07 ha is proposed in areas that were mostly impacted by previous quarry works. Stage 1 of the Quarry is a 25.95 ha area that includes the old quarry pit and expands into bushland to the south and west. Stage 2 is 13.83 ha which occurs to the east of Stage 1.

The current indicative plan is subject to refinement following further assessment.

Figure 5.1 Extent of proposed impacts in relation to Habitat Zones

Boundary Road Quarry Site

EVC Legend

Habitat zones

EVC Field Data (Jacobs, 11/01/2018)

- 793, Damp Heathy Woodland
- 175, Grassy Woodland
- 136, Sedge Wetland
- 59, Riparian Thicket
- 53, Swamp Scrub
- 23, Herb-rich Foothill Forest
- 16, Lowland Forest/NNV

HZ1, HZ2, HZ3, HZ4, HZ5, HZ6, HZ7, HZ8, HZ9, HZ10, HZ11A, HZ11B, HZ12, HZ13, HZ14, HZ15, HZ16, HZ17, HZ18, HZ19, NNV

Boundary Road, Sheepwash Creek, West Branch Creek, Sheepwash, Eatons Cutting, OT Dam

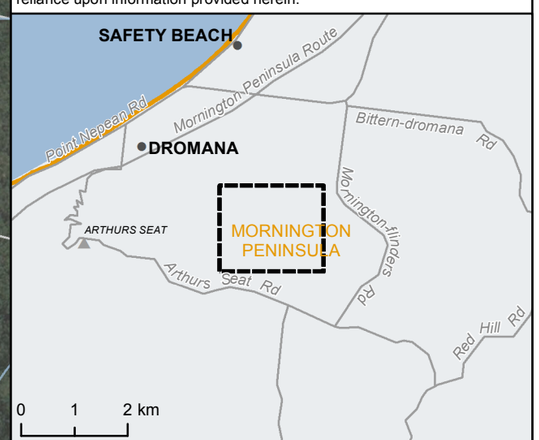
Legend

- Scattered Trees
- Boundary Road Quarry Site - 83.59ha (Jacobs, 31/01/2018)
- Quarry Floor
- Further survey required
- Quarry Wall
- Existing Access
- Plant & Stockpiling Area - 7.07ha
- Stage 1 - 25.05ha
- Stage 2 - 13.83ha
- Watercourse
- Cadastre

N

IS209400
GDA 1994 MGA Zone 55

0 200 400
Metres



JACOBS

Document Path: J:\IE\Projects\03_Southern\IS209400\Spatial\ArcGIS\Ecology\IS209400_EVC Site Map.mxd

Date Published: 27 Feb 2018

6. Legislative and policy implications

Commonwealth and State legislation and key policy documents ensure that the environment is protected in the event of development. The specific legislative instruments and their environmental requirements as relevant to the Project, are presented in the sections below.

6.1 Environment Protection and Biodiversity Conservation (EPBC) Act

There are a number of EPBC Act listed species that have been identified as potentially occurring on-site. These considerations are summarised in Table 6.1 below.

Table 6.1 : Summary of potentially occurring EPBC Act listed species

Species	EPBC Listing	Nature of Record	Assessment
Swift Parrot	Critically Endangered	Modelled and Recorded	Potential seasonal visitor, reliant on the vegetation as part of the annual migration pattern. A Significant Impact could be considered due to: • adversely affect habitat critical to the survival of a species • interfere with the recovery of the species. Further liaison with authorities is recommend to determine the need for further field survey.
Eastern Dwarf Galaxias	Vulnerable	Modelled	Appears unlikely to occur within the project site. A significant impact is not considered likely as the site is unlikely to maintain an 'important population' with respect to the EPBC Act.
Southern Brown Bandicoot	Endangered	Modelled and Recorded	Potentially found within the bushland area. A significant impact may be considered likely if impacts: • lead to a long-term decrease in the size of a population • reduce the area of occupancy of the species • fragment an existing population into two or more populations • adversely affect habitat critical to the survival of a species • modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline • interfere with the recovery of the species. Further field survey is recommended.
Swamp Antechinus	Vulnerable	Modelled	Low to moderate potential to be found within the bushland area. A significant impact is not considered likely as the site is unlikely to maintain an 'important population' with respect to the EPBC Act. Further liaison with authorities is recommend to determine the need for further field survey.
Purple Eye Bright	Endangered	Modelled and Recorded	Potential member of the bushland community on site. A significant impact could be considered due to: • lead to a long-term decrease in the size of a population • adversely affect habitat critical to the survival of a species • interfere with the recovery of the species. Further field survey is recommended.
Clover Glycine	Vulnerable	Modelled and Recorded	Potentially found within bushland areas on the site. A significant impact is not considered likely as the site is unlikely to maintain an 'important population' with respect to the EPBC Act. Further field survey is recommended to confirm this.

6.2 Flora and Fauna Guarantee (FFG) Act 1988

As private land, the FFG Act theoretically does not apply unless the site is listed as critical habitat, which it is not. Removal of native vegetation on public land (e.g. the adjacent road reserve) will require a 'Permit to take' for species protected under the FFG Act.

6.3 Planning and Environment Act 1987

6.3.1 Guidelines for the removal, destruction or lopping of native vegetation

Clause 52.17 of the Victorian Planning Provisions applies *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a) to provide a risk-based level of assessment for approval to remove native vegetation. Based on the potential for biodiversity loss, the risk-based level of assessment identifies the level of risk posed by the Project to Victoria's biodiversity and requires an appropriately detailed level of assessment to be conducted to inform determining authorities in making approvals decisions.

The risk-based level of assessment (basic, intermediate or detailed) is determined by considering the Location Category, Extent and number of Large Trees of the proposed native vegetation clearing. The Guidelines specify the resulting assessment pathway (Table 6.2).

Where a site occupies a broad area, various Location Categories may apply. In this case the highest of category is applied to the entire application. Extent includes the area of impact to native vegetation; both patches and scattered trees.

Table 6.2 : Risked-based assessment pathways for remnant patches of native vegetation reproduced from Biodiversity Assessment Guidelines

Extent of native vegetation	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

Vegetation loss includes loss due to direct removal of vegetation and indirect impacts from construction (e.g. access and stockpiling areas) and impacts to Tree Protection Zones. Trees within patches and scattered trees require offsetting if more than 10 per cent of the Tree Protection Zone is impacted (DELWP 2017d).

Test scenario

A test scenario has been run calculating indicative offsets for the removal of all vegetation identified within the proposed impact areas (Figure 5.1). Note this report is based on estimated data and should be considered indicative only. Further assessment of the old quarry area is required to identify scattered trees and refine Habitat Zone mapping. The estimated extent of clearing results in a Detailed Assessment Pathway.

The associated Native Vegetation Removal Report is provided in Appendix H and the indicative offset requirement summarised in Table 6.3. Specific habitat units are required for eleven species. For a number of these species up to 40 units are required. It is estimated that 40 specific units may cost from two to six million dollars. An offset site can provide an offset for more than one (1) species so it is not expected that 11different offset sites will be required. However, it is anticipated that not one site will be able to provide the offsets for all 11 species, it is anticipated that perhaps three (3)to six (6) sites may be necessary which would provide an

indicative cost ranging from six (6) to 36 million dollars. The ability of a site to provide the required offsets is dependent on the site being modelled in DELWP statewide data layers to provide habitat for the species in question or if sufficient evidence can be collected to detail that the species utilises that site.

It is anticipated that detailed consultation with DELWP would be necessary to agree and finalise the details of a suitable offset.

Table 6.3 : Summary of estimated Native Vegetation Offset Costs

Estimated offset amount	Indicative cost per unit	Indicative cost
Up to 40 units of specific habitat units for 11 species	$50,000-150,000	$2,000,000 to 6,000,000 per species

It is anticipated that detailed consultation with DELWP would be necessary to agree and finalise the details of a suitable offset.

Alternate offsets

Alternative arrangements for offsets can be made given written approval is provided by the Secretary to DELWP. This includes the removal of specific offsets if an ecologist confirms that the native vegetation to be removed has habitat characteristics that are clearly inconsistent with the habitat requirements of that particular species.

Table 6.4 provides a summary of the species requiring specific offsets and potential on-site habitat. In general, they are relatively widely distributed flora species with relatively broad habitat requirements, but are uncommon. Some species are fairly geographically limited and not expected to occur in the region. It is suggested that three (3) of the 11 species may be considered by DELWP to be exempt from the offset requirements.

Table 6.4 : Species requiring specific offsets and potential on-site habitat

Scientific name	Common Name	Habitat	Habitat on site
Senecio glomeratus subsp. longifructus	Annual Fireweed	Grows adjacent to streams and swamps throughout the south and north-east of the state (RBGV 2017).	**Potential –** Widespread but uncommon species with fairly general habitat requirements
Corybas despectans	Coast Helmet-orchid	Known from the Portland area in the far west, and an isolated occurrence at Cape Schanck on the Mornington Peninsula. Colony-forming, occurs in sandy soils, often in the shelter of bracken swards. Flowers Jul.–Aug. (self–pollinating) (RBGV 2015).	**Unlikely** – Generally found on deeper sands.
Oxalis rubens	Dune Wood-sorrel	Rarely collected in Victoria. Most collections are from coastal eastern Victoria, with two collections from Loch Ard Gorge area, near Port Campbell. Largely confined to near-coastal sites, often growing on stabilised sand-dunes, in Banksia integrifolia woodland, and beaches among Spinifex sericeus (RBGV 2017).	**Potential**-While generally restricted to near coastal conditions, adjacent records from Arthurs Seat State Park suggest it potentially occurs on site.
Prasophyllum lindleyanum	Green Leek-orchid	Widespread, but generally uncommon in near-coastal scrub, dry woodlands further inland and sub-alpine herbfield. Flowers Sep.-Jan. (RBGV 2015)	**Potential**-While not considered prime habitat conditions on site are potentially suitable for this species.
Eucalyptus fulgens	Green Scentbark	Occurs east from Healesville and Woori Yallock to the Latrobe Valley near Driffield (Walsh and Entwisle 1996). Open forest often with moist conditions (Bull 2014).	**Potential –** While outside the known range of this species, habitat conditions are similar to locations elsewhere it is found.
Thelymitra malvina	Mauve-tuft Sun-orchid	Found in tall open forest, heathy woodlands and coastal scrublands on well-drained sand or clay loams (RBGV 2018).	**Potential –** Widespread but uncommon species with fairly general habitat requirements
Pteris comans	Netted brake	Although restricted in distribution in Victoria, it is often locally abundant and conspicuous, favouring seepages, stream banks and damp flats in shady forests (e.g. Beech Forest in the Otway Range, Dandenong Ranges where rare, Wilsons Promontory, etc.) (Walsh and Entwisle 1994).	**Potential –** May occur in shady fern dominated gullies of study area.
Correa reflexa var. lobata	Powelltown Correa	Locally common on moist, often heathy open-forest from the Dandenong Ranges to near Powelltown, with an isolated occurrence at Cranbourne. (Walsh and Entwisle 1999)	**Potential –** this species has fairly general habitat requirements but is geographically restricted. It is highly likely to have been observed if present.
Eucalyptus willisii s.s.	Promontory Peppermint	Apparently restricted to sandy areas and granite hills in Wilsons Promontory. Plants previously included in this species from the Gippsland Lakes region are now recognised as a distinct species (E. arenicola) (RBGV 2016).	**No** – while suitable habitat in the form of granite hills are provided, the site location is well outside of known range of this species.
Euphrasia collina subsp. muelleri	Purple Eyebright	Endemic in Victoria. Formally widespread in lowland to montane central and western Victoria, but now exceedingly rare through habitat destruction, surviving in heathland and heathy woodland on the Mornington Peninsula and near Jamieson. (Walsh and Entwisle 1999)	**Potential** -While not considered prime habitat conditions on site are potentially suitable for this species.
Xanthosia tasmanica	Southern Xanthosia	Occurring in coastal areas in heath on sand. Flowers Spring and Summer. (Walsh and Entwisle 1999)	**Unlikely –** Heathland does not occur on-site.

6.4 Catchment and Land Protection Act

Noxious weeds were recorded within the site, which it is the duty of the landowner to manage. These are listed in Table 6.5.

Table 6.5 : Declared noxious weeds recorded

Scientific name	Common name	Control category
Asparagus asparagoides	Bridal Creeper	R
Chrysanthemoides monilifera subsp. monilifera	African Boneseed	C
Cirsium vulgare	Spear Thistle	C
Genista linifolia	Flax-leaf Broom	C
Lycium ferocissimum	African Box-thorn	C
Nassella trichotoma	Serrated Tussock	C
Onopordum acanthium subsp. acanthium	Scotch Thistle	P
Rosa rubiginosa	Sweet Briar	C
Rubus fruticosus spp. agg.	Blackberry	C
Salix cinerea	Grey Sallow	R
Ulex europaeus	Gorse	C
Verbascum thapsus subsp. thapsus	Great Mullein	R
Watsonia meriana var. bulbillifera	Bulbil Watsonia	C

Control category legend:

- **State Prohibited Weeds (S)** either do not occur in Victoria but pose a significant threat if they invade, or are present, pose a serious threat and can reasonably be expected to be eradicated. If present, infestations of a State prohibited weed are relatively small. They are to be eradicated from Victoria if possible or excluded from the State. The Victorian Government is responsible for their eradication, but under Section 70(1) of the CaLP Act, it may direct land owners to prevent their growth and spread
- **Regionally Prohibited Weeds (P)** are not widely distributed in a region but are capable of spreading further. It is reasonable to expect that they can be eradicated from a region and they must be managed with that goal. Land owners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate regionally prohibited weeds on their land
- **Regionally Controlled Weeds (C)** are usually widespread in a region. To prevent their spread, ongoing control measures are required. Land owners have the responsibility to take all reasonable steps to prevent the growth and spread of Regionally controlled weeds on their land.
- **Restricted Weeds (R)** pose an unacceptable risk of spreading in this State and are a serious threat to another State or Territory of Australia. Trade in these weeds and their propagules, either as plants, seeds or contaminants in other materials is prohibited.

7. Conclusion

The Boundary Road quarry site has been assessed for potential ecological values relating to permit and approval requirements.

The site retains areas of high and moderate quality native vegetation and suitable habitat for a range of threatened species listed under state and federal environmental legislation.

Areas of vegetation on the site are degraded from the quarry operations conducted onsite.

Given the potential impact on remaining vegetation patches and their respective quality, any offset requirements associated with vegetation clearance are anticipated to be extensive..

Targeted survey recommended for some threatened species considered to have potential to occur, including the Southern Brown Bandicoot. The results of further survey will enable updating of this report.

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Appendix A. Flora observed within Project site

Origin key: (*) Exotic to Victoria; (#) Native to Victoria but alien at the site; (N) Exotic and not known to be naturalised in Victoria; (P) Planted.

Origin	Scientific Name	Common Name	Jacobs (2018)	Ecocentric (2014)	ERM (2014)
*	*Acacia baileyana*	Cootamundra Wattle	x	x	x
#	*Acacia floribunda*	White Sallow-wattle	x	x	
#	*Acacia longifolia subsp. longifolia*	Sallow Wattle	x	x	
#	*Acacia longifolia subsp. sophorae*	Coast Wattle	x	x	x
	Acacia mearnsii	Black Wattle	x	x	x
	Acacia melanoxylon	Blackwood	x	x	
	Acacia myrtifolia	Myrtle Wattle	x		
	Acacia paradoxa	Hedge Wattle	x	x	x
#	*Acacia pravissima*	Ovens Wattle			x
	Acacia suaveolens	Sweet Wattle			x
	Acacia verticillata	Prickly Moses	x		
	Acacia verticillata subsp. cephalantha	Needle-leaf Prickly Moses		x	x
	Acaena novae-zelandiae	Bidgee-widgee	x	x	
	Acrotriche prostrata	Trailing Ground-berry	x	x	
	Acrotriche serrulata	Honey-pots	x	x	
	Adiantum aethiopicum	Common Maidenhair	x	x	x
*	*Agapanthus praecox subsp. orientalis*	Agapanthus	x		
*	*Agonis flexuosa*	Willow Myrtle		x	
*	*Agrostis capillaris*	Brown-top Bent	x		
*	*Aira spp.*	Hair Grass	x	x	
	Allocasuarina littoralis	Black Sheoak	x	x	x
	Amyema pendula subsp. pendula (s.s.)	Drooping Mistletoe	x	x	x
*	*Anthoxanthum odoratum*	Sweet Vernal-grass	x	x	x
	Arthropodium strictum s.s.	Chocolate Lily	x		
*	*Asparagus asparagoides*	Bridal Creeper	x	x	
	Astroloma humifusum	Cranberry Heath	x	x	
	Austrostipa muelleri	Wiry Spear-grass	x		
	Austrostipa spp.	Spear Grass	x	x	x
	Azolla filiculoides	Pacific Azolla	x	x	
	Banksia marginata	Silver Banksia	x	x	x
*	*Bartsia trixago*	Bellardia		x	
*	*Billardiera heterophylla*	Bluebell Creeper	x	x	x
	Blechnum cartilagineum	Gristle Fern	x	x	
	Blechnum nudum	Fishbone Water-fern	x	x	
	Bolboschoenus medianus	Marsh Club-sedge	x	x	
*	*Briza maxima*	Large Quaking-grass	x	x	x
*	*Briza minor*	Lesser Quaking-grass	x	x	x
*	*Bromus catharticus*	Prairie Grass	x	x	
	Burchardia umbellata	Milkmaids	x	x	x
	Bursaria spinosa	Sweet Bursaria	x	x	x
*	*Callitriche stagnalis*	Common Water-starwort	x	x	
	Calochlaena dubia	Common Ground-fern	x	x	

Origin	Scientific Name	Common Name	Jacobs (2018)	Ecocentric (2014)	ERM (2014)
	Carex appressa	Tall Sedge	x	x	
	Carex fascicularis	Tassel Sedge	x		
	Carex spp.	Sedge	x	x	
	Cassinia aculeata subsp. aculeata	Common Cassinia	x	x	x
	Cassinia longifolia	Shiny Cassinia		x	x
	Cassinia sp. aff. arcuata (Midlands)	Drooping Cassinia	x	x	x
	Cassytha glabella	Slender Dodder-laurel	x		
	Cassytha pubescens s.s.	Downy Dodder-laurel	x		
*	*Cenchrus clandestinus*	Kikuyu	x	x	
*	*Centaurium erythraea*	Common Centaury	x		
	Cheilanthes austrotenuifolia	Green Rock-fern	x	x	
	Chiloglottis spp.	Bird Orchid	x		
*	*Chrysanthemoides monilifera subsp. monilifera*	African Boneseed	x	x	x
	Chrysocephalum apiculatum s.l.	Common Everlasting		x	
	Chrysocephalum semipapposum	Clustered Everlasting	x		
*	*Cirsium vulgare*	Spear Thistle	x	x	x
	Clematis aristata	Mountain Clematis	x	x	
	Comesperma volubile	Love Creeper	x		
	Coprosma quadrifida	Prickly Currant-bush	x	x	
*	*Coprosma repens*	Mirror Bush	x		
*	*Coprosma robusta*	Karamu	x		
	Coronidium scorpioides s.s.	Button Everlasting	x		
*	*Cortaderia spp.*	Pampas Grass	x	x	x
	Corybas spp.	Helmet Orchid	x		
*	Cotoneaster glaucophyllus	Large-leaf Cotoneaster	x	x	
*	*Cotoneaster pannosus*	Velvet Cotoneaster	x	x	
*	*Cotula coronopifolia*	Water Buttons	x	x	x
*	*Crocosmia X crocosmiiflora*	Montbretia	x		
	Cryptostylis subulata	Large Tongue-orchid	x		
	Cyathea australis	Rough Tree-fern	x	x	x
*	*Cynosurus echinatus*	Rough Dog's-tail		x	
*	*Cyperus eragrostis*	Drain Flat-sedge	x	x	
	Cyperus lucidus	Leafy Flat-sedge	x	x	
*	*Dactylis glomerata*	Cocksfoot	x	x	
	Daviesia latifolia	Hop Bitter-pea	x		
	Desmodium gunnii	Southern Tick-trefoil		x	
	Deyeuxia quadriseta	Reed Bent-grass	x	x	
	Dianella admixta	Black-anther Flax-lily	x	x	x
	Dianella tasmanica	Tasman Flax-lily	x		
	Dichondra repens	Kidney-weed	x		x
	Dillwynia spp.	Parrot Pea	x		
	Dipodium roseum s.l.	Rosy Hyacinth-orchid	x		
*	*Dipogon lignosus*	Common Dipogon	x	x	
	Doodia australis	Common Rasp-fern	x		
	Drosera macrantha subsp. macrantha	Climbing Sundew		x	
	Drosera peltata s.l.	Pale Sundew			x

Origin	Scientific Name	Common Name	Jacobs (2018)	Ecocentric (2014)	ERM (2014)
*	*Ehrharta erecta var. erecta*	Panic Veldt-grass	x	x	
	Eleocharis acuta	Common Spike-sedge	x	x	
	Epacris impressa	Common Heath	x		
	Epilobium billardierianum	Variable Willow-herb	x	x	
	Eragrostis brownii	Common Love-grass	x		
*	*Erica lusitanica*	Spanish Heath	x	x	
*	*Erigeron karvinskianus*	Seaside Daisy		x	x
*	*Erigeron spp.*	Fleabane	x	x	
	Eucalyptus cephalocarpa s.l.	Silver-leaf Stringybark	x		x
	Eucalyptus obliqua	Messmate Stringybark	x	x	x
	Eucalyptus ovata subsp. ovata	Swamp Gum	x	x	x
	Eucalyptus radiata subsp. radiata	Narrow-leaf Peppermint	x	x	x
P	Eucalyptus sideroxylon subsp. sideroxylon	Mugga			x
	Eucalyptus spp.	Eucalypt		x	
	Eucalyptus viminalis subsp. pryoriana	Coast Manna-gum	x		
	Eucalyptus viminalis subsp. viminalis	Manna Gum	x	x	x
	Euchiton japonicus s.s.	Creeping Cudweed	x		
	Euchiton sphaericus	Annual Cudweed		x	
	Euchiton spp.	Cudweed		x	
*	*Euphorbia peplus*	Petty Spurge		x	
	Exocarpos cupressiformis	Cherry Ballart	x		x
*	*Fumaria bastardii*	Bastard's Fumitory		x	
	Gahnia radula	Thatch Saw-sedge	x		x
	Gahnia sieberiana	Red-fruit Saw-sedge	x	x	
*	*Galium aparine*	Cleavers	x	x	
*	*Gamochaeta calviceps*	Silky Cudweed			x
*	*Gamochaeta purpurea s.l.*	Purple Cudweed	x	x	
*	*Gazania linearis*	Gazania		x	
*	*Genista linifolia*	Flax-leaf Broom	x	x	x
*	*Genista monspessulana*	Montpellier Broom		x	x
*	*Geranium dissectum*	Cut-leaf Crane's-bill		x	
	Geranium potentilloides	Soft Crane's-bill	x		
	Geranium spp.	Crane's Bill	x		
*	*Gladiolus spp.*	Gladiolus		x	
	Gleichenia microphylla	Scrambling Coral-fern	x	x	
	Glyceria australis	Australian Sweet-grass	x		
	Glycine clandestina	Twining Glycine	x		x
	Gonocarpus humilis	Shade Raspwort	x		
	Gonocarpus tetragynus	Common Raspwort	x	x	
	Goodenia lanata	Trailing Goodenia	x		
	Goodenia ovata	Hop Goodenia		x	
	Goodenia ovata	Hop Goodenia	x		
	Goodia lotifolia s.l.	Golden Tip	x		
	Gratiola pubescens	Glandular Brooklime	x		
*	*Hakea drupacea*	Sweet Hakea	x		
*	*Hakea salicifolia subsp. salicifolia*	Willow-leaf Hakea	x	x	x

Origin	Scientific Name	Common Name	Jacobs (2018)	Ecocentric (2014)	ERM (2014)
*	*Hakea suaveolens*				x
	Hakea ulicina	Furze Hakea	x		
	Helichrysum luteoalbum	Jersey Cudweed	x	x	
	Hibbertia riparia	Erect Guinea-flower	x		x
*	*Holcus lanatus*	Yorkshire Fog	x	x	x
	Hovea heterophylla	Common Hovea	x		x
	Hydrocotyle hirta	Hairy Pennywort	x	x	
	Hypericum gramineum s.l.	Small St John's Wort	x	x	
*	*Hypochaeris glabra*	Smooth Cat's-ear		x	
*	*Hypochaeris radicata*	Flatweed	x	x	x
#	*Imperata cylindrica*	Blady Grass		x	
	Indigofera australis subsp. australis	Austral Indigo		x	
	Indigofera australis subsp. australis	Austral Indigo		x	
	Isolepis cernua var. platycarpa	Broad-fruit Club-sedge	x	x	
	Isolepis inundata	Swamp Club-sedge	x	x	
	Isolepis spp.	Club Sedge	x		
*	*Jasminum mesnyi*	Primrose Jasmine	x		
*	*Juncus articulatus subsp. articulatus*	Jointed Rush	x	x	
	Juncus bufonius	Toad Rush	x	x	
	Juncus caespiticius	Grassy Rush	x		
*	*Juncus capitatus*	Capitate Rush		x	
*	*Juncus microcephalus*	Tiny-headed Rush		x	
	Juncus pallidus	Pale Rush	x	x	
	Juncus pauciflorus	Loose-flower Rush	x	x	
	Juncus planifolius	Broad-leaf Rush	x	x	
	Juncus spp.	Rush	x	x	
	Kennedia prostrata	Running Postman		x	x
	Lagenophora spp.	Bottle Daisy	x		
	Lepidosperma laterale var. laterale	Variable Sword-sedge	x		
	Lepidosperma laterale var. majus	Variable Sword-sedge	x	x	
	Lepidosperma spp.	Sword Sedge		x	
	Leptospermum continentale	Prickly Tea-tree	x	x	
N	*Leptospermum juniperum*				x
#	Leptospermum laevigatum	Coast Tea-tree	x	x	x
	Leptospermum lanigerum	Woolly Tea-tree	x		
	Leptospermum myrsinoides	Heath Tea-tree	x		x
*	*Ligustrum vulgare*	European Privet	x		
	Lindsaea linearis	Screw Fern	x		
*	*Linum trigynum*	French Flax		x	
	Lobelia anceps	Angled Lobelia	x	x	
*	*Lolium spp.*	Rye Grass	x	x	
	Lomandra filiformis subsp. filiformis	Wattle Mat-rush	x	x	x
	Lomandra longifolia subsp. longifolia	Spiny-headed Mat-rush	x	x	x
	Lomatia ilicifolia	Holly Lomatia	x		
*	*Lotus spp. (naturalised)*	Trefoil	x	x	
*	*Lysimachia arvensis*	Pimpernel	x	x	

Origin	Scientific Name	Common Name	Jacobs (2018)	Ecocentric (2014)	ERM (2014)
	Lythrum hyssopifolia	Small Loosestrife		x	
	Mazus pumilio	Swamp Mazus	x		
*	*Medicago lupulina*	Black Medic			x
*	*Medicago polymorpha*	Burr Medic			x
#	*Melaleuca armillaris subsp. armillaris*	Giant Honey-myrtle		x	x
#	*Melaleuca ericifolia*	Swamp Paperbark	x	x	x
*	*Melaleuca hypericifolia*	Hillock Bush		x	x
	Melaleuca squarrosa	Scented Paperbark	x	x	x
	Microlaena stipoides var. stipoides	Weeping Grass	x	x	
	Microsorum pustulatum subsp. pustulatum	Kangaroo Fern	x		
	Microtis parviflora	Slender Onion-orchid			x
	Microtis unifolia	Common Onion-orchid		x	
*	*Myosotis arvensis*	Field Forget-me-not	x	x	
	Myriophyllum caput-medusae	Coarse Water-milfoil	x		
*	*Nassella trichotoma*	Serrated Tussock		x	
	Olearia lirata	Snowy Daisy-bush	x	x	x
	Olearia myrsinoides	Silky Daisy-bush	x		
*	*Onopordum acanthium subsp. acanthium*	Scotch Thistle			x
	Opercularia varia	Variable Stinkweed	x		
*	*Ornithopus pinnatus*	Sand Bird's-foot		x	
	Oxalis exilis	Shade Wood-sorrel	x	x	
*	*Oxalis incarnata*	Pale Wood-sorrel		x	x
	Oxalis perennans	Grassland Wood-sorrel	x		
	Oxalis spp.	Wood Sorrel		x	
	Ozothamnus ferrugineus	Tree Everlasting	x	x	
N	*Pandorea jasmoides*			x	
	Pandorea pandorana subsp. pandorana	Wonga Vine		x	
*	*Paspalum dilatatum*	Paspalum	x	x	
*	*Phalaris aquatica*	Toowoomba Canary-grass	x	x	
	Phragmites australis	Common Reed	x	x	
*	*Phytolacca octandra*	Red-ink Weed	x	x	
	Pimelea linifolia	Slender Rice-flower	x		
*	*Pinus radiata*	Radiata Pine	x	x	x
#	*Pittosporum undulatum*	Sweet Pittosporum	x	x	x
*	*Plantago coronopus subsp. coronopus*	Buck's-horn Plantain	x	x	
	Plantago debilis	Shade Plantain		x	
*	*Plantago lanceolata*	Ribwort	x	x	x
	Platylobium obtusangulum	Common Flat-pea	x		
*	*Poa annua*	Annual Meadow-grass	x	x	
	Poa ensiformis	Sword Tussock-grass	x		
	Poa labillardierei var. labillardierei	Common Tussock-grass	x	x	
	Poa morrisii	Soft Tussock-grass	x		
	Poa sieberiana	Grey Tussock-grass	x		
	Poa spp.	Tussock Grass	x	x	
	Poa tenera	Slender Tussock-grass	x		
*	*Prunella vulgaris*	Self-heal	x	x	

Origin	Scientific Name	Common Name	Jacobs (2018)	Ecocentric (2014)	ERM (2014)
*	*Prunus spp.*	Prunus	x	x	
*	*Psoralea pinnata*	Blue Psoralea		x	x
	Pteridium esculentum	Austral Bracken	x	x	x
	Pultenaea daphnoides	Large-leaf Bush-pea	x	x	x
	Pultenaea gunnii	Golden Bush-pea			x
*	*Ranunculus repens*	Creeping Buttercup		x	
*	*Rosa rubiginosa*	Sweet Briar	x	x	
*	*Rubus anglocandicans*	Common Blackberry	x	x	
*	*Rubus fruticosus spp. agg.*	Blackberry	x	x	x
	Rubus parvifolius	Small-leaf Bramble	x	x	
	Rumex brownii	Slender Dock		x	
*	*Rumex conglomeratus*	Clustered Dock	x		
*	*Rumex crispus*	Curled Dock	x	x	
	Rytidosperma bipartitum s.l.	Leafy Wallaby-grass	x		
	Rytidosperma geniculatum	Kneed Wallaby-grass	x		
	Rytidosperma setaceum	Bristly Wallaby-grass	x		
	Rytidosperma spp.	Wallaby Grass	x	x	
*	*Salix cinerea*	Grey Sallow	x	x	
	Schoenus apogon	Common Bog-sedge	x		
	Schoenus lepidosperma	Slender Bog-sedge	x		
	Senecio glomeratus	Annual Fireweed	x	x	
	Senecio hispidulus s.l.	Rough Fireweed	x	x	
	Senecio linearifolius	Fireweed Groundsel	x		
	Senecio minimus	Shrubby Fireweed	x	x	
*	*Senecio pterophorus*	African Daisy			x
	Senecio quadridentatus	Cotton Fireweed	x	x	
	Sigesbeckia orientalis subsp. orientalis	Indian Weed		x	
*	*Sisyrinchium iridifolium*	Striped Rush-leaf	x	x	
*	*Solanum mauritianum*	Wild Tobacco Tree	x	x	
*	*Solanum nigrum s.l.*	Black Nightshade	x	x	
*	*Sonchus asper s.s.*	Rough Sow-thistle	x	x	x
*	*Sonchus oleraceus*	Common Sow-thistle	x	x	x
*	*Sporobolus africanus*	Rat-tail Grass	x	x	
	Stellaria pungens	Prickly Starwort		x	
	Stylidium armeria	Common Triggerplant	x		
	Stylidium graminifolium s.l.	Grass Triggerplant		x	
	Tetrarrhena juncea	Forest Wire-grass	x		
	Tetratheca ciliata	Pink-bells	x		x
	Thelymitra flexuosa	Twisted Sun-orchid		x	
	Thelymitra pauciflora s.l.	Slender Sun-orchid		x	
	Themeda triandra	Kangaroo Grass	x	x	
	Thysanotus tuberosus subsp. tuberosus	Common Fringe-lily	x		
	Tricoryne elatior	Yellow Rush-lily	x	x	
*	*Trifolium repens var. repens*	White Clover	x	x	x
*	*Trifolium spp.*	Clover	x	x	
	Typha spp.	Bulrush	x		

Origin	Scientific Name	Common Name	Jacobs (2018)	Ecocentric (2014)	ERM (2014)
*	*Ulex europaeus*	Gorse	x	x	x
*	*Vellereophyton dealbatum*	White Cudweed			x
*	*Verbascum thapsus subsp. thapsus*	Great Mullein	x		
*	*Veronica arvensis*	Wall Speedwell	x		
	Veronica plebeia	Trailing Speedwell	x		
*	*Vicia spp.*	Vetch	x		
	Viola hederacea sensu Entwisle (1996)	Ivy-leaf Violet	x		x
*	*Viola odorata*	Common Violet	x	x	
*	*Vulpia spp.*	Fescue	x	x	
	Wahlenbergia gracilis	Sprawling Bluebell	x		
	Wahlenbergia gracilis	Sprawling Bluebell	x		
	Wahlenbergia spp.	Bluebell	x		
	Wahlenbergia stricta subsp. stricta	Tall Bluebell	x		
*	*Watsonia meriana var. bulbillifera*	Bulbil Watsonia	x	x	
*	*Westringia fruticosa*	Coast Rosemary			x
	Xanthosia dissecta s.s.	Native Parsley	x		
	Xanthosia huegelii	Heath Xanthosia	x		

Appendix B. Fauna recorded on or within 5km of Project site

The following table provides the non-marine fauna recorded within 5km of the project area in the VBA and/or if it has been recorded in the project area in either this study (Jacobs column) or previously.

Key

International Treaty: B: Bonn Convention; C: CAMBA; J: JAMBA; R: ROKAMBA.

EPBC Act 1999: EX: Extinct; **CR**: Critically endangered; **EN:** Endangered; **VU:** Vulnerable; **CD:** Conservation dependant.

Origin: * Denotes exotic species

FFG Act 1988: **L**: Listed, **N**: Nominated, **I**: Invalid or ineligible, **D**: Delisted, **R**: Rejected

VicAdv: ex: Extinct, **rx**: Regionally Extinct, **wx**: Extinct in the Wild, **cr**: Critically Endangered, **en**: Endangered, **vu**: Vulnerable, **nt**: Near Threatened, **dd**: Data Deficient

Previous site rec: **E**: Ecocentric (Ecocentric 2014); **EM:** E.McNabb (McNabb and Dewar-McNabb 2013); **JM**: J.McGuckin (McGuckin 2013).

Origin	Scientific Name	Common Name	TREATY	EPBC	FFG	VicAdv	Count VBA (5km)	Last record VBA (5km)	Previous site rec	Jacobs
	CRUSTACEANS									
	Cherax destructor destructor	Common Yabby					2	1997		
	Engaeus cunicularius	Granular Burrowing Crayfish					2	2016		
	Engaeus spp.	Burrowing Crayfish					nil	nil		x
	Paratya australiensis	Common Freshwater Shrimp					6	2016		
	FISH									
	Anguilla australis	Southern Shortfin Eel					8	2016		
	Gadopsis marmoratus	River Blackfish					1	1929		
	Galaxias brevipinnis	Climbing Galaxias					4	2006		
	Galaxias maculatus	Common Galaxias					1	2006		
	Galaxias truttaceus	Spotted Galaxias					4	2006		
*	Gambusia holbrooki	Eastern Gambusia					4	2009	JM	
	Macquaria australasica	Macquarie Perch		E	L	en	1	1931		
	Mordacia mordax	Shorthead Lamprey					1	1934		
*	Oncorhynchus mykiss	Rainbow Trout					1	1981		
*	Perca fluviatilis	Redfin					2	2006	JM	
	Philypnodon grandiceps	Flathead Gudgeon					1	1929		
	Pseudaphritis urvillii	Congolli					1	2006		
*	Salmo trutta	Brown Trout					3	2006		
	AMPHIBIANS									
	Crinia signifera	Common Froglet					115	2010	E	
	Geocrinia victoriana	Victorian Smooth Froglet					1	2002		
	Limnodynastes dumerilii	Southern Bullfrog (ssp. unknown)					19	2010	E	
	Limnodynastes tasmaniensis	Spotted Marsh Frog (race unknown)					4	2004		
	Litoria ewingii	Southern Brown Tree Frog					32	2010		
	Litoria ewingii SOUTHERN	Southern Brown Tree Frog SOUTHERN					3	1989		
	Litoria peronii	Peron's Tree Frog					1	2005		

Origin	Scientific Name	Common Name	TREATY	EPBC	FFG	VicAdv	Count VBA (5km)	Last record VBA (5km)	Previous site rec Jacobs
	Litoria verreauxii (ssp. unknown)	Unknown Tree Frog					3	2010	E
	Litoria verreauxii verreauxii	Verreaux's Tree Frog					13	2007	
	Paracrinia haswelli	Haswell's Froglet					1	2005	
	Pseudophryne semimarmorata	Southern Toadlet				vu	6	2006	
	Accipiter cirrhocephalus	Collared Sparrowhawk					2	2007	
	REPTILES								
	Acritoscincus duperreyi	Eastern Three-lined Skink					5	2003	
	Amphibolurus muricatus	Tree Dragon					3	1987	E
	Anepischtos maccoyi	McCoy's Skink					14	2009	
	Austrelaps superbus	Lowland Copperhead					16	2007	
	Chelodina longicollis	Eastern Snake-necked Turtle				dd	1	2003	
	Drysdalia coronoides	White-lipped Snake					7	2004	
	Eulamprus tympanum tympanum	Southern Water Skink					1	1989	
	Lampropholis delicata	Delicate Skink					16	2007	
	Lampropholis guichenoti	Garden Skink					29	2008	
	Liopholis whitii GROUP	White's Skink					3	2003	
	Lissolepis coventryi	Swamp Skink			L	vu	10	2011	
	Niveoscincus metallicus	Metallic Skink					2	2003	
	Notechis scutatus	Tiger Snake					3	1987	
	Parasuta flagellum	Little Whip Snake					1	1760	
	Pseudemoia entrecasteauxii	Southern Grass Skink					1	2005	
	Pseudemoia rawlinsoni	Glossy Grass Skink				vu	4	2003	
	Rhinoplocephalus nigrescens	Eastern Small-eyed Snake					2	1988	
	Saproscincus mustelinus	Weasel Skink					17	2004	
	Tiliqua nigrolutea	Blotched Blue-tongued Lizard					10	2004	
	Tiliqua scincoides	Common Blue-tongued Lizard					3	2004	
	Varanus varius	Lace Monitor				en	1	1932	
	BIRDS								
	Waders								
	Arenaria interpres	Ruddy Turnstone	B,R, J,C			vu	1	1954	
	Calidris alba	Sanderling	B,R, J,C			nt	1	1954	
	Calidris alpina	Dunlin	C,R				1	1954	
	Calidris canutus	Red Knot	B,R, J,C	E		en	1	1954	
	Charadrius veredus	Oriental Plover	B,R, J				1	1954	
	Chroicocephalus novaehollandiae	Silver Gull					28	2007	
	Haematopus fuliginosus	Sooty Oystercatcher				nt	1	1998	
	Himantopus himantopus	Black-winged Stilt					1	1999	
	Hydroprogne caspia	Caspian Tern	C,J		L	nt	1	2001	
	Larus dominicanus	Kelp Gull					1	1954	

Origin	Scientific Name	Common Name	TREATY	EPBC	FFG	VicAdv	Count VBA (5km)	Last record VBA (5km)	Previous site rec	Jacobs
	Larus pacificus pacificus	Pacific Gull				nt	8	2003		
	Numenius minutus	Little Curlew	B,R, J,C				1	1954		
	Numenius phaeopus	Whimbrel	B,R, J,C			vu	1	1954		
	Pluvialis squatarola	Grey Plover	B,R, J,C			en	1	1954		
	Sterna striata	White-fronted Tern				nt	1	1959		
	Thalasseus bergii	Crested Tern					4	2003		
	Tringa stagnatilis	Marsh Sandpiper	B,R, J,C			vu	1	1954		
	Vanellus miles	Masked Lapwing					29	2016		
	Xenus cinereus	Terek Sandpiper	B,R, J,C		L	en	1	1954		
	Passerine Birds									
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater					4	2006		
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill					8	2000		
	Acanthiza lineata	Striated Thornbill					77	2010		
	Acanthiza nana	Yellow Thornbill					5	2007		
	Acanthiza pusilla	Brown Thornbill					83	2014	E	X
	Acanthiza reguloides	Buff-rumped Thornbill					12	2008		
	Acanthorhynchus tenuirostris	Eastern Spinebill					116	2014		
*	Acridotheres tristis	Common Myna					127	2016	E	
	Acrocephalus stentoreus	Clamorous Reed Warbler	B				2	1998		
*	Alauda arvensis	European Skylark					10	2011		
	Anthochaera carunculata	Red Wattlebird					119	2016	E	X
	Anthochaera chrysoptera	Little Wattlebird					98	2016	E	X
	Anthus novaeseelandiae	Australasian Pipit					1	1981		
	Artamus cyanopterus	Dusky Woodswallow					6	2007		
	Calamanthus fuliginosus	Striated Fieldwren					1	1989		
*	Carduelis carduelis	European Goldfinch					31	2010		
	Cheramoeca leucosternus	White-backed Swallow					1	2007		
*	Chloris chloris	European Greenfinch					9	2001		
	Cisticola exilis	Golden-headed Cisticola					2	1989		
	Colluricincla harmonica	Grey Shrike-thrush					178	2014	E	X
	Coracina novaehollandiae	Black-faced Cuckoo-shrike					65	2011	E	
	Cormobates leucophaeus	White-throated Treecreeper					89	2010		
	Corvus coronoides	Australian Raven					53	2016		
	Corvus mellori	Little Raven					113	2014	E	X
	Cracticus tibicen	Australian Magpie					174	2016		X
	Cracticus torquatus	Grey Butcherbird					148	2014		X
	Daphoenositta chrysoptera	Varied Sittella					22	2007		
	Dicaeum hirundinaceum	Mistletoebird					49	2011		
	Eopsaltria australis	Eastern Yellow Robin					138	2014	E	X

Origin	Scientific Name	Common Name	TREATY	EPBC	FFG	VicAdv	Count VBA (5km)	Last record VBA (5km)	Previous site rec	Jacobs
	Falcunculus frontatus	Crested Shrike-tit					15	2009		
	Grallina cyanoleuca	Magpie-lark					147	2016	E	
	Hirundo neoxena	Welcome Swallow					94	2011	E	
	Lichenostomus chrysops	Yellow-faced Honeyeater					59	2014		
	Lichenostomus fuscus	Fuscous Honeyeater					1	2006		
	Lichenostomus leucotis	White-eared Honeyeater					89	2014		
	Lichenostomus penicillatus	White-plumed Honeyeater					14	2006		
	Lichenostomus virescens	Singing Honeyeater					1	2010		
	Malurus cyaneus	Superb Fairy-wren					164	2011	E	X
	Manorina melanocephala	Noisy Miner					84	2011	E	X
	Manorina melanophrys	Bell Miner					5	2004	E	
	Melithreptus brevirostris	Brown-headed Honeyeater					22	2007		
	Melithreptus lunatus	White-naped Honeyeater					54	2014	E	
	Myiagra cyanoleuca	Satin Flycatcher	B				32	2011		
	Myiagra inquieta	Restless Flycatcher					1	1986		
	Myiagra rubecula	Leaden Flycatcher					3	2008		
	Myzomela sanguinolenta	Scarlet Honeyeater					1	1981		
	Neochmia temporalis	Red-browed Finch					72	2011	E	
	Oriolus sagittatus	Olive-backed Oriole					1	2009		
	Pachycephala olivacea	Olive Whistler					7	2006		
	Pachycephala pectoralis	Golden Whistler					62	2009		
	Pachycephala rufiventris	Rufous Whistler					35	2009		
	Pardalotus punctatus punctatus	Spotted Pardalote					71	2014		
	Pardalotus striatus	Striated Pardalote					60	2014	E	
*	Passer domesticus	House Sparrow					22	2009	E	
*	Passer montanus	Eurasian Tree Sparrow					21	2005		
	Petrochelidon ariel	Fairy Martin					2	2004		
	Petrochelidon nigricans	Tree Martin					1	2000		
	Petroica boodang	Scarlet Robin					13	2010		
	Petroica phoenicea	Flame Robin					6	1999		
	Petroica rodinogaster	Pink Robin					8	2001		
	Petroica rosea	Rose Robin					1	1989		
	Philemon corniculatus	Noisy Friarbird					2	2008		
	Phylidonyris novaehollandiae	New Holland Honeyeater					74	2009		x
	Phylidonyris pyrrhoptera	Crescent Honeyeater					35	2009		
	Psophodes olivaceus	Eastern Whipbird					1	2004		
	Rhipidura albiscapa	Grey Fantail					168	2011	E	x
	Rhipidura leucophrys	Willie Wagtail					53	2016	E	
	Rhipidura rufifrons	Rufous Fantail	B				35	2011		
	Sericornis frontalis	White-browed Scrubwren					116	2016	E	

Origin	Scientific Name	Common Name	TREATY	EPBC	FFG	VicAdv	Count VBA (5km)	Last record VBA (5km)	Previous site rec	Jacobs
	Smicrornis brevirostris	Weebill						nil	E	
	Stagonopleura bella	Beautiful Firetail					1	2004		
	Stipiturus malachurus	Southern Emu-wren					3	1987		
	Strepera graculina	Pied Currawong					8	2010	E	
	Strepera versicolor	Grey Currawong					46	2014		
*	Sturnus vulgaris	Common Starling					131	2016		
*	Turdus merula	Common Blackbird					191	2016	E	
*	Turdus philomelos	Song Thrush					9	2004		
	Zoothera lunulata	Bassian Thrush					13	2001	E	
	Zosterops lateralis	Silvereye					77	2014	E	x
	Other Non-passerine Birds									
	Accipiter fasciatus	Brown Goshawk					30	2014		
	Accipiter novaehollandiae novaehollandiae	Grey Goshawk			L	vu	14	2009		
	Aegotheles cristatus	Australian Owlet-nightjar					2	2005	EM	
	Alcedo azurea	Azure Kingfisher				nt	1	1986		
	Alisterus scapularis	Australian King-Parrot					59	2011		
	Anas castanea	Chestnut Teal					27	2004		
*	Anas platyrhynchos	Northern Mallard					4	2007		
	Anas superciliosa	Pacific Black Duck					59	2009	E	
	Aquila audax	Wedge-tailed Eagle					84	2011		
	Ardea ibis	Cattle Egret	C,J				2	2005		
	Ardea modesta	Eastern Great Egret	C,J		L	vu	2	1991		
	Ardea pacifica	White-necked Heron					3	2009	E	
	Aythya australis	Hardhead				vu	2	2001		
	Botaurus poiciloptilus	Australasian Bittern		E	L	en	1	2003		
	Cacatua galerita	Sulphur-crested Cockatoo					154	2014	E	X
	Cacatua sanguinea	Little Corella					20	2011		
	Cacatua tenuirostris	Long-billed Corella					2	2007		
	Cacomantis flabelliformis	Fan-tailed Cuckoo					35	2014	E	
	Cacomantis pallidus	Pallid Cuckoo					7	2008		
	Cacomantis variolosus	Brush Cuckoo					8	2011		
	Callocephalon fimbriatum	Gang-gang Cockatoo					1	1987	E	
	Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo					60	2011		
	Cereopsis novaehollandiae	Cape Barren Goose					4	1998		
	Chenonetta jubata	Australian Wood Duck					137	2011		X
	Chrysococcyx basalis	Horsfield's Bronze-Cuckoo					19	2004		
	Chrysococcyx lucidus	Shining Bronze-Cuckoo					17	2003		
	Circus approximans	Swamp Harrier					22	2011	E	
*	Columba livia	Rock Dove					6	2006		
	Coturnix pectoralis	Stubble Quail					2	1987		

Origin	Scientific Name	Common Name	TREATY	EPBC	FFG	VicAdv	Count VBA (5km)	Last record VBA (5km)	Previous site rec	Jacobs
	Coturnix ypsilophora australis	Brown Quail					3	2011		
	Cygnus atratus	Black Swan					4	2001		
	Dacelo novaeguineae	Laughing Kookaburra					145	2014	E	X
	Dromaius novaehollandiae	Emu				nt	1	2002		
	Egretta garzetta nigripes	Little Egret			L	en	3	2005	E	
	Egretta novaehollandiae	White-faced Heron					41	2016	E	
	Elanus axillaris	Black-shouldered Kite					10	2007		
	Eolophus roseicapillus	Galah					111	2016		
	Eurostopodus mystacalis	White-throated Nightjar					7	2007		
	Falco berigora	Brown Falcon					5	2007		
	Falco cenchroides	Nankeen Kestrel					12	2010		
	Falco longipennis	Australian Hobby					5	2006		
	Falco peregrinus	Peregrine Falcon					47	2008	E	X
	Fulica atra	Eurasian Coot					3	2001		
	Gallinago hardwickii	Latham's Snipe	B,R, J,C			nt	1	2003		
	Gallinula tenebrosa	Dusky Moorhen					2	2001		
	Gallirallus philippensis	Buff-banded Rail					1	1989		
	Geopelia cuneata	Diamond Dove			L	nt	1	1992		
	Glossopsitta concinna	Musk Lorikeet					26	2011		
	Glossopsitta pusilla	Little Lorikeet					1	2003		
	Haliaeetus leucogaster	White-bellied Sea-Eagle	C		L	vu	5	2010		
	Haliastur sphenurus	Whistling Kite					1	1999	E	
	Hieraaetus morphnoides	Little Eagle					2	2004		
	Hirundapus caudacutus	White-throated Needletail	C,R, J			vu	13	2009		
	Lathamus discolor	Swift Parrot		E	L	en	1	1986		
	Lewinia pectoralis pectoralis	Lewin's Rail			L	vu	1	1989		
	Limicola falcinellus	Broad-billed Sandpiper	B,R, J,C				1	1954		
	Microcarbo melanoleucos	Little Pied Cormorant					17	2005		
	Neophema chrysostoma	Blue-winged Parrot					1	1986		
	Ninox connivens connivens	Barking Owl			L	en	1	1986		
	Ninox novaeseelandiae	Southern Boobook					73	2011	EM	
	Ninox strenua	Powerful Owl			L	vu	40	2013	E	
	Nycticorax caledonicus hillii	Nankeen Night Heron				nt	1	1986		
	Ocyphaps lophotes	Crested Pigeon					6	2010	E	
	Oxyura australis	Blue-billed Duck			L	en	1	2003		
	Pelecanus conspicillatus	Australian Pelican					3	2006		
	Phalacrocorax carbo	Great Cormorant					5	2003		
	Phalacrocorax sulcirostris	Little Black Cormorant					2	2003	E	
	Phalacrocorax varius	Pied Cormorant				nt	7	2010		

Origin	Scientific Name	Common Name	TREATY	EPBC	FFG	VicAdv	Count VBA (5km)	Last record VBA (5km)	Previous site rec	Jacobs
	Phaps chalcoptera	Common Bronzewing					121	2011	E	X
	Phaps elegans	Brush Bronzewing					5	2004	E	
	Platycercus elegans	Crimson Rosella					202	2011	E	X
	Platycercus eximius	Eastern Rosella					144	2016		X
	Podargus strigoides	Tawny Frogmouth					13	2006	E	
	Podiceps cristatus	Great Crested Grebe					1	1954		
	Porphyrio porphyrio	Purple Swamphen					3	2003		
	Psephotus haematonotus	Red-rumped Parrot					1	2016		
	Stictonetta naevosa	Freckled Duck			L	en	5	2011		
	Stiltia isabella	Australian Pratincole				nt	1	1954		
*	Streptopelia chinensis	Spotted Turtle-Dove					160	2016		
	Tachybaptus novaehollandiae	Australasian Grebe					13	2011		
	Tadorna tadornoides	Australian Shelduck					18	2010		
	Threskiornis molucca	Australian White Ibis					57	2011	E	
	Threskiornis spinicollis	Straw-necked Ibis					75	2016	E	
	Todiramphus sanctus	Sacred Kingfisher					6	1991		
	Trichoglossus haematodus	Rainbow Lorikeet					30	2014		
	Turnix varia	Painted Button-quail					2	1987		
	Tyto javanica	Pacific Barn Owl					5	2003		
	Bats									
	Chalinolobus gouldii	Gould's Wattled Bat					10	2005		
	Chalinolobus morio	Chocolate Wattled Bat					2	2003		
	Nyctophilus geoffroyi	Lesser Long-eared Bat					6	2010		
	Tadarida australis	White-striped Freetail Bat					3	2005		
	Vespadelus darlingtoni	Large Forest Bat					12	2005		
	Vespadelus regulus	Southern Forest Bat					7	2005		
	Vespadelus vulturnus	Little Forest Bat					12	2005		
	Acrobates pygmaeus	Feathertail Glider					4	1990		
	MAMMALS									
	Bats									
	Chalinolobus gouldii	Gould's Wattled Bat					10	2005		
	Chalinolobus morio	Chocolate Wattled Bat					2	2003		
	Nyctophilus geoffroyi	Lesser Long-eared Bat					6	2010		
	Tadarida australis	White-striped Freetail Bat					3	2005		
	Vespadelus darlingtoni	Large Forest Bat					12	2005		
	Vespadelus regulus	Southern Forest Bat					7	2005		
	Vespadelus vulturnus	Little Forest Bat					12	2005		
	Acrobates pygmaeus	Feathertail Glider					4	1990		
	Other mammals									
	Antechinus agilis	Agile Antechinus					28	2006		

Origin	Scientific Name	Common Name	TREATY	EPBC	FFG	VicAdv	Count VBA (5km)	Last record VBA (5km)	Previous site rec	Jacobs
	Antechinus swainsonii	Dusky Antechinus					16	2006		
	Canis lupus	Dingo & Dog (feral)					1	1991		
*	Canis lupus familiaris	Dog					1	2000		
*	Felis catus	Cat					25	2011	E	
	Hydromys chrysogaster	Water Rat					2	2006		
	Isoodon obesulus obesulus	Southern Brown Bandicoot		E	L	nt	2	1972		
*	Lepus europeaus	European Hare					1	2009		
	Macropus giganteus	Eastern Grey Kangaroo					30	2011		
*	Mus musculus	House Mouse					19	2007	E	
*	Oryctolagus cuniculus	European Rabbit					48	2011		
	Petaurus breviceps	Sugar Glider					28	2005		
	Phascolarctos cinereus	Koala					54	2010	E	
	Pseudocheirus peregrinus	Common Ringtail Possum					49	2011	E	
	Rattus lutreolus	Swamp Rat					33	2014		
*	Rattus norvegicus	Brown Rat					1	1760		
*	Rattus rattus	Black Rat					13	2005	E	
	Sminthopsis leucopus	White-footed Dunnart			L	nt	1	1972		
	Tachyglossus aculeatus	Short-beaked Echidna					56	2011	E	x
	Trichosurus vulpecula	Common Brushtail Possum					31	2010		
	Vombatus ursinus	Common Wombat					1	1968		
*	Vulpes vulpes	Red Fox					86	2011	E	x
	Wallabia bicolor	Black Wallaby					82	2011	E	x

Appendix C. Potentially occurring threatened flora species

C.1 Potentially occurring EPBC Act listed flora

Scientific Name	Common Name	Status	Presence Listing	Likelihood of Significant Impact
Plants				
Euphrasia collina subsp. muelleri	Purple Eyebright, Mueller's Eyebright	Endangered	Species or species habitat known to occur within area.	**Moderate** – records present within the vicinity of the site, within range and potential habitat present. Warrants further survey
Glycine latrobeana	Clover Glycine, Purple Clover	Vulnerable	Species or species habitat known to occur within area.	**Moderate-Low** records present within the vicinity of the site, within range and potential habitat present. Warrants further survey
Prasophyllum frenchii	Maroon Leek-orchid, Slaty Leek-orchid, Stout Leekorchid, French's Leek-orchid, Swamp Leek-orchid	Endangered	Species or species habitat likely to occur within area.	**Low** – species generally associated with grassland areas and no nearby recent records
Pterostylis cucullata	Leafy Greenhood	Vulnerable	Species or species habitat may occur within area.	**Low** – on the Mornington Peninsula species associated with coastal scrub on stabilised sand dunes; this habitat not present on site.

C.2 Threatened flora recorded within 5 km of Project site

Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Potential for Significant Impact
Acacia howittii Sticky Wattle #	**Vic.Adv.** Rare	2004	1	Grows in moist forest in far eastern Victoria.[6]	**Present** –Recorded on site by ERM (2013).	**Nil** – The site is outside natural range and occurs as an invasive weed in the local area
Billardiera scandens s.s. Velvet Apple-berry	**Vic.Adv.** Rare	1990	1	Apparently uncommon in Victoria, occurring chiefly in dry open-forests and woodlands in the north-east (Beechworth, Whitfield etc.), with isolated occurrences near Mt Macedon, Eltham-Hurstbridge area, Eildon and Orbost[6]	**Low** – not known to occur on the Mornington Peninsula, species record considered erroneous.	**Low** – Species is not likely to occur on the site.
Caladenia dilatata s.s. Green-comb Spider-orchid	**Vic.Adv.** Poorly known	1993	7	Grows mostly in coastal or near-coastal heathland and open-forest across the State.[6]	**High** – suitable is habitat present on the site.	**High** – Species has a high potential to occur on the site.
Corymbia maculata Spotted Gum #	**Vic.Adv.** Vulnerable	2004	1	Grows naturally only in far east Gippsland within Victoria - Commonly planted street tree.[6]	**Not applicable** – Outside natural range.	**Nil** – The site is outside natural range and occurs as a weed in the local area
Desmodium varians Slender Tick-trefoil	**Vic.Adv.** Poorly known	1980	1	Dry sclerophyll forest, plains grassland, crevices in escarpments.[6]	**Moderate-Low** – parts of the site present suitable habitat for the species but limited records	**Low** – Species unlikely to have significant population on site.
Diuris behrii Golden Cowslips	**Vic.Adv.** Vulnerable	2005	1	Locally common in grassland and open woodland mostly in western Victoria.[6]	**Low** – local records remote from the site, suitable habitat not present.	**Low** – Species unlikely to be present on the site.
Euphrasia collina subsp. muelleri Purple Eyebright	**EPBC** Endangered **FFG** **Vic.Adv.** Endangered	2010	7	Endemic in Victoria. Formally widespread in lowland to montane central and western Victoria, but now exceedingly rare through habitat destruction, surviving in heathland and heathy woodland on the Mornington Peninsula and near Jamieson.[6] Recorded in Arthur's Seat SP where found associated with *Eucalyptus cephalocarpa, Hakea ulicina, Epacris impressa, Pultenaea dentata* and *Austrostipa muelleri*.[8]	**Moderate** – habitat is present on site, species is found in Arthur's Seat SP in similar habitat to that occurring on site..	**Moderate** – Species may persist on the site, further survey in impact areas recommended.

Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Potential for Significant Impact
Exocarpos syrticola Coast Ballart	**Vic.Adv.** Rare	2001	1	Confined to coastal dunes and cliffs on and west of Wilsons Promontory, but locally common.[7]	**Low** – species habitat not present on site.	**Low** – species is not likely to be present on the site.
Geranium solanderi var. solanderi s.s. Austral Crane's-bill	**Vic.Adv.** Vulnerable	2004	1	An uncommon species occurring in damp to dryish, sheltered sites of grassy woodlands, often along drainage lines or seepage areas.[6]	**Moderate** – suitable habitat present in forested areas adjoining drainage line on the site, but limited local records.	**Moderate** – species has potential to be present in areas of proposed impact.
Glossostigma diandrum Spoon-leaf Mud-mat	**Vic.Adv.** Vulnerable	2009	1	Uncommon, from temporary pools on granite out-crops, clayey soils of the Murray floodplain and margins of subalpine bogs. Also recorded near Dromana. Mostly flowers Aug-Nov. [6]	**Moderate-Low** – may occur in swampy areas in the lower section of Sheepwash Creek	**Low** – species unlikely to occur within the impact area.
Glycine latrobeana Clover Glycine	**EPBC** Vulnerable **FFG** **Vic.Adv.** Vulnerable	1970	1	Plains grassland, box woodland and dry sclerophyll forests.[6]	**Low-Moderate** – possible component of woodland/forest areas but not optimum habitat and limited nearby records.	**Moderate** – Suitable habitat present, further survey recommended.
Lachnagrostis punicea subsp. punicea Purple Blown-grass	**Vic.Adv.** Rare	2005	5	Seasonally wet, heavy clay soils near Hamilton, Casterton and Skipton areas and near Craigieburn.[6]	**Low –** Habitat not present on site.	**Low** – Species is unlikely to be present on the site.
Lachnagrostis rudis subsp. rudis Rough Blown-grass	**Vic.Adv.** Rare	1993	5	Uncommon in in moist, shaded forests and swamp margins near the coast, scattered from along southern Victorian coastal areas.[6]	**Moderate** – may adjoin drainage line habitat in forested areas on the site.	**Moderate** – Potentially present on the site.
Melaleuca armillaris subsp. armillaris Giant Honey-myrtle #	**Vic.Adv.** Rare	2004	1	Mainly confined to near-coastal sandy heaths, scrubs slightly raised above saltmarsh, riparian scrubs, rocky coastlines and foothill outcrops in the far east of Victoria. Widely planted ornamental.[6]	**Not applicable** – outside natural range.	**Nil** – The site is outside natural range and occurs as a weed in the local area

Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Potential for Significant Impact
Oxalis rubens Dune Wood-sorrel	**Vic.Adv.** Rare	2004	2	Generally associated with sandy areas (stabilised dunes and back beach), grows in *Banksia integrifolia* woodland, and beaches among *Spinifex sericeus*,[7] but also local records from adjacent Arthurs Seat in dry forest.	**Moderate** – potential habitat is present on the site.	**Moderate** – potential habitat is present on the site.
Poa labillardierei var. (Volcanic Plains) Basalt Tussock-grass	**Vic.Adv.** Poorly known	2005	6	Common along relatively undisturbed waterways throughout Victoria. Specific variety generally associated with the Volcanic Plain.[6]	**Low** – likely present along waterway on the site, although this specific variety associated with the volcanic plain.	**Low** – Specific variety is unlikely to be present on the site.
Prasophyllum lindleyanum Green Leek-orchid	**Vic.Adv.** Vulnerable	1980	2	Associated with more fertile soils of woodland or scrubby heath, but now localized and uncommon. Flowers Sep.-Jan. Widespread, but generally uncommon in near-coastal scrub, dry woodlands further inland and sub-alpine herbfield.[6]	**Moderate** – possible component of woodland/forest areas.	**Moderate** – Potentially present on site
Pteris comans Netted brake	**Vic.Adv.** Rare	1979	2	Restricted distribution in Victoria, may be locally abundant and conspicuous, favouring seepages, stream banks and damp flats in shady forests (e.g. Beech Forest in the Otway Range, Dandenong Ranges where rare, Wilsons Promontory, etc.)[6]	**Moderate** – may occur in shaded fern-rich gullies.	**Moderate** – Potentially present on site
Rytidosperma dimidiatum Tasmanian Wallaby-grass	**Vic.Adv.** Vulnerable	1940	1	A species that has been recently revised. Now *Rytidosperma pilosum.* Common south of the Great Divide in a variety of dry forest types.[6]	**Not applicable –** Considered not applicable as species not recognised as present in Victoria. However, habitat present for *Rytidosperma pilosum*.	**Not applicable**
Salsola tragus subsp. pontica Coast Saltwort	**Vic.Adv.** Rare	2010	3	Associated with exposed coastal site in a disjunct distribution across Victorian coast.[6]	**Low** – site is not subject to exposed coastal conditions.	**Low** – Species is unlikely to be present on the site.
Stylidium dilatatum (syn. armeria subsp. *armeria)* Tasman Triggerplant	**Vic.Adv.** Poorly known	2004	7	Widespread throughout the State, from the coast (on foredunes at e.g. Wilsons Promontory and islands of Corner Inlet) to the alps (usually within snow-gum woodlands), excluding areas of heavy alluvial soil.[6]	**High** – possible component of woodland/forest areas.	**Moderate** – Species has high potential to be present on the site, but reduced risk of significant impact for this taxon species given it is widespread.

Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Potential for Significant Impact
Triglochin mucronata Prickly Arrowgrass	**Vic.Adv.** Rare	1952	1	Occurs in herbfields on damp saline soils of salt-flats and coastal saltmarshes.[6]	**Low** – Site is unlikely to support areas of saline soaks.	**Low** – Species is unlikely to be present on the site.

[6] Flora of Victoria (Walsh and Entwisle 1994, Walsh and Entwisle 1996, Walsh and Entwisle 1999)

[7] VICFLORA Flora of Victoria online (RBGV 2017)

[8] Species Profile and Threats Database (SPRAT) (DEE 2017b)

Threatened Flora within 5km

Boundary Road Quarry Site

Purple Blown-grass
Purple Blown-grass
Golden Cowslips
Purple Blown-grass
Thick-lip Spider-orchid
Coast Saltwort
Coast Saltwort
Coast Saltwort
Purple Eyebright
Purple Eyebright
Tasmanian Wallaby-grass
Boundary Road Quarry
Sticky Wattle
Spotted Gum
Dune Wood-sorrel
Dune Wood-sorrel
Giant Honey-myrtle
Giant Honey-myrtle
Clover Glycine
Clover Glycine
Clover Glycine
Clover Glycine
Rough Blown-grass
Purple Eyebright
Rough Blown-grass
Rough Blown-grass
Purple Eyebright
Clover Glycine
Purple Eyebright
Purple Eyebright
Clover Glycine
Purple Eyebright
Mauve-tuft Sun-orchid
Naked Sun-orchid
Purple Eyebright
Purple Eyebright
Purple Eyebright
Netted brake
Netted brake
Clover Glycine
Spotted Gum
Crested Sun-orchid
Mauve-tuft Sun-orchid
Netted brake
Netted brake
Netted brake
Netted brake
Netted brake
Netted brake

Legend

- Boundary Road Quarry
- Boundary Road Quarry Site - 83.59ha (Jacobs, 31/01/2018)
- Buffer 5km
- Flora Threatened
- Channel / Drain
- Watercourse River
- Watercourse Stream
- Waterbody

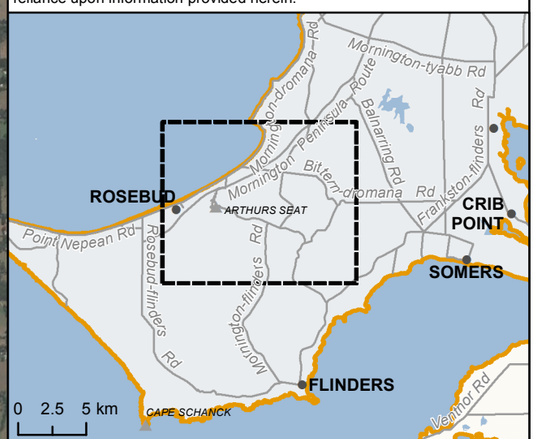
N

IS209400

GDA 1994 MGA Zone 55

0 1.25 2.5
Kilometers

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Vicmap Data © State of Victoria 2017.



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Date Published: 27 Feb 2018

Appendix D. Potentially occurring threatened fauna

D.1 Potentially occurring EPBC Act listed fauna

Scientific Name	Common Name	Status	Presence Listing	Likelihood of Significant Impact
Birds				
L	Regent Honeyeater	Critically Endangered	Species or species habitat likely to occur within area.	**Low**: Species unlikely to be present. Not previously recorded in vicinity of the site. Outside main distribution.
Botaurus poiciloptilus	Australasian Bittern	Endangered	Species or species habitat known to occur within area.	**Low**: Species unlikely to be present. Existing record 1986. Habitat may not be impacted.
Calidris canutus	Red Knot, Knot	Endangered	Species or species habitat may occur within area.	**Low**: Species unlikely to be present. Existing record 1954. Specific habitat not present on site.
Calidris ferruginea	Curlew Sandpiper	Critically Endangered	Species or species habitat may occur within area.	**Low**: Species unlikely to be present. Not previously recorded in vicinity of the site. Specific habitat not present on site.
Lathamus discolor	Swift Parrot	Critically Endangered	Species or species habitat likely to occur within area.	**Moderate-Low:** species records exist in proximity to the site. The site is part of a large contiguous patch of vegetation which is likely utilised as a stopover area on their annual migration.
Limosa lapponica baueri	Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit	Vulnerable	Species or species habitat likely to occur within area.	**Low**: Species unlikely to be present. Not previously recorded in vicinity of the site. Specific habitat not present on site.
Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit	Critically Endangered	Species or species habitat may occur within area	**Low**: Species unlikely to be present. Not previously recorded in vicinity of the site. Specific habitat not present on site.

Scientific Name	Common Name	Status	Presence Listing	Likelihood of Significant Impact
Rostratula australis	Australian Painted Snipe	Endangered	Species or species habitat may occur within area.	**Low**: Species unlikely to be present. Not previously recorded in vicinity of the site. Specific habitat not present on site.
Fish				
Galaxiella pusilla	Eastern Dwarf Galaxias, Dwarf Galaxias	Vulnerable	Species or species habitat likely to occur within area	**Low-Moderate:** Previous surveys within the study area did not reveal these species and they were generally thought to be precluded from occurring given the presence of Redfin and Gambusia (see McGuckin 2013)
Prototroctes maraena	Australian Grayling	Vulnerable	Species or species habitat may occur within area.	**Low**: Species unlikely to be present. Not previously recorded in vicinity of the site. Specific riparian habitat not present on site.
Frogs				
Litoria raniformis	Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog	Vulnerable	Species or species habitat likely to occur within area.	**Low**: Species unlikely to be present. Not previously recorded in vicinity of the site. Specific wetland habitat limited on site.
Insects				
Synemon plana	Golden Sun Moth	Critically Endangered	Species or species habitat may occur within area.	**Low**: Species unlikely to be present. Not previously recorded in vicinity of the site. Specific grassland habitat not present on site.
Mammals				
Antechinus minimus maritimus	Swamp Antechinus (mainland)	Vulnerable	Species or species habitat likely to occur within area.	**Low-Moderate** – Species is not known to occur on the Mornington Peninsula but recently recorded (2007) near Langwarrin and suitable habitat present although this is mostly focussed outside of the proposed impacts.

Scientific Name	Common Name	Status	Presence Listing	Likelihood of Significant Impact
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern)	Endangered	Species or species habitat likely to occur within area.	**Moderate** - Within range. Species has been previously recorded, albeit not in recent times. Field survey recommended.
Petauroides volans	Greater Glider	Vulnerable	Species or species habitat may occur within area.	**Low** – Outside known range.
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Foraging, feeding or related behaviour likely to occur within area.	**Low** Species likely to forage within the area, although no designated camp sites are known from the vicinity of the site.

D.2 Threatened fauna recorded within 5 km of Project site

Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Likelihood of Significant Impact
Fish						
Macquaria australasica Macquarie Perch	**EPBC** Endangered **FFG** **Vic.Adv.** Endangered	1931	1	Occurs in a variety of riverine habitats but prefers warm, slow moving turbid sections of streams.[1]	**Low** – outside natural range, record likely associated with naturalisation trials.	**Low** – Habitat unlikely to be impacted and species unlikely to be present.
Birds						
Accipiter novaehollandiae novaehollandiae Grey Goshawk	**FFG** **Vic.Adv.** Vulnerable	2009	14	Rainforests, forests; forest gullies and valleys; taller woodlands, timber on watercourses; open country in autumn dispersal.[2]	**High** – Species likely to utilise the site as part of its hunter range. Large eucalypts on ridge likely to provide suitable breeding sites.	**High** – Records exist on elevated ridge line, potentially associated with breeding site.
Alcedo azurea Azure Kingfisher	**Vic.Adv.** Near threatened	1986	1	Root-festooned banks of fresh or tidal creeks, rivers and streams in rainforest, lakes, swamps, estuaries, mangroves.[2]	**Low-Moderate** – Sheepwash Creek and the quarry lake potentially provides some marginal habitat	**Low** – marginal habitat for this species
Ardea modesta Eastern Great Egret	**FFG** **Vic.Adv.** Vulnerable	1991	2	Shallows of rivers, estuaries, tidal mudflats, freshwater wetlands; sewage ponds, irrigation areas, larger dams etc.[2]	**Moderate** – site offers limited wetland habitat.	**Low** – suitable habitat not present.
Arenaria interpres Ruddy Turnstone	**Vic.Adv.** Vulnerable	1954	1	Ocean coasts with exposed rock, stony, sandy or shelly beaches, mudflats. Occasionally inland on shallow waters, sewage ponds, saltfields, open or ploughed ground.[2]	**Low** – Suitable wetland habitat not present within the study area.	**Low** – species unlikely to be present on site.
Aythya australis Hardhead	**Vic.Adv.** Vulnerable	2001	2	Deep, permanent wetlands, large open waters, brackish coastal swamps, farm dams, ornamental lakes, sewage ponds.[2]	**Moderate** – quarry provides some marginal habitat	**Low** – species unlikely to make significant use of the site.

Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Likelihood of Significant Impact
Botaurus poiciloptilus Australasian Bittern	**EPBC** Endangered **FFG** **Vic.Adv.** Endangered	2003	1	Narrow habitat preferences, preferring shallow, vegetated freshwater or brackish swamps.[2]	**Low-Moderate** – swamp areas provide some marginal habitat.	**Low** – species unlikely to make significant use of the site.
Calidris alba Sanderling	**Vic.Adv.** Near threatened	1954	1	Tidal mudlfats; saltmarsh, saltfields; fresh, brackish or saline wetlands; sewage ponds. [2]	**Low** – Site is remote from estuarine environment.	**Low** – species is unlikely to be present on site.
Calidris canutus Red Knot	**EPBC** Endangered **Vic.Adv.** Endangered	1954	1	Tidal mudflats, sandflats, beaches, saltmarshes, flooded pastures, ploughed lands. [2]	**Low** – Site is remote from estuarine environment.	**Low** – species is unlikely to be present on site.
Diomedea exulans Wandering Albatross	**EPBC** Vulnerable **FFG** **Vic.Adv.** Endangered	1975	1	Circumpolar breeding on many sub Antarctic islands, including Macquarie and Heard Island. Ranges north to coasts of all southern continents. [2]	**Low** - Marine species, site is remote from specific marine habitat.	**Low** – species is unlikely to occur on the project site.
Dromaius novaehollandiae Emu	**Vic.Adv.** Near threatened	2002	1	Range of habitats across Australia, including desert, arid woodlands and forest. [2]	**Moderate** – potential visitor.	**Moderate** – habitat loss would fragment the wider vegetated landscape, reducing the foraging capability for the species in the area.
Egretta garzetta nigripes Little Egret	**FFG** **Vic.Adv.** Endangered	2005	3	Tidal mudflats, saltmarshes, mangroves, freshwater wetlands, sewage ponds.[2]	**Moderate –** potential visitor to the site; this species was recorded on-site by Ecocentric (2014)	**Low** – species unlikely to make significant use of the site.
Geopelia cuneate Diamond Dove	**FFG** **Vic.Adv.** Near threatened	1992	1	Drier grassy woodlands, scrub near water, wooded watercourses. [2]	**Low** – generally confined to further north of state and only rare visitor on Mornington Peninsula..	**Low** – species unlikely to make significant use of the site.

Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Likelihood of Significant Impact
Haliaeetus leucogaster White-bellied Sea-Eagle	**FFG** **Vic.Adv.** Vulnerable	2010	5	Coasts, inlands, estuaries, inlets, large rivers, inland lakes, reservoirs. [2]	**Moderate** –suitable habitat for the species but not recorded as resident in previous surveys of the site.	**Moderate** – Home range likely to encompass wider vegetated area that takes in the adjoining state park.
Hirundapus caudacutus White-throated Needletail	**Vic.Adv.** Vulnerable	2009	13	Airspace over forests, woodlands, farmlands, plains, lakes, coasts, towns, feeding companies frequency patrol back and forward along favoured hilltops and timbered ranges. [2]	**High** – Site retains forested ridgetop woodland. White-throated Needletail's are known to make temporary use of trees for resting.	**Moderate** – Species likely to make use of the site and other vegetated ridge tops present in the vicinity of the site.
Hydroprogne caspia Caspian Tern	**FFG** **Vic.Adv.** Near threatened	2001	1	Coastal, offshore waters, beaches, mudflats, estuaries, larger rivers, reservoirs and lakes. [2]	**Low** – Site is remote from estuarine environment.	**Low** – species is unlikely to occur on the project site..
Larus pacificus pacificus Pacific Gull	**Vic.Adv.** Near threatened	2003	8	Coasts, bays, offshore islands, coastal farmland, swamps, garbage tips; some follow rivers inland. [2]	**Low** – Site is remote from estuarine environment.	**Low** – species is unlikely to occur on the project site..
Lathamus discolour Swift Parrot	**EPBC** Critically Endangered **FFG** **Vic.Adv.** Endangered	1986	1	Open grassy woodland, with dead trees, near permanent water and forested hills, coastal heaths, pastures with exotic grasses, weeds, roadsides, orchards. [2]	**Moderate-Low** – species potentially utilises habitat on the site as part of its annual migration from Tasmanian breeding areas to Box Ironbark forest of central Victoria.	**Moderate-Low**: While vegetation on site does not constitute breeding habitat, vegetation is within the migration corridor which may provide roosting areas to support the species.
Lewinia pectoralis pectoralis Lewin's Rail	**FFG** **Vic.Adv.** Vulnerable	1989	1	Swamp woodlands, rushes, reeds, rank grass in swamps, creeks, paddocks; wet heaths. [2]	**Moderate** – some potential habitat is present on site, but limited local records.	**Low** – species unlikely to make significant use of the site and limited areas of habitat affected
Ninox connivens connivens Barking Owl	**FFG** **Vic.Adv.** Endangered	1986	1	Open forests, woodlands, dense scrubs, foothills, river red gums, other large trees near water courses, penetrating otherwise open country, and paperbark woodlands. [2]	**Moderate-Low** – suitable habitat is present on the site and a previous record adjacent the site however they were not identified in targeted survey (see McNabb and Dewar-McNabb 2013).	**Moderate-Low**– Barking Owl appears unlikely to make significant use of the site.

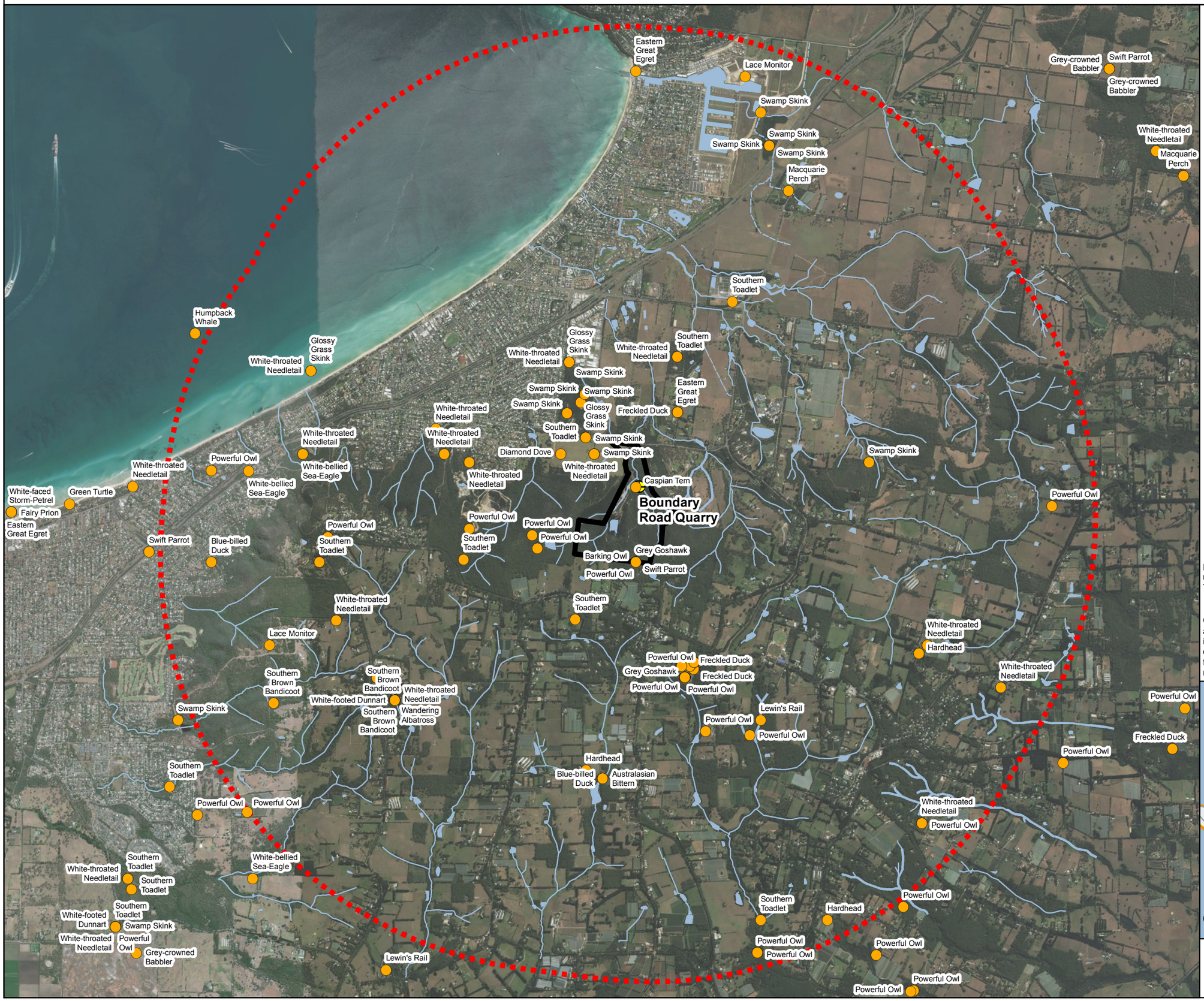
Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Likelihood of Significant Impact
Ninox strenua Powerful Owl	**FFG** **Vic.Adv.** Vulnerable	2013	40	Pairs occupy a large, probably permanent, home range in mountain forests, gullies and forest margins, sparser hilly woodlands, coastal forests, woodlands, scrubs, exotic pine plantations, large trees in private/public gardens, some in cities. [2]	**Present** – breeding pair of adults are resident on site (see McNabb and Dewar-McNabb 2013).	**High** – The proposal will impact high quality breeding roosts utilised by the species.
Numenius phaeopus Whimbrel	**Vic.Adv.** Vulnerable	1954	1	Estuaries, mangroves, tidal flats, coral cays, exposed reefs, flooded paddocks, sewerage ponds, bare grassland, sports grounds, lawns. [2]	**Low** – Site is remote from estuarine environment.	**Low** – species is unlikely to occur on the project site.
Nycticorax caledonicus hillii Nankeen Night Heron	**Vic.Adv.** Near threatened	1986	1	Shallow margins of rivers, wetlands, mangrove-lined estuaries, offshore islands, floodwaters, garden trees. [2]	**Low** – Site is remote from estuarine environment.	**Low** – species is unlikely to occur on the project site.
Oxyura australis Blue-billed Duck	**FFG** **Vic.Adv.** Endangered	2003	1	Found on temperate, fresh to saline, terrestrial wetlands including sewerage ponds, rivers, salt lakes and saltpans. Preferring deep, permanent open water within or near dense vegetation. [2]	**Low** – suitable aquatic habitat is not present on site, limited vegetation around quarry lake.	**Low:** species unlikely to make significant use of the site
Phalacrocorax varius Pied Cormorant	**Vic.Adv.** Near threatened	2010	7	Coastal waters with sloping shorelines; estuaries, bays, tidal inlets, large inland lakes and rivers, irrigation ponds, coastal mangroves and offshore islands. [2]	**Moderate**– marginal habitat present, limited vegetation around quarry lake.	**Low:** species unlikely to make significant use of the site
Pluvialis squatarola Grey Plover	**Vic.Adv.** Endangered	1954	1	Mudflats, saltmarsh, tidal reefs, estuaries, rarely inland. [2]	**Low** – site is remote from estuarine environment.	**Low** – species is unlikely to occur on the project site.
Sterna striata White-fronted Tern	**Vic.Adv.** Near threatened	1959	1	Offshore waters; bays, reefs, islands. [2]	**Low** – suitable habitat is not present.	**Low** – species is unlikely to occur on the project site.
Stictonetta naevosa Freckled Duck	**FFG** **Vic.Adv.** Endangered	2011	5	Large, well vegetated swamps; in dry periods moves to open lakes. [2]	**Moderate** – limited aquatic habitat provide on site as there is little vegetation around quarry lake.	**Low:** species unlikely to make significant use of the site.

Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Likelihood of Significant Impact
Stiltia Isabella Australian Pratincole	**Vic.Adv.** Near threatened	1954	1	Vicinity of water on inland plains, to coastal floodplains, stony ground with sparse low shrubs, claypans, bare margins of swamps, stock tanks, stock routes, airfields. [2]	**Low** – suitable aquatic habitat is not present on site.	**Low** – species is unlikely to occur on the project site.
Thalassarche cauta Shy Albatross	**EPBC** Vulnerable **FFG** **Vic.Adv.** Vulnerable	1954	1	The only Albatross with Australian breeding stations: on Albatross Rock, Bass Strait. Common all months (but mostly winter) on coasts of Vic, Tas, NSW and SA; uncommon in S.E. Qld and WA to Carnarvon. [2]	**Low** - Marine species, the study area is remote from specific marine habitat.	**Low** – species is unlikely to occur on the project site.
Tringa stagnatilis Marsh Sandpiper	**Vic.Adv.** Vulnerable	1954	1	Muddy margins of wetlands; tidal mangroves; margins of tidal mudflats; saltmarshes, sewerage ponds. [2]	**Low** – Site is remote from estuarine environment.	**Low** – species is unlikely to occur on the project site.
Xenus cinereus Terek Sandpiper	**FFG** **Vic.Adv.** Endangered	1954	1	Tidal mudflats, estuaries, shores and reefs of islands, coastal swamps, commercial saltfields. [2]	**Low** – Site is remote from estuarine environment.	**Low** – species is unlikely to occur on the project site.
Reptiles						
Lissolepis coventryi Swamp Skink	**FFG** **Vic.Adv.** Vulnerable	2011	10	Is often restricted to densely vegetated swamps and associated watercourses, and adjacent wet heaths (*Melaleuca* or *Leptospermum* thickets), sedgelands and saltmarshes. It can occur in association with freshwater and saltmarsh environments. [3]	**High**- Excellent habitat for this species occurs in the swampy areas nearby Boundary Road, where a number of recent records occur.	**High-** While prime habitat on-site is not proposed to be impacted, further up the catchment potential habitat such as HZ17 is.
Pseudemoia rawlinsoni Glossy Grass Skink	**Vic.Adv.** Vulnerable	2003	4	Confined to humid microhabitats such as marshlands and the margins of creeks, swamps and lakes.3	**High** – previous records from 2003 potential on adjacent suggest it is likely to occur along the Sheepwash Creek, most predominantly in the swampy areas nearby Boundary Road.	**High-** While prime habitat on-site is not proposed to be impacted, further up the catchment, potential habitat such as HZ17 is.

Name (Scientific/Common)	Status	Last recorded	Count of sightings	Habitat	Likelihood of Presence	Likelihood of Significant Impact
Varanus varius Lace Monitor	**Vic.Adv.** Endangered	1932	1	Coast, ranges, slopes and adjacent plains of eastern and south-eastern Australia. It feeds on insects, reptiles and small mammals, but is a major predator of nestling birds. Often forages on the ground, and in trees. Often lays eggs within the protection of a hole dug into a termite nest. [3]	**Moderate-Low** – suitable habitat is present on the site, although limited records on the Mornington Peninsula.	**Moderate-Low-** Site constitutes suitable habitat.
Amphibians						
Pseudophryne semimarmorata Southern Toadlet	**Vic.Adv.** Vulnerable	2006	6	Found in a variety of damp situations in sclerophyll forests under logs, leaf-litter etc. where it lives in small tunnels during the breeding season (March-May).[4]	**High** – suitable habitat is present on site and numerous nearby recent records.	**High** – Species is likely to be present in forested habitat on the site.
Mammals						
Isoodon obesulus obesulus Southern Brown Bandicoot	**EPBC** Endangered **FFG** **Vic.Adv.** Near threatened	1972	2	Prefers sandy soil with scrubby vegetation and / or areas with low ground cover that are burnt out from time to time.[5]	**Moderate** – areas of lower elevation are composed of sandy soil and suitable vegetation characteristics, however limited recent records.	**Moderate** – Potential to occur on site.
Sminthopsis leucopus White-footed Dunnart	**FFG** **Vic.Adv.** Near threatened	1972	1	Wide range of habitats including disturbed areas. Heathy woodland and forest, coastal scrub and coastal dune grasslands.[5]	**Moderate-Low** – suitable habitat is present on the site, but limited local records.	**Moderate-Low –** Species potentially occurs on site.

Threatened Fauna within 5km

Boundary Road Quarry Site



Legend

- Boundary Road Quarry
- Boundary Road Quarry Site - 83.59ha (Jacobs, 31/01/2018)
- Buffer 5km
- Fauna Threatened
- Channel / Drain
- Watercourse River
- Watercourse Stream
- Waterbody

N

IS209400

GDA 1994 MGA Zone 55

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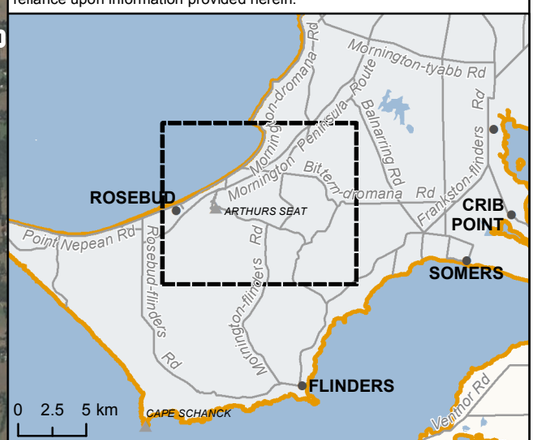
Kilometers



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Date Published: 27 Feb 2018

Appendix E. Protected Matters Search Tool (PMST) report

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.

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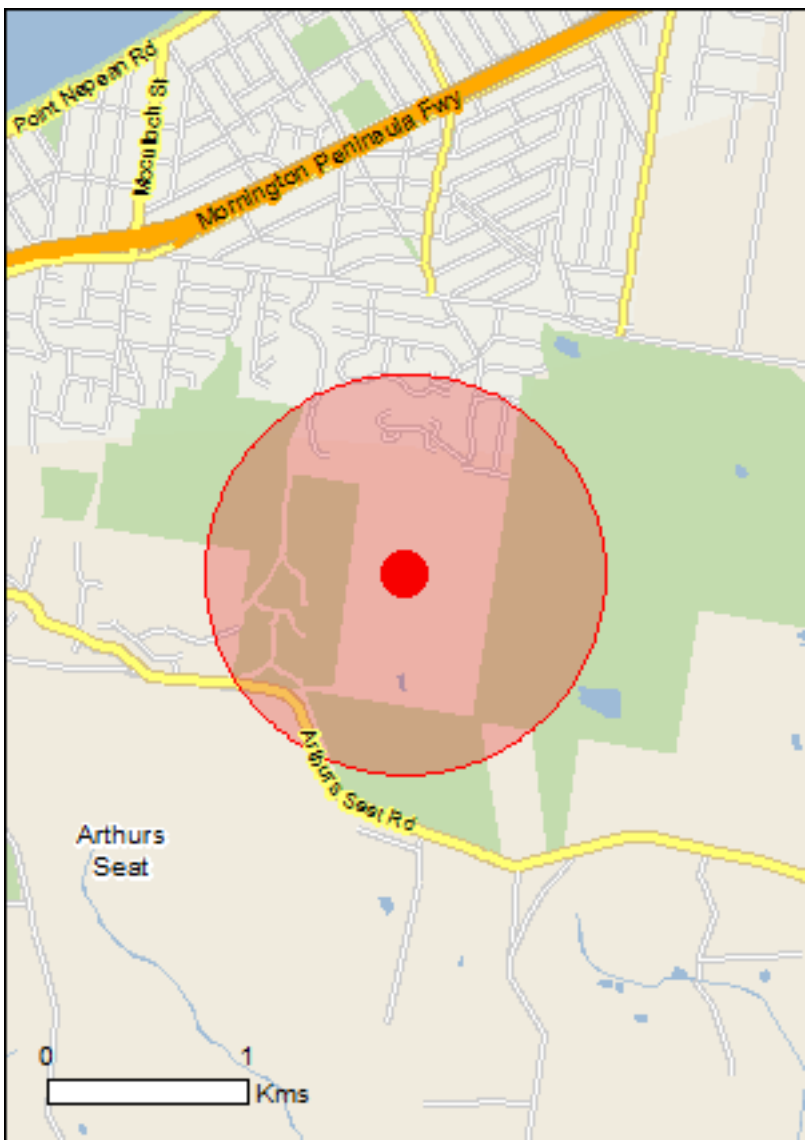
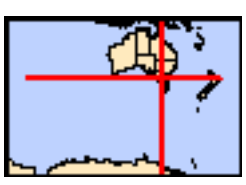


Coordinates

Buffer: 1.0Km



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:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	21
Listed Migratory Species:	17

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:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	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:	1
Regional Forest Agreements:	None
Invasive Species:	45
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

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 may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Galaxiella pusilla Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Frogs		
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
Insects		
Synemon plana		
Golden Sun Moth [25234]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Antechinus minimus maritimus		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat likely to occur within area
Isoodon obesulus obesulus		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Euphrasia collina subsp. muelleri		
Purple Eyebright, Mueller's Eyebright [16151]	Endangered	Species or species habitat known to occur within area
Glycine latrobeana		
Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area
Prasophyllum frenchii		
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
Pterostylis cucullata		
Leafy Greenhood [15459]	Vulnerable	Species or species habitat may 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		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to 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 likely to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species

Name	Threatened	Type of Presence
		habitat may 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 may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

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 may 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 likely to occur

Name	Threatened	Type of Presence within area
[Ardea ibis](#) Cattle Egret [59542]		Species or species habitat may occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
[Hirundapus caudacutus](#) White-throated Needletail [682]		Species or species habitat known to occur within area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat likely to occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Breeding known to occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat may occur within area
[Puffinus carneipes](#) Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Arthurs Seat	VIC

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		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis		
Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis		
European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris		
European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus		
House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus		
Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus		
Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis		
Spotted Turtle-Dove [780]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Turdus philomelos Song Thrush [597]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Asparagus aethiopicus 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 Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Carrichtera annua Ward's Weed [9511]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana 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 Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Protasparagus densiflorus Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

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

-38.35317 144.97227

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-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

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix F. Criteria for Bioregional Conservation Status of EVC

Presumed Extinct	**Status code: X** **Probably no longer present in the bioregion (the accuracy of this resumption is limited by the use of remotely - sensed 1:100 000 scale woody vegetation cover mapping to determine depletion - grassland, open woodland and wetland types are particularly affected).**
Endangered	Status code: E Contracted to less than 10% of former range; OR Less than 10% pre-European extent remains; OR Combination of depletion, degradation, current threats and rarity is comparable overall to the above: • 10 to 30% pre-European extent remains and severely degraded over a majority of this area; or • naturally restricted EVC reduced to 30% or less of former range and moderately degraded over a majority of this area; or • rare EVC cleared and/or moderately degraded over a majority of former area.
Vulnerable	Status code: V 10 to 30% pre-European extent remains; OR Combination of depletion, degradation, current threats and rarity is comparable overall to the above: • greater than 30% and up to 50% pre-European extent remains and moderately degraded over a majority of this area; or • greater than 50% pre-European extent remains and severely degraded over a majority of this area; or • naturally restricted EVC where greater than 30% pre-European extent remains and moderately degraded over a majority of this area; or • rare EVC cleared and/or moderately degraded over a minority of former area.
Depleted	Status code: D Greater than 30% and up to 50% pre-European extent remains; OR Combination of depletion, degradation and current threats is comparable overall to the above and: • greater than 50% pre-European extent remains • and moderately degraded over a majority of this area.
Rare	Status code: R Rare EVC (as defined by geographic occurrence) but neither depleted, degraded nor currently threatened to an extent that would qualify as Endangered, Vulnerable or Depleted.
Least Concern	Status code: LC Greater than 50% pre-European extent remains and subject to little to no degradation over a majority of this area.

Appendix G. Significant Impact Criteria EPBC Act

G.1 Critically endangered and endangered species

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of a population
- Reduce the area of occupancy of the species
- Fragment an existing population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of a population
- Modify, destroy, remove, 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 critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
- Introduce disease that may cause the species to decline, or
- Interfere with the recovery of the species.

G.2 Vulnerable species

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- 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
- Fragment an existing important population into two or more populations
- Adversely affect habitat critical to the survival of a species
- 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
- 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
- Interfere substantially with the recovery of the species.

G.3 Critically endangered and endangered ecological communities

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- Reduce the extent of an ecological community
- Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- Adversely affect habitat critical to the survival of an ecological community

- Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: assisting invasive species, that are harmful to the listed ecological community, to become established, or
- Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- Interfere with the recovery of an ecological community.

Appendix H. Native Vegetation Removal Report – Scenario Test

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: **27/02/2018** **Report ID: Scenario Testing**
Time of issue: **1:17 pm**

Project ID	ensym_loss_20180227VGc

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	37.642 ha
Extent of past removal	0.000 ha
Extent of proposed removal	37.642 ha
No. Large trees proposed to be removed	160
Location category	Location 3 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.

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:

Species offset amount[1]	37.958 specific units of habitat for Coast Helmet-orchid, *Corybas despectans* 40.908 specific units of habitat for Netted brake, *Pteris comans* 38.070 specific units of habitat for Promontory Peppermint, *Eucalyptus willisii s.s.* 33.613 specific units of habitat for Powelltown Correa, *Correa reflexa var. lobata* 22.390 specific units of habitat for Dune Wood-sorrel, *Oxalis rubens* 40.984 specific units of habitat for Green Leek-orchid, *Prasophyllum lindleyanum* 40.893 specific units of habitat for Mauve-tuft Sun-orchid, *Thelymitra malvina* 40.984 specific units of habitat for Southern Xanthosia, *Xanthosia tasmanica* 40.865 specific units of habitat for Purple Eyebright, *Euphrasia collina subsp. muelleri* 34.585 specific units of habitat for Green Scentbark, *Eucalyptus fulgens* 25.982 specific units of habitat for Annual Fireweed, *Senecio glomeratus subsp. longifructus*
Large trees	160 trees

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 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**
1-11A	Patch	gipp0793	Vulnerable	10	no	0.764	4.870	4.870	0.749	0.823	6.781	500836 Coast Helmet-orchid *Corybas despectans*
										0.845	6.865	502778 Netted brake *Pteris comans*
										0.845	6.865	504480 Promontory Peppermint *Eucalyptus willisii s.s.*
										0.463	6.813	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.845	6.865	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.334	6.812	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.845	6.865	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.845	6.865	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*

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
										0.733	6.887	505175 Green Scentbark *Eucalyptus fulgens*
										0.176	6.919	507144 Annual Fireweed *Senecio glomeratus subsp. longifructus*
1-2	Patch	gipp0053	Endangered	10	no	0.624	0.031	0.031	0.870	0.740	0.034	500836 Coast Helmet-orchid *Corybas despectans*
										0.740	0.034	502390 Dune Wood-sorrel *Oxalis rubens*
										0.740	0.034	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.740	0.034	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.740	0.034	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.740	0.034	505175 Green Scentbark *Eucalyptus fulgens*
										0.740	0.034	507144 Annual Fireweed *Senecio glomeratus subsp. longifructus*
1-7	Patch	gipp0053	Endangered	10	no	0.824	0.042	0.042	0.870	0.740	0.060	500836 Coast Helmet-orchid *Corybas despectans*
										0.041	0.060	502778 Netted brake *Pteris comans*
										0.740	0.060	502390 Dune Wood-sorrel *Oxalis rubens*
										0.740	0.060	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.740	0.060	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.740	0.060	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.740	0.060	505175 Green Scentbark *Eucalyptus fulgens*
										0.740	0.060	507144 Annual Fireweed *Senecio glomeratus subsp. longifructus*

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**
1-9	Patch	gipp0793	Vulnerable	10	no	0.664	2.025	2.025	0.879	0.805	2.427	500836 Coast Helmet-orchid *Corybas despectans*
										0.507	2.424	502778 Netted brake *Pteris comans*
										0.139	2.448	504480 Promontory Peppermint *Eucalyptus willisii s.s.*
										0.805	2.427	502390 Dune Wood-sorrel *Oxalis rubens*
										0.805	2.427	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.786	2.426	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.805	2.427	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.452	2.438	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
										0.805	2.427	505175 Green Scentbark *Eucalyptus fulgens*
										0.805	2.427	507144 Annual Fireweed *Senecio glomeratus subsp. longifructus*
1-10	Patch	gipp0175	Endangered	10	no	0.684	8.536	8.536	0.848	0.834	10.710	500836 Coast Helmet-orchid *Corybas despectans*
										0.555	10.718	502778 Netted brake *Pteris comans*
										0.687	10.714	504480 Promontory Peppermint *Eucalyptus willisii s.s.*
										0.113	10.487	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.345	10.641	502390 Dune Wood-sorrel *Oxalis rubens*
										0.835	10.714	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.412	10.674	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*

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
										0.835	10.714	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.835	10.714	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
										0.813	10.716	505175 Green Scentbark *Eucalyptus fulgens*
										0.485	10.694	507144 Annual Fireweed *Senecio glomeratus subsp. longifructus*
1-17	Patch	gipp0059	Vulnerable	10	no	0.749	0.638	0.638	0.568	0.817	0.869	500836 Coast Helmet-orchid *Corybas despectans*
										0.808	0.865	502778 Netted brake *Pteris comans*
										0.808	0.865	504480 Promontory Peppermint *Eucalyptus willisii s.s.*
										0.578	0.864	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.808	0.865	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.475	0.861	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.808	0.865	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.808	0.865	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
1-16	Patch	gipp0793	Vulnerable	10	no	0.608	1.013	1.013	0.562	0.818	1.120	500836 Coast Helmet-orchid *Corybas despectans*
										0.794	1.105	502778 Netted brake *Pteris comans*
										0.794	1.105	504480 Promontory Peppermint *Eucalyptus willisii s.s.*
										0.599	1.100	505404 Powelltown Correa *Correa reflexa var. lobata*

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
										0.794	1.105	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.782	1.104	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.794	1.105	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.794	1.105	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
1-12	Patch	gipp0023	Vulnerable	10	no	0.564	3.546	3.546	0.572	0.749	3.498	500836 Coast Helmet-orchid *Corybas despectans*
										0.748	3.496	502778 Netted brake *Pteris comans*
										0.748	3.496	504480 Promontory Peppermint *Eucalyptus willisii s.s.*
										0.036	3.433	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.062	3.419	502390 Dune Wood-sorrel *Oxalis rubens*
										0.748	3.496	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.748	3.496	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.748	3.496	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.748	3.496	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
										0.051	3.079	505175 Green Scentbark *Eucalyptus fulgens*
1-13	Patch	gipp0793	Vulnerable	10	no	0.534	1.517	1.517	0.524	0.730	1.402	500836 Coast Helmet-orchid *Corybas despectans*
										0.838	1.489	502778 Netted brake *Pteris comans*
										0.838	1.489	504480 Promontory Peppermint *Eucalyptus willisii s.s.*

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
										0.838	1.489	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.543	1.492	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.838	1.489	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.838	1.489	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
1-11B	Patch	gipp0793	Vulnerable	10	no	0.744	1.643	1.643	0.519	0.730	2.115	500836 Coast Helmet-orchid *Corybas despectans*
										0.844	2.255	502778 Netted brake *Pteris comans*
										0.844	2.255	504480 Promontory Peppermint *Eucalyptus willisii s.s.*
										0.066	2.262	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.844	2.255	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.844	2.255	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.844	2.255	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.844	2.255	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
										0.173	2.259	505175 Green Scentbark *Eucalyptus fulgens*
1-14	Patch	gipp0023	Vulnerable	10	no	0.784	2.299	2.299	0.521	0.738	3.134	500836 Coast Helmet-orchid *Corybas despectans*
										0.821	3.282	502778 Netted brake *Pteris comans*
										0.821	3.282	504480 Promontory Peppermint *Eucalyptus willisii s.s.*

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
										0.101	3.335	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.821	3.282	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.821	3.282	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.821	3.282	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.821	3.282	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
										0.431	3.319	505175 Green Scentbark *Eucalyptus fulgens*
1-15	Patch	gipp0793	Vulnerable	10	no	0.718	2.040	2.040	0.511	0.765	2.585	502778 Netted brake *Pteris comans*
										0.765	2.585	504480 Promontory Peppermint *Eucalyptus willisii s.s.*
										0.148	2.477	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.765	2.585	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.765	2.585	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.765	2.585	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.765	2.585	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
2-9	Patch	gipp0793	Vulnerable	10	no	0.664	2.121	2.121	0.771	0.745	2.458	500836 Coast Helmet-orchid *Corybas despectans*
										0.563	2.434	502778 Netted brake *Pteris comans*
										0.741	2.460	502390 Dune Wood-sorrel *Oxalis rubens*
										0.745	2.458	502702 Green Leek-orchid *Prasophyllum lindleyanum*

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
										0.745	2.458	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.745	2.458	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.264	2.435	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
										0.745	2.458	505175 Green Scentbark *Eucalyptus fulgens*
										0.745	2.458	507144 Annual Fireweed *Senecio glomeratus subsp. longifructus*
2-18	Patch	gipp0793	Vulnerable	10	no	0.400	0.493	0.493	0.680	0.552	0.306	500836 Coast Helmet-orchid *Corybas despectans*
										0.553	0.306	502778 Netted brake *Pteris comans*
										0.002	0.278	502390 Dune Wood-sorrel *Oxalis rubens*
										0.554	0.306	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.512	0.307	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.554	0.306	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.554	0.306	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
										0.554	0.306	505175 Green Scentbark *Eucalyptus fulgens*
										0.371	0.301	507144 Annual Fireweed *Senecio glomeratus subsp. longifructus*
2-10	Patch	gipp0175	Endangered	10	no	0.684	1.040	1.040	0.722	0.793	1.276	500836 Coast Helmet-orchid *Corybas despectans*
										0.488	1.264	502778 Netted brake *Pteris comans*
										0.680	1.278	504480 Promontory Peppermint *Eucalyptus willisii s.s.*

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
										0.243	1.259	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.406	1.276	502390 Dune Wood-sorrel *Oxalis rubens*
										0.794	1.276	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.511	1.267	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.794	1.276	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.794	1.276	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*
										0.794	1.276	505175 Green Scentbark *Eucalyptus fulgens*
										0.245	1.270	507144 Annual Fireweed *Senecio glomeratus subsp. longifructus*
2-19	Patch	gipp0793	Vulnerable	10	no	0.200	5.787	5.787	0.678	0.529	1.770	500836 Coast Helmet-orchid *Corybas despectans*
										0.503	1.761	502778 Netted brake *Pteris comans*
										0.094	1.689	504480 Promontory Peppermint *Eucalyptus willisii s.s.*
										0.048	1.583	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.291	1.797	502390 Dune Wood-sorrel *Oxalis rubens*
										0.529	1.770	502702 Green Leek-orchid *Prasophyllum lindleyanum*
										0.475	1.780	503374 Mauve-tuft Sun-orchid *Thelymitra malvina*
										0.529	1.770	504088 Southern Xanthosia *Xanthosia tasmanica*
										0.488	1.756	504468 Purple Eyebright *Euphrasia collina subsp. muelleri*

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
										0.512	1.764	505175 Green Scentbark *Eucalyptus fulgens*
										0.364	1.820	507144 Annual Fireweed *Senecio glomeratus subsp. longifructus*

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
Promontory Peppermint	*Eucalyptus willisii s.s.*	504480	Rare	Dispersed	Top ranking map	0.5150
Netted brake	*Pteris comans*	502778	Rare	Dispersed	Top ranking map	0.3690
Coast Helmet-orchid	*Corybas despectans*	500836	Vulnerable	Dispersed	Top ranking map	0.1307
Promontory Peppermint	*Eucalyptus willisii s.s.*	504480	Rare	Dispersed	Habitat importance map	0.0447
Powelltown Correa	*Correa reflexa var. lobata*	505404	Rare	Dispersed	Top ranking map	0.0429
Netted brake	*Pteris comans*	502778	Rare	Dispersed	Habitat importance map	0.0323
Coast Helmet-orchid	*Corybas despectans*	500836	Vulnerable	Dispersed	Habitat importance map	0.0275
Southern Xanthosia	*Xanthosia tasmanica*	504088	Rare	Dispersed	Habitat importance map	0.0123
Purple Eyebright	*Euphrasia collina subsp. muelleri*	504468	Endangered	Dispersed	Habitat importance map	0.0122
Annual Fireweed	*Senecio glomeratus subsp. longifructus*	507144	Rare	Dispersed	Habitat importance map	0.0077
Green Scentbark	*Eucalyptus fulgens*	505175	Rare	Dispersed	Habitat importance map	0.0062
Dune Wood-sorrel	*Oxalis rubens*	502390	Rare	Dispersed	Habitat importance map	0.0059
Mauve-tuft Sun-orchid	*Thelymitra malvina*	503374	Vulnerable	Dispersed	Habitat importance map	0.0054
Green Leek-orchid	*Prasophyllum lindleyanum*	502702	Vulnerable	Dispersed	Habitat importance map	0.0053
Austral Tobacco	*Nicotiana suaveolens*	502275	Rare	Dispersed	Habitat importance map	0.0044
Sticky Wattle	*Acacia howittii*	500044	Rare	Dispersed	Habitat importance map	0.0042
Green-striped Greenhood	*Pterostylis chlorogramma*	504728	Vulnerable	Dispersed	Habitat importance map	0.0041
Parsley Xanthosia	*Xanthosia leiophylla*	504562	Rare	Dispersed	Habitat importance map	0.0040
Giant Honey-myrtle	*Melaleuca armillaris subsp. armillaris*	502145	Rare	Dispersed	Habitat importance map	0.0038
Cobra Greenhood	*Pterostylis grandiflora*	502798	Rare	Dispersed	Habitat importance map	0.0037

Powelltown Correa	*Correa reflexa var. lobata*	505404	Rare	Dispersed	Habitat importance map	0.0034
Leafy Twig-sedge	*Cladium procerum*	500786	Rare	Dispersed	Habitat importance map	0.0034
Southern Toadlet	*Pseudophryne semimarmorata*	13125	Vulnerable	Dispersed	Habitat importance map	0.0032
Rough Blown-grass	*Lachnagrostis rudis subsp. rudis*	500159	Endangered	Dispersed	Habitat importance map	0.0029
Naked Sun-orchid	*Thelymitra circumsepta*	503383	Vulnerable	Dispersed	Habitat importance map	0.0029
Glossy Grass Skink	*Pseudemoia rawlinsoni*	12683	Vulnerable	Dispersed	Habitat importance map	0.0020
Swamp Skink	*Lissolepis coventryi*	12407	Vulnerable	Dispersed	Habitat importance map	0.0019
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0016
Veined Spear-grass	*Austrostipa rudis subsp. australis*	504940	Rare	Dispersed	Habitat importance map	0.0014
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0012
Finger-leaved Daisy	*Brachyscome exilis*	500457	Rare	Dispersed	Habitat importance map	0.0008
Yarra Gum	*Eucalyptus yarraensis*	501326	Rare	Dispersed	Habitat importance map	0.0008
Tremont Bundy	*Eucalyptus aff. goniocalyx (Dandenong Ranges)*	507008	Vulnerable	Dispersed	Habitat importance map	0.0008
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0007
Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0006
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0005
Baillon's Crake	*Porzana pusilla palustris*	10050	Vulnerable	Dispersed	Habitat importance map	0.0004
Australasian Bittern	*Botaurus poiciloptilus*	10197	Endangered	Dispersed	Habitat importance map	0.0003
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0003
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0002
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	12922	Critically endangered	Dispersed	Habitat importance map	0.0001
Dense Leek-orchid	*Prasophyllum spicatum*	504506	Endangered	Dispersed	Habitat importance map	0.0001

Common Bent-wing Bat (eastern ssp.)	*Miniopterus schreibersii oceanensis*	61342	Vulnerable	Dispersed	Habitat importance map	0.0001
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0000
Blue-billed Duck	*Oxyura australis*	10216	Endangered	Dispersed	Habitat importance map	0.0000
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0000
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0000
Musk Duck	*Biziura lobata*	10217	Vulnerable	Dispersed	Habitat importance map	0.0000
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

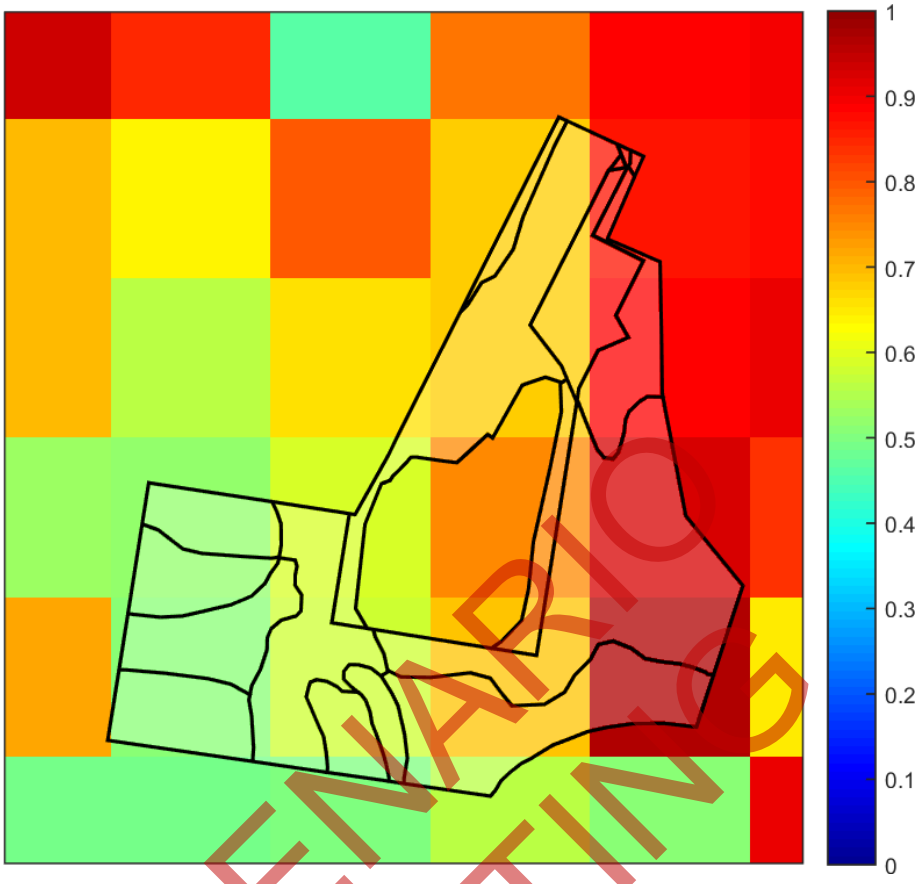
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

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.

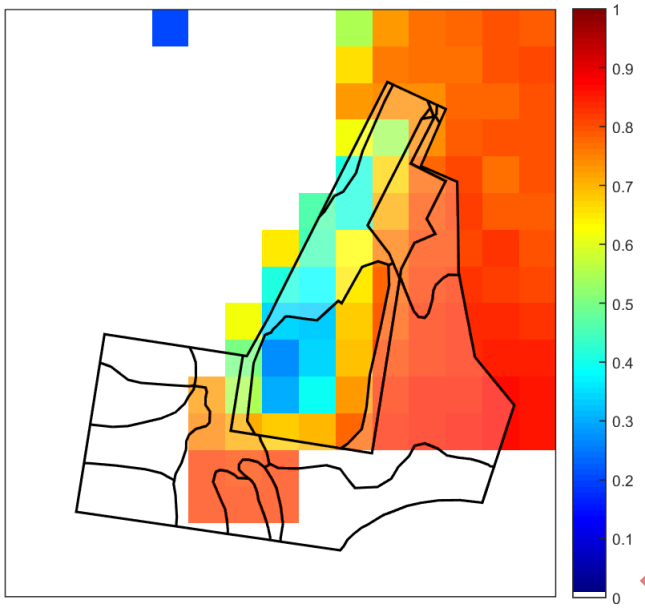
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map

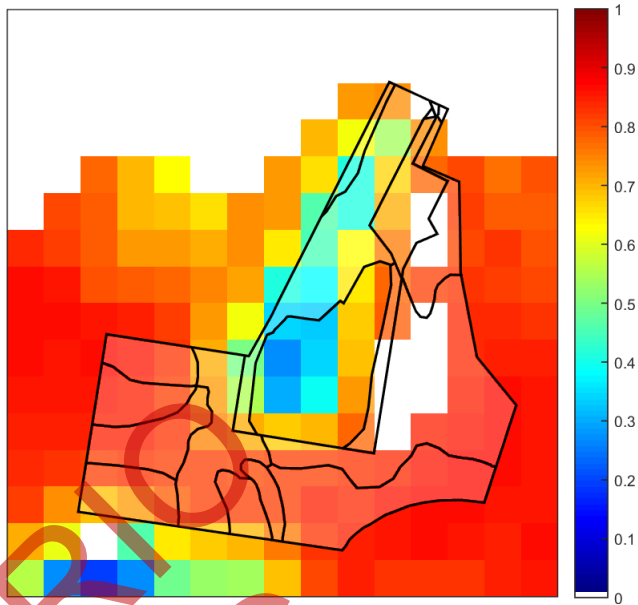


3. Habitat importance maps

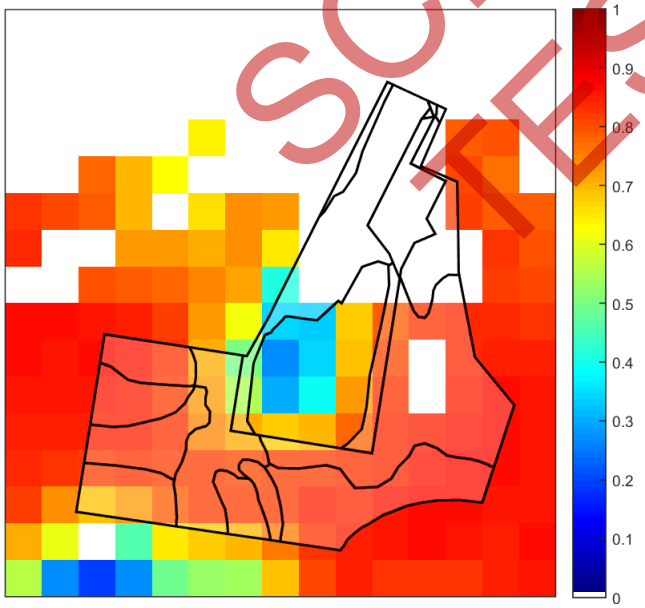
Coast Helmet-orchid
Corybas despectans
500836



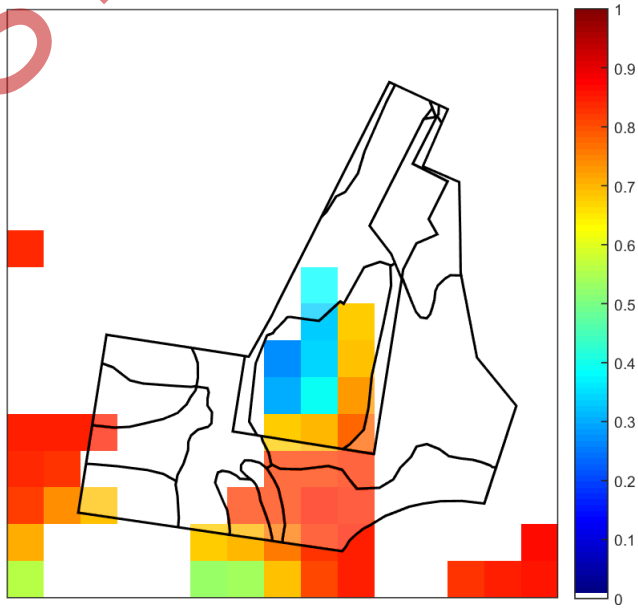
Netted brake
Pteris comans
502778



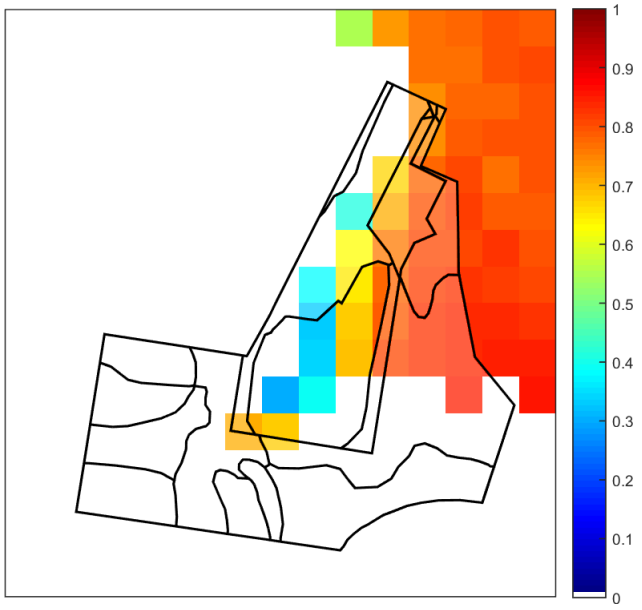
Promontory Peppermint
Eucalyptus willisii s.s.
504480



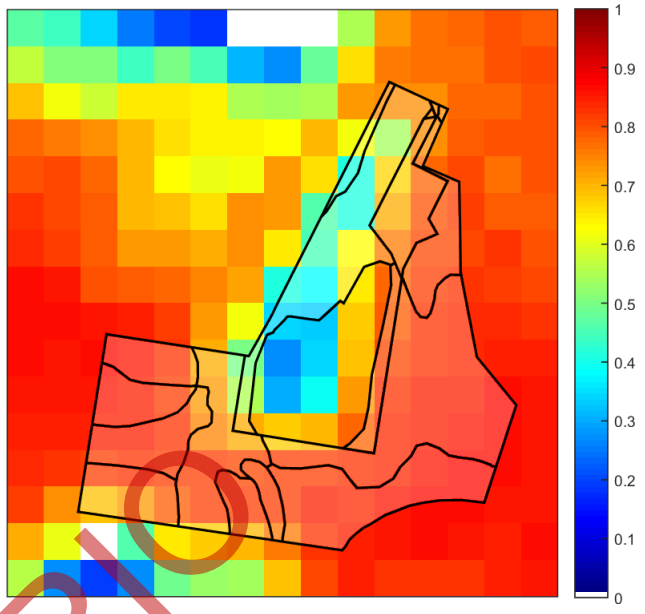
Powelltown Correa
Correa reflexa var. lobata
505404



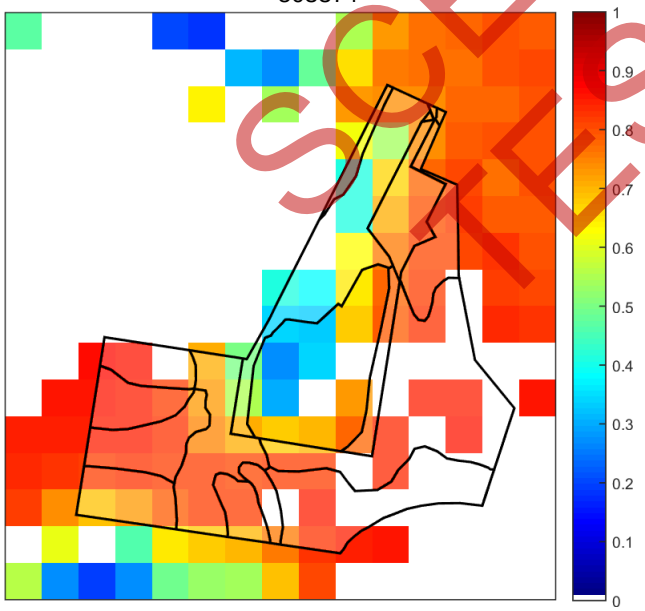
Dune Wood-sorrel
Oxalis rubens
502390



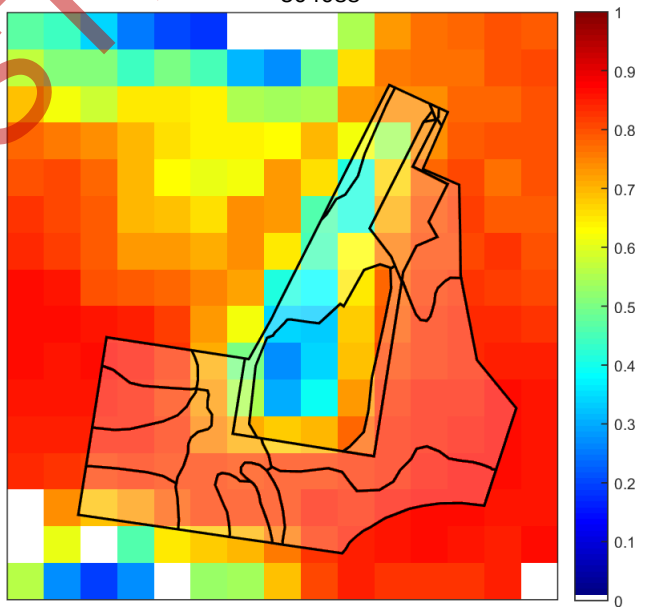
Green Leek-orchid
Prasophyllum lindleyanum
502702



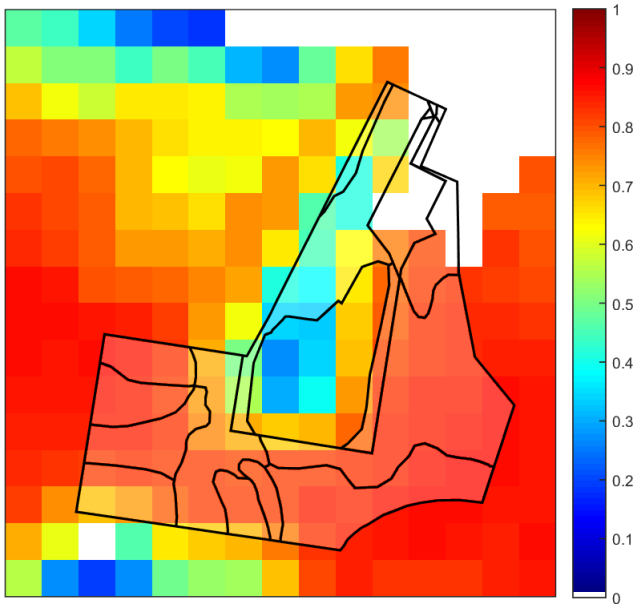
Mauve-tuft Sun-orchid
Thelymitra malvina
503374



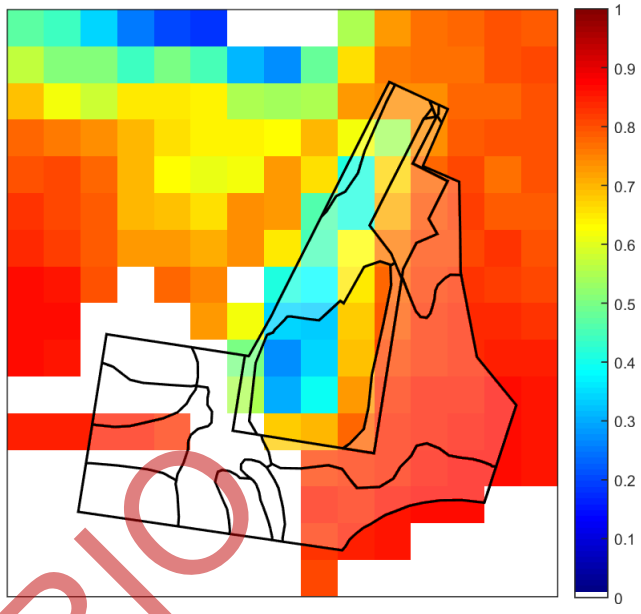
Southern Xanthosia
Xanthosia tasmanica
504088



Purple Eyebright
Euphrasia collina subsp. muelleri
504468



Green Scentbark
Eucalyptus fulgens
505175



Annual Fireweed
Senecio glomeratus subsp. longifructus
507144