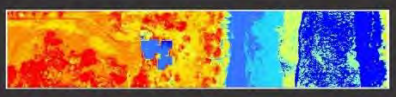
landtech consulting

Land Capability Assessment
Biodiversity Survey
Drone Mapping & Survey
Bushfire Attack Level Assessment (BAL)
GIS Mapping & Analysis



Client: [redacted]

Project: Flora & Fauna/Biodiversity Assessment for 109 Old Peterborough Road, Peterborough, Victoria.

Date: October 20, 2023

Contact: [redacted]

Landtech: [redacted]

Figure 1 – Proposed stage one subdivision site with adjoining regrowth roadside vegetation.

[redacted]

[redacted]

Document control

Assessment	Flora & Fauna/Biodiversity Assessment (stage 1 subdivision development)
Address	109 Old Peterborough Road, Peterborough, 3270, Victoria.
Project number	786
Project manager	[redacted]
Client	[redacted]
Bioregion	Warrnambool Plain Bioregion
CMA	Glenelg-Hopkins CMA
Council	Moyne Shire Council

Acknowledgements

[redacted]

Disclaimer

Although Landtech Consulting have taken all the necessary steps to ensure that an accurate document has been prepared, the company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report and its contents.

Figure 2 – View from the north-east with proposed subdivision site in foreground and coastline to the south.

SUMMARY 1 – VEGETATION/BIODIVERSITY ASSESSMENT

The following report is based on a request from John Delany for a Flora/Biodiversity Assessment to address planning implications such as the potential for removal of native vegetation for site access and development, assessment of potential significant species and their habitats, and assessment against Clause 52.17, SLO, and ESO implications at 109 Old Peterborough Road, Peterborough, Victoria.

The following report is based on:

1. An environmental assessment of the potential implications of Clause 52.17 such as flora, fauna, and habitat significance of the land, recommended actions for management, and revegetation and restoration of any identified conservation and vegetation protection areas identified (see *Section 4*).

2. The study site is also within the following applicable zoning/overlays which will be briefly assessed in this report:

GENERAL RESIDENTIAL ZONE (GRZ)	32.08-13 - 24/01/2020 - VC160 - Decision guidelines Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate: • *The Municipal Planning Strategy and the Planning Policy Framework.*[1] • *The purpose of this zone.* • *The objectives set out in a schedule to this zone.* • *Any other decision guidelines specified in a schedule to this zone.*
GENERAL RESIDENTIAL ZONE - SCHEDULE 1 (GRZ1)	-3 – 15 lots All except Clauses 56.02-1, 56.03-1 to 56.03-4, 56.05-2, 56.06-1, 56.06-3 and 56.06-6.
ENVIRONMENTAL SIGNIFICANCE OVERLAY (ESO)	42.01-5 - Decision guidelines Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate: • The Municipal Planning Strategy and Planning Policy Framework. • The statement of environmental significance and the environmental objective contained in a schedule to this overlay. • The need to remove, destroy or lop vegetation to create a defendable space to reduce the risk of bushfire to life and property. • Any other matters specified in a schedule to this overlay.
ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 1 (ESO1)	To protect and enhance flora and fauna habitat of the coast, estuaries, associated wetlands and indigenous native vegetation from the impacts of development. To protect and enhance the stability and environmental quality of sand dunes and coastal cliffs from the impacts of development. To protect the physical, biological and water quality integrity and functioning of estuaries from development within or adjoining an estuary including: • Avoiding the interference of environmental flows, natural flooding regimes and tidal flows. • The avoidance of interfering with the appropriate management of artificial river mouth openings of estuaries that minimises detrimental effects on the estuarine environment. • The avoidance of concentrated stormwater flows and filtering of stormwater, nutrients and other pollutants. • The prevention of soil erosion and sedimentation. • The prevention of the disturbance of acid sulphate soils associated with estuaries and low-lying coastal areas. • The recharge and discharge of ground waters. To encourage development including infrastructure to locate away from the sea, estuaries and wetlands through the use of buffer zones. Buffer zones can assist in protecting development from sea level rise hazards, mitigate the impacts of development and permit wetland vegetation to migrate as a result of predicted sea level rise associated with climate change.

[1] Moyne Shire Council 2022; MUNICIPAL STRATEGIC STATEMENT - CLAUSE 21.01; Accessed from: https://stfpbsprodapp01.blob.core.windows.net/amendmentfiles/c942fe6b-6c70-e811-a860-000d3ad0ed15_c59d59d6-5203-4fcf-b3ff-b1fa217c0cac_exh%20C42%20Clause%2021.01.pdf

ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 2 (ESO2)	Environmental objective to be achieved To conserve and enhance the environmental qualities of the coast, estuarine ecology of the Curdies River and structural and water quality of the limestone depressions and in particular to ensure that: • The water quality of the limestone depressions and the estuary of the Curdies River is maintained and enhanced; • Sand dunes and coastal cliffs in the coastal area remain in a stable condition; and • Valuable ecological systems are protected. • To require the proper management of stormwater discharges to the Curdies River estuary and limestone depressions from development. • To encourage development to implement stormwater and grey water recycling systems. • To encourage revegetation using native coastal species local to the Peterborough area. Decision guidelines The following decision guidelines apply to an application for a permit under Clause 42.01, in addition to those specified in Clause 42.01 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority: • The existing use or development of the land. • The impact of the development on other properties. • The degree of dependence of the development on the coastal environment. • The soil stability of the subject land and the need to prevent soil erosion. • The likelihood of pollution and/or siltation of any watercourse. • The amount of natural vegetation to be removed through the construction of any buildings or works. • Whether adequate provision has been made for the landscaping and treatment of the site. • The value of any native vegetation to be removed in terms of its physical condition, rarity, or variety. • The protection and enhancement of the landscape. • The desirability of retaining a buffer strip of native vegetation along roads, watercourses, and property boundaries. • The need to protect the environmental values of limestone depressions including avoidance of the draining and filling of limestone depressions. • The desirability of maintaining natural drainage features. • The Peterborough Urban Design Framework, 2002.
SIGNIFICANT LANDSCAPE OVERLAY (SLO)	Decision guidelines Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate: • The Municipal Planning Strategy and the Planning Policy Framework. • The statement of the nature and key elements of the landscape and the landscape character objective contained in a schedule to this overlay. • The conservation and enhancement of the landscape values of the area. • The need to remove, destroy or lop vegetation to create a defendable space to reduce the risk of bushfire to life and property. • The impact of the proposed buildings and works on the landscape due to height, bulk, colour, general appearance or the need to remove vegetation. • The extent to which the buildings and works are designed to enhance or promote the landscape character objectives of the area. • The impact of buildings and works on significant views. • Any other matters specified in a schedule to this overlay.
SIGNIFICANT LANDSCAPE OVERLAY - SCHEDULE 2 (SLO2)	Vegetation • Whether the size, species, age and health of existing vegetation proposed to be removed, destroyed or lopped and the size, species and growth characteristics of any proposed replacement vegetation. • The reasons for removing the tree and the practicalities of alternative options that do not require removal of any trees. • The effect of constructing a building or constructing or carrying out works on the root system, canopy and overall appearance of any trees. • The impact of a specified flood level on the overall height of a building.
SIGNIFICANT LANDSCAPE OVERLAY - SCHEDULE 3 (SLO3)	SCHEDULE 3 TO CLAUSE 42.03 SIGNIFICANT LANDSCAPE OVERLAY - WESTERN COASTAL CLIFFS LANDSCAPE AREA – not applicable to the study site

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SUMMARY 2 – ESO, SLO PLANNING IMPLICATIONS

The study site includes General Residential Zoning and applicable overlays such as Environmental Significance (ESO) and Significant Landscape Overlay (SLO).

The study site is part of the western Curdies Inlet depression-based landforms of low elevation and highly-modified vegetation, and thus faunal habitat cover.

The site has an agriculture-based land-use history typical of surrounding catchments with increased landscape nutrient in-flows, sedimentation, soil structural compaction, and historic vegetation removal.

Past land-use has contributed to aquatic and terrestrial weed infestation, depression sedimentation, and entire removal of previous indigenous vegetation cover. Species compositions are now heavily dominated by common and exotic species with land-use impacting soil-based natural regenerative triggers.

The study site includes an approximately 1800m^2 eastern-adjoining roadside vegetation patch potentially requiring minor removal for multiple subdivision road access points.

The remainder of the site contains entirely-modified natural values such as natural depression/soakage areas to the west and north-west of the lot. Such a modified site may in fact be enhanced ecologically via longer-term subdivision development and resulting/required indigenous vegetation in-fill.

This biodiversity assessment was completed to provide benchmark flora and fauna habitat values understanding to support the potential sustainably-based future use of the site. The author suggests development and stewardship (ownership) of the site and ensuing lots may in fact increase habitat values in the long-term as landscape plans based on the *Peterborough Residential Design Guidelines*[2] are implemented.

Such implications are best managed via a concise and site/context/scale-based Environmental Management Plan (EMP) (or CEMP Construction Environmental MP).

Figure 3 – Study site features with site boundaries, adjoining roadside vegetation, and Curdies wetland system to the east.

[2] Moyne Shire Council 2006; Residential Design Guidelines, Peterborough, Victoria; Accessed from: https://www.moyne.vic.gov.au/files/assets/public/documents/your-property/planning/strategic-planning/peterborough_guidelines.pdf

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Figure 4 – Adjoining eastern fence-line with regrowth Coastal Headland Scrub (EVC161) vegetation and gravel dump site.

1 INTRODUCTION

1.1 Background

Peterborough is located on the banks of the Curdies River estuary and the eastern part of the spectacular limestone cliffs of the Bay of Islands Coastal Park containing a range of geomorphological features including cliffs, coastal stacks, headlands, and beaches. A number of geomorphologically and ecologically significant limestone depression wetlands or 'sinkholes' occur within and surrounding the town with increased groundwater/surface water connections.[3]

The Curdies River estuary is a significant ecosystem and nursery for a range of aquatic species providing important habitat for a variety of birdlife. It is important that development does not detrimentally affect these drainage features, further reduce the water quality of the Curdies River estuary, or impact on the environmental values of the coastal area.

The diversity of estuarine and wetland habitats support a range of flora and fauna species, both aquatic and terrestrial, with the estuary once an important resource for local indigenous populations.

The Curdies River Estuary forms a highly significant coastal estuary and wetland system providing potential transient habitat for *Flora and Fauna Guarantee Act (1988)* and *Environment Protection and Biodiversity Conservation Act (1999)* listed species (see *Section 2* & *Appendix 4-5*).[4]

The natural landscape is an important asset of the municipality that requires protection from inappropriate use and development. Erosion, sediment runoff, and the need to protect native vegetation are significant issues requiring ongoing attention, with surrounding in-fill development and introductions of pest plant and animals having ongoing impact on local and regional biodiversity (see *Section 3*).

Figure 5 – Existing distribution of within-site modified soakage areas and adjoining roadside regrowth coastal heath vegetation.

[3] Moyne Shire Council 2023; Moyne Shire Planning Scheme: Accessed from: https://planning-schemes.app.planning.vic.gov.au/MOYNE/ordinance/5120008
[4] RM Consulting Group 2017; CURDIES RIVER Estuary Management Plan; Accessed from: https://www.ccmaknowledgebase.vic.gov.au/soilhealth/soils_resource_details.php?resource_id=4873

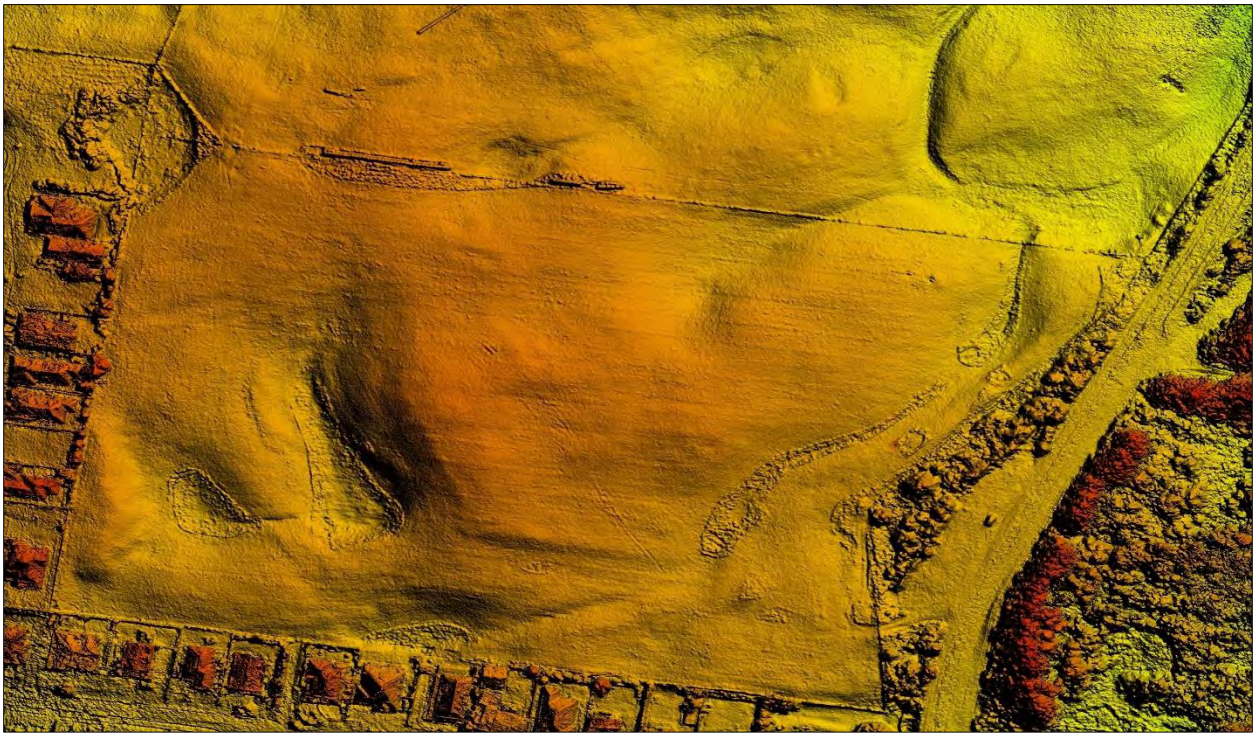


Figure 6 – Digital Surface Model (drone-generated) depicting slightly-exaggerated within-site drainage and slope patterns.

→ Properties should use in an integrated manner planting guidelines[5] developed by Moyne Shire Council with Parks Victoria. All new development should incorporate substantial provision of indigenous planting to foster rehabilitation of the coastal flora and fauna.

→ Habitat Corridors should be developed within all new developments, with the use of indigenous landscape guides defined by Moyne Shire Council.

Figure 7 – Current state of part of retained roadside vegetation due to material storage use.

[5] Moyne Shire Council 2006; Residential Design Guidelines, Peterborough, Victoria; Accessed from: https://www.moyne.vic.gov.au/files/assets/public/documents/your-property/planning/strategic-planning/peterborough_guidelines.pdf

[redacted]

1.2 Site Natural Features

The study site exists within northern fringes of the Peterborough township within coastal floodplain landscapes of generally flat volcanic and sedimentary-based landforms.

The site adjoins recent-decade subdivisions to the west with older residential development to the south. Eastern roadside vegetation adjoins the lot with proximal remnant indigenous vegetation within properties adjoining Old Peterborough Road to the east (see *Figure 8*).

The site includes multiple depression soakage areas now highly-modified with fringing exotic aquatic vegetation. The site forms part of the remaining modified floodplain landscapes to the east of Curdies Estuary.

The study site includes typical agriculture-based, widespread, and common exotic weed species such as Blackberry, Oxalis, and Ragwort. This therefore impacts remaining sparse habitat values confined outside the eastern lot boundary.

The site in general provides low-quality habitat for the most common and mobile (native/introduced) faunal species that may visit or be resident within the site (see *Figures 5-10*).

Figure 8 – Site subdivision configuration (Source: SITEC 2023).

The existing site has recently been utilised as grazing paddocks with the overarching landform consisting of ancient sand dune and floodplain landscapes. The study site's geology was formed on both volcanic and sedimentary lithologies.[6]

[6] Agriculture Victoria 2022, Victorian Geomorphology (sub-unit 6.2 Sedimentary plains; Accessed from: http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/landform_geomorphological_framework_6.2

Review of the 1:250 000 geological map of Colac (*SJ54-12*)[7] suggests the site is within an area of Tertiary, Miocene epoch Heytesbury Group, and Port Campbell Limestone geologies including continental shelf deposits including calcarenite, minor calcilutite, generally fine-grained, bryozoan, mollusc, echinoid, and brachiopod fragments.

Soil textures include minor coarse-grained calcarenite quartz sand and clayey silt that is weakly cemented and moderately bedded.

The study site is within western sub-catchments of the Curdies River Estuary with all original extent of EVC's (Ecological Vegetation Classes - vegetation) removed (such as EVC161 Coastal Headland Scrub and the endangered EVC746 Damp Heathland Mosaic).

Figure 9 – Coast Beard Heath (Leucopogon parviflorus) dominates regrowth sites within the fringing eastern roadside vegetation.

1.3 Survey Objectives

The objective of this biodiversity assessment was to inform future potential planning approval processes.

To complete this task the following legislative and natural asset information data collection occurred:

- *Review of relevant flora and fauna databases and available literature;*
- *Completion of a site assessment to identify flora and fauna values within the study area;*
- *Provision of maps showing any areas of remnant native vegetation and locations of any significant flora and fauna species, and/or fauna habitat;*
- *Classification of any flora and fauna species and vegetation communities identified or considered likely to occur within the study area in accordance with Commonwealth and State legislation;*
- *Opportunistic biodiversity assessment within the study area;*
- *Documented and relevant environmental legislation and policy; and*
- *Mitigation of potential risk to vegetation and fauna and their communities and habitats.*

Figure 10 – Un-managed gravel storage within roadside zones has fragmented localised indigenous species regrowth.

[7] Agriculture Victoria 2022, Victorian Geomorphology (sub-unit 6.2 Sedimentary plains; Accessed from: http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/landform_geomorphological_framework_6.2

1.4 Assessment Qualifications and Limitations

Data and information held within the ecological databases and mapping programs reviewed in the desktop assessment (e.g., VBA, PMST, Biodiversity Interactive Maps etc.) is in many cases aged data, unlikely to represent all flora and fauna observations within and surrounding the study area. It is therefore important to acknowledge that a lack of documented records does not necessarily indicate that a species or community is absent.

The field assessment was undertaken during a sub-optimal season for the identification of flora and fauna species (February 2023). The 'snapshot' nature of a standard biodiversity assessment meant that migratory, transitory, or uncommon fauna species may have been absent from typically occupied habitats at the time of the site assessment. In addition, annual or cryptic flora species such as those that persist via underground tubers may also be absent.

Figure 11 – Study lot and internal natural depression areas.

Figure 12 – Study site's adjoining and remaining habitat value within an entirely cleared and modified site.

2 RESULTS

2.1 Study Area

The study site exists to the west of the Curdies River Estuary within a flat and northern-facing site dominated by exotic vegetation and eastern-adjoining lot roadside native vegetation.

The study area occurs within the Warrnambool Plain Bioregion and Glenelg Hopkins Catchment Management Authority (CMA) area including the Moyne Shire Council local government area. The following table details key study area site features.

Table 1 – Key study site features.

Site feature	Description
Location	Address: 109 Old Peterborough Road, Peterborough, 3270. Lot and Plan Number: Lot 3 PS615833 Standard Parcel Identifier (SPI): 3\PS615833 Council Property Number: 500801 Planning Scheme: Moyne Shire
Topography	The study site includes flat to depression-based topography across the entire lot. The lot is west of the Curdies River Estuary and north of the Peterborough township and the Southern Ocean.
Site configuration	The study lot is broadly rectangular in shape on an east-west axis. Site configuration is based on historic land use and title delineation and not based on ecological principles.
Surface water	The within lot area includes multiple ephemeral depressions and a north-south drainage line, now highly modified.
Groundwater	Groundwater depth is suggested to be at between 13m and 21m depth and must be protected with any future development proposed[8] (based on Bore 84287).[9]
Indigenous vegetation (and species habitats)	*EVC161 Coastal Headland Scrub*[10] and *EVC746 Damp Heathland Mosaic* once would have persisted across the site based on previous EVC mapping although has probably not persisted on the site for over 50 years. Due to the highly-fragmented native vegetation within the site, it is expected and was observed that only common and mobile pest, exotic, and some native bird species utilise the site.
Modified vegetation	Few exotic or modified vegetation persists in the form of woody weeds, exotic pasture, aquatic, and wetland species. The lot edges include typical exotic grasses such as annual grasses, Rye Grass, Kikuyu, and Buffalo Grass. The lot also includes weed species such as: Blackberry (*Rubus sp.*) Various Thistle's (*Sonchus sp.)* Yorkshire Fog (*Holcus lanatus*) Flatweed (*Hypochoeris radicata)*.
Habitats	The historic removal of indigenous vegetation and related structural attributes and therefore potential faunal habitat, has been and continues to be, entirely modified within the site. Faunal species expected through such sites include the native Swamp and Bush Rats etc. Such species require above-average complexity such as diverse vegetation age classes, and understorey mosaics not existing within this site.
Site Threats – any works	-Increased surface water, nutrient, and sediment inputs/outputs from catchment and neighbouring properties -Existing indigenous vegetation fragmentation and removal -Weed seed dispersal from uncontrolled catchment and neighbouring properties and any proposed development including provision of site access. -Dust drift into/over/smothering wetland vegetation from building activities. -Surface and groundwater impacts -Introduction of weed seed to site from earthworks, within-site movement, construction vehicle local movements. -Erosion/removal of critical habitat substrates and soil-stored indigenous seed store.
Site Threats – ongoing land use	-Impacts to regenerating, restored site, or existing vegetation -Un-improved hydrology and catchment impacts increasing water and sediment inputs/outputs -Surface and groundwater impacts -Woody and bird/wind-dispersed weed species infestation -Whole of area wildfire -Uncontrolled domestic cat and dog access -Fox predation of persisting native faunal species including birds, small mammals, lizards, and amphibians -Uncontrolled site access and vegetation fragmentation -Lack of planned management for the site and subdivision
Site environmental values	See *Section 2.3*

[8] Federation University 2023; Visualising Victoria's Groundwater Map Portal; Groundwater Bores: Accessed from https://www.vvg.org.au/vvg_map.php?
[9] Federation University 2023; Visualising Victoria's Groundwater Map Portal; Groundwater Bores: Accessed from https://www.vvg.org.au/vvg_map.php?
[10] DELWP 2023; EVC Benchmarks; Accessed from: https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks

2.2 Desktop Assessment

Relevant literature, online-resources, and numerous databases were reviewed to provide an assessment of flora and fauna values associated with the study site. The following information sources were reviewed (see *Table 2*):

Table 2 - Relevant literature, online-resources, and numerous databases.

The DELWP NatureKit Map (DELWP 2022) and Native Vegetation Information Management (NVIM) Tool (DELWP 2022b) for:	-Modelled data for location risk, remnant vegetation patches, scattered trees, and habitat for rare or threatened species; -The extent of historic and current EVCs;
VicPlan	-To ascertain current zoning and environmental overlays;
EVC benchmarks (DELWP 2017b)	-Descriptions of EVCs within the relevant bioregion;
The Victorian Biodiversity Atlas (VBA) (DELWP 2018c)	-Previously documented flora and fauna records within the project locality;
The Illustrated Flora Information System of Victoria (IFLISV) (Gullan 2017)	-For assistance with the distribution and identification of flora species;
The Commonwealth Department of the Environment and Energy (DoAWE 2020) Protected Matters Search Tool (PMST)	-For matters of National Environmental Significance (NES) protected under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act);
Relevant listings under the Victorian Flora and Fauna Guarantee Act 1988 (FFG Act), including the latest Threatened and Protected Lists (DELWP 2018b)	-Victorian flora and fauna threatened species advisory lists for study area and sites proximal;
Drone and Aerial photography of the study area	-Collected drone and acquired aerial imagery;
Relevant environmental legislation and policies	-Ascertain planning and regulatory requirements;
Previous ecological assessments within study area	-Provide information regarding species surveyed, significance.

Figure 13 – Roadside regrowth *Coastal Headland Scrub* dominated by Coast Beard Heath as structural framework species.

2.3 Site Assessment

A site assessment was undertaken on the 18th February 2023 to obtain information on flora (and fauna) values within the study site and assess Clause 52.17, ESO, and SLO implications. All flora and fauna species observed within the study area were recorded, with significant records mapped, and the condition of existing vegetation and habitats noted.

Site inspection included a complete walk and drone inspection/mapping of the entire site. This allowed for rapid ground-based flora and biodiversity assessment of any persisting significant indigenous vegetation and related habitats. A GIS mapping project was created to integrate project information to enhance site interpretation of ongoing threats within and external to the study site.

Ecological Vegetation Classes (EVCs) were determined[11] with reference to DELWP pre-1750 and extant EVC mapping published descriptions (see *Figure 14*).[12]

EVC	EVC_BCS	EVCBCSDESC	X_EVCNAME
1	V	Vulnerable	Coastal Dune Scrub/Coastal Dune Grassland Mosaic
10	D	Depleted	Estuarine Wetland
16	V	Vulnerable	Lowland Forest
23	V	Vulnerable	Herb-rich Foothill Forest
53	E	Endangered	Swamp Scrub
160	D	Depleted	Coastal Dune Scrub
161	V	Vulnerable	Coastal Headland Scrub
162	V	Vulnerable	Coastal Headland Scrub/Coastal Tussock Grassland Mosaic
163	V	Vulnerable	Coastal Tussock Grassland
165	V	Vulnerable	Damp Heath Scrub
181	E	Endangered	Coast Gully Thicket
746	E	Endangered	Damp Heathland/Damp Heathy Woodland Mosaic

Figures 14-15 - Representative EVC's include elements of EVC161 Coastal Headland Scrub and EVC746 Damp Heathland Mosaic once dominated the site; local EVC's within 5km site buffer (Source: DELWP 2023).

Historically-distributed *Coastal Headland Scrub (EVC161)* and *Damp Heathland Mosaic (EVC746)* both endangered local EVC's should be utilised to restore the site and typically included the following life-forms and species: [13] *A low, grassy, or bracken-dominated Eucalypt forest or open woodland to 15m tall, with a large shrub layer and ground layer rich in herbs, grasses, and orchids. Such vegetation occurs on flat or undulating areas on moderately fertile, relatively well-drained, deep sandy or loamy topsoils, over heavier subsoils (duplex soils).*

Figures 16-17 – Swamp Antechinus *Antechinus minimus* and Australasian Bittern *Botaurus poiciloptilus* would have once been widely-distributed throughout the subject site (Source: Victoria Museum 2022).

[11] DELWP (2023), Native Vegetation Information Management System; Accessed from: https://nvim.delwp.vic.gov.au/
[12] DSE (2013), Vegetation Quality Assessment Guidelines; Accessed from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0023/51809/VQAM-V1_3-Chapters-1-11.pdf
[13] DELWP (2023); Warrnambool Plain Bioregion; Accessed from; https://www.environment.vic.gov.au/__data/assets/pdf_file/0031/48757/WaP_EVCs_combined.pdf

Table 3 – Field assessment results.

EVC's	Indigenous remnant vegetation has been entirely cleared from the lot however exists as a patch of roadside vegetation along the eastern lot boundary. This approximately 1800m² patch of regrowth *coastal headland scrub* includes localised native species as a result of gravel storage adjoining this area. This patch does however include elements of both previously-recorded EVC's; *EVC161 Coastal Headland Scrub and EVC746 Damp Heathland Mosaic*. Historic EVC161 and 746 and their key species and life-forms should form part of any broad-scale or within lot restoration effort.
Significant communities	No EPBC and FFG Act-listed communities exist within or immediately proximal to the study area based on desktop (and field survey) completed for this report.
Significant flora and fauna	Targeted surveys for threatened flora and fauna species have not been previously undertaken within the study area based on VVB[14] (DELWP 2023) database records. Areas within 5km of the study area do contain past records of significant terrestrial species however many records date back to the 1970's (and previous) and the species now don't exist due to increased localised fragmentation and vegetation modification. During the site assessment, any additional areas that could provide potential habitat for significant faunal species were noted.
Vegetation Condition Remnant Patches	Review of pre-1750 vegetation mapping[15] indicates that the study area would have originally supported two EVCs (161 & 746) and where the study area has been historically cleared for residential/agricultural activities on a relatively broad scale. The existing remnant and regrowth patch within eastern lot boundary areas is of moderate habitat quality of reduced area. The site is not directly contiguous with any remnant vegetation (connections) however patches of significant vegetation do persist on properties to the east of Old Peterborough Road (eastern direction).
Other vegetation within the study area	The lot is dominated by exotic pasture and some herbaceous vegetation. Woody weed species persist within the roadside patch.
Predominantly Introduced Vegetation	Exotic species within the site include woody, herbaceous, aquatic, and pasture exotic species.

Figure 18 – Dominance of movement-dispersed species within the gravel storage site such as *Cassinia aculeata*.

[14] CERDI (2023), Visualising Victoria's Biodiversity – Online Mapping; Accessed from: http://www.vvb.org.au/vvb_map.php
[15] DELWP (2023), Native Vegetation Information Management System; Accessed from: https://nvim.delwp.vic.gov.au/

[redacted]

Figure 19 – DELWP-modelled existing EVC patches within the landscape that don't actually exist on ground.

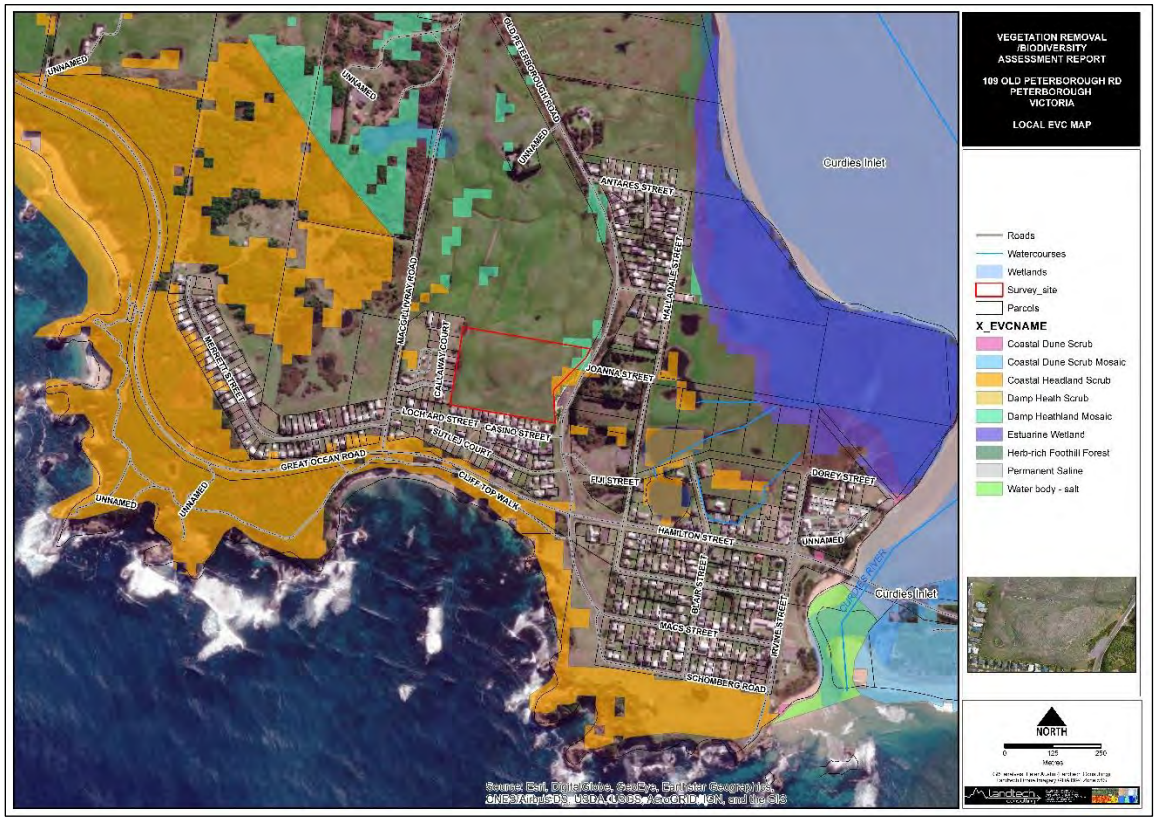


Figure 20 – Broad view of locally distributed EVC's or vegetation (faunal habitat) proximal to the site.

[redacted]

2.4 Significant Terrestrial vegetation within study area

Significant Vegetation Communities	
EPBC Act-listed Communities	No ecological communities listed under the EPBC Act are present within the study area.
FFG Act Listed Communities	No ecological communities listed under the FFG Act are present within the study area and will not be impacted by any future subdivision development.
Significant Flora Species	
Flora Species	A total of 396 plant taxa (287 indigenous, 109 introduced) have been recorded within 5km of the broader study area (DELWP VBA records).[16] Planted trees and shrubs were not recorded unless they were seen to be naturally recruiting on site (see *Appendix 5*).
National	Targeted surveys identified no flora species of national significance within the broader study area. There are 2 records of nationally significant flora species within 5km of the study site: *Clover Glycine (Glycine latrobeana – Vulnerable EPBC Act)*[17] *Swamp Greenhood (Pterostylis tenuissima - Vulnerable EPBC Act)* Such species will not be impacted by the subdivision development.
State	No state significant flora species were recorded within the study area. There is however 2 records of State-significant flora (both Vulnerable – FFG Act) within 5km of the study area that will not be impacted by the subdivision proposal. *Clover Glycine (Glycine latrobeana – Vulnerable FFG Act)* [18] *Swamp Greenhood (Pterostylis tenuissima - Vulnerable FFG Act)*

[16] CERDI (2023), Visualising Victoria's Biodiversity – Online Mapping; Accessed from: http://www.vvb.org.au/vvb_map.php
[17] Dept. of AWE (2023); Species SRAT Profile: Accessed from: https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=16542
[18] DELWP (2023); Flora & Fauna FFG Listings; Accessed from: https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=16542

Significant Fauna Species	
Fauna Species	A total of 172 fauna species comprising 165 native, 7 introduced were recorded during desktop scoping and via opportunistic recording during field assessment. A list of fauna species previously recorded within 5 kilometres of the study area is provided in *Appendix 5.*
National[19]	No nationally significant fauna species were recorded within the footprint of the study area. Twenty (12) nationally-listed fauna species has been recorded within 5km of the study area. However, these species are not provided the extent and connected high-quality habitat within the study area. Calidris ferruginea Curlew Sandpiper Critically Endangered Neophema chrysogaster Orange-bellied Parrot Critically Endangered Isoodon obesulus obesulus Southern Brown Bandicoot Endangered Botaurus poiciloptilus Australasian Bittern Endangered Arctocephalus tropicalis Subantarctic Fur Seal Endangered Thinornis rubricollis rubricollis Hooded Plover Vulnerable Thalassarche cauta Shy Albatross Vulnerable Thalassarche melanophris melanophris Black-browed Albatross Vulnerable Antechinus minimus maritimus Swamp Antechinus Vulnerable Sternula nereis nereis Fairy Tern Vulnerable Limosa lapponica Bar-tailed Godwit Vulnerable Neophoca cinerea Australian Sea Lion Vulnerable
State[20]	Seven (7) State-listed fauna species has been recorded within 5km of the study area consisting of the; Neophema chrysogaster Orange-bellied Parrot Critically endangered Isoodon obesulus obesulus Southern Brown Bandicoot Near threatened Botaurus poiciloptilus Australasian Bittern Endangered Thinornis rubricollis rubricollis Hooded Plover Vulnerable Thalassarche cauta Shy Albatross Vulnerable Antechinus minimus maritimus Swamp Antechinus Near threatened Sternula nereis nereis Fairy Tern Endangered These species are not provided the extent of and connected quality habitat within the study area to persist.
Fauna Habitats	
Significant faunal habitat	The study area would have once supported two broad faunal habitat types: Coastal Headland Scrub (EVC161) and Damp Heathland Mosaic (EVC746). Fauna habitat quality within the study site is low.
National	No faunal habitats of national significance were recorded within the study area.
State	No faunal habitats of State significance were recorded within the study area. Based on habitat type and conditions present, it is unlikely that any State significant fauna habitat will be significantly impacted by site development.
Regional and local	No regionally significant faunal habitats were recorded during field assessment within the study area.

[19] Dept. of AWE (2023b); Species SRAT Profile: Accessed from:http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=87645
[20] DELWP (2014) Advisory list of rare or threatened plants in Victoria; Accessed from:
https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

Significant Vegetation Communities	
EPBC Act-listed Communities	No ecological communities listed under the EPBC Act are present within the study area.
FFG Act Listed Communities	No ecological communities listed under the FFG Act are present within the study area and therefore will not be impacted by future subdivision development.
Significant Flora Species	
Flora Species	A total of 396 plant taxa (287 indigenous, 109 introduced) have been recorded within 5km of the broader study area (DELWP VBA records).[21] Planted trees and shrubs were not recorded unless they were seen to be naturally recruiting on site.
National	Targeted surveys identified no flora species of national significance within the broader study area.
State	No state significant flora species were recorded within the footprint of the study area.[22]
Significant Fauna Species	
Fauna Species	A total of 172 fauna species comprising 165 native and 7 introduced were recorded during desktop scoping and via opportunistic recording during field assessment. A list of fauna species previously recorded within 5 kilometres of the study area is provided in *Appendix 5*.
National	No nationally significant fauna species were recorded within the footprint of the study area.[23]
State	No State-listed fauna species has been recorded within the study area.
Fauna Habitats	
Significant faunal habitat	The study area would have once supported two broad faunal habitat types: Coastal Headland Scrub and Damp Heathland. Fauna habitat quality within the study area is low.
National	No faunal habitats of national significance were recorded within the study area.
State	No faunal habitats of State significance were recorded within the study area, and it is unlikely that any State significant fauna habitat will be significantly impacted by any future development.
Regional and local	No regionally significant faunal habitats were recorded during field assessment within the study area.

Figure 19 – Site feature map depicting subdivision configuration and roadside vegetation.

[redacted]

[21] CERDI (2023), Visualising Victoria's Biodiversity – Online Mapping; Accessed from: http://www.vvb.org.au/vvb_map.php
[22] DELWP (2014) Advisory list of rare or threatened plants in Victoria; Accessed from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

3 POTENTIAL IMPACTS

The study site exists as part of important local estuarine floodplain landscapes, with highly modified existing habitat values due to overarching historic agricultural and more recent residential growth impacts.

The site is already entirely cleared and devoid of habitat requiring sensitive site development to reduce impact to surrounding/proximal important estuarine and wetland habitats. Such impacts include modified hydrological regime from changed site flows (from potential site preparation activities), increased sediment movement, pollutants, and weed seed/propagules.

Where lot subdivision development proceeds, the integrated impacts should be managed carefully by a site-based Environmental Management Plan (EMP) for the longer term and must include weed management to manage access and construction impact.

Risks to groundwater from increased site water usage and rapid infiltration must be mitigated due to proximity of local groundwater to the surface.

Secondary impacts can be as fragmenting to ecological systems and their processes via simple examples such as construction dust smothering adjoining native vegetation and depression areas or weed infestation resulting from uncovered and contaminated construction soils, poor access/within-site movement procedures, poor site hygiene, intense rainfall events, and where storage, use of soils, and vegetation cover removal at the site may be uncontrolled.

Cumulative secondary impacts may impact specifically small mammals due to reduced diverse cover/habitat, increased and uncontrolled site access during construction activities providing increased pest and domestic animal pathways into and through the site.

If activities proposed such as earthworks are planned including the potential for ongoing impact, an environmental and weed management plan should be developed to support such a proposal.

Such integrated risks can be mitigated via the utilization of a site and context-based environmental management plan (construction/development/ongoing) applied to the site and should include management of primary and secondary impacts supporting measurable increases in local biodiversity long-term.

Best-practice suggests the completion and implementation of a context-based CEMP or Construction Environmental Management Plan integrating potential impacts with resolving mitigation measures.

The CEMP can also detail enhancing local biodiversity connections within and proximal to the site long-term through increasing the extent of (post-development) revegetation, site sedimentation mitigation, and vegetation quality improvements.

A summary of the key potential environmental impacts that typically require management prior to, during, and post-development is listed below.

Figure 20 – Existing lower quality grassland sites with reduced habitat quality and previous fragmentation.

Key impacts likely include:

- Fragmentation of existing roadside vegetation;
- Sediment and erosion impact to existing natural site drainage patterns, depressions, and groundwater;
- Surface water impact from development activities and poor drainage/sediment control techniques;
- Soil disturbance and compaction which contributes to soil structural decline, erosion, and increased weed spread within the study site and beyond;
- Potential local weed spread via worker, construction equipment, vehicle movement, and uncontrolled site movement and access;
- Direct impacts to neighbouring properties, amenity, human health during construction activities;
- Dust depositing on within and beyond-site vegetation;
- Incremental degradation of site's remaining habitat values;
- Reduced existing vegetation protection – damage to existing natural infrastructure; and
- Potential impact to groundwater table and local aquifers.

Figure 21 – Retained/regrowth roadside vegetation that may be impacted by access points to the subdivision site.

4. Assessment of native vegetation/biodiversity - native vegetation guidelines (Clause 52.17)

The purpose of *Clause 52.17* (Native Vegetation)[24] is to ensure that there is no net loss to biodiversity as a result of the removal, destruction, or lopping of native vegetation, and is achieved by applying the following three-step approach in accordance with the Guidelines for the removal of native vegetation (DELWP 2017):

1. Avoid the removal, destruction or lopping of native vegetation.
2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
3. Provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation. To manage the removal, destruction or lopping of native vegetation to minimise land and water degradation.

The proposal includes detailed site feature and access design to minimise the required removal of native regrowth vegetation within a 66m^2 area and requiring offsetting as part of Clause 52.17.[25]

Avoid statement

The following practical approaches to minimising site impact should apply to this proposal.

- Design, location, and area minimisation/restriction of any proposed access/development footprints to minimise impact to the site, it's catchment, landform, vegetation, and soil profiles.
- Planned development has been designed/located to *avoid* impact to reduced quality and coverage of native vegetation.
- The design proposal has utilised existing site features for access to minimise impact to the site and adjoining vegetation.
- Utility infrastructure should be located underground by boring instead of open trenching.
- Adjoining roadside and within site existing vegetation and modified wetland area should be protected as part of suggested site and context-based Construction Environmental Management Plan (CEMP) to reduce impact to extent and condition (incremental fragmentation, dust coverage, weed infestation, localised erosion, uncontrolled site access etc.
- Future revegetation of the site's reserve areas should utilise elements of key historic EVC161 species (Coastal Headland Scrub) and/or EVC746 (Damp Heathland mosaic) to enhance site habitat values and total vegetation extent.

[24] DELWP (2022); Victorian Planning Provision 52.17; Accessed from; https://planning-schemes.delwp.vic.gov.au/schemes/vpps/52_17.pdf
[25] (DELWP 2005). A NATIONAL APPROACH TO BIODIVERSITY DECLINE; Accessed from: https://www.awe.gov.au/sites/default/files/documents/biodiversity-decline.pdf

Minimise Statement

The minimisation of impact to roadside vegetation and the within-lot entirely-cleared and modified site includes techniques based on an understanding of surrounding intact local ecosystem types and their intrinsic dynamics.

Managing construction impact and relinking land cover would form a framework for sustaining the site and adjoining local and regional natural values. Key considerations must include the impact of surface cover removal, vegetation removal, sedimentation, changed site hydrology, weed invasion, dust impact, and groundwater/aquifer protection.

The following minimisation processes should be built into site environmental and construction management actions:

- Encourage natural regeneration, utilise direct-seeding, fencing off, and extensive/linkage replanting of native EVC161 and EVC746 (Warrnambool Plain Bioregion) species (replace)[26]
- Minimise disturbance to adjoining roadside vegetation and within lot historic depression areas by reducing planned built/development footprints, elevating built features, reducing site excavation, and controlling site construction movement (minimise);
- Minimise loss of existing roadside vegetation remaining as faunal cover during any construction or development activity;
- If replanting, use native species and local provenance/EVC-type to restore the natural hierarchy of trees, shrubs, and groundcover life forms;
- Siting and design of structures/utilities to avoid impacts to existing vegetation and depressions (avoid).

Future site landscape design/architecture planning can incorporate improvements to implement wind protection, erosion reduction, and the provision of natural protection/buffering of existing roadside natural values. Such objectives will be supported by specific outcomes and implementation measures resulting in overall improvements to the environmental management of the study site.

Effective site impact minimisation will include consideration of both the natural and cultural heritage values, maintenance of the health of local ecological systems and landscape processes, managing threats to flora and fauna, and enacting high-level and ecologically sound on-ground adaptive management.

Figures 22-23 – Indigenous species such as those within EVC161 and EVC746 above should be utilised at least as part of future site development and enhancement (Source: DELWP 2023).

[26] Victorian Government (2020); Siting & Design Guidelines; Accessed from: https://www.marineandcoasts.vic.gov.au/__data/assets/pdf_file/0027/478413/Siting-and-Design-Guidelines_May2020_WEB.pdf

Figures 22-23 – Extent of impacted vegetation resulting from access design.

[redacted]

5. Assessment of ESO overlay

The study site is within both the Environmental Significance Overlay (ESO) and Significant Landscape Overlay (SLO) and related schedules. The report is based primarily on flora/fauna/biodiversity assessment compliance and where ESO and SLO compliance discussion is included to support integrated planning approval outcomes.

ENVIRONMENTAL SIGNIFICANCE OVERLAY (ESO) - 42.01-5 - Decision guidelines

Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

Table 4 - Environmental Significance Overlay response.

The Municipal Planning Strategy and Planning Policy Framework	The Municipal Planning Strategy and Planning Policy Framework recognises the need to protect, conserve, manage and develop the coast in a sustainable environmental and economic manner with relation to reference documents required such as: • Peterborough Residential Design Guidelines (Moyne Shire Council 2006)[27] • Peterborough Urban Design Framework (2002)[28] • Moyne Shire Coastal Area Study, 1996 • Moyne Coastal Action Plan 2001 • South West Victoria Regional Coastal Action Plan 2001 • South West Victoria Estuaries Coastal Action Plan 2001 Reference documents listed above were accessed in the development of this report.
The statement of environmental significance and the environmental objective contained in a schedule to this overlay.	Statement of environmental significance *The study site is proximal to wetlands and significant geological feature to the east and west (associated with the Curdies River Estuary).* Environmental objective Any future site proposal must be guided by an Environmental Management Plan to support mitigation of impact to the following proximal regional area natural assets. This should include: -conserve and enhance the environmental qualities of the coast, estuarine ecology of the Curdies River, and structural and water quality of local limestone depressions; -the water quality of the limestone depressions and maintenance and enhancement of the estuary of the Curdies River; -protection of sand dunes and coastal cliffs to remain in a stable condition; -significant and valuable ecological systems are protected; -management of stormwater discharges to the Curdies River estuary and limestone depressions from development; -implement stormwater and grey water recycling systems where applicable; and -a focus on buffering revegetation using native coastal species local to the Peterborough area and suggested historic EVC.
The need to remove, destroy or lop vegetation to create a defendable space to reduce the risk of bushfire to life and property.	The subject lot adjoins highly modified lawn/pasture/roadside land cover reducing the bushfire risk. No vegetation will be required to be removed for defendable space provision.
Any other matters specified in a schedule to this overlay.	The site should be enhanced with strategic revegetation which could enhance habitat quality over the longer term. This would be required to be based on an integrated and strategic EMP (and Construction EMP) utilising local EVCs and aimed at enhancing site habitat values.

[27] Moyne Shire Council 2006; Peterborough Residential Design Guidelines.
[28] Moyne Shire Council 2002; Peterborough Urban Design Framework.

ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 2 (ESO2) - Decision guidelines

The following guidelines apply to an application for a permit under Clause 42.01, in addition to those specified in Clause 42.01 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority:

Table 5 – ESO2 response.

The existing use or development of the land.	The lot is currently entirely cleared of native vegetation and dominated by exotic pasture cover and used as grazing land. The condition of the site depicts the historic use of the site for intensive agriculture.
The impact of the development on other properties.	The potential impact to surrounding properties includes dust deposition, surface water run-on, noise, vibration, and access constraints based on the extent of subdivision development. Such impacts must be managed via a detailed Construction Environmental Management Plan which depicts mitigation if such issues. Further impact mitigation is detailed in additional consultant reports lodged with the planning permit. Development of the study site may in fact lead to reduced impact to neighbouring properties as the site is restored via weed control and additional planted vegetation from the current reduced quality state.
The degree of dependence of the development on the coastal environment.	Any multi-lot subdivision requires enhanced mitigation measures to limit impact to associated and proximal wetlands to the east as part of broader coastal environs. Further site mitigation and rehabilitation should be guided by the proposed CEMP to support proposed development within the site.
The soil stability of the subject land and the need to prevent soil erosion.	Soil erosion and sedimentation prevention is critical to any proposed subdivision development within the lot. Context-specific guidelines such as the Peterborough Urban Design Framework (2002), Siting and Design Guidelines for Structures on the Victorian Coast (1998), and erosion and sediment control specific documents such as EPA Publication 1834, and AS/NZS ISO 14001:2004 Environmental Management Systems should be utilised.
The likelihood of pollution and/or siltation of any watercourse.	The site is proximal to but does not adjoin key wetland receptors to the east. The site is geographically buffered to such sites however subdivision earthworks and development must include sedimentation management mitigation as a key environmental management planning issue. Based on suggested use of erosion and sediment control management and planning strategies in a detailed CEMP, impacts to local watercourses should be minimised.
The amount of natural vegetation to be removed through the construction of any buildings or works.	Impacts to native vegetation have been minimised via careful selection of access points and required roadside vegetation to be removed. No native vegetation exists within the subject lot therefore impact is negated.
Whether adequate provision has been made for the landscaping and treatment of the site.	Landscape and Revegetation planning should be completed within the planning permit process including the requirement for lot-based landscape plans that utilise a high proportion of local EVC indigenous species. Such plans should detail site restoration and enhancement techniques strategically utilised to support increased habitat values and longer term site sustainability. Revegetation plans can be incorporated into an ongoing Environmental Management Plan that is lot and context-based utilising elements from historic EVCs such as EVC161 Coastal Headland Scrub.
The value of any native vegetation to be removed in terms of its physical condition, rarity, or variety.	The existing within lot native vegetation cover is non-existent with adjoining lot roadside native vegetation persisting. Coastal Headland Scrub is a depleted vegetation locally that has regrowth ability to re-colonise sites such as the roadside area. Such vegetation is significant in as much as it provides transitional habitat for a reduced suite of faunal species based on reduced area.
The protection and enhancement of the landscape.	Landscape and Revegetation planning should be completed via the CEMP process detailed in this report. Such plans should detail site restoration and enhancement techniques strategically utilised to support increased habitat values and longer term site sustainability.
The desirability of retaining a buffer strip of native vegetation along roads, watercourses, and property boundaries.	Buffer strips should be utilised if possible at this site to improve amenity, increase interception of surface waters, and provides partial habitat for common and mobile species. The existing eastern roadside native vegetation will be protected and enhanced via the CEMP planning process and where additional buffer strip planting should utilise EVC161 and EVC746 species.[29]

[29] Moyne Shire Council 2002; Peterborough Urban Design Framework.

The need to protect the environmental values of limestone depressions including avoidance of the draining and filling of limestone depressions.	It is imperative that sinkhole/limestone depressions within the Peterborough township are protected and enhanced. Natural drainage onto the lot from surrounding catchments should be restored to as close as possible to 'natural flows'. The overarching structure and integrity of local wetlands must be maintained and not altered without prior detailed analysis.
The desirability of maintaining natural drainage features.	The lot includes a number of former natural depressions now entirely modified but nonetheless requiring careful management during subdivision construction. Such sites form former connections to proximal depressions and where construction water must be minimised within site. Local sinkhole features are integral to the localised limestone geology and provide landforms not found in many parts of Australia.
The Peterborough Urban Design Framework, 2002.	Section 5 of the Peterborough Urban Design Framework (2002) suggests: Buildings should address both the street they are on and the landscape feature. This address should be open and informal. Buildings should have a minimum setback of 15m from any sinkhole's edge. Fences are discouraged and should not block views between dwellings and the feature. Instead, developments should use landscaping or built form decisions to enable the protection of outdoor zones from weather. Fencing will only be supported in extreme circumstances. Where included as part of a town trail network, adequate informal reserve should be provided so that pedestrians can access local sinkholes and walk around one side of them. For this purpose, a strip of at least 5m should be maintained around a sinkhole's edge.

Figure 24 – Potential site enhancement may include linkage of the site via corridors and stepping stones to surrounding core remnants.

6. Assessment of SLO and SLO2 OVERLAYS

42.03 SIGNIFICANT LANDSCAPE OVERLAY (SLO) - Objectives

- To implement the Municipal Planning Strategy and the Planning Policy Framework.
- To identify significant landscapes.
- To conserve and enhance the character of significant landscapes.
- A statement of the nature and key elements of the landscape.
- The landscape character objectives to be achieved.

Decision guidelines

Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

Table 6 – SLO, SLO2 response.

The Municipal Planning Strategy and the Planning Policy Framework.	The Municipal Planning Strategy and Planning Policy Framework recognises the need to protect, conserve, manage and develop the coast in a sustainable environmental and economic manner. Reference documents such as the following have been accessed in the development of this report: • Peterborough Residential Design Guidelines (Moyne Shire Council 2006)[30] • Peterborough Urban Design Framework (2002)[31] • Moyne Shire Coastal Area Study, 1996 • Moyne Coastal Action Plan 2001 • South West Victoria Regional Coastal Action Plan 2001 • South West Victoria Estuaries Coastal Action Plan 2001
The statement of the nature and key elements of the landscape and the landscape character objective contained in a schedule to this overlay.	SIGNIFICANT LANDSCAPE OVERLAY - SCHEDULE 2 (SLO2) - SCHEDULE 2 TO CLAUSE 42.03 SIGNIFICANT LANDSCAPE OVERLAY - PETERBOROUGH URBAN COASTAL AREA To maintain the small scale seaside village character of Peterborough. To encourage the development of buildings that fit within the landscape and do not dominate the streetscape and long distance views from the coast, estuary, the rural hinterland and along the Great Ocean Road. To minimise the impact of buildings that project above the vegetation canopy. To encourage development to continue the use of light colours and tones, rather than bright or garish colours. To provide space around buildings for the retention and planting of vegetation, particularly native coastal species common to the area. To maximise opportunities for view sharing, particularly where views are available to the ocean, Curdies River, the rural hinterland and along the Great Ocean Road from private dwellings. To protect vistas of the ocean and the Curdies River available from public viewing points in the town, Bay of Islands Coastal Park and other areas of high visual amenity.
The conservation and enhancement of the landscape values of the area.	Any proposed project must utilise mitigatory techniques and methodologies to conserve local geologically significant landscapes and their inherent values. This requires compliance with overlay requirements and a focus on a context-based environmental management plan to reverse and manage key issues impacting local area landscape values. Landscape planning will be required to utilise elements from historic EVCs distributed within the site to enhance habitat and biodiversity values within and beyond the site. Site drainage and hydrology mechanisms must be addressed to redirect potential high-nutrient stormwater flows influencing increased exotic species dominance within the site. Groundwater flows must also be protected via mitigating increased flows via construction practices. Best-practice erosion and sediment control guidelines such as ASNZS and EPA Publications provide useful guidance regarding site impact minimisation measures. A restoration and revegetation plan should be part of the CEMP prepared for the site that aims to replace key elements of historically distributed coastal-based species.

[30] Moyne Shire Council 2006; Peterborough Residential Design Guidelines.
[31] Moyne Shire Council 2002; Peterborough Urban Design Framework.

The impact of the proposed buildings and works on the landscape due to height, bulk, colour, general appearance or the need to remove vegetation.	Any development proposal must meet planning regulatory requirements and a focus on the Peterborough Residential Design Guidelines (Moyne Shire Council 2006)[32] and the Peterborough Urban Design Framework (2002).[33]
The extent to which the buildings and works are designed to enhance or promote the landscape character objectives of the area.	
The impact of buildings and works on significant views.	
Any other matters specified in a schedule to this overlay.	

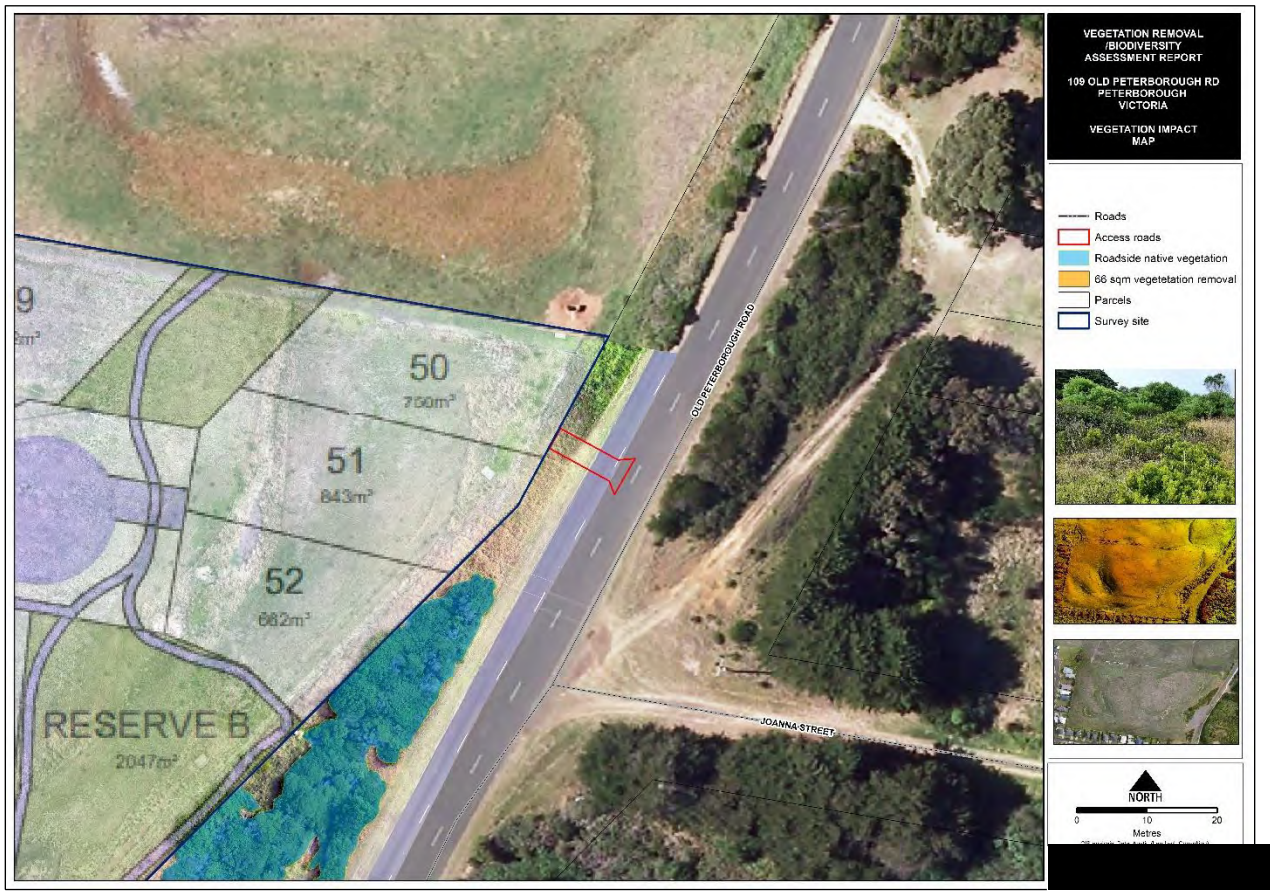


Figure 25 – Closer view of northern access point and lack of native vegetation impacted.

[32] Moyne Shire Council 2006; Peterborough Residential Design Guidelines.
[33] Moyne Shire Council 2002; Peterborough Urban Design Framework.

7. MITIGATION MEASURES - SUMMARY

Mitigation measures should be specifically detailed in an EMP or CEMP and address the following key points:

1. Mitigate and manage key threats such as – further vegetation fragmentation, groundwater recharge, sediment and erosion inputs, development/construction impact to entire lot drainage, increased off-site nutrient discharge, increased weed and pest animal invasion, impact to adjoining vegetation, dust impact on adjoining wetlands, simplification of habitat structure, reduced adjoining amenity.

2. Protect biodiversity values – protecting/hessian fencing vegetation, strategic planning of site activities to reduce acute/chronic impact to site, promoting self-regenerative processes (natural revegetation, direct-seeding, weed suppression), increase indigenous vegetation cover/structural attributes, integrated weed control, and minimise pest animal species harbourage.

3. Enhance biodiversity values – increase within and off-site vegetation connections via assisted revegetation and woody and herbaceous weed control.

4. Develop and implement a CEMP or EMP that addresses key threats and their management within the site during development and longer term.

5. The development of effective weed management should follow guidelines set out in the CaLP Act (1994), be based on known ecological principles, and outline obligations in relation to minimising the spread of weeds and enable planning of weed minimisation steps, including management of construction stockpiles, minimising machinery impact, bare earth cover practices, and activities that must be located away from areas supporting existing native vegetation and other ecologically sensitive areas.

Figure 26 – Digital surface model depicting site elevation for planning and development interpretation.

8. CONCLUSION/RECOMMENDATIONS

The following recommendations are provided to meet Clause 52.17, ESO, and SLO findings:

1. The proposal includes detailed site feature and access design to minimise the required removal of native regrowth roadside vegetation within a 66m² area and requiring offsetting as part of Clause 52.17.[34]

2. "The client will be purchasing an offset from an existing native vegetation credit site."

3. Vegetation assessed within the subject lot is entirely modified and does not meet the definition of native vegetation (DELWP 2019);

4. Future site reserve revegetation and potential site linkage within the broader landscape should utilise elements of key historic EVC groups such as *EVC161 Coastal Headland Scrub* and *EVC746 Damp Heathland* mosaic to enhance site habitat values and total vegetation extent; and

5. Implementation of a site and context-based EMP or CEMP (Construction Environmental Management Plan) based on accepted guidelines such as *Environmental Guidelines for Major Construction Sites.*[35] The EMP should detail weed management processes, enhancing local biodiversity connections within and proximal to the site, increasing the extent of (post-development) revegetation, ongoing site sedimentation mitigation, and vegetation/habitat quality improvements.[36]

Figure 27 – Southern access points and roadside native vegetation impacted.

[34] (DELWP 2005). A NATIONAL APPROACH TO BIODIVERSITY DECLINE; Accessed from: https://www.awe.gov.au/sites/default/files/documents/biodiversity-decline.pdf
[35] EPA Victoria; Publication 1834; Accessed from: https://www.epa.vic.gov.au/about-epa/publications/1834
[36] (DELWP 2005). A National Approach To Biodiversity Decline - Accessed from: https://www.awe.gov.au/sites/default/files/documents/biodiversity-decline.pdf

9. (CONSTRUCTION) ENVIRONMENTAL MANAGEMENT PLAN

The provision of a site-based CEMP is beyond the scope of this report but would be required to address as a minimum the details provided below.

The CEMP typically consists of the following key aspects:

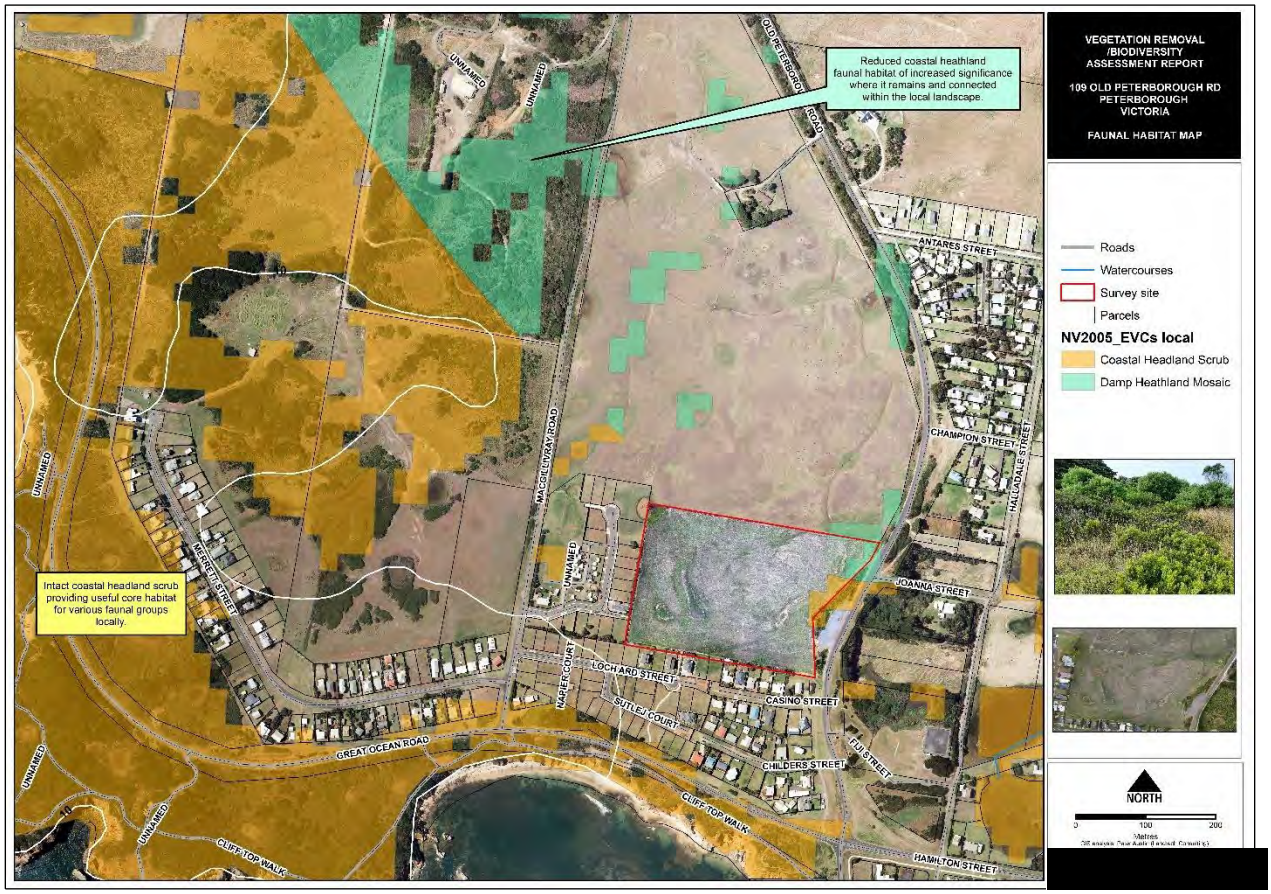
1. Environmental values
2. Environmental and Noxious weeds
3. Potential project/development environmental impacts/threats
4. Post construction threats, mitigation measures
5. Key mitigation measures
6. Performance indicators
7. Monitoring and reporting
8. Contingency planning

The Construction Environmental Management Plan must address the potential environmental impacts of any project and be incorporated into an operating framework which can be readily understood by the intended users. As a minimum it must include:

- → *identification of environmental risks, threats, conditions, and issues, particularly sensitive areas, and potential impacts, including those matters described in relevant studies;*
- → *the management measures and methodologies to be taken to meet the environmental performance requirements, and the risk assessment procedures to be applied in evaluating siting, design, and mitigation measures;*
- → *contingency measures to be adopted if significant environmental risks are either identified/encountered through the risk assessment process or project itself;*
- → *develop the Construction Environmental Management Plan with reference to the Environment Protection Authority Publication No 480 Environmental Guidelines for Major Construction Sites, and any specific requirements of relevant Authorities;*
- → *Regulatory mechanisms do not require the enhancement of vegetation however this is encouraged as best-practice coastal management procedures and aims to reduce potential for negative impacts to adjoining site biodiversity values.*
- → *the following environmental management system elements:*

  (i) environmental policy and planning;
  (ii) resources, roles, responsibilities, and authorities;
  (iii) competence, induction, training, and awareness including the methods and means by which environmental management requirements will be incorporated into day-to-day work activities (for example, JSEA, design standards, work method statements, pre-start checklist and "tool box" training);
  (iv) documentation;
  (v) control of environmental documents;
  (vi) management review including performance monitoring of the implementation and effectiveness of the environmental management system

Appendix 1 – Key site features map



Appendix 2 – Legislative, Policy implications

Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act establishes a Commonwealth process for the assessment of actions likely to have a significant impact on any matters of National Environment Significance (NES), described below.

Potential impacts to Matters of National Environmental Significance (NES).

Matter of NES	Potential impacts
World Heritage Properties	The proposed action will not impact World Heritage Properties.
National Heritage Places	The proposed action will not impact national heritage places.
Ramsar Wetlands of International Significance	The proposed action occurs within 100km of a Ramsar Wetland and will not impact this Ramsar site.
Threatened Species and Ecological Communities	The proposed action[37] will not impact Threatened Species and Communities.
Migratory and Marine species	The proposed action will not impact migratory and marine species.
Commonwealth Marine Area	The proposed action is not in a Commonwealth marine area.
Nuclear Actions (Uranium Mining)	The proposed action is not a nuclear action.
Great Barrier Reef Marine Park	The proposed action will not impact the Great Barrier Reef Marine Park.
Water Resources impacted by Coal Seam Gas or Mining Development	The proposed action is not a coal seam gas or mining development.

[37] Dept. of AWE (2022); Species Profile and Threats Database. Accessed from: https://www.environment.gov.au/cgi-bin/sprat/public/conservationadvice.pl

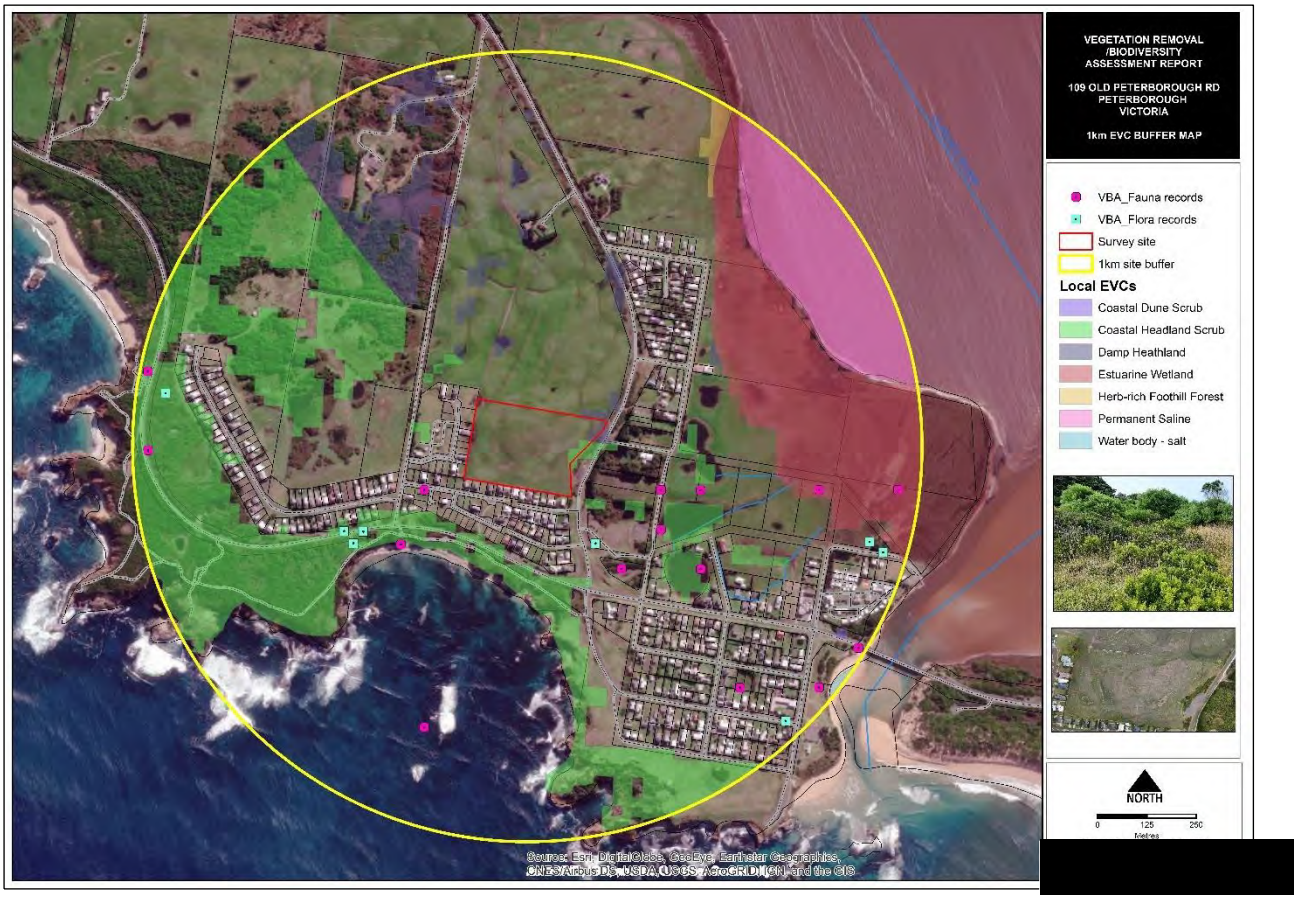
Proposed actions and related legislative implications

Legislation	Impact
Flora and Fauna Guarantee Act 1988 (Victoria)	The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to 'take' listed and/or protected flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.
Flora	There were no species listed under the FFG Act identified within the study area. Two (2) species listed under the FFG Act have previously been recorded within 5km of the study area.[38] Any proposed development is not likely to significantly impact such species.
Fauna	No species listed under the FFG Act were detected during the flora/fauna assessments within the study area. Twelve (15) species listed under the FFG Act have previously been recorded within 5km of the study area.[39] Due to the fragmented and modified nature of the existing site and absent habitat, it is unlikely any state-significant species are likely to use habitat resources within the study area, and therefore any future development is not likely to significantly impact such species.
Communities	There were no communities listed under the FFG Act within the study area.
Threatening processes	Threatening process listed under *Schedule 3 of the FFG Act* that require consideration include: • Alteration to the natural flow regimes of rivers and streams; • Degradation of native riparian vegetation along Victorian rivers and streams; • Increase of sediment input into Victorian rivers and streams due to human activities; • Input of toxic substances into Victorian rivers and streams; • Invasion of native vegetation by Gorse (*Ulex europaeus);* • Invasion of native vegetation by 'environmental weeds'; • Loss of hollow-bearing trees from Victorian native forests; and • Prevention of passage of aquatic biota as a result of the presence of instream structures.
Environment Effects Act 1978 (Victoria)	The Environment Effects Act 1978 provides for assessment of actions that are capable of having a significant effect on the environment via the preparation of an Environment Effects Statement (EES). A project with potential adverse environmental effects that, individually or in combination, could be significant in a regional or State context should be referred. An action may be referred for an EES decision where one of the following occurs: -Potential clearing of 10 hectares or more of native vegetation from an area that: ▪ is of an EVC identified as endangered by DELWP; ▪ is of Very High conservation significance; or, ▪ is not authorised under an approved Forest Management Plan or Fire Protection Plan. -Potential long-term loss of a significant proportion (1-5% depending on conservation status of species) of known remaining habitat or population of a threatened species within Victoria; or where two or more of the following occur: ▪ Potential clearing of 10 hectares or more of native vegetation, unless authorised under an approved Forest Management Act or Fire Protection Plan; ▪ Matters listed under the FFG Act: • Potential loss of a significant area of a listed ecological community; • Potential loss of a genetically important population of an endangered or threatened species; • Potential loss of critical habitat; or, • Potential significant effects on habitat values of a wetland supporting migratory birds. <u>The proposed subdivision will result in no removal of native vegetation. Based on the extent of the potential impacts a referral under the EE Act is not warranted. An explanation relating to the specific criteria relevant to ecology is provided:</u> <u>The proposal will not lead to the potential long-term loss of a significant proportion (1-5% depending on conservation status of species) of known remaining habitat or population of a threatened species within Victoria. The development will not lead to the loss of the following:</u> ▪ Matters listed under the FFG Act: ▪ Potential loss of a significant area of a listed ecological community; ▪ Potential loss of a genetically important population of an endangered or threatened species; ▪ Potential loss of critical habitat; or, ▪ Potential significant effects on habitat values of a wetland supporting migratory birds.

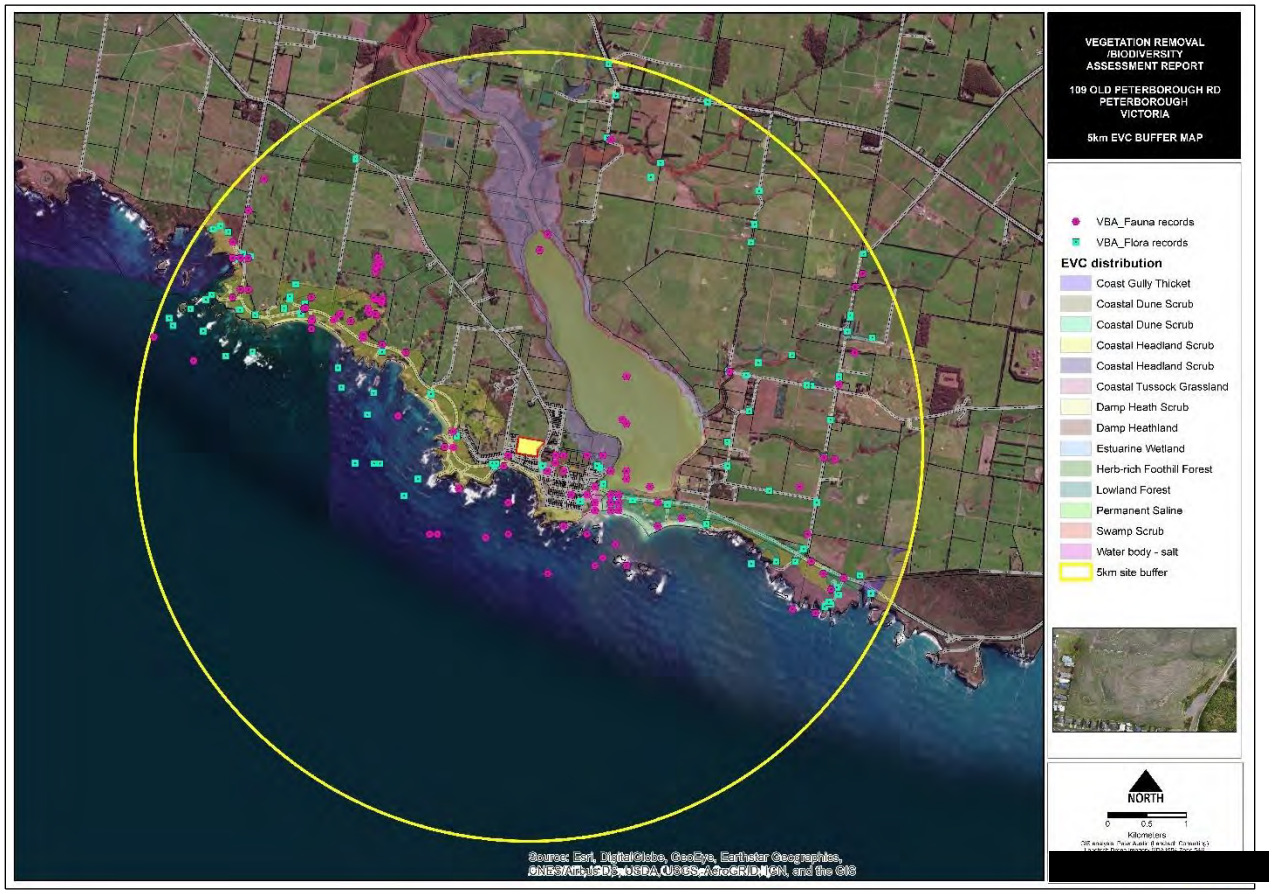
[38] Viridans (2013), Victorian Fauna and Flora Database; Accessed from: http://www.viridans.com/vicfisvfd/
[39] Viridans (2013), Victorian Fauna and Flora Database; Accessed from: http://www.viridans.com/vicfisvfd/

Legislation	Impact
Wildlife Act 1975 and Wildlife Regulations 2013 (Victoria)	The Wildlife Act 1975 (and associated Wildlife Regulations 2013) is the primary legislation in Victoria providing for protection and management of wildlife. Authorisation for habitat removal may be obtained under the Wildlife Act 1975 through a licence granted under the Forests Act 1958, or under any other Act such as the Planning and Environment Act 1987. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the Wildlife Act 1975, issued by DELWP. If processes within the suggested CEMP are adopted, any future development will not result in likely salvage of fauna, and therefore Management Authorisation under the Wildlife Act 1975 is not required.
Catchment and Land Protection Act 1994 (Victoria)	The Catchment and Land Protection Act 1994 (CaLP Act) contains provisions relating to catchment planning, land management, noxious weeds, and pest animals. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species to minimise their spread and impact on ecological values. A number of weeds listed as noxious under the CaLP Act were recorded proximal to the assessment site such as African Boxthorn. Any development should include controls (within the CEMP) to prevent the introduction of noxious weed species within the property or adjoining vegetation corridors. Any infestation of noxious weeds that may become established during and/or after the completion of any works should be appropriately controlled in areas of native vegetation to minimise their spread and overall impact on ecological values. It is understood that these requirements could be adequately addressed by the development of a site-based CEMP management arrangement.

Appendix 3 – Vegetation types, Biodiversity values map



Appendix 4 – Flora/Faunal records map (within 5km of study area)



Appendix 5 – Flora/Fauna records (within 5km of study area)

SCI_NAME - FLORA	COMM_NAME	VICADVDESC	EPBC_DESC	ORIGIN
Glycine latrobeana	Clover Glycine	Vulnerable	Vulnerable	
Pterostylis tenuissima	Swamp Greenhood	Vulnerable	Vulnerable	
Acacia genistifolia	Spreading Wattle			
Acacia howittii	Sticky Wattle	Rare		Native but some stands may be alien
Acacia longifolia	Sallow Wattle			Native but some stands may be alien
Acacia longifolia subsp. longifolia	Sallow Wattle			Native but some stands may be alien
Acacia longifolia subsp. sophorae	Coast Wattle			Native but some stands may be alien
Acacia melanoxylon	Blackwood			
Acacia myrtifolia	Myrtle Wattle			
Acacia stricta	Hop Wattle			
Acacia verticillata	Prickly Moses			
Acacia verticillata subsp. verticillata	Prickly Moses			
Acaena echinata	Sheep's Burr			
Acaena novae-zelandiae	Bidgee-widgee			
Acaena spp.	Sheep's Burr			
Acrotriche affinis	Ridged Ground-berry			
Acrotriche prostrata	Trailing Ground-berry			
Acrotriche serrulata	Honey-pots			
Actites megalocarpus	Dune Thistle			
Agapanthus praecox subsp. orientalis	Agapanthus			Introduced
Agrostis capillaris	Brown-top Bent			Introduced
Agrostis capillaris var. capillaris	Brown-top Bent			Introduced
Aira caryophyllea subsp. caryophyllea	Silvery Hair-grass			Introduced
Aira cupaniana	Quicksilver Grass			Introduced
Aira praecox	Early Hair-grass			Introduced
Allocasuarina paludosa	Scrub Sheoak			
Allocasuarina verticillata	Drooping Sheoak			
Alyxia buxifolia	Sea Box			
Ammophila arenaria	Marram Grass			Introduced
Amperea xiphoclada var. xiphoclada	Broom Spurge			
Amphibromus neesii	Southern Swamp Wallaby-grass			
Angianthus preissianus	Salt Angianthus			
Anthoxanthum odoratum	Sweet Vernal-grass			Introduced
Apium prostratum subsp. prostratum	Sea Celery			
Apium spp.	Celery			
Apodasmia brownii	Coarse Twine-rush			
Arctotheca calendula	Cape weed			Introduced
Argentina anserina	Silverweed			
Arum italicum subsp. italicum	Italian Cuckoo-pint			Introduced
Asperula conferta	Common Woodruff			
Astroloma humifusum	Cranberry Heath			
Atriplex prostrata	Hastate Orache			Introduced
Austrostipa rudis subsp. rudis	Veined Spear-grass			
Austrostipa semibarbata	Fibrous Spear-grass			
Banksia marginata	Silver Banksia			
Barbula calycina	Common Beard-moss			
Baumea juncea	Bare Twig-sedge			

Baumea spp.	Twig Sedge			
Bolboschoenus caldwellii	Salt Club-sedge			
Bossiaea prostrata	Creeping Bossiaea			
Brachyscome graminea	Grass Daisy			
Brachyscome parvula	Coast Daisy			
Brachyscome perpusilla	Rayless Daisy			
Briza minor	Lesser Quaking-grass			Introduced
Bromus catharticus	Prairie Grass			Introduced
Bromus diandrus	Great Brome			Introduced
Burchardia umbellata	Milkmaids			
Bursaria spinosa subsp. spinosa	Sweet Bursaria			
Bursaria spinosa subsp. spinosa var. spinosa	Sweet Bursaria			
Caesia parviflora	Pale Grass-lily			
Cakile maritima subsp. maritima	Sea Rocket			Introduced
Caladenia latifolia	Pink Fairies			
Calandrinia calyptrata	Pink Purslane			
Calystegia sepium subsp. roseata	Large Bindweed			
Carex appressa	Tall Sedge			
Carex fascicularis	Tassel Sedge			
Carex gunniana var. gunniana	Swamp Sedge			
Carex spp.	Sedge			
Carpobrotus rossii	Karkalla			
Cassinia aculeata subsp. aculeata	Common Cassinia			
Cassytha glabella	Slender Dodder-laurel			
Cassytha melantha	Coarse Dodder-laurel			
Cassytha pubescens s.s.	Downy Dodder-laurel			
Centaurium erythraea	Common Centaury			Introduced
Centaurium tenuiflorum	Slender Centaury			Introduced
Centella cordifolia	Centella			
Centipeda cunninghamii	Common Sneezeweed			
Centrolepis aristata	Pointed Centrolepis			
Centrolepis strigosa subsp. strigosa	Hairy Centrolepis			
Cerastium glomeratum s.l.	Common Mouse-ear Chickweed			Introduced
Cerastium glomeratum s.s.	Sticky Mouse-ear Chickweed			Introduced
Chamaescilla corymbosa var. corymbosa	Blue Stars			
Chorizandra spp.	Bristle Sedge			
Chrysanthemoides monilifera	Boneseed			Introduced
Chrysanthemoides monilifera subsp. monilifera	African Boneseed			Introduced
Cirsium vulgare	Spear Thistle			Introduced
Cladia aggregata	Common Coral-lichen			
Clematis aristata	Mountain Clematis			
Clematis microphylla s.l.	Small-leaved Clematis			
Clematis microphylla var. microphylla spp. agg.	Small-leaved Clematis			
Comesperma volubile	Love Creeper			
Convolvulus arvensis	Common Bindweed			Introduced
Coprosma repens	Mirror Bush			Introduced
Coronidium scorpioides s.s.	Button Everlasting			
Correa reflexa	Common Correa			
Cortaderia selloana	Pampas Grass			Introduced
Corybas spp.	Helmet Orchid			

Cotoneaster spp.	Cotoneaster			Introduced
Cotula coronopifolia	Water Buttons			Introduced
Crassula helmsii	Swamp Crassula			
Crassula sieberiana s.l.	Sieber Crassula			
Cycnogeton alcockiae	Southern Water-ribbons			
Cycnogeton procerum s.s.	Common Water-ribbons			
Cycnogeton spp.	Water Ribbons			
Cynoglossum australe	Australian Hound's-tongue			
Cyperus eragrostis	Drain Flat-sedge			Introduced
Cyperus lucidus	Leafy Flat-sedge			
Dactylis glomerata	Cocksfoot			Introduced
Delairea odorata	Cape Ivy			Introduced
Deyeuxia quadriseta	Reed Bent-grass			
Dianella revoluta s.l.	Black-anther Flax-lily			
Dianella revoluta var. revoluta s.l.	Black-anther Flax-lily			
Dianella tasmanica	Tasman Flax-lily			
Dichelachne crinita	Long-hair Plume-grass			
Dichelachne micrantha	Small-seed Plume-grass			
Dichondra repens	Kidney-weed			
Distichlis distichophylla	Australian Salt-grass			
Drosera auriculata	Tall Sundew			
Drosera peltata subsp. peltata spp. agg.	Pale Sundew			
Drosera pygmaea	Tiny Sundew			
Eleocharis acuta	Common Spike-sedge			
Eleocharis sphacelata	Tall Spike-sedge			
Epacris impressa	Common Heath			
Epilobium billardierianum	Variable Willow-herb			
Epilobium billardierianum subsp. billardierianum	Smooth Willow-herb			
Epilobium billardierianum subsp. cinereum	Grey Willow-herb			
Eragrostis brownii	Common Love-grass			
Erigeron bonariense	Flaxleaf Fleabane			Introduced
Erigeron canadensis s.l.	Canadian Fleabane			Introduced
Erigeron spp.	Fleabane			Introduced
Erigeron sumatrensis	Tall Fleabane			Introduced
Erodium cicutarium	Common Heron's-bill			Introduced
Eryngium vesiculosum	Prickfoot			
Eucalyptus baxteri s.l.	Brown Stringybark			
Eucalyptus falciformis	Western Peppermint	Rare		
Eucalyptus obliqua	Messmate Stringybark			
Eucalyptus ovata	Swamp Gum			
Eucalyptus ovata subsp. ovata	Swamp Gum			
Eucalyptus pauciflora subsp. pauciflora	White Sallee			
Eucalyptus viminalis	Manna Gum			
Euchiton japonicus s.s.	Creeping Cudweed			
Euphorbia paralias	Sea Spurge			Introduced
Exocarpos cupressiformis	Cherry Ballart			
Exocarpos syrticola	Coast Ballart	Rare		
Festuca arundinacea	Tall Fescue			Introduced
Ficinia nodosa	Knobby Club-sedge			
Gahnia clarkei	Tall Saw-sedge			

Gahnia filum	Chaffy Saw-sedge			
Gahnia radula	Thatch Saw-sedge			
Gahnia sieberiana	Red-fruit Saw-sedge			
Gahnia trifida	Coast Saw-sedge			
Galium aparine	Cleavers			Introduced
Galium binifolium	Reflexed Bedstraw			
Geranium potentilloides	Soft Crane's-bill			
Geranium solanderi s.l.	Austral Crane's-bill			
Geranium spp.	Crane's Bill			
Glossodia major	Wax-lip Orchid			
Glyceria australis	Australian Sweet-grass			
Glycine clandestina	Twining Glycine			
Gonocarpus tetragynus	Common Raspwort			
Goodenia humilis	Swamp Goodenia			
Goodenia lanata	Trailing Goodenia			
Goodenia ovata	Hop Goodenia			
Gratiola peruviana	Austral Brooklime			
Gynatrix pulchella s.l.	Hemp Bush			
Hainardia cylindrica	Common Barb-grass			Introduced
Haloragis brownii	Swamp Raspwort			
Helminthotheca echioides	Ox-tongue			Introduced
Hemarthria uncinata var. uncinata	Mat Grass			
Hesperocyparis macrocarpa	Monterey Cypress			Introduced
Hibbertia aspera s.l.	Rough Guinea-flower			
Hibbertia procumbens	Spreading Guinea-flower			
Hibbertia riparia	Erect Guinea-flower			
Hibbertia sericea s.l.	Silky Guinea-flower			
Hibbertia stricta s.l.	Upright Guinea-flower			
Hibbertia truncata	Port Campbell Guinea-flower	Rare		
Holcus lanatus	Yorkshire Fog			Introduced
Hydrocotyle capillaris	Thread Pennywort			
Hydrocotyle hirta	Hairy Pennywort			
Hydrocotyle laxiflora	Stinking Pennywort			
Hydrocotyle muscosa	Mossy Pennywort			
Hydrocotyle sibthorpioides	Shining Pennywort			
Hydrocotyle spp.	Pennywort			
Hypericum gramineum	Small St John's Wort			
Hypochaeris glabra	Smooth Cat's-ear			Introduced
Hypochaeris radicata	Flatweed			Introduced
Hypolepis muelleri	Harsh Ground-fern			
Imperata cylindrica	Blady Grass			Native but some stands may be alien
Isoetes drummondii	Plain Quillwort			
Isolepis cernua var. cernua	Nodding Club-sedge			
Isolepis cernua var. platycarpa	Broad-fruit Club-sedge			
Isolepis fluitans var. fluitans	Floating Club-sedge			
Isolepis inundata	Swamp Club-sedge			
Isolepis levynsiana	Tiny Flat-sedge			Introduced
Isopogon ceratophyllus	Horny Cone-bush			
Juncus articulatus subsp. articulatus	Jointed Rush			Introduced
Juncus articulatus x holoschoenus	Jointed Rush x Joint-leaf Rush hybrid			

Juncus bufonius	Toad Rush			
Juncus caespiticius	Grassy Rush			
Juncus capitatus	Capitate Rush			Introduced
Juncus kraussii subsp. australiensis	Sea Rush			
Juncus pallidus	Pale Rush			
Juncus planifolius	Broad-leaf Rush			
Kennedia prostrata	Running Postman			
Kniphofia uvaria	Red-hot Poker			Introduced
Kunzea spp.	Kunzea			
Lachnagrostis billardierei s.l.	Coast Blown-grass			
Lachnagrostis filiformis s.l.	Common Blown-grass			
Lachnagrostis rudis subsp. rudis	Rough Blown-grass	Rare		
Lagurus ovatus	Hare's-tail Grass			Introduced
Laphangium luteoalbum	Jersey Cudweed			
Lasiopetalum schulzenii	Drooping Velvet-bush	Rare		
Lawrencia spicata	Salt Lawrencia	Rare		
Leontodon saxatilis subsp. saxatilis	Hairy Hawkbit			Introduced
Lepidosperma concavum	Sandhill Sword-sedge			
Lepidosperma filiforme	Common Rapier-sedge			
Lepidosperma gladiatum	Coast Sword-sedge			
Lepidosperma laterale	Variable Sword-sedge			
Lepidosperma laterale var. laterale	Variable Sword-sedge			
Lepidosperma laterale var. majus	Variable Sword-sedge			
Lepidosperma longitudinale	Pithy Sword-sedge			
Lepidosperma spp.	Sword Sedge			
Leptospermum continentale	Prickly Tea-tree			
Leptospermum laevigatum	Coast Tea-tree			Native but some stands may be alien
Leptospermum lanigerum	Woolly Tea-tree			
Leptospermum myrsinoides	Heath Tea-tree			
Leptospermum scoparium	Manuka			
Leptostigma reptans	Dwarf Nertera			
Leucanthemum vulgare	Ox-eye Daisy			Introduced
Leucophyta brownii	Cushion Bush			
Leucopogon australis	Spike Beard-heath			
Leucopogon parviflorus	Coast Beard-heath			
Leucopogon spp.	Beard Heath			
Leucopogon virgatus	Common Beard-heath			
Lindsaea linearis	Screw Fern			
Lobelia anceps	Angled Lobelia			
Lobelia irrigua	Salt Pratia			
Lobelia pedunculata s.l.	Matted Pratia			
Logania ovata	Oval-leaf Logania	Rare		
Lomandra filiformis	Wattle Mat-rush			
Lomandra glauca s.l.	Pale Mat-rush			
Lomandra longifolia	Spiny-headed Mat-rush			
Lonicera japonica	Japanese Honeysuckle			Introduced
Lotus subbiflorus	Hairy Bird's-foot Trefoil			Introduced
Luzula meridionalis	Common Woodrush			
Luzula meridionalis var. flaccida	Common Woodrush			
Luzula meridionalis var. meridionalis	Common Woodrush			

Lycium ferocissimum	African Box-thorn			Introduced
Lycopus australis	Australian Gipsywort			
Lysimachia arvensis	Pimpernel			Introduced
Lythrum hyssopifolia	Small Loosestrife			
Lythrum junceum	Mediterranean Loosestrife			Introduced
Malus spp.	Apple			Introduced
Mazus pumilio	Swamp Mazus			
Melaleuca armillaris subsp. armillaris	Giant Honey-myrtle	Rare		Native but some stands may be alien
Melaleuca squarrosa	Scented Paperbark			
Melilotus indicus	Sweet Melilot			Introduced
Microlaena stipoides var. stipoides	Weeping Grass			
Microtis arenaria	Notched Onion-orchid			
Microtis unifolia	Common Onion-orchid			
Montia australasica	White Purslane			
Muehlenbeckia australis	Climbing Lignum			
Myoporum insulare	Common Boobialla			Native but some stands may be alien
Myosotis australis	Austral Forget-me-not			
Myosotis sylvatica	Wood Forget-me-not			Introduced
Myriophyllum spp.	Water Milfoil			
Nasturtium officinale	Watercress			Introduced
Olearia axillaris	Coast Daisy-Bush			
Olearia erubescens	Moth Daisy-bush			
Olearia ramulosa	Twiggy Daisy-bush			
Opercularia varia	Variable Stinkweed			
Ornduffia reniformis	Running Marsh-flower			
Oxalis corniculata s.l.	Yellow Wood-sorrel			
Oxalis corniculata s.s.	Creeping Wood-sorrel			Introduced
Oxalis exilis	Shade Wood-sorrel			
Oxalis perennans	Grassland Wood-sorrel			
Oxalis spp.	Wood Sorrel			
Ozothamnus ferrugineus	Tree Everlasting			
Ozothamnus turbinatus	Coast Everlasting			
Papaver somniferum	Opium Poppy			Introduced
Paraserianthes lophantha subsp. lophantha	Cape Wattle			Introduced
Paspalum dilatatum	Paspalum			Introduced
Paspalum distichum	Water Couch			Introduced
Pauridia glabella/vaginata spp. agg.	Tiny/Yellow Star species aggregate			
Pelargonium australe	Austral Stork's-bill			
Persicaria decipiens	Slender Knotweed			
Phalaris aquatica	Toowoomba Canary-grass			Introduced
Phragmites australis	Common Reed			
Pittosporum undulatum	Sweet Pittosporum			Native but some stands may be alien
Plantago coronopus	Buck's-horn Plantain			Introduced
Plantago hispida	Hairy Plantain			
Plantago lanceolata	Ribwort			Introduced
Plantago major	Greater Plantain			Introduced
Poa annua	Annual Meadow-grass			Introduced
Poa billardierei	Coast Fescue	Rare		
Poa ensiformis	Sword Tussock-grass			
Poa labillardierei	Common Tussock-grass			

Poa labillardierei var. labillardierei	Common Tussock-grass			
Poa morrisii	Soft Tussock-grass			
Poa poiformis	Coast Tussock-grass			
Poa poiformis var. poiformis	Coast Tussock-grass			
Poa rodwayi	Velvet Tussock-grass			
Poa sieberiana	Grey Tussock-grass			
Poa spp.	Tussock Grass			
Polypogon monspeliensis	Annual Beard-grass			Introduced
Pomaderris prunifolia var. prunifolia	Prunus Pomaderris			
Populus spp.	Poplar			Introduced
Poranthera microphylla s.l.	Small Poranthera			
Potamogeton tricarinatus s.l.	Floating Pondweed			
Pteridium esculentum	Austral Bracken			
Pteris tremula	Tender Brake			
Pterostylis longifolia s.l.	Tall Greenhood			
Pterostylis lustra	Small Sickle Greenhood	Endangered		
Pterostylis nutans	Nodding Greenhood			
Pultenaea canaliculata	Coast Bush-pea	Rare		
Pultenaea mollis	Soft Bush-pea			
Pultenaea stricta	Rigid Bush-pea			
Pultenaea tenuifolia	Slender Bush-pea			
Ranunculus amplus	Lacey River Buttercup	Rare		
Ranunculus spp.	Buttercup			
Raphanus raphanistrum	Wild Radish			Introduced
Rhagodia candolleana subsp. candolleana	Seaberry Saltbush			
Romulea rosea var. australis s.s.	Common Onion-grass			Introduced
Rosa spp.	Rose			Introduced
Rosulabryum billarderi	Common Thread-moss			
Rosulabryum torquescens	Twisting Thread-moss			
Rubus fruticosus spp. agg.	Blackberry			Introduced
Rubus parvifolius	Small-leaf Bramble			
Rumex brownii	Slender Dock			
Rumex conglomeratus	Clustered Dock			Introduced
Rumex crispus	Curled Dock			Introduced
Rytidosperma caespitosum	Common Wallaby-grass			
Rytidosperma geniculatum	Kneed Wallaby-grass			
Rytidosperma semiannulare	Wetland Wallaby-grass			
Rytidosperma setaceum	Bristly Wallaby-grass			
Samolus repens var. repens	Creeping Brookweed			
Sarcocornia quinqueflora	Beaded Glasswort			
Schoenus apogon	Common Bog-sedge			
Schoenus lepidosperma	Slender Bog-sedge			
Sebaea ovata	Yellow Sebaea			
Selaginella gracillima	Tiny Selaginella			
Selliera radicans	Shiny Swamp-mat			
Senecio biserratus	Jagged Fireweed			
Senecio elegans	Purple Groundsel			Introduced
Senecio glomeratus	Annual Fireweed			
Senecio hispidulus s.l.	Rough Fireweed			
Senecio jacobaea	Ragwort			Introduced

Senecio minimus	Shrubby Fireweed			
Senecio pinnatifolius	Variable Groundsel			
Senecio spathulatus s.l.	Dune Groundsel			
Senecio spp.	Groundsel			
Senecio tenuiflorus s.l.	Slender Fireweed			
Senecio vulgaris	Common Groundsel			Introduced
Solanum douglasii	Douglas' Nightshade			Introduced
Solanum laciniatum	Large Kangaroo Apple			
Solanum nigrum s.l.	Black Nightshade			Introduced
Solanum nigrum s.s.	Black Nightshade			Introduced
Sonchus asper s.l.	Rough Sow-thistle			Introduced
Sonchus asper s.s.	Rough Sow-thistle			Introduced
Sonchus oleraceus	Common Sow-thistle			Introduced
Spinifex sericeus	Hairy Spinifex			
Sporobolus africanus	Rat-tail Grass			Introduced
Spyridium parvifolium	Dusty Miller			
Spyridium vexilliferum	Winged Spyridium			
Stenotaphrum secundatum	Buffalo Grass			Introduced
Swainsona lessertiifolia	Coast Swainson-pea			
Symphyotrichum subulatum	Aster-weed			Introduced
Taraxacum officinale spp. agg.	Garden Dandelion			Introduced
Tetragonia implexicoma	Bower Spinach			
Tetragonia tetragonioides	New Zealand Spinach			
Tetrarrhena distichophylla	Hairy Rice-grass			
Thelymitra spp.	Sun Orchid			
Themeda triandra	Kangaroo Grass			
Thyridia repens	Creeping Monkey-flower			
Thysanotus patersonii	Twining Fringe-lily			
Trifolium campestre var. campestre	Hop Clover			Introduced
Trifolium dubium	Suckling Clover			Introduced
Trifolium fragiferum var. fragiferum	Strawberry Clover			Introduced
Trifolium repens var. repens	White Clover			Introduced
Trifolium resupinatum	Shaftal Clover			Introduced
Trifolium spp.	Clover			Introduced
Triglochin striata	Streaked Arrowgrass			
Utricularia dichotoma s.l.	Fairies' Aprons			
Verbascum virgatum	Twiggy Mullein			Introduced
Veronica calycina	Hairy Speedwell			
Veronica gracilis	Slender Speedwell			
Vicia sativa	Common Vetch			Introduced
Viola hederacea sensu Entwisle (1996)	Ivy-leaf Violet			
Viola hederacea sensu Willis (1972)	Ivy-leaf Violet			
Viola spp.	Violet			
Wahlenbergia gracilis	Sprawling Bluebell			
Wahlenbergia stricta subsp. stricta	Tall Bluebell			
Xanthorrhoea australis	Austral Grass-tree			
Xanthorrhoea minor subsp. lutea	Small Grass-tree			
Zantedeschia aethiopica	White Arum-lily			Introduced

SCI_NAME	COMM_NAME	FFG	FFG_DESC	VICADVDESC	EPBC_DESC
Thinornis rubricollis rubricollis	Hooded Plover	L	Listed	Vulnerable	Vulnerable
Tringa nebularia	Common Greenshank			Vulnerable	
Ardea modesta	Eastern Great Egret	L	Listed	Vulnerable	
Anas rhynchotis	Australasian Shoveler			Vulnerable	
Biziura lobata	Musk Duck			Vulnerable	
Haliaeetus leucogaster	White-bellied Sea-Eagle	L	Listed	Vulnerable	
Sternula albifrons sinensis	Little Tern	L	Listed	Vulnerable	
Actitis hypoleucos	Common Sandpiper			Vulnerable	
Lewinia pectoralis pectoralis	Lewin's Rail	L	Listed	Vulnerable	
Thalassarche cauta	Shy Albatross	L	Listed	Vulnerable	Vulnerable
Pluvialis fulva	Pacific Golden Plover			Vulnerable	
Thalassarche melanophris melanophris	Black-browed Albatross			Vulnerable	Vulnerable
Accipiter novaehollandiae novaehollandiae	Grey Goshawk	L	Listed	Vulnerable	
Aythya australis	Hardhead			Vulnerable	
Larus pacificus pacificus	Pacific Gull			Near threatened	
Phalacrocorax fuscescens	Black-faced Cormorant			Near threatened	
Phalacrocorax varius	Pied Cormorant			Near threatened	
Gallinago hardwickii	Latham's Snipe			Near threatened	
Isoodon obesulus obesulus	Southern Brown Bandicoot	L	Listed	Near threatened	Endangered
Antechinus minimus maritimus	Swamp Antechinus	L	Listed	Near threatened	Vulnerable
Sminthopsis leucopus	White-footed Dunnart	L	Listed	Near threatened	
Hydroprogne caspia	Caspian Tern	L	Listed	Near threatened	
Platalea regia	Royal Spoonbill			Near threatened	
Plegadis falcinellus	Glossy Ibis			Near threatened	
Dasyornis broadbenti	Rufous Bristlebird	L	Listed	Near threatened	
Chlidonias hybridus javanicus	Whiskered Tern			Near threatened	
Calidris ferruginea	Curlew Sandpiper			Endangered	Critically Endangered
Sternula nereis nereis	Fairy Tern	L	Listed	Endangered	Vulnerable
Botaurus poiciloptilus	Australasian Bittern	L	Listed	Endangered	Endangered
Neophema chrysogaster	Orange-bellied Parrot	L	Listed	Critically endangered	Critically Endangered
Macropus giganteus	Eastern Grey Kangaroo				
Crinia signifera	Common Froglet				
Litoria ewingii	Southern Brown Tree Frog				
Stipiturus malachurus	Southern Emu-wren				
Epthianura albifrons	White-fronted Chat				
Hirundo neoxena	Welcome Swallow				
Sturnus vulgaris	Common Starling				
Grampus griseus	Risso's Dolphin				
Limosa lapponica	Bar-tailed Godwit				Vulnerable
Megalurus gramineus	Little Grassbird				
Thalasseus bergii	Crested Tern				
Chroicocephalus novaehollandiae	Silver Gull				
Haematopus longirostris	Pied Oystercatcher				
Vanellus miles	Masked Lapwing				
Charadrius bicinctus	Double-banded Plover				
Charadrius ruficapillus	Red-capped Plover				
Circus approximans	Swamp Harrier				

Calidris ruficollis	Red-necked Stint				
Malurus cyaneus	Superb Fairy-wren				
Lichenostomus virescens	Singing Honeyeater				
Phylidonyris novaehollandiae	New Holland Honeyeater				
Platalea flavipes	Yellow-billed Spoonbill				
Rhipidura leucophrys	Willie Wagtail				
Porzana fluminea	Australian Spotted Crake				
Turdus merula	Common Blackbird				
Podiceps cristatus	Great Crested Grebe				
Fulica atra	Eurasian Coot				
Phalacrocorax carbo	Great Cormorant				
Threskiornis molucca	Australian White Ibis				
Microcarbo melanoleucos	Little Pied Cormorant				
Morus serrator	Australasian Gannet				
Pelecanus conspicillatus	Australian Pelican				
Cygnus atratus	Black Swan				
Tadorna tadornoides	Australian Shelduck				
Anas superciliosa	Pacific Black Duck				
Anas castanea	Chestnut Teal				
Anas gracilis	Grey Teal				
Ardea ibis	Cattle Egret				
Porphyrio porphyrio	Purple Swamphen				
Egretta novaehollandiae	White-faced Heron				
Poliocephalus poliocephalus	Hoary-headed Grebe				
Anhinga novaehollandiae	Darter				
Leucophaeus pipixcan	Franklin's Gull				
Phalacrocorax sulcirostris	Little Black Cormorant				
Vulpes vulpes	Red Fox				
Austrelaps superbus	Lowland Copperhead				
Tiliqua scincoides	Common Blue-tongued Lizard				
Antechinus swainsonii	Dusky Antechinus				
Rattus lutreolus	Swamp Rat				
Rattus fuscipes	Bush Rat				
Oryctolagus cuniculus	European Rabbit				
Macropus rufogriseus	Red-necked Wallaby				
Hydrurga leptonyx	Leopard Seal				
Eudyptula minor	Little Penguin				
Cladorhynchus leucocephalus	Banded Stilt				
Tachyglossus aculeatus	Short-beaked Echidna				
Passer domesticus	House Sparrow				
Cracticus tibicen	Australian Magpie				
Grallina cyanoleuca	Magpie-lark				
Carduelis carduelis	European Goldfinch				
Elseyornis melanops	Black-fronted Dotterel				
Calidris acuminata	Sharp-tailed Sandpiper				
Chloris chloris	European Greenfinch				
Corvus mellori	Little Raven				
Hieraaetus morphnoides	Little Eagle				
Haliastur sphenurus	Whistling Kite				

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Elanus axillaris	Black-shouldered Kite				
Erythrogonys cinctus	Red-kneed Dotterel				
Colluricincla harmonica	Grey Shrike-thrush				
Glossopsitta concinna	Musk Lorikeet				
Neophema chrysostoma	Blue-winged Parrot				
Sericornis frontalis	White-browed Scrubwren				
Lobodon carcinophagus	Crabeater Seal				
Tasmanogobius lasti	Scary's Tasmangoby				
Aquila audax	Wedge-tailed Eagle				
Falco cenchroides	Nankeen Kestrel				
Limnodynastes peronii	Striped Marsh Frog				
Limnodynastes tasmaniensis	Spotted Marsh Frog (race unknown)				
Arctocephalus pusillus doriferus	Australian Fur Seal	X	Rejected		
Tachybaptus novaehollandiae	Australasian Grebe				
supf. Percoidea fam. Kuhliidae	Flagtails				
Anguilla australis	Southern Shortfin Eel				
Galaxias maculatus	Common Galaxias				
Nannoperca australis	Southern Pygmy Perch				
Paratya australiensis	Common Freshwater Shrimp				
Tribonyx ventralis	Black-tailed Native-hen				
Cisticola exilis	Golden-headed Cisticola				
Girella tricuspidata	Luderick				
Macquaria colonorum	Estuary Perch				
Acanthopagrus butcheri	Black Bream				
Aldrichetta forsteri	Yellow-eye Mullet				
Ammotretis rostratus	Longsnouted Flounder				
fam. Arripidae gen. Arripis	Salmon				
Arripis georgianus	Australian Herring				
Perca fluviatilis	Redfin				
Tinca tinca	Tench				
Mugil cephalus	Sea Mullet				
Galaxias brevipinnis	Climbing Galaxias				
Falco peregrinus	Peregrine Falcon				
Neochmia temporalis	Red-browed Finch				
Cacatua tenuirostris	Long-billed Corella				
Threskiornis spinicollis	Straw-necked Ibis				
Rhipidura albiscapa	Grey Fantail				
Tiliqua nigrolutea	Blotched Blue-tongued Lizard				
Wallabia bicolor	Black-tailed Wallaby				
Puffinus tenuirostris	Short-tailed Shearwater				
Liopholis whitii GROUP	White's Skink				
Zosterops lateralis	Silvereye				
Corvus tasmanicus	Forest Raven				
Lichenostomus leucotis	White-eared Honeyeater				
Notechis scutatus	Tiger Snake				
Mus musculus	House Mouse				
Arctocephalus tropicalis	Subantarctic Fur Seal				Endangered
Eopsaltria australis	Eastern Yellow Robin				
Felis catus	Cat				

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Zoothera lunulata	Bassian Thrush				
Coturnix pectoralis	Stubble Quail				
Pseudocheirus peregrinus	Eastern Ring-tailed Possum				
Phaps chalcoptera	Common Bronzewing				
Phascolarctos cinereus	Koala				
Ocyphaps lophotes	Crested Pigeon				
Acritoscincus duperreyi	Eastern Three-lined Skink				
Nyctophilus geoffroyi	Lesser Long-eared Bat				
Chalinolobus morio	Chocolate Wattled Bat				
Falsistrellus tasmaniensis	Eastern False Pipistrelle				
Anthochaera carunculata	Red Wattlebird				
fam. Macropodidae gen. Macropus	Kangaroo				
Galaxias truttaceus	Spotted Galaxias				
Falco berigora	Brown Falcon				
Ardea pacifica	White-necked Heron				
Anthus novaeseelandiae	Australasian Pipit				
Todiramphus sanctus	Sacred Kingfisher				
Chrysococcyx lucidus	Shining Bronze-Cuckoo				
Strepera versicolor	Grey Currawong				
Himantopus himantopus	Black-winged Stilt				
Cracticus torquatus	Grey Butcherbird				
Dacelo novaeguineae	Laughing Kookaburra				
Limnodynastes dumerilii	Southern Bullfrog (ssp. unknown)				
Corvus coronoides	Australian Raven				
Neophoca cinerea	Australian Sea Lion				Vulnerable
Gallinula tenebrosa	Dusky Moorhen				
Platycercus elegans	Crimson Rosella				

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