Biodiversity impact assessment for a proposed solar farm at Mortlake

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Template 2.8.1

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1. Introduction

1.1 Background

Urbis, on behalf of BrightNight, engaged Eco Logical Australia (ELA) to undertake a biodiversity impact assessment for a new solar farm located near Hamilton Highway, Mortlake, Victoria (study area). The proposed development will consist of a photovoltaic solar farm installation and ancillary infrastructure. The study area is approximately 1,927 hectares and comprises a combination of agricultural land, plantations and native vegetation.

This report has been prepared to support an application for a planning permit under the Moyne Shire planning scheme in accordance with the *Solar Energy Facilities - Design and Development Guideline* (DELWP, 2019). This includes an assessment of the ecological values within the study area and a determination of the implications of solar farm development on these values, including consideration of the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning (DELWP, 2017)). Management recommendations for minimising impacts to ecological values and offset scenarios for native vegetation removal are also provided.

The assessment study area is based on plans provided by Urbis on behalf of BrightNight (Figure 1).

1.2 Legislative context

This project has been assessed with consideration of the following legislation policy and guidelines. A summary of legislation and an assessment of project legislative implications is presented in Section 6.

1.2.1 Commonwealth

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Weeds of National Significance (WoNS)

1.2.2 Victorian legislation

- *Environmental Effects Act 1978* (EE Act)
- *Planning and Environment Act 1987* (P&E Act)
- *Flora and Fauna Guarantee Act 1988* (FFG Act)
- *Wildlife Act 1975* (Wildlife Act)
- *Catchment and Land Protection Act 1994* (CaLP Act)

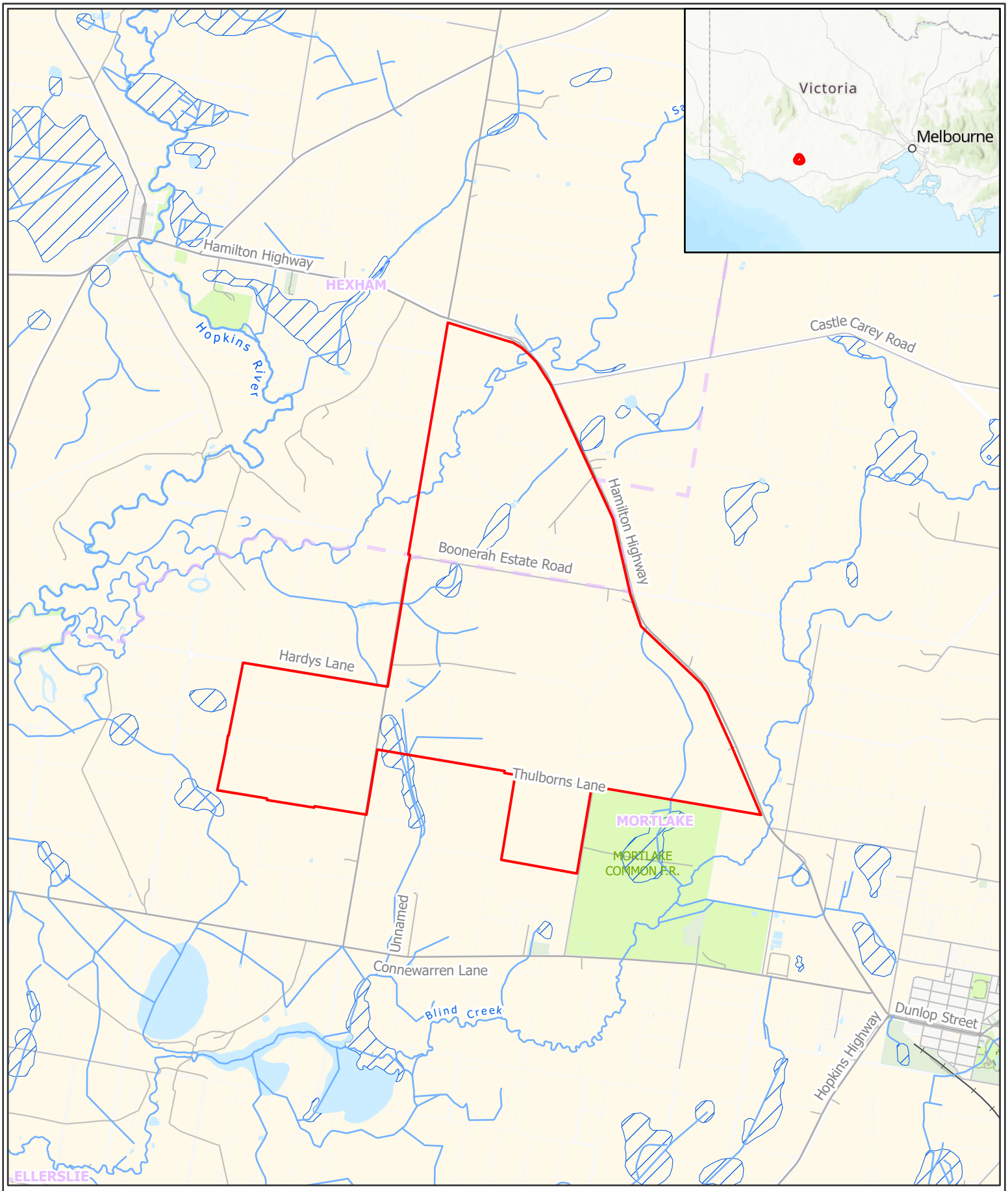
1.3 Study area

The study area is in western Victoria, located near the townships of Hexham and Mortlake, is approximately 227 kms from Melbourne CBD within the Victorian Volcanic Plains Bioregion (Figure 1). Comprising multiple parcels of land and covering approximately 1,927 hectares the study area borders the Hamilton Highway and Mortlake Common Flora Reserve (Figure 1). Primarily zoned as farming land, current land use is grazing (sheep and cattle), with a native Blue Gum plantation adjacent to the Mortlake Terminal Station to the west (Figure 1). An existing high voltage electricity transmission easement transects the study area east to west. Salt Creek meanders through the north of the study area in the east.

The study area is comprised of the following land parcels.

Table 1. Land administration details for study area.

	Study area
Location	Hexham (Figure 1)
Current Zones	Solar farm and associated infrastructure
Overlays	Farming Zone (FZ) and Principal Road Network (TRZ2)
Bushfire	Bushfire Management Overlay (BMO) and Environmental Significance Overlay (ESO3)
Local council	Moyne Shire
Bioregion	Victorian Volcanic Plain
Catchment	Glenelg Hopkins
Area	1,927 hectares (approximately)



Location of the Study Area

Moyne Shire

- Study Area
- Locality
- Local Government Area
- Major watercourse
- Minor watercourse
- Water area
- Area subject to inundation
- Rail
- Roads
- Streets
- Minor streets
- Tracks
- Trail
- Parcels
- Park or Reserve
- Other public land

0 1 2
Kilometres

Datum/Projection:
GDA 1994 MGA Zone 54

Project: 4927-RS Date: 2/02/2024

Source:
Basemap: VICMAP, 2023
Inset basemap: ESRI Topographic

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2. Methods

2.1 Desktop review

The following databases were accessed for records of significant species and ecological communities within the study area and surrounding landscape, and for other general environmental information:

- EPBC Act Protected Matters Search Tool (PMST) administered by the Australian Government Department of Climate Change Energy, Environment and Water (DCCEEW)
- The following online tools and databases administered by the Victorian Government Department Energy, Environment and Climate Action (DEECA)
    - Victorian Biodiversity Atlas (VBA) for records of threatened flora and fauna and declared migratory species.
    - NatureKit for information on Ecological Vegetation Classes (EVCs), Bioregions, Local Government Areas (LGAs), Catchment Management Authority (CMA) boundaries, and the maps that are used in the native vegetation removal regulations (native vegetation location map, native vegetation condition map, strategic biodiversity value map and habitat importance maps for Victoria's rare or threatened species).
    - Mapshare Vic for location of mapped wetlands.
    - Native Vegetation Information Management (NVIM) online tool for information related to native vegetation removal regulations.
    - EVC Benchmarks to use in assessing native vegetation quality using the Vegetation Quality Assessment (VQA) method (https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks).
    - Environmental Systems Modelling Platform Native Vegetation Regulations Tool (EnSym NVR tool) to test native vegetation removal scenarios and identify potential native vegetation offset requirements (if required).
- The following online tools and databases administered by the Victorian Department of Transport and Planning
    - *Vic*Plan online for the location of and information to pertaining to planning zones and environmental overlays.

The review of the PMST and VBA databases was based on a 10-kilometre buffer from the study area boundary. The buffer was applied to capture highly mobile fauna species, and to account for the possible lack of historic survey effort for threatened species in the study area.

The following literature and project information was also reviewed as part of this assessment.

- Biosis 2017. Mount Fyans Wind Farm: Targeted surveys and impact assessment.
- Biosis 2022. Mount Fyans Wind Farm: Flora and Fauna existing conditions.

2.2 Field survey

Field surveys were undertaken in accordance with a two staged approach. Each of these stages was undertaken by a DEECA Vegetation Quality Assessment (VQA) accredited ELA ecologist.

In the first stage, a rapid field assessment was undertaken to inform a preliminary constraints assessment. The assessment occurred over one day on 2 August 2023. The purpose of this assessment was to identify the broad quality and extent of ecological features in the study area, identify potential red flags, and inform the need for further ecological assessments. During this survey, the following information was collected in the field and supplemented by the analysis of aerial imagery as appropriate:

- Broad extent of EVC's.
- Broad extent of scattered trees, inclusive of their species and estimated size class. This was also informed by the analysis of aerial imagery.
- Broad habitat values and the study areas potential to support threatened species.

The second stage involved a detailed ecological field survey which was informed by the results of the constraints assessment and preliminary solar farm designs provided by Urbis in December of 2023. The detailed survey was undertaken between 4 – 6 December 2023 and 30 - 31 January 2024. This survey was focussed on collecting detailed data for ecological features within and in close proximity to the preliminary impact area. As a minimum, the following information was recorded:

- The location and nature of remnant vegetation, including its origin, ecological vegetation class and vegetation condition score in accordance with the Vegetation Quality Assessment method (DSE, 2004).
- The location and nature of all scattered and large trees within patches. This will include the species, origin, size class (Diameter at Breast Height – (DBH)) and where applicable, the diameter at breast height of trees, for the purpose of calculating Tree Protection Zones (TPZ).
- Vascular flora species lists for Ecological Vegetation Classes identified within the study area.
- Presence of significant ecological communities.
- Noxious or high-threat weeds, including population size and extent of infestation.

Any opportunities for avoiding and minimising the impacts of the planned work, or improving project outcomes, were also recorded during the assessments.

Results of field surveys as presented in this report are based on a combination of outcomes of the above outlined two stage approach.

2.3 Likelihood of occurrence

The likelihood of occurrence is a determination of the potential for threatened flora, fauna or ecological communities to be present and for threatened flora and fauna to make significant use of the survey area. The ranking of a species or ecological communities' likelihood of occurrence is determined by:

- Reviewing information contained in public biological datasets (e.g., past records and species distribution models).
- Assessing the suitability of study area to support the species based on the outcomes of the field survey.

Based on these assessments the species or ecological community was determined as one of the following:

Table 2. Likelihood of occurrence criteria for threatened species

Likelihood of occurrence	Criteria
Present	The species/ecological community was recorded by ELA or by a recent assessment in the study area.
High	The flora species/ecological community was identified to have been recently recorded (~10 years) by the desktop assessment and suitable high quality species habitat exists or could exist in the study area following detailed ecological studies. For fauna, species recent records were identified by the desktop assessment, the study area is within the species known range and is likely to support a population of the species, or the species may be reliant on its habitat.
Moderate	The flora species/ecological community was identified to have been recently or historically recorded by the desktop assessment and suitable moderate quality species habitat exists or could exist in the study area following detailed ecological studies. For fauna, the species historical records were identified by the desktop assessment and the species may regularly visit the study area. Further assessment to determine the extent and nature of their habitat use is likely to be required.
Low	The flora species/ecological community was not identified to have been recently recorded by the desktop assessment and/or suitable species habitat does not exist in or adjacent to the study area. For fauna, the species recent or historical records were identified by the desktop assessment, however the species may fly over or be present on a rare and opportune basis when foraging but is unlikely to make significant use of the study area or to rely on its habitats.
Negligible	The species/community predicted distribution includes the study area but the desktop assessment did not identify records of the species and the study area is unlikely (or is not considered) to support species habitat.

The determinations of a species' likelihood provided are not absolute, rather they represent a species' potential to occur in the survey area. The following species were excluded from the assessment.

- Marine mammals and birds which occur exclusively in marine and offshore environments and are thus not of relevance to this assessment.
- Listed marine species unless otherwise listed under the EPBC Act or FFG Act.

The results of the likelihood of occurrence analysis are provided in Appendix A.

2.4 Targeted Surveys

Based on the results of the constraints assessment and consideration of preliminary project design, targeted surveys for survey Growling Grass Frog (*Litoria raniformis*) were recommended. This was due to the study area's proximity to recent VBA records and its location between two large areas of known habitat (Mortlake Common and Salt Creek). Potential habitat was identified for the species to be present within waterbodies and farm dams across the site, either as resident or when moving across the landscape between those environs. Determination of species presence therefore needed to inform the potential nature and extent of project impacts.

This targeted survey is the subject of a separate technical report and can be found in Appendix C. This report includes a detailed survey methodology.

Results of these surveys are summarised in section 4 of this report and considered as part of the impact assessment.

2.5 Impact analysis

Based on the results of the desktop review, field surveys and the proposed impact footprint and method, potential direct and indirect impacts to biodiversity were determined. The determination of potential impacts was informed by relevant standards, policies and guidelines were relevant to the assessment, including:

- the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017)
- *Australian Standard 4970-2009 Protection of trees on development sites* (Standards Australia Limited, 2009)
- *Significant impact guidelines - matters of national environmental significance* (DoE 2013)
- *Ministerial Guidelines for assessment of environmental effects under the Environmental Effects Act 1978, Eight edition (DTP, 2023)*

2.6 Study limitations

A common limitation of ecological surveys is the short duration and lack of sampling across seasons. The field assessments were undertaken during winter and summer, which is considered suboptimal timing for observing some flowering species and may be insufficient for detecting cryptic species e.g. orchids and lilies. However, based on habitat within the impact area, which is generally degraded and accessible by stock, it is unlikely that any threatened flowering species would be present. Where impacts are not proposed, targeted surveys within suitable habitat have not be undertaken. Therefore, a conservative approach has been taken with the determination of species likelihood of occurrence whereby the species has been assumed present.

3. Results

3.1 Local and regional setting

The study area occurs within an area of agricultural land use approximately 4.5 km north-east of the Mortlake city centre. The surrounding landscape comprises primarily of farming land used for grazing and cropping however timber plantations and the Mortlake gas fired power station also occur within close proximity to the study area. The power station is serviced by an existing high voltage electricity transmission easement. Most of the native vegetation within the broader landscape has been cleared with the remaining patches of remnant native vegetation and scattered trees occurring to the south at Mortlake Common Flora Reserve, along Salt Creek in the north and scattered occurrences within road reserves including Castle Carey Road to the east. Scattered trees also occur within gazing land. Multiple waterbodies occur within 5 km of the study area including Blind Creek, Lake Connewarren and the Hopkins River.

3.2 Desktop assessment

3.2.1 Protected Matters Search Tool

A search of the Protected Matters Search Tool was completed on 16 January 2024. A summary of the PMST search output is presented in Table 3 and a copy of the report is presented in Appendix D.

Table 3. Matters of National Environmental Significance (5 km radius)

Matters of National Environmental Significance	Number identified
World Heritage Properties	-
National Heritage Places	-
Wetlands of international importance	-
Commonwealth Marine Area	-
Threatened ecological communities	5 • Grassy Eucalypt Woodland of the Victorian Volcanic Plain • Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Natural Temperate Grassland of the Victorian Volcanic Plain • Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains • White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
Threatened flora	21
Threatened fauna	31
Migratory Species	11

Matters of National Environmental Significance (MNES) identified are further considered by this report and when interpreting the findings of the field surveys. Threatened and migratory species identified by the PMST are tabulated and further considered as part of the likelihood of occurrence assessment presented in Appendix A.

3.2.2 Modelled Native Vegetation

The Department of Energy, Environment and Climate Action (DEECA) pre-1750 Ecological Vegetation Class (EVC) modelling indicates the study area would have once supported EVC 55: Plains Grassy Woodland (EVC 55), Floodplain Riparian Woodland (EVC 56), Plains Grassy Wetland (EVC 125) and Plains Grassland (EVC 132). 2005 EVC modelling indicates that fragmented areas of all four of these EVC's persist across the study area. A summary of EVC modelling for the study area, along with the EVC's Bioregional Conservation Status (BCS) is presented in Table 4.

Table 4 Modelled EVC

EVC #	EVC Name	Bioregional conservation status (VVP)
55	Plains Grassy Woodland	Endangered
56	Floodplain Riparian Woodland	Endangered
125	Plains Grassy Wetland	Endangered
132	Plains Grassland	Endangered

3.2.3 Victorian Biodiversity Atlas

The extract of the VBA identified a total of 15 threatened flora and 40 threatened and/or EPBC Act migratory fauna to have been previously recorded within 10 km of the study area. A summary of threatened species records by legislation is presented in Table 5. It is noted that whilst most species listed under the Commonwealth EPBC Act are also listed under the Victorian FFG Act this is not true for all species. Similarly, some species listed as EPBC Act migratory are also listed as threatened species under the EPBC and or FFG Act.

Table 5. Summary of VBA species records (10 km radius)

Taxon	EPBC (threatened and or migratory)	FFG	Total species
Flora	3	15	15
Amphibians	1	3	3
Bats	1	3	3
Birds	12	14	21
Fish	1	2	2
Mammals	1	3	8
Invertebrates	-	1	1
Reptiles	1	2	2

Threatened fauna records are tabulated and further considered as part of the likelihood of occurrence assessment (Appendix A).

3.2.4 Mapped Wetlands

One modelled wetland is located within the study area to the immediate south of Boonerah South Road (where it runs east to west) in the north of the study area (wetland ID 28276).

A further three wetlands occur just beyond the study area boundary, wetland ID 28282 located to the south-east of the study area (Mortlake Common) and wetland ID 2871 located to the west and wetland 28264 located in proximity to the Mortlake Power Station.

The location of Mapped Wetlands is shown in Figure 2.

3.2.5 Environmental Overlays

An Environmental Significance Overlay (ESO3) applies to the western portion of the study area (near the Mortlake Power Station). This ESO coincides with a timber plantation.

Planning overlays are represented in Figure 2 and further discussed in section 5.3.2.

3.3 Field survey

At the time of the assessments, remnant native vegetation was primarily identified in the north and south-east of the study area (Figure 2). Due to historical and ongoing agricultural land use, most of the remnant native vegetation has been cleared in the east of the study area and replaced with pasture, and in parts with planted exotic and native windrows (Figure 2). Ground cover across the study area was primarily improved pastures with some scattered native grassy species observed (Figure 2). In the west of the study area, near the Mortlake Power Station is a native *Eucalyptus globulus* sp. (Blue Gum) plantation (Figure 2). Toowoomba Canary Grass *Phalaris aquatica* was dominant in the road reserves except for a section near Woodcutters Lane (Figure 2).

Remnant native vegetation identified within the study area included the following:

- Floodplain Riparian Woodland along Salt Creek.
- A patch of Plains Grassland on Hamilton Highway northern road reserve.
- Two patches of Plains Grassy Wetland, which includes a DEECA mapped wetland adjacent to Boonerah Estate Road.
- Multiple patches of Plains Grassy Woodland along Hardys Lane, Bonnerah Estate Road and a large area covering the south-east of the study area near Thorburns Lane.
- A total of 592 scattered River Red Gums trees were recorded across the study area. Tree densities were highest in the south-west portion of the study area.

Ecological features as recorded within the study area are further described below.

3.3.1 Vegetation

Remnant vegetation is described by EVC below and is further documented in section 3.4.1.

EVC 55: PLAINS GRASSY WOODLAND

Plate 1. Plains Grassy Woodland within the study area

Patches of Plains Grassy Woodland (EVC 55) were primarily recorded in the south western portion of the study area near Boonerah Estate Road and Hardys Lane and typically consisted of a group of three or more canopy trees above a highly modified understory (Plate 1; Figure 2). Two larger patches of Plains Grassy Woodland occurred within the road reserve on Boonerah Estate Road extending into the adjacent property to the east. Numerous large old, scattered trees occupied the south-western corner of the site (Plate 1; Figure 2). The canopy within patches was dominated by large old *Eucalyptus camaldulensis* (River Red Gum). *Acacia mearnsii* (Blackwood) was occasionally found in the midstory, either by itself or in association with *E. camaldulensis***.** Understory vegetation was almost entirely dominated by exotic pasture species such as *Lolium perrene* (Rye Grass) and *Hordeum* sp. (Barley), with occasional scattered native *Rytidosperma duttonianum* (Brown-back Wallaby Grass) occurring in some patches. Noxious and high-threat weed species including *Crataegus monogyna* (Hawthorn) and *Onopordum acanthium* (Scotch Thistle) were also recorded within many of the patches. All patches were generally of low-quality due to the lack of understorey species, however, tree canopy health was generally good (>70%) to fair (30-70%), with the latter towards the higher end of the health scale.

EVC 56: FLOODPLAIN RIPARIAN WOODLAND

Plate 2. Floodplain Riparian Woodland within the study area

A remnant patch of Floodplain Riparian Woodland (EVC 56) was recorded in the north-east of the study area along Salt Creek (Figure 2; Plate 2; HZ20). This patch was variable in quality and likely comprises multiple discrete patches given the observed variance in quality and structure. The southernmost extent of the patch comprised a canopy of large old *E. camaldulensis* with fringing Cumbungi (*Typha domingensis*) and Giant Rush (*Juncus pallidus*) and an extensive cover of floating and emergent Water Ribbons (*Triglochin procera*). Banks showed some signs of stock access but were otherwise colonised by a mixture of pasture and native tussock grass species such as Common Tussock-grass (*Poa labillardierei*).

Canopy cover was primarily absent near the Hamilton Highway Road crossing (bridge). Here the EVC was characterised by a high instream cover of floating and emergent species such as Common Reed (*Phragmites australis*), *T. domingensis, T procera* and Tall Spikerush (*Eleocharis sphacelata*). Extending into the floodplain, herbaceous species diversity increased, with a good cover of native species including *Selliera radicans* (Shiny Swamp-mat), *Samolus repens* (Creeping Brookweed), *Leptinella reptans* (Creeping Cotula), *Hydrocotyle hirta* (Hairy Pennywort) and *Lobelia pratioides* (Poison Lobelia). Grass and rush species included *Hemarthria uncinata* var. *uncinata* (Mat Grass) and *Juncus bufonius* (Toad Rush), with the latter tending to become dominant in disturbed environments. A moderate cover of the introduced *Cotula coronopifolia* (Water Buttons) was also noted.

EVC 125: PLAINS GRASSY WETLAND

Plate 3: Plains Grassy Wetland

Two patches of Plains Grassy Wetland (EVC 125), which includes a DEECA mapped wetland (ID 28276) were recorded adjacent to Boonerah Estate Road (Plate 3; Figure 2; HZ13 and 21). These patches were dry at the time of the assessment and heavily pugged from stock access. Both patches were characterised by a mix of native grass, rush and sedge species including *Lachnagrostis filiformis* (Common Blown Grass), *Rytidosperma duttonianum* (Brown-back Wallaby Grass), *Juncus* sp. (Rush) and *Eleocharis* sp. (Spikerush) which form part of this EVC during sustained dry periods. These areas may become temporarily inundated during periods of high precipitation but on the basis of topography are unlikely to hold water for sustained periods of time. A high cover of improved pasture and naturalised species was observed within the patches including *Phalaris aquatica* (Toowoomba Canary Grass), *Hordeum* spp. (Barley) and *C. coronopifolia*. Due to the ephemeral nature of this EVC, dormant flora species including large and medium herbs which were absent at the time of the assessment may reappear following inundation.

EVC 132: PLAINS GRASSLAND

Plate 4. Plains Grassland north-eastern boundary of study area

One patch of highly degraded Plains Grassland (EVC 132) was recorded within the roadside verge of the Hamilton Highway in the north eastern boundary of the study area (Figure 2; Plate4; HZ19). This patch was assessed to inform potential access points to the study area as part of the phase 1 assessment and inform detailed design. Native ground cover comprised *Themeda triandra* (Kangaroo Grass) and *Ryditosperma* sp. (Wallaby Grass) which just bordered on the 25% cover threshold. The patch contained a high cover of introduced *P. aquatica* which occupied inter-tussock spaces.

PLANTED AND EXOTIC VEGETATION

Due to historical and ongoing agricultural land use native understory has been cleared across the study area and replaced with improved pasture, with some scattered native grassy species observed (Figure 2). Planted exotic and native windrows occur in the east of the study area and in the west, near the Mortlake Power Station is a native Blue Gum *Eucalyptus globulus* sp. plantation (Figure 2). Toowoomba Canary Grass *Phalaris aquatica* was dominant in the road reserves except for a section near Woodcutters Lane which contained Plains Grassland and small patches of Plains Grassy Woodland comprising *A. melanoxylon* along Hardys Lane (Plate 4; Figure 2).

3.3.2 Habitat

Fauna habitat within the study area comprised of remanent *E. camaldulensis* woodland (discrete patches and scattered remnant trees), remnant grassland, waterbodies, drainage lines and the Salt Creek corridor.

Most of the study area comprised of cleared agricultural land subject to intensive grazing and historical pasture improvement. These areas were dominated by exotic pasture and for the most part highly trafficked by livestock making them of negligible faunal habitat for native species.

Habitat did, however, exist for fauna in the form of large old hollow bearing trees, present with the study area as a mixture of remnant patches and scattered remnant trees (Plates 5 and 6; Figure 2). This habitat type was most prevalent in the southwest of the study area and formed a large area of semi- contiguous to contiguous woodland habitat north of Thorburn's lane and east of Boonerah Estate Road (Plate 6; Figure 2). Trees within this woodland consisted of large old remnant *E. camaldulensis*, many of which contained a diversity of spout and trunk hollows of varying shapes and sizes. Hollows are likely to provide nesting and refuge opportunities to a diversity of birds, bats and arboreal mammals, whilst flowering material of these trees, some of which were noted as having expansive canopies are also likely to provide a valuable foraging resource in the landscape. Extensive tree scratching observed suggests the habitat is used by arboreal mammals. Woodland habitat was also present in a slightly more fragmented form in the far south-west of the study area within the road reserves of Hardy Lane, Boonerah Estate Road and as scattered paddock trees (Figure 2). Fauna species recorded utilising this habitat included Australian Magpie (*Gymnorhina tibicen*), Red-rumped Parrot (*Psephotus haematonotus*), Tree Martin (*Petrochelidon nigricans*), Willie Wag Tail (*Rhipidura leucophrys*), Eastern Rosella (*Platycercus eximius*), Whistling Kite (*Haliastur sphenurus*), and Koala (*Phascolarctos cinereus*) (Plate 7).

Remnant Plains Grassland recorded to the north of the study area was noted to have a high cover of perennial pasture species, leading to a high biomass and reduced inter-tussock spacing. Other typical features of this habitat such as the presence of embedded surface rock and cracking soils were also not readily apparent. In its modified form and given its discrete location, this habitat is unlikely to be of high value for native fauna but may provide opportunities for ground dwelling species such as reptiles and small mammals. Remnant Plains Grassy Wetland habitat were dry at the time of assessment (Plate 4). The ephemeral nature of these wetlands means that in their current form provide limited habitat but following inundation, dormant flora species may return and the wetlands may provide foraging habitat for wetland bird species inclusive of wetland birds and frogs. Areas of Plains Grassy Wetland were also noted to be accessible to sheep and cows with the presence of livestock causing degradation of the habitat and likely to reducing usage of these areas by native species.

The study area contained a diversity of discrete waterbodies and drainage lines (Plates 7 and 8). Detailed assessment of these waterbodies and to a lesser extent drainage lines was the subject of targeted assessments for Growling Grass Frog, the findings of which are summarised in section 4.4.2. During the detailed field surveys, most waterbodies were noted to be heavily trafficked by livestock, their margins typically devoid of fringing vegetation and pugged. These waterbodies in most cases also lacked any floating, submerged or emergent macrophyte cover. Species observed utilising this habitat consisted of common aquatic avifauna species such as Australian Wood Duck (*Chenonetta jubata*), Pacific Black Duck (*Anas superciliosa*), Chestnut teal (*Anas castanea*) and Australasian Grebe (*Tachybaptus*

novaehollandiae). Spotted Marsh Frog (*Limnodynastes tasmaniensis*) and Brown Tree Frog (*Littoria ewingii*) were also recorded. Drainage lines whilst evidenced in DEECA study area hydrology mapping and as low-lying areas, were dominated by exotic pasture species and were of negligible habitat at the time of the field survey (Plate 8). These areas may however, provide for dispersal habitats at times of heavy precipitation.

Salt Creek Corridor meanders through the north-eastern portion of the study area where it occurs within a highly modified landscape (Plates 2 and 10; Figure 2). Riparian vegetation within the creek corridor was heavily modified, especially within the northern reach near Hamilton Highway which was completely cleared of overstorey vegetation. Overstorey vegetation was however present further south where a thin corridor of *E. camaldulensis* shaded its banks. Signs of stock access were prevalent along the waterways grassy verge. Despite the waterways modified banks, instream vegetation consisted of extensive areas of floating and emergent macrophyte cover likely to provide habitat and refuge to a diversity of fauna species. Fauna recorded within the waterway included Pacific Black Duck, Australian Short finned Eel *Anguilla australis*, Little Galaxias (*Galaxiella toourtkoourt*), and Eastern Long-necked turtle (*Chelodina longicollis*) (Plate 11). Suitability of the above the above-described habitats to support threatened species is further discussed in section 4.4.2.

Plate 5: Modified Plains Grassy Woodland within large woodland area containing tree hollows

Plate 6: Modified Plains Grassy Woodland on Boonerah Estate Road and Hardys Lane containing tree hollows

Plate 7: Koala on Hardys Lane

Plate 8: Drainage line linking study area and Mortlake Common

Plate 9: Wetland fringed by rock with extensive cover of submerged aquatic vegetation

Plate 10: Salt Creek north-eastern reach

Plate 11: Eastern Snake-necked Turtle on the bank on Salt Creek

3.4 Significant ecological values

3.4.1

3.4.2 Native vegetation

A total of 23 patches of native vegetation were recorded across the study area totalling 37.62 ha (Figure 2). Of these, 19 are Plains Grassy Woodland (EVC 55), two Plains Grassy Wetland (EVC 125) one Floodplain Riparian Woodland (EVC 56) and one Plains Grassland (EVC 132). All patches were highly modified and disturbed from stock access. Floodplain Riparian Woodland along Salt Creek which had the highest species diversity observed out of any of the patches (Figure 2). A total of 18 large canopy trees were recorded within patches.

In addition to these remnant patches and canopy trees in patches, a further 543 large and 31 small scattered trees were identified throughout the study area (Figure 2).

Within the project footprint, both patches of Plains Grassy Wetland were highly degraded due to stock access and score low Vegetation Quality Assessment (VQA) condition scores of 20 out of 100 (Table 6). Of the total 592 trees recorded within the study area, a total of 29 remnant trees were recorded within the project footprint (Table 7). Of these, four were dead stags, six were of poor health, 13 were of fair (30-70% foliage cover) health and six were in good health (>70% foliage cover).

Table 6: Patches within the project footprint

Zone ID	EVC	No. large trees	VQA score	Area (ha)
1	Plains Grassy Woodland (55)	0	20	0.02
2	Plains Grassy Woodland (55)	1	20	0.02

Table 7: Trees recorded within the project footprint

Type	Size	Species	Count
Scattered	Large	River Red Gum *Eucalyptus camaldulensis*	19
	Small	River Red Gum *Eucalyptus camaldulensis*	4
Patch	Large	River Red Gum *Eucalyptus camaldulensis*	1
	Small	River Red Gum *Eucalyptus camaldulensis*	5

3.4.3 Significant species

Threatened fauna

One threatened fauna as listed under the EPBC Act or FFG Act was recorded within the study area. This species, Little Galaxias was incidentally recorded incidentally during targeted Growling Grass Frog surveys. A number of species were also identified as having a moderate or above likelihood of occurrence. These species are summarised in Table 8 and furthered discussed below.

Table 8: Threatened fauna with a moderate or above likelihood of occurrence within the study area.

Scientific name	Common name	FFG	EPBC	Number of records	Last record
Litoria raniformis	Growling Grass Frog	VU	VU	12	2018
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	VU		12	2011
Antigone rubicunda	Brolga	EN		107	2020
Ardea alba modesta	Eastern Great Egret	VU	Ma	5	2018
Aythya australis	Hardhead	VU		15	2020
Gallinago hardwickii	Latham's Snipe		VU, Ma, Mi	3	2018
Hieraaetus morphnoides	Little Eagle	VU		4	2018
Galaxiella toourtkoourt / *Galaxiella pusilla*	Little Galaxias / Dwarf galaxias	EN	VU	2	2008
Delma impar	Striped Legless Lizard	EN	VU	13	2013
Eulamprus tympanum marnieae	Corangamite Water Skink	EN	EN	-	-
Pseudemoia pagenstecheri	Tussock Skink	EN		65	2013
Pteropus poliocephalus	Grey-headed Flying Fox	VU	VU	9	2021

GROWLING GRASS FROG

As described in section 3.4, Growling Grass Frog was the subject of a targeted assessment (Appendix C). Targeted surveys for the species were initially scoped on the basis of the species potential to disperse across the study area between the species known habitats of Salt Creek, which transects the study area in the north and Mortlake Common which occurs just beyond the study areas southern boundary. Targeted surveys did not detect the species and it is considered to have a low likelihood of occurrence in the study area. Wetlands (farm dams) and drainage lines within the study area determined during the surveys to be of low habitat value. Due to the suitability of habitat and past records of the species downstream, the species is however considered to have a residual likelihood of moderate along the section of Salt Creek that transects the study area.

YELLOW-BELLIED SHEATHTAIL BAT

Yellow Bellied Sheathtail-bat (*Saccolaimus flaviventris*) is known from a wide variety of habitats but is most often associated with wooded habitats as present in the study areas south-west. The species may be present foraging aerially within study area and as the species may roost within hollows of large old *E. camaldulensis* trees. The species distribution and habits are poorly understood, but the species is thought to be a summer migrant to Victoria and therefore if present is likely to be a seasonal visitor to the study area (OEH, 2022).

BROLGA

Brolga (*Antigone rubicunda*) is listed as an endangered under the FFG Act and is a species of regional significance in western Victoria. As a result the species was considered in detail as part of the desktop

assessment and field surveys. 107 records of the species occur within 10 km of the site with the most recent record from 2020.

Due to the regional significance of Brolga and their potential interaction with Windfarm projects in the western Victoria a clear rationale has been determined for identifying species habitat. This includes the declaration of No Go Flocking Areas, the use of DEECA mapped wetlands to identify species breeding habitat and records within the VBA been specified as general and breeding records. The study area is not located within a No Go flocking area. Flocking areas in closest proximity to the site include Darlington located approximately 25 km to the north- east and Hamilton approximately 35 km to the north-west.

With the study area one mapped wetland was identified (Section 4.2.4). This mapped wetland (ID 28276) is characterised by the mapping as unknown, was dry at the time of assessment and based on a combination of topography and observed floristic composition appears unlikely to hold sufficient water to support the species. This mapped wetland is described in further detail in 4.3.1. Beyond the boundary of the study area two mapped wetlands were identified that contain breeding records for the species. These mapped wetlands include wetland ID 28282 located to the south-east of the study area (Mortlake Common) and wetland ID 28264 located to the south-west.

Wetland ID 28282 (Mortlake Common) is located within the Mortlake Common Flora Reserve and is a habitat of significance to the species within the locality. Based on a review of the VBA the species was most recently recorded in the common in 2020 and the most recent breeding record was taken in 2007. Two separate breeding locations within the wetland identified. It is likely the species is intermittently present within the wetland each year, utilising the area either for the purpose of breeding or foraging depending on water availability.

Wetland ID 28264 is located in proximity to the Mortlake Power Station. The last breeding record at the wetland ID also dates back to 2007. This record represents the only record of the species at that location. It is noted that location of the wetland coincides with ESO3 of the Moyne Planning Scheme that identifies land development restrictions on the basis of noise disturbance produced by the existing gas fired Mortlake Power station. Given this source of noise disturbance, surrounding land use as a plantation and the proximity of the wetland to an existing overhead transmission line the extent to which the species still utilises this habitat is unclear.

EASTERN GREAT EGRET

Eastern Great Egret (*Ardea alba modesta*) is a relatively widespread species that is at times encountered in modified agricultural landscapes in association with watercourse, wetlands, inundated grasslands and dams. Highest quality habitat for the species was identified along Salt Creek with the waterway having the potential to form an important foraging and refuge habitat within the landscape. Here the species is considered to have a moderate likelihood of occurrence. Elsewhere in the study area Eastern Great Egret may occasionally and opportunistically forage in farm dams (particularly those with vegetated margins), in inundated grassland habitats and drainage lines but would not be anticipated to make significant use of the study area or to be reliant on its habitat and is considered to have a low likelihood of occurrence.

LATHAM'S SNIPE

Latham's Snipe (*Gallinago hardwickii*) is a migratory shorebird species and was recently (January 2023) listed as vulnerable under the EPBC Act. This notoriously cryptic species has a preference for densely vegetated wetlands and watercourses when visiting Australia during its non-breeding period. Such habitats within the study area are considered to be restricted to the Salt Creek corridor, where thick beds of emergent macrophyte cover such as *Phragmites australis* and *Typha sp* provide foraging and refuge opportunities. Suitable habitat for the species is also considered to be present just beyond the study areas southern boundary in association with Mortlake Common.

LITTLE EAGLE

Little Eagle (*Hieraaetus morphnoides*) is commonly associated with timbered farmland. Whilst not incidentally recorded during the field survey the species is considered to have a moderate likelihood of occurrence within the study area, with Eucalyptus camaldulensis woodland and scattered trees within the south western portion of the study area potentially providing nesting and foraging habitat for the species.

LITTLE GALAXIAS / DWARF GALAXIAS

Little Galaxias (*Galaxiella toourtkoourt)* which is listed under the EPBC Act as Dwarf Galaxias (*Galaxiella pusilla*) was incidentally recorded in Salt Creek during targeted Growling Grass Frog surveys. The species was also recorded during targeted assessments undertaken for the species as part of the Mount Fyans Windfarm project, with a location of detection corresponding with an area of study area common to the two projects (Biosis, 2017). This location is in the far north-east of the study area (of this assessment) where Salt Creek passes under the Hamilton Highway. The species was also recorded in Salt Creek upstream of this location (Biosis, 2017). Whilst the species is also often associated with offline habitat and found in well vegetated wetlands, drainage lines and areas subject to inundation no such habitat with connectivity to Salt Creek was identified. Species habitat is therefore considered to be confined to Salt Creek.

STRIPED LEGLESS LIZARD AND TUSSOCK SKINK

Striped Legless Lizard (*Delma impar*) and Tussock Skink (*Pseudemoia pagenstecheri*) are discussed together due to the similarity in their habitat requirements, although Tussock Skink is generally considered to be more widespread and better able to persists in modified habitats. Suitable habitat for these species occurs within the study area in association with mapped patches of Plains Grassland (EVC 132). Plains Grassland (EVC 132) is located along the Hamilton Highway (HZX) with this is considered as having a moderate potential of supporting Tussock Skink and Striped Legless Lizard. HZX forms a tussock grassland although its habitat somewhat limited by its discrete size, lack of rock and limited cracking soils and the presence of perennial weed species. In the absence of targeted survey a precautionary approach to species presence in this area has been adopted. Both species were recorded in close proximity to the study area during surveys completed for the Mt Fyans Windfarm (Biosis, 2017).

In relation to Striped Legless Lizard the species was recorded in 2013 along Castle Cary Road near its junction with Hamilton Highway (Biosis, 2017) which is located just beyond the study areas north east boundary. It is however noted that vegetation within which detection of Striped Legless Lizard occurred was considered to constitute the EPBC Act listed threatened ecological community Natura Temperate Grassland Victorian Volcanic Plain (Biosis, 2022). Plains Grassland (EVC 132) vegetation within the

project study area was not considered to meet the condition thresholds of the community (further details, section 4.4.3) and is therefore likely to be of lower habitat value than habitat provided by Castle Cary Road.

CORANGAMITE WATER SKINK

No records of Corangamite Water Skink (*Eulamprus tympanum marnieae*) were identified via a search of the VBA however the species was identified by the PMST and was also the subject of detailed assessment during surveys completed for the Mt Fyans Windfarm during which the species was recorded (Biosis, 2022). These records occurred outside the study area (of this assessment) in association with wetlands near the locality of Woorndoo. However suitable habitat for the species was also identified along the Salt Creek with habitat identified in the section of Salt Creek just north of Hamilton Highway and therefore in proximity to the study area. Habitat with the potential to support Corangamite Water Skink is therefore considered to occur where Salt Creels meanders through the northern portion of the study area. No other habitat for the species was however identified, with all other waterbodies in the study area considered too degraded, isolated, small in extent and / or modified to support the species.

GREY-HEADED FLYING FOX

The Grey-headed Flying Fox (*Pteropus poliocephalus*) is a wide ranging and highly mobile species that uses a range of habitats where flowering eucalyptus trees, fruit crops and urban gardens are present. The species National Recovery Plan (DAWE, 2021) does not identify or define important populations of the species. The plan does however, identify nationally important camps for the species. Of these camps the camp in the Geelong Botanic Gardens is the nearest nationally significant camp and is approximately 140 kilometres east of the study area. Minor camps identified in the National Flying Fox Monitoring Viewer occur approximately 1.5 km to the west of the study area in Hexham, 41 km to the south in Warrnambool and 81 km to the east in Colac (DCCEEW, 2024). The minor camp closest to the study area in Hexham, was first identified in August 2021 with between 2,500 – 9,999 individuals occurring (DCCEEW, 2024). The number of individuals declined to between 500 -2,499 in February 2022 and is the last known monitoring undertaken for the camp (DCCEEW, 2024). Grey-headed Flying-fox have also been recorded at Salt Creek Wind Farm approximately 10 km north of the study area as part of the bat monitoring undertaken for the wind farm in 2020 (Biosis, 2020).

Suitable foraging habitat occurs within the study area in the form of large scattered paddock trees, and large remnant trees associated with Salt Creek (Figure 2). When in flower, these trees are likely to provide foraging habitat which forms part of a broader foraging area.

KOALA

Whilst Koala populations in Victoria are not considered to be threatened this iconic species is often considered of local significance. A Koala was incidentally observed within a scattered paddock tree near the corner of Boonerah Estate Road and Hardy's Lane. Whilst all Eucalyptus trees in the study area have the potential to provide habitat for Koala areas likely to be of greatest importance to the species is likely to be near where the species was observed in the study areas south west. The species considered likely to utilise treed vegetation along Hardys Lane, Boonerah Estate Road and in particular the large are of contiguous and semi contiguous woodland habitat north of Thorburn's lane and east of Boonerah Estate Road.

SOUTHERN BENT-WING BAT

In addition to the above listed species impacts to bats were also identified as being subject to community concern during community consultation sessions. In addition to the Yellow-bellied Sheathtail Bat and Grey-headed Flying-fox (discussed above) the additional species of Southern Bent-winged Bat (*Miniopterus orianae bassanii*) was identified by the desktop assessment. The speciues Listed as critically endangered under the EPBC Act but was assessed as having a low likelihood of occurrence.

Southern Bent-winged Bat was a species of interest during targeted surveys completed for the Mount Fyans Wind Farm (Biosis, 2017). The species is an is an obligate cave-dwelling bat with a restricted distribution (DELWP, 2020). No caves are located within the study area and unlike other micro-bat species it is not known to utilise hollows. The Mount Fyans assessment did not detect the species and did not identify the presence of suitable roosting sites within their study area or the surrounding locality (Biosis, 2017). However, this species was detected during targeted surveys at Salt Creek Wind Farm (Biosis, 2020). Given that this species was not detected during targeted surveys within the study area but occurs north of the study area, there is the potential to utilise the site for foraging (on an opportunistic basis) but is not considered likely to be reliant on the habitat within the study area.

Threatened Flora

No threatened flora species listed under the EPBC Act or FFG Act were recorded within the study area. However, a total of three species were identified as having a moderate likelihood of occurrence and are associated outside the project footprint at Salt Creek and the adjacent patch of degraded Plains Grassland. These species are summarised in Table 9 and furthered discussed below.

Table 9: Threatened flora with a moderate or above likelihood of occurrence within the study area.

Scientific name	Common name	FFG	EPBC	Number of records	Last record
Amphibromus fluitans	River Swamp Wallaby-grass		VU	PMST	NA
Coronidium gunnianum	Pale Swamp Everlasting	CR		4	2013
Dianelle amoena	Matted Flax-lily	CR	EN	PMST	NA
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	CR	CE	PMST	NA

One FFG Act protected species *Pseudognaphalium luteoalbum* (Jersey Cudweed) was recorded during the field survey. This species is protected under the FFG Act as a member of the family Asteraceae and was recorded in the south-west of the study area, within proximity to the existing overhead power easement that transects the study area and connects with the Mortlake Power station. This species was found in a modified area and whilst a protected species is known to colonise areas following disturbance. In total approximately 36 individuals were recorded across 2 discrete locations. Plants occurred as scattered native species and were of insufficient cover and extent to be considered a remnant patch.

AMPHIBROMUS FLUITANS

Amphibromus fluitans (River Swamp Wallaby-grass) grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally-fluctuating water levels (Royal Botanic Gardens, 2024). Suitable habitat is present for this species at Salt Creek despite not being observed as part of the field assessments. However, it is noted that key threats to this species include grazing and trampling by livestock, hydrological changes and invasion of remnant habitats by exotic grasses and weeds (DEWHA 2008). The section of Salt Creek within the study area is subject to all of these threats which may reduce the suitability of habitat for this species. Given the avoidance of Salt Creek as part of detailed design r targeted surveys to determine presence were not undertaken. The species is considered to have moderate likelihood of occurrence in proximity to Salt Creek but is not likely to occur elsewhere in the study area.

CORONIDIUM GUNNIANUM

Coronidium gunnianum (Pale Swamp Everlasting) occurs at low elevations (under c. 100 m) in grasslands and riverine *E. camaldulensis* woodland on soils that are prone to inundation (Royal Botanic Gardens, 2024). This species has been recorded in Mortlake Common to the south of the study area in 2013 (VBA, 2024). Low to moderate quality habitat for this species occurs in patches of Plains Grassy Wetland (EVC 125) and when areas supporting the EVC become inundated, this species may occur.

DIANELLA AMOENA

Dianella amoena (Matted Flax-lily) is found in association with lowland grasslands, grassy woodlands, valley grassy forest and creeklines of herb-rich woodland (Royal Botanic Gardens, 2024). The species occurs on well drained to seasonally wet fertile sandy loams to heavy cracking clays derived from Silurian or Tertiary sediments, or from volcanic geology (Royal Botanic Gardens, 2024). Plains Grassland in the north is highly degraded, however, this species has the potential to occur within degraded Plains Grassland on Hamilton Highway.

PIMELEA SPINESCENS SUBSP. *SPINESCENS*

Pimelea spinescens subsp. spinescens (Spiny Rice-flower) Grows in grassland, open shrubland and occasionally woodland, often on basalt-derived soils. Plants from more northerly populations occur on red clay complexes, while plants from southern populations occur on heavy grey-black clay loams (Royal Botanic Gardens, 2024). Topography is generally flat but populations may occur on slight rises or in slightly wettish depressions. Vegetation is often dominated by *Themeda triandra*, with *Austrostipa* spp. Or *Rytidosperma* spp. Co-dominant (Royal Botanic Gardens, 2024). Plains Grassland in the north is highly degraded, however, this species has been recorded on Castle-Carey Road to the west of the study area (Biosis, 2017). Therefore, this species has the potential to occur within degraded Plains Grassland on Hamilton Highway.

3.4.4 Threatened ecological communities

The desktop review identified the following threatened communities with a natural or modelled distribution covering the project area:

- Grassy Eucalypt Woodland of the Victorian Volcanic Plain (EPBC Act)

- Grey Box (*Eucalyptus macrocarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act)
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (EPBC Act)
- Natural Temperate Grassland of the Victorian Volcanic Plain ecological community (EPBC Act)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act)
- Western (Basalt) Plains Grassland Community (FFG Act)

Patches of Plains Grassy Wetland (EVC 56; HZ13 and 21) were assessed against the criteria for both the Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (EPBC Act) community and the Natural Temperate Grassland of the Victorian Volcanic Plain ecological community (EPBC Act), noting that the latter has been previously identified within the DEECA mapped wetland by Biosis (2022).

At the time of our assessment in early December 2023, Rush *Juncus* sp. was noted to be the dominant ground cover species, with a low cover of Brown Backed Wallaby Grass *Rytidosperma duttonianum* and Common Blown Grass *Lachnogrostis filiformis*. While both grass species form part of the Seasonal Herbaceous Wetlands community, patches are excluded if taller native graminoids i.e. *Juncus* sp. occur (DSEWPC, 2012). Therefore, these patches do not meet the listing criteria for the Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (EPBC Act) community at this time.

Since the assessment was undertaken by Biosis, which may have been as early as 2013 (Biosis, 2022), it is possible that grazing and other climactic conditions have altered the composition of these two patches, reducing native graminoid cover which may have been present at the time of their assessment, resulting in the patch previously qualifying as Natural Temperate Grassland of the Victorian Volcanic Plain. At the time of our assessment, native grasses including Wallaby, Spear, Tussock or Kangaroo Grass which characterise this community were not the dominant species recorded. Of these, only *Rytidosperma duttonianum* was recorded in low cover with *Juncus* sp. and *Lachnogrostis filiformis* the most dominant native species. Therefore, at the time of this assessment, patches of Plains Grassy Wetland do not qualify as the Natural Temperate Grassland of the Victorian Volcanic Plain EPBC Act community.

The patch of Plains Grassland (EVC 132) recorded along Hamilton Highway (HZ19) is also not considered to meet the condition thresholds for Natural Temperate Grassland of the Victorian Volcanic Plain. Cover of perennial native grasses within this patch was less than 50%, native forb cover was absent. The area was also assessed as likely to have a cover non grass weeds in excess of 30%, with the patch containing a high cover of Ribwort Plantain (*Plantago lanceolata*).

Whilst Plains Grassy Woodland (EVC 55) is considered synonymous with the EPBC Act Threatened Ecological Community *Grassy Eucalypt Woodland of the Victorian Volcanic Plain* and the FFG Act *Western Basalt Plains (River Red Gum) Grassy Eucalypt Woodland* vegetation present is not considered to be representative either of these communities. For the EPBC Act Threatened Ecological Community *Grassy Eucalypt Woodland of the Victorian Volcanic Plain* vegetation is not considered to meet the condition thresholds for the community. Native grass sparse and not accounting for 50% of the perennial ground layer cover, wildflowers absent and perennial weed species accounting for greater than 70% of the ground layer vegetation. Furthermore, whilst there was noted to be a high prevalence of large trees the diversity of perennial native species was poor (less than 10 species per 100 m2).

In relation to the FFG Act *Western Basalt Plains (River Red Gum) Grassy Eucalypt Woodland* no specific condition thresholds exist. However, a key characteristic of the community is a ground layer dominated by native grassland species with a diversity of forbs. All patches of Plains Grassy Woodland (EVC 55) within the study area were identified to have highly degraded understorey values with native grass cover sparse to absent and never accounting for more than 20% cover of the perennial understorey.

No vegetation consistent with Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act) or White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act) was mapped by the assessment.

3.4.5 Hollow bearing trees

A total of 170 trees were assessed as part of the detailed field assessment. Of those, 103 trees were hollow bearing. This equates to 60% of remnant trees containing tree hollows.

A further 422 trees were identified within the study area as part of the constraints assessment for which tree hollow data was not collected. However, based on the ratio of hollow bearing trees collected as part of the detailed assessment, it is estimated that approximately 253 of these trees would be anticipated to contain hollows. On this basis an estimated total of 356 hollow bearing trees occur within the study area.

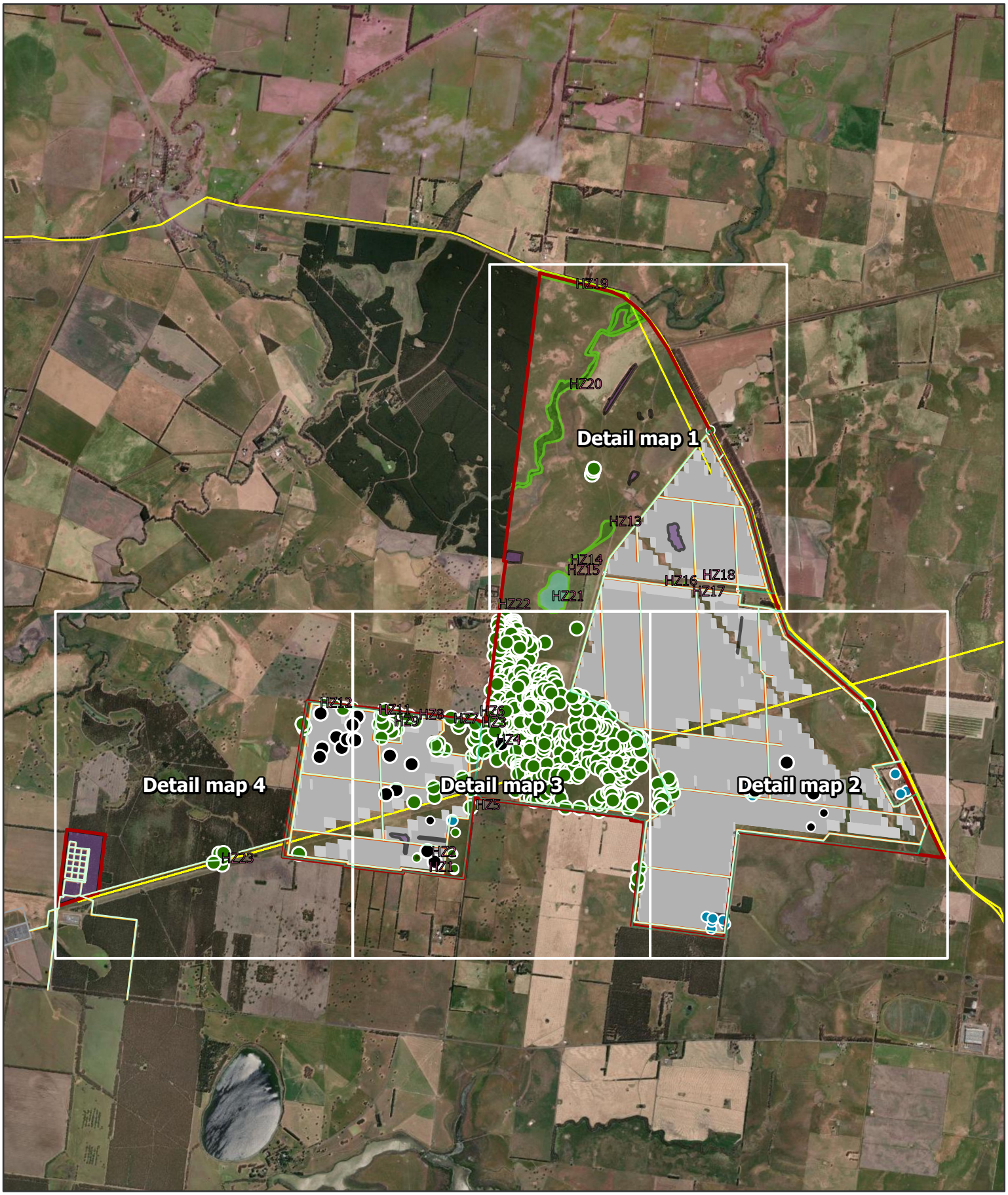
3.4.6 Weeds

The field assessment identified the presence of four noxious weed species as listed under the CaLP Act within the study area. These species along with their status in the Glenelg Hopkins Catchment Management Authority are summarised in Table 10.

Table 10. Weeds

Common Name	Scientific name	CaLP status
African Box-thorn	*Lycium ferocissimum*	Controlled
Hawthorn	*Crataegus monogyna*	Restricted
Spear Thistle	*Cirsium vulgare*	Restricted
Scotch Thistle	*Onopordum acanthium*	Controlled
Variegated Thistle	*Silybum marianum*	Restricted

In addition to those species listed under the CaLP Act a further four high risk weeds as identified by the *Advisory list of Environmental Weeds in Victoria* (White *et al*. 2022) were also recorded in varying densities including *Dactylis glomerata* (Cocksfoot*), Hordeum* spp. (Barley) *Holcus lanatus* (Yorkshire Fog*), and Phalaris aquatica* (Canary Toowoomba Grass).



Ecological Values: Overview

Moyne Shire

- Study area
- BESS
- Firebreak
- Gates
- Inverer pad
- Powerline underground
- Powerlines existing
- Roads
- Solar panel 1
- Solar panel 2
- Vegetation Screening

Vegetation

- Native (exempt) - planted
- Native - current wetlands
- Native - remnant
- Planted native tree

- Small native tree
- Large native tree
- Native vegetation removed

Native trees removed

- Small
- Large

Source:
Basemap: VICMAP, 2023

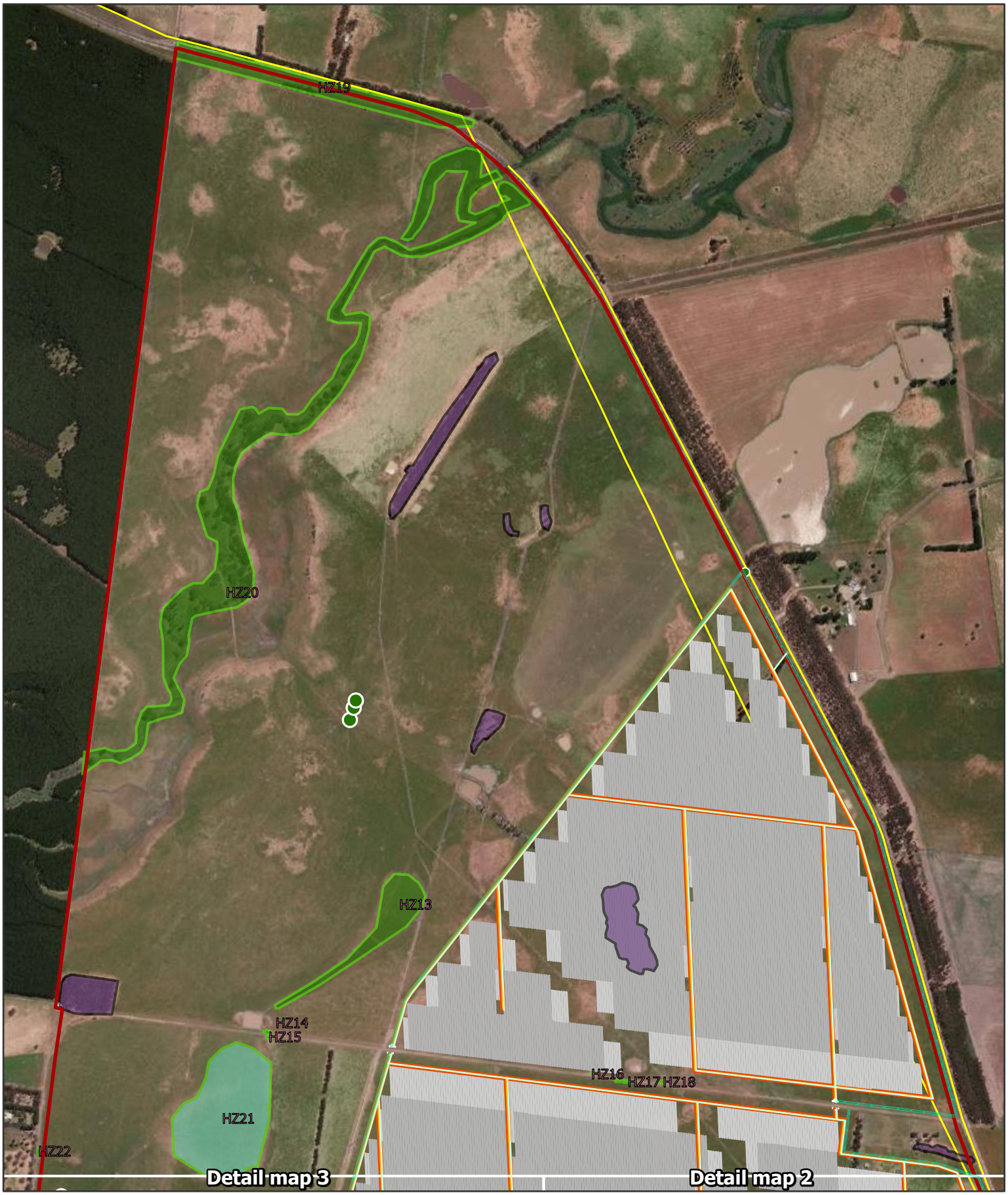
0 820 1,640
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927 Date: 06/05/2024

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



Ecological Values: Detail map 1

Moyne Shire

- Study area
- BESS
- Firebreak
- Gates
- Inverer pad
- Powerlines existing
- Roads
- Solar panel 1
- Solar panel 2
- Vegetation Screening

Vegetation

- Native (exempt) - planted
- Native - current wetlands
- Native - remnant
- Small native tree
- Large native tree

0 250 500
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927 Date: 06/05/2024

Source:
Basemap: VICMAP, 2023

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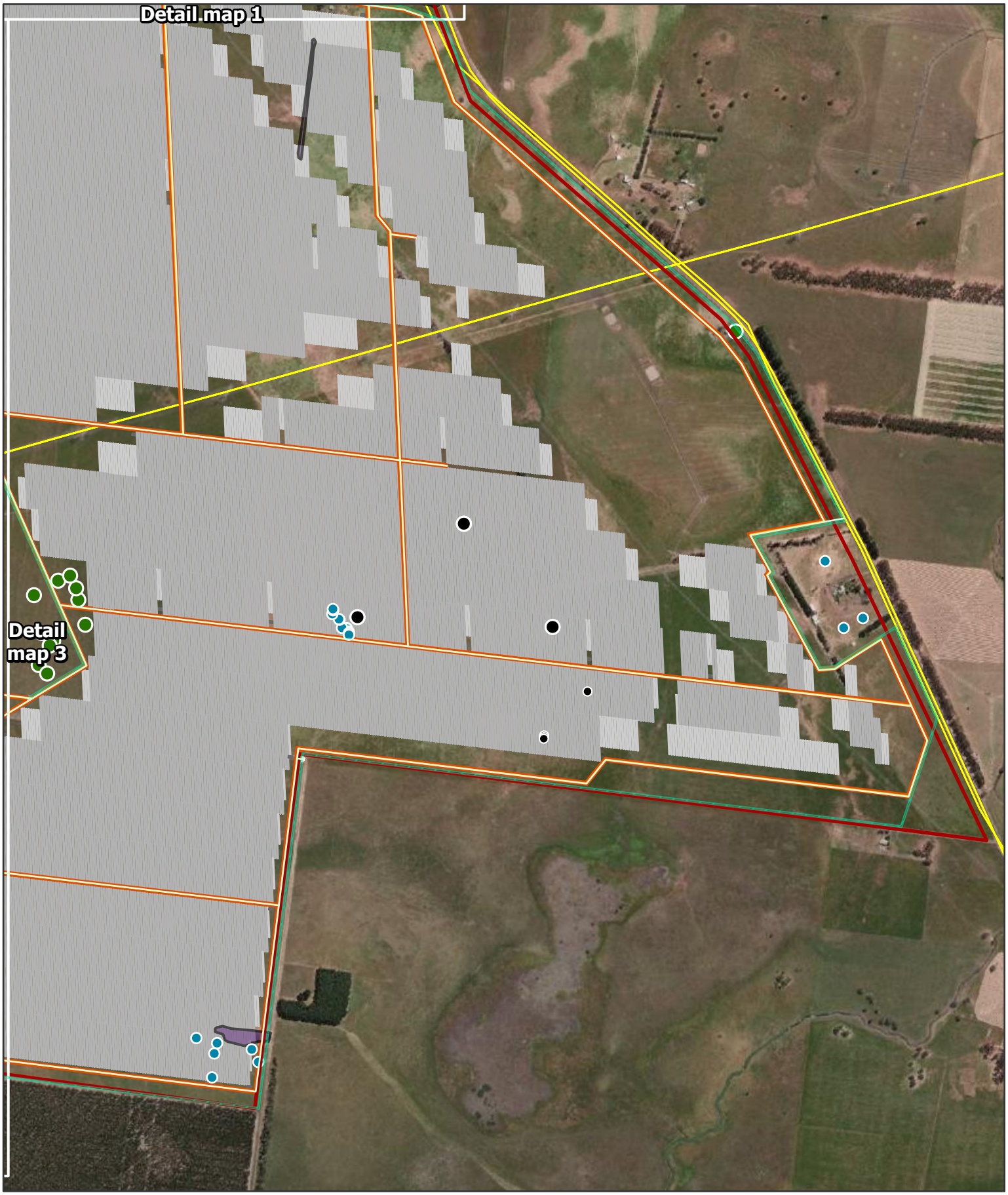

Ecological Values: Detail map 2

Moyne Shire

- Study area
- Firebreak
- Gates
- Inverer pad
- Powerlines existing
- Roads
- Solar panel 1
- Solar panel 2
- Vegetation Screening

Vegetation

- Native (exempt) - planted

- Planted native tree
- Small native tree
- Large native tree

Native trees removed

- Small
- Large

0 250 500
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927 Date: 06/05/2024

Source:
Basemap: VICMAP, 2023

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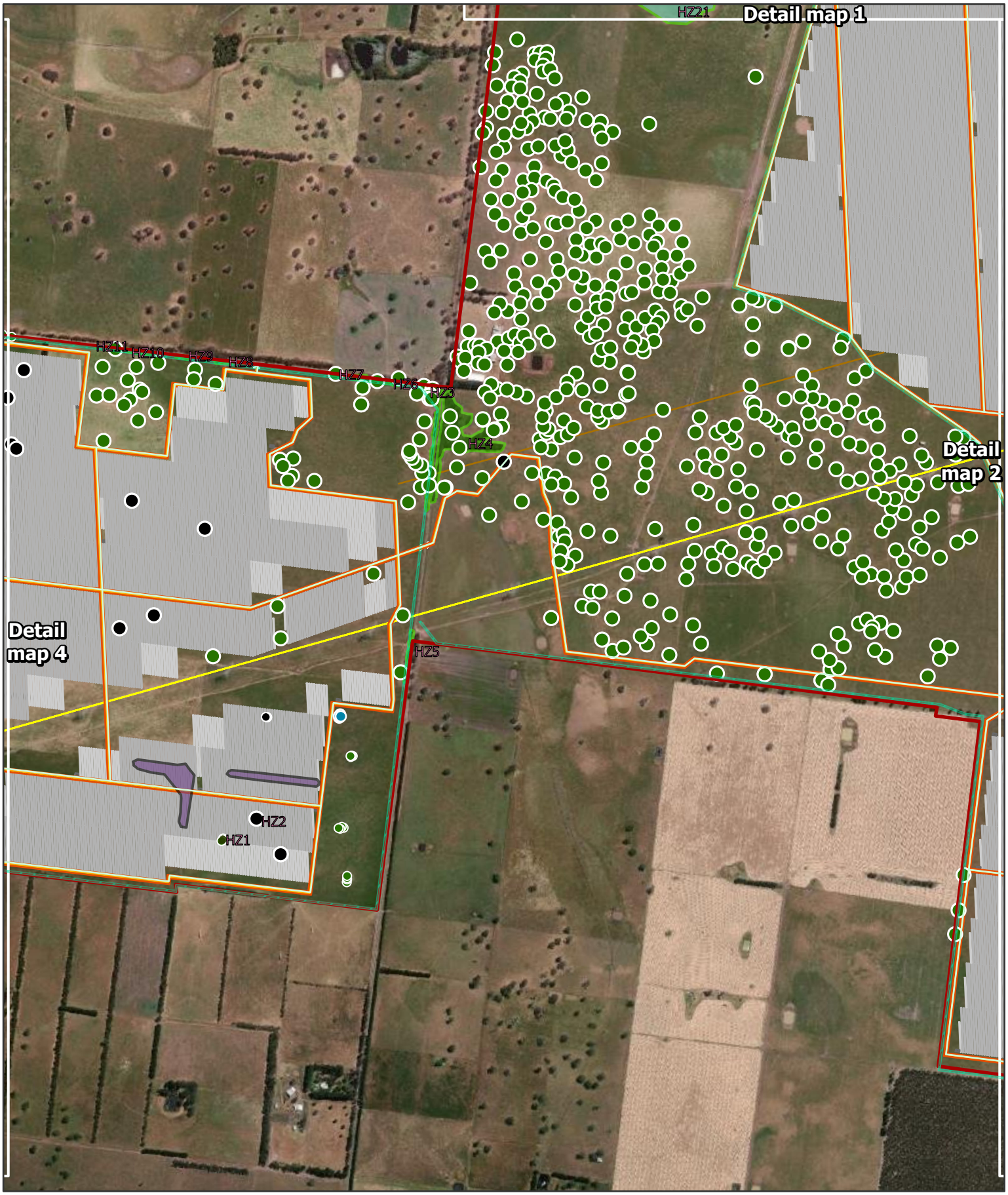


Ecological Values: Detail map 3

Moyne Shire

- Study area
- Firebreak
- Gates
- Inverer pad
- Powerline underground
- Powerlines existing
- Roads
- Solar panel 1
- Solar panel 2
- Vegetation Screening

Vegetation

- Native (exempt) - planted
- Native - current wetlands
- Native - remnant
- Planted native tree

- Small native tree
- Large native tree
- Native vegetation removed

Native trees removed

- Small
- Large

0 250 500
Meters

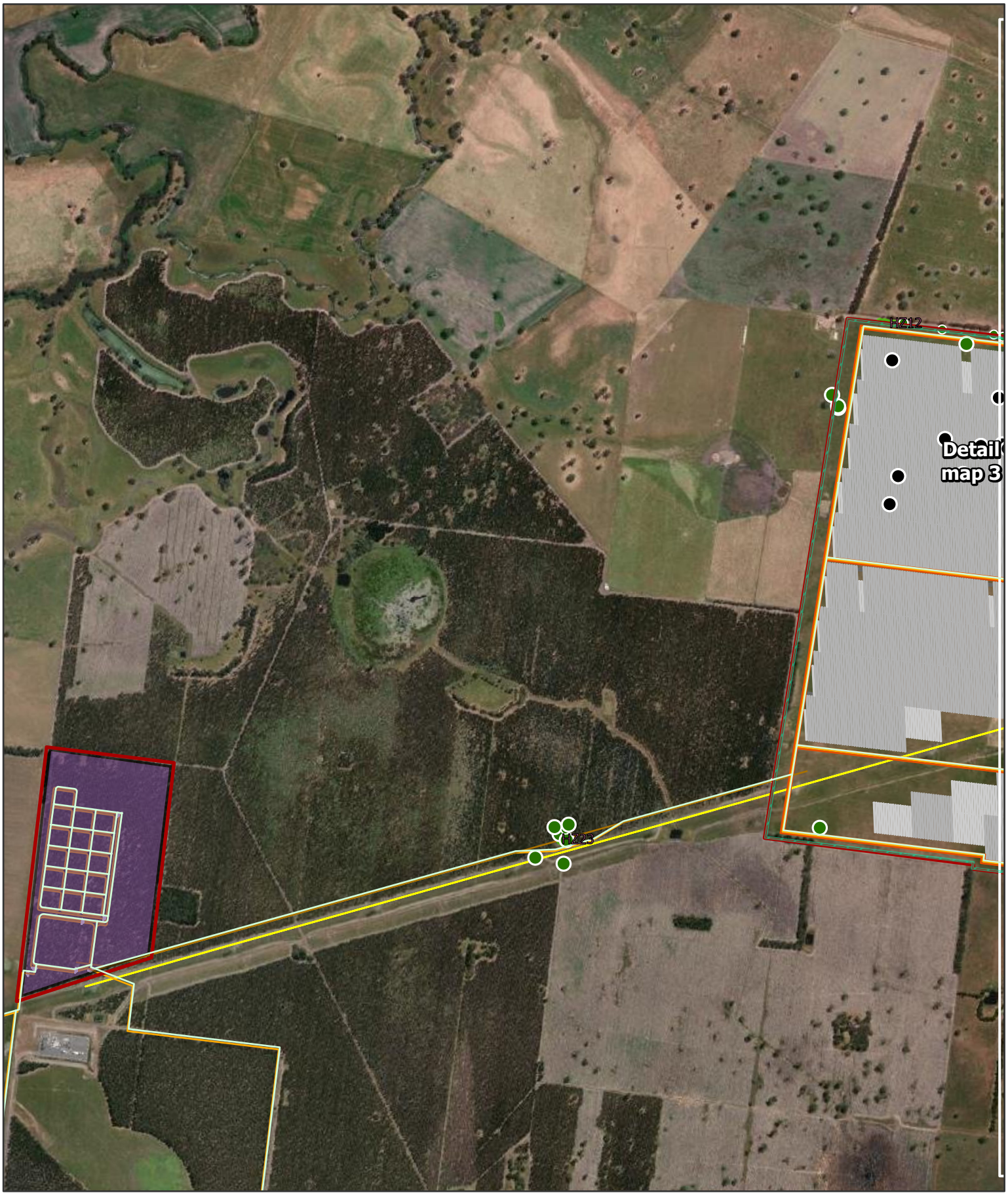
Datum/Projection:
GDA 1994 VICGRID94

Project: 4927 Date: 06/05/2024

Source:
Basemap: VICMAP, 2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



Ecological Values: Detail map 4

Moyne Shire

- Study area
- Firebreak
- Gates
- Inverer pad
- Powerline underground
- Powerlines existing
- Roads
- Solar panel 1
- Solar panel 2
- Vegetation Screening

Vegetation

- Native (exempt) - planted
- Native - remnant
- Small native tree
- Large native tree

Native trees removed

- Large

0 250 500
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927 Date: 06/05/2024

Source:
Basemap: VICMAP, 2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

4. Project impacts

4.1 Project description

The proposed Mortlake Solar Farm (the project) is a renewable energy project that 360MW solar energy facility and a utility installation (300MW BESS facility) including solar panel arrays across 1060 hectares, substation, 300 MW BESS, 500 kV transmission line traversing the site, and associated solar farm infrastructure. The project is located approximately 8 km north-west of Mortlake adjacent to Hamilton Highway.

Transmission lines will consist of an underground cable between sites A and B and to the BESS (Appendix G). The cable will be horizontal direct drilled to a minimum depth of 600 mm to avoid impacts to tree protection and structural root zones in accordance with the Australian Tree Standards (AS 4970-2009).

The location of project impacts is overlayed with the location of mapped ecological impacts in Figure 2.

4.2 Avoid and minimisation

Through and iterative detailed design process the project has worked to avoid and minimize impacts to ecological values as identified by the desktop assessment and field surveys. These avoid and minimisation measures were first informed by the findings of the initial constraints assessment and then again by the findings of the detailed vegetation assessment and targeted surveys / assessment. Avoid and minimise measures are summarised by significant ecological value below.

4.2.1 Native vegetation

Revisions in project design have led to the following avoidance a minimisation of impacts to native vegetation:

- Avoidance of floodplain Riparian Woodland (EVC 56) vegetation is association with Salt Creek. Works buffered from the creek corridor by minimum of approximately 1.1 km.
- Avoidance of Plains Grassland (EVC 132) vegetation located along Hamilton Highway, with no infrastructure to be built in the north portion of the study area and access to be achieved by existing roads, tracks and areas of disturbed and modified roadside vegetation.
- Avoidance of Plains Grassy Wetland (EVC 125) vegetation associated with Mapped Wetland 28276.
- Avoidance of Plains Grassy Woodland (EVC 55) vegetation and associated scattered trees within the south west of the study area. This includes no installation of photovoltaic panels in the area of woodland north of north of Thorburn's lane and east of Boonerah Estate Road and the retention of scattered trees and patches of native vegetation where feasibly possible along Hardy's Lane, Boonerah Estate Road within the paddock to the south and west.
- Minimisation, through the use of an underground transmission cable to connect photovoltaic panels to be constructed in the east of the study area to the west and then to from the west to connect with the Mortlake power station. This will minimise impacts to the area of woodland north of north of Thorburn's lane and east of Boonerah Estate Road with directional drilling to be used to avoid and minimise impacts to TPZ's.

Combined these measures will avoid 37.58 ha of remnant vegetation patch and 565 trees.

4.2.2 Significant fauna

Revisions in project design have led to the following avoidance a minimisation of impacts to significant fauna species:

- Avoidance of project footprint in proximity to Salt Creek. This will avoid impacts to potential habitat for Growling Grass Frog, Latham's Snipe, Little/Dwarf Galaxias, Corangamite Water Skink and Eastern Great Egret.
- Avoidance of grassland habitat along Hamilton Highway with the potential to support Striped Legless Lizard and Tussock Skink.
- Avoidance and or minimisation of impacts to woodland habitat which may support Grey-headed Flying Fox, Little Eagle and Yellow-bellied Sheathtail Bat through the measures to avoid and minimise impacts to Plains Grassy Woodland vegetation. Koala (regionally significant) is also known to occur within this habitat.

4.2.3 Significant flora

Revisions in project design have led to the following avoidance a minimisation of impacts to significant flora species:

- Avoidance of project footprint in proximity to Salt Creek. This will avoid impacts to potential habitat for *A. flutitans* and *C. gunnianum.*
- Avoidance of grassland habitat along Hamilton Highway. This will avoid impacts to potential habitat for *D. ameona* and *P. spinescens* var. *spinescens*.

4.3 Direct impacts

4.3.1 Native vegetation

Based on the project design and construction method, the project will result in the removal of **1.490 ha** of native vegetation and includes the following (Figure 2):

- 0.04 ha of Plains Grassy Woodland across two patches (HZ1 and HZ2).
- 20 large trees (1 canopy tree in a patch and 19 scattered trees).
- 7 small scattered trees.

Impacts to native vegetation have been determined based on the *Guidelines for the removal, destruction or lopping of native vegetation*.

4.3.2 Loss of hollow bearing trees

The project will result in the loss of 14 hollow bearing trees out of the approximately 356 present within the study area. These trees will primarily be lost in association to project impacts occurring the south west corner of the study area. Retention of hollow bearing trees within the study area near Hardys Lane and Boonerah Estate Road has been prioritised to retain connectivity within the landscape. Due to the size and age class of remnant trees within the study area, majority contains tree hollows and avoidance of all hollow bearing trees was not possible. Trees containing tree hollows which are proposed to be impacted are scattered within the south-west corner of the study area and where a suitable cavity occurs, would be utilised by mobile fauna.

4.3.3 Significant fauna

The project will result in the loss of 0.04 ha of native vegetation plus 20 large and 7 small remnant trees from within the study area. These areas may provide habitat for the EPBC Act listed Grey-headed Flying Fox and the FFG Act listed Yellow-bellied Sheath-tail Bat and Little Eagle.

A significant impact assessment has been undertaken in accordance with the EPBC Act significant impact guidelines for Grey-headed Flying Fox and is provided in Appendix B. No significant impact is likely for Grey-headed Flying Fox based on the significant impact assessments (Appendix B). This is largely due to the avoidance of high-quality habitat within the study area and the removal of a small area of habitat which is unlikely to be critical to the survival of this species (Appendix B).

Furthermore, this habitat may also support the Koala, a species of local significance. As per section 5.2.2 Koala was observed during the field survey and is likely to primarily utilise treed vegetation along Hardys Lane, Boonerah Estate Road and in particular the large are of contiguous and semi contiguous woodland habitat north of Thorburn's lane and east of Boonerah Estate Road which will not be impacted by the project. The species is less likely to utilise vegetation to be impacted by the project which primarily consists of isolated trees within grazed paddocks, however occasional use of such trees is considered possible.

4.3.4 Significant flora

No significant flora species or floristic communities were identified as part of the assessment. Due to the avoidance of areas which may provide suitable habitat for threatened flora species including Salt Creek and remnant degraded Plains Grassland, no impacts to threatened flora are likely.

4.4 Indirect impacts

Potential indirect mechanisms of impact associated with the project include:

- Noise and light pollution immediate adjacent to nesting and roosting habitat, which may adversely impact the natural behaviour of associated species and reproductive cycles and success. Works will occur within proximity to two Brolga breeding wetlands. In relation to Mortlake Common works will be offset from the boundary of the study area and the boundary of the Mortlake Flora Reserve by 160 meters based on current design plans. The northern extent of the wetland is approximately 200 meters south of the reserve boundary. Project works will also occur within proximity to wetland ID 28264 however, works at this location are to be restricted to an underground transmission cable and will occur at a distance of approximately 600 meters from the wetland. Works will also occur in proximity to a minor camp (Hexham) of Grey-headed Flying Fox. This camp is located within 1.5 km of the impact area.
- An increase in traffic in the immediate area including haul trucks which may result in an increase of fauna mortality due to motor vehicle collision with wildlife.
- Impacts to water quality within waterways and waterbodies associated within ground disturbance and sediment run off.

Whilst these mechanisms of indirect impact have been identified it is important to consider these impacts in the context of existing land uses within and abutting the study area. These include:

- Existing agricultural activities.
- Timber production / harvesting.

- Existing works associated with the Mortlake Power station.
- The presence of an existing major road (Hamilton Highway) along the study areas eastern boundary.

It is therefore considered that indirect impacts associated by the project can be addressed by mitigation measures to be implemented during project construction. Mitigation measures are recommended in Section 7.

5. Legislative implications

5.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act is Commonwealth legislation that protects MNES. Where a development or activity has the potential to have a significant impact on a MNES, a referral is made to the DCCEEW. An action must be referred if it 'has, will have or is likely to have a significant impact' on a MNES. DCCEEW provides guidelines on assessing whether a proposed action is likely to have a significant impact on an MNES and whether a referral is likely to be required. The Minister or delegate determines whether the activity can proceed with no further assessment by the Commonwealth, or whether it will be a controlled action for which assessment is required.

Implications

Habitat for the following EPBC Act listed species was identified within the study area:

- *D. amoena*
- *P. spinescens var. spinescens*
- Growling Grass Frog
- Latham's Snipe
- Little Galaxias / Dwarf galaxias
- Striped Legless Lizard
- Corangamite Water Skink.
- Grey -headed Flying Fox

With the exception of Grey-headed Flying Fox identified habitat for these species has been avoided by the project construction footprint. Therefore, no impacts to these species are anticipated and assessment against species specific significant impact guidelines is not considered to be warranted.

For Grey-headed Flying Fox project impacts will result in the loss of a small number of foraging trees within proximity to a known minor camp of the species. These trees, all River Red Gums may provide occasional foraging habitat (when in flower) but the species is unlikely to be reliant on this habitat. To account for natural variance of food resources (flowering periods) the species forages over a broad area with individuals known to fly as far a 40 km to feed before return to a camp that same night (DAWE, 2021). Given the small extent of vegetation losses in the context of the study area and broader landscape the direct project impacts are unlikely to have a significant impact on the species. Furthermore, indirect impacts associated with noise and light are not considered likely to impact on the species. Camps, many of which are Nationally important known proximity to large cities and towns and therefore subject to prolonged exposure to noise and light disturbance that far exceed that likely to be encountered during construction and operation of the solar fam. Formal assessment of project impacts against the species significant impact criteria is presented in Appendix B.

The project is not considered to require referral to the minister under the EPBC Act.

5.2 Environmental Effects Act

The *Environment Effects Act 1978* (EE Act) requires the preparation of an EES for activities considered to have, or to be capable of having, a significant effect on the environment. Triggers for an EES are set out as referral criteria in the *Ministerial Guidelines for Assessment of Environmental Effects under the EE Act* (DTP, 2023).

Implications

Project Impacts are assessed against EES criteria in Table 12 below.

Table 12. Environmental effects assessment criteria

Criteria type		Criteria met
individual referral criteria	Potential removal, destruction or lopping of 10 hectares or more of native vegetation , that consists of, or comprises a combination of: – an ecological vegetation class (EVC) classified as endangered; or – an EVC that is classified as vulnerable (with a condition score of 0.5 or more) or rare (with a condition score of 0.6 or more); and – that is not authorised for removal under an approved forest management plan or fire protection plan	No The project will result in the loss of 1.490 ha of native vegetation. Of this vegetation 0.04 ha is considered to belong to a vulnerable or greater EVC. For vulnerable and rare EVC's condition scores were below 0.5 and 0.6 (respectively).
	Potential clearing of an area determined as 'critical habitat' under the Flora and Fauna Guarantee Act 1988	No Critical habitat has yet to be defined by the FFG Act. Regardless given the modified and disturbed nature of the study area and avoidance and minimisation by the project
	Potential for loss of a significant proportion (e.g. 1 percent or greater) of known remaining habitat or population of a threatened species within Victoria.	No Two species listed under the FFG Act may be impacted by the project. These species are Yellow-bellied Sheathtail Bat and Little Eagle. Provided vegetation clearance activities associated with the project avoid spring summer when Little Eagle has the potential to be breeding and Yellow-Bellied Sheathtail Bat has the potential to be present impacts to these species are anticipated to be minor. Given the small magnitude of project impacts it is likely to have a negligible impact on overall species habitat (if the species is present).
	Potential for long-term change to the ecological character of a wetland listed under the Ramsar Convention or in A Directory of Important Wetlands in Australia.	No, No Ramsar sites occur within 10 km of the study area.
Combined referral criteria	Potential removal, destruction or lopping of 10 hectares or more of native vegetation , unless it is authorised for removal under an approved forest management plan2 or fire protection plan.	No, see response above.
	Matters listed under the Flora and Fauna Guarantee Act 1988: – potential loss of a significant area of a listed ecological community; or – potential loss of a genetically important population of an endangered or	No

Criteria type		Criteria met
	threatened species (listed or nominated for listing), including from loss or fragmentation of habitats; or – potentially significant effects on habitat values of a wetland supporting migratory bird species.	
	Matters listed under the Flora and Fauna Guarantee Act 1988: – potential loss of a significant area of a listed ecological community; or – potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including from loss or fragmentation of habitats; or – potentially significant effects on habitat values of a wetland supporting migratory bird species.	No

Based on an assessment against referral criteria the project does not require further assessment under the EE Act.

5.3 Planning and Environment Act 1987

The P&E Act governs the use, development, and protection of land in Victoria. The Act provides an integrated framework for planning policies and considerations across local, regional and state levels of governance and land use. These are incorporated through the Victorian Planning Provisions (VPP) and enacted under the municipal planning scheme through legal instruments such as planning permits and precinct plans.

5.3.1 Victorian native vegetation removal regulations

The Victorian Native Vegetation Removal regulations are designed to protect Victoria's biodiversity from uncontrolled clearing. Under Clause 52.17 of the VPP, a permit is required to remove, destroy or lop native vegetation on sites greater than 0.4 hectares; unless an exemption applies, or the work is undertaken in accordance with a Precinct Structure Plan (PSP) as set out under Clause 52.16 of the VPP.

The process for determining impacts when native vegetation is removed is set out under the *Guidelines for the removal, destruction or lopping of native vegetation* (the 'Guidelines'). They apply a risk-based approach using the extent, quality and landscape scale importance of vegetation to determine its significance and therefore the assessment pathway under which the application must be considered and associated approval conditions. Risk based assessment pathways are summarised in Table 13.

Table 13. Assessment pathways

Extent of native vegetation	Location Category		
	Location 1	Location 2	Location 3
Less than 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
Less than 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
0.5 hectares or more	Detailed	Detailed	Detailed

In addition to the regulation of native vegetation removal under Clause 52.16 or 52.17, the Planning and Environment Act also regulates impacts to biodiversity via planning zones, overlays, and local laws.

Implications

Impacts to native vegetation have been determined based on the *Guidelines* (DEECA, 2017). This includes consideration of the three-step approach (avoid, minimise and offset) to ensure the removal of native vegetation achieves a no net loss to biodiversity.

The extent of vegetation removal has been mapped to include both direct removal of vegetation and consequential impacts to trees outside the impact footprint based on encroachment of more than 10% of the associated TPZs. Native vegetation offset requirements have been assessed using Native Vegetation Removal tools provided by DEECA (Appendix E)

A total of 37.62 ha of native vegetation patches and 592 (561 large and 31 small) scattered trees were identified in the study area. Of this vegetation the project will impact upon 1.490 ha of native vegetation including 0.04 ha of native vegetation patches and 27 trees (20 large and 7 small). The planning application will fall under the Detailed Assessment Pathway and require an offset of **0.307 general habitat units** to compensate for the loss. This offset must:

- Be located within the Glenelg Hopkins Catchment Management Authority (CMA) or Moyne Shire Council.
- Have a minimum strategic biodiversity score of 0.304, and 20 large trees.

For further details, see the response to the applicant's requirements and Native Vegetation Removal report in Appendix E.

Prior to works commencing, a planning permit will be required for the removal of native vegetation under Clause 52.17 of the Victorian planning scheme. The application must be lodge with the Minister for Planning, who is the responsible authority for a Renewable energy facility with an installed capacity of 1MW or greater, via DELWP in accordance with the *Solar Energy Facilities - Design and Development Guideline* (DELWP, 2019).

5.3.2 Planning Overlays

Planning Overlays are a mechanism of the VPP applied over areas of land to control and guide their development. The overlays typically include schedules which specify the overlays objectives and requirements within a given planning scheme. Depending on the schedule these overlays can be general or specific in nature. Three types of overlay are considered to be of specific relevance to the assessment of ecological impacts. These are, Environmental Significance Overlays (ESOs), Vegetation Protection Overlays (VPO's) and Significant Landscape Overlays (SLO's).

Unless an exemption applies, any permit application to remove native vegetation within an area which is subject to one or more of these overlays must show consideration of the intent and requirements of those overlays.

Implications

A small portion of the study area and proposed impact footprint are within an area subject ESO3 of the Moyne Shire Planning Scheme. This location of this ESO coincides with a *Eucalyptus globulus* plantation.

The statement of environmental significance of the ESO relates to the presence of the Mortlake (gas fired) Power Station and associated generated noise. The objective of the ESO is to ensure the potential noise impact are considered in any decision regarding accommodation land use and development.

Given the nature of the project in the context of the ESO objectives no permit implications in accordance with the ESO are anticipated.

5.4 Flora and Fauna Guarantee Act 1988

The FFG Act regulates the protection and management of biodiversity including the conservation of threatened species and communities and the management of threatening processes. Permits are required to take, remove, or disturb listed and/or protected flora species, listed communities and fish on public land. Listed fauna species are also protected under controls contained in the *Wildlife Management Act 1975.*

Implications

Two threatened fauna species listed under the FFG Act are considered to have potential to be impacted by the project. These species are Little Eagle and Yellow-Bellied Sheath-tail Bat. Provided vegetation clearance activities associated with the project avoid spring summer when Little Eagle has the potential to be breeding and Yellow-Bellied Sheath-tail Bat has the potential to be present impacts to these species are anticipated to be minor. Little Eagle is likely to be able to flee the area. No permits are required under the FFG Act for impacts to threatened fauna. Consideration should however be given to requirements under the Wildlife Act and species-specific offset requirements in accordance with the guidelines.

No threatened flora or fauna species or communities were identified by the field survey. Therefore, no permit implications are anticipated under the FFG Act. One protected flora species under the Act was recorded along the proposed underground transmission line route which occurs on private land. As a result, no permit to take protected flora is required.

The project is considered as having the potential to exacerbate one threatening process listed under the Act. The project has avoided the vast majority of hollow bearing trees in the study area and trees to be impacted are typically isolated within cleared paddocks. A total of 14 hollow bearing trees are to be impacted by the project out of the approximate 356 present within the study area.

5.5 Wildlife Act 1975

The Wildlife Act protects and manages wildlife (fauna) in Victoria. The purpose of the act is to provide procedures for the protection and conservation of wildlife, the prevention of wildlife extinction, sustainable use and access to wildlife, and prohibit and regulate interactions with wildlife.

The Wildlife Act regulates interactions with wildlife including both native and non-native terrestrial species, and is the main legislation determining licensing relating to wildlife along the FFG Act for threatened and protected taxa.

The Wildlife Regulations 2013 provides for changes in licensing for the possession, use and trade of wildlife and further instruments for protecting wildlife under Part 2 – Protection of Wildlife including that a 'Person not to damage, disturb or destroy any wildlife habitat' under Section 42 of the regulations.

If trees are felled, fauna monitoring and salvage of hollow-dependent fauna or nesting birds may be required by the responsible authority. This work should be undertaken by a suitably qualified ecologist/zoologist with appropriate permits under the Wildlife Act and FFG Act

Implications

Native vegetation to be impacted by the project and in particular woodland vegetation and scattered trees are considered likely to support a diversity of fauna species including Koala (regionally significant) which was observed during the field survey. Where required clearance of this vegetation should be done in a staged manner to encourage fauna to flee the area into areas of contiguous and or connected vegetation to be retained of their own accord. It is also recommended that vegetation clearance works be undertaken outside of spring summer when faunal activity is typically highest and resident fauna is most likely to be breeding.

Although translocation of wildlife is typically not supported by DEECA, salvage and relocation to adjacent habitat may be required. Expectations around faunal salvage should be discussed with the Moyne Shire and as appropriate the regional DEECA office prior to works commencing.

5.6 Catchment and Land Protection Act 1994

The CaLP Act is the main legislative instrument for preventing land degradation and defining catchment planning and land management responsibilities.

The act has provisions for pest animals and noxious weeds and sets out requirements for landowners (including the Crown) in relation to these matters and land management practices. Under the Act, landowners have responsibilities set out for different categories of weeds which are listed by species in a 'declared list of noxious weeds'. These categories include State Prohibited Weeds, Regionally Prohibited Weeds, Regionally Controlled Weeds, and Restricted Weeds.

Landowners have responsibility to take all reasonable steps to control and prevent the spread and growth of Regional Controlled noxious weed species on their land and roadsides which adjoin their land. Appropriate weed control measures should be incorporated into the Construction Environmental Management Plan for any proposed works within the study area.

A permit from Agriculture Victoria is required to remove soil, sand, gravel, or stone that contains or is likely to contain a noxious weed or that comes from land on which noxious weeds grow. A permit is also required to deposit on land a noxious weed or the seeds of noxious weeds that are capable of germinating.

Implications

Five weeds listed under the CaLP Act were recorded during the field survey. During construction and operation the project will be required to implement measures to prevent the introduction and spread of CaLP Act listed weeds. These measures should be detailed in a Construction Environment Management Plan and the subject of project inductions.

Works are not understood to involve the removal or import of soil. However, should this change the need for a permit from Agriculture Victoria should be reviewed.

6. Next steps

Prior to works commencing, a planning permit will be required for the removal of native vegetation under Clause 52.17 of the Victorian planning scheme. The application must be lodged with the Minister for Planning, who is the responsible authority for a Renewable energy facility with an installed capacity of 1MW or greater, via DEECA in accordance with the *Solar Energy Facilities - Design and Development Guideline* (DELWP, 2019). The permit application will need to show consideration of Victoria's Native Vegetation Removal Regulations, including the requirement to avoid and minimise impacts, and secure an offset of **0.307 general habitat units and 20 large trees**. The application will fall under the **'detailed assessment pathway'** under the regulations.

In addition, the following approvals may be required:

- Requirement for pre-clearance surveys for fauna and supervision of vegetation clearing by a suitably qualified ecologist. Trees proposed for removal contain tree hollows and may support common fauna which require relocating. Any relocation plans should be included in the construction environment management plan.
- Arborist assessment of trees along underground cable route and alternative internal road in site B where applicable to determine if any impacts to remnant trees are proposed based on HDD and / ground compaction (Appendix G).

Recommended management measures include:

- Establishing temporary fencing around native trees and patches to be retained based on their associated tree protection zones. Fencing must be of a good standard to ensure all vehicles, equipment and materials (including stockpiles) are excluded from the area. Fencing to be signed "No-Go Zone".
- Pre-construction site assessment to confirm that vegetation and trees to be retained have been adequately protected from impact.
- Undertake pre-clearing inspections to confirm the on-site location of fauna immediately prior to habitat removal.
- Where suitable, Salvage tree hollows of hollow bearing trees to be lost. Where possible introduce habitat into areas to be retained. Salvaged hollows could be attached to trees to mitigate impacts to arboreal fauna or birds, or placed in the understorey to provide habitat for ground dwelling fauna.
- Removal of large native trees that support fauna habitat should preferably be undertaken between February and September to avoid the breeding season for the majority of fauna species.
- Managing native fauna that may be displaced due to habitat removal, in compliance with the *Wildlife Act 1975* and in consultation with public land managers where relevant.
- Limit noise disturbance in proximity to the minor Grey-headed Flying Fox Camp. Where possible time loud construction events outside of the period of October to December when the majority of Grey-headed Flying Fox births occur (DAWE, 2021).
- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Authority guidelines (EPA 1991; EPA 1996; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands.

- Implementation of appropriate measures to manage the risk of the spread and introduction of pest animals, weeds and pathogens during construction.
- Implementation of traffic management inclusive of reduced speed limits during construction to reduce the risk animal strike. In particular this measure should be considered on Hardys Lane, Boonerah Estate Road and Thorburn's Lane to reduce potential impacts to resident fauna species such as Koala.

Where relevant, these measures should be incorporated into the construction environment management plan and should include the following measures:

- Develop a vegetation management plan for inclusion in the CEMP, covering as a minimum:
  - Identification of areas of important flora and fauna habitat to be protected during construction.
  - Fencing protected areas and no-go zones to a standard suitable to prevent all access during construction.
  - Pre-construction site assessment to confirm that vegetation and trees to be retained have been adequately protected from impact.
  - Vegetation clearing controls and protection measures.
  - Implementation of appropriate measures to manage the risk of the spread and introduction of pest animals, weeds and pathogens during construction.
  - Procedures if unexpected threatened species are identified.
- Develop a fauna management plan for inclusion in the CEMP, covering as a minimum:
  - Undertaking pre-clearing inspections by a suitably qualified zoologist or wildlife handler to confirm the on-site location of fauna immediately prior to habitat removal.
  - Salvage and translocation of fauna by a suitably qualified zoologist or wildlife handler if required prior to construction.
  - Daily inspections of open trenches or pits for trapped animals, such as reptiles and small-ground dwelling mammals.
  - Managing native fauna that may be displaced due to habitat removal, in compliance with the Wildlife Act.
  - Night lighting shall be restricted to the minimum amount required to safely operate the site to minimise light pollution and adverse effects to nocturnal species such as bats. This will include using:
    - light shields to direct light and reduce light spill.
    - low beam vehicle lights except where safety is compromised.
  - Work restrictions during sensitive life-stages (e.g. breeding, nesting, etc.) to avoid disturbance to native fauna. This may include restrictions on work activities during a season (e.g., spring), species life stage (e.g., breeding or nesting) or time of day (e.g., night-time).

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Appendix A Likelihood of threatened species

A1 Terms

Likelihood of occurrence	FFG Act	EPBC Act	Protected Matters Search Tool
Present: The species/ecological community was recorded by ELA or by a recent assessment in the study area. **High:** The flora species/ecological community was identified to have been recently recorded (~10 years) by the desktop assessment and suitable high quality species habitat exists or could exist in the study area following detailed ecological studies. For fauna, species recent records were identified by the desktop assessment, the study area is within the species known range and is likely to support a population of the species, or the species may be reliant on its habitat. **Moderate:** The species/community predicted distribution includes the study area but the desktop assessment did not identify records of the species and the study area is unlikely (or is not considered) to support species habitat. For fauna, the species historical records were identified by the desktop assessment and the species may regularly visit the study area. Further assessment to determine the extent and nature of their habitat use is likely to be required. **Low**: The flora species/ecological community was not identified to have been recently recorded by the desktop assessment and/or suitable species habitat does not exist in or adjacent to the study area. For fauna, the species recent or historical records were identified by the desktop assessment, however the species may fly over or be present on a rare and opportune basis when foraging but is unlikely to make significant use of the study area or to rely on its habitats. **Negligible:** The species/community predicted distribution includes the study area but the desktop assessment did not identify records of the species and the study area is unlikely (or is not considered) to support species habitat.	**EX**: Extinct **CR**: Critically endangered **EN**: Endangered **VU**: Vulnerable	**EX**: Extinct **CE**: Critically endangered **EN**: Endangered **VU**: Vulnerable **CD**: Conservation dependent	**PMST-K:** Species or species habitat known to occur within area **PMST-L**: Species or species habitat likely to occur within area **PMST-M:** Species or species habitat may occur within area **PMST-F:** Foraging, feeding or related behaviour likely to occur within area

A2 Significant fauna

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Amphibians									
Litoria raniformis	Growling Grass Frog	VU	VU	12	2018	VBA, PMST	Moderate	The species persists in isolated populations in the greater Melbourne area, in the south-west of Victoria and a few sites in central Victoria and Gippsland. Occurs in a variety of still or slow-moving permanent and semi-permanent water bodies with abundant submerged and emergent vegetation and minimal tree canopy cover including farm dams, irrigation channels and disused quarries.	Recently recorded in the surrounding areas. Suitable wetland habitat available within the study area.
Pseudophryne bibronii	Brown Toadlet	EN		3	1962	VBA	Low	Found in a wide variety of habitats such as dry forests, woodland, shrubland, grassland, coastal swamps, heathland, and sub-alpine areas, particularly in areas that are likely to be inundated after rainfall. Shelter in damp areas under leaf litter, logs, or other cover	Last recorded in the surrounding areas over 62 years ago. Some suitable habitat available within the study area.
Pseudophryne semimarmorata	Southern Toadlet	EN		13	1979	VBA	Low	Occurs in forests, woodlands, heaths, and grasslands at lower elevations. Found under leaf litter, logs or rocks in damp areas and drainage lines but not necessarily near permanent water.	Last recorded in the surrounding areas over 45 years ago. Some suitable habitat within the study area.
Bats									
Miniopterus orianae bassanii	Southern Bent-winged Bat (southern ssp.)	CR		7	2010	VBA, PMST	Low	Only found in south-western Victoria and south-eastern South Australia in a limited number of caves with suitable microclimate.	No suitable caves. Species not known to use tree hollows, however, may on occasion forage within the study area.

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Pteropus poliocephalus	Grey-headed Flying-fox	VU	VU	9	2021	VBA, PMST	Moderate	Wide ranging and highly mobile species that uses a range of habitats where flowering eucalyptus trees, fruit crops and urban gardens are present. Roosts are commonly in gullies, close to water with a dense canopy.	No nearby camps, however, may on occasion forage within the study area.
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	VU		12	2011	VBA	High	Occurs in a variety of habitats. Forages above the canopy but can also forage in treeless areas. Requires tree hollows for roosting and nesting.	Suitable tree hollows and foraging habitat occurs within the study area.
Birds									
Accipiter novaehollandiae	Grey Goshawk	EN		1	1998	VBA	Low	Mainly tall wet forests and gullies in the Otway Ranges but also woodlands, dry forests, wooded farmland and suburban parks in the Strzelecki Ranges, Gippsland Plains and Otway Plains.	Few records over 10 years ago. Sub-optimal habitat within the study area.
Actitis hypoleucos	Common Sandpiper	VU	Ma, Mi	N/A	N/A	PMST	Low	Prefers the muddy edges or rocky shores of fresh or saline coastal wetlands. Less often recorded inland on the muddy or sandy edges of lakes, dams, waterholes and bore drains.	Limited suitable habitat within the study area.
Antigone rubicunda	Brolga	EN		107	2020	VBA	Moderate	Large open wetlands, grassy plains, coastal mudflats, and irrigated croplands. Occasionally mangrove-studded creeks and estuaries.	Degraded wetland habitat occurs within the study area. May occasionally use the study area when inundated.
Aphelocephala leucopsis	Southern Whiteface		VU	N/A	N/A	PMST	Low	A wide range of open woodland and shrubland habitats, containing shrubs and / or grasses in the understorey. Occurs in the foothills, lowlands, and plains.	Limited suitable habitat within the study area.

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Apus pacificus	Fork-tailed Swift		Ma, Mi	N/A	N/A	PMST	Low	Primarily an aerial species which forages in flight and may occasionally land.	Modelled habitat, no nearby recent records. Foraging habitat occurs but likely only utilised on an opportunistic basis.
Ardea alba modesta	Eastern Great Egret	VU	Ma	5	2018	VBA	Moderate	Widespread in Australia. Inhabits swamps and marshes, grasslands, margins of rivers and lakes, salt pans, estuarine mudflats, and other wetland habitats.	Potential for this species to occur within the surrounding farmlands and the mapped wetland when inundated or Salt Creek.
Ardeotis australis	Australian Bustard	CR		1	1876	VBA	Negligible	Primarily an inland and tropical species.	No suitable habitat.
Aythya australis	Hardhead	VU		15	2020	VBA	Low	Prefers open freshwater swamps and wetlands and occasionally in sheltered estuaries. They are rarely seen on land and tend to roost on low branches and stumps near the water. They prefer deep, fresh open water and densely vegetated wetlands for breeding.	Limited suitable habitat within the study area.
Biziura lobata	Musk Duck	VU	Ma	10	1995	VBA	Low	Prefers deep fresh open water and densely vegetated wetlands and swamps. Occasionally found in estuaries and bays.	Limited suitable habitat within the study area.
Botaurus poiciloptilus	Australasian Bittern	CR	EN	N/A	N/A	PMST	Low	Prefers permanent freshwater wetlands with tall aquatic vegetation such as bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Occasionally occurs in rice fields and saltmarshes.	Limited suitable habitat within the study area.
Calidris acuminata	Sharp-tailed Sandpiper		VU, Ma, Mi	11	2012	VBA, PMST	Low	Widespread in most regions of Victoria, especially in coastal areas. Inhabits shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	Limited suitable habitat within the study area.

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Calidris ferruginea	Curlew Sandpiper	CR	CE, Ma, Mi	5	1998	VBA, PMST	Low	Nonbreeding migratory species that occurs primarily on intertidal mudflats of estuaries, lagoons, mangroves, and less often on beaches, rocky shores and around lakes, dams. Can also occur on suitable inland habitats in the Kerang area, Mildura, and western districts.	Limited suitable habitat within the study area.
Calidris melanotos	Pectoral Sandpiper		Ma, Mi	N/A	N/A	PMST	Low	Nonbreeding migratory species that prefers shallow fresh to saline wetlands with open fringing mudflats and low, emergent, or fringing vegetation, such as grass or samphire. Also occurs in swamps, saltmarshes, lakes, and inundated grasslands.	Limited suitable habitat within the study area.
Calidris minuta	Little Stint		Ma	1	1988	VBA	Low	A migratory species that breeds in Scandinavia and Russia. In Australia, recorded on mudflats, sandflats or islets of sheltered coastal estuaries and embayments. Also found in near-coastal wetlands including open shallow freshwater lakes, lagoons and shallow pools and puddles, as well as sewage farms and salt ponds.	Limited suitable habitat within the study area.
Calidris ruficollis	Red-necked Stint		Ma, Mi	5	2011	VBA	Low	Coastal species which occurs in sheltered inlets, bays, lagoons, estuaries, intertidal mudflats and protected sandy or coralline shores. Occasionally occur in saltworks, sewage farms, saltmarsh, shallow wetlands, lakes, swamps, riverbanks, dams, flooded paddocks or damp grasslands.	Limited suitable habitat within the study area.

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Callocephalon fimbriatum	Gang-Gang Cockatoo	EN	EN	1	1980	VBA, PMST	Low	Gang-gang Cockatoos primarily occur within the temperate eucalypt forests and woodlands of mainland south-east Australia. The species is an altitudinal migrant. During summer months, Gang-gang Cockatoos primarily inhabit mature, wet sclerophyll forests, typically dominated by eucalypts. During winter months, Gang-gang Cockatoos tend to range beyond montane forests to inhabit woodland assemblages at lower, drier altitudes	Single historical record. Foraging habitat available within the study area, however given the limited records is unlikely to be present.
Charadrius bicinctus	Double-banded Plover		Ma, Mi	2	1988	VBA	Low	Found in both coastal and inland areas on coastal beaches, mudflats, sewage farms, riverbanks, fields, dunes, upland tussock grasses and shingle.	Limited suitable habitat within the study area.
Climacteris picumnus victoriae	Brown Treecreeper (south-eastern subspecies)		VU	N/A	N/A	PMST	Low	Prefers woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, a low shrub cover and plenty of fallen timber. Also occurs in River Red Gum Forest near wetlands	Limited suitable habitat within the study area.
Falco hypoleucos	Grey Falcon	VU	VU	N/A	N/A	PMST	Low	Primarily occurs inland in arid areas but can occur elsewhere in Australia. Prefers lightly timbered woodland and Acacia scrub.	Limited suitable habitat within the study area.
Falco subniger	Black Falcon	CR		3	2011	VBA	Low	Sparsely distributed across Victoria. Occurs in woodland, shrubland and grassland in particularly along wooded watercourses and agricultural land with scattered remnant trees.	Limited suitable habitat within the study area.

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Gallinago hardwickii	Latham's Snipe		VU, Ma, Mi	3	2018	VBA, PMST	Moderate	Non-breeding migratory species that occurs in freshwater wetlands with low dense vegetation on or near the coast. Preferred wetland vegetation includes sedges, grasses, lignum, reeds, and rushes. Also occurs in saltmarsh and creek edges on migration, drainage ditches along roadsides and railways, crops and pasture.	Suitable habitat occurs at Salt Creek and within pasture.
Gelochelidon macrotarsa	Australian Gull-billed Tern		Ma, Mi	2	1999	VBA	Low	Prefers marshier habitats of freshwater swamps, brackish and salt lakes and occasionally on beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands, and grasslands.	Limited suitable habitat within the study area.
Grantiella picta	Painted Honeyeater	VU	VU	N/A	N/A	PMST	Negligible	Prefers forest/woodland, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands with mistletoe a high number of mature trees. Also occurs in acacia-dominated woodlands, paperbarks, casuarinas, Callitris, and trees on farmland or gardens.	No suitable habitat or mistletoe.
Hieraaetus morphnoides	Little Eagle	VU		4	2018	VBA	Moderate	Widespread species. Occurs primarily in wooded farmland and dry woodlands.	Suitable foraging habitat within the study area.
Hirundapus caudacutus	White-throated Needletail	VU	VU, Ma, Mi	N/A	N/A	PMST	Low	Primarily an aerial species which forages in flight and may occasionally land. Occurs most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Modelled habitat, no nearby recent records. Foraging habitat occurs but likely only utilised on an opportunistic basis.

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Lathamus discolor	Swift Parrot	CR	CE	N/A	N/A	PMST	Low	Non-breeding winter migrant. Prefers dry forest and woodland, particularly box-ironbark forest in central and NE Victoria, and eucalyptus sp. within greater Melbourne. Feeds on nectar and lerps of winter flowering eucalyptus including Grey Box (Eucalyptus microcarpa), Red Ironbark (*Eucalyptus tricarpa*), Mugga Ironbark (*Eucalyptus sideroxylon*) (far north-east Victoria), Yellow Gum (*Eucalyptus leucoxylon*) and White Box (*Eucalyptus albens*).	Modelled habitat, no nearby recent records. Foraging habitat occurs but likely only utilised on an opportunistic basis.
Melanodryas cucullata cucullata	Hooded Robin	VU	EN	N/A	N/A	PMST	Low	Found all over mainland Australia. Inhabits lightly timbered woodland usually dominated by acacia and/or eucalypts.	Limited suitable habitat.
Motacilla flava	Yellow Wagtail		Ma, Mi	N/A	N/A	PMST	Negligible	Nonbreeding migratory species. Occurs in grassland habitat subject to inundation.	No suitable habitat.
Myiagra cyanoleuca	Satin Flycatcher		Ma, Mi	N/A	N/A	PMST	Negligible	In Victoria, the species is widespread in the south and east. Prefers tall wetter Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily vegetated gullies.	No suitable habitat.
Neophema chrysostoma	Blue-winged Parrot		VU, Ma	N/A	N/A	PMST	Low	Occurs in range of habitats from coastal, sub-coastal, and inland areas, through to semi-arid zones. Throughout their range they favour grasslands and grassy woodlands and are found near wetlands both by the coast and in semi-arid zones. Can also be found in altered environments like airfields, golf courses, and paddocks	

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Oxyura australis	Blue-billed Duck	VU		2	2020	VBA	Low	Prefers deep permanent well vegetated freshwater swamps, large dams, lakes, and open waters. Important breeding sites are primarily in south-west Victoria but also at a few sites in Port Phillip, north-east Victoria, Gippsland, and north-west Victoria.	Limited suitable habitat.
Pedionomus torquatus	Plains-wanderer	CR	CE	N/A	N/A	PMST	Negligible	Prefers native grassland.	No suitable habitat.
Plegadis falcinellus	Glossy Ibis		Ma, Mi	1	1991	VBA	Low	Occasionally seen in eastern Victoria. Requires shallow water and mudflats, so is found in well-vegetated wetlands, floodplains, mangroves, and rice fields.	Limited suitable habitat.
Rhipidura rufifrons	Rufous Fantail		Ma, Mi	N/A	N/A	PMST	Low	Found in south and central Victoria in wet sclerophyll forests, subtropical and temperate rainforests. It sometimes inhabits drier sclerophyll forests and woodlands.	Limited suitable habitat.
Rostratula australis	Australian Painted-snipe	CR	EN, Ma	N/A	N/A	PMST	Low	Occurs in shallow fresh or brackish wetlands with permanent or semi-permanent water, cover of adjacent grasses and muddy edges. Also occurs in waterlogged grassland, sewage ponds and dams.	Limited suitable habitat.
Spatula rhynchotis	Australasian Shoveler	VU		18	2017	VBA	High	Found throughout much of Victoria. Prefers permanent, well-vegetated wetlands with abundant aquatic vegetation but will use most freshwater habitats.	Limited suitable habitat.
Stagonopleura guttata	Diamond Firetail	VU	VU	N/A	N/A	PMST	Low	Found throughout south-eastern mainland Australia. Inhabits grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, secondary derived grassland, riparian areas and lightly wooded farmland.	Limited suitable habitat.

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Stictonetta naevosa	Freckled Duck	EN		6	2019	VBA	Low	Prefers large freshwater inland wetlands, generally with dense vegetation. Occasionally recorded in coastal wetlands.	Limited suitable habitat.
Tringa nebularia	Common Greenshank	EN	EN, Ma, Mi	5	1988	VBA, PMST	Low	Prefers sheltered coastal habitats with large mudflats and saltmarsh, mangroves, or seagrass. Can occur inland, in estuaries and mudflats, mangrove swamps and lagoons, billabongs, swamps, sewage farms and flooded crops.	Limited suitable habitat.
Fish									
Galaxiella toourtkoourt	Little Galaxias	EN		2	2008	VBA	Present	Occupies coastal drainages in western Victoria and South Australia.	Recorded at Salt Creek during targeted Growling Grass Frog surveys.
Macquaria australasica	Macquarie Perch	EN	EN	2	1920	VBA	Low	Occurs in upstream reaches of Murray-Darling Basin where water has lots of cover from aquatic vegetation, rocks, and overhanging banks.	Limited suitable habitat.
Nannoperca obscura	Yarra Pygmy Perch	VU	VU	N/A	N/A	PMST	Negligible	Typically occurs in lakes, ponds, and slow-flowing rivers, but prefers small to medium sized streams that are shallow with moderate to high flow. Usually associated with large amounts of aquatic vegetation.	No suitable habitat.
Prototroctes maraena	Australian Grayling	EN	VU	N/A	N/A	PMST	Negligible	Occurs in freshwater rivers and streams with moderate flow, gravel substrate and alternating pools and rifles. The species spends part of its lifecycle in freshwater and at least part of the larval and/or juvenile stages in coastal seas.	No suitable habitat.
Mammals									

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Antechinus minimus maritimus	Swamp Antechinus (mainland)	VU	VU	N/A	N/A	PMST	Low	Mainly occurs in damp areas with dense vegetation at about 1–2 m above ground level, including dense wet heathlands, tussock grasslands, sedgelands, damp gullies, swamps, and some shrubby woodlands. Found in Coastal Victoria as far east as Wilson's Promontory.	Limited suitable habitat.
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	EN	EN	N/A	N/A	PMST	Low	Occurs in a range of environments from rainforest to open woodland. Particularly wet eucalypt forests with rocky outcrops, extensive riparian vegetation and ground dwelling prey. Highly mobile but requires suitable den sites such as rock crevices, caves, hollow logs, burrows, and tree hollows. In Victoria, locations include East Gippsland, the Strzelecki Ranges, and Wilson's Promontory NP	Limited suitable habitat.
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern)	EN	EN	N/A	N/A	PMST	Low	Prefers heathland, heathy open forest, and woodland with dense ground cover up to 1 m tall on sandy and well drained soils. Also occurs in dense Blackberry thickets.	Limited suitable habitat.
Ornithorhynchus anatinus	Platypus	VU		1	1911	VBA	Low	Prefers well vegetated freshwater creeks, slow-moving rivers, lakes joined by rivers, and built water storages such as farm dams. Builds burrows into riverbanks among tree roots.	Limited suitable habitat.
Perameles gunnii	Eastern Barred Bandicoot	EN	EN	4	1997	VBA	Negligible	Extinct in the wild. Has been reintroduced in areas along the Bass Coast, in Hamilton and Woodlands Historic Park in Greenvale.	No suitable habitat.

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Petaurus australis australis	Yellow-bellied Glider (south-eastern)	VU	VU	N/A	N/A	PMST	Negligible	Occurs in tall mature eucalypt forest in areas of high rainfall and nutrient-rich soils. Their forest type preferences change with latitude and elevation; mixed coastal forests to dry escarpments in northern part of range; moist coastal gullies and creek flats to tall mountain forests in southern part of range	No suitable habitat.
Potorous tridactylus trisulcatus	Long-nosed Potoroo	VU	VU	N/A	N/A	PMST	Negligible	In Victoria, the Long-nosed Potoroo (SE Mainland) occurs in six discrete regions (Seebeck 1981), including the South-western region, Grampians, Otways, Western Port, Wilsons Promontory, and east Gippsland. Most commonly inhabits heath-woodland grading into heath dominated by Eucalyptus obliqua and E. baxteri, and sometimes E. radiata.	No suitable habitat.
Sminthopsis crassicaudata	Fat-tailed Dunnart	VU		17	2010	VBA	Low	Occurs in grassland and shrubland with tussocky grasses, cracking soils, rocks and logs. Can occur in agricultural land and in sheds.	Limited suitable habitat.
Invertebrates									
Engaeus sericatus	Hairy Burrowing Crayfish	VU		4	2021	VBA	Low	Freshwater crayfish that burrows into river banks. May occur in streams with surrounding native vegetation in agricultural areas.	Limited suitable habitat.
Synemon plana	Golden Sun Moth	VU	VU	N/A	N/A	PMST	Low	Prefers native grassland with Rytidosperma and Austrostipa grass species and suitable inter-tussock space. Also occurs in exotic grassland comprising Serrated Tussock and Chilean Needle Grasses.	Limited suitable habitat.
Reptiles									

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Delma impar	Striped Legless Lizard	EN	VU	13	2013	VBA, PMST	Moderate	Occurs in grassland with complex grass structure, including native and exotic tussock grasses with high biomass, surface rocks, arthropod burrows, or cracking soils. Occurs on roadsides and can persist in disturbed areas with low-moderate intensity grazing but not in cropped or ploughed land.	Degraded Plains Grassland provides potential suitable habitat.
Eulamprus tympanum marnieae	Corangamite Water Skink	EN	EN	N/A	N/A	PMST	Moderate	Habitat consists of large deeply fissured basaltic flows or outcrops, remnant vegetation and adjacent permanent or ephemeral wetlands.	Suitable habitat at Salt Creek.
Lissolepis coventryi	Swamp Skink	EN	EN	N/A	N/A	PMST	Low	Occurs in densely vegetated swamps and associated watercourses, and adjacent wet heaths (tea-tree thickets), sedgelands and saltmarshes.	Limited suitable habitat.
Pseudemoia pagenstecheri	Tussock Skink	EN		65	2013	VBA	Moderate	Occurs in grassland habitat.	Degraded Plains Grassland provides potential suitable habitat.

A3 Significant flora

Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
Amphibromus fluitans	River Swamp Wallaby-grass	VU				PMST	Moderate	River Swamp Wallaby-grass grows mostly in permanent swamps and lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally fluctuating water levels.	Suitable habitat present at Salt Creek within Floodplain Riparian Woodland.
Carex tasmanica	Curly Sedge		EN	1	2005	VBA	Low	Uncommon, confined to seasonally wet, heavy clayey soils immediately north of Melbourne (Craigieburn) and farther west (to Heywood near Portland).	Limited suitable habitat present within study area. Unlikely to occur.
Comesperma polygaloides	Small Milkwort		CR	1	1901	VBA	Low	Occasional on heavier soils (clays, alluvium) supporting grassland and grassy woodland communities in central and south-western areas.	Historical record only. Low-quality, degraded habitat present within the study area. Unlikely to occur.
Coronidium gunnianum	Pale Swamp Everlasting		CR	4	2013	VBA	Moderate	Usually at low elevations (under c. 100 m) in grasslands and riverine Eucalyptus camaldulensis woodland on soils that are prone to inundation.	Degraded but ephemeral Plains Grassy Wetland habitat within the study area. Potential to occur following inundation.
Dianella amoena	Matted Flax-lily	EN	CR			PMST	Moderate	Most commonly in lowland grasslands, grassy woodlands, valley grassy forest and creek lines of herb-rich woodland. Typically, the species occurs on well drained to seasonally wet fertile sandy loams to heavy cracking clays derived from Silurian or Tertiary sediments, or from volcanic geology	Plains Grassland on Hamilton Highway provides habitat for this species which can occur in degraded environments.

Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
Dodonaea procumbens	Trailing Hop-bush	VU				PMST	Low	This species grows in low-lying, often winter-wet areas in woodland, low open forests, heathland and grasslands, on sands and clays. Victorian populations have been recorded in various plant communities including grassy woodland dominated by River Red Gum in western Victoria, heathy dry forest in central Victoria, damp heath in far-western Victoria	Limited suitable habitat. Woodlands have stock access and are likely too degraded to occur.
Glycine latrobeana	Clover Glycine	VU	VU	10	1998	VBA, PMST	Low	Clover Glycine is found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands, and low open woodlands with a grassy ground layer	Limited suitable habitat. Woodlands have stock access and are likely too degraded to occur.
Juncus revolutus	Creeping Rush		EN	2	1979	VBA	Negligible	Found in damp saline or subsaline communities near the coast.	No suitable habitat.
Lachnagrostis adamsonii	Adamson's Blown-grass	EN	EN			PMST	Low	Confined to slow moving creeks, swamps, flats, depressions, or drainage lines (such as along roadsides) that are seasonally inundated or waterlogged and usually moderately to highly saline. Soils are black, cracking clays or duplex soils with poorly permeable subsoils ranging from acidic (pH 4.6) to alkaline (pH 9.1). Plants appear to favour sites that have some shelter from the wind, often provided by other species such as Canary-grass (Phalaris aquatica), Juncus spp. or Gahnia spp. This preference for protected sites may explain why plants are rarely found around larger, more open, exposed saline lakes. The species will also tolerate some waterlogging but will not survive in relatively deep water for any length of time.	Not recorded in Not recorded in Plains Grassy Wetland during GGF survey. Survey was during species flowering period. Habitat is highly degraded.
Lachnagrostis robusta	Salt Blown-grass		EN	1	2008	VBA	Negligible	Occurs around margins of salt lakes and saline depressions mostly across the Volcanic Plain, with eastern outliers near Tooradin and Seaspray and a few sites west of the Grampians (Douglas, Natimuk areas).	No suitable habitat.

Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
Lachnagrostis semibarbata var. filifolia	Purple Blown-grass		EN	2	2009	VBA	Low	There are two varieties, both occurring in Victoria, mostly associated with slightly to markedly saline sites. This subspecies known further east near the Gippsland Lakes east of Sale.	Not recorded in Plains Grassy Wetland during GGF survey. Survey was during species flowering period. Habitat is highly degraded.
Lachnagrostis semibarbata var. semibarbata	Purple Blown-grass		EN	1	1995	VBA	Low	Scattered in wet marshes and slightly saline swamps and depressions across the Victorian Volcanic Plain.	Not recorded in Plains Grassy Wetland during GGF survey. Survey was during species flowering period. Habitat is highly degraded.
Lepidium aschersonii	Spiny Peppercress	VU	EN	4	1983	VBA, PMST	Negligible	Mostly on heavy clay soil near salt lakes on volcanic plain, but with outlying records from near Lake Omeo (in 1940 &1981) and the Grampians (in 1893).	No suitable habitat.
Lepidium hyssopifolium	Basalt Peppercress	EN	EN			PMST	Low	Collected from scattered sites on the volcanic plain, but now much reduced from its former range and recorded recently only from e.g. Moorabool, Winchelsea, Bacchus Marsh, Woodend, Trentham. Most recent collections are from disturbed, rather weedy sites. One collection from near Port Fairy is noteworthy for its occurrence in a slightly saline estuary amongst saltmarsh and fringing sedgeland.	Limited suitable habitat. Unlikely to occur.
Leucochrysum albicans subsp. tricolor	White Sunray	EN	EN	2	2007	VBA, PMST	Low	In Victoria, the Hoary Sunray occurs almost exclusively on acidic clay soils derived from basalt, occasionally on nearby sandy-clay soils derived from sedimentary material	Limited suitable habitat. Unlikely to occur.
Microseris scapigera s.s.	Plains Yam-daisy		CR	1	2009	VBA	Low	Formerly widespread in moist depressions on the basalt plains of western Victoria, but now very rare due to loss of habitat.	Limited suitable habitat. Unlikely to occur.

Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
Pimelea spinescens subsp. spinescens	Spiny Rice-flower	CE	CR			PMST	Moderate	Grows in grassland, open shrubland and occasionally woodland, often on basalt-derived soils. Plants from more northerly populations occur on red clay complexes, while plants from southern populations occur on heavy grey-black clay loams. Topography is generally flat, but populations may occur on slight rises or in slightly wettish depressions. Vegetation is often dominated by *Themeda triandra*, with *Austrostipa spp.* or *Austrodanthonia spp.* co-dominant.	Plains Grassland on Hamilton Highway provides habitat for this species which can occur in degraded environments.
Poa sallacustris	Salt-lake Tussock-grass	VU	CR			PMST	Negligible	Apparently endemic in Victoria. Known only from margins of brackish to salt lakes in the western district (Lakes Corangamite and Terangpom near Cressy, Black Lake near Skipton, Lake Linlithgow near Hamilton) although generally occurring above the level of significant saline influence. Regarded as threatened by grazing and encroachment of exotic pasture species.	No suitable habitat.
Prasophyllum sp. aff. correctum (Mortlake)	Western Gaping Leek-orchid		CR	7	2020	VBA	Low	Endemic to Victoria were known only from grassland in the Mortlake area west of Melbourne.	Limited suitable habitat. Unlikely to occur.
Prasophyllum spicatum	Dense Leek-orchid	VU	CR			PMST	Negligible	Coastal heathland and near-coastal heathy forest on sandy soils	No suitable habitat.
Prasophyllum suaveolens	Fragrant Leek-orchid	EN	CR			PMST	Low	Endemic to the basalt plains of south-western Victoria this species is mostly found from inland areas growing in grasslands and open grassy woodlands, on poorly drained, red-brown soils.	Limited suitable habitat. Unlikely to occur.
Prasophyllum viretrum	Basalt Leek-orchid		CR	5	2013	VBA	Low	Restricted to a few sites in south-western Victoria growing in moist to wet grassland on dark basaltic loam.	Limited suitable habitat. Unlikely to occur.
Pterostylis chlorogramma	Green-striped Greenhood	VU	EN			PMST	Low	Moist areas of heathy shrubby forest on well-drained soils.	Limited suitable habitat. Unlikely to occur.

Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
Ptilotus erubescens	Hairy Tails		CR	25	2004	VBA	Low	Occasional on relatively fertile soils supporting grassland and woodland communities in northern and western Victoria, but not in mallee areas.	Limited suitable habitat. Unlikely to occur.
Rutidosis leptorhynchoides	Button Wrinklewort	EN	EN			PMST	Low	Restricted to open stands of plains grassland and grassy woodlands, on fertile clays to clay loams, usually in areas where the grass cover is more open, either as a result of recurrent fires or grazing by native macropods or stock. It also occurs on low rises with shallow, stony soils at less than 100 m above sea level.	Limited suitable habitat. Unlikely to occur.
Senecio macrocarpus	Large-headed Fireweed	VU	CR			PMST	Low	Grasslands, sedgelands, shrublands and woodlands, generally on sparsely vegetated sites on sandy loam to heavy clay soils, often in depressions that are waterlogged in winter. At many sites in western Victoria, the Large-fruit Groundsel occurs with many other herb species in grassland dominated by Kangaroo Grass *Themeda triandra* on heavy basalt clay soils. There are also several records from Yellow Gum *Eucalyptus leucoxylon* woodland, generally in low, flat areas where there are few other understorey species.	Limited suitable habitat. Unlikely to occur.
Senecio psilocarpus	Swamp Fireweed	VU				PMST	Negligible	Restricted to several sites in herb-rich winter-wet swamps throughout the south of the state, to the west of Sale. Grows on volcanic clays and peaty soils.	No suitable habitat.
Swainsona murrayana	Slender Darling-pea	VU	EN			PMST	Low	Extremely rare in northern and western Victoria, with an isolated southern recorded labelled 'Wannon River'. Usually found in seasonally inundated flats and around lakes.	Limited suitable habitat. Unlikely to occur.
Thelymitra basaltica	Grassland Sun-orchid		CR	2	2007	VBA	Low	Grassland on sandy brown volcanic loams.	Limited suitable habitat. Unlikely to occur.

Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
Thelymitra epipactoides	Metallic Sun-orchid	EN	EN			PMST	Negligible	Found in coastal heathland, grassland and woodland, but extending further inland into similar habitats in the west of its range. On moist or dry sandy soils.	No suitable habitat.
Thelymitra matthewsii	Spiral Sun-orchid	VU	EN			PMST	Negligible	Little is known of the specific habitat requirements of the Spiral Sun-orchid. It grows in heathy open forest and woodlands, on well-drained sand, gravel and clay loam soils, especially areas where there has been some soil disturbance, such as around old quarries and gravel pits, and on road and track verges, including those periodically slashed for fire breaks. Most sites tend to have a relatively open ground layer.	No suitable habitat.
Thelymitra orientalis	Hoary Sun-orchid	CE	CR			PMST	Negligible	Grows in damp heathy flats and seepage areas usually in peaty white sands.	No suitable habitat.
Xerochrysum palustre	Swamp Everlasting	VU	CR			PMST	Low	Grows in wetlands including sedge-swamps and shallow freshwater marshes, often on heavy black clay soils. The species will also grow in more marginal wetland habitats such as seasonally wet areas of native grassland and heath communities.	Limited suitable habitat. Unlikely to occur.

Appendix B EPBC Act assessment of impacts

Table 10. Grey-headed Flying-fox (listed as Vulnerable under the EPBC Act)

Criterion	Question	Response
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1)	lead to a long-term decrease in the size of an important population of a species	No, The species National Recovery Plan (DAWE, 2021) does not identify or define important populations of the species. The plan does however identify nationally important camps for the species. No camps occur within the study area. T Of these camps the camp in the Geelong Botanic Gardens is the nearest nationally significant camp and is approximately 140 kilometres east of the study area. Minor camps identified in the National Flying Fox Monitoring Viewer occur approximately 1.5 km to the west of the study area in Hexham, 41 km to the south in Warrnambool and 81 km to the east in Colac (DCCEEW, 2024). The minor camp closest to the study area in Hexham, was first identified in August 2021 with between 2,500 – 9,999 individuals occurring (DCCEEW, 2024). The number of individuals declined to between 500 -2,499 in February 2022 and is the last known monitoring undertaken for the camp (DCCEEW, 2024). Grey-headed Flying-fox have also been recorded at Salt Creek Wind Farm approximately 10 km north of the study area as part of the bat monitoring undertaken for the wind farm in 2020 (Biosis, 2020). Suitable foraging habitat occurs within the study area in the form of large scattered paddock trees, and large remnant trees associated with Salt Creek (Figure 2). When in flower, these trees are likely to provide foraging habitat which forms part of a broader foraging extent. The project proposes to remove a small portion of foraging habitat within the study area. This vegetation primarily consists of isolated paddock trees, with larger more connected habitat to be retained. As such the proposed impact works are not considered likely to lead to a long-term decrease in the size of an important population of the species. additionally temporary noise disturbance associated with project construction is considered unlikely to alter species occupancy. The species frequently found in association with large cities and towns where anthropogenic noise levels would be reasonably expected to commonly exceed those associated with the project.
2)	reduce the area of occupancy of an important population	No, Project impacts will be limited to the 0.04 ha of native vegetation patches and 20 large trees within the study area. Furthermore, as per the response to criterion 1 the study area is not located within proximity to any Nationally

Criterion	Question	Response
		Important Camps (DAWE, 2021). However, the study area is located in close proximity to a minor camp in Hexham. As such habitat to be lost is likely to be opportunistically foraged by the species when in flower. In the context of the study area vegetation to be lost is considered to form a negligible component of the camps overall foraging resources with 37.58 ha of native vegetation and 565 trees to be retained within the study area and similar resources (scattered paddock tress) prevalent within the broader landscape. Likewise, temporary noise impacts associated with project construction are considered unlikely to influence species occupancy.
3)	fragment an existing important population into two or more populations	No, The project does not occur in association within proximity to any nationally important camps (DAWE, 2021). Construction and operation of the solar farm is unlikely to alter species movement. The species is highly dispersive, and impacts associated with the project are considered negligible when considering the species broad foraging extent.
4)	adversely affect habitat critical to the survival of a species	No, The National Recovery Plan (DAWE, 2021) identifies critical habitat for Grey-headed Flying Fox as • Habitat that supports important winter and spring (flowering) communities. • contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May) • contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer • Contain Native and or exotic species used for roosting at the site of a nationally important Grey-headed Flying-fox Camp. On the basis of vegetation composition, small area of vegetation loss and the study area's location relative to the nearest nationally important camp (approximately 140km) the project is not considered to be likely to adversely affect habitat critical to the survival of a species
5)	disrupt the breeding cycle of an important population	No, Grey-headed Flying Fox are often found in association with major cities and town. Examples in Victoria include Melbourne and Geelong where large successful breeding populations are known in close proximity to city CBD's. The Hexham camp is a potential receptor of noise disturbance

Criterion	Question	Response
		associated with project construction; however, such noise impacts are temporary and considered to be minor in the context of those experienced by other populations. The project is therefore not likely to disrupt the breeding cycle of an important population.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No, Habitat within the study area is limited to foraging habitat. The project will result in the loss of 0.04 ha of native vegetation and 20 large trees which provide foraging habitat with the project study area. This loss is considered negligible in the context of habitat to be retained in the study area and the species overall distribution.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No, No mechanism for the establishment of harmful invasive species are identified in relation to the project.
8)	introduce disease that may cause the species to decline	No, The proposed development is not likely to introduce a disease that may cause the species to decline.
9)	interfere substantially with the recovery of the species.	No, The National Recover Plan (DAWE, 2021) identifies 9 recovery objectives for the species. On review of those objectives and in consideration of the following. - the nature of habitat to be impacted (broad foraging habitat - The study areas distance from a nationally important camp (greater than 100km) - the small quantum of impact the project is not considered likely to interfere substantially with the recovery of the species
Conclusion	**Is there likely to be a significant impact?**	**After considering the above statements, the project is unlikely to have a significant impact on the Grey-headed Flying-fox.**

Appendix C Growling Grass Frog targeted survey

Mortlake Solar Farm Targeted Growling Grass Frog Survey

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DOCUMENT TRACKING

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Template 2.8.1

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1. Introduction

1.1 Background

Eco Logical Australia (ELA) has been engaged Urbis, on behalf of Ausnet to undertake an ecological assessment for of the proposed solar farm site located near Hamilton Highway, Mortlake (Stage 1). An initial ecological constraints assessment of the site was completed on 2 August 2022 (ELA, 2024). This assessment identified the potential of the site to support Growling Grass Frog. Growling Grass Frog is listed as vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act) and Vulnerable under the Victorian Flora and Fauna Guarantee Act (FFG Act). Targeted surveys were recommended to determine species presence absence and inform project legislative implications in relation to the species.

1.2 Species profile

Growling Grass Frog is a large species of frog and a member of the Bell Frog complex. Adult frogs can be as large as 105 mm in length. Colouration is variable between individuals but typically ranges from dull olive to bright emerald green, with large black, brown and bronze splotches on its dorsal surface (Clemann & Swan, 2023). A black stripe runs from the species nostril, through the eye and above the tympanum (Clemann & Swan, 2023). The species is also characterised by the presence of warts across its dorsum, flanks and legs (Clemann & Swan, 2023).

Growling Grass Frog depend on a mix of aquatic and terrestrial habitat for breeding, foraging, shelter and dispersal, and are typically found in areas with both permanent and semi-permanent waterbodies with still or slow-moving water (DEWHA, 2009). Optimal breeding habitat includes emergent vegetation around the edges of waterbodies, mats of floating and submerged plants and with minimal shading from trees (DEWHA, 2009). Growling Grass Frogs also regularly use water bodies as non-breeding habitat and prefer areas with emergent vegetation to provide for protection and areas in which they can bask (DEWHA, 2009). They periodically use terrestrial areas adjacent to the water bodies that have shelter and feeding habitat that includes terrestrial vegetation such as grasses and low shrubs that provide invertebrates for food and shelter when frogs are migrating overland between water bodies (DEWHA, 2009). Rocks, logs and debris surrounding the waterbodies provide essential over-wintering habitat (DEWHA, 2009). Connectivity between clusters of suitable waterbodies is essential to promote movement between breeding and non-breeding sites to maintain genetic diversity, improve breeding opportunities under different environmental conditions and promote recolonisation following local extinction (DEWHA, 2009).

Principal threats to Growling Grass Frogs are habitat loss and degradation such as:

- changes in hydrological regimes that reduce the hydroperiod and stops tadpoles reaching metamorphosis
- removal of aquatic and terrestrial vegetation, fallen logs and debris which provide over-wintering habitat
- overshading of waterbodies by trees that reduces water temperatures, which is unfavourable for tadpole growth

- damage to banks by trampling caused by stock, which creates turbidity and loss of emergent vegetation for shelter
- predation of eggs and larvae by introduced fish such as Mosquito Fish *Gambusia affinis*
- loss of habitat connectivity.
- poor water quality caused by increased turbidity, nutrients, pesticides, detergents and heavy metals
- disease from Chytrid fungus (DEWHA 2009 and DELWP, 2017).

Growling Grass Frog breeding occurs dung warmer months from August through to March (DELWP, 2017). Females lay eggs in water bodies that retain water at least through summer, enabling the tadpoles to develop (DELWP, 2017).

Figure 1. Growling Grass Frog (photo Jonathan Billington, ELA)

1.3 Survey rationale

A review of records for Growling Grass Frog identified 12 records occurring within a 10 km buffer of the site boundary, the most recent of which was recorded in 2018 (VBA, 2023). Of these records, three were collected in the last 30 years that occur within proximity (approximately 2 km) of the site. These records are as follows:

- A record within Mortlake Common collected in 2000.
- A record near the confluence of Salt Creek and Hopkins River collected in 2011.
- A record associate with Boonerah Estate Road collected in 2011.

Given the sites proximity to these records and its location between two large areas of known habitat (Mortlake Common and Salt Creek) potential habitat was identified for the species to be present within waterbodies and farm dams across the site, either as resident or when moving across the landscape between those environs. Targeted survey was thus recommended. The location of Growling Grass Frog records is shown in Figure 3.

2. Methods

Surveys for Growling Grass Frog comprised of detailed habitat assessments and nocturnal surveys comprising of call playback and spotlight surveys. Surveys were conducted with reference to the following guidelines and references:

- Significant Impact Guidelines for the Vulnerable Growling Grass Frog *Litoria raniformis* (DEWHA, 2009a).
- Survey Guidelines for Australia's threatened frogs (DEWHA, 2010).
- Biodiversity Precinct Structure Kit (DSE 2010).

Survey locations and methods are described below.

2.1 Survey locations

Given the number of waterbodies across the site, sampling of all potential habitat was not possible. A subset of representative waterbodies was therefore selected on the basis of the following rationale:

- Location of historic records.
- Habitat attributes, taking into consideration habitat extent and quality. This was informed by the results of the desktop and field based constraints assessment.
- Proximity to natural drainage lines and unnamed watercourses with the potential to link habitats between Mortlake Common and Salt Creek.
- Location within the projects likely impact footprint as informed by preliminary project design.

In total, seven locations were the subject of targeted survey comprising three locations along Salt Creek and five discrete locations (one location included two small discrete waterbodies sampled together because of their proximity (Figure 3). At the time of assessment, areas of Mortlake Common and the drainage line linking the site to the reserve were noted to be dry (Figure 3). Surveys at this location were therefore not possible at the time of assessment. Suitable habitat on site was however surveyed which is proximal to the site and Mortlake Common Boundary.

Survey locations are presented in Figure 3.

2.2 Habitat assessment

A diurnal assessment of each survey location was undertaken. The purpose of this assessment was to characterise and describe the quality and extent of habitat present, and to assess its potential to support Growling Grass Frog. Habitat attributes recorded at each location were as follows:

- Waterbody type (i.e. creek, dam or drainage line).
- Presence of aquatic vegetation and type (emergent, submergent, floating).
- In-stream habitat (i.e. rocks and logs).
- Terrestrial refuge (i.e. grassy banks, logs, rocks).
- Waterbody dimensions and likelihood of permanence.

2.3 Nocturnal surveys

Nocturnal surveys were conducted over two evenings after sunset during suitable weather conditions (above 12 degrees, no to moderate wind). The timing of these surveys occurred during the Growling Grass Frog breeding season between November and March in temperate regions (DEWHA 2009a). Typically, optimal timing for detection of this species is between November and December, when males are actively calling following rain events (DEWHA, 2009a).

On arriving at each location ELA ecologists passively listened for frogs for a period of 10 minutes. If no frogs were heard call-playback was used to elicit a response from any males that may have been present. Call play-back was conducted using a pre-recorded male Growling Grass Frog call broadcast through a hand-held Bluetooth speaker. Calls were broadcast for a period of 2 minutes followed by 5 minutes of quiet listening. If nothing was heard, the call playback procedure was repeated. Following call-playback, active searches with hand-held torches were systematically completed in suitable habitat around the margins and banks of the waterbody/waterway. Given the site extent and the number of waterbodies present, emphasis was placed site based surveys rather than reference site checks.

The Growling Grass Frog – Calling and Activity Diary survey data available on the Ecological Consultants Association of Victoria website confirmed species activity on the nights and period of survey however, the majority of sites were in greater Melbourne (ECA Vic, 2024). The species was recorded in Dunkeld approximately 50 km northwest of the site on the 7 December 2023.

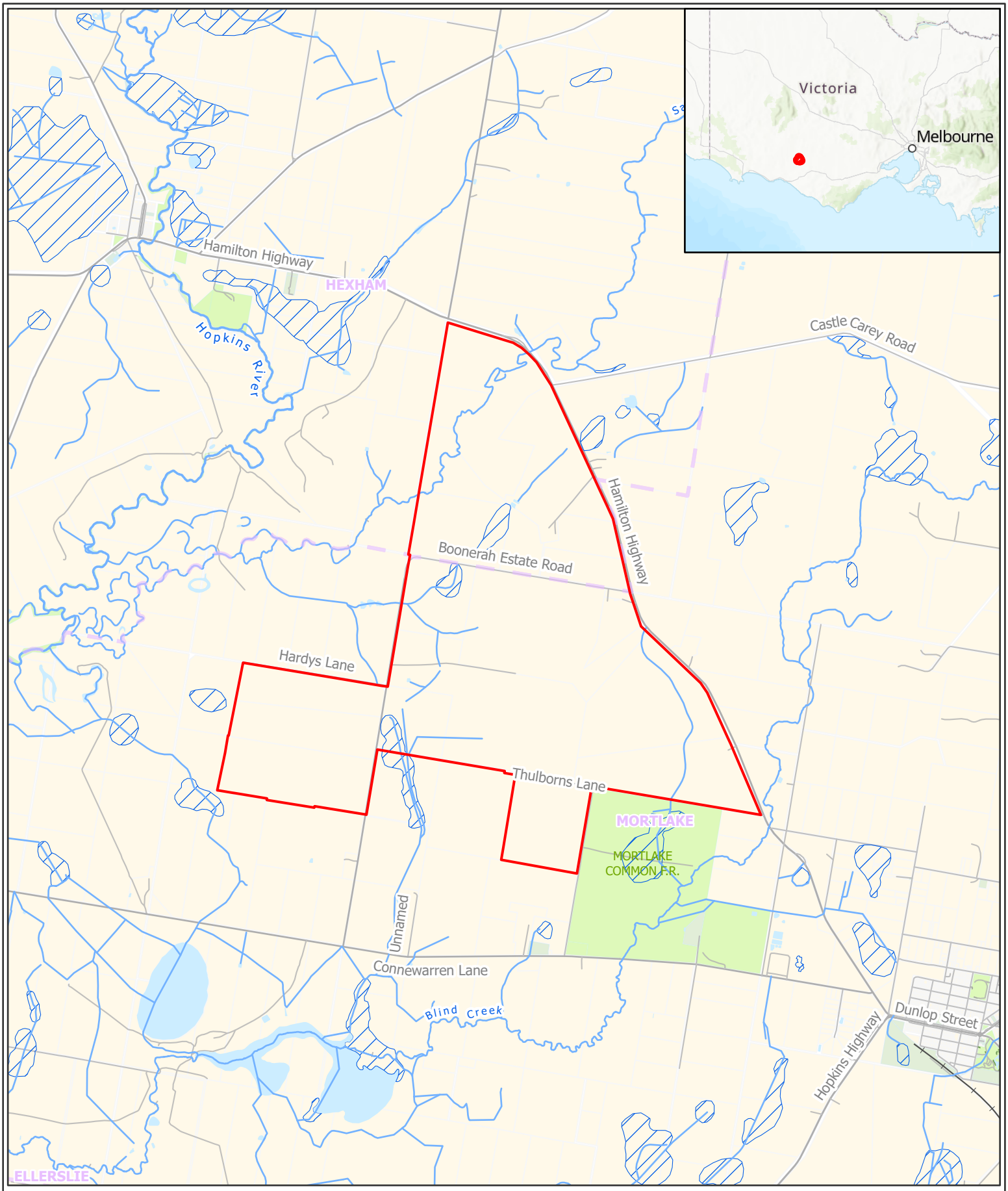
Weather conditions during the nocturnal surveys were suitable for detection and included:

- 4 December 2023 – 10% cloud cover, light air (4 km/h beaufort wind scale), 16-13 ^{o}C, Last significant rainfall 26 November 2023 (14.8 mm) (BoM, 2024).
- 5 December 2023 – 80% cloud cover, gentle breeze (11 -15 km/h beaufort wind scale), 15-19 ^{o}C, Last significant rainfall 26 November 2023 (14.8 mm) (BoM, 2024).

Proceeding daytime temperatures ranged between 27 – 32 degrees and were also considered conducive to frog activity.

2.4 Study limitations

The survey effort and methods were consistent with relevant state and Commonwealth guidelines, and although the targeted surveys were undertaken during suitable, and often favourable, survey periods for the target species, detection is not guaranteed even if a species may be present (i.e. imperfect detection). Species also fluctuate in abundance and distribution based on prevailing and preceding conditions; and may occur at low densities (i.e. low detectability) at times.



Location of the Study Area

Moyne Shire

- Study Area
- Locality
- Local Government Area
- Major watercourse
- Minor watercourse
- Water area
- Area subject to inundation
- Rail
- Roads
- Streets
- Minor streets
- Tracks
- Trail
- Parcels
- Park or Reserve
- Other public land

0 1 2
Kilometres

Datum/Projection:
GDA 1994 MGA Zone 54

Project: 4927-RS Date: 2/02/2024

Source:
Basemap: VICMAP, 2023
Inset basemap: ESRI Topographic

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3. Results

3.1 Habitat assessments

The highest quality habitat was identified along Salt Creek and in particular location 1 which was the most downstream location sampled, where the waterway was wide and shallow with a high cover of aquatic macrophyte vegetation (Figure 3; Plate 1). Aquatic macrophyte vegetation comprised of discrete beds of reeds and rushes primarily situated along the waterways margins including Cumbungi (*Typha domingensis*) and Giant Rush (*Juncus pallidus*) with an extensive cover of floating and emergent Water Ribbons (*Triglochin procera*) interspersed with discrete areas of open water. Banks showed some signs of stock access but were otherwise colonised by a mixture of pasture and native tussock grass species. Scattered River Red Gums (*Eucalyptus camaldulensis*) along the waterways provided light shading. Similarly, location 2 also had an extensive cover of floating and emergent *T. procera* with discrete beds of reed and rushes along its margin (Figure 3; Plate 2). Canopy cover, however, was absent and signs of stock access more extensive. Location 3 was located near the Hamilton Highway Road crossing (bridge) which contained a high cover of macrophytes but was dominated by emergent species such as Common Reed (*Phragmites australis*), *T. domingensis* and Tall Spikerush (*Eleocharis sphacelata*) (Figure 3; Plate 3). Habitat along Salt Creek particularly locations 1 and 2 provided good refuge, foraging and basking opportunities for Growling Grass Frog.

Survey locations 4 and 5 were located in the interior of the site proximal to the Boonerah Estate Road reserve (Figure 3; Plates 4 and 5). The locations, which comprised two discrete dams were highly degraded by intensive stock (sheep) access and devoid of aquatic macrophyte cover or fringing habitats. These dams, appearing anthropogenic in origin were heavily trafficked at the time of assessment with areas of pugging. Habitat here was considered marginal for Growling Grass Frog with species use likely to be limited to dispersal and occasional refuge habitat when when adult frogs are moving across the landscape.

Survey locations 6 - 8 were located in the southeastern corner of the site and surveyed for their proximity to Mortlake Common and a drainage line connecting the common to the subject site (Figure 3; Plates 6 - 8). Survey location 6 was comprised of two discrete waterbodies approximately 50m apart (Figure 3; Plates 6 and 7). The northern of these two waterbodies (location 6N) was bordered by volcanic boulders (around 2/3 of the waterbodies perimeter) with extensive cover of submerged Red Water-milfoil (*Myriophyllum verrucosum*) and Pondweed (*Potamogeton* sp.) (Figure 3; Plate 6). It appeared as if water levels at the waterbody were in the process of receding. Signs of stock access here were evident, but limited to areas lacking rock cover, with the presence of the volcanic rock perhaps acting as a deterrent to stock access. Habitat here for Growling Grass Frog was low to moderate. Submerged macrophyte cover and bordering volcanic rock likely to provide refuge habitat, but the waterbodies small extent and shallow nature meaning it is unlikely to provide a permanent source of habitat and is likely not suitable to support breeding. The second waterbody to the south (6S) was of far lower habitat value, devoid of macrophyte cover, or fringing vegetation and showing signs of extensive stock access (Figure 3; Plate 7). Filamentous algae was noted floating near its margins.

Survey location 7 was completely bordered by volcanic rock and had a near 100% cover of Water Fern (*Azolla* sp.) with discrete beds of *Juncus sp*. along its margin and no obvious signs of stock access (Figure 3; Plate 8). Like the northern most wetland (location 6N), habitat at survey location 7 was considered

low to moderate with the dam providing some refuge to the species but due to its small size unlikely to support breeding or to provide habitat to the species year-round.

As noted in section 2.1 whilst not a location of targeted survey (as a consequence of being dry at the time of assessment), the drainage line linking the site to Mortlake Common was also assessed for habitat suitability (Plate 9). On inspection, the drainage line was noted to be heavily colonised by terrestrial pasture species such as Perennial Rye Grass *Lolium sp*., with no aquatic vegetation persisting (Figure 3; Plate 9). This was considered to indicate that the drainage line is ephemeral and frequently dry. The drainage line therefore is only likely to act as an intermittent dispersal corridor during periods of high and perhaps sustained rainfall.

Habitat characteristics by survey location are further summarised in Appendix A.

Plate 1: Salt Creek (location 1)

Plate 2: Salt Creek (location 2)

Plate 3: Salt Creek (location 3)

Plate 4: Stock dam (location 4)

Plate 5: Stock dam (survey Location 5)

Plate 6: Wetland fringed by rock with extensive cover of submerged aquatic vegetation (location 6N)

Plate 7: Stock watering dam (survey location 6S)

Plate 8: Small waterbody fringed with extensive rock cover (survey location 7)

Plate 9: Drainage line linking study area and Mortlake Common

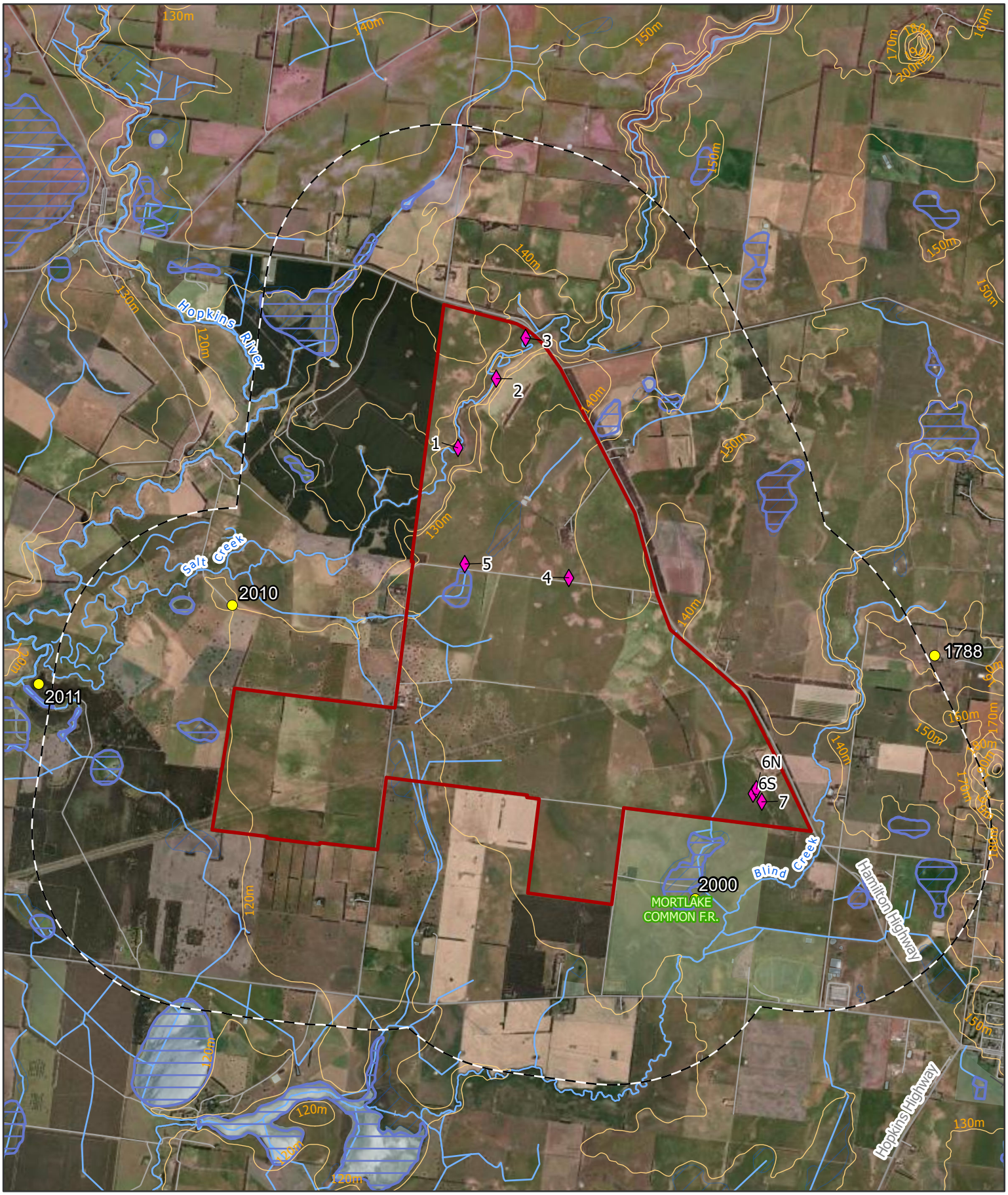
3.2 Nocturnal surveys

Despite suitable survey timing, weather and the presence of suitable habitat, no Growling Grass Frog were detected and amphibian activity was notably low across survey locations. Non target frog species recorded included Spotted Marsh Frog *Limnodynastes tasmaniensis*, Striped Marsh Frog *Limnodynastes peroni* and Southern Brown Tree Frog *Litoria ewingii*. Results by location are summarised in Table 1 below.

Table 1. Targeted survey results

Survey location	Species	Comments
1	Nil	No frog activity
2	Spotted Marsh Frog, Striped Marsh Frog	
3	Striped Marsh Frog	
4	Spotted Marsh Frog	
5	Nil	No frog activity
6	Spotted Marsh Frog, Striped Marsh Frog and Southern Brown Tree Frog.	
7	Nil	No frog activity

In addition to non-target frog species, native species including Australian Short finned Eel *Anguilla australis*, Eastern Snake-necked Turtle *Chelodina longicollis* and the EPBC Act listed Dwarf Galaxias *Galaxias pusilla* (considered synonymous with Little Galaxias *Galaxiella toourtkoourt*) were also recorded at Salt Creek. Fish activity was most prevalent at survey location 1, where in the shallow water, fish were observed close to the surface.



Growling Grass Frog Targeted Survey Results: Overview

Moyne Shire

- Study area
- 2km buffer on study area
- Growling Grass Frog (VBA, 2023)
- Growling Grass Frog targeted survey location
- Elevation - 10m
- Current wetland
- Major watercourse
- Minor watercourse
- Water area
- Area subject to inundation
- Park or Reserve
- Other public land

0 1,000 2,000
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927-LP Date: 29/01/2024

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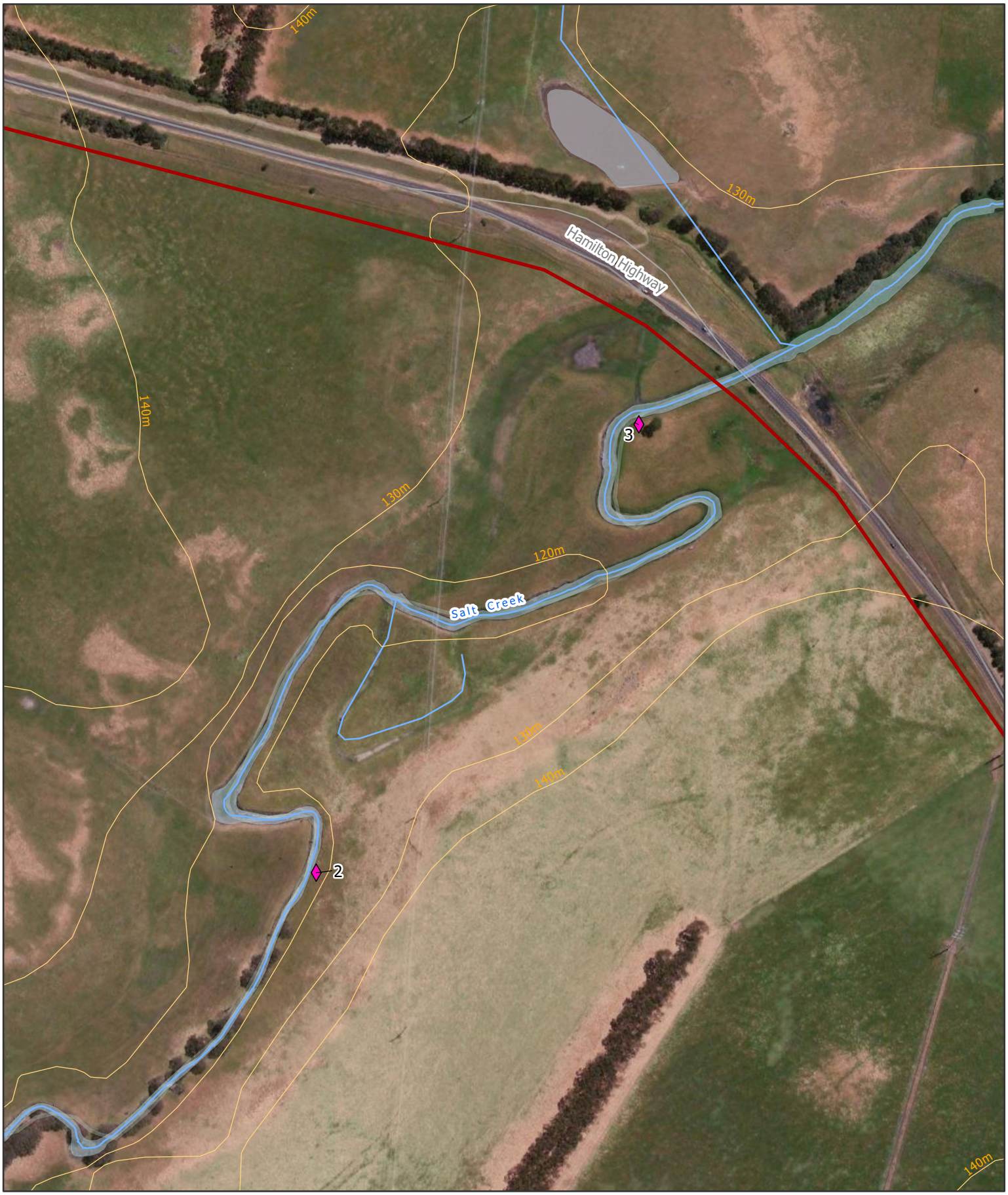
Source: Basemap: VICMAP, 2023; Aerial: ESRI, 2024; VBA data: DELWP, 2023



Growling Grass Frog Targeted Survey Results: Detail map 1

Moyne Shire

- Study area
- 2km buffer on study area
- Growling Grass Frog targeted survey location
- Elevation - 10m
- Minor watercourse
- Water area
- Other public land

0 100 200
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927-LP Date: 29/01/2024

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Source: Basemap: VICMAP, 2023; Aerial: ESRI, 2024; VBA data: DELWP, 2023

Growling Grass Frog Targeted Survey Results: Detail map 2

Moyne Shire

- Study area
- 2km buffer on study area
- Growling Grass Frog targeted survey location
- Elevation - 10m
- Current wetland
- Minor watercourse
- Water area
- Area subject to inundation
- Other public land

0 200 400
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927-LP Date: 29/01/2024

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Source: Basemap: VICMAP, 2023; Aerial: ESRI, 2024; VBA data: DELWP, 2023

Growling Grass Frog Targeted Survey Results: Detail map 3

Moyne Shire

- Study area
- 2km buffer on study area
- Growling Grass Frog targeted survey location
- Current wetland
- Minor watercourse
- Area subject to inundation
- Park or Reserve

0 100 200
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927-LP Date: 29/01/2024

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Source: Basemap: VICMAP, 2023; Aerial: ESRI, 2024; VBA data: DELWP, 2023

4. Discussion

No Growling Grass Frog were detected and amphibian activity was notably low across all survey locations.

Despite not recording Growling Grass Frog at the time of the assessment, Salt Creek provides suitable habitat for the species due to the permanency of the water and abundance of fringing and floating aquatic vegetation. It is uncertain as to why none were recorded during the assessment given the suitability of habitat. However, given the presence of suitable habitat and existing recent historical records, it remains likely that Growling Grass Frog occur at Salt Creek, at least on an intermittent basis.

Outside of Salt Creek surveyed habitat is mostly considered marginal for the species. Dams across the site were typically heavily trafficked by sheep and as a consequence heavily degraded, lacking suitable terrestrial fringing and aquatic macrophyte cover and offering little species refuge. Where stock access was limited by natural features, such as the presence of volcanic rock, habitat suitability was higher although the small size of these habitats (locations 6N and 7) and their likely ephemeral nature they are unlikely to support the species on an ongoing basis. Furthermore, the drainage line identified during the desktop assessment as potentially linking the site and Mortlake Common was dry and colonised exclusively by pasture grass species. This considered to indicate that it likely provides limited opportunities for species dispersal. Based on these assessments it now considered that species dispersal across the site, linking the habitats of Salt Creek and Mortlake is unlikely, with connectivity between these habitats likely supported by other waterways and bodies within the surrounding landscape.

On the basis of species non detection and limited habitat, Growling Grass Frog (with the exception of Salt Creek) are considered to have a low likelihood of occurrence.

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APPENDIX A. Habitat assessment

Location	Type	Character	Species	Vegetation Cover %			Dimensions
				Fringing	Emergent	Floating	
1	Creek	Open pool of shallow water with minimal shading from River Red Gums along tree banks. Emergent and floating aquatic vegetation with in-stream debris including logs for basking. Muddy banks edges show signs of pugging from sheep.	Bullrush *Typha sp.* Common Reed *Phragmites australis* Common Tussock-grass *Poa Labillardieri* Giant Rush *Juncus pallidus* Tall Spikerush *Eleocharis sphacelata* Water Ribbons *Triglochin procera* River Red Gum *Eucalyptus camaldulensis* Pasture Grass	40	10	30	Contiguous waterway, approximately 12 m wide
2	Creek	Shallow narrow creek line with a moderate cover of floating and emergent aquatic vegetation and in-stream woody and small rocky debris. Native and exotic fringing grassy and sedgy vegetation. Muddy banks edges show signs of pugging from sheep.	Common Tussock-grass *Poa Labillardieri* Tall Spikerush *Eleocharis sphacelata* Thistle sp. Toowoomba Canary *Grass Phalaris aquatica* Water Ribbons *Triglochin procera*	80	30	25	Contiguous waterway, approximately 12 m wide
3	Creek	Shallow narrow creek line with a high cover of emergent aquatic vegetation dominated by Common Reed Phragmites australis. Minimal in-stream woody and small rocky debris. Native and exotic fringing grassy and sedgy vegetation. Muddy banks edges show signs of pugging from sheep.	Bullrush *Typha sp.* Common Reed *Phragmites australis* Common Tussock-grass *Poa Labillardieri* Tall Spikerush *Eleocharis sphacelata* Water Ribbons *Triglochin procera* Pasture Grass	80	60	5	Contiguous waterway, approximately 15 m wide

	4	Dam	Stock dam. Highly pugged. Fringing comprises pasture grass only with one large rock for shelter. Marginal dispersal habitat as dam is located between to ephemeral wetlands and downstream of Salt Creek.	Pasture Grass	80	0	0	40 x 20 m
	5	Dam	Stock dam. Highly pugged. Stands of scotch thistle and fringing pasture grass. Marginal dispersal habitat as dam is located between to ephemeral wetlands and downstream of Salt Creek.	Pasture Grass	80	0	0	55 x 40 m
6N		Wetland	Small wetland / dam bounded by medium and large sized volcanic rock. The grassy bank was primarily improved pasture grass with scattered native Wallaby Grass and Rush. High aquatic vegetation cover dominated, Pondweed and Milfoil. With only a small amount of emergent and fringing Juncus sp. A second low quality dam was located approximately 50 m to the south west.	Red Water-milfoil *Myriophyllum verrucosum* Pondweed *Potamogeton sp* Rush *Juncus sp*. Spikerush *Eleocharis sp.* Wallaby Grass *Rytidosperma sp.* Pasture Grass	50	5	65	16 x 10 m
6S		Dam	Low-quality dam with pasture grass dominating the pugged grassy bank. In proximity to nearby moderate quality wetlands Location 6N and 7. Floating filamentous algae near margins	Pasture Grass, floating filamentous algae.	5	0	0	25 x 20 m

7	Wetland	Small wetland / dam bounded by medium and large sized volcanic rock. The grassy bank was primarily improved pasture grass with scattered native Wallaby Grass and Rush. Aquatic vegetation cover was high and was dominated by Water Fern	Rush *Juncus sp*. Spikerush *Eleocharis sp.* Wallaby Grass *Rytidosperma sp.* Water Fern *Azolla s.p* Pasture grass	80	5	90	10 x 12 M

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Appendix D Protected Matters Search Tool

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 14-Sep-2023

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	53
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	15
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In feature area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community may occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area	In feature area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Stagonopleura guttata](#) Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
[Galaxiella pusilla](#) Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Maccullochella peelii](#) Murray Cod [66633]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Nannoperca obscura](#) Yarra Pygmy Perch [26177]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
FROG			
[Litoria raniformis](#) Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In feature area
INSECT			
[Synemon plana](#) Golden Sun Moth [25234]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			
[Antechinus minimus maritimus](#) Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Dasyurus maculatus maculatus (SE mainland population)](#) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In feature area
[Isoodon obesulus obesulus](#) Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Miniopterus orianae bassanii			
Southern Bent-wing Bat [87645]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Potorous tridactylus trisulcatus			
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
PLANT			
Amphibromus fluitans			
River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In feature area
Dianella amoena			
Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area	In feature area
Dodonaea procumbens			
Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Glycine latrobeana			
Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lachnagrostis adamsonii			
Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat likely to occur within area	In feature area
Lepidium aschersonii			
Spiny Peppercress [10976]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lepidium hyssopifolium			
Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat known to occur within area	In feature area
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Poa sallacustris Salt-lake Tussock-grass [24424]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat may occur within area	In feature area
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Pterostylis basaltica Basalt Greenhood [56506]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat may occur within area	In feature area
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area	In feature area
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat may occur within area	In feature area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area	In feature area
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In feature area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eulamprus tympanum marnieae Corangamite Water Skink, Dreeite Water Skink [64487]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Lissolepis coventryi Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat likely to occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sterna striata White-fronted Tern [799]		Migration route may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Cobra Killuc W.R.	Nature Conservation Reserve	VIC	In buffer area only
Mortlake Common F.R	Nature Conservation Reserve	VIC	In feature area

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In feature area

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Woorndoo-Hopkins Wetlands	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Hexham Wind Farm	2022/09287		Assessment	In buffer area only
Controlled action				
Dundonnell Wind Farm, VIC	2012/6557	Controlled Action	Post-Approval	In feature area
Mortlake Wind Farm	2008/4128	Controlled Action	Post-Approval	In buffer area only
Mt Fyans Wind Farm	2019/8589	Controlled Action	Assessment Approach	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In buffer area only
Not controlled action				

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Ellerslie Timber Bridge Partial Restoration	2009/4734	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Mortlake South Wind Farm, 5 km south of Mortlake, Vic	2017/8137	Not Controlled Action	Completed	In buffer area only
Salt Creek Wind Farm	2006/3012	Not Controlled Action	Completed	In buffer area only
Salt Creek Wind Farm transmission line, Vic	2016/7763	Not Controlled Action	Completed	In feature area
The Sisters Wind Farm	2008/4268	Not Controlled Action	Completed	In buffer area only
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In feature area
Water pipelines, Mortlake Power Station	2006/2881	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

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

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

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

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Appendix E Response to application requirements of 52.17

The following information is provided as a response to the application requirements for the removal of native vegetation under the detailed pathway, in accordance with Schedule 52.17 of the Moyne Shire planning scheme and the *Planning and Environment Act 1987*.

1. Native vegetation to be removed or lost	
Assessment pathway	Detailed
Description	• 0.04 ha of Plains Grassy Woodland across two patches. • 20 large trees (1 canopy tree in a patch and 19 scattered). • 7 small scattered trees.
Extent	1.490 hectares
Condition score	0.20
Location category	Location 2
Modelled habitat	Not applicable
Offset	0.307 general habitat units
Offset requirements	Glenelg Hopkins Catchment Management Authority (CMA) or Moyne Shire Council have a minimum strategic biodiversity score of 0.304, and contain 20 large trees.
2. Topographic and land information	
Topography	Generally low lying to gently undulating. Moderately steep escarpment occurs in the north-eat of the study area down to Salt Creek.
Water bodies and features	Numerous waterbodies occur across the study area. Most are of man made origin for the purpose of stock watering. Some low lying areas occur including a DEECA mapped wetland in the central east of the study area with potential for occasional inundation following heavy rain. All were observed to be of low-quality due to stock access.
Saline discharge areas	None observed.
Erosion risk	Sediment controls during construction will minimise the risk of sedimentation. Erosion is considered unlikely given that grass can establish under and between the solar panels post-construction stabilising the soil. Additionally, Salt Creek has been avoided as part of the design plans, with a buffer of approximately 1.3 km to the nearest location of project impact.
3. Photographs of vegetation	

Scattered trees in the north-east proposed for removal

Patch of Plains Grassy Woodland proposed for removal (three canopy trees over an exotic ground cover)

4. Additional vegetation clearance or approvals

Not applicable – there is no known application to remove native vegetation at the property in the past five years.

5. Avoid and minimise statement

Mitigation measures recommended to ensure indirect impacts are avoided and/or minimised are provide in Section 4.4.

6. Property management plans

Not applicable - There is no property vegetation plan for this parcel of land.

7. Defendable space statement

Not applicable – the removal of native vegetation is not required to create defendable space for bushfire mitigation.

8. Native Vegetation Precinct Plan considerations

Not applicable - There is no native vegetation precinct plan covering this parcel of land.

9. Offset statement

Suitable offsets are available for purchase through the Native Vegetation Credit Register which have been identified on 8 April 2024 and is attached below. A quote from an accredited offset broker can be obtained as part of the planning application submission.

10. Site assessment report

This impact assessment report details information related to native vegetation and habitat within the study area.

11. Impacts to rare or threatened species habitat

Impacts to rare and threatened species are considered to be minor. The study area is highly modified and where suitable habitat exists it has largely been avoided by project design. .

Native vegetation removal report

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The report **is not an assessment by DELWP** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Date of issue: **26/04/2024**
Time of issue: **3:41 pm**

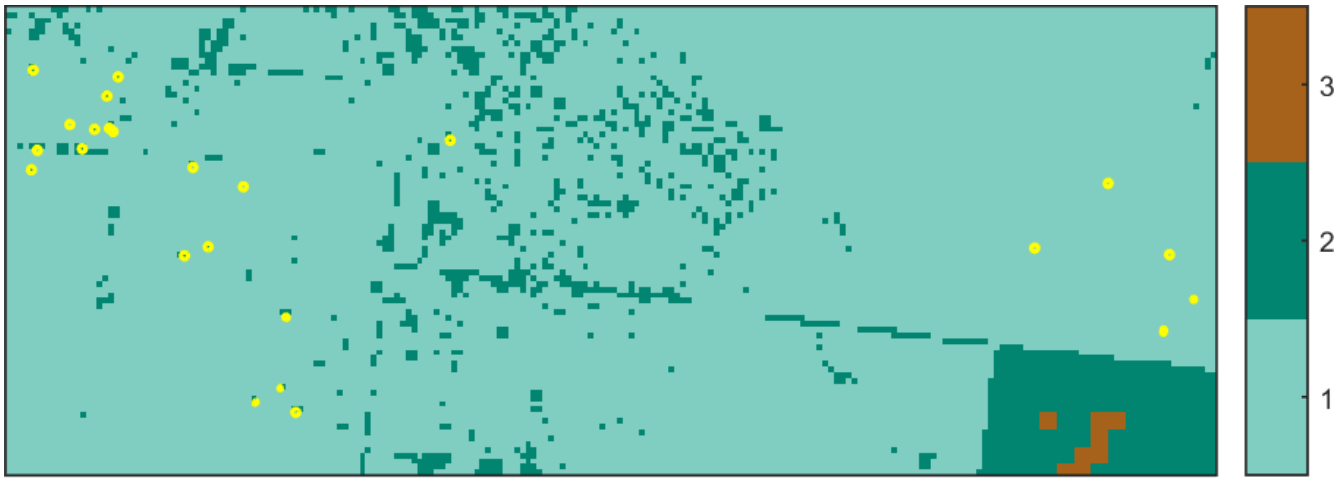
Report ID: ECL_2024_034

Project ID	23MEL4927_ensym_26042024

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	1.490 ha
Extent of past removal	0.000 ha
Extent of proposed removal	1.490 ha
No. Large trees proposed to be removed	20
Location category of proposed removal	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map). Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

1. Location map



Offset requirements if a permit is granted

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

General offset amount[1]	0.307 general habitat units
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA) or Moyne Shire Council
Minimum strategic biodiversity value score[2]	0.304
Large trees	20 large trees

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

Appendix 1 includes information about the native vegetation to be removed

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

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

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

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

Next steps

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

If you wish to remove the mapped native vegetation you are required to apply for a permit from your local council. Council will refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

This *Native vegetation removal report* must be submitted with your application for a permit to remove, destroy or lop native vegetation.

Refer to the *Guidelines for the removal, destruction or lopping of native* vegetation (the Guidelines) for a full list of application requirements This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway
- A description of the native vegetation to be removed (partly met)
- Maps showing the native vegetation and property (partly met)
- Information about the impacts on rare or threatened species.
- The offset requirements determined in accordance with section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs
- Details of past native vegetation removal
- An avoid and minimise statement
- A copy of any Property Vegetation Plan that applies
- A defendable space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- A site assessment report including a habitat hectare assessment of any patches of native vegetation and details of trees
- An offset statement that explains that an offset has been identified and how it will be secured.

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

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

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

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

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

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

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

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

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

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-B	Patch	vvp_0055_61	Endangered	1	no	0.110	0.018	0.018	0.380		0.002	General
1-A	Patch	vvp_0055_61	Endangered	0	no	0.200	0.023	0.023	0.380		0.005	General
2-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.400		0.015	General
3-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.400		0.015	General
4-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.390		0.015	General
5-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.380		0.015	General
6-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.380		0.015	General
7-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.387		0.015	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
8-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.064	0.450		0.014	General
9-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.064	0.450		0.014	General
10-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.390		0.015	General
11-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.390		0.015	General
12-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.380		0.015	General
15-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.390		0.015	General
16-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.380		0.015	General
17-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.380		0.015	General
18-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.380		0.015	General
20-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.400		0.015	General
25-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.280		0.014	General
26-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.330		0.014	General
29-T	Scattered Tree	vvp_0055_61	Endangered	0	no	0.200	0.031	0.015	0.380		0.003	General
30-T	Scattered Tree	vvp_0055_61	Endangered	0	no	0.200	0.031	0.007	0.380		0.001	General
32-T	Scattered Tree	vvp_0055_61	Endangered	0	no	0.200	0.031	0.020	0.330		0.004	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
33-T	Scattered Tree	vvp_0055_61	Endangered	0	no	0.200	0.031	0.031	0.340		0.006	General
38-T	Scattered Tree	vvp_0055_61	Endangered	0	no	0.200	0.031	0.010	0.330		0.002	General
39-T	Scattered Tree	vvp_0055_61	Endangered	0	no	0.200	0.031	0.021	0.330		0.004	General
40-T	Scattered Tree	vvp_0055_61	Endangered	0	no	0.200	0.031	0.017	0.380		0.004	General
135-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.340		0.014	General

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

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

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Southern Bent-wing Bat	*Miniopterus schreibersii bassanii*	61343	Critically endangered	Dispersed	Habitat importance map	0.0000
Curly Sedge	*Carex tasmanica*	500650	Vulnerable	Dispersed	Habitat importance map	0.0000
Wind-blown Tussock-grass	*Poa physoclina*	507791	Endangered	Dispersed	Habitat importance map	0.0000
Salt Blown-grass	*Lachnagrostis robusta*	504223	Rare	Dispersed	Habitat importance map	0.0000
Fragrant Leek-orchid	*Prasophyllum suaveolens*	504567	Endangered	Dispersed	Habitat importance map	0.0000
Brolga	*Grus rubicunda*	10177	Vulnerable	Dispersed	Habitat importance map	0.0000
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Habitat importance map	0.0000
Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0000
Salt Lawrencia	*Lawrencia spicata*	501888	Rare	Dispersed	Habitat importance map	0.0000
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*	503624	Endangered	Dispersed	Habitat importance map	0.0000
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	503625	Vulnerable	Dispersed	Habitat importance map	0.0000
Small Scurf-pea	*Cullen parvum*	502773	Endangered	Dispersed	Habitat importance map	0.0000
Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0000
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Habitat importance map	0.0000
Clumping Golden Moths	*Diuris gregaria*	504887	Endangered	Dispersed	Habitat importance map	0.0000
Purple Blown-grass	*Lachnagrostis punicea subsp. punicea*	504206	Rare	Dispersed	Habitat importance map	0.0000
Leafy Twig-sedge	*Cladium procerum*	500786	Rare	Dispersed	Habitat importance map	0.0000

Elegant Parrot	*Neophema elegans*	10307	Vulnerable	Dispersed	Habitat importance map	0.0000
Striped Legless Lizard	*Delma impar*	12159	Endangered	Dispersed	Habitat importance map	0.0000
Swamp Everlasting	*Xerochrysum palustre*	503763	Vulnerable	Dispersed	Habitat importance map	0.0000
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0000
Purple Blown-grass	*Lachnagrostis punicea subsp. filifolia*	504222	Rare	Dispersed	Habitat importance map	0.0000
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	505560	Vulnerable	Dispersed	Habitat importance map	0.0000
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0000
Forked Rice-flower	*Pimelea hewardiana*	502522	Rare	Dispersed	Habitat importance map	0.0000
Small Milkwort	*Comesperma polygaloides*	500798	Vulnerable	Dispersed	Habitat importance map	0.0000
Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0000
Button Immortelle	*Leptorhynchos waitzia*	501949	Vulnerable	Dispersed	Habitat importance map	0.0000
Fine-hairy Spear-grass	*Austrostipa puberula*	503988	Rare	Dispersed	Habitat importance map	0.0000
Plains Yam-daisy	*Microseris scapigera s.s.*	504657	Vulnerable	Dispersed	Habitat importance map	0.0000
Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0000
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0000
Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0000
Pale-flower Crane's-bill	*Geranium sp. 3*	505344	Rare	Dispersed	Habitat importance map	0.0000
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0000
Trailing Hop-bush	*Dodonaea procumbens*	501090	Vulnerable	Dispersed	Habitat importance map	0.0000
Basalt Sun-orchid	*Thelymitra gregaria*	504019	Endangered	Dispersed	Habitat importance map	0.0000
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0000
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0000
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0000

Common Pipewort	*Eriocaulon scariosum*	501218	Rare	Dispersed	Habitat importance map	0.0000
White Sunray	*Leucochrysum albicans subsp. tricolor*	504581	Endangered	Dispersed	Habitat importance map	0.0000
Small-flower Mat-rush	*Lomandra micrantha subsp. tuberculata*	504711	Rare	Dispersed	Habitat importance map	0.0000
Swamp Flax-lily	*Dianella callicarpa*	505086	Rare	Dispersed	Habitat importance map	0.0000

Habitat group

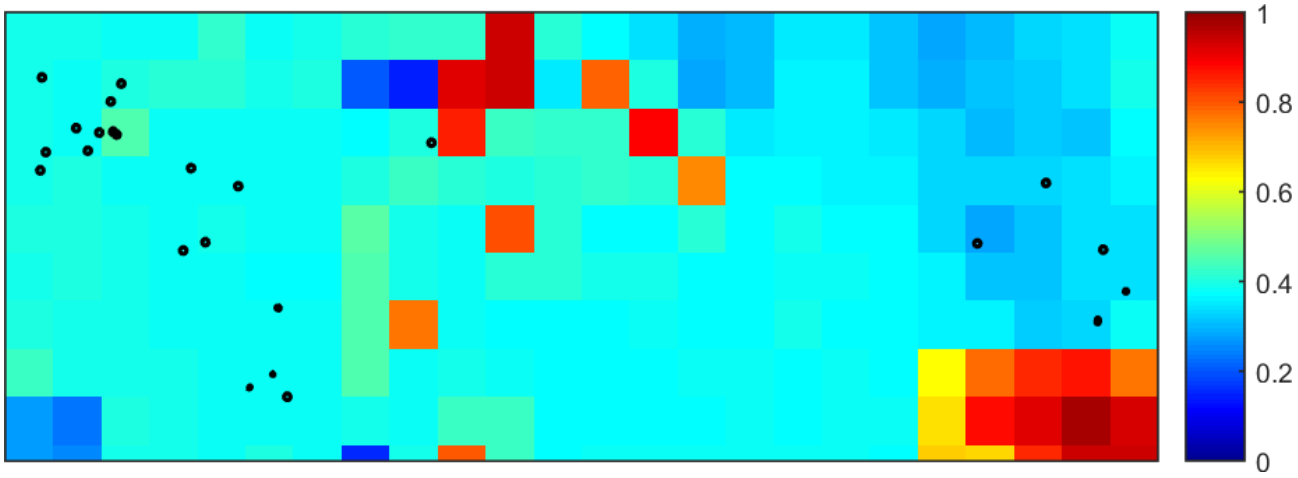
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

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

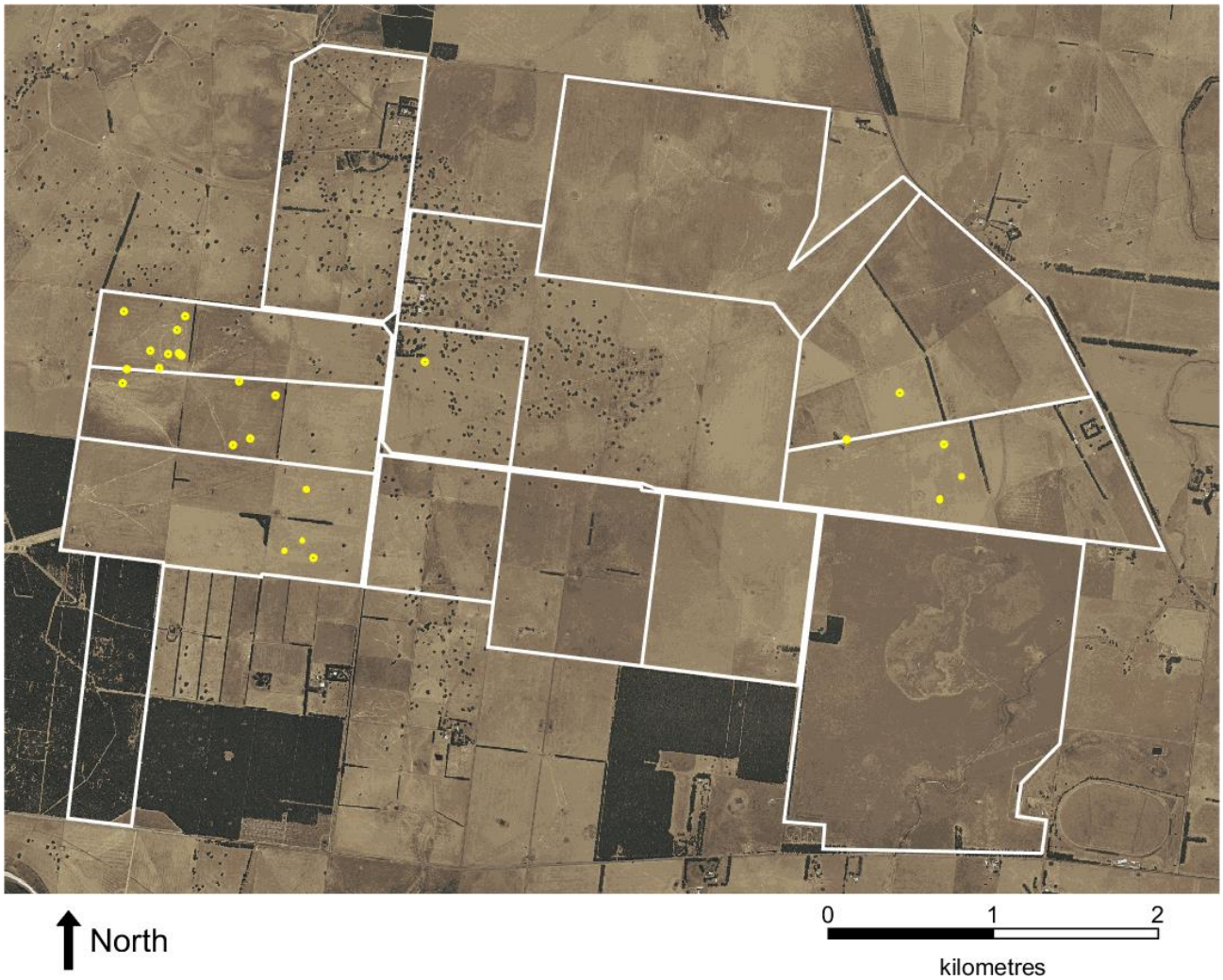
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation

4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.

vegetationlink

Our reference: VLQ-10347

Your reference: Mortlake Energy Hub

30 April 2024

BrightNight Australia
c/- Robert Doherty, Urbis Ltd
rdoherty@urbis.com.au

To whom it may concern

RE: Quotation for the supply of native vegetation credits

Vegetation Link is an accredited offset provider with the Department of Energy, Environment and Climate Action (DEECA). We offer a specialised brokerage service to enable permit holders and developers to identify suitable native vegetation credits to meet their planning permit offset requirements.

Based on the information you have provided; I understand you require the following native vegetation offset:

Offset type	Vicinity	General habitat units (GHU)	Min. strategic biodiversity value (SBV)	Large trees
General	Glenelg Hopkins CMA	0.307	0.304	20

To meet your offset requirements, you can purchase native vegetation credits from a third party as per the options quoted below[1]. This quotation is valid for 14 days, subject to credit availability.

Credit Trade Option 1: **3-Party CTA pathway - offset site located on Djabwurung and Jadawadjali Country[2] in the Southern Grampians Shire area** (approx. 3-6 week turnaround from acceptance of quote)

Native Vegetation Credit Fees – Invoiced by Credit Owner	
Cost of native vegetation credits (ex. GST)	$23,025.00
Broker Fee – Invoiced by Vegetation Link	
Cost of broker fee (ex. GST)	$1,250.00
Total Credit Trade Fees	
Subtotal Cost (ex. GST)	$24,275.00
Total GST applicable	$2,427.50
Total Cost (inc. GST)	**$26,702.50**

[1] *Note that the broker fee includes the NVOR transfer and allocation fees when an allocation is done at the time of purchase.*

[2] *Traditional Country names sourced from the AIATSIS Map of Indigenous Australia*

Credit Trade Option 2: **2 x 3-Party CTA pathway - offset sites located on Djabwurung & Gunditjmara Country in the Ararat Rural City and Glenelg Shire areas** (approx. 3-6 week turnaround from acceptance of quote)

Native Vegetation Credit Fees – Invoiced by DEECA	
Cost of native vegetation credits for 0.297 GHU's & 14 LT's (ex. GST)	$37,125.00
Native Vegetation Credit Fees – Invoiced by the Credit Owner	
Cost of native vegetation credits for 0.010 GHU's & 6 LT's (ex. GST)	$3,800.00
Broker Fee – Invoiced by Vegetation Link	
Cost of broker fee (ex. GST)	$2,500.00
Total Credit Trade Fees	
Subtotal Cost (ex. GST)	$43,425.00
Total GST applicable	$4,342.50
Total Cost (inc. GST)	**$47,767.50**

If you would like to purchase credits, let us know that you accept the quote and return the attached **purchaser details form** by email. If more than one quotation option is provided above, specify which option you choose. Upon receipt of the form, we will begin the trade process. Further details of the process for credit allocation are in the FAQ below.

Should you have any queries, please do not hesitate to contact us on 1300 VEG LINK (1300 834 546) or email offsets@vegetationlink.com.au.

Sincerely,

Tesha Mahoney
Senior Broker – Victorian Offsets

FAQs

What is a third party offset?

A third-party offset is an offset site owned by another landowner who manages and protects native vegetation on their land. Landowners who establish these offset sites are required to:

- Enter into a Landowner Agreement for the specified offset site. A landowner agreement is in perpetuity and is binding upon the current and future landowners of the site. It permanently restricts use of the site for many purposes.
- Implement a detailed 10-year Management Plan endorsed by the DEECA Native Vegetation Offset Register to manage and improve the biodiversity values of the site.

How is the price of native vegetation offset credit (GHUs, GBEUs etc.) determined?

Landowners who own offset sites set their own price for native vegetation credits. They determine the price based on numerous factors. This includes but not limited to site establishment, the cost to manage the site in perpetuity (e.g., maintain fencing, control pest species), foregone use cost, and administrative costs. Depending on how the site is registered, the credit fee may be paid to either DEECA or directly to the landowner.

Further information about the work some of our landowners are doing can be found on the Vegetation Link website.

What is the process after I accept the quote?

After you accept the quote and return the purchaser table, the following steps will be undertaken:

1. We will set up a contract between the parties involved and send the contract out for signing by all parties.
2. Once the contract is signed by all parties, invoices will be issued for the fees listed in the quotation. We will send you two invoices, one for our transaction fee invoiced by Vegetation Link and one for the credit fee, usually to be paid to DEECA or the landowner. We recommend providing remittances for your payments.
3. Once payments are received, Vegetation Link will send you an allocated credit extract from the Native Vegetation Offset Register and your executed contract as evidence that you have purchased the offset.

How long will the process take? When will I get my credits?

Generally, the process from quote acceptance to having evidence of allocated credits takes between 2-6 weeks. This is dependent on a range of factors including the type of landholder agreement, contract types and organisational workflows. We work as quickly as possible to get your credits to you within this time period.

We note that you **cannot** remove vegetation until you have been given permission by the Responsible Authority (usually the council that has issued your permit).

What happens if I don't have a permit yet?

When people are buying credits before a permit is issued, the following three options are most common:

- You can pay for the offsets before the planning permit is available, and then the offsets are allocated to the permit when it is available. This will incur an additional $50 fee from DEECA. When considering this option, it is important to realise that your estimated offset requirements may be different than the actual permit requirements.
- You can wait for the planning permit to be approved first and then request a quote to meet the requirements in your permit. Should credits be available, you can then start the offset purchase process. We then use the planning permit number for allocating the credits. Allocating credits to the permit is evidence that you have purchased your offset.
- You can request a quote to confirm availability and to get an idea of the cost of offsetting before you apply for a permit. Once you receive the planning permit you can request an updated quote. It is at this point that you can then go through the offset purchase process.

We cannot guarantee credit availability until a) contracts are executed, or b) credits have been held via a pending trade lodged with DEECA Native Vegetation Offset Register.

We cannot guarantee price until a) a quote has been accepted within 14 days, and b) a Credit Trading Agreement is signed within 21 days, and c) the invoice for the credits is paid within 28 days of the date the invoice is issued.

If I sign the contract, does that mean I MUST pay for the credits?

Yes, you have entered into a contract agreeing to pay for the offset credits therein and are required to pay for those credits. The credits must be paid for within 28 days of the date of the invoice.

Can you hold the credits for me, as I want to pay later?

We are unable to hold credits for later payment. Please also see 'What happens if I don't have a permit yet?' above.

For further information, see our website, the DEECA website or call us any time on 1300 834 546.

Appendix F Observed species

F1 Key

Origin	Status
* - Introduced	EPBC – listed under EPBC Act
N - Naturalised	EPBC Mi– migratory species listed under EPBC Act
In – Indigenous	EPBC Ma - marine species listed under EPBC Act
	FFG L – Listed under FFG Act
	FFG P – Protected under the FFG Act
	DELWP – Listed on the DELWP Advisory lists
	Noxious – Listed as a noxious weed
	H/T – Considered a high threat weed in the context of the site

F2 Fauna

Species name	Common name	Origin[1]	Status[2]
Australian White Ibis	*Threskiornis molucca*	In	
Australasian Grebe	*Tachybaptus novaehollandiae*	In	
Australasian Pipit	*Anthus novaeseelandiae*	In	
Australian Magpie	*Cracticus tibicen*	In	
Australian Raven	*Corvus coronoides*	In	
Black Swan	*Cygnus atratus*	In	
Brown Falcon	*Falco berigora*	In	
Brown Songlark	*Cincloramphus cruralis*	In	
Brown Tree Frog	*Littoria ewingii*	In	
Chestnut Teal	*Anas castanea*	In	
Common Brushtail Possum	*Trichosurus vulpecula*	In	
Common Starling	*Sturnus vulgaris*	*	
Crested Pigeon	*Ocyphaps lophotes*	In	
Little/Dwarf Galaxias	*Galaxiella toourtkoourt*	In	EPBC Act
Eastern Rosella	*Platycercus eximius*	In	
Eastern Grey Kangaroo	*Macropus giganteus*	In	
Eastern Long-necked Turtle	*Chelodina longicollis*	In	
European Goldfinch	*Carduelis carduelis*	*	
European Skylark	*Alauda arvensis*	*	
Fairy Martin	*Petrochelidon ariel*	In	
Hoary-headed Grebe	*Poliocephalus*	In	

Species name	Common name	Origin[1]	Status[2]
	poliocephalus		
House Sparrow	*Passer domesticus*	*	
Mosquito Fish	*Gambusia affinis*	*	
Nankeen Kestrel	*Falco cenchroides*	In	
New-holland Honeyeater	*Phylidonyris novaehollandiae*	In	
Long Billed Corella	*Cacatua tenuirostris*	In	
Pacific Black Duck	*Anas superciliosa*	In	
Red-rumped Parrot	*Psephotus haematonotus*	In	
Short-finned Eel	*Anguilla australis*	In	
Southern Brown Tree Frog	*Litoria ewingii*	In	
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	In	
Striped Marsh Frog	*Limnodynastes peroni*	In	
Stubble Quail	*Coturnix pectoralis*	In	
Straw-necked Ibis	*Threskiornis spinicollis*	In	
Tawny Frogmouth	*Podargus strigoides*	In	
Tree Martin	*Petrochelidon nigricans*	In	
Welcome Swallow	*Hirundo neoxena*	In	
Whistling Kite	*Haliastur sphenurus*	In	
White-faced Heron	*Egretta novaehollandiae*	In	
White-necked Heron	*Ardea pacifica*	In	
Willie Wagtail	*Rhipidura leucophrys*	In	
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	In	

F3 Flora

Species name	Common name	Origin[1]	Status[2]
Acacia genistifolia	Spreading Wattle	In	FFG-P
Acacia longifolia subsp. *longifolia*	Coast Wattle	N	
Acacia mearnsii	Black Wattle	In	FFG-P
Acacia melanoxylon	Blackwood	In	
Acacia oxycedrus	Spike Wattle	In	FFG-P
Acacia terminalis	Sunshine Wattle	In	FFG-P
Acrotriche serrulata	Honeypot	In	

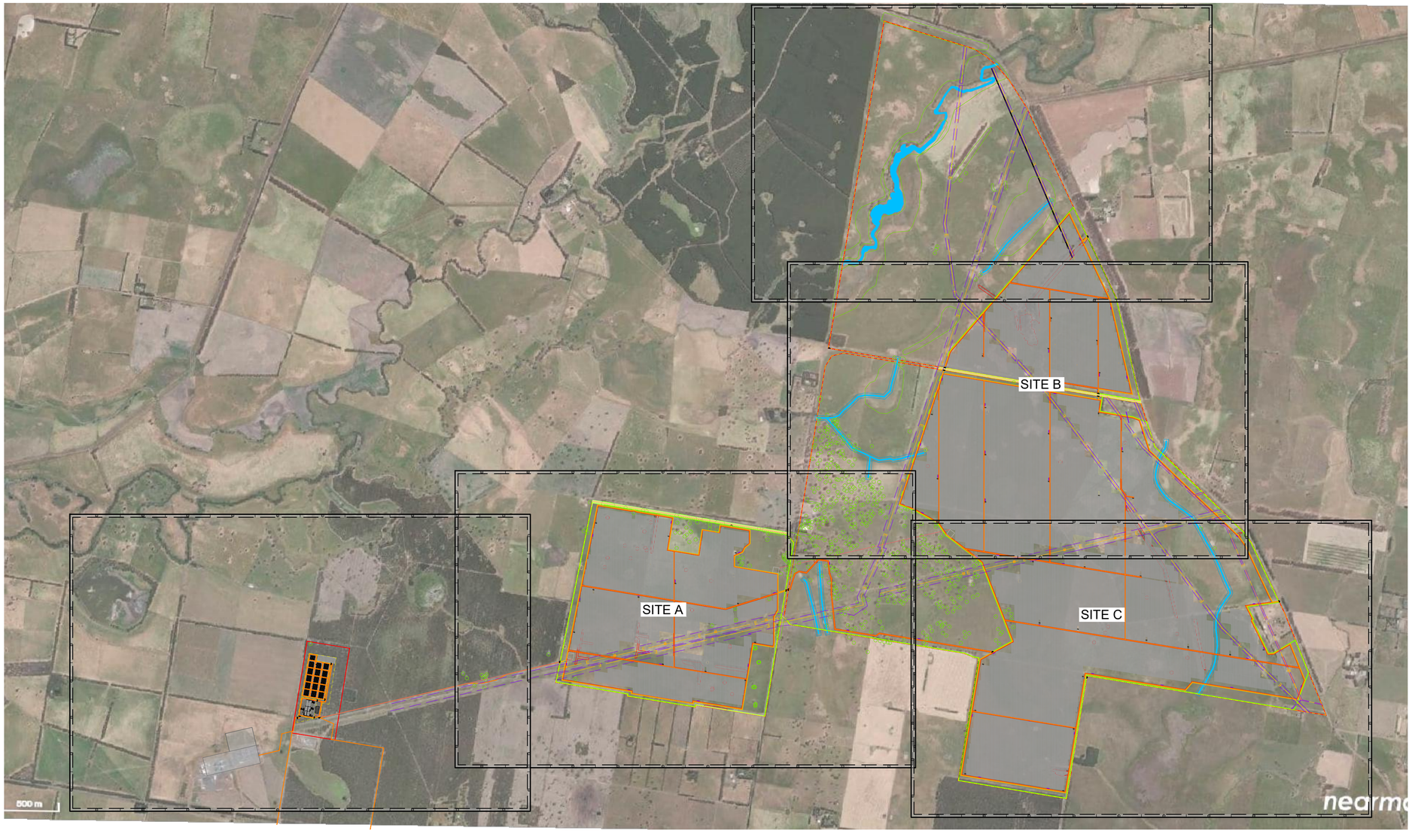
Species name	Common name	Origin[1]	Status[2]
Allocasuarina littoralis	Black Sheoak	In	
Amperea xiphoclada var. *xiphoclada*	Broom Spurge	In	
Amyema spp.	Mistletoe	In	
Arthropodium strictum s.l.	Chocolate Lily	In	
Asparagus asparagoides	Bridal Creeper	*	
Asperula spp.	Woodruff	In	
Austrostipa spp.	Spear Grass	In	
Avena spp.	Wild Oats	*	
Banksia marginata	Silver Banksia	In	
Bossiaea heterophylla	Variable Bossiaea	In	FFG
Bossiaea prostrata	Creeping Bossiaea	In	
Bursaria spinosa	Sweet Bursaria	In	
Carex inversa	Knob Sedge	In	
Carex spp.	Sedge	In	
Cassinia aculeata subsp. *aculeata*	Common Cassinia	In	
Cassinia longifolia	Shiny Cassinia	In	
Cassytha glabella	Slender Dodder-laurel	In	
Centella cordifolia	Centella	In	
Cheilanthes spp.	Rock Fern	In	FFG-P
Chiloglottis curviclavia	Autumn Wasp-orchid	In	FFG-P
Cirsium vulgare	Spear Thistle	*	
Clematis microphylla s.l.	Small-leaved Clematis	In	
Comesperma volubile	Love Creeper	In	
Correa reflexa	Common Correa	In	FFG-P
Cotula australis	Common Cotula	In	
Cyperus eragrostis	Drain Flat-sedge	*	
Dactylis glomerata	Cock's Foot	*	
Dianella revoluta s.l.	Black-anther Flax-lily	In	
Dichondra repens	Kidney Weed	In	
Dillwynia glaberrima	Smooth Parrot-pea	In	
Ehrharta spp.	Veldtgrass	*	

Species name	Common name	Origin[1]	Status[2]
Einadia nutans	Nodding Saltbush	In	
Epacris impressa	Common Heath	In	FFG-P
Eucalyptus bridgesiana s.l.	But But	In	
Eucalyptus globoidea	White Stringybark	In	
Eucalyptus tereticornis subsp. *mediana*	Gippsland Red-gum	In	
Exocarpos cupressiformis	Cherry Ballart	In	
Gahnia radula	Thatch Saw-sedge	In	
Geranium spp.	Crane's Bill	In	
Gonocarpus humilis	Shade Raspwort	In	
Gonocarpus tetragynus	Common Raspwort	In	
Hardenbergia violacea	Purple Coral-pea	In	
Holcus lanatus	Yorkshire Fog	*	
Hydrocotyle laxiflora	Stinking Pennywort	In	
Hypericum gramineum	Small St John's Wort	In	
Hypochaeris radicata	Cat's Ear	*	
Isolepis spp.	Club Sedge	In	
Juncus pallidus	Pale Rush	In	
Juncus bufonius	Toad Rush	In	
Kennedia prostrata	Running Postman	In	
Kunzea ericoides s.l.	Burgan	In	
Lepidosperma concavum	Variable Sword-sedge	In	
Leucopogon virgatus var. *virgatus*	Common Bearded-heath	In	
Lomandra filiformis	Wattle Mat-rush	In	
Lomandra longifolia	Spiny-headed Mat-rush	In	
Lomandra nana	Dwarf Mat-rush	In	
Melaleuca ericifolia	Swamp Paperbark	In	
Microlaena stipoides var. *stipoides*	Weeping Grass	In	
Olearia lirata	Snowy Daisy-bush	In	
Opercularia sp.	Stinkweed	In	
Oxalis spp.	Wood Sorrel	N	
Pinus radiata	Radiata Pine	*	

Species name	Common name	Origin[1]	Status[2]
Plantago gaudichaudii	Narrow Plantain	In	
Plantago lanceolata	Ribwort Plantain	*	
Platylobium formosum s.l.	Handsome Flat-pea	In	
Platysace lanceolata	Shrubby Platysace	In	
Poa labillardierei	Common Tussock-grass	In	
Poa spp.	Tussock Grass	In	
Poranthera microphylla s.l.	Small Poranthera	In	
Pteridium esculentum subsp. *esculentum*	Austral Bracken	In	
Pultenaea spp.	Bush-pea	In	
Rytidosperma spp.	Wallaby Grass	In	
Senecio prenanthoides	Beaked Fireweed	In	
Senecio spp.	Fireweed	In	
Tetrarrhena juncea	Forest Wire-grass	In	
Themeda triandra	Kangaroo Grass	In	
Triticum aestivum	Common Wheat	*	
Viola hederacea sensu Entwisle (1996)	Ivy-leaf Violet	In	
Wahlenbergia spp.	Bluebell	In	
Xanthorrhoea minor subsp. *lutea*	Small Grass-tree	In	FFG-P

Appendix G Design plans

MORTLAKE ENERGY HUB
SITE PLAN



PROJECT DETAILS	
BOUNDARY AREA	1900 Ha
PANEL AREA	1060 Ha (56% of site)
GATES	19
DC CAPACITY	360MWp
AC CAPACITY	300MW
PV MODULES	795,762
STRING TRACKERS	8455
SOLAR INVERTER SKID	44
BESS INVERTER SKID	78
ROW DISTANCE	7.25m
SECURITY FENCE LENGTH	28.8km

GENERAL LEGEND

- DEVELOPMENT BOUNDARY
- PERIMETER FENCE
- SECURITY FENCE
- UNDERGROUND CABLE 33kV
- ACCESS ROADS
- PUBLIC ROADS IN RESERVE
- EXTERNAL VEGETATION BUFFER (5m)
- INTERNAL FIRE SAFETY BUFFER (10m)
- EXISTING EASEMENT POWERLINES SET WITHIN
- OVERLAND FLOW PATH
- PASSING BAYS
- GATES
- W.T — 45,000L WATER TANK (11)
- W.T — 288,00L WATER TANK (1)
- INV. SKID — SOLAR INVERTER (44)
- EXISTING VEGETATION - REMOVED
- EXISTING VEGETATION - RETAINED

2-STRING TRACKER (1251) - 66 PANELS

3-STRING TRACKER (7204) - 99 PANELS

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URBIS

PROJECT
MORTLAKE ENERGY HUB
SITE PLAN
HAMILTON HIGHWAY, MORTLAKE 3272
VICTORIA, AUSTRALIA

Level 10, 477 Collins Street | Melbourne VIC 3000 AUSTRALIA | +61 3 8663 4888 | URBIS Pty Ltd | ABN 50 105 256 228

KEY PLAN

REV	DESCRIPTION	DWN	CHK	DATE
E	FOR APPROVAL	AF	BB	29.04.2024
D	FOR REVIEW	AF	BB	11.04.2024
C	FOR REVIEW	OS	BB	18.03.2024
B	FOR REVIEW	AF	BB	28.02.2024
A	INTERNAL DRAFT FOR REVIEW	AF	BB	13.12.2023

PROJECT DIRECTOR: BRENTON BEGGS

CLIENT
MORTLAKE ENERGY HUB

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ISSUE
FOR APPROVAL

PROJECT NO.
P0040707

SCALE

NORTH

DRAWING TITLE
000-CS COVERSHEET 00
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DRAWING NO.
000-CS

REVISION
E

PROJECT DETAILS	
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- 3-STRING TRACKER (7204) - 99 PANELS

TEMPORARY LAYDOWN

PROPOSED BESS

PROPOSED SUBSTATION

SITE ACCESS

PROPOSED EXTENSION

EXISTING SUBSTATION

UNDERGROUND CABLE 33kv

288,000L WATER TANK

SITE ACCESS

SITE ACCESS

PLOT STYLE: URBIS_A1.CTB

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PLOT DATE: 02.05.2024

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URBIS

PROJECT

MORTLAKE ENERGY HUB

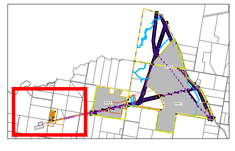
SITE PLAN

HAMILTON HIGHWAY, MORTLAKE 3272

VICTORIA, AUSTRALIA

Level 10, 477 Collins Street | Melbourne VIC 3000 AUSTRALIA | +61 3 8663 4888 | URBIS Pty Ltd | ABN 50 105 256 228

KEY PLAN



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A	INTERNAL DRAFT FOR REVIEW	AF	BB	13.12.2023

PROJECT DIRECTOR: BRENTON BEGGS

CLIENT
MORTLAKE ENERGY HUB

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DRAWING TITLE
001-CS DETAIL PLAN 01
.

ISSUE
FOR APPROVAL

PROJECT NO.
P0040707

SCALE
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50 100 150 200 250m

NORTH

DRAWING NO.
001-CS

REVISION
E

PROJECT DETAILS	
BOUNDARY AREA	1900 Ha
PANEL AREA	1060 Ha (56% of site)
GATES	19
DC CAPACITY	360MWp
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BESS INVERTER SKID	78
ROW DISTANCE	7.25m
SECURITY FENCE LENGTH	28.8km

GENERAL LEGEND

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3-STRING TRACKER (7204) - 99 PANELS

UNDERGROUND CABLE 33kv

SITE ACCESS

HARDYS LN

SITE ACCESS

THULBORNS LN

SITE ACCESS

BOONERAH ESTATE ROAD

BOOTHS RD

PLOT STYLE: URBIS_A1.CTB

PAGE SETUP: ----

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PLOT DATE: 02.05.2024

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URBIS

PROJECT

MORTLAKE ENERGY HUB

SITE PLAN

HAMILTON HIGHWAY, MORTLAKE 3272

VICTORIA, AUSTRALIA

Level 10, 477 Collins Street | Melbourne VIC 3000 AUSTRALIA | +61 3 8663 4888 | URBIS Pty Ltd | ABN 50 105 256 228

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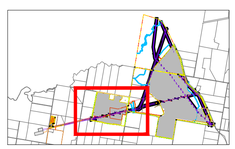

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A	INTERNAL DRAFT FOR REVIEW	AF	BB	13.12.2023

PROJECT DIRECTOR: BRENTON BEGGS

CLIENT

MORTLAKE ENERGY HUB

.

DRAWING TITLE

002-CS DETAIL PLAN 02

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ISSUE

FOR APPROVAL

PROJECT NO.

P0040707

SCALE

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NORTH

DRAWING NO.

002-CS

REVISION

E

PROJECT DETAILS	
BOUNDARY AREA	1900 Ha
PANEL AREA	1060 Ha (56% of site)
GATES	19
DC CAPACITY	360MWp
AC CAPACITY	300MW
PV MODULES	795,762
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SOLAR INVERTER SKID	44
BESS INVERTER SKID	78
ROW DISTANCE	7.25m
SECURITY FENCE LENGTH	28.8km

GENERAL LEGEND

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- SOLAR INVERTER (44)
- EXISTING VEGETATION - REMOVED
- EXISTING VEGETATION - RETAINED

2-STRING TRACKER (1251) - 66 PANELS

3-STRING TRACKER (7204) - 99 PANELS

HAMILTON HWY

EMERGENCY ACCESS

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URBIS

PROJECT

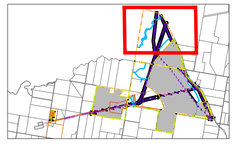
MORTLAKE ENERGY HUB

SITE PLAN

HAMILTON HIGHWAY, MORTLAKE 3272

VICTORIA, AUSTRALIA

Olderfleet, Level 10, 477 Collins Street | Melbourne VIC 3000 AUSTRALIA | +61 3 8663 4888 | URBIS Pty Ltd | ABN 50 105 256 228



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B	FOR REVIEW	AF	BB	28.02.2024
A	INTERNAL DRAFT FOR REVIEW	AF	BB	13.12.2023

PROJECT DIRECTOR: BRENTON BEGGS

CLIENT

MORTLAKE ENERGY HUB

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DRAWING TITLE

003-CS DETAIL PLAN 03

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ISSUE

FOR APPROVAL

PROJECT NO.

P0040707

SCALE

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NORTH

DRAWING NO.

003-CS

REVISION

E

PROJECT DETAILS	
BOUNDARY AREA	1900 Ha
PANEL AREA	1060 Ha (56% of site)
GATES	19
DC CAPACITY	360MWp
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BESS INVERTER SKID	78
ROW DISTANCE	7.25m
SECURITY FENCE LENGTH	28.8km

GENERAL LEGEND

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- 3-STRING TRACKER (7204) - 99 PANELS

SITE ACCESS

SITE ACCESS

BOONERAH ESTATE ROAD

TEMPORARY LAYDOWN AREA

BUSINESS SIGNAGE

PRIMARY SITE ACCESS - INTERSECTION TREATMENT REQUIRED

SITE ACCESS

BOONERAH ESTATE ROAD

1006274

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URBIS

PROJECT

MORTLAKE ENERGY HUB

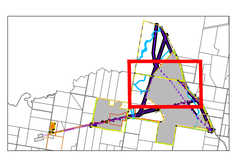
SITE PLAN

HAMILTON HIGHWAY, MORTLAKE 3272

VICTORIA, AUSTRALIA

Level 10, 477 Collins Street | Melbourne VIC 3000 AUSTRALIA | +61 3 8663 4888 | URBIS Pty Ltd | ABN 50 105 256 228

KEY PLAN



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PROJECT DIRECTOR: BRENTON BEGGS

CLIENT

MORTLAKE ENERGY HUB

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DRAWING TITLE

004-CS DETAIL PLAN 04

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ISSUE

FOR APPROVAL

PROJECT NO.

P0040707

SCALE

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NORTH

DRAWING NO.

004-CS

REVISION

E

PROJECT DETAILS

BOUNDARY AREA	1900 Ha
PANEL AREA	1060 Ha (56% of site)
GATES	19
DC CAPACITY	360MWp
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SOLAR INVERTER SKID	44
BESS INVERTER SKID	78
ROW DISTANCE	7.25m
SECURITY FENCE LENGTH	28.8km

GENERAL LEGEND

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- SECURITY FENCE
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URBIS

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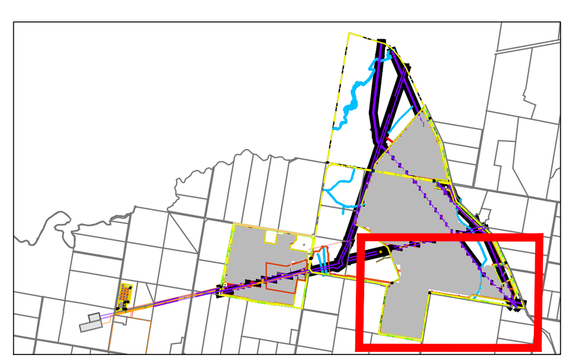
MORTLAKE ENERGY HUB
SITE PLAN
HAMILTON HIGHWAY, MORTLAKE 3272
VICTORIA, AUSTRALIA

Level 10, 477 Collins Street | Melbourne VIC 3000 AUSTRALIA | +61 3 8663 4888 | URBIS Pty Ltd | ABN 50 105 256 228

KEY PLAN



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DISCLAIMER

PROJECT DIRECTOR: BRENTON BEGGS

CLIENT
MORTLAKE ENERGY HUB

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DRAWING TITLE
005-CS DETAIL PLAN 05
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ISSUE
FOR APPROVAL

PROJECT NO.
P0040707

SCALE
1:5000 @ A1 1:10000 @ A3
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NORTH

DRAWING NO.
005-CS

REVISION
E

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Mortlake Solar Farm Targeted Growling Grass Frog Survey

Urbis

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DOCUMENT TRACKING

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Template 2.8.1

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1. Introduction

1.1 Background

Eco Logical Australia (ELA) has been engaged Urbis, on behalf of Ausnet to undertake an ecological assessment for of the proposed solar farm site located near Hamilton Highway, Mortlake (Stage 1). An initial ecological constraints assessment of the site was completed on 2 August 2022 (ELA, 2024). This assessment identified the potential of the site to support Growling Grass Frog. Growling Grass Frog is listed as vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act) and Vulnerable under the Victorian Flora and Fauna Guarantee Act (FFG Act). Targeted surveys were recommended to determine species presence absence and inform project legislative implications in relation to the species.

1.2 Species profile

Growling Grass Frog is a large species of frog and a member of the Bell Frog complex. Adult frogs can be as large as 105 mm in length. Colouration is variable between individuals but typically ranges from dull olive to bright emerald green, with large black, brown and bronze splotches on its dorsal surface (Clemann & Swan, 2023). A black stripe runs from the species nostril, through the eye and above the tympanum (Clemann & Swan, 2023). The species is also characterised by the presence of warts across its dorsum, flanks and legs (Clemann & Swan, 2023).

Growling Grass Frog depend on a mix of aquatic and terrestrial habitat for breeding, foraging, shelter and dispersal, and are typically found in areas with both permanent and semi-permanent waterbodies with still or slow-moving water (DEWHA, 2009). Optimal breeding habitat includes emergent vegetation around the edges of waterbodies, mats of floating and submerged plants and with minimal shading from trees (DEWHA, 2009). Growling Grass Frogs also regularly use water bodies as non-breeding habitat and prefer areas with emergent vegetation to provide for protection and areas in which they can bask (DEWHA, 2009). They periodically use terrestrial areas adjacent to the water bodies that have shelter and feeding habitat that includes terrestrial vegetation such as grasses and low shrubs that provide invertebrates for food and shelter when frogs are migrating overland between water bodies (DEWHA, 2009). Rocks, logs and debris surrounding the waterbodies provide essential over-wintering habitat (DEWHA, 2009). Connectivity between clusters of suitable waterbodies is essential to promote movement between breeding and non-breeding sites to maintain genetic diversity, improve breeding opportunities under different environmental conditions and promote recolonisation following local extinction (DEWHA, 2009).

Principal threats to Growling Grass Frogs are habitat loss and degradation such as:

- changes in hydrological regimes that reduce the hydroperiod and stops tadpoles reaching metamorphosis
- removal of aquatic and terrestrial vegetation, fallen logs and debris which provide over-wintering habitat
- overshading of waterbodies by trees that reduces water temperatures, which is unfavourable for tadpole growth

- damage to banks by trampling caused by stock, which creates turbidity and loss of emergent vegetation for shelter
- predation of eggs and larvae by introduced fish such as Mosquito Fish *Gambusia affinis*
- loss of habitat connectivity.
- poor water quality caused by increased turbidity, nutrients, pesticides, detergents and heavy metals
- disease from Chytrid fungus (DEWHA 2009 and DELWP, 2017).

Growling Grass Frog breeding occurs dung warmer months from August through to March (DELWP, 2017). Females lay eggs in water bodies that retain water at least through summer, enabling the tadpoles to develop (DELWP, 2017).

Figure 1. Growling Grass Frog (photo Jonathan Billington, ELA)

1.3 Survey rationale

A review of records for Growling Grass Frog identified 12 records occurring within a 10 km buffer of the site boundary, the most recent of which was recorded in 2018 (VBA, 2023). Of these records, three were collected in the last 30 years that occur within proximity (approximately 2 km) of the site. These records are as follows:

- A record within Mortlake Common collected in 2000.
- A record near the confluence of Salt Creek and Hopkins River collected in 2011.
- A record associate with Boonerah Estate Road collected in 2011.

Given the sites proximity to these records and its location between two large areas of known habitat (Mortlake Common and Salt Creek) potential habitat was identified for the species to be present within waterbodies and farm dams across the site, either as resident or when moving across the landscape between those environs. Targeted survey was thus recommended. The location of Growling Grass Frog records is shown in Figure 3.

2. Methods

Surveys for Growling Grass Frog comprised of detailed habitat assessments and nocturnal surveys comprising of call playback and spotlight surveys. Surveys were conducted with reference to the following guidelines and references:

- Significant Impact Guidelines for the Vulnerable Growling Grass Frog *Litoria raniformis* (DEWHA, 2009a).
- Survey Guidelines for Australia's threatened frogs (DEWHA, 2010).
- Biodiversity Precinct Structure Kit (DSE 2010).

Survey locations and methods are described below.

2.1 Survey locations

Given the number of waterbodies across the site, sampling of all potential habitat was not possible. A subset of representative waterbodies was therefore selected on the basis of the following rationale:

- Location of historic records.
- Habitat attributes, taking into consideration habitat extent and quality. This was informed by the results of the desktop and field based constraints assessment.
- Proximity to natural drainage lines and unnamed watercourses with the potential to link habitats between Mortlake Common and Salt Creek.
- Location within the projects likely impact footprint as informed by preliminary project design.

In total, seven locations were the subject of targeted survey comprising three locations along Salt Creek and five discrete locations (one location included two small discrete waterbodies sampled together because of their proximity (Figure 3). At the time of assessment, areas of Mortlake Common and the drainage line linking the site to the reserve were noted to be dry (Figure 3). Surveys at this location were therefore not possible at the time of assessment. Suitable habitat on site was however surveyed which is proximal to the site and Mortlake Common Boundary.

Survey locations are presented in Figure 3.

2.2 Habitat assessment

A diurnal assessment of each survey location was undertaken. The purpose of this assessment was to characterise and describe the quality and extent of habitat present, and to assess its potential to support Growling Grass Frog. Habitat attributes recorded at each location were as follows:

- Waterbody type (i.e. creek, dam or drainage line).
- Presence of aquatic vegetation and type (emergent, submergent, floating).
- In-stream habitat (i.e. rocks and logs).
- Terrestrial refuge (i.e. grassy banks, logs, rocks).
- Waterbody dimensions and likelihood of permanence.

2.3 Nocturnal surveys

Nocturnal surveys were conducted over two evenings after sunset during suitable weather conditions (above 12 degrees, no to moderate wind). The timing of these surveys occurred during the Growling Grass Frog breeding season between November and March in temperate regions (DEWHA 2009a). Typically, optimal timing for detection of this species is between November and December, when males are actively calling following rain events (DEWHA, 2009a).

On arriving at each location ELA ecologists passively listened for frogs for a period of 10 minutes. If no frogs were heard call-playback was used to elicit a response from any males that may have been present. Call play-back was conducted using a pre-recorded male Growling Grass Frog call broadcast through a hand-held Bluetooth speaker. Calls were broadcast for a period of 2 minutes followed by 5 minutes of quiet listening. If nothing was heard, the call playback procedure was repeated. Following call-playback, active searches with hand-held torches were systematically completed in suitable habitat around the margins and banks of the waterbody/waterway. Given the site extent and the number of waterbodies present, emphasis was placed site based surveys rather than reference site checks.

The Growling Grass Frog – Calling and Activity Diary survey data available on the Ecological Consultants Association of Victoria website confirmed species activity on the nights and period of survey however, the majority of sites were in greater Melbourne (ECA Vic, 2024). The species was recorded in Dunkeld approximately 50 km northwest of the site on the 7 December 2023.

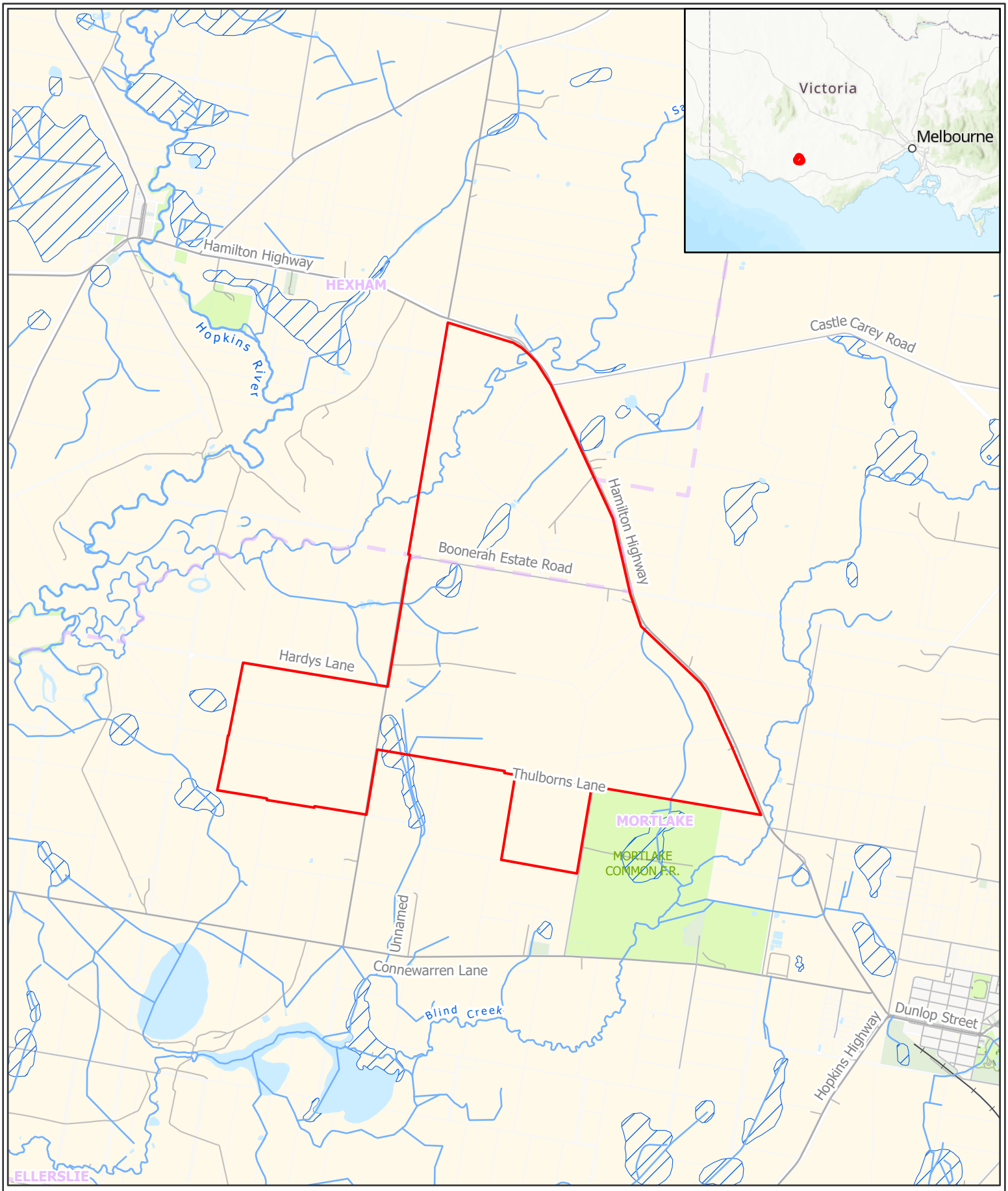
Weather conditions during the nocturnal surveys were suitable for detection and included:

- 4 December 2023 – 10% cloud cover, light air (4 km/h beaufort wind scale), 16-13 ^{o}C, Last significant rainfall 26 November 2023 (14.8 mm) (BoM, 2024).
- 5 December 2023 – 80% cloud cover, gentle breeze (11 -15 km/h beaufort wind scale), 15-19 ^{o}C, Last significant rainfall 26 November 2023 (14.8 mm) (BoM, 2024).

Proceeding daytime temperatures ranged between 27 – 32 degrees and were also considered conducive to frog activity.

2.4 Study limitations

The survey effort and methods were consistent with relevant state and Commonwealth guidelines, and although the targeted surveys were undertaken during suitable, and often favourable, survey periods for the target species, detection is not guaranteed even if a species may be present (i.e. imperfect detection). Species also fluctuate in abundance and distribution based on prevailing and preceding conditions; and may occur at low densities (i.e. low detectability) at times.



Location of the Study Area

Moyne Shire

- Study Area
- Locality
- Local Government Area
- Major watercourse
- Minor watercourse
- Water area
- Area subject to inundation
- Rail
- Roads
- Streets
- Minor streets
- Tracks
- Trail
- Parcels
- Park or Reserve
- Other public land

0 1 2
Kilometres

Datum/Projection:
GDA 1994 MGA Zone 54

Project: 4927-RS Date: 2/02/2024

Source:
Basemap: VICMAP, 2023
Inset basemap: ESRI Topographic

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3. Results

3.1 Habitat assessments

The highest quality habitat was identified along Salt Creek and in particular location 1 which was the most downstream location sampled, where the waterway was wide and shallow with a high cover of aquatic macrophyte vegetation (Figure 3; Plate 1). Aquatic macrophyte vegetation comprised of discrete beds of reeds and rushes primarily situated along the waterways margins including Cumbungi (*Typha domingensis*) and Giant Rush (*Juncus pallidus*) with an extensive cover of floating and emergent Water Ribbons (*Triglochin procera*) interspersed with discrete areas of open water. Banks showed some signs of stock access but were otherwise colonised by a mixture of pasture and native tussock grass species. Scattered River Red Gums (*Eucalyptus camaldulensis*) along the waterways provided light shading. Similarly, location 2 also had an extensive cover of floating and emergent *T. procera* with discrete beds of reed and rushes along its margin (Figure 3; Plate 2). Canopy cover, however, was absent and signs of stock access more extensive. Location 3 was located near the Hamilton Highway Road crossing (bridge) which contained a high cover of macrophytes but was dominated by emergent species such as Common Reed (*Phragmites australis*), *T. domingensis* and Tall Spikerush (*Eleocharis sphacelata*) (Figure 3; Plate 3). Habitat along Salt Creek particularly locations 1 and 2 provided good refuge, foraging and basking opportunities for Growling Grass Frog.

Survey locations 4 and 5 were located in the interior of the site proximal to the Boonerah Estate Road reserve (Figure 3; Plates 4 and 5). The locations, which comprised two discrete dams were highly degraded by intensive stock (sheep) access and devoid of aquatic macrophyte cover or fringing habitats. These dams, appearing anthropogenic in origin were heavily trafficked at the time of assessment with areas of pugging. Habitat here was considered marginal for Growling Grass Frog with species use likely to be limited to dispersal and occasional refuge habitat when when adult frogs are moving across the landscape.

Survey locations 6 - 8 were located in the southeastern corner of the site and surveyed for their proximity to Mortlake Common and a drainage line connecting the common to the subject site (Figure 3; Plates 6 - 8). Survey location 6 was comprised of two discrete waterbodies approximately 50m apart (Figure 3; Plates 6 and 7). The northern of these two waterbodies (location 6N) was bordered by volcanic boulders (around 2/3 of the waterbodies perimeter) with extensive cover of submerged Red Water-milfoil (*Myriophyllum verrucosum*) and Pondweed (*Potamogeton* sp.) (Figure 3; Plate 6). It appeared as if water levels at the waterbody were in the process of receding. Signs of stock access here were evident, but limited to areas lacking rock cover, with the presence of the volcanic rock perhaps acting as a deterrent to stock access. Habitat here for Growling Grass Frog was low to moderate. Submerged macrophyte cover and bordering volcanic rock likely to provide refuge habitat, but the waterbodies small extent and shallow nature meaning it is unlikely to provide a permanent source of habitat and is likely not suitable to support breeding. The second waterbody to the south (6S) was of far lower habitat value, devoid of macrophyte cover, or fringing vegetation and showing signs of extensive stock access (Figure 3; Plate 7). Filamentous algae was noted floating near its margins.

Survey location 7 was completely bordered by volcanic rock and had a near 100% cover of Water Fern (*Azolla* sp.) with discrete beds of *Juncus sp*. along its margin and no obvious signs of stock access (Figure 3; Plate 8). Like the northern most wetland (location 6N), habitat at survey location 7 was considered

low to moderate with the dam providing some refuge to the species but due to its small size unlikely to support breeding or to provide habitat to the species year-round.

As noted in section 2.1 whilst not a location of targeted survey (as a consequence of being dry at the time of assessment), the drainage line linking the site to Mortlake Common was also assessed for habitat suitability (Plate 9). On inspection, the drainage line was noted to be heavily colonised by terrestrial pasture species such as Perennial Rye Grass *Lolium sp*., with no aquatic vegetation persisting (Figure 3; Plate 9). This was considered to indicate that the drainage line is ephemeral and frequently dry. The drainage line therefore is only likely to act as an intermittent dispersal corridor during periods of high and perhaps sustained rainfall.

Habitat characteristics by survey location are further summarised in Appendix A.

Plate 1: Salt Creek (location 1)

Plate 2: Salt Creek (location 2)

Plate 3: Salt Creek (location 3)

Plate 4: Stock dam (location 4)

Plate 5: Stock dam (survey Location 5)

Plate 6: Wetland fringed by rock with extensive cover of submerged aquatic vegetation (location 6N)

Plate 7: Stock watering dam (survey location 6S)

Plate 8: Small waterbody fringed with extensive rock cover (survey location 7)

Plate 9: Drainage line linking study area and Mortlake Common

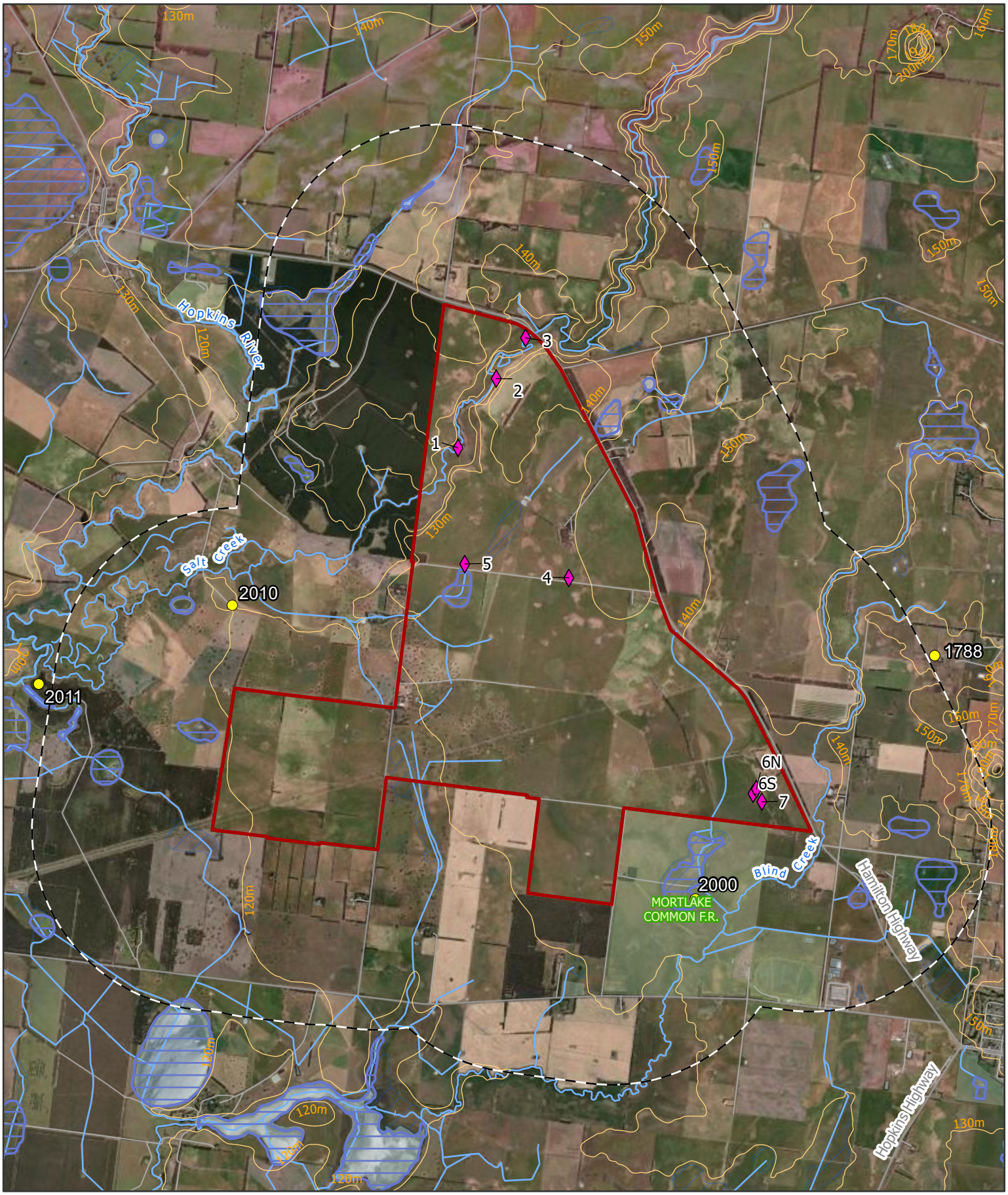
3.2 Nocturnal surveys

Despite suitable survey timing, weather and the presence of suitable habitat, no Growling Grass Frog were detected and amphibian activity was notably low across survey locations. Non target frog species recorded included Spotted Marsh Frog *Limnodynastes tasmaniensis*, Striped Marsh Frog *Limnodynastes peroni* and Southern Brown Tree Frog *Litoria ewingii*. Results by location are summarised in Table 1 below.

Table 1. Targeted survey results

Survey location	Species	Comments
1	Nil	No frog activity
2	Spotted Marsh Frog, Striped Marsh Frog	
3	Striped Marsh Frog	
4	Spotted Marsh Frog	
5	Nil	No frog activity
6	Spotted Marsh Frog, Striped Marsh Frog and Southern Brown Tree Frog.	
7	Nil	No frog activity

In addition to non-target frog species, native species including Australian Short finned Eel *Anguilla australis*, Eastern Snake-necked Turtle *Chelodina longicollis* and the EPBC Act listed Dwarf Galaxias *Galaxias pusilla* (considered synonymous with Little Galaxias *Galaxiella toourtkoourt*) were also recorded at Salt Creek. Fish activity was most prevalent at survey location 1, where in the shallow water, fish were observed close to the surface.



Growling Grass Frog Targeted Survey Results: Overview

Moyne Shire

- Study area
- 2km buffer on study area
- Growling Grass Frog (VBA, 2023)
- Growling Grass Frog targeted survey location
- Elevation - 10m
- Current wetland
- Major watercourse
- Minor watercourse
- Water area
- Area subject to inundation
- Park or Reserve
- Other public land

0 1,000 2,000
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927-LP Date: 29/01/2024

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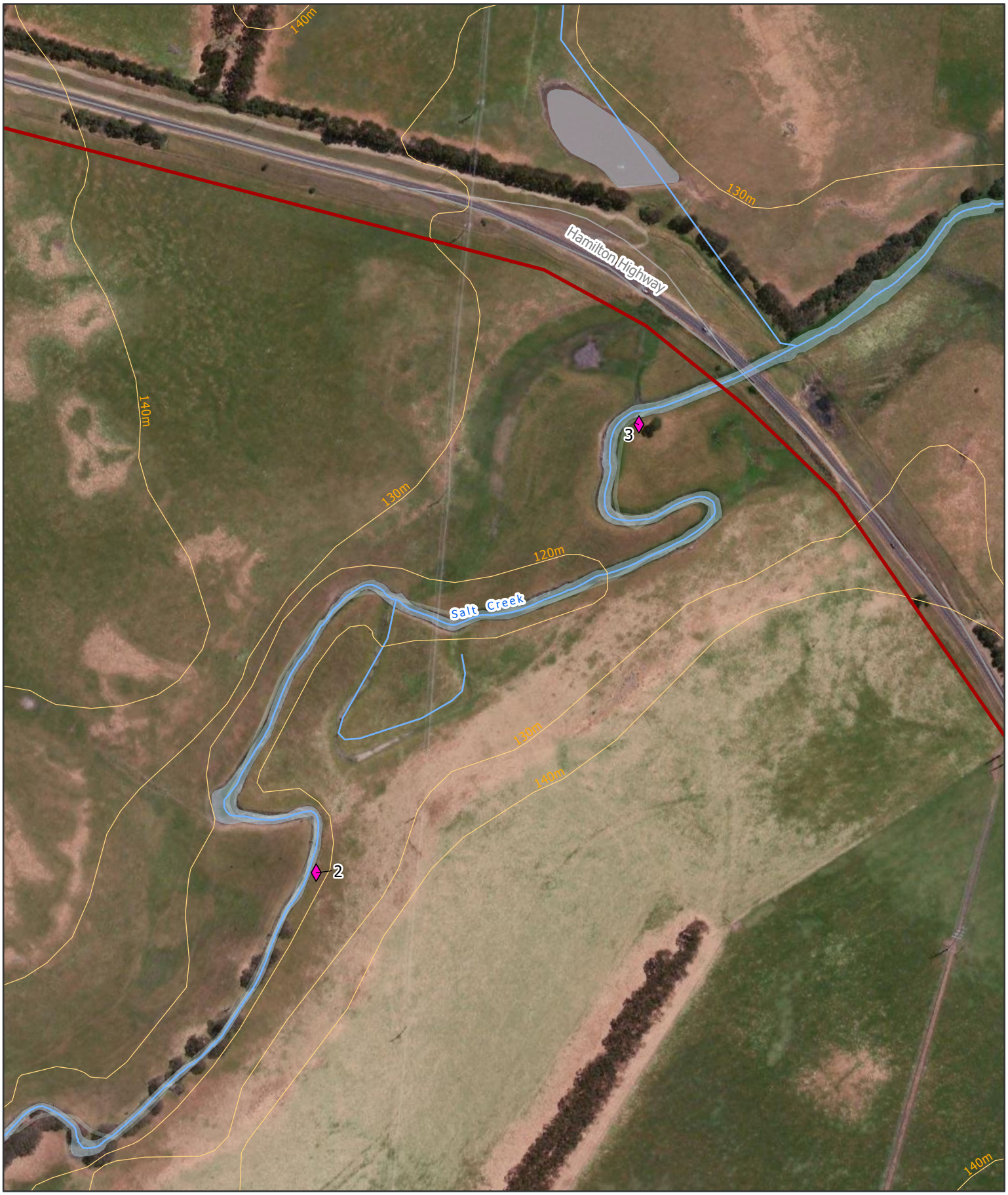
Source: Basemap: VICMAP, 2023; Aerial: ESRI, 2024; VBA data: DELWP, 2023



Growling Grass Frog Targeted Survey Results: Detail map 1

Moyne Shire

- Study area
- 2km buffer on study area
- Growling Grass Frog targeted survey location
- Elevation - 10m
- Minor watercourse
- Water area
- Other public land

0 100 200
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927-LP Date: 29/01/2024

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Source: Basemap: VICMAP, 2023; Aerial: ESRI, 2024; VBA data: DELWP, 2023

Growling Grass Frog Targeted Survey Results: Detail map 2

Moyne Shire

- Study area
- 2km buffer on study area
- Growling Grass Frog targeted survey location
- Elevation - 10m
- Current wetland
- Minor watercourse
- Water area
- Area subject to inundation
- Other public land

0 200 400
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927-LP Date: 29/01/2024

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Source: Basemap: VICMAP, 2023; Aerial: ESRI, 2024; VBA data: DELWP, 2023

Growling Grass Frog Targeted Survey Results: Detail map 3

Moyne Shire

- Study area
- 2km buffer on study area
- Growling Grass Frog targeted survey location
- Current wetland
- Minor watercourse
- Area subject to inundation
- Park or Reserve

0 100 200
Meters

Datum/Projection:
GDA 1994 VICGRID94

Project: 4927-LP Date: 29/01/2024

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Source: Basemap: VICMAP, 2023; Aerial: ESRI, 2024; VBA data: DELWP, 2023

4. Discussion

No Growling Grass Frog were detected and amphibian activity was notably low across all survey locations.

Despite not recording Growling Grass Frog at the time of the assessment, Salt Creek provides suitable habitat for the species due to the permanency of the water and abundance of fringing and floating aquatic vegetation. It is uncertain as to why none were recorded during the assessment given the suitability of habitat. However, given the presence of suitable habitat and existing recent historical records, it remains likely that Growling Grass Frog occur at Salt Creek, at least on an intermittent basis.

Outside of Salt Creek surveyed habitat is mostly considered marginal for the species. Dams across the site were typically heavily trafficked by sheep and as a consequence heavily degraded, lacking suitable terrestrial fringing and aquatic macrophyte cover and offering little species refuge. Where stock access was limited by natural features, such as the presence of volcanic rock, habitat suitability was higher although the small size of these habitats (locations 6N and 7) and their likely ephemeral nature they are unlikely to support the species on an ongoing basis. Furthermore, the drainage line identified during the desktop assessment as potentially linking the site and Mortlake Common was dry and colonised exclusively by pasture grass species. This considered to indicate that it likely provides limited opportunities for species dispersal. Based on these assessments it now considered that species dispersal across the site, linking the habitats of Salt Creek and Mortlake is unlikely, with connectivity between these habitats likely supported by other waterways and bodies within the surrounding landscape.

On the basis of species non detection and limited habitat, Growling Grass Frog (with the exception of Salt Creek) are considered to have a low likelihood of occurrence.

5. References

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APPENDIX A. Habitat assessment

Location	Type	Character	Species	Vegetation Cover %			Dimensions
				Fringing	Emergent	Floating	
1	Creek	Open pool of shallow water with minimal shading from River Red Gums along tree banks. Emergent and floating aquatic vegetation with in-stream debris including logs for basking. Muddy banks edges show signs of pugging from sheep.	Bullrush *Typha sp.* Common Reed *Phragmites australis* Common Tussock-grass *Poa Labillardieri* Giant Rush *Juncus pallidus* Tall Spikerush *Eleocharis sphacelata* Water Ribbons *Triglochin procera* River Red Gum *Eucalyptus camaldulensis* Pasture Grass	40	10	30	Contiguous waterway, approximately 12 m wide
2	Creek	Shallow narrow creek line with a moderate cover of floating and emergent aquatic vegetation and in-stream woody and small rocky debris. Native and exotic fringing grassy and sedgy vegetation. Muddy banks edges show signs of pugging from sheep.	Common Tussock-grass *Poa Labillardieri* Tall Spikerush *Eleocharis sphacelata* Thistle sp. Toowoomba Canary *Grass Phalaris aquatica* Water Ribbons *Triglochin procera*	80	30	25	Contiguous waterway, approximately 12 m wide
3	Creek	Shallow narrow creek line with a high cover of emergent aquatic vegetation dominated by Common Reed Phragmites australis. Minimal in-stream woody and small rocky debris. Native and exotic fringing grassy and sedgy vegetation. Muddy banks edges show signs of pugging from sheep.	Bullrush *Typha sp.* Common Reed *Phragmites australis* Common Tussock-grass *Poa Labillardieri* Tall Spikerush *Eleocharis sphacelata* Water Ribbons *Triglochin procera* Pasture Grass	80	60	5	Contiguous waterway, approximately 15 m wide

	4	Dam	Stock dam. Highly pugged. Fringing comprises pasture grass only with one large rock for shelter. Marginal dispersal habitat as dam is located between to ephemeral wetlands and downstream of Salt Creek.	Pasture Grass	80	0	0	40 x 20 m
	5	Dam	Stock dam. Highly pugged. Stands of scotch thistle and fringing pasture grass. Marginal dispersal habitat as dam is located between to ephemeral wetlands and downstream of Salt Creek.	Pasture Grass	80	0	0	55 x 40 m
6N		Wetland	Small wetland / dam bounded by medium and large sized volcanic rock. The grassy bank was primarily improved pasture grass with scattered native Wallaby Grass and Rush. High aquatic vegetation cover dominated, Pondweed and Milfoil. With only a small amount of emergent and fringing Juncus sp. A second low quality dam was located approximately 50 m to the south west.	Red Water-milfoil *Myriophyllum verrucosum* Pondweed *Potamogeton sp* Rush *Juncus sp*. Spikerush *Eleocharis sp.* Wallaby Grass *Rytidosperma sp.* Pasture Grass	50	5	65	16 x 10 m
6S		Dam	Low-quality dam with pasture grass dominating the pugged grassy bank. In proximity to nearby moderate quality wetlands Location 6N and 7. Floating filamentous algae near margins	Pasture Grass, floating filamentous algae.	5	0	0	25 x 20 m

7	Wetland	Small wetland / dam bounded by medium and large sized volcanic rock. The grassy bank was primarily improved pasture grass with scattered native Wallaby Grass and Rush. Aquatic vegetation cover was high and was dominated by Water Fern	Rush *Juncus sp*. Spikerush *Eleocharis sp.* Wallaby Grass *Rytidosperma sp.* Water Fern *Azolla s.p* Pasture grass	80	5	90	10 x 12 M

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