Ecological Assessment

Flanagans Drive, Merrimu

24-Aug-2023

Ecological Assessment

Flanagans Drive, Merrimu

Client: The Long Forest Unit Trust

ABN: 83 982 031 956

Prepared by

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1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was engaged by the Long Forest Unit Trust to undertake a detailed ecological assessment of a proposed future residential development site located on Flanagans Drive, Merrimu known as the Long Forest Estate (the 'study area'). The Long Forest Estate property is located within the Merrimu Precinct Structure Plan (PSP) which is an area identified for future urban development as part of the expansion of Bacchus Marsh under the Bacchus Marsh Urban Growth Framework developed by Moorabool City Council and the Victorian Planning Authority (VPA). The VPA have indicated that the findings from this ecological assessment will be incorporated into the *Existing Ecological Conditions: Merrimu Precinct Structure Plan, Victoria* prepared by Ecology and Heritage Partners (EHP) in 2021.

1.1 Scope of work

The purpose of this assessment is to identify and quantify native vegetation (flora) and fauna habitat values in line with Victorian and Commonwealth policy and legislation. The scope of works for the existing conditions flora and fauna assessment was to:

- Undertake a desktop review of relevant ecological legislation, in particular the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), and the *Planning and Environment Act 1987* (P&E Act). This includes any species or vegetation communities of conservation significance that have been recorded either within, or in close proximity to, the study area.
- Present a review of existing reports relevant to the study area. This includes reports previously prepared for the site and those prepared as part of the broader Merrimu PSP area.
- Assess the likelihood of Commonwealth and State listed threatened flora and fauna species and communities occurring within the study area.
- Consider other significant biodiversity values (e.g. environmental and vegetation overlays, Conservation Reserves in proximity to the site and wildlife corridors).
- Undertake a field survey to;
    - verify any of the values identified during the desktop review.
    - complete a Vegetation Quality Assessment (VQA) and map the extent of native vegetation
    - identify the presence of the FFG Act-listed Fragrant Saltbush *Rhagodia parabolica*
    - note any incidental records of Commonwealth and State listed fauna and flora species and ecological communities within the study area.
    - Identify the presence or otherwise of the EPBC Act-listed Golden Sun Moth *Synemon plana* across the site (including mapping of suitable habitat for the species).
- Identify potential ecological implications, in the context of relevant Victorian and Commonwealth policy and legislation,
- Outline the offset quantum for removal of all vegetation (complete loss scenario) in the study area.
- Identify next steps and/or further survey requirements (if necessary).

1.2 Study area

The study area is approximately 107 ha in size and is located within the Long Forest Estate, Merrimu, approximately 5 km northeast of the township of Bacchus Marsh and 60 km northwest of the Melbourne CBD (Figure 1). The site is immediately adjacent to the Long Forest Nature Conservation Reserve (NCR) (managed by Parks Victoria), north of Bacchus Marsh Road between Melton and Bacchus Marsh.

Long Forest Estate is within the Victorian Volcanic Plains (VVP) Bioregion and the Port Phillip and Westernport Catchment Management Authority (PPWCMA) region. The relevant local government planning scheme is the Moorabool Shire Council Planning Scheme.

PROJECT ID	60516929
CREATED BY	brierej
LAST MODIFIED	brierej 18 NOV 2021

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Coordinate System: GDA 1994 MGA Zone 55

0 500 1,000 2,000

metres

1:50,000 (when printed at A3)

LEGEND

Study Area

SITE LOCATION

ResCom Group *Ecological Assessment of Flanagan's Road, Merrimu* Flanagan's Road, Merrimu, VIC	**Figure** **F1**

Map Document: (\\aumel1fp003.au.aecomnet.com\groups\ENV\Admin\PubMEL\Team_NR\6. NR Project Delivery\Vic Projects\ResCom\Flanagnans drive Merrimu\GIS\02_Maps\2021\11\F1_Merrimu_Site_Location.mxd)

2.0 Methods

2.1 Biodiversity legislation and policy context

The assessment of ecological values was guided by consideration of the following Commonwealth and State biodiversity legislation and policies:

- Commonwealth
  - *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- State:
  - *Flora and Fauna Guarantee Act 1988* (FFG Act).
  - *Catchment and Land Protection Act 1994* (CaLP Act).
  - *Planning and Environment Act 1987* (P& E Act) and the incorporated *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP, 2017a) (the 'Guidelines') and related policy documents.
  - *Wildlife Act 1975.*

An introduction to the above biodiversity legislation and policy, and the implication to the project is provided in Section 4.0 of this report.

2.2 Database searches

The following State and Commonwealth-curated 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, the Environment and Water (DCCEEW) to identity Matters of National Environmental Significance (MNES) that may occur with 5 km of the study area.
- Databases administered by the Victorian Government Department of Environment, Energy and Climate Action (DEECA):
  - Victorian Biodiversity Atlas (VBA) for records of flora and fauna species. The review of the VBA included a 5 km buffer around the study area to capture records of highly mobile fauna species, and to account for the possible lack of historic survey effort for threatened species in the study area itself.
  - NatureKit for environmental datasets including Ecological Vegetation Class mapping
  - Native Vegetation Information Management (NVIM) for Victoria's native vegetation information.
  - Mapshare Victoria for environmental datasets including *Vic*Plan online for information on planning zones and overlays.
  - Planning Schemes Online for planning information related to the Merrimu Precinct Structure Plan (PSP)
- aerial photographs

The Atlas of Living Australia hosted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) was also consulted for observations of threatened species when considering likelihood of occurrence.

2.3 Review of previous ecological assessments

A review of previous studies completed for the project as well as studies associated the Merrimu PSP was completed to inform the current assessment. The review considered threatened flora and fauna species and Threatened Ecological Communities (TECs) of interest to the project. Previous studies reviewed were:

- *Flora and Fauna Assessment, and Net Gain Analysis at Long Forest Estate, Merrimu, Victoria. Report prepared for QOD Property Group* (EHP, 2012).
- *Targeted Flora and Fauna Surveys at Long Forest Estate, Merrimu, Victoria. Report prepared for QOD Property Group* (EHP, 2013)
- *Land Management Plan: Long Forest Estate Conservation Reserve. Report prepared for Long Forest Estate Pty Ltd* (AECOM, 2014)
- *Ecological Assessment: Bacchus Marsh Development Project, Victoria* (EHP, 2018a).
- *Targeted Surveys for Golden Sun Moth Synemon plana and Striped Legless Lizard Delma impar: Bacchus Marsh Development Project, Bacchus Marsh, Victoria* (EHP, 2018b).
- *Ecological Assessment for Stage [state] Significant Values: Merrimu Precinct Structure Plan, Victoria* (EHP, 2019).
- *Ecological Values: Merrimu Precinct Structure Plan Areas 1-6, Victoria* (EHP, 2020).
- *Preliminary Tree Assessment for Victorian Planning Authority: Assessment of trees within the proposed Merrimu Precinct and Parwan Station Precinct, Parwan and Merrimu, Bacchus Marsh (*Homewood Consulting, 2022*)*

2.4 Likelihood of occurrence of threatened species

An assessment was undertaken of the likelihood of threatened and/or migratory species occurring within the study area. This included species:

- Listed as threatened under the EPBC Act
- Listed as migratory under the EPBC Act
- Listed as threatened in Victoria under the FFG Act (DELWP, 2022a)

This assessment was completed for species recorded on the VBA and/or predicted to occur by the PMST, within 5 km of the study area.

A number of species were eliminated from the VBA list and are not considered further in this report on the basis of:

- Records older than 30 years (pre-1991)
- Species listed under the FFG Act as 'Extinct'
- Some threatened flora species which are outside their natural range but are commonly used for landscaping and amenity plantings, including Spotted Gum (*Corymbia maculata*) and Giant Honey-myrtle (*Melaleuca armillaris*).

The likelihood of occurrence assessment was based on the number of VBA records, year of most recent VBA record, species ecology and the habitat values observed during the field assessment. The likelihood assessment is presented in Appendix A.

The following likelihood categories were used to rate each species' likelihood of occurrence:

- **Unlikely:** No preferred habitat in the study area. No recent records of the species within 5 km of the study area. Species unlikely to be present on the site at any time or during any season.
- **Possible:** Habitat is available in the study area which partially meets the requirements of the species. A recent record/s of the species within proximity to the study area. In the case of fauna, the species may infrequently visit for foraging but would not reside, roost or otherwise depend on habitats in the study area for their survival. Migratory and aerial foraging birds may overfly the site.

- **Likely:** Species has historically been recorded in the study area (or within very close proximity). The study area contains habitat that meets their habitat requirements and is likely to support a population of the species.
- **Present:** Species confirmed to be present within the study area during site assessment or has regularly been observed in recent times.

This process was used to short-list species that have the potential to be impacted by the proposed works and therefore, prioritise field survey effort. The desk-based assessment of likelihood of occurrence was updated following the field assessment.

The recent rediscovery of the Victorian Grassland Earless Dragon *Tympanocryptis pinguicolla* in Melbourne's western plains is addressed in section 3.7.2.

2.5 Field-based assessment

AECOM undertook site assessments on the 7th of October 2021, 14-18th and 23-24th November 2022 to assess the extent and quality of all native vegetation on-site, using the Habitat Hectare methodology. The assessments were conducted by DEECA-accredited native vegetation assessors. The presence of habitat for threatened fauna/flora/ecological communities, identified as having the potential to occur on site was noted during the site assessments.

Targeted surveys for Golden Sun Moth were conducted in December 2021, with the appropriate timing for surveys informed by the Golden Sun Moth flight updates released by the Ecological Consultants Association. Golden Sun Moth habitat mapping was completed on 15-16th November 2022. The survey for Golden Sun Moth followed that of DSE (2010).

Targeted flora surveys were undertaken in November 2022 targeting Fragrant Saltbush.

The approach for these surveys is outlined below

2.5.1 Native vegetation assessment (VQA)

Native vegetation within the study area was assessed according to the prescriptions of the Guidelines. Under the Guidelines, native vegetation is considered to be either a patch or scattered tree, where:

A patch is defined as:

> '*an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native", or "an area with three or more native canopy trees where the drip line of each tree touches the drop line of at least one other tree, forming a continuous canopy" or "any mapped wetland included in the Current wetlands map, available in DELWP systems and tools*' (DELWP 2017, pg. 6).

And a scattered tree is defined as:

> '*a native canopy tree that does not form part of a patch", where a native canopy tree is defined as "a mature tree that is greater than 3 metres in height and is normally found in the upper layer of the relevant vegetation type'* (DELWP 2017, pg. 6).

Native vegetation in Victoria is classified into types known as Ecological Vegetation Classes (EVC). Each EVC has been assigned a benchmark for assessing vegetation quality through a Vegetation Quality Assessment (VQA). The EVC benchmarks have been prepared for each of the Victorian bioregions. Bioregions are a landscape-scale approach to classifying the environment in Victoria.

Scattered trees can be classified as large or small so long as they consist of a canopy species for the relevant EVC. Large, scattered tree Diameter at Breast Height (DBH) is specified in the relevant EVC benchmark description. Small, scattered trees are those less than the EVC benchmark for a large tree but greater than 3 meters in height.

A VQA was undertaken using the Habitat Hectares method as described in the *Vegetation Quality Assessment Manual – guidelines for applying the habitat hectare scoring method* (DSE, 2004) for all patches of native vegetation. Individual patches are termed Habitat Zones (HZ) in accordance with DEECA terminology. Scattered trees were assessed using the criteria outlined in the Guidelines (DELWP, 2017).

2.5.2 Targeted survey

2.5.2.1 Flora

Targeted flora surveys for the FFG Act-listed Fragrant Saltbush *Rhagodia parabolica* were completed on 17-18 and 23-24 November, 2022. Surveys were completed by teams of two AECOM ecologists. Survey teams included at least one assessor accredited by DEECA to conduct Vegetation Quality Assessments and experienced in conducting targeted flora surveys.

Surveys were conducted by walking transects approximately 15 m apart and systematically searching either side of the transect for the target flora species. Individual plants were mapped using the Esri Field Maps program loaded onto hand-held units such as a Samsung tablet and mobile phones. Devices were paired with GPS receivers which provide point accuracy generally <2-3 metres.

Flora surveys were conducted in accordance with the conditions of *Flora and Fauna Guarantee Act 1988* Permit to Take Protected Flora (Permit no. 10010464).

2.5.2.2 Golden Sun Moth

Targeted survey

Targeted surveys for the EPBC Act-listed Golden Sun Moth were completed on three separate days between the 1st of December and the 30th December, 2021. Results for the Golden Sun Moth study are described in Section 3.7.2.3.

Targeted surveys for Golden Sun Moth followed the species-specific procedures outlined in the *Significant impact guidelines for the critically endangered golden sun moth (Synemon plana*) (DEWHA, 2009). This included:

- All Golden Sun Moth surveys were undertaken by qualified and experienced ecologists within all habitats deemed to be suitable for the species. All ecologists utilised for the fauna survey had extensive experience in the designing and undertaking surveys for the species..
- Surveys were carried out in areas of suitable habitat (including areas dominated by Chilean Needle-grass *Nassella neesiana*) and irrespective of past / current land management practices.
- Survey continued until either a population (defined as five or more moths) was detected or until four surveys, spaced at least 1 week apart were completed, at which point a population of the species is determined to be absent. Surveys commenced only when the flight season in Melbourne was confirmed. This peak flight period is generally considered to occur from late October or early November through to late December subject to appropriate weather conditions. AECOM typically visited known reference sites on suitable survey days to determine if moths were active or relied upon information from the Ecological Consultants Association of Victoria Golden Sun Moth Flight Diary. On all surveys days however, moths were observed flying within the subject site, removing the need for reference site verification (and the requirement to complete four surveys).
- Surveys at the site were undertaken under the following conditions only:
    - Warm to hot days, (generally above 20°C by 10.00am).
    - Days of clear or mostly cloudless sky.
    - Days or days of relatively calm wind conditions
    - Between 10:00am and 3:00pm; however, if males were still observed flying after 3.00pm at the reference site, surveys continued until males were no longer observed actively flying.
- AECOM used the prescribed transect approach (50m, 25m and 10m) to survey for the species.

The Bureau of Meteorology website www.bom.gov.au was used as a guide to identify suitable survey conditions.

Habitat Mapping

Golden Sun Moth habitat mapping was undertaken across the site on 15-16th November, 2022. Habitat mapping was based on the habitat description contained within the most recent conservation advice updates provided in *Conservation Advice for Synemon plana (Golden Sun Moth)* (DAWE, 2021).

Golden Sun Moth occurs in areas containing, or that once contained, native grassland, open grassy woodlands and secondary grasslands (grassy woodlands without overstorey tree cover) where they retain a component of larval food species. Golden Sun Moth larvae are underground feeders which are found in silk-lined burrows that are closely associated with the roots that they feed upon (DAWE, 2021).

Understanding of larval food species for Golden Sun Moth has expanded over the years since the species was listed under the EPBC Act. Initially Golden Sun Moth were thought to be restricted to Wallaby grasses (*Rytidosperma* spp.) and Spear-grasses (*Austrostipa* spp.) and it was suggested that a cover of 40% or higher cover of Wallaby grass was required to support the species. More recently, Golden Sun Moth have been found in locations with less than 10% cover of Wallaby grass and there is now strong evidence that the species also feeds on exotic Chilean Needle-grass which is a distant relative of native Spear-grasses and, even more recently, Serrated Tussock (*Nassella trichotoma*) (DAWE, 2021).

Golden Sun Moth habitat mapping was undertaken based on the following criteria:

- Suitable habitat represented by patches of Plains Grassland EVC (Wallaby grasses and Spear grasses) and areas dominated by other suitable food plants, namely Chilean Needle-grass and Serrated Tussock.
- Sub-optimal habitat represented by
    - patches of Sifton Bush (*Cassinia sifton*) with an understorey dominated by food plants (native and exotic) due to the density of shrubs likely to inhibit the flight of patrolling males.
    - Areas dominated by artichoke thistle or boxthorn but with visible grassy interspaces supporting food plants
- Marginal to unsuitable habitat represented by
    - patches of Sifton Bush that were dense and lacking an understorey of food plants,
    - areas dominated by artichoke thistle or boxthorn with limited to no grassy interspaces
    - stockpiles and areas subject to disturbance (pipelines, tracks)

2.6 Assumptions and limitations

The findings of this report are subject to the following assumptions and limitations:

- Mapping was conducted using hand-held units i.e. iPhone SE and aerial photo interpretation. The accuracy of the mapping is subject to the accuracy of the unit and access to satellite information (generally < 6 metres). As such, these points should not be relied on for detailed design purposes.
- This assessment includes terrestrial vascular plant species (ferns, conifers and flowering plants) and terrestrial vertebrate fauna (mammals, birds, reptiles, and frogs). Non-vascular flora (e.g. mosses, liverworts, lichens), fungi and terrestrial invertebrates have not been considered as part of this assessment, except where listed threatened species are known or suspected to occur, or where bryophytes comprise part of an EVC benchmark.
- The spatial analysis of biodiversity attributes is complex and has significant limitations when it is driven by historical record data such as the VBA. The timing of surveys and incidental observations may not correspond with ideal sampling periods; some species have naturally low detectability rates; Not all locations of records in the VBA are precise, with the actual accuracy of a record can range from +/- 1 m to +/- 500 m; and the validity of records accepted by the VBA was not assessed.

- The advice relating to biodiversity legislation and policy does not constitute legal advice. This technical study has been undertaken to identify the ecological features present with the study area. The advice given in relation to legislative implications is general in nature and based on AECOM's understanding of the proposed works at the time of field assessments.
- Individual FFG Act 'protected flora' species and non-native plants were not mapped as part of this assessment but rather have been recorded as part of VQA assessments for each habitat zone. The exception to this are Scattered Trees and Large Trees in Patches, listed as 'protected' which are required to be mapped in accordance with the Guidelines.

3.0 Results

3.1 Site history

Merrimu is historically a farming area dominated by agricultural land uses. Whilst still remaining predominantly agricultural, the subdivision of farmland for the purposes of residential housing is becoming more prevalent as Melbourne's population increases and the Urban Growth Area expands.

Long Forest Estate was purchased in 2012 with an expired planning permit to subdivide the land into 84 residential lots (minimum lots size of 7,500m^2). Infrastructure including gas, water and wastewater was installed before the project ceased and the land was sold to the current landowner. Since 2012, various landowners have been in consultation with Moorabool Shire Council about subdividing the land. A referral under the EPBC Act was submitted in 2014 (EPBC 2014/7251) to develop the site, and the referral was supported by an existing conditions site assessment by EHP (2013). The proposed development was determined to be a controlled action to be assessed under preliminary documentation. The proposal was withdrawn in 2019.

The ecological assessment of the Long Forest Estate property completed by EHP in 2012 was also used to inform a new Planning Permit application for subdivision of the study area (which was rejected and withdrawn).

In 2018, the Victorian Planning Authority and Moorabool Shire Council prepared the *Bacchus Marsh Urban Growth Framework*, which was approved by the Minister for Planning in November 2018. The framework provides for the expected doubling of the Bacchus Marsh population by 2041, and identifies Merrimu (and the study area) as a residential growth precinct. EHP subsequently completed an ecological assessment of several parcels located within the Merrimu Precinct Structure Plan (PSP) area for Bacchus Marsh Developments in collaboration with the Victorian Planning Authority (VPA). The Merrimu PSP is an area identified for future urban development as part of the expansion of Bacchus Marsh under the Bacchus Marsh Urban Growth Framework.

Ecology and Heritage Partners assessed the Long Forest Estate property again in 2019 as part of the Bacchus Marsh Eastern Link Project investigation for Regional Roads Victoria (EHP, 2021).

The Victorian Planning Authority released an existing conditions report for the Merrimu PSP in 2021 (EHP, 2021) which draws on information on ecological values obtained during the 2012 assessments of the Long Forest Estate portion of the PSP. It is VPAs expectation that the more recent (2022) ecological assessment of the Long Forest Estate property will inform the final existing conditions report for the Merrimu PSP and that the updated results will be considered in the future precinct planning.

Since being in its current ownership, the landowner has grazed the site with cattle in low numbers to address fire risk. Some weed control works were also prioritised from 2016 onwards to address weed control and spread as required by landowners under the *Catchment and Land Protection Act 1994* (CaLP Act).

3.2 Previous ecological assessments

A review of previous studies completed by EHP (2012; 2013, 2018a, 2018b, 2019, 2020 and 2021) and AECOM (2014) was conducted and findings of each study are summarised in this section.

It should be noted that EHP (2021) consolidates all relevant biodiversity information from land parcels surveyed as part of the Merrimu PSP. The report consolidates ground-truthed data as well as modelled data for land parcels unable to be accessed for survey.

It is also acknowledged that the property has been subject of other investigations prior to 2012 as part of the Bences Road Local Structure Plan. However, as the more recent studies by EHP and AECOM supersede those findings, the reports have not been obtained or reviewed.

EHP also assessed Long Forest Estate in November and December 2019 as part of the BMEL investigations (EHP, 2020) however a copy of the report is not publicly available and has not been reviewed. It is assumed the findings of the EHP (2012) assessment informed the most recent 2021 existing conditions assessment for the Merrimu PSP area.

3.2.1 EHP (2012) Flora and Fauna Assessment, and Net Gain Analysis at Long Forest Estate, Merrimu, Victoria

EHP (2012) undertook an assessment of the study area to identify flora and fauna values, determine potential impacts and mitigation measures, and conduct a Net Gain analysis. Field assessment was undertaken on foot between September and October 2012 which identified habitat values, incidental observations of flora and fauna species and habitat hectare assessment.

A total of 103 flora species, including one state significant species Fragrant Saltbush were recorded during the assessment. Two EVCs were identified, *Low-rainfall* Plains Grassland (EVC 132_63) and Rocky Chenopod Woodland (EVC 64). One EPBC Act-listed threatened ecological community, the *Natural Temperate Grasslands of the Victorian Volcanic Plains* (NTGVVP) (Critically Endangered), and two FFG Act-listed threatened ecological communities, *Rocky Chenopod Open Scrub Community* and *Western (Basalt) Plains Grassland Community* were also identified. The study area was found to contain 85.97 ha of native vegetation.

Thirty-two fauna species were recorded within the study area, none of which were listed under the EPBC Act or FFG Act. The study area was found to support four broad habitat types: 1) native grassland; 2) the interface of the rocky chenopod woodland adjacent to the study area and the grassland within the study area; 3) weedy 'islands' created through previous stockpiling of soil and rock; and 4) a low-lying drainage line, dominated by woody weeds.

3.2.2 EHP (2013) Targeted Flora and Fauna Surveys at Long Forest Estate, Merrimu, Victoria

EHP (2013) undertook targeted flora and fauna surveys for the Long Forest Estate generally between October and December 2012. The survey for Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* was undertaken between April and August 2013, however this report is not publicly available. The purpose of the targeted surveys were to determine presence/absence of all assessed species.

Targeted survey was undertaken for the following flora species:

- EPBC Act-listed species
  - Large-headed Fireweed *Senecio macrocarpus*
  - Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*
  - Maroon Leek-orchid *Prasophyllum frenchii*
  - Small Golden Moths *Diuris basaltica*
  - Clover Glycine *Glycine latrobeana*
- State-listed species
  - Arching Flax-lily *Dianella* sp. aff. *Longifolia* (Benambra)
  - Small Scurf-pea *Cullen parvum*
  - Tough Scurf-pea *Cullen tenax*
  - Rye Beetle Grass *Tripogon loliiformis*
  - Austral Cranesbill *Geranium solanderi* var. *solanderi s.s.*

Targeted flora surveys for all species involved assessors walking transects in 5 m grid intervals over the entire study area.

Targeted survey was undertaken for the following fauna species:

- EPBC Act-listed species
  - Striped Legless Lizard *Delma impar*
  - Golden Sun Moth *Synemon plana*
- State-listed species
  - Common Dunnart *Sminthopsis murina murina*
  - Fat-tailed Dunnart *Sminthopsis crassicaudata*

Targeted Golden Sun Moth surveys were undertaken on two occasions in December 2012 on foot and by vehicle under ideal survey conditions. Two surveys were conducted instead of the standard four because all objectives of the targeted surveys for this species were met by the conclusion of the second survey.

For the remaining fauna species, ten tile grids were set up in the study area in August 2012. Each grid contained 50 terracotta roof tiles, 5 m apart, arranged as a 10 x 5 grid. Eight checks were undertaken between October and December 2012.

No other species targeted during surveys were identified within the study area. Spiny Rice-flower targeted survey were not included in this report and no further information could be found relating to results of that survey; however, a check of the VBA and Atlas of Living Australia did not identify any records within the study area.

Five hundred and fifty-one Golden Sun Moth were recorded during targeted survey throughout the study area in comparable densities. No Striped Legless Lizards, Common or Fat-tailed Dunnarts were detected during targeted survey.

3.2.3 AECOM (2014) Land Management Plan: Long Forest Estate Conservation Reserve

AECOM (2014) developed the Land Management Plan (LMP) to provide high level strategic management direction of a proposed conservation reserve (64 ha) for the study area. The purpose of the LMP was to inform potential land purchasers and provide information on both the values within the reserve and their associated management requirements. The conservation reserve was originally designated in order to fulfill the offset obligations of the proposed development across the remainder of the site.

Documented important ecological values for the study area included:

- A population of Golden Sun Moth
- Two flora species of state significance, Fragrant Saltbush (VROT rare) and Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis* (formerly VROT 'poorly known')
- One threatened ecological community, NTGVVP, which occupied 45.5 ha of approximately 52.29 ha of mapped *Low-rainfall* Plains Grassland (EVC 132_63).

A number of CaLP Act noxious weeds were identified within the study area including:

- African Boxthorn *Lycium ferocissimum*
- Blackberry *Rubus fruticosus* spp*. agg.*
- Bridal Creeper *Asparagus asparagoides*
- Chilean Needle-grass *Nassella neesiana*
- Horehound *Marrubium vulgare*
- Prickly Pear *Opuntia* spp.
- Serrated Tussock *Nassella trichotoma*
- Soursob *Oxalis pes-caprae*
- Spear Thistle *Cirsium vulgare*
- Prairie Ground-cherry *Physalis viscosa*
- Sweet Briar *Rosa rubiginosa*

Pest animals identified on site included:

- Red Fox *Vulpes vulpes*
- European Rabbit *Oryctolagus cuniculus*
- Cat *Felis catus*
- European Hare *Lepus europaeus*
- Common Myna *Acridotheres tristis*

3.2.4 EHP (2018a) Ecological Assessment: Bacchus Marsh Development Project, Victoria

EHP (2018a) undertook a detailed ecological assessment of 16 properties within the proposed Bacchus Marsh Development Project, Victoria. Field assessments were undertaken from August-December 2017 to assess and map native vegetation followed by a targeted flora survey for Spiny Rice-flower in July 2018.

Four EVCs were recorded across the study area including *Low-rainfall* Plains Grassland (EVC 132_63), Grassy Woodland (EVC 175), Rocky Chenopod Woodland (EVC 64) and Plains Grassy Wetland (EVC 125). Plains Grassland was the most abundant EVC recorded. Areas of Plains Grassland mapped that were considered higher quality were recorded as the nationally-significant NTGVVP.

Spiny Rice-flower was the only EPBC Act species recorded within the study area – a total of 201 individual plants were recorded within property 11 which lies directly west of Flanagans Drive and the study area. Two FFG Act-listed species were also recorded during surveys including Fragrant Saltbush and Bacchus Marsh Wattle *Acacia rostriformis.* Two species formerly listed as VROTS including Black Roly-poly *Sclerolaena muricata* var. *muricata* and Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis* were also recorded.. Based on previous records EHP (2018a) also concluded that suitable habitat existed for Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata*, Small Scurf-pea *Cullen parvum*, Arching Flax-lily *Dianella sp. aff. longifolia* (Benambra), and Austral tobacco *Nicotiana suaveolens*.

Following surveys, EHP identified properties 11 and 16 to be of high ecological significance due to presence of remnant vegetation (and endangered EVCs), presence of the NTGVVP ecological community, presence of the nationally significant Spiny Rice-flower, presence of two FFG Act-listed communities and habitat for the Golden Sun Moth.

3.2.5 EHP (2018b) Targeted Surveys for Golden Sun Moth *Synemon plana* and Striped Legless Lizard *Delma impar*: Bacchus Marsh Development Project, Bacchus Marsh, Victoria

EHP (2018b) undertook targeted surveys for State and Commonwealth-listed species including Golden Sun Moth and Striped Legless Lizard within 16 properties (approximately 430 ha) identified for the proposed Bacchus Marsh Development Project, Victoria. Targeted surveys for Golden Sun Moth were undertaken over four days from 30 November – 3 January 2018. Targeted surveys for Striped Legless Lizard were completed in spring (September – November) 2017. Surveys were undertaken to establish the presence of threatened fauna species and implications under Commonwealth legislation.

A significant number of GSM were recorded during targeted surveys across the study area during the four surveys completed – this included >200 GSM recorded across all properties on the first survey in Nov. As the initial survey recorded high numbers within some properties, these properties (properties 1,3,13,16 were omitted from the survey program and inly properties 2,5,6-13 and 15 were surveyed thereafter. Surveys were only conducted in appropriate habitat (areas not subject to cropping or dominated by the species non-preferred food plants). In total, 58.725 ha on confirmed GSM habitat was recorded across the study area; ~42 ha was located in properties 1-15 and ~17 ha was recorded within property 16.

Seventeen tile grids were placed in areas representative of the best quality habitat and surveys were completed at an appropriate time of year (September-November, 2017). No Striped Legless Lizard were recorded during the survey program. EHP (2108) concluded that a population of Striped Legless Lizards are considered unlikely to be present in the study area, or if present, are in only very low numbers.

3.2.6 EHP (2019) Ecological Assessment for Stage Significant Values: Merrimu Precinct Structure Plan, Victoria

EHP (2019) is a subset of an earlier report prepared by EHP (EHP, 2018a) and focussed on state-significant values recorded within Bacchus Marsh Developments landholdings (17 properties). Results provided are refined to State-significant values only.

As above from studies completed by EHP in 2018, the ecological values present across 17 properties include:

- Native vegetation: four EVCs including *Low-rainfall* Plains Grassland (EVC 132_63), Grassy Woodland (EVC 175), Rocky Chenopod Woodland (EVC 64) and Plains Grassy Wetland (EVC 125), one DEECA wetland and scattered trees
- Threatened Ecological Communities: presence of Western (Basalt) Plains Grassland Community and Rocky Chenopod Open Scrub Community
- Flora: Spiny Rice-flower, Fragrant Saltbush, Black Roly-poly, Slender Bindweed, Melbourne Yellow-gum and Bacchus Marsh Wattle. To note, Black Roly-poly and Slender Bindweed were formerly 'poorly know' VROTS but aren't currently listed under the FFG Act Threatened List (DELWP, 2022a)
- Fauna: confirmed Golden Sun Moth habitat. Potential habitat for Speckled Warbler, Barking Owl and Crested Bellbird as well as Fat-tailed Dunnart and Spotted Harrier

3.2.7 EHP (2020) Ecological Values: Merrimu Precinct Structure Plan Areas 1-6, Victoria

EHP (2020) completed an assessment of several parcels located within the Merrimu PSP area. Assessments completed include detailed desktop assessments, native vegetation assessment and mapping and habitat assessments. Due to land access constraints some parcels were unable to be surveyed and ecological assessment was based upon information obtained through the desktop assessment. Baseline data was used to inform strategic land-use decisions as part of the Merrimu PSP and Native Vegetation Precinct Plan preparation.

A single field assessment was undertaken on 31 January 2020 to obtain baseline terrestrial flora and fauna values within the study area. Ecological values recorded include:

- Patches of Plains Grassland ranging from isolated patches to larger diverse patches qualifying as NTGVVP and the FFG Act-listed Western (Basalt) Plains Grassland community.
- No EPBC Act or FFG Act-listed flora or fauna were recorded. Due to past historical records immediately adjacent to the study area, targeted surveys were recommended for Spiny Rice-flower and Golden Sun Moth.

3.2.8 EHP (2021) Existing Ecological Conditions: Merrimu Precinct Structure Plan, Victoria

The EHP (2021) report consolidates the results of desktop and detailed field assessments (i.e. baseline ecological studies) for properties included in previous assessments for the Merrimu PSP. Ecological values recorded include:

- Native vegetation: four EVCs including *Low-rainfall* Plains Grassland (EVC 132_63), Grassy Woodland (EVC 175), Rocky Chenopod Woodland (EVC 64) and Plains Grassy Wetland (EVC 125), one DEECA Wetland, Scattered Trees and Large Trees in Patches. Modelled native vegetation within properties not surveyed includes Grassy Woodland, Red Gum Swamp (EVC 292), Low rainfall Plains Grassland and Rocky Chenopod Woodland.
- Ecological communities:
  - 91.895 ha of the EPBC Act-listed NTGVVP ecological community
  - 90.065 ha of the FFG Act-listed Western (Basalt) Plains Grassland ecological community
  - 34,517 ha of the FFG Act-listed Rocky Chenopod Open Scrub community (contiguous with Long Forest NCR)
- Flora: Spiny Rice-flower, Fragrant Saltbush, Black Roly-poly, Slender Bindweed, Melbourne Yellow-gum and Bacchus Marsh Wattle, as well as 15 species 'protected' under the FFG Act. Based on habitat condition and the proximity of previous records habitat is also considered suitable for Buloke *Allocasuarina luehmannii*, Buloke Mistletoe *Amyema linophylla* subsp. *orientalis*, Plains Joyweed *Alternanthera* sp. 1 (Plains), Small Scurf-pea *Cullen parvum*, Cane Spear-grass *Austrostipa breviglumis*, Heath Spear-grass *Austrostipa exilis*, Tough Scurf-pea *Cullen tenax* and Austral Tobacco.

- Fauna: Presence of Golden Sun Moth. Despite surveys being undertaken for Striped Legless Lizard, no individuals were recorded and based on lack of records within the project locality, a population is considered highly unlikely to be present. Similarly, no Growling Grass Frog were detected.

3.3 Database searches

3.3.1 Protected Matters Search Tool results

The Protected Matters Search Tool (PMST) identified a number of Matters of National Environmental Significance (MNES) that may occur, or for which suitable habitat may occur within the study area.

Results of the PMST search as requested on 28 October 2021 are summarised in table 1 below.

Table 1 Summary of PMST results

MNES	Number of occurrences
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Significance (Ramsar Sites)	One wetland of international significance • Port Phillip Bay (western shoreline) and Bellarine Peninsula
Listed threatened species and ecological communities	Five threatened ecological communities • 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 • 31 listed threatened species made up of - 19 fauna species - 12 flora species
Migratory Species	13 migratory species
Commonwealth Marine Areas	None

The full PMST results are provided in Appendix B. A list of the threatened and migratory species identified by the PMST is provided in Appendix A, along with their conservation status, likelihood of occurrence, habitat descriptions, and information on any records within close proximity to the study area.

3.3.2 Victorian Biodiversity Atlas

The following section provides the results of the Victorian Biodiversity Atlas (VBA) extract for species considered to have a possible or high likelihood of occurrence within the study area following the initial AECOM field assessment in 2021. Species recorded from previous ecological assessment are bold. For the location of threatened species records refer to Figure 2 (Fauna) and Figure 3 (Flora). For the full list of flora and fauna species recorded within 5 km of the study area and the likelihood of occurrence assessment, please see Appendix A.

Fauna

Twenty-two threatened and/or EPBC Act-listed 'migratory' fauna species have been recently recorded within 5 km of the study area, including five threatened EPBC Act-listed species (Table 2).

Table 2 EPBC and /or FFG Act listed fauna species recorded within 5 km of the study area with a possible or high likelihood of occurrence

Scientific Name	Common Name	Conservation Status		Record (Year, #)
		EPBC Act	FFG Act	
Birds				
Accipiter novaehollandiae	Grey Goshawk		Endangered	(2019, 1)
Anseranas semipalmata	Magpie Goose		Vulnerable	(2019, 1)
Aythya australis	Hardhead		Vulnerable	(2015, 11)
Biziura lobata	Musk Duck		Vulnerable	(2019, 17)
Falco subniger	Black Falcon		Critically Endangered	(2019, 9)
Haliaeetus leucogaster	White-bellied Sea-Eagle		Endangered	(2018, 9)
Hieraaetus morphnoides	Little Eagle		Vulnerable	(2016, 41)
Hirundapus caudacutus	White-throated Needletail	Vu, Mi	Vulnerable	(2016, 10)
Hydroprogne caspia	Caspian Tern	Mi	Vulnerable	(2013, 3)
Lathamus discolor	Swift Parrot	CR	Critically Endangered	(2007, 7)
Ninox connivens	Barking Owl		Critically Endangered	(2002, 21)
Ninox strenua	Powerful Owl		Vulnerable	(2011, 4)
Oreoica gutturalis	Crested Bellbird		Endangered	(2003, 18)
Oxyura australis	Blue-billed Duck		Vulnerable	(2018, 3)
Pyrrholaemus sagittatus	Speckled Warbler		Endangered	(2019, 125)
Spatula rhynchotis	Australasian Shoveler		Vulnerable	(2006, 5)
Stagonopleura guttata	Diamond Firetail		Vulnerable	(2018, 72)
Stictonetta naevosa	Freckled Duck		Endangered	(2006, 2)
Mammals				
Ornithorhynchus anatinus	Platypus		Vulnerable	(2018, 4)
Pteropus poliocephalus	Grey-headed Flying-fox	VU	Vulnerable	(2020, 3)
Amphibians				
Litoria raniformis	Growling Grass Frog	VU	Vulnerable	(2018, 13)
Invertebrates				
Synemon plana	**Golden Sun Moth**	**CR**	**Vulnerable**	**(2012, 331)**

Note to table: **Bold** denotes species recorded in the study area.

Flora

Twenty-four threatened flora species have been recently recorded within 5 km of the study area, including two threatened EPBC Act-listed species (Table 3).

Table 3 EPBC and /or FFG Act listed flora species recently recorded within 5 km of the study area with a possible or high likelihood of occurrence

Scientific Name	Common Name	Conservation Status		Record (Year, #)
		EPBC Act	FFG Act	
Acacia aspera subsp. *parviceps*	Rough Wattle		Endangered	(2009, 1)
Acacia rostriformis	**Bacchus Marsh Wattle**		**Vulnerable**	**(2021, 142)**
Allocasuarina luehmannii	**Buloke**		**Vulnerable**	**(2021, 12)**
Austrostipa breviglumis	Cane Spear-grass		Endangered	(2018, 18)
Austrostipa exilis	Heath Spear-grass		Vulnerable	(2009, 17)
Calotis lappulacea	Yellow Burr-daisy		Vulnerable	(2009, 1)
Cullen tenax	Tough Scurf-pea		Endangered	(2009, 1)
Dianella longifolia var. *grandis*	Flax-lily		Critically Endangered	(2016, 6)
Eucalyptus baueriana subsp. *thalassina*	Werribee Blue-box		Endangered	(2018, 310)
Eucalyptus leucoxylon subsp. *connata*	Melbourne Yellow-gum		Endangered	(2018, 53)
Glycine latrobeana	Clover Glycine	VU	Vulnerable	(2020, 1)
Goodia medicaginea	Western Golden-tip		Endangered	(2008, 4)
Nicotiana suaveolens	Austral Tobacco		Endangered	(2011, 25)
Olearia minor	Satin Daisy-bush		Endangered	(2009, 1)
Pimelea hewardiana	Forked Rice-flower		Endangered	(2018, 16)
Pimelea spinescens* subsp. *spinescens	**Spiny Rice-flower**	**CR**	**Critically Endangered**	**(2003, 5)**
Podolepis linearifolia	Basalt Podolepis		Endangered	(2020, 2)
Prostanthera nivea var. *nivea*	Snowy Mint-bush		Vulnerable	(2011, 5)
Pterostylis conferta	Leprechaun Greenhood		Critically Endangered	(1996, 2)
Pterostylis truncata	Brittle Greenhood		Critically Endangered	(2013, 56)
Rhagodia parabolica	**Fragrant Saltbush**		**Vulnerable**	**(2018, 500)**

Scientific Name	Common Name	Conservation Status		Record (Year, #)
		EPBC Act	FFG Act	
Roepera billardierei	Coast Twin-leaf		Endangered	(2008, 2)
#Scleroleana muricata var. muricata	**Black Roly-poly**		**NA**	**NA**
Senecio cunninghamii var. *cunninghamii*	Branching Groundsel		Endangered	(1994, 3)
Tripogonella loliiformis	Rye Beetle-grass		Endangered	(2008, 3)

Note to table: **Bold** denotes species recorded in the study area.

# denotes species formerly listed as VROTs and recorded by EHP during previous surveys but not shown on the VBA. These species are not currently listed under the FFG Act Threatened List (DELWP, 2022a).

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LEGEND

- Study Area
- VBA Fauna Records
- Watercourses
- Waterbodies
- Mapped Wetlands

Bioregions

- Central Victorian Uplands
- Victorian Volcanic Plain

VBA FAUNA RECORDS WITHIN 5 KM OF THE STUDY AREA

ResCom Group

Ecological Assessment of Flanagan's Road, Merrimu

Flanagan's Road, Merrimu, VIC

Figure F2

Map Document: (\\aumel1fp003.au.aecomnet.com\groups\ENV\Admin\PubMEL\Team_NR\6. NR Project Delivery\Vic Projects\ResCom\Flanagnans drive Merrimu\GIS\02_Maps\2021\11\F2_Merrimu_VBA_Fauna.mxd)

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LEGEND

- Study Area
- VBA Flora Records
- Watercourses
- Waterbodies
- Mapped Wetlands

Bioregions

- Central Victorian Uplands
- Victorian Volcanic Plain

VBA FLORA RECORDS WITHIN 5 KM OF THE STUDY AREA

ResCom Group *Ecological Assessment of Flanagan's Road, Merrimu* Flanagan's Road, Merrimu, VIC	**Figure** **F3**

Map Document: (\\aumel1fp003.au.aecomnet.com\groups\ENV\Admin\PubMEL\Team_NR\6. NR Project Delivery\Vic Projects\ResCom\Flanagnans drive Merrimu\GIS\02_Maps\2021\11\F3_Merrimu_VBA_Flora.mxd)

3.3.3 NatureKit / MapshareVic

3.3.3.1 Bioregion

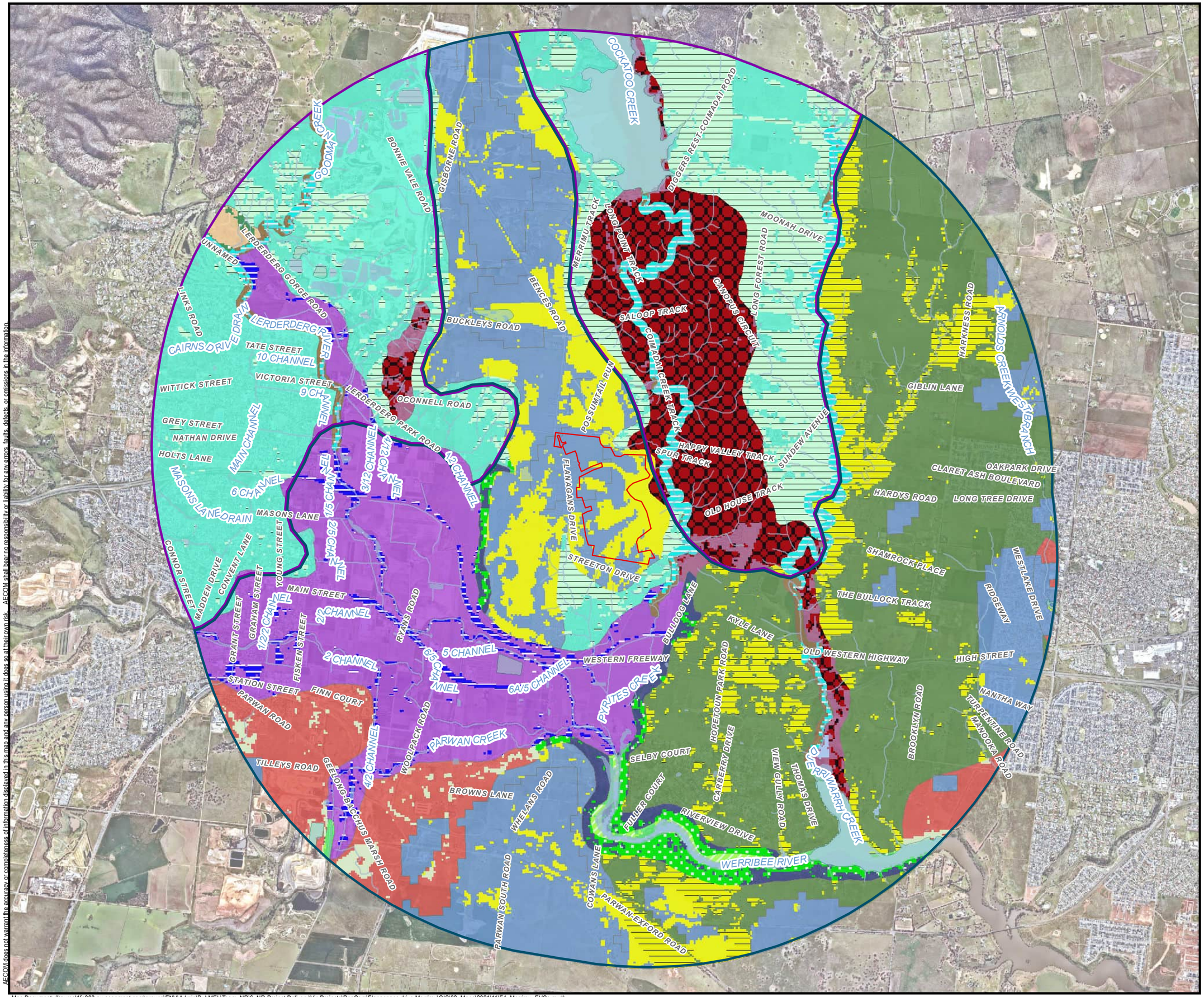
The study area and 5 km buffer, falls within the Central Victorian Uplands and Victorian Volcanic Plain bioregion.

3.3.3.2 Ecological Vegetation Classes (EVCs)

Based on DEECA EVC modelling, there is potential for 12 EVCs to occur within 5 km of the study area (Table 4). These EVCs and their Biodiversity Conservation Status (BCS) in the Central Victorian Uplands and Victorian Volcanic Plain Bioregion are listed in Table 4 and are mapped in Figure 4.

Table 4 EVC mapping within 5 km of study area derived from NatureKit

EVC No.	EVC Name	Central Victorian Uplands BCS	Victorian Volcanic Plains BCS
47	Valley Grassy Forest	Vulnerable	-
55	Plains Grassy Woodland	-	Endangered
64	Rocky Chenopod Woodland	Vulnerable	Vulnerable
68	Creekline Grassy Woodland	-	Vulnerable
125	Plains Grassy Woodland	-	Endangered
132	Plains Grassland	Endangered	Endangered
175	Grassy Woodland	Endangered	Endangered
292	Red Gum Swamp	Endangered	Endangered
693	Plains Woodland/Plains Grassland Mosaic	Endangered	Endangered
851	Stream Bank Shrubland	-	Endangered
895	Escarpment Shrubland	-	Endangered
998	Water Body – man-made	N/A	N/A



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LEGEND

- Study Area
- Watercourses
- Waterbodies
- Mapped Wetlands

Bioregions

- Central Victorian Uplands
- Victorian Volcanic Plain

2005 Ecological Vegetation Classes

- 125 Plains Grassy Wetland
- 132 Plains Grassland
- 175 Grassy Woodland
- 292 Red Gum Swamp
- 47 Valley Grassy Forest
- 55 Plains Grassy Woodland
- 64 Rocky Chenopod Woodland
- 68 Creekline Grassy Woodland
- 693 Plains Woodland/Plains Grassland Mosaic
- 851 Stream Bank Shrubland
- 895 Escarpment Shrubland
- 998 Water Body - man-made

Pre-1750 Ecological Vegetation Classes

- Creekline Grassy Woodland
- Escarpment Shrubland
- Grassy Woodland
- Plains Grassland
- Plains Grassy Wetland
- Plains Grassy Woodland
- Plains Woodland/Plains Grassland Mosaic
- Red Gum Swamp
- Rocky Chenopod Woodland
- Stream Bank Shrubland
- Valley Grassy Forest

EVCS WITHIN 5 KM OF THE STUDY AREA

ResCom Group

Ecological Assessment of Flanagan's Road, Merrimu

Flanagan's Road, Merrimu, VIC

Figure F4

Map Document: (\\aumel1fp003.au.aecomnet.com\groups\ENV\Admin\PubMEL\Team_NR\6. NR Project Delivery\Vic Projects\ResCom\Flanagnans drive Merrimu\GIS\02_Maps\2021\11\F4_Merrimu_EVCs.mxd)

3.3.3.3 Current Mapped Wetlands

Mapped wetlands are identified in the DEECA's Current Wetlands Map in MapShare Vic and are included in Location 2 of the Location risk map in NVIM. The Current Wetlands Map is used to identify wetlands which can be difficult to identify onsite detect onsite due to their dynamic nature. The map has been generated by DEECA using a combination of aerial photo interpretation and field validation. Areas mapped as wetlands on NVIM need to be considered in efforts to avoid and minimise impacts on biodiversity.

Under the Guidelines (DELWP, 2017a), mapped wetlands are regarded as a patch of native vegetation when mapping native vegetation to be removed or offset (DELWP, 2018a). These wetlands are not assigned an EVC in MapShare. Presence of mapped wetlands within 5 km of the study area was assessed during the desktop assessment (Table 5). No wetlands from the Current Wetlands Map were identified within the study area and no wetlands were identified during the site assessment.

Table 5 DEECA Mapped Wetlands identified within 5km of the study area

Wetland ID	Area	Wetland ID	Area
Wetland #70133	1.95 ha	Wetland #72560	0.04 ha
Wetland #70114	4.13 ha	Wetland #72759	1.09 ha
Wetland #70115-– Bacchus Marsh Sewage Farm	5.97	Wetland #70119– Lake Merrimu	230.33 ha
Wetland #70132	1.88 ha	Wetland #70520 – Melton Reservoir	177.49 ha
Wetland #70121	5.32 ha	Wetland #72561	0.04 ha
Wetland #72559	0.04 ha	Wetland #72562	0.02 ha

3.3.4 VicPlan – environmental planning overlays

There are two relevant overlays applicable to the study area (Figure 5):

- Bushfire Management Overlay (BMO)
- Environmental Significance Overlay (ESO3)

3.4 Site assessment

Exotic grassland was prevalent throughout the site dominated by exotic species such as Chilean Needle-grass, Artichoke Thistle *Cynara cardunculus* subsp. *flavescens*, Carpet Weed *Galenia pubescens*, Wild Oats *Avena fatua* Great Brome *Bromus diandrus*, African Boxthorn *Lycium ferocissimum*, Serrated Tussock *Nassella trichotoma*, Cape Weed *Arctotheca calendula* amongst others. Several areas of the site also showed evidence of ground disturbance, which typically resulted in a high cover of weeds (Plate 1 and Plate 5)

Sifton Bush *Cassinia sifton* has become abundant in parts of the study area likely due to a lack of management and fire (Plate 2). Although a native species, expert advice on the origin and status of the species in Victoria has been considered by DEECA in 2022 (DELWP, 2022b). and Sifton Bush has been refined under the Victorian Biodiversity Atlas (VBA) as 'native but some stands may be alien'. As Sifton Bush would be considered a native environmental weed with the ability to displace other lifeforms, areas dominated by this species have been excised from native vegetation mapping. Further, Sifton Bush is not a lifeform in the relevant EVC benchmark (Plains Grassland) and so areas dominated by these species are not considered a patch of native vegetation due to the complete lack of other indigenous species. Whilst a permit is still required to remove the species because it is native to Victoria, it is not assessed through a Vegetation quality Assessment unless the site is within natural range of the species which is defined by DELWP (2022b) as Goldfields, Central Victorian Uplands, Northern Inland Slopes and Victorian Riverina bioregions.

Since the last site assessment in 2012, native vegetation values across the study area have decreased in both cover and quality. Regardless, patches of *Low-rainfall* Plains Grassland occur throughout the site (Plate 4) and an area of remnant woodland (Rocky Chenopod Woodland) supporting a canopy dominated by Grey Box *Eucalyptus microcarpa* persists in the north-east corner of the study area, contiguous with larger expanses of Rocky Chenopod Woodland and Grassy Woodland within Long Forest NCR (Plate 6). The area of woodland supports large trees (both Scattered Trees and Large Trees in Patches) that support hollows and habitat for fauna (Plate 7).

Shrub cover (contributed by Sifton Bush, Africa Box-thorn and Fragrant Saltbush) throughout the grassland areas provides refuge for small birds and a perch and vantage point for other larger birds and birds of prey (Plate 2 and Plate 3).

The site is currently managed by low-intensity grazing by cattle. During surveys in 2021 a large mob of Eastern Grey Kangaroo *Macropus giganteus* were observed within the bounds of the site and were considered to be resident. At the time, assessors noted that the site was heavily grazed which was attributed to the presence of macropods. During the most recent site assessment in 2022 grassy areas (both native and non-native) had recovered and grazing intensity was not as severe.

A list of flora species observed in the study area is provided in Appendix D.

A list of fauna species incidentally observed in the study area during the site assessments is provided in Appendix D.

Plate 1 **Representative photo of exotic grassland throughout the study area dominated by Artichoke thistle**

Plate 2 **A typical patch of Sifton Bush that has recolonised in dense stands across the site**

Plate 3 **Representative photo of exotic grassland throughout the study area with high cover of African Box-thorn, grass and herb weeds**

Plate 4 **Plains Grassland patches exist throughout the study area and are represented by consistent cover of Spear Grasses and Wallaby Grasses**

Plate 5 **Example of disturbed areas common throughout the study area**

Plate 6 **Rocky Chenopod Woodland in the north-east of the study area, contiguous with Long Forest NCR.**

Plate 7 **Grey Box within Rocky Chenopod Woodland contiguous with Long Forest NCR supporting fauna habitat and hollows**

3.5 Landscape context

The study area is located adjacent to Long Forest (NCR) which lies on the border of the Victorian Volcanic Plain and the Central Victorian Uplands bioregions. Long Forest NCR protects ~600 ha of remnant vegetation dominated by Rocky Chenopod Woodland (EVC) and Grassy Woodland (EVC 175). To the north, the Long Forest NCR joins the larger Lerderderg State Park.

3.6 Native vegetation

3.6.1 EVCs

Two EVCs occur in the study area (Figure 5): Plains Grassland (EVC 132) and Rocky Chenopod Woodland (EVC 64). The EVCs are within the Victorian Volcanic Plains bioregion and have a bioregional conservation status of Endangered and Vulnerable respectively. The EVCs recorded were consistent with EVCs modelled within the surrounding landscape and extending into Long Forest NCR. EVCs were represented by either the presence of three or more canopy trees (Rocky Chenopod Woodland EVC) and areas of consistent cover (i.e. >25% cover) of native grasses and herbs (Plains Grassland EVC).

Plains Grassland (EVC 132)

Plains Grassland (EVC 132) was found in small patches through the centre (north to south) of the site. This community varied in quality from highly degraded to moderately degraded and contained species including Woolly New-holland-daisy *Vittadinia gracilis*, Kidney Weed *Dichondra repens*, Wallaby grasses *Rytidosperma* spp., Spear grasses *Austrostipa* spp., Nodding Salt-bush *Einadia nutans*, Wood Sorrel *Oxalis perennans*, Weeping Grass *Microlaena stipoides*, Lemon Beauty-heads *Calocephalus citreus*, Jersey Cud-weed *Laphangium luteoalbum*, Bluebells *Wahlenbergia* spp., Common Rice-flower *Pimela humilis,* Minnie Daisy *Minuria leptophylla*, Daisy *Brachyscome* spp. and Pussytails *Ptilotus* sp. amongst others (Plate 8 and Plate 9).

Changes to native vegetation quality between the EHP 2012 assessment and the AECOM 2021 and 2022 assessments are evident in the spread of woody weeds (both exotic and native) throughout the site, and a reduction in native vegetation extent and quality (Plate 10 and Plate 11). Due to a lack of both woody weed management and grass and herb weed management the cover of invasive species including African Box-thorn, Serrated Tussock and Artichoke Thistle has increased throughout the site. This is coincident with other impacts such as overgrazing by kangaroos, and cumulatively, these impacts have resulted in a reduction in the extent and quality of Plains Grassland EVC.

The establishment and proliferation of Sifton Bush has also played a role in reducing Plains Grassland EVC quality and extent in a similar way to African Boxthorn, Serrated Tussock and Artichoke Thistle.

Plate 8 **Pussy tails found in higher quality EVC 132 Plains Grassland**

Plate 9 **High diversity of native herbaceous and grassy species found in a patch of higher quality EVC 132 Plains Grassland**

Plate 10 **Lower quality Plains Grassland represented by native grasses – Wallaby Grass and Spear Grass – with high cover of exotic species**

Plate 11 **Higher quality Plains Grassland represented by a more consistent cover of native grasses and supporting a diversity of herb species**

Rocky Chenopod Woodland (EVC 64)

Rocky Chenopod Woodland (EVC 64) was found exclusively to the east of the site, contiguous with Long Forest NCR. This community was represented by a moderate cover of canopy species including Grey Box *Eucalyptus microcarpa* and Bull Mallee *Eucalyptus behriana.* The understorey, while degraded as result of grazing and historical agricultural use, contained species typical of the understorey of this EVC including Fragrant Saltbush, Nodding Saltbush *Einadia nutans*, Wallaby grasses and Kidney Weed. Exotic species such as African Box-thorn, Carpetweed, Capeweed, Serrated tussock and Texan needle-grass *Nassella leucotricha* are abundant in the understorey (Plate 12 and Plate 13).

Plate 12 **EVC 64 Rocky Chenopod Woodland contiguous with Long Forest Nature Conservation Reserve supporting a canopy of Grey Box over a modified understorey of grasses and chenopod shrubs**

Plate 13 **EVC 64 Rocky Chenopod Woodland found to the east of the site showing native canopy and largely exotic understorey**

3.6.2 Patches

58 patches of native vegetation were mapped across the study area (Figure 5). These patches total 15.35 ha **(**Table 6**)** and were comprised of EVC 132_63 *Low-rainfall* Plains Grassland (14.84 ha) and EVC 64 Rocky Chenopod Woodland (0.51 ha). A total of five Large Trees in Patches were identified within the area of Rocky Chenopod Woodland patch mapped.

The Habitat Hectare scores of each habitat zone are presented in Appendix **C**.

Table 6 Summary of habitat hectares within the study area

EVC	Habitat zones (ha)
132_63 *Low Rainfall* Plains Grassland	14.84
64 Rocky Chenopod Woodland	0.51

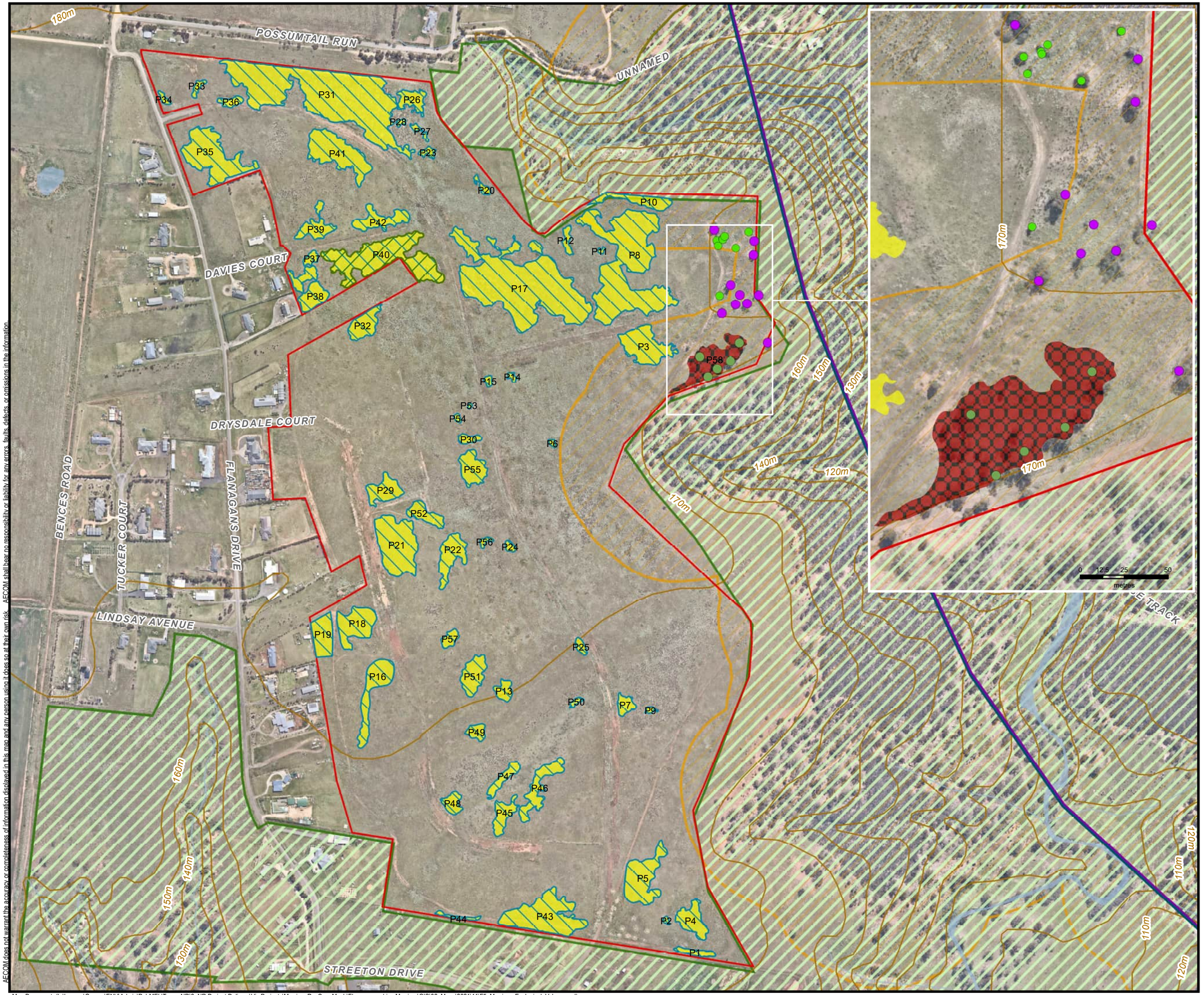
3.6.3 Trees

A total of 24 trees were also recorded from the study area. All trees recorded are located in the north-eastern extent of the study area adjacent to Long Forest NCR (Figure 5). A summary of the trees recorded within the study area, the species and size classification is presented in Table 7. Of the 24 trees recorded within the study area, 16 were large trees and eight were small. The dominant canopy tree was Grey Box with lesser numbers of Bull Mallee also recorded.

Large Trees in Patches are considered in biodiversity offset calculations for patches of native vegetation.

Table 7 Summary of trees recorded within the study area

	Tree categorization		
Species	Small Scattered Tree	Large Scattered Tree	Large Trees in Patch
Grey Box *Eucalypus microcarpa*	2	10	5
Bull Mallee *Eucalyptus behriana*	6	1	-



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0 60 120 240

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LEGEND

- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree

Native Vegetation

- 132 Plains Grassland
- 64 Rocky Chenopod Woodland

Threatened Ecological Communities

- Natural Temperate Grasslands of the Victorian Volcanic Plain (EPBC Act)
- Western Basalt Plains Grassland Community (FFG Act)

- 10m Contours
- Watercourses
- Waterbodies

Bioregions

- Central Victorian Uplands
- Victorian Volcanic Plain

Planning Zones

- BMO
- ESO3
- Study area

NATIVE VEGETATION VALUES WITHIN THE STUDY AREA

ResCom Group

Ecological Assessment of Flanagan's Road, Merrimu

Flanagan's Road, Merrimu, VIC

Figure F5

Map Document: (L:\Legacy\Groups\ENV\Admin\PubMEL\Team_NR\6. NR Project Delivery\Vic Projects\Merrimu ResCom Mesh\Flanagnans drive Merrimu\GIS\02_Maps\2021\11\F5_Merrimu_Ecological_Values.mxd)

3.7 Threatened species – likelihood of occurrence

An assessment of threatened species likelihood within the study area (as identified by the desktop assessment) is presented in Appendix A. Following completion of the site assessment, those species listed under the EPBC and/or FFG Acts that were considered 'Likely' to be present or were recorded during the site assessment are discussed below. State-listed threatened species (VROT), that are not listed under the EPBC Act or FFG Act, are not considered further as there are no statutory conservation requirements for those species.

The exception is that all native fauna species are protected under the Wildlife Act, and Flora listed as 'Protected' under the FFG Act require a 'Permit to Take' for removal. Further information on how to address these issues is presented in Section 4.0.

3.7.1 Flora

Following the likelihood assessment conducted in Appendix A, three threatened flora species were present within or immediately adjacent to the study area. These species include:

- Bacchus Marsh Wattle
- Buloke
- Fragrant Saltbush

Although not observed on the property during AECOM's survey, the DEECA Grampians region staff believe that at least one tree on the property may be Werribee Blue-box *Eucalyptus baueriana* subsp. *thalassina*, an FFG Act-listed species.

No Spiny Rice-flower (SRF) plants were recorded on site which is consistent with the findings of EHP. It should however be noted, that due to the prevalent weeds and biomass cover across the site that SRF could go undetected and surveys for the species (whilst incidental) were not conducted at the optimal time of year to detect the species (i.e. winter).

3.7.1.1 Bacchus Marsh Wattle

One record of Bacchus Marsh Wattle (ALA) was recorded on the northern boundary of the study area along Possumtail Run in August 2021; however, no further records were identified by EHP (2012) or the current assessment.

3.7.1.2 Buloke

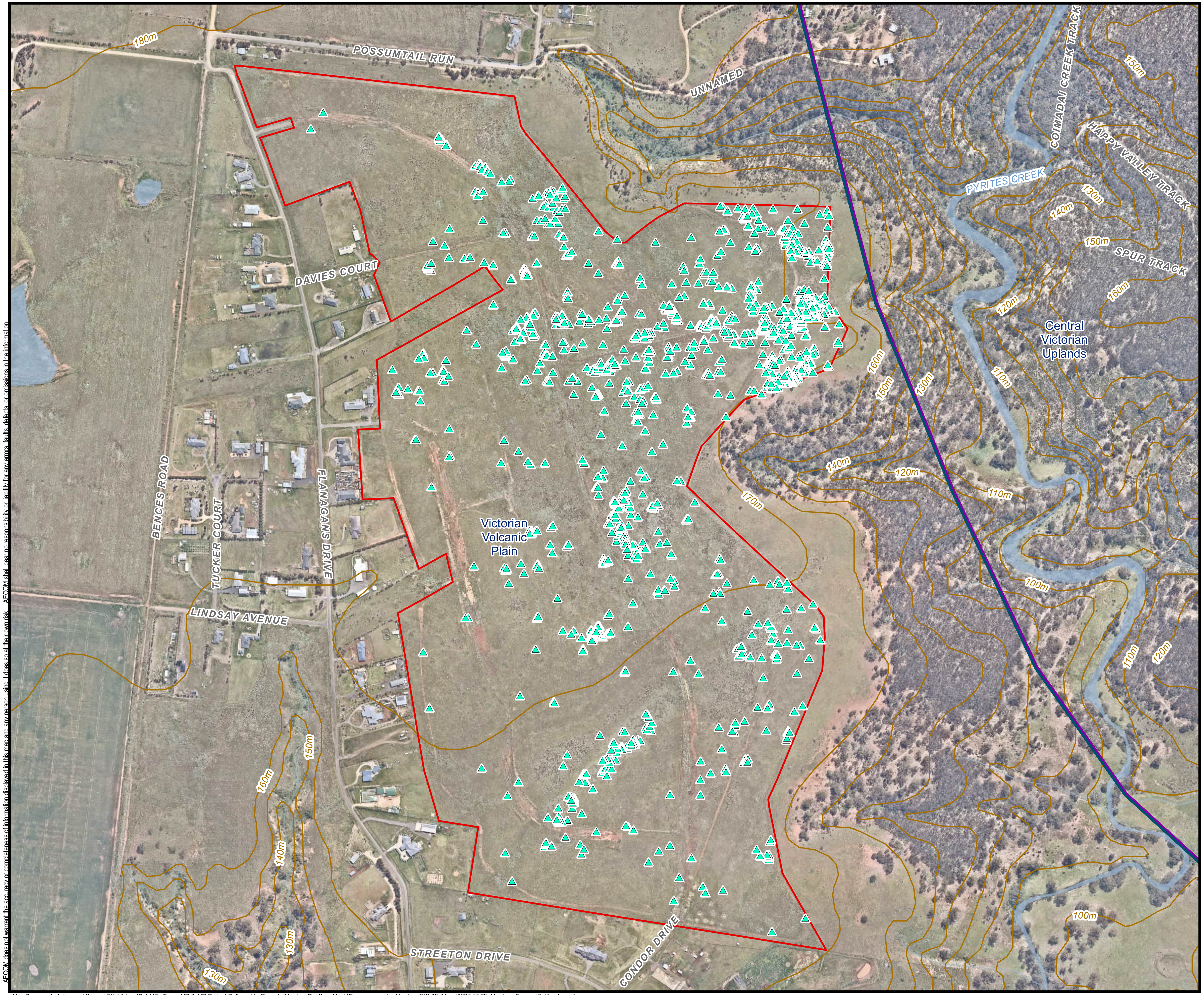
One record of Buloke (ALA) was recorded in the south-eastern corner of the study area within Long Forest NCR. No further records were identified by EHP (2012) or the current assessment.

3.7.1.3 Fragrant Saltbush

Fragrant Saltbush was identified by both EHP (2012) and the current assessment within the study area.

During EHP's 2012 assessment, Fragrant Saltbush was identified in relative abundance across the site as shown in Figure 5 (EHP, 2021).

The most recent surveys for Fragrant Saltbush (2022) recorded 1,946 individual plants throughout the site (Figure 6). Records for the species tended to coincide with areas supporting higher numbers and cover of African Box-thorn; this higher abundance may be attributed to birds perching on Box-thorn and distributing Fragrant Saltbush seeds via droppings. The Box-thorn may also be protecting these new plants from being grazed upon by cattle and therefore allowing the plants to establish.



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0 62.5 125 250
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LEGEND

- Fragrant saltbush
- Study area
- 10m Contours
- Watercourses
- Waterbodies

Bioregions

- Central Victorian Uplands
- Victorian Volcanic Plain
- Study area

TARGETED FLORA SURVEY - FRAGRANT SALTBUSH

ResCom Group

Ecological Assessment of Flanagan's Road, Merrimu

Flanagan's Road, Merrimu, VIC

Figure **F6**

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3.7.2 Fauna

Following the likelihood assessment conducted in Appendix A for species with VBA records in the last 30 years, five threatened fauna species were considered to 'Likely' be present or were present within the study area. These species include:

- Black Falcon *Falco subniger* (FFG Act Critically Endangered)
- Little Eagle *Hieraaetus morphnoides* (FFG Act Vulnerable)
- Speckled Warbler *Pyrrholaemus sagittatus* (FFG Act Endangered)
- Diamond Firetail *Stagonopleura guttata* (FFG Act Vulnerable)
- Golden Sun Moth *Synemon plana* (EPBC Act Vulnerable; FFG Act Vulnerable).

Two species with VBA records more than 30 years old are also considered likely to occur due to the occurrence of woodland habitat containing hollow-bearing trees within the study area which is connected to Long Forest NCR – Brush-tailed Phascogale *Phascogale tapoatafa* (FFG Act Vulnerable) and Lace Monitor *Varanus varius* (FFG Act Endangered).

3.7.2.1 Birds

All four FFG Act-listed bird species were considered likely to occur occasionally within the study area, mainly for foraging, due to the proximity of Long Forest NCR. It is unlikely that they would utilise the study area on a permanent basis given the relative lack of habitat (i.e. trees and shrubs cover) and degraded nature of the vegetation present.

3.7.2.2 Brush-tailed Phascogale and Lace Monitor

Rocky Chenopod Woodland in the north-east of the study area provides potential habitat for Brush-tailed Phascogale and Lace Monitor. Although there are no VBA records for these species in the last 30 years, they have been recorded historically in the Long Forest Nature Conservation Reserve. As such, both species have potential to utilise the woodland and associated hollow-bearing trees in the study area on occasions as an extension of the habitat contained within the reserve.

3.7.2.3 Golden Sun Moth

During targeted survey for Golden Sun Moth in 2012/2013 flight season (EHP, 2013), 551 individuals were recorded across the study area (Figure 7). However, given the time since targeted survey and degradation of the native vegetation on site, further targeted survey was undertaken during the 2021/2022 flight season (Summer) to determine the current presence, distribution and abundance of the species.

Surveys for Golden Sun Moth conducted in December 2021 recorded 57 Golden Sun Moth (Figure 7). The details of this survey are provided in Table 8 below.

Another survey of the Long Forest Estate area was undertaken by EHP on 16 December 2019 as part of ecological investigations for the Bacchus Marsh Eastern Link Project but the results of that survey were not available to document in this report.

Golden Sun Moth surveys were also completed by EHP on other properties within the Merrimu PSP area: BMD land (2017/2018 flight season) and other assessed land at 55 and 95 Oconnell Road (2019/2020 flight season). Golden Sun Moth was recorded in 59 ha of habitat on the BMD land and in 25 ha of habitat on the other assessed land (EHP, 2021). A reference site was checked at 289 Bences Road. The location of these properties are show on Figure 4 EHP (2021).

Golden Sun Moth habitat persists across most of the site (Figure 7). While the extent of native vegetation has declined over the past 10 years since previous native mapping was completed (Section 3.5), the site still has good coverage of suitable food plants (both native and exotic). Habitat within the study area is represented by both native grassland patches dominated by Wallaby grass *Rytidosperma* spp. and Spear Grass *Austrostipa* spp. and patches of Chilean Needle-grass or Serrated Tussock with an open tussock structure. As Golden Sun Moth can occur in both native and exotic grassland areas, distinction cannot be made on areas of higher priority for the species although the habitat mapping sought to distinguish areas that are marginal or unsuitable for Golden Sun Moth

A total of 74.4 ha of suitable habitat for Golden Sun Moth was mapped across the study area (Figure 7). Those areas supported patches of Plains Grassland (Wallaby-grasses and Spear-grasses as food plants) and areas dominated by other suitable foodplants (Chilean Needle-grass and Serrated Tussock). A further 13.9 ha of potential but sub-optimal habitat was also mapped which was represented by patches of Sifton Bush, artichoke thistle with an understorey of food plants.

Although the numbers in the Long Forest Estate population appear to have reduced between surveys in 2012 and 2021 (and vegetation condition and extent has also changed from 39.23 ha in 2012 to 14.84 ha in 2022), it is not possible to conclude that the population has declined, or is in a state of decline. It is possible climatic/seasonal conditions at the time of the two surveys may have influenced the emergence and therefore numbers of individuals observed in each season. Although, this rationale for why numbers were fewer in 2021 may not have merit because according to the Conservation Advice, there is no evidence that the species experiences wide, rapid and frequent variation in populations size or distribution (DAWE, 2021).

Table 8 Results of Golden Sun Moth site surveys and reference site checks

Assessor	Survey Dates/Times	Site Conditions	Type of Survey	Site Location / Duration of Survey	Results of Survey
Study Area at Flanagans Drive, Merrimu.					
Christopher White	1st December 2021 10.30am-3pm	Temperature of 33°C Partial cloud Some occasional wind gusts but mostly calm Ground conditions were dry with no prior rainfall for at least 5 days	Transects where driven were able, and walked when necessary	4.5 hours	23 moths observed
Christopher White	13th December 2021 10.00am-4pm	Temperature of 33°C Clear skies with no cloud. Very calm, with slight occasional gusts Ground conditions were dry with no prior rainfall for 4 days	Transects where driven were able, and walked when necessary	6 hours mins	19 moths observed
Christopher White	30th December 2021 10.30am-3.30pm	Temperature of 36°C Clear skies with no cloud. Very calm, with slight occasional gusts Very hot conditions, dry ground and no rainfall for at least 7 days prior	Transects where driven were able, and walked when necessary	5 hours mins	15 moths observed

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LEGEND

- Golden Sun Moth Records
- 10m Contours
- Watercourses
- Waterbodies

Bioregions

- Central Victorian Uplands
- Victorian Volcanic Plain
- Study area

GOLDEN SUN MOTH 2021/2022 SEASON SURVEY RESULTS

ResCom Group

Ecological Assessment of Flanagan's Road, Merrimu

Flanagan's Road, Merrimu, VIC

Figure F7

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LEGEND

GSM Habitat
- Sub-optimal
- Suitable
- 10m Contours
- Watercourses
- Waterbodies

Bioregions
- Central Victorian Uplands
- Victorian Volcanic Plain
- Study area

GOLDEN SUN MOTH HABITAT MAPPING

ResCom Group

Ecological Assessment of Flanagan's Road, Merrimu

Flanagan's Road, Merrimu, VIC

Figure
F8

Map Document: (\\na.aecomnet.com\lfs\APAC\Melbourne-AUMEL1\Legacy\Groups\ENV\Admin\PubMEL\Team_NR\6. NR Project Delivery\Vic Projects\Merrimu ResCom Mesh\Flanagnans drive Merrimu\GIS\02_Maps\2023\02\F8_Merrimu_GSM_Habitat.mxd)

3.7.2.4 Victorian Grassland Earless Dragon *Tympanocryptis pinguicolla*

In June 2023, the VGED was rediscovered in grasslands west of Melbourne after previously being considered extinct. The species has not been sighted in more than 50 years, despite intensive searches. As a result of its rediscovery, the species is now listed as critically endangered under the FFG Act and the EPBC Act.

The Victorian Planning Authority (VPA) has been advised that the Parwan Employment Precinct (which lies south of the subject site on the southern side of the Western Highway has been identified as likely having habitat that would support the VGED. On the DCCEEW website, the subject site is considered to be at the furthest likely range of habitation, but its absence from the site cannot be determined at this stage.

DEECA and DCCEEW are collaborating on the development of a strategy to ensure the preservation of the species. This will include the preparation of new survey methods, enabling more precise identification of the presence of VGED at a site, as well as clarifying the potential habitats that are likely to support this species. Both governments are working on a survey approach using sniffer dogs to improve the likely detectability of what is now Australia's most endangered reptile. The draft national recovery plan for this species will be released over coming weeks and allow for a 3-month public consultation period.

Ultimately, it is likely that surveys for the species will commence in warmer months if 2023/24 in all areas of potential habitat within the state. Further consideration of the species at the site will be necessary following this release of this information, and a survey of the site might need to be considered for later in 2023, subject to engagement with species experts.

3.8 Threatened ecological communities

3.8.1 EPBC Act

Five EPBC Act-listed TECs were identified in the PMST search (Section 3.3.1). Four of these communities are not considered present within the study area due to not meeting the listing criteria . A single community – Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) – was considered during the current assessment.

EHP (2012) identified the presence of the EPBC Act-listed NTGVVP during their original assessment of the site in 2012. The TEC is also synonymous with the FFG Act-listed ecological community, Western (Basalt) Plains Grassland.

During the current detailed site assessment, it was determined that a single patch of Plains Grassland (HZ 40) met the key condition and threshold criteria to be considered the EPBC Act TEC. This was predominantly owing to the higher cover of native grasses, presence of grassland herbs and lower cover of weeds. The habitat zones in question comprised consistent cover (>50% cover) of *Austrostipa scabra*, *Austrostipa bigeniculata*, Wallaby Grass, Fuzzy New Holland Daisy, Kidney Weed, and Bindweed *Convolvulus* sp. Weed cover was low (<20% cover) but consistent with weeds dominant across the site including African Box-thorn, Serrated Tussock and Artichoke Thistle.

The assessment against the key condition and threshold criteria is presented in Table 9.

Table 9 Condition threshold for Natural Temperate Grassland of the Victorian Volcanic Plain (DSEWPaC, 2011)

	Criteria	Criteria met? (Y/N)
Step 1: Is the Natural Temperate Grassland or Grassy Eucalypt Woodland ecological community present at my site?	Does the patch occur within or near the VVP?	Y
	Is the site dominated by native vegetation i.e. a native vegetation remnant? If uncertain proceed to YES	Y
	Are trees absent or sparse such that the projective foliage cover	Y

	of native trees in the patch is 5% or less?	
	Is the ground vegetation layer dominated by native grasses and/or other native herbs?	Y
Step 2: Is the patch of sufficient quality for national listing?	Is the patch bigger than or equal to 0.05 hectares (e.g. 10 x 50m OR 20 x 25m)?	Y
	The dominant native species represent at least 50% of the native species and the perennial tussock cover; OR non-grass weeds comprise less than 30% of ground cover; OR native forbs (wildflowers) comprise at least 50% of total vegetation cover during spring – summer.	Y – high cover of native perennial grasses (>50% cover)

3.8.2 FFG Act

Based on the native vegetation and landscape features present within the study area two FFG Act ecological communities were recorded including the Western (Basalt) Plains Grassland community and the Rocky Chenopod Open-Scrub Community are considered present.

3.8.2.1 Western (Basalt) Plains Grassland Community

The Western (Basalt) Plains Grassland Community is an open grassland community typically found on undisturbed, poorly-drained heavy clay soils on the basalt plains of western Victoria. Vegetation is dominated by perennial native grasses with spare to no cover of eucalypts and shrubs. Characteristic species include Kangaroo Grass, Common Everlasting and Lemon Beauty-heads. Degraded examples of the community can be heavily invaded by introduced grasses and weed species.

All patches of Plains Grassland EVC recorded across the site are considered to meet the description of the FFG community. These examples were generally of lower quality and comprised a grassy sword of Wallaby Grasses and Spear Grasses with the occasional native herb present that is consistent with those species representative of the community.

3.8.2.2 Rocky Chenopod Open-scrub Community

The Rocky Chenopod Open Scrub Community is described as an open-scrub community comprising a shrubby understorey and an open ground layer. The community it typically located on skeletal soils. Characteristic tree canopy species include the multi-stemmed Bull Mallee as well as Gums and Box species including Yellow Gum, and/or Grey Box. Box Mistletoe *Amyema miquellii* is commonly found in canopy trees. Chenopod shrubs are abundant.

The community has a very restricted distribution and less than 200 ha may still exist, all on sites near Melbourne. Long Forest is a known location for the community.

A single patch (HZ 58) of Rocky Chenopod Woodland recorded in the north-east of the study area and contiguous with Long Forest NCR is considered to meet the description of the FFG community owing to the presence of Grey Box as the dominant canopy tree and a relatively open understorey and ground layer of grasses and chenopod shrubs. Some of the characteristic species of the community including chenopod shrubs such as Fragrant Saltbush, Berry Saltbush *Atriplex semibaccata*, Ruby Saltbush *Enchylaena tomentosa* var. *tomentosa,* Small-leaved Clematis *Clematis microphylla* and Nodding Saltbush *Einadia nutans* subsp. *nutans* were recorded.

4.0 Legislative implications

This section provides an outline of the relevant biodiversity legislation and policy and the implications of development of the Long Forest Estate property based on a total clearance scenario. The implications should be considered in a separate impact assessment report in designing the proposed development of the property and the Merrimu PSP.

4.1 Commonwealth

4.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

One of the main aims of the EPBC Act is to provide for the conservation of biodiversity and the protection of the environment, particularly those aspects that are considered to be MNES. The EPBC Act defines nine MNES as follows:

- World heritage properties
- National heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements (JAMBA, CAMBA, ROKAMBA)
- Commonwealth marine environment
- Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- A water resource, in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, actions[1] that are likely[2] to have a significant impact upon MNES are required to be referred to the Environment Minister for approval.

Of these MNES, listed threatened species and ecological communities were potentially relevant to this project. Under the EPBC Act, actions that are likely to have a significant impact upon MNES are required to be referred to the Commonwealth Environment Minister for approval.

Species identified by the PMST that are not considered relevant to this study (e.g. marine species records returned for land-based enquiries) have been omitted from further discussion.

Implications:

One MNES, Golden Sun Moth (listed as vulnerable), has historically been recorded within the study area (EHP, 2012), and at that time (2012), the proposed project was considered to potentially have a significant impact on this species, therefore requiring a referral to DAWE (now DCCEEW). Golden Sun Moth at that time was listed as critically endangered under the EPBC Act. The species status was revised to vulnerable on 7 December 2021.

A population of Golden Sun Moth persists within the study area supported by 74.4 ha of suitable and 13.9 ha of sub-optimal habitat (Section 3.7.2.3). A significant impact analysis of the proposed development against the EPBC *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (DoE 2013) for a vulnerable species is provided in Appendix E. It is likely the Long Forest Estate population would represent an important population and the habitat would be regarded as critical habitat based on the Conservation Advice for Golden Sun Moth. This determination of an important population should be provided to DCCEEW for their consideration and feedback as this informs the assessment against some of the Significant Impact Criteria.

The Significant Impact Assessment in Appendix E considers impacts to Golden Sun Moth within Long Forest Estate in isolation of other areas within the Merrimu PSP. Part of the PSP has already been

[1] Under the EPBC Act an 'action' includes any project, development, undertaking, activity or series of activities.
[2] Under the EPBC Act 'likely' refers to when the potential for a significant impact on the environment to be real or not a remote chance or possibility.

referred (BMD land - EPBC 2018/8271) which was deemed a controlled action to be assessed by preliminary documentation. Consideration of the cumulative impacts of development within the broader Merrimu PSP area should be considered by the VPA during the planning process for the PSP.

Consultation with DCCEEW is required and a referral for the entire Merrimu precinct may be required rather than on an individual landholding basis.

4.1.2 Weeds of National Significance

Weeds of National Significance (WoNS) are species that are recognised as a current and future threat which require coordinated and strategic management involving landowners and land managers at all levels (IPAC, 2017). The 32 species currently classified as WoNS have been agreed by Australian governments based on an assessment process that prioritised the weeds based on their invasiveness, potential for spread, environmental, social and economic impacts, and their ability to be successfully managed (DAWE undated). Targets for eradication have been identified for these species and landowners are responsible for managing WoNS on their land.

Implications

Five WoNS were identified during the field survey including Bridal Creeper, African Box-thorn, Serrated Tussock, Prickly Pear *Opuntia* spp. and Chilean Needle-grass (Appendix D). All efforts should be made to reduce the spread of weeds into and out of the site through good vehicle, equipment and personnel hygiene practices.

A summary of landowner activities has been provided to DEECA and the VPA which documents landowner activities that have contributed to the change in native vegetation cover and increase in weed cover and abundance at the site over the last 10 years. The summary also suggests that weed infestation was already an issue in 2008 based on correspondence from Council to the previous property owner.

4.2 Victoria

4.2.1 Planning and Environment Act 1987

The *Planning and Environment Act 1987* (P and E Act) establishes the framework for the use, development and protection of land in Victoria. The P and E Act provides for the preparation of standard provisions for planning schemes which are administered by local government.

All Victorian planning schemes contain standard provisions requiring a permit to remove, destroy or lop native vegetation (collectively referred to as 'remove native vegetation') unless an exemption to Clause 52.16 or Clause 52.17 applies (DELWP, 2017b). These regulations are known as the 'native vegetation removal regulations.

4.2.1.1 Planning Overlays

Planning overlays are part of municipal planning schemes and are applied to areas of land to control development. Overlays may be applied to protect areas from adverse impacts or to allow easy identification of constraints in developments on that area. One or more overlays may be applied to an area. For example, Vegetation Protection Overlays (VPOs) are applied to areas where vegetation of significance exists. Most overlays also have schedules which specify municipal objectives and requirements.

Implications:

The study area is located within a Rural Conservation Zone (RCZ) and Public Conservation and Resource Zone (PCRZ) under the Moorabool Planning Scheme.

The study area is subject to the following environmental overlays:

- Bushfire Management Overlay (BMO)
- Environmental Significance Overlay (ESO3)

The BMO and ESO3 both partially cover the study area (Figure 5).

Under the BMO, a permit is required to subdivide land and/or construct a building or construct or carry out works associated with a number of listed uses. An application for a permit under this overlay will require a proponent to prepare a bushfire hazard site assessment, bushfire hazard landscape assessment and bushfire management statement.

Under ESO3, a permit is not required; however, the following information must be provided:

- The purpose of the removal of vegetation.
- Method of removal of vegetation.
- Photographs of vegetation to be removed, or alternatively, a report from a qualified person detailing the level of significance and status of vegetation to be removed.
- A plan drawn to scale, showing the area and location of vegetation to be removed.
- Details of any replanting or regenerative measures to be undertaken.

Additionally, when the relevant authority is making its decision, within ESO3, it will consider:

- The extent of vegetation to be removed.
- The reason for removing the vegetation.
- Whether the removal of the native vegetation will detrimentally impact on the sustainability of Bull Mallee and other threatened flora and fauna.
- The cumulative effect of incremental removal of native vegetation.
- Whether the removal of native vegetation will detrimentally affect the scenic value of the locality.
- Whether the removal of native vegetation will detrimentally affect the habitat value of the locality.
- Any replanting or regenerative measures to be undertaken.

4.2.1.2 Planning provisions

4.2.1.3 Amendment C81 – Bacchus Marsh Urban Growth Framework

Amendment C81 to the Moorabool Planning Scheme incorporated the Urban Growth Framework Plan for Bacchus Marsh into the planning scheme in 2018. The UGF covers land in the urban and rural areas of Bacchus Marsh, Darley, Maddingly and Pentland Hills as well as the rural fringe areas of Merrimu, Parwan, Hopetoun Park, Coimadai (part), Long Forest (part) and Rowsley (part) (EHP, 2020). The amendment promotes coordinated, master-planned development of areas in and around Bacchus Marsh.

Implications

Long Forest Estate is included in the Merrimu PSP and the current assessment and findings must be considered in the strategic planning for the PSP area.

4.2.1.4 Native vegetation removal regulations

4.2.1.4.1 Clause 12.01-1S – Protection of biodiversity

Clause 12.01-1S of the Moorabool Planning Scheme addresses the protection of Victoria's biodiversity. Consideration must be given to the impacts of land use and development on Victoria's biodiversity including how cumulative impacts, fragmentation of habitat and the spread of pest plants, animals and pathogens into natural systems might affect biodiversity values.

Consideration must be given to any change in land use or development that may affect the biodiversity of national parks and conservation reserves or nationally or internationally significant sites including wetlands and wetland wildlife habitat designated under the Convention on Wetlands of International Importance (the Ramsar Convention) and sites utilised by species listed under the Japan-Australia Migratory Birds Agreement (JAMBA), the China-Australia Migratory Birds Agreement (CAMBA), or the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

In addition, the Clause assists in the identification, protection and management of important areas of biodiversity; the establishment, protection and re-establishment of links between important areas of

biodiversity, including through a network of green spaces and large-scale native vegetation corridor projects and is enacted to support land use and development that contributes to protecting and enhancing habitat for indigenous plants and animals in urban areas.

Implications:

EHP (2018a) identified properties 11 and 16 within the Merrimu PSP to be of high ecological significance due to presence of remnant vegetation (and endangered EVCs), presence of the NTGVVP ecological community, presence of the nationally significant Spiny Rice-flower, presence of two FFG Act-listed communities and habitat for the Golden Sun Moth.

Based on the EHP (2018a) determinations, Long Forest Estate or areas within the property should also be considered of high ecological significance due to:

- Location adjacent to Long Forest NCR
- Presence of remnant *Low-rainfall* Plains Grassland vegetation (endangered within the Victorian Volcanic Plain Bioregion)
- Presence of the EPBC Act-listed NTGVVP
- Presence of two FFG Act-listed communities (Western (Basalt) Plains Grassland and Rocky Chenopod Open-scrub Community))
- Presence of Fragrant Saltbush
- Presence of (and habitat for) Golden Sun Moth.

4.2.1.4.2 Clause 12.01-2S – Native vegetation managements

Clause 12.01-2S of the Moorabool Planning Scheme sets out the requirements to ensure no net loss to biodiversity occurs a as result of the removal, destruction or lopping of native vegetation. As part of the requirements under this clause, a proponent must demonstrate how they have applied the three-step approach in accordance with the Guidelines (DELWP, 2017) to:

- Avoid the removal, destruction or lopping of native vegetation
- Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
- Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation.

Implications:

Please see Section 4.2.1.3 for application of the Guidelines.

It is noted that it is likely more appropriate to address this clause by considering values across the entire precinct rather than to discuss its application on each property in isolation. Appropriate recognition of the Clause 12.01 can and should be addressed in the PSP or NVPP.

4.2.1.4.3 Clause 52.17 - *Guidelines for the removal, destruction or lopping of native vegetation*

Clause 52.17 of the relevant council planning scheme enacts the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017a). The Guidelines provide instructions on how an application for a permit to remove native vegetation is to be assessed under the P&E Act. This includes requirements to undertake a site assessment, the assessment method, and specific conditions that may form part of a granted permit, such as offsetting.

In addition to the above, under the Guidelines, if native vegetation has been planted or grown with public funding for the primary purposes of enhancing biodiversity or protection of land the funding agency or its successor must provide written agreement to remove the native vegetation.

Approval pathways

Under the Guidelines, there are three pathways under which an application to remove native vegetation can be assessed as - Basic, Intermediate or Detailed assessment pathways. The assessment pathway determines the types of offsets that are required to be implemented for the removals. This is determined

via an assessment of location, whether any large trees are to be removed and the extent risk to biodiversity by a particular project:

- Location risk is determined by assessing the likelihood that the removal of a small amount of native vegetation may impact the persistence of a rare or threatened species. Location risk has been determined for all of Victoria with areas being categorised as Location 1, Location 2 or Location 3. The location risk of a particular site is determined using the native vegetation location risk map available from the NVIM tool found on the DELWP website.
- Extent risk is determined by the extent of the native vegetation including the presence or absence of large trees that is proposed to be removed.

Together, these two types of risk are used to determine the assessment pathway for a permit application to remove native vegetation (DELWP, 2017a).

Table 10 presents the risk-based pathways for patches of native vegetation and scattered trees.

Table 10 Native vegetation patch risk-based pathways

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

The assessment-based pathway determines the process to be followed when applying to remove native vegetation:

- Basic or Intermediate assessment pathway: A habitat hectare assessment is not required and modelled site condition scores can be used to assess basic and intermediate pathway applications. However, if a habitat hectare assessment report is available, then this can be used in place of modelled data for determining general offset requirements if a permit is granted.
- Detailed assessment pathway applications: A habitat-hectare assessment report must be included and accompanied by a statement outlining the steps that have been taken to ensure that impacts on biodiversity from the removal of native vegetation has been minimised. Offsets required for detailed assessment pathway applications may trigger a *species offset requirement* (if the native vegetation is habitat for rare or threatened taxa.

Habitat hectare assessments

Habitat hectare assessments are a site-based measure of biodiversity value calculated by multiplying the extent of native vegetation by its condition score. The Habitat Hectares method is described in the *Vegetation Quality Assessment Manual – guidelines for applying the habitat hectare scoring method* (DSE, 2004a).

The total extent of native vegetation is calculated for patches (including mapped wetlands) in hectares and scattered trees are expressed as the area of a circle with a 15 metre radius for large trees and a 10 metre radius for small trees (DELWP, 2017a).

Mapped wetlands

Mapped wetlands are identified in the *Current wetlands map* and are included in Location 2 of the Location risk map in MapshareVic. Areas mapped as wetlands on MapshareVic need to be considered in efforts to avoid and minimise impacts on biodiversity.

The Native Vegetation Newsletter released by DELWP in November 2019 provides guidance on how to exclude a mapped wetland shown in the *Current wetlands map* from the native vegetation removal assessment process. This guidance supersedes information in Appendix 4D of the *Assessor's handbook: Applications to remove, destroy or lop native vegetation* (DELWP, 2018b). Mapped wetland (or part thereof) may be excluded from the assessment process if it meets one of the following scenarios:

1. Mapped wetland is covered by a hardened, man-made surface
2. Mapped wetland is geospatially misaligned with its on-ground location due to geospatial projections
3. *Current wetlands map* has incorrectly identified a wetland
4. Mapped wetland cannot support native vegetation.

Table 1 in DELWP (2019c) describes the evidence required to demonstrate a mapped wetland that cannot support native vegetation for each of these situations. With the exception of Scenario 1, the application to exclude requires written agreement from the Secretary to DELWP following submission of evidence to the DELWP Native Vegetation Support team.

Implications:

Clause 52.17 of the relevant council planning scheme enacts the Guidelines. Any removal of native vegetation associated with the project is required to satisfy Clause 52.17 by submitting an application to the relevant planning authority for a permit to remove native vegetation.

The study area contains location categories 1, 2 and 3. Based on a complete loss scenario the project may impact up to 16.14 hectares of native vegetation. It is therefore likely that any application to remove native vegetation will be assessed under the detailed pathway of assessment.

Offset

Where removal of native vegetation is unavoidable, biodiversity loss will need to be offset in accordance with the Guidelines (DELWP, 2017a) in order to compensate for this loss. A combination of site-based and landscape scale information is used to calculate the biodiversity value of the vegetation to be removed. This information is used to determine the loss in biodiversity value that needs to be compensated for with an offset that provides equivalent gain in biodiversity value. Biodiversity value is represented by a general or species habitat score.

Either a species offset or a general offset is required to compensate for any removals:

- A species offset is required when the removal of native vegetation has a significant impact on habitat for a rare or threatened species. Species offsets must compensate for the removal of that particular species' habitat.
- A general offset is required when the removal of native vegetation does not have a significant impact on any habitat for rare or threatened species.

Implications:

Based on a complete loss scenario, the project may result in the removal of 16.142 ha of native vegetation from within Location 3)(comprises of both patches of vegetation and scattered trees).

The EnSym report is provided in Appendix F states that an species offsets are required for the removal of native vegetation. These are summarised in Table 11.

Table 11 Native vegetation offset requirement summary

Unit type	Species	Amount
Species Habitat Unit	Fragrant Saltbush, *Rhagodia parabolica*	6.379
	Heath Spear-grass, *Austrostipa exilis*	6.379
	Bacchus Marsh Wattle *Acacia rostriformis*	5.065
Large Trees	NA	16

4.2.2 Flora and Fauna Guarantee Act 1988

The *Victorian Flora and Fauna Guarantee Act 1988* (FFG Act) was established to provide a legal framework for enabling and promoting the conservation of all Victoria's native flora and fauna, and to enable management of potentially threatening processes. One of the main features of the Act is the listing process, whereby native species and communities of flora and fauna, and the processes that threaten native flora and fauna, are listed in the schedules of the Act. This assists in identifying those species and communities that require management to survive and identifies the processes that require management to minimise the threat to native flora and fauna species and communities within Victoria.

A permit from DELWP is required to 'take' listed flora species that are members of listed communities or 'Protected' flora from public land. A permit is not required under the FFG Act for private land, unless listed species are present and the land is declared 'critical habitat' for the species. No critical habitat has been identified in Victoria to date. A permit under the FFG Act is also required for activities relating to protected fish.

Implications:

A single flora species (Fragrant Saltbush) was recorded during the field assessment and targeted flora survey. The desktop assessment identified seven FFG Act-listed species including four fauna species and three flora species that were likely to occur or were present within the study area (Sections 3.7.2, 3.7.1 and Appendix A). Consideration should be given to potential impacts to these species during design of the project.

Seven flora species listed as 'Protected' under the FFG Act were observed during the site assessment (Appendix D); however, as the land in the study area is not located within public land, a 'Permit to Take Protected Flora' will not be required to remove these species.

Two FFG Act-listed ecological communities were recorded in the study area – the Western (Basalt) Plains Grassland community and Rocky Chenopod Open Scrub Community. Based on the complete loss scenario, 14.84 ha of the grassland community and 0.51 ha of the Rock Chenopod Open Scrub community may be impacted by the project.

The presence of hollow-bearing trees within the study area and adjacent to Long Forest NCR has the potential to exacerbate a potentially threatening process listed under the FFG Act. This process – *loss of hollow-bearing trees from Victorian native forests and woodlands* – identified the loss of scattered love or dead hollow-bearing trees on private land as one of the factors influencing the loss of hollow-bearing trees in Victoria (DSE, 2003). An Action Statement has been prepared which sets out the actions to conserve and manage hollow-bearing trees; the objectives include significantly reducing the loss of hollow-bearing trees from private land. No specific approvals are required under the FFG Act but consideration should be given to avoiding and minimising the loss of hollow-bearing trees during detailed design which is consistent with the requirements under the P&E Act in relation to loss of native vegetation.

4.2.3 Environment Effects Act 1978

Under Victoria's *Environmental Effects Act 1978* (EE Act), projects that could have a 'significant effect' on Victoria's environment can require an Environmental Effect Statement (EES). This Act applies to any

public works 'reasonably considered to have or be capable of having a significant effect on the environment'.

The EES referral criteria for impacts to ecological values are listed in Table 12 were considered as part of this assessment. If either any single mandatory referral criterion, or combination of two or more referral criteria are met, then the proponent is required to submit a referral to the Minister for Planning who will then determine whether or not an EES is required.

Implications:

The potential ecological impacts of the project have been considered against the relevant EES referral criteria (refer to Table 12). A referral is likely to be required, however EHP (2021) states that *Actions undertaken in accordance with a prescribed PSP are exempt from the requirements of the EE Act. Provided a PSP is prepared guiding future development within the Precinct, then a referral under the EE Act is not required*. AECOM are not in a position to verify the accuracy of this assertion.

Table 12 EES referral criteria for ecological matters considered in this assessment

Criteria type	Criteria	Criteria met
Individual mandatory referral criteria for ecological matters	Potential clearing of 10 ha or more of native vegetation from an area that: • Is of an Ecological Vegetation Class identified as endangered by the Department of Environment, Land, Water and Planning, or • Is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework)	**Yes** A total of 15.35 hectares of native vegetation occurs within the study area. The majority of the native vegetation is Plains Grassland which is an endangered EVC. As such this criteria is triggered under a total loss scenario. An approved development plan for the site is required for the full loss scenario to be understood.

Criteria type	Criteria	Criteria met
	Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) or known remaining habitat or population of a threatened species within Victoria	**Unlikely** Despite the presence on site of Fragrant Saltbush and Golden Sun Moth, the site is not considered to represent a significant proportion of known remaining habitat for a threatened species in Victoria. DEECA Grampians region have raised the possibility that the site provides '*64%of known individuals in Victoria which exceeds the EE Act referral criteria of a significant proportion of a known population of a threatened species within Victoria'.* AECOM contends that this is not an accurate assessment of the remaining plants within Victoria. The species is historically under surveyed, and is known from the site assessment to be prevalent both within Long Forest Nature Conservation Reserve and on the southern slopes of the Merrimu escarpment towards the western Highway. The determination of there being 64% of remaining Victorian plants within the site appears to be based on known records. This is not an accurate approach and underestimates the likely number of plants within the state. Regardless, any referral under the EE Act should be done on a precinct-wide basis and not for this site alone. The potential for the site to provide habitat for Victorian Grassland Earless Dragon is not clearly understood and further assessment of this species is needed within the site and the precinct.
	Potential 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** The project does not have the potential to result in long-term changes to the ecological character of a Ramsar wetland or a wetland listed in the Directory of Important Wetlands in Australia.

Criteria type	Criteria	Criteria met
Combination referral criteria for ecological matters	Potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan	**Yes** A total of 15.35 hectares of native vegetation occurs within the study area and may be impacted. Although some of this vegetation is likely to be retained, the design of the estate and the Merrimu PSP is unknown at this stage.
	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 listed), including as a result of loss of fragmentation of habitats, or • Potential loss of critical habitat, or • Potential significant effects on habitat values of a wetland supporting migratory bird species.	**Possible** A total of 14.84 hectares of Western (Basalt) Plains Grassland and 0.51 hectares of Rocky Chenopod Open-Scrub Community occurs within the study area. Although the Rocky Chenopod Open-Scrub community and some of Western (Basalt) Plains Grassland community is likely to be retained, the design of the estate and the Merrimu PSP is unknown at this stage. Loss of 15.35 hectares (on a total loss scenario) may not be regarded as a 'significant area' however in the absence of threshold defining what constitutes a significant area of these threatened ecological communities, a precautionary approach should be taken. Golden Sun Moth population is likely to be an important population and, by definition, the study area supports critical habitat for the species (see Appendix E). The project will not impact on criteria wetland supporting migratory bird species.
	• Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the *National Parks Act 1975*	**No** The project is not considered likely to result in extensive or major effects on landscape values of regional importance. Long Forest NCR is not reserved under the *National Parks Act 1975* and is not covered by the Significant Landscape Overlay under the Moorabool Planning Scheme.

4.2.4 Catchment and Land Protection Act 1994

The *Catchment and Land Protection Act 1994* (CaLP Act) establishes a framework for management and protection of catchments through the management of land and water resources. The CaLP Act is the principal legislation relating to the management of pest plants and animals in Victoria.

Under the CaLP Act, landowners have a number of responsibilities including:

- Avoiding causing or contributing to land degradation
- Taking all reasonable steps to conserve soil
- Protecting water resources
- Eradicating regionally prohibited weeds
- Preventing the growth and spread of regionally controlled weeds
- Where possible eradicating established pest animals declared under the CaLP Act.

Invasive species can cause environmental and economic harm, or are considered to have the potential to cause such harm. They can also present risks to human health. Weed categories include:

State prohibited weeds

These invasive plants either do not occur in Victoria but pose a significant threat if they invade, or are present, and pose a serious threat and can reasonably be expected to be eradicated.

They are to be eradicated from Victoria if possible or excluded from the State. The Victorian Government is responsible for their eradication, but under Section 70(1) of the CaLP Act, it may direct landowners to prevent their growth and spread.

Regionally prohibited weeds

Regionally prohibited weeds are not widely distributed in a region but are capable of spreading further. It is reasonable to expect that they can be eradicated from a region and they must be managed with that goal. Landowners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate regionally prohibited weeds on their land.

Regionally controlled weeds

These invasive plants are usually widespread in a region. To prevent their spread, ongoing control measures are required. Landowners have the responsibility to take all reasonable steps to prevent the growth and spread of Regionally Controlled weeds on their land.

Restricted weeds

This category includes plants that pose an unacceptable risk of spreading in this State and are a serious threat to another State or Territory of Australia. Trade in these weeds and their propagules, either as plants, seeds or contaminants in other materials is prohibited.

Implications:

Twelve CaLP Act-listed weeds were identified during the assessment:

- Artichoke Thistle *Cynara cardunculus*
- African Boxthorn *Lycium ferocissimum*
- Blackberry *Rubus fruticosus* spp. agg.
- Bridal Creeper *Asparagus asparagoides*
- Chilean Needle-grass *Nassella neesiana*
- Horehound *Marrubium vulgare*
- Prickly Pear *Opuntia* spp.
- Prairie Ground-cherry *Physalis viscosa*
- Serrated Tussock *Nassella trichotoma*
- Soursob *Oxalis pes-caprae*
- Spear Thistle *Cirsium vulgare*

- Sweet Briar *Rosa rubiginosa*

Any works must be considerate of the CaLP Act and take reasonable measures to avoid the spread of CaLP listed species.

In addition, two pest animal species listed on the CaLP Act were observed during the field study:

- Red Fox *Vulpes vulpes*
- European Rabbit *Oryctolagus cuniculus.*

All landowners are responsible for controlling pest animals and penalties can be imposed if control works are not carried out.

4.2.5 Wildlife Act 1975 and Wildlife Regulations 2013

The *Wildlife Act 1975* (Wildlife Act) forms the procedural, administrative and operational basis for the protection and conservation of native wildlife within Victoria. The purposes of the Act are to establish procedures in order to promote:

- the protection and conservation of wildlife
- the prevention of taxa of wildlife from becoming extinct
- the sustainable use of and access to wildlife

Under the Wildlife Act, it is an offence to wilfully damage, disturb or destroy wildlife habitat, disturb protected wildlife or take or destroy take or destroy threatened or protected wildlife (including listed fish) without authorisation. However, under the Wildlife Regulations 2013 (Regulation 42(2)a)) a person does not commit an offence if the person is authorised to damage, disturb or destroy wildlife habitat under any other Act. This includes holding a planning permit to remove, destroy or lop native vegetation. With the exception of pest animals declared under the CaLP Act or wildlife declared to be unprotected wildlife, all fauna species native to Victoria are listed as protected under the Wildlife Act. Threatened wildlife means protected wildlife that are listed under the FFG Act.

Translocation of wildlife requires approval under the Wildlife Act. Salvage and translocation of non-threatened native wildlife from an area to be disturbed to an area reserved or protected from future development is generally not supported by DEECA for wildlife welfare reasons (DELWP, 2020). Translocation of threatened species requires authorisation. Applicants must apply for a scientific permit under the Wildlife Act which will not be issued unless a Translocation Plan is approved by the Threatened Fauna Translocation Evaluation Panel (TEP).

Implications:

As all native species are protected under the Wildlife Act, any potential impacts should be discussed with DEECA to ascertain their expectations in relation to the Wildlife Act.

Although translocation of non-threatened and threatened wildlife is generally not supported by DEECA, salvage and relocation of individuals from the construction area to adjacent habitat may be permitted. If so, then a suitably qualified wildlife handler holding a relevant and current management authorisation under the Wildlife Act would need to be engaged prior to construction to salvage any wildlife encountered during the construction program.

Provided the project secures a planning permit to remove, destroy or lop native vegetation, approval to wilfully damage, disturb or destroy wildlife habitat or protected wildlife under the Wildlife Act is adequately addressed.

5.0 Conclusion

The flora and fauna assessment identified key ecological features within the study area. The assessment involved both desktop and field assessments and included consideration of the presence of EPBC and FFG Act-listed species and ecological communities. The legislative implications of development of the entire site under a complete loss scenario are presented. The updated ecological values will be incorporated into the Merrimu PSP Existing Ecological Conditions Report (EHP, 2021).

Ecological values identified within the Long Forest Estate included:

- Native vegetation:
  - 15.35 ha of native vegetation. Two EVC's were recorded across the site including *Low-rainfall* Plains Grassland (EVC 132_63) and Rocky Chenopod Woodland (EVC 64).
  - Five Large Trees in Patches
  - 19 Scattered Trees (11 large and 8 small)
- Two FFG Act-listed ecological communities – 14.84 ha of the Western (Basalt) Plains Grassland community and 0.51 ha of the Rocky Chenopod Open-Scrub community
- Hollow-bearing trees. Loss of hollow-bearing trees may exacerbate the potentially threatening process '*loss of hollow-bearing trees from Victorian native forests and woodlands' listed* under the FFG Act.
- Presence of a Golden Sun Moth (EPBC Act and FFG Act listed) population and suitable and sub-optimal GSM habitat distributed across the study area. A significant Impact Assessment determined that the proposed development may constitute a significant impact and require referral to the Commonwealth.
- Presence of a population of FFG Act listed Fragrant Saltbush distributed across the study area.
- Potential habitat for several FFG Act listed flora and fauna species:
  - Four FFG Act-listed bird species (Black Falcon, Little Eagle, Speckled Warbler and Diamond Firetail) which are likely to occur occasionally within the study area, mainly for foraging, due to the proximity of Long Forest NCR. It is unlikely that they would utilise the study area on a permanent basis given the relative lack of habitat (i.e. trees and shrubs cover) and degraded nature of the vegetation present.
  - Brush-tailed Phascogale and Lace Monitor although not recorded on the VBA in the last 30 years are likely to occur due to the occurrence of woodland habitat containing hollow-bearing trees which is connected to Long Forest NCR.
- Seven flora species listed as 'Protected' under the FFG Act (in addition to FFG Act listed species and members of threatened communities) were observed; however, as the land in the study area is not located within public land, a 'Permit to Take Protected Flora' will not be required to remove these species.
- Twelve CaLP Act-listed noxious weeds and two pest animals observed during site assessments.

A potential native vegetation offset obligation was determined based on a complete loss scenario. Removal of all native vegetation on site would require Species Habitat Units (offsets) for Fragrant Saltbush, Heath Spear-grass and Bacchus Marsh Wattle.

The recent rediscovery of the Victorian Grassland Earless Dragon may have implications for the development of the site and the broader precinct, and surveys for the species may be necessary over warmer months in 2023 and 2024 subject to the imminent release of the draft national recovery plan.

6.0 Recommendations

The following recommendations are made for the next steps of the project.

Incorporation of findings into the Merrimu PSP:

- The findings of the current existing conditions assessment must be incorporated into the Merrimu PSP Existing Ecological Conditions Report (EHP, 2021) to inform strategic planning of the precinct.
- The impacts of the development of Merrimu PSP must be considered 'as a whole' in relation to the EPBC Act, FFG Act, EE Act and the P&E Act to establish the cumulative impacts of the precinct development rather than impacts on individual landholdings in isolation. A referral under the EE Act and EPBC Act may be required, particularly for ecological values identified in this report including:
  - Clearance of >10 ha of an endangered EVC
  - Clearance of an important population and known habitat for Golden Sun Moth. The findings of the important population determination and the Significant Impact Assessment presented in Appendix E should be presented to DCCEEW for their consideration and feedback.
  - Further research into the significance of the population of Fragrant Saltbush is needed at the site. Whilst the site supports high numbers of plants, the species is quite widespread within Melbourne's western plains and more prolific than publicly-available records suggest.

Detailed design:

- During design, it is recommended that as many patches of native vegetation and Golden Sun Moth habitat as practicable are able to be incorporated into the design. For this site, those patches within proximity to Long Forest NCR should be considered a priority for retention and management commitments with the future land manager should be agreed upon. In general, larger patches of native grassland and those identified as being of higher quality (i.e. NTGVVP) should be prioritised over smaller, disconnected patches which are unlikely to persist in the face of future urban development. Retention of habitat patches within a design should avoid isolation of patches within a developed area and rather should retain patches connected with Long Forest NCR.
- Prioritise the retention of large trees, both those in patches and presenting as scattered trees, into the PSP as Conservation Reserves or Public Open Space to protect fauna habitat resources.
- Develop design recommendations and mitigation measures to inform development of Long Forest Estate and consider in line with the wider Merrimu PSP area.

Permits and approvals

As above, planning and approvals for the Merrimu PSP will need to be considered 'as a whole' and the cumulative impact under the EPBC Act, FFG Act, EE Act and the P&E Act will need to be completed. This current report details the results of the existing conditions assessment of the Long Forest Estate property which must be incorporated into EHP (2021) to enable an assessment of impacts on a precinct-wide scale to be completed.

In relation to the P&E Act, a planning permit from the relevant authority to remove native vegetation will be required. A planning submission seeking a permit to remove native vegetation will need to be accompanied by the following;

- a Native Vegetation Removal (NVR) report which can be obtained from DEECA following the submission of spatial data identifying vegetation proposed to be removed (spatial data is to be formatted to DEECA data standards). Whilst the EnSym provided in Appendix F details the offset obligations for Long Forest Estate, an NVR for the development of the Merrimu PSP will need to be actioned.
- an avoid and minimise statement that clearly demonstrates why vegetation must be removed, and that all options to retain vegetation including scattered trees have been explored and exhausted. This will need to be completed as a precinct-wide exercise to detail how the Merrimu PSP development has avoided and minimised impacts to native vegetation and threatened species habitat.

- an offset statement that provides evidence that the offsets for the project are available and can be secured. Once the cumulative impacts of the Merrimu PSP are known, an offset statement for the entire precinct will be required.

Prior to project commencement, DEECA will need to be supplied with a Native Vegetation Credit Register extract identifying that biodiversity offsets have been achieved and secured.

A permit under the FFG Act and/or the Wildlife Act may also be required.

Construction:

The following are high-level, general recommendations usually implemented for construction projects:

- Develop and implement appropriate mitigation measures prior to construction to avoid adverse consequential impact to retained native vegetation patches, scattered trees and Golden Sun Moth habitat. This may include;
    - Identify and fence No Go Zones to protect retained ecological values.
    - Preparing a Native Vegetation Management Plan which identifies measures to be taken to avoid impacts to retained scattered trees or trees in patches. The plan will also need to detail the timeline, commitments and responsible persons.
- Implement appropriate measures to avoid the spread of high threat environmental weeds including those identified in this report. Measures can be captured in an Environmental Management Plan for the Merrimu PSP. Active management to reduce woody weed cover and to control grass and herb weeds would aid in the recovery of native grassland values, however it should also be noted that in some instances African Box-thorn is inadvertently providing a refuge for Fragrant Saltbush which is growing amongst the box-thorn where it is protected from grazing.
- Implement measures to reduce impacts on wildlife during construction. These measures should be outlined in a Wildlife Management Plan and should consider:
    - Design of fencing to allow for the safe passage of wildlife through the landscape. For example:
        - fence construction should not use barbed wire to reduce the risk of injury or entanglement and should prevent populations of wildlife from becoming trapped within the development area.
- Develop species-specific management controls for any threatened species present or located during works in consultation with DEECA.

7.0 References

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Appendix A

Likelihood of threatened species

Appendix A Likelihood of threatened species

Table 13 Likelihood of threatened flora species

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat present? (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Acacia aspera subsp. *parviceps*	Rough Wattle		Endangered	(2009, 1)	Y	Possible	Some habitat may be present; however, species was not identified during field assessments.
Acacia rostriformis	Bacchus Marsh Wattle		Vulnerable, Protected	(2021, 142)	Y	Present	Species is confined to the Bacchus Marsh area (including Long Forest) and a recent record (ALA 2021) was identified within the study area. EHP (2021) recorded Bacchus Marsh Wattle within BMD land, adjacent to Gisborne Road.
Allocasuarina luehmannii	Buloke		Vulnerable, Protected	(2021, 12)	Y	Present immediately adjacent to study area	Species was identified immediately adjacent to the site within Long Forest NCR
Amphibromus fluitans	River Swamp Wallaby-grass	VU		PMST	N	Unlikely	No suitable habitat is present on site and no recent records have been identified in proximity to the study area.
Austrostipa breviglumis	Cane Spear-grass		Endangered	(2018, 18)	Y	Possible	Potential habitat is present on site and recent records are contained within Long Forest Nature Conservation Reserve
Austrostipa exilis	Heath Spear-grass		Vulnerable	(2009, 17)	Y	Possible	Potential habitat is present on site and recent records are contained within Long Forest Nature Conservation Reserve

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat present? (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Calotis lappulacea	Yellow Burr-daisy		Vulnerable, Protected	(2009, 1)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.
Cullen tenax	Tough Scurf-pea		Endangered, Protected	(2009, 1)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.
Dianella amoena	Matted Flax-lily	EN	Critically Endangered, Protected	PMST	Y	Unlikely	While potential habitat is present, targeted survey and subsequent field assessments have not identified the species on site. No recent records have been identified in proximity to the study area.
Dianella longifolia var. *grandis*	Flax-lily		Critically Endangered	(2016, 6)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.
Diuris basaltica	Small Golden Moths	EN	Critically Endangered, Protected	PMST	Y	Unlikely	While potential habitat is present, targeted survey and subsequent field assessments have not identified the species on site. No recent records have been identified in proximity to the study area.
Diuris fragrantissima	Sunshine Diuris	EN	Critically Endangered, Protected	PMST	Y	Unlikely	While potential habitat is present, targeted survey and subsequent field assessments have not identified the species on site. No recent records have been identified in proximity to the study area.

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat present? (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Dodonaea procumbens	Trailing Hop-bush	VU		PMST	Y	Unlikely	While potential habitat is present, targeted survey and subsequent field assessments have not identified the species on site. No recent records have been identified in proximity to the study area.
Eucalyptus baueriana subsp. *thalassina*	Werribee Blue-box		Endangered	(2018, 310)	N	Unlikely	While there are many records in close proximity to the site in Long Forest Conservation Reserve, the site was largely devoid of treed vegetation and the species was not identified within the study area.
Eucalyptus leucoxylon subsp. *connata*	Melbourne Yellow-gum		Endangered	(2018, 53)	N	Unlikely	While there are many records in close proximity to the site in Long Forest Conservation Reserve, the site was largely devoid of treed vegetation and the species was not identified within the study area. EHP (2021) recorded the species within two properties (subject to desktop assessment only). Homewood Consulting (2022) recorded 43 Yellow Gum as part of the Preliminary Arboriculture Assessment for Merrimu PSP (some of which may be Melbourne Yellow Gum).
Glycine latrobeana	Clover Glycine	VU	Vulnerable, Protected	PMST, (2020, 1)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.
Goodia medicaginea	Western Golden-tip		Endangered	(2008, 4)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat present? (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Lachnagrostis adamsonii	Adamson's Blown-grass	EN	Endangered, Protected	PMST	N	Unlikely	No suitable habitat is present on site and no recent records have been identified in proximity to the study area.
Lepidium hyssopifolium	Basalt Peppercress	EN	Endangered, Protected	PMST	Y	Unlikely	Some collections of the species have occurred around Bacchus Marsh; however, there are no recent records in close proximity to the study area
Leucochrysum albicans subsp. *tricolor*	Hoary Sunray	EN	Endangered, Protected	PMST	N	Unlikely	No suitable habitat is present on site and no recent records have been identified in proximity to the study area.
Nicotiana suaveolens	Austral Tobacco		Endangered	(2011, 25)	Y	Possible	Recent records have been identified immediately adjacent to the study area; however, field assessments have not identified the species.
Olearia minor	Satin Daisy-bush		Endangered, Protected	(2009, 1)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.
Pimelea hewardiana	Forked Rice-flower		Endangered	(2018, 16)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	CR	Critically Endangered, Protected	PMST, (2003, 5)	Y	Possible	While potential habitat is present, targeted survey and subsequent field assessments have not identified the species on site. EHP (2018a) recorded Spiny Rice-flower in land adjacent to the study area
Podolepis linearifolia	Basalt Podolepis		Endangered, Protected	(2020, 2)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat present? (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Prostanthera nivea var. *nivea*	Snowy Mint-bush		Vulnerable, Protected	(2011, 5)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.
Pterostylis conferta	Leprechaun Greenhood		Critically Endangered, Protected	(1996, 2)	N	Unlikely	No suitable habitat is present on site and no recent records have been identified in close proximity to the study area.
Pterostylis truncata	Brittle Greenhood		Critically Endangered, Protected	(2013, 56)	Y	Possible	Recent records have been identified immediately adjacent to the study area; however, field assessments have not identified the species.
Rhagodia parabolica	Fragrant Saltbush		Vulnerable	(2018, 500)	Y	Present	Species previously recorded on site and recorded during the current assessment..
Roepera billardierei	Coast Twin-leaf		Endangered	(2008, 2)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.
Rutidosis leptorhynchoides	Button Wrinklewort	EN	Endangered, Protected	PMST	N	Unlikely	No suitable habitat is present on site and no recent records have been identified in close proximity to the study area.
Senecio cunninghamii var. *cunninghamii*	Branching Groundsel		Endangered, Protected	(1994, 3)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.
Senecio macrocarpus	Large-headed Fireweed	VU	Critically Endangered, Protected	PMST	N	Unlikely	No suitable habitat is present on site and no recent records have been identified in close proximity to the study area.

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat present? (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Tripogonella loliiformis	Rye Beetle-grass		Endangered	(2008, 3)	Y	Possible	Potential habitat is present on site and a recent record in proximity to the study area.

Table 14 Likelihood of threatened fauna species

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat Present (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Birds							
Accipiter novaehollandiae	Grey Goshawk		Endangered	(2019, 1)	Y	Possible	Species may forage within the study area.
Actitis hypoleucos	Common Sandpiper	Mi	Vulnerable	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Anseranas semipalmata	Magpie Goose		Vulnerable	(2019, 1)	N	Unlikely	No suitable habitat present in the study area.
Anthochaera phrygia	Regent Honeyeater	CR	Critically Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Apus pacificus	Fork-tailed Swift	Mi		PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Aythya australis	Hardhead		Vulnerable	(2015, 11)	N	Unlikely	No suitable habitat present in the study area.
Biziura lobata	Musk Duck		Vulnerable	(2019, 17)	N	Unlikely	No suitable habitat present in the study area.
Botaurus poiciloptilus	Australasian Bittern	EN	Critically Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Calidris acuminata	Sharp-tailed Sandpiper	Mi		PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Calidris ferruginea	Curlew Sandpiper	CR, Mi	Critically Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Calidris melanotos	Pectoral Sandpiper	Mi		PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Falco hypoleucos	Grey Falcon	Vu	Vulnerable	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat Present (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Falco subniger	Black Falcon		Critically Endangered	(2019, 9)	Y	Likely	Species may forage within the study area.
Gallinago hardwickii	Latham's Snipe	Mi		PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Grantiella picta	Painted Honeyeater	Vu	Vulnerable	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Haliaeetus leucogaster	White-bellied Sea-Eagle		Endangered	(2018, 9)	N	Unlikely	No suitable habitat present in the study area.
Hieraaetus morphnoides	Little Eagle		Vulnerable	(2016, 41)	Y	Likely	Species may forage within the study area.
Hirundapus caudacutus	White-throated Needletail	Vu, Mi	Vulnerable	PMST, (2016, 10)	N	Possible	Species may overfly study area but unlikely to utilise it.
Hydroprogne caspia	Caspian Tern	Mi	Vulnerable	(2013, 3)	N	Unlikely	No suitable habitat present in the study area.
Lathamus discolor	Swift Parrot	CR	Critically Endangered	PMST (2007, 7)	N	Unlikely	No suitable habitat present in the study area.
Motacilla flava	Yellow Wagtail	Mi		PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Myiagra cyanoleuca	Satin Flycatcher	Mi		PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Ninox connivens	Barking Owl		Critically Endangered	(2002, 21)	Y	Possible	Species may forage within the study area.
Ninox strenua	Powerful Owl		Vulnerable	(2011, 4)	Y	Possible	Species may forage within the study area.
Numenius madagascariensis	Eastern Curlew	CR, Mi	Critically Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat Present (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Oreoica gutturalis	Crested Bellbird		Endangered	(2003, 18)	Y	Possible	Species may forage within the study area.
Oxyura australis	Blue-billed Duck		Vulnerable	(2018, 3)	N	Unlikely	No suitable habitat present in the study area.
Pandion cristatus	Eastern Osprey	Mi		PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Pedionomus torquatus	Plains-wanderer	CR	Critically Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Pyrrholaemus sagittatus	Speckled Warbler		Endangered	(2019, 125)	Y	Likely	Past records identified within the study area and within the Long Forest Conservation Reserve.
Rhipidura rufifrons	Rufous Fantail	Mi		PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Rostratula australis	Australian Painted Snipe	EN	Critically Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Spatula rhynchotis	Australasian Shoveler		Vulnerable	(2006, 5)	N	Unlikely	No suitable habitat present in the study area.
Stagonopleura guttata	Diamond Firetail		Vulnerable	(2018, 72)	Y	Likely	Past records identified within the study area and within the Long Forest Conservation Reserve.
Stictonetta naevosa	Freckled Duck		Endangered	(2006, 2)	N	Unlikely	No suitable habitat present in the study area.
Tringa nebularia	Common Greenshank	Mi	Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Mammals							
Dasyurus maculatus	Spot-tailed Quoll	EN	Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.

Scientific Name	Common Name	Conservation Status		Record (Year, #)	Habitat Present (Y/N)	Likelihood of Occurrence	Rationale
		EPBC Act	FFG Act				
Ornithorhynchus anatinus	Platypus		Vulnerable	(2018, 4)			
Pteropus poliocephalus	Grey-headed Flying-fox	VU	Vulnerable	PMST (2020, 3)	N	Unlikely	No suitable habitat present in the study area.
Reptiles							
Aprasia parapulchella	Pink-tailed Worm-Lizard	VU	Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Delma impar	Striped Legless Lizard	VU	Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Tympanocryptis pinguicolla	Grassland Earless Dragon	EN	Critically Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Amphibians							
Litoria raniformis	Growling Grass Frog	VU	Vulnerable	PMST (2018, 13)	N	Unlikely	No suitable habitat present in the study area.
Fishes							
Prototroctes maraena	Australian Grayling	VU	Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Galaxiella pusilla	Dwarf Galaxias	VU	Endangered	PMST	N	Unlikely	No suitable habitat and no recent records in proximity to study area.
Invertebrates							
Synemon plana	Golden Sun Moth	CR	Vulnerable	PMST (2012, 331)	Y	Present	Species recorded during the current assessment.

Appendix B

EPBC - Protected Matters Search Tool Results

Appendix B EPBC - Protected Matters Search Tool Results

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

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

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

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

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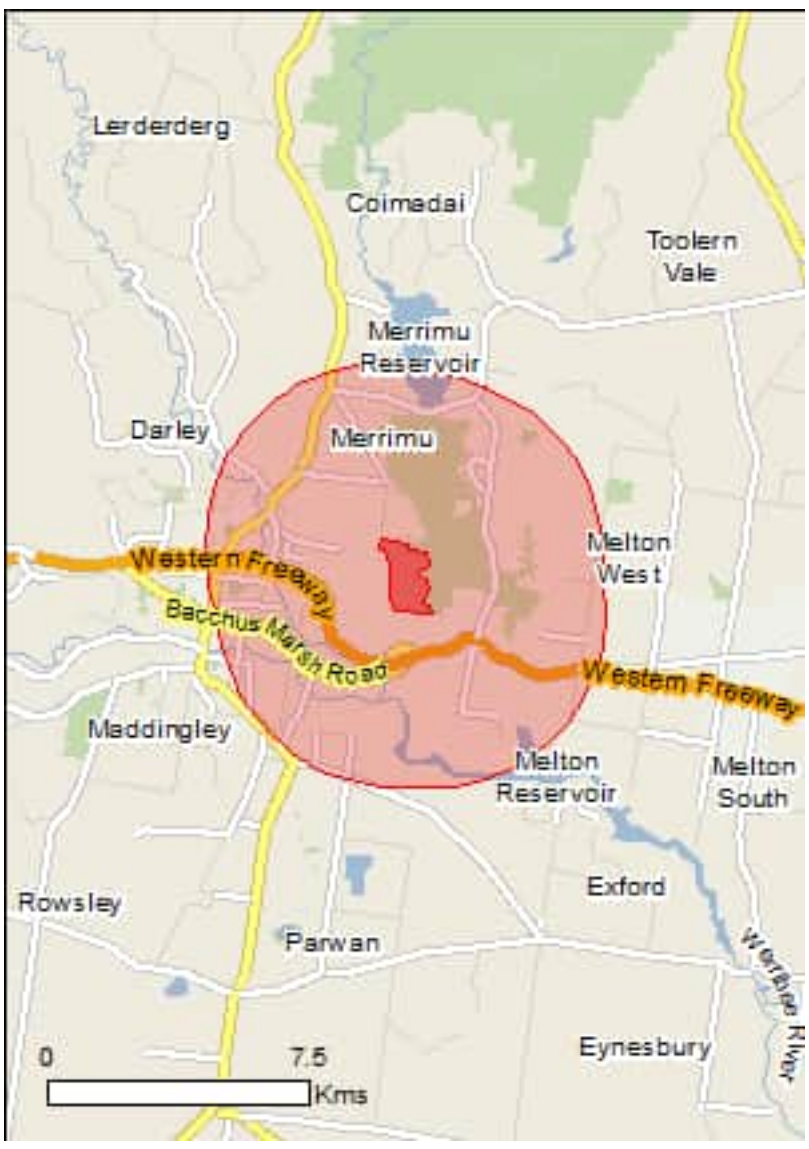

This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates

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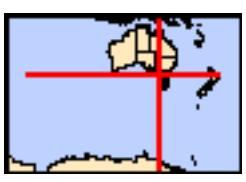

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	31
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	1
Invasive Species:	36
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Port phillip bay (western shoreline) and bellarine peninsula	20 - 30km upstream

Listed Threatened Ecological Communities [Resource Information]

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

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

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Galaxiella pusilla Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
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
Insects		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat known to occur within area
Mammals		
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
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area
Diuris basaltica Small Golden Moths Orchid, Early Golden Moths [64654]	Endangered	Species or species habitat known to occur within area
Diuris fragrantissima Sunshine Diuris, Fragrant Doubletail, White Diuris [21243]	Endangered	Species or species habitat may occur within area
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely to occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
[Pimelea spinescens subsp. spinescens](#) Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat known to occur within area
[Rutidosis leptorhynchoides](#) Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area
[Senecio macrocarpus](#) Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat known to occur within area
Reptiles		
[Aprasia parapulchella](#) Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
[Delma impar](#) Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat known to occur within area
[Tympanocryptis pinguicolla](#) Grassland Earless Dragon [66727]	Endangered	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Breeding known to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Defence - RSL Hall

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans		
Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Long Forest F.F.R.	VIC

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
West Victoria RFA	Victoria

Invasive Species [Resource Information]

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

Name	Status	Type of Presence

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Turdus philomelos Song Thrush [597]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur

Name	Status	Type of Presence within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-37.659666 144.480116,-37.659632 144.480116,-37.660686 144.486897,-37.662045 144.487283,-37.662452 144.492089,-37.664966 144.492433,-37.666563 144.489471,-37.667752 144.491918,-37.669994 144.492518,-37.672813 144.49063,-37.673493 144.492819,-37.675089 144.493119,-37.674681 144.483463,-37.673153 144.483077,-37.671862 144.482176,-37.665136 144.481961,-37.661807 144.481103,-37.661909 144.479644,-37.659666 144.480116

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 C

Native vegetation – habitat hectare and tree results

Appendix C Native vegetation – Habitat hectare tables and tree results

Table 15 Habitat Hectare tables

Habitat Zone			HZ1	HZ2	HZ3	HZ4	HZ5	HZ6	HZ7	HZ8	HZ9	HZ10
EVC			132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
Bioregional Conservation Status (BCS)			E	E	E	E	E	E	E	E	E	E
Threatened Ecological Community			WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG
Site Condition	Large Old Trees	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	15	0	0	0	0	0	0	0	0	0	0
	Understorey	25	5	5	5	5	5	5	5	5	5	5
	Recruitment	10	3	3	3	3	3	3	3	3	3	3
	Organic Litter	5	2	2	2	2	2	2	2	2	2	2
	Logs	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total Site Score	75	10	10	10	10	10	10	10	10	10	10
Standardiser		-	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Standardised Site Score		-	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6
Landscape Context	Patch Size	10	1	1	1	1	1	1	1	1	1	1
	Distance to Core Area	5	3	3	3	3	3	3	3	3	3	3
	Neighbourhood	10	3	3	3	3	3	3	3	3	3	3
	Total Landscape Score	25	7	7	7	7	7	7	7	7	7	7
Habitat Score		100	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6
Habitat Points = Score/100		1	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060
Total area of Habitat Zone (ha)			0.0597	0.0116	0.3965	0.2070	0.4293	0.0119	0.0812	1.6108	0.0151	0.1863
Habitat Hectares (Hha)			0.0123	0.0024	0.0817	0.0426	0.0884	0.0024	0.0167	0.3318	0.0031	0.0384

Habitat Zone			HZ11	HZ12	HZ13	HZ14	HZ15	HZ16	HZ17	HZ18	HZ19	HZ20
EVC			132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
Bioregional Conservation Status (BCS)			E	E	E	E	E	E	E	E	E	E
Threatened Ecological Community			WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG
Site Condition	Large Old Trees	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	15	0	0	0	0	0	0	0	0	0	0
	Understorey	25	5	5	5	5	5	5	5	5	5	5
	Recruitment	10	3	3	3	3	3	3	3	3	3	3
	Organic Litter	5	2	2	2	2	2	2	2	2	2	2
	Logs	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total Site Score	75	10	10	10	10	10	10	10	10	10	10
Standardiser		-	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Standardised Site Score		-	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6
Landscape Context	Patch Size	10	1	1	1	1	1	1	2	1	1	1
	Distance to Core Area	5	3	3	3	3	3	3	3	3	3	3
	Neighbourhood	10	3	3	3	3	3	3	3	3	3	3
	Total Landscape Score	25	7	7	7	7	7	7	8	7	7	7
Habitat Score		100	20.6	20.6	20.6	20.6	20.6	20.6	21.6	20.6	20.6	20.6
Habitat Points = Score/100		1	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2160	0.2060	0.2060	0.2060
Total area of Habitat Zone (ha)			0.0087	0.0530	0.0842	0.0172	0.0212	0.3374	2.0575	0.3269	0.2337	0.0335
Habitat Hectares (Hha)			0.0018	0.0109	0.0174	0.0035	0.0044	0.0695	0.4444	0.0673	0.0481	0.0069

Habitat Zone			HZ21	HZ22	HZ23	HZ24	HZ25	HZ26	HZ27	HZ28	HZ29	HZ30
EVC			132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
Bioregional Conservation Status (BCS)			E	E	E	E	E	E	E	E	E	E
Threatened Ecological Community			WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG
Site Condition	Large Old Trees	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	15	0	0	0	0	0	0	0	0	0	0
	Understorey	25	5	5	5	5	5	5	5	5	5	5
	Recruitment	10	3	3	3	3	3	3	3	3	3	3
	Organic Litter	5	2	2	2	2	2	2	2	2	2	2
	Logs	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total Site Score	75	10	10	10	10	10	10	10	10	10	10
Standardiser		-	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Standardised Site Score		-	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6
Landscape Context	Patch Size	10	1	1	1	1	1	1	1	1	1	1
	Distance to Core Area	5	3	3	3	3	3	3	3	3	3	3
	Neighbourhood	10	3	3	3	3	3	3	3	3	3	3
	Total Landscape Score	25	7	7	7	7	7	7	7	7	7	7
Habitat Score		100	17	17	17	17	17	17	17	17	17	17
Habitat Points = Score/100		1	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060
Total area of Habitat Zone (ha)			0.6051	0.2522	0.0336	0.0267	0.0371	0.1356	0.0262	0.0141	0.1992	0.0490
Habitat Hectares (Hha)			0.1246	0.0520	0.0069	0.0055	0.0077	0.0279	0.0054	0.0029	0.0410	0.0101

Habitat Zone			HZ31	HZ32	HZ33	HZ34	HZ35	HZ36	HZ37	HZ38	HZ39	HZ40
EVC			132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
Bioregional Conservation Status (BCS)			E	E	E	E	E	E	E	E	E	E
Threatened Ecological Community			WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	NTGVVP WBPG
Site Condition	Large Old Trees	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	15	0	0	0	0	0	0	0	0	0	4
	Understorey	25	5	5	5	5	5	5	5	5	5	10
	Recruitment	10	3	3	3	3	3	3	3	3	3	6
	Organic Litter	5	2	2	2	2	2	2	2	2	2	3
	Logs	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total Site Score	75	10	10	10	10	10	10	10	10	10	23
Standardiser		-	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Standardised Site Score		-	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	31.28
Landscape Context	Patch Size	10	2	1	1	1	1	1	1	1	1	1
	Distance to Core Area	5	3	3	3	3	3	3	3	3	3	3
	Neighbourhood	10	3	3	3	3	3	3	3	3	3	3
	Total Landscape Score	25	8	7	7	7	7	7	7	7	7	7
Habitat Score		100	21.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	38.28
Habitat Points = Score/100		1	0.2160	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.3828
Total area of Habitat Zone (ha)			2.1759	0.1940	0.0342	0.0215	0.6181	0.0543	0.0417	0.2712	0.1692	0.8807
Habitat Hectares (Hha)			0.4700	0.0400	0.0070	0.0044	0.1273	0.0112	0.0086	0.0559	0.0349	0.3371

Habitat Zone			HZ41	HZ42	HZ43	HZ44	HZ45	HZ46	HZ47	HZ48	HZ49	HZ50
EVC			132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63	132_63
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
Bioregional Conservation Status (BCS)			E	E	E	E	E	E	E	E	E	E
Threatened Ecological Community			WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG
Site Condition	Large Old Trees	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	15	0	0	0	0	0	0	0	0	0	0
	Understorey	25	5	5	5	5	5	5	5	5	5	5
	Recruitment	10	3	3	3	3	3	3	3	3	3	3
	Organic Litter	5	2	2	2	2	2	2	2	2	2	2
	Logs	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total Site Score	75	10	10	10	10	10	10	10	10	10	10
Standardiser		-	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Standardised Site Score		-	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6
Landscape Context	Patch Size	10	1	1	1	1	1	1	1	1	1	1
	Distance to Core Area	5	3	3	3	3	3	3	3	3	3	3
	Neighbourhood	10	3	3	3	3	3	3	3	3	3	3
	Total Landscape Score	25	7	7	7	7	7	7	7	7	7	7
Habitat Score		100	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6
Habitat Points = Score/100		1	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060
Total area of Habitat Zone (ha)			0.5150	0.2178	0.6641	0.0337	0.1518	0.2568	0.1091	0.0932	0.0723	0.0193
Habitat Hectares (Hha)			0.1061	0.0449	0.1368	0.0069	0.0313	0.0529	0.0225	0.0192	0.0149	0.0040

Habitat Zone			HZ51	HZ52	HZ53	HZ54	HZ55	HZ56	HZ57	HZ58
EVC			132_63	132_63	132_63	132_63	132_63	132_63	132_63	64
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
Bioregional Conservation Status (BCS)			E	E	E	E	E	E	E	V
Threatened Ecological Community			WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	WBPG	RCOS
Site Condition	Large Old Trees	10	NA	NA	NA	NA	NA	NA	NA	7
	Tree Canopy Cover	5	NA	NA	NA	NA	NA	NA	NA	4
	Lack of Weeds	15	0	0	0	0	0	0	0	4
	Understorey	25	5	5	5	5	5	5	5	15
	Recruitment	10	3	3	3	3	3	3	3	5
	Organic Litter	5	2	2	2	2	2	2	2	3
	Logs	5	NA	NA	NA	NA	NA	NA	NA	3
	Total Site Score	75	10	10	10	10	10	10	10	41
Standardiser		-	1.36	1.36	1.36	1.36	1.36	1.36	1.36	N/A
Standardised Site Score		-	13.6	13.6	13.6	13.6	13.6	13.6	13.6	N/A
Landscape Context	Patch Size	10	1	1	1	1	1	1	1	1
	Distance to Core Area	5	3	3	3	3	3	3	3	4
	Neighbourhood	10	3	3	3	3	3	3	3	3
	Total Landscape Score	25	7	7	7	7	7	7	7	8
Habitat Score		100	20.6	20.6	20.6	20.6	20.6	20.6	20.6	49
Habitat Points = Score/100		1	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.2060	0.4900
Total area of Habitat Zone (ha)			0.2137	0.1474	0.0049	0.0126	0.2106	0.0213	0.0638	0.5086
Habitat Hectares (Hha)			0.0440	0.0304	0.0010	0.0026	0.0434	0.0044	0.0131	0.2492

Table 16 Trees recorded within the study area

Tree ID	Scientific Name	Common Name	DBH (cm)	Circumference (cm)	Tree Type	Notes
ST1	*Eucalyptus microcarpa*	Grey Box	70	219.91	Large Scattered Tree	Small hollow (multi)
ST2	*Eucalyptus microcarpa*	Grey Box	109	342.43	Large Scattered Tree	Small hollow (multi)
ST3	*Eucalyptus microcarpa*	Grey Box	111	348.72	Large Scattered Tree	Small hollow (multi)
ST4	*Eucalyptus microcarpa*	Grey Box	95	298.45	Large Scattered Tree	Large hollow (single)
ST5	*Eucalyptus microcarpa*	Grey Box	69	216.77	Large Scattered Tree	
ST6	*Eucalyptus microcarpa*	Grey Box	100	314.16	Large Scattered Tree	
ST7	*Eucalyptus microcarpa*	Grey Box	91	285.88	Large Scattered Tree	Large hollow (multi), Small hollow (multi)
ST8	*Eucalyptus microcarpa*	Grey Box	89	279.60	Large Scattered Tree	Large hollow (multi)
ST12	*Eucalyptus microcarpa*	Grey Box	11	34.56	Small Scattered Tree	
ST9	*Eucalyptus microcarpa*	Grey Box	60	188.50	Large Scattered Tree	
ST10	*Eucalyptus microcarpa*	Grey Box	130	408.41	Large Scattered Tree	Small hollow (multi)
ST13	*Eucalyptus microcarpa*	Grey Box	10	31.42	Small Scattered Tree	
ST14	*Eucalyptus behriana*	Bull Mallee	12	37.70	Small Scattered Tree	
ST15	*Eucalyptus behriana*	Bull Mallee	12	37.70	Small Scattered Tree	
ST16	*Eucalyptus behriana*	Bull Mallee	7	21.99	Small Scattered Tree	
ST17	*Eucalyptus behriana*	Bull Mallee	25	78.54	Small Scattered Tree	
ST11	*Eucalyptus behriana*	Bull Mallee	45	141.37	Large Scattered Tree	
ST18	*Eucalyptus behriana*	Bull Mallee	4	12.57	Small Scattered Tree	
ST19	*Eucalyptus behriana*	Bull Mallee	23	72.26	Small Scattered Tree	
P58	*Eucalyptus microcarpa*	Grey Box	84	263.89	Large Tree in Patch	Large hollow (single), Small hollow (multi)
P58	*Eucalyptus microcarpa*	Grey Box	93	292.17	Large Tree in Patch	Large hollow (multi)
P58	*Eucalyptus microcarpa*	Grey Box	112	351.86	Large Tree in Patch	Large hollow (multi)
P58	*Eucalyptus microcarpa*	Grey Box	50	157.08	Large Tree in Patch	
P58	*Eucalyptus microcarpa*	Grey Box	100	314.16	Large Tree in Patch	Large hollow (single), Small hollow (multi)

Appendix D

Flora and fauna results

Appendix D Flora and fauna results

Table 17 Flora species observed in the study area

Common Name	Scientific Name	Status	EHP 2021 (Merrimu PSP)	AECOM 2019/2021 (Long Forest Estate
Acacia acinacea s.l.	Gold-dust Wattle	P	Y	Y
Acacia implex	Lightwood		Y	Y
Acacia paradoxa	Hedge Wattle		Y	N
Acacia pycnantha	Golden Wattle	P	Y	N
Acacia rostriformis	Bacchus Marsh Wattle	P,v	Y	N
Acaena echinata	Sheep's Burr		Y	Y
Asperula conferta	Common Woodruff		Y	Y
Atriplex semibaccata	Berry Saltbush		Y	Y
Austrostipa bigeniculata	Kneed Spear-grass		Y	Y
Austrostipa densiflora	Foxtail Spear-grass		Y	N
Austrostipa elegantissima	Feather Spear-grass		Y	N
Austrostipa gibbosa	Spurred Spear-grass		Y	Y
Austrostipa scabra var. *scabra*	Rough Spear-grass		Y	Y
Brachyscombe dentata	Lobe-seed Daisy	P	Y	Y
Caesia calliantha	Blue Grass-lily		N	Y
Calocephalus citreus	Lemon Beauty-heads l	P	Y	Y
Carpobrotus modestus	Inland Pigface		Y	Y
Cassinia sifton	Sifton Bush		Y	N
Cassytha glabella	Slender Dodder-laurel		Y	N
Centrolepis aristata	Pointed Centrolepis		Y	N
Cheilanthes sieberi	Narrow Rock-fern	P	Y	Y
Chamaesyce drumondii	Flat Spurge		Y	N
Chloris truncata	Windmill grass		Y	Y
Chrysocephalum apiculatum	Common Everlasting	P	Y	N
Clematis microphylla	Small-leaved Clematis		Y	Y

Common Name	Scientific Name	Status	EHP 2021 (Merrimu PSP)	AECOM 2019/2021 (Long Forest Estate
Convolvulus angustissima sp. agg.	Pink Bindweed		Y	N
Convolvulus angustissimus subsp. *omnigracilis*	Slender Bindweed		Y	N
Convolvulus spp.	Bindweed		N	Y
Crassula decumbens var. *decumbens*	Spreading Crassula		Y	Y
Crassula sieberiana s.l.	Siebers Crassula		Y	N
Dichondra repens	Kidney weed		Y	Y
Dodonaea viscosa	Sticky Hop-bush		Y	Y
Einadia hastata	Saloop		Y	N
Einadia nutans subsp. nutans	Nodding Saltbush		Y	Y
Eleocharis acuta	Common Spike-sedge		Y	N
Enchylaena tomentosa var. *tomentosa*	Ruby Saltbush		Y	Y
Eremophila deserti	Turkey Bush		N	Y
Erodium crinitum	Blue Herons-bill		Y	Y
Eucalyptus behriana	Bull Mallee		Y	Y
Eucalyptus leucoxylon subsp. *connata*	Melbourne Yellow Gum	v	Y	N
Eucalyptus leucoxylon subsp. *pruinosa*	Waxy Yellow-gum		Y	N
Eucalyptus melliodora	Yellow Box		Y	N
Eucalyptus microcarpa	Grey-box		Y	Y
Eucalyptus obliqua	Messmate Stringybark		Y	N
Euchiton sphaericus	Annual Cudweed	P	Y	N
Eutaxia microphylla	Common Eutaxia		Y	N
Goodenia ovata	Hop Goodenia		Y	N
Helichrysum luteoalbum	Jersey Cudweed	P	Y	Y
Juncus holoschoenus	Joint-leaf Rush		Y	N

Common Name	Scientific Name	Status	EHP 2021 (Merrimu PSP)	AECOM 2019/2021 (Long Forest Estate
Juncus pallidus	Pale Rush		Y	N
Linum marginale	Native Flax		Y	N
Lomandra filiformis	Wattle Mat-rush		Y	N
Lythrum hyssopifolia	Small Loosestrife		Y	N
Maireana enchylaenoides	Wingless Bluebush		Y	Y
Melaleuca lanceolata	Moonah		Y	N
Melicytus dentatus s.l.	Tree Violet		Y	N
Oxalis exilis Shady	Wood-sorrel		Y	N
Oxalis perennans	Grassland Wood-sorrel		Y	Y
Pimelea curviflora	Curved Rice-flower		Y	Y
Pimelea spinescens subsp. spinescens	Spiny Rice-flower CR L e	CR, ce	Y	N
Ptilotus spatulatus	Pussy Tails		Y	Y
Pycnosorus chrysanthes	Golden Billy-buttons l	P	Y	N
Rhagodia parabolica	Fragrant Saltbush r	r	Y	Y
Rumex brownii	Slender Dock		Y	N
Rumex conglomeratus	Clustered Dock		Y	N
Rytidosperma caespitosum	Common Wallaby-grass		Y	Y
Rytidosperma duttoniana	Brown-back Wallaby-grass		Y	Y
Rytidosperma geniculatum	Kneed Wallaby-grass		Y	Y
Rytidosperma racemosum	Wallaby Grass		Y	Y
Rytidosperma setaceum	Bristly Wallaby-grass		Y	Y
Sclerolaena diacantha	Grey Copperburr		Y	N
Sclerolaena muricata var. *muricata*	Black Roly-poly		Y	N
Sclerolaena muricata var. *villosa*	Grey Roly-poly		Y	N
Senecio pinnatifolius	Variable Groundsel l	P	Y	N

Common Name	Scientific Name	Status	EHP 2021 (Merrimu PSP)	AECOM 2019/2021 (Long Forest Estate
Senecio quadridentalis	Cotton Fireweed	P	Y	Y
Senna form taxon 'filifolia'	Fine-leaf Desert Cassia		Y	N
Themeda triandra	Kangaroo Grass		Y	Y
Typha spp.	Bulrush		Y	N
Vittadinia cuneata	Fuzzy New Holland Daisy	P	Y	Y
Wahlenbergia gracilis	Sprawling Bluebell		Y	Y
Wahlenbergia luteola	Bronze Bluebell		Y	N
Walwhalleya proluta	Rigid Panic		Y	Y
Xerochrysum viscosum	Sticky Everlasting	P	Y	N
Introduced				
Acetosella vulgaris	Sheep Sorrel		Y	Y
Aira caryophyllea subsp. *caryophyllea*	Silvery Hair-grass		Y	Y
Arctotheca calendula	Cape Weed		Y	Y
Arpentia cordifolia	Heart-leaf Ice plant		Y	N
Asparagus asparagoides	Bridal Creeper	W	Y	Y
Avena spp.	Oat		Y	Y
Brassica spp.	Turnip		Y	Y
Brassica tournefortii	Mediterranean Turnip		Y	N
Briza minor	Lesser Quaking-grass		Y	Y
Bromus catharticus	Prairie Grass		Y	N
Bromus diandrus	Great Brome		Y	Y
Bromus hordeaceus subsp. *hordeaceus*	Soft Brome		Y	N
Bromus rubens	Red Brome		Y	N
Centaurium erythraea	Common Centaury		Y	N
Cirsium vulgare	Spear Thistle		Y	Y
Conyza bonariensis	Flaxleaf Fleabane		Y	Y
Conyza spp.	Fleabane		Y	Y

Common Name	Scientific Name	Status	EHP 2021 (Merrimu PSP)	AECOM 2019/2021 (Long Forest Estate
Coprosma repens	*Mirror Bush*		Y	N
Cupressus macrocarpa	Monterey Cypress		Y	N
Cynara cardunculus subsp. *flavescens*	Artichoke Thistle		Y	Y
Cynodon dactylon var. *dactylon*	Couch		Y	Y
Cyperus eragrostis	Drain Flat-sedge		Y	N
Dactylis glomerata	Cocksfoot		Y	Y
Dittrichia graveolens	Stinkwort		Y	N
Ehrharta erecta var. *erecta*	Panic Veldt-grass		Y	N
Ehrhata longifolia	Annual Veldt-grass		Y	N
Erodium circutarium	Common Stork-bill		Y	N
Eucalyptus botryoides	Southern Mahogany		Y	N
Eucalyptus cladocalyx	Sugar Gum		Y	N
Galenia pubescens var. *pubescens*	Galenia		Y	Y
Gazania linearis	Gazania		Y	N
Helminthotheca echioides	Ox-tongue		Y	Y
Hirschfeldia incana	Buchan Weed		Y	N
Holcus lanatus	Yorkshire Fog		Y	N
Hypericum perforatum	St John's Wort		Y	N
Hordeum spp.	Barley		Y	N
Hypochoeris radicata	Flatweed		Y	Y
Lepidum africanum	Common Peppercress		Y	Y
Linaria pelisseriana	Pelisser's Toad-flax		Y	N
Lolium perenne Perennial	Rye-grass		Y	Y
Lycium ferocissimum	African Box-thorn	W	Y	Y
Madiola caroliniana	Red-flower Mallow		Y	N
Marrubium vulgare	Horehound		Y	Y
Medicago minima	Burr Medic		Y	Y

Common Name	Scientific Name	Status	EHP 2021 (Merrimu PSP)	AECOM 2019/2021 (Long Forest Estate
Medicago polymorpha	Burr Medic		Y	N
Nassella leucotricha	Texas Needle-grass		N	Y
Nassella neesiana	Chilean Needle-grass	W	Y	Y
Nassella trichotoma	Serrated Tussock	W	Y	Y
Olea europaea	Olive		Y	N
Opuntia spp.	Prickly Pear	W	Y	Y
Oxalis pes-caprae	Soursob		Y	Y
Paspalum dilatatum	Paspalum		Y	N
Petrohagia dubia	Velvety Pink		Y	N
Phalaris aquatica	Toowoomba Canary-grass		Y	Y
Physalis hederifolia	Sticky Ground-cherry		Y	Y
Plantago coronopus	Buck's-horn Plantain		Y	N
Plantago lanceolata	Ribwort		Y	Y
Prunus spp.	Prunus		Y	N
Rapistrum rugosum	Giant Mustard		Y	N
Romulea rosea	Onion Grass		Y	Y
Rosa rubiginosa	Sweet Briar		Y	Y
Rubus fruticosus spp. agg. [Rubus parvifolius]	Blackberry	W	Y	Y
Rumex crispus	Curled Dock		Y	Y
Salvia verbenaca	Wild Sage		Y	N
Schinus molle	Pepper Tree		Y	N
Sherardia arvensis	Field Madder		Y	N
Solanum nigrum s.l.	Black Nightshade		Y	N
Sonchus asper s.l.	Rough Sow-thistle		Y	Y
Sonchus oleraceus	Common Sow-thistle		Y	Y
Taraxacum sp. agg.	Dandelion		Y	N
Tribulus terrestris	Caltrop		Y	N
Trifolium angustifolium var. *angustifolium*	Narrow-leaf Clover		Y	Y

Common Name	Scientific Name	Status	EHP 2021 (Merrimu PSP)	AECOM 2019/2021 (Long Forest Estate
Trifolium spp.	Clover		Y	N
Vulpia bromoides	Squirrel-tail Fescue		Y	Y
Vulpia myuros	Rat's-tail Fescue		Y	N

Table 18 Fauna species observed in the study area

Common Name	Scientific Name	Native/ Introduced	EHP 2021 (Merrimu PSP)	AECOM 2021/2022 (Long Forest Estate)
Mammals				
Common Ringtail Possum	*Pseudocheirus peregrinus*	Native	Y	N
European Hare	*Lepus europaeus*	Introduced	Y	Y
European Rabbit	*Oryctolagus cuniculus*	Introduced	Y	Y
Eastern Grey Kangaroo	*Macropus giganteus*	Native	Y	Y
House Mouse	*Mus musculus*	Introduced	Y	N
Red Fox	*Vulpes vulpes*	Introduced	Y	Y
Birds				
Australasian Pipit	*Anthus novaeseelandiae*	Native	Y	Y
Australasian Swamphen	*Porphyrio melanotus*	Native	Y	N
Australian Magpie	*Gymnorhina tibicen*	Native	Y	Y
Australian White Ibis	*Threskiornis moluccus*	Native	Y	N
Banded Lapwing	*Vanellus tricolor*	Native	Y	N
Black-shouldered Kite	*Elanus axillaris*	Native	Y	Y
Blue-winged Parrot	*Neophema chrysostoma*	Native (EPBC Act)	Y	Y
Brown Falcon	*Falco berigora*	Native	Y	Y
Brown Goshawk	*Accipiter fasciatus*	Native	Y	N
Brown Quail	*Coturnix ypsilophora australis*	Native	Y	N
Brown Songlark	*Cincloramphus cruralis*	Native	Y	N
Cattle Egret	*Ardea ibis*	Native	Y	N
Collared Sparrowhawk	*Accipiter cirrhocephalus*	Native	Y	N
Common Blackbird	*Turdus merula*	Introduced	Y	Y
Common Myna	*Acridotheres tristis*	Introduced	Y	Y
Common Starling	*Sturnus vulgaris*	Introduced	Y	Y
Crested Pigeon	*Ocyphaps lophotes*	Native	N	Y
Crimson Rosella	*Platycercus elegans*	Native	Y	Y
Darter	*Anhinga novaehollandiae*	Native	Y	N

Common Name	Scientific Name	Native/ Introduced	EHP 2021 (Merrimu PSP)	AECOM 2021/2022 (Long Forest Estate)
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	Native	N	Y
Dusky Woodswallow	*Artamus cyanopterus*	Native	Y	N
Eastern Great Egret	*Ardea modesta*	Native	Y	N
Eastern Rosella	*Platycercus eximius*	Native	Y	Y
Eurasian Coot	*Fulica atra*	Native	Y	N
European Goldfinch	*Carduelis carduelis*	Introduced	Y	Y
European Skylark	*Alauda arvensis*	Introduced	Y	Y
Fan-tailed Cuckoo	*Cacomantis flabelliformis*	Native	Y	Y
Galah	*Eolophus roseicapilla*	Native	Y	Y
Golden-headed Cisticola	*Cisticola exilis*	Native	Y	N
Grey Fantail	*Rhipidura albiscarpa*	Native	Y	Y
Grey Teal	*Anas gracilis*	Native	Y	N
House Sparrow	*Passer domesticus*	Introduced	Y	Y
Little Raven	*Corvus mellori*	Native	Y	Y
Long-billed Corella	*Cacatua tenuirostris*	Native	Y	Y
Magpie-lark	*Grallina cyanoleuca*	Native	Y	Y
Masked Lapwing	*Vanellus miles*	Native	Y	Y
Nankeen Kestrel	*Falco cenchroides*	Native	Y	Y
Pacific Black Duck	*Anas superciliosa*	Native	Y	N
Red Wattlebird	*Anthochaera carunculata*	Native	Y	Y
Red-rumped Parrot	*Psephotus haematonotus*	Native	Y	Y
Southern Boobook	*Ninox novaeseelandiae*	Native	Y	N
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	Native	Y	Y
Straw-necked Ibis	*Threskiornis spinicollis*	Native	Y	N
Striated Pardalote	*Pardalotus striatus*	Native	Y	Y
Striated Thornbill	*Acanthiza lineata*	Native	Y	Y
Stubble Quail	*Coturnix pectoralis*	Native	Y	N
Sulphur-crested Cockatoo	*Cacatua galerita*	Native	Y	Y

Common Name	Scientific Name	Native/ Introduced	EHP 2021 (Merrimu PSP)	AECOM 2021/2022 (Long Forest Estate)
Superb Fairy-wren	*Malurus cyaneus*	Native	Y	Y
Tawny Frogmouth	*Podargus strigoides*	Native	Y	N
Wedge-tailed Eagle	*Aquila audax*	Native	Y	Y
Welcome Swallow	*Hirundo neoxena*	Native	Y	Y
Whistling Kite	*Haliastur sphenurus*	Native	Y	Y
White-browed woodswallow	*Artamus superciliosus*	Native	Y	N
White-faced heron	*Egretta novaehollandiae*	Native	Y	Y
White-fronted Chat	*Epthianura albifrons*	Native	N	Y
White-necked Heron	*Ardea pacifica*	Native	Y	N
Willie Wagtail	*Rhipidura leucophrys*	Native	Y	Y
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	Native	Y	Y
Reptiles				
Bougainville's Skink	*Lerista bougainvillii*	Native	Y	N
Delicate Skink	*Lampropholis delicata*	Native	Y	N
Eastern Blue-tongue Lizard	*Tiliqua scincoides scincoides*	Native	Y	Y
Garden Skink	*Lampropholis guichenoti*	Native	Y	N
Marbled Gecko	*Christinus marmoratus*	Native	Y	N
Tiger Snake	*Notechis scutatus*	Native	Y	N
Frogs				
Common Froglet	*Crinia signifera*	Native	Y	N
Eastern Banjo frog	*Limnodynastes dumerilii*	Native	Y	Y
Growling Grass Frog	*Litoria raniformis*	Native (EPBC Act)	Y	Y
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	Native	Y	Y
Invertebrates				
Golden Sun Moth	*Synemon plana*	Native (EPBC Act)	Y	Y

Appendix E

Golden Sun Moth legislative discussion

Appendix E Golden Sun Moth legislative discussion

An assessment of the proposed development of the study area (total loss scenario) against the significant impact criteria defined in the EPBC Act *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (DoE 2013) for a vulnerable species is outlined in Table 20 below. Although there are species-specific significant impact guidelines for Golden Sun Moth (DEWHA 2009), those criteria for impacts were defined based on the species being listed as critically endangered rather than vulnerable. As such, the applicability of the significant impact thresholds is uncertain. The assessment against the significant impact criteria for a vulnerable species in Table 20 draws on information contained within DEWHA (2009) where relevant.

For vulnerable species, the significant impact assessment relates to an 'important population'. DoE 2013) defines an 'important population' as *a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:*

- *key source population, either for breeding or dispersal*
- *a population that is necessary for maintaining genetic diversity, and/or*
- *a population that is near the edge of the species range.*

As assessment of whether the population at Long Forest Estate meets the criteria for an important population is provided in Table 19.

Table 19 Important population criteria – Golden Sun Moth

Important population criteria	Criteria met?	Notes
Recovery plan	N/A	There is no adopted or made Recovery Plan for this species therefore important populations have not been identified through that mechanism. The Conservation Advice (DAWE, 2021) indicates that Golden Sun Moth is known from 104 sites in Victoria, of which 36 are extant (known to persist), noting that data is not available to confirm the status of the species in all recorded locations. Although the Conservation Advice does not define an important population, it does define what constitutes critical habitat for Golden Sun Moth. According to the Conservation Advice (DAWE, 2021): *Habitat critical to the survival of the Golden Sun Moth has yet to be identified but likely includes all native grassland and open grassy woodland habitat occupied by the species across its range. As the species has specialised habitat requirements with a fragmented distribution, all occupied habitat is important for the breeding activity of the associated subpopulation and the recovery of the species. …Sites occurring at or toward the limit of the species range, or sites that are a long distance from other known subpopulations are also likely to be defined as habitat critical to the survival of the species for their importance toward conserving the full range in genetic diversity* (p8). In the absence of a recovery plan, performance against this criteria is informed by the Conservation Advice which requires outlining critical habitat for the species. In this instance, even exotic-dominated grassland habitat (i.e. Chilean Needle-grass) can be considered critical habitat for Golden Sun Moth. It is recommended that advice from DCCEEW is sought regarding the population within the Merrimu PSP rather than the Long Forest Estate property in isolation.

Important population criteria	Criteria met?	Notes
Key source population, either for breeding or dispersal	Maybe	The term source population is interpreted as a population that exists within higher quality habitat that is viable (i.e. breeding) and therefore resilient to withstand changes in the environment and supplement other populations nearby, or be a source of dispersing individuals which establish new populations. A source population for Golden Sun Moth is difficult to define given the species is known to have limited dispersal ability (estimated to be around 200 m). Sites separated by more than 200 m of unsuitable habitat are likely to be geographically isolated and therefore represent individual subpopulations (DAWE, 2021). Figure 9 below illustrates the subpopulation structure of the Merrimu precinct based on Golden Sun Moth habitat mapping and population surveys by EHP. The figure suggests that the Long Forest Estate population could be linked to other smaller areas of habitat to the west which in turn link to the population to the north which is otherwise separated from the Long Forest Estate population by approximately 350 m of agricultural land. The Long Forest Estate could therefore be a source of recruitment, gene flow or recolonisation of those areas. What is unknown is whether the Long Forest Estate population is linked to the population to the north via the land outside the eastern precinct boundary that has therefore not been subject to habitat assessment or survey. If Golden Sun Moth occurs through that area, then the Long Forest Estate population would form part of a larger, more extensive population in the Merrimu PSP area. The presence of a larger, more extensive population would alter the implications of development of the PSP (and Long Forest Estate).
A population that is necessary for maintaining genetic diversity, and/or	Maybe	Genetic studies suggest that Victorian subpopulations are distinct from the NSW/ACT subpopulations. Within Victoria, populations separated by more than 200 m of unsuitable habitat (not connected) are likely to be geographically isolated and therefore represent individual subpopulations (DAWE, 2021). Given the documented lack of dispersal ability it is also not clear to what extent the Long Forest Estate population may play a role in maintaining genetic diversity of the species. Given that all discrete populations are effectively isolated from other populations (no mechanism of gene flow) it could be argued that, in the absence of data, all populations have the potential to be genetically important. The subject population is one of many known populations in the Victorian Volcanic Plain bioregion but it is located at the interface between the Victorian Volcanic Plain and Central Uplands bioregions and may therefore be genetically distinct from other populations. The Long Forest Estate population is likely to be linked to smaller discrete areas of habitat where Golden Sun Moth have been previously recorded to the immediate west (EHP, 2021). But beyond that, the records of other Golden Sun Moth in the Merrimu PSP are separated by more than 200 m and are likely to therefore be functioning as discrete populations.

Important population criteria	Criteria met?	Notes
		The other populations shown on the VBA at Hopetoun Park and Maddingley represent areas that have since been developed (residential) based on aerial photography. The record along the Western Freeway is likely to have been partly impacted by Anthony's Cutting but perhaps not completely lost as the locality appears to be still largely paddocks. Records further to the south east corner are associated with Mount Cottrell Nature Conservation Reserve (from 2016). It is unclear if the subject population meets this criteria therefore in keeping with a precautionary approach, it should be assumed that the Long Forest Estate population is important for maintaining genetic diversity.
A population that is near the edge of the species range	Maybe	The study area is located within the modelled distribution of Golden Sun Moth in the area categorised as 'species or species habitat known or likely to occur'(Figure 9). The study area is also located in the approximate centre of the broader Victorian distribution of Golden Sun Moth which extends from approximately Harcourt in the north, Wangaratta to the north-east, Nhill in the north-west and Hamilton to the west. However, the study area is located at the northern edge of the species range within the Victorian Volcanic Plain bioregion which is a bioregional boundary identified in the modelled distribution before the notable gap depicting the Central Victorian Uplands. Geographically/topographically, the Long Forest Estate population may therefore be considered to be the edge of the species range and the possibility that this criteria is met cannot be discounted.

Map 1 Modelled distribution of Golden Sun Moth

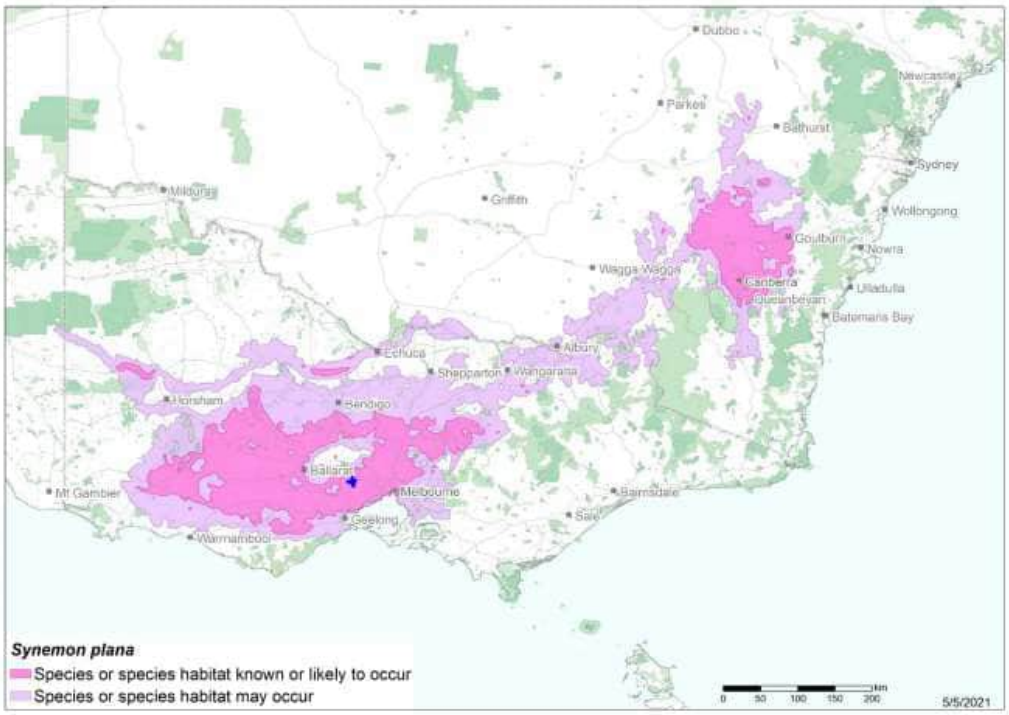


Figure 9 Study area and modelled distribution of Golden Sun Moth (Map 1 sourced from DAWE, 2021

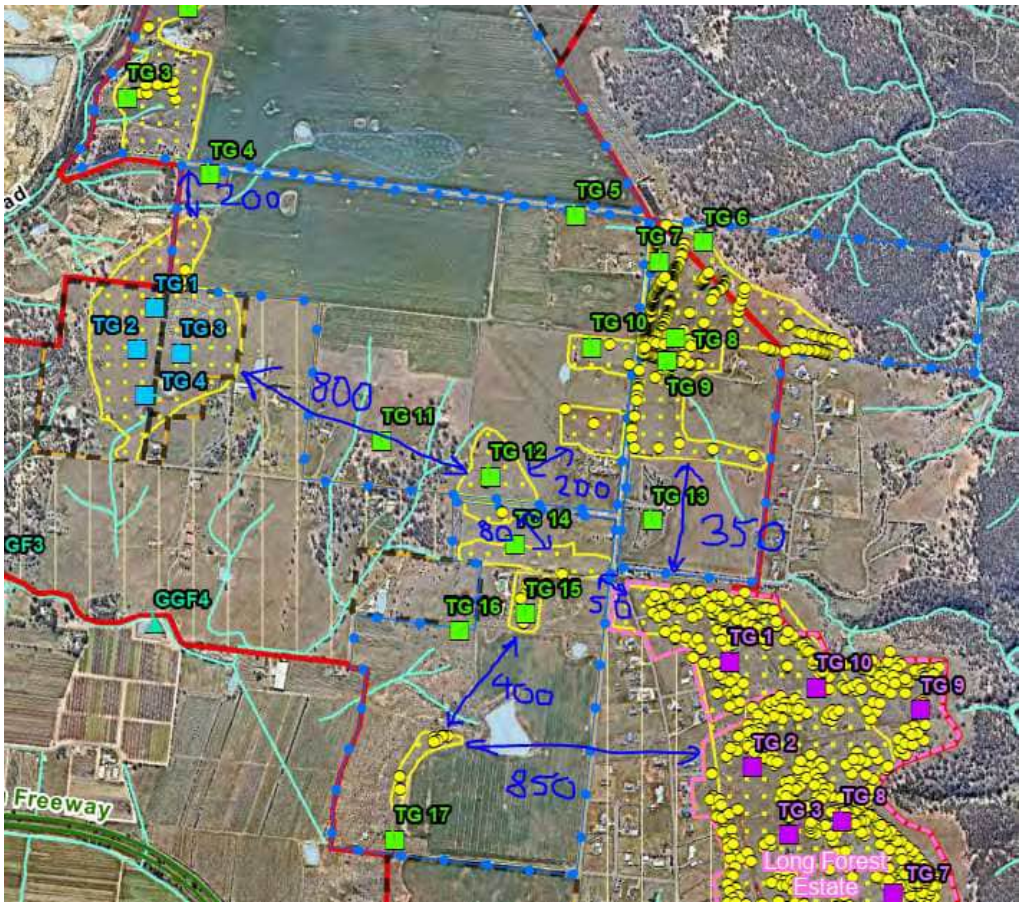


Figure 10 Golden Sun Moth populations within the Merrimu PSP area with approximate distances (adapted from EHP 2021)

Table 20 Significant Impact Criteria for Vulnerable Species - Golden Sun Moth.

Significant Impact Criteria for vulnerable species	Criteria met?	Comment
Lead to a long-term decrease in the size of an important population of a species	Yes	The results of targeted surveys undertaken for Golden Sun Moth by AECOM during the 2021 summer flying season confirmed the persistence of Golden Sun Moth within the study area. The population is likely to be regarded as an important population (see Table 19) and permanent removal of habitat will represent a long-term decrease in the size of the population.
Reduce the area of occupancy of an important population	Yes	As the population on Long Forest Estate is likely to be an important population, development of the site will reduce the area of occupancy of an important population. Although Golden Sun Moth status has been updated from Critically Endangered to Vulnerable the species-specific guidelines – significant impacts thresholds for Golden Sun Moth suggest that for a large or contiguous habitat areas (>10 ha), habitat loss or degradation of >0.5 ha is considered to be a significant impact (DEWHA, 2009).
Fragment an existing important population into two or more populations	No	Under a complete removal scenario, development of the site would not represent fragmentation of the population into two or more populations. However, if a population occurs to the west of Long Forest Estate which may rely on, or form part of, the population and may therefore be fragmented. The limited dispersal ability of the Golden Sun Moth means that habitat areas separated by >200m are effectively isolated and should therefore be considered as separate habitat areas. Breaks in habitat of >200m and structures that prohibit movement (e.g. buildings, solid fences) represent barriers to dispersal (DEWHA, 2009). As such, a design which retains some of the habitat within the Long Forest Estate without consideration of connectivity has the potential to fragment the population. It is possible that the Long Forest Estate population is linked to the population to the north via the unassessed land to the immediate east of the Merrimu PSP boundary. Should that be the case then development in the Long Forest Estate area of the PSP would contribute to fragmentation of the population.
Adversely affect habitat critical to the survival of a species	Yes	No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat (DAWE, 2021). However, according to the Conservation Advice (DAWE, 2021): *Habitat critical to the survival of the Golden Sun Moth has yet to be identified but likely includes all native grassland and open grassy woodland habitat occupied by the species across its range. As the species has specialised habitat requirements with a fragmented distribution, all occupied habitat is important for the breeding activity of the associated subpopulation and the recovery of the species. …Sites occurring at or toward the limit of the species range, or sites that are a long distance from other known subpopulations are also likely to be defined as habitat critical to the survival of the species for their importance toward conserving the full range in genetic diversity* (p8).

Significant Impact Criteria for vulnerable species	Criteria met?	Comment
		Given the now limited distribution of natural grasslands within the wider regional landscape, and occupation of the habitat by a population of Golden Sun Moth, the study area represents critical habitat for the species. The full or partial removal of the habitat that exists at the site will adversely affect habitat critical to the survival of a species. It is not possible to define a percent clearance threshold below which the impacts would not be adverse for the population. Factors such as location and context of retained and removed habitat would influence whether the effects on critical habitat would be adverse. Consultation with/referral to DCCEEW will be necessary.
Disrupt the breeding cycle of an important population	Yes	Based on a total removal scenario, the whole population would be lost therefore breeding will cease. In a partial removal scenario, removal of habitat will remove larvae at the base of grass tussocks from that area and therefore reduce the numbers recruited to the remaining population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	Removal of habitat within the study area is unlikely to contribute to the decline of the species when taken in the context of a single action for a single population. The continued modification or destruction of habitat within the area of occupancy of the species across Melbourne (including elsewhere in the Merrimu PSP area) is likely to contribute to the decline of the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	No	Development of the study area is unlikely to result in invasive species that are harmful to Golden Sun Moth being introduced to the site. Weed invasion of native grassland is a process recognised as a threat to Golden Sun Moth (DAWE, 2021) and is a process already underway on the site. Predation by birds and insects also contributes to adult mortality but the proposed actions in not likely to encourage the establishment of these species as they are already present in the environment. However, installation of artificial structures (such as fences) can promote hunting by providing vantage points (perches) for birds (DAWE, 2021).
Introduce disease that may cause the species to decline.	No	The proposed action in unlikely to introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species.	Maybe	All occupied habitat is important for the breeding activity of the associated subpopulation and the recovery of the species as the species has specialised habitat requirements with a fragmented distribution (DAWE, 2021). Based on this, removal of occupied habitat at Long Forest Estate could therefore interfere with the recovery of the species. In the absence of thresholds for defining what would constitute 'interfering substantially with' the recovery of the species, a precautionary approach must be adopted. The occurrence of Golden Sun Moth within the Long Forest Estate property is also likely to be supporting the persistence of the species in the adjacent, connected Long Forest Nature Conservation Reserve.

Appendix F

EnSym Report

Appendix F EnSym Report

Scenario test – native vegetation removal

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

Date of issue: **08/02/2023**
Time of issue: **10:09 am**

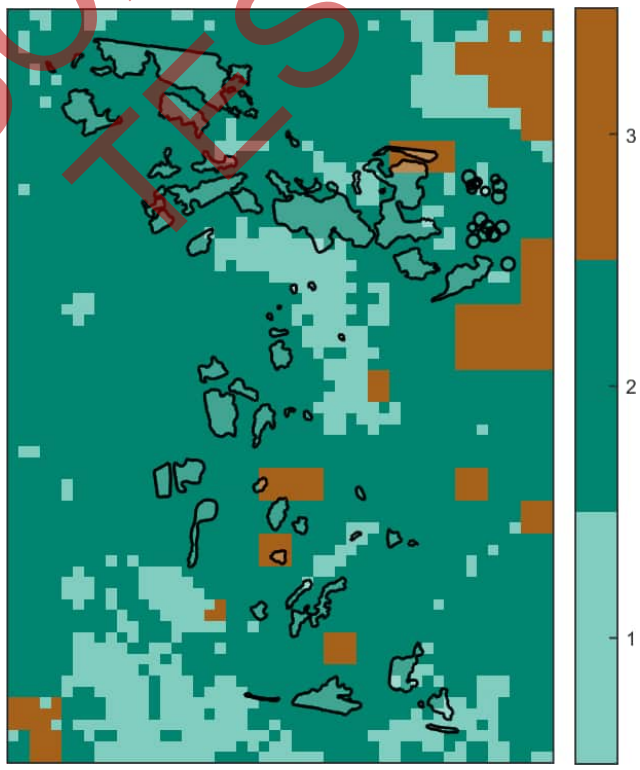
Report ID: Scenario Testing

Project ID	Aecom_Merrimu_VegLoss_VG94_V3_20220208

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	16.142 ha
Extent of past removal	0.000 ha
Extent of proposed removal	16.142 ha
No. Large trees proposed to be removed	16
Location category of proposed removal	Location 3 The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species.The native vegetation is also in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map).

1. Location map



Scenario test – native vegetation removal

Offset requirements if a permit is granted

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

Species offset amount[1]	6.379 species units of habitat for Fragrant Saltbush, *Rhagodia parabolica* 6.379 species units of habitat for Heath Spear-grass, *Austrostipa exilis* 5.065 species units of habitat for Bacchus Marsh Wattle, *Acacia rostriformis*
Large trees	16 trees

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

Appendix 1 includes information about the native vegetation to be removed

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

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

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

Scenario test – native vegetation removal

Next steps

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

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

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

Appendix 1: Description of native vegetation to be removed

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

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

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

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

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

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

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

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-P1	Patch	vvp_0132	Endangered	0	no	0.206	0.060	0.060	0.830	0.672	0.021	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.672	0.021	503984 Heath Spear-grass *Austrostipa exilis*
										0.672	0.021	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P2	Patch	vvp_0132	Endangered	0	no	0.206	0.012	0.012	0.743	0.678	0.004	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.678	0.004	503984 Heath Spear-grass *Austrostipa exilis*
										0.678	0.004	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P3	Patch	vvp_0132	Endangered	0	no	0.206	0.396	0.396	0.958	0.736	0.142	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.736	0.142	503984 Heath Spear-grass *Austrostipa exilis*
										0.736	0.142	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P4	Patch	vvp_0132	Endangered	0	no	0.206	0.207	0.207	0.832	0.673	0.071	502929 Fragrant Saltbush *Rhagodia parabolica*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.673	0.071	503984 Heath Spear-grass *Austrostipa exilis*
										0.673	0.071	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P5	Patch	vvp_0132	Endangered	0	no	0.206	0.429	0.429	0.990	0.702	0.150	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.702	0.150	503984 Heath Spear-grass *Austrostipa exilis*
										0.702	0.150	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P6	Patch	vvp_0132	Endangered	0	no	0.206	0.012	0.012	0.450	0.696	0.004	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.696	0.004	503984 Heath Spear-grass *Austrostipa exilis*
										0.696	0.004	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P7	Patch	vvp_0132	Endangered	0	no	0.206	0.081	0.081	0.920	0.765	0.030	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.765	0.030	503984 Heath Spear-grass *Austrostipa exilis*
										0.765	0.030	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P8	Patch	vvp_0132	Endangered	0	no	0.206	1.611	1.611	0.879	0.720	0.571	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.720	0.571	503984 Heath Spear-grass *Austrostipa exilis*
										0.720	0.571	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P9	Patch	vvp_0132	Endangered	0	no	0.206	0.015	0.015	0.920	0.770	0.006	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.770	0.006	503984 Heath Spear-grass *Austrostipa exilis*
										0.770	0.006	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P10	Patch	vvp_0132	Endangered	0	no	0.206	0.186	0.186	0.814	0.717	0.066	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.717	0.066	503984 Heath Spear-grass *Austrostipa exilis*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.717	0.066	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P11	Patch	vvp_0132	Endangered	0	no	0.206	0.009	0.009	0.810	0.700	0.003	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.700	0.003	503984 Heath Spear-grass *Austrostipa exilis*
										0.700	0.003	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P12	Patch	vvp_0132	Endangered	0	no	0.206	0.053	0.053	0.810	0.715	0.019	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.715	0.019	503984 Heath Spear-grass *Austrostipa exilis*
										0.715	0.019	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P13	Patch	vvp_0132	Endangered	0	no	0.206	0.084	0.084	0.930	0.740	0.030	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.740	0.030	503984 Heath Spear-grass *Austrostipa exilis*
										0.740	0.030	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P14	Patch	vvp_0132	Endangered	0	no	0.206	0.017	0.017	0.440	0.680	0.006	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.680	0.006	503984 Heath Spear-grass *Austrostipa exilis*
										0.680	0.006	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P15	Patch	vvp_0132	Endangered	0	no	0.206	0.021	0.021	0.440	0.684	0.007	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.684	0.007	503984 Heath Spear-grass *Austrostipa exilis*
										0.684	0.007	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P16	Patch	vvp_0132	Endangered	0	no	0.206	0.337	0.337	0.910	0.772	0.123	502929 Fragrant Saltbush *Rhagodia parabolica*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.772	0.123	503984 Heath Spear-grass *Austrostipa exilis*
										0.772	0.123	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P17	Patch	vvp_0132	Endangered	0	no	0.216	2.057	2.057	0.745	0.725	0.766	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.702	0.766	503984 Heath Spear-grass *Austrostipa exilis*
										0.640	0.766	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P18	Patch	vvp_0132	Endangered	0	no	0.206	0.327	0.327	0.930	0.751	0.118	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.751	0.118	503984 Heath Spear-grass *Austrostipa exilis*
										0.751	0.118	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P19	Patch	vvp_0132	Endangered	0	no	0.206	0.234	0.234	0.930	0.762	0.085	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.762	0.085	503984 Heath Spear-grass *Austrostipa exilis*
										0.762	0.085	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P20	Patch	vvp_0132	Endangered	0	no	0.206	0.033	0.033	0.870	0.729	0.012	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.729	0.012	503984 Heath Spear-grass *Austrostipa exilis*
										0.729	0.012	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P21	Patch	vvp_0132	Endangered	0	no	0.206	0.605	0.605	0.944	0.745	0.217	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.745	0.217	503984 Heath Spear-grass *Austrostipa exilis*
										0.399	0.217	505136 Bacchus Marsh Wattle *Acacia rostriformis*

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-P22	Patch	vvp_0132	Endangered	0	no	0.206	0.252	0.252	0.990	0.772	0.092	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.772	0.092	503984 Heath Spear-grass *Austrostipa exilis*
										0.606	0.092	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P23	Patch	vvp_0132	Endangered	0	no	0.206	0.034	0.034	0.870	0.730	0.012	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.730	0.012	503984 Heath Spear-grass *Austrostipa exilis*
										0.730	0.012	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P24	Patch	vvp_0132	Endangered	0	no	0.206	0.027	0.027	0.990	0.740	0.010	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.740	0.010	503984 Heath Spear-grass *Austrostipa exilis*
										0.740	0.010	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P25	Patch	vvp_0132	Endangered	0	no	0.206	0.037	0.037	0.900	0.740	0.013	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.740	0.013	503984 Heath Spear-grass *Austrostipa exilis*
										0.740	0.013	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P26	Patch	vvp_0132	Endangered	0	no	0.206	0.136	0.136	0.910	0.736	0.049	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.736	0.049	503984 Heath Spear-grass *Austrostipa exilis*
										0.736	0.049	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P27	Patch	vvp_0132	Endangered	0	no	0.206	0.026	0.026	0.910	0.730	0.009	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.730	0.009	503984 Heath Spear-grass *Austrostipa exilis*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.730	0.009	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P28	Patch	vvp_0132	Endangered	0	no	0.206	0.014	0.014	0.910	0.730	0.005	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.730	0.005	503984 Heath Spear-grass *Austrostipa exilis*
										0.730	0.005	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P29	Patch	vvp_0132	Endangered	0	no	0.206	0.199	0.199	0.920	0.758	0.072	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.758	0.072	503984 Heath Spear-grass *Austrostipa exilis*
										0.009	0.071	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P30	Patch	vvp_0132	Endangered	0	no	0.206	0.049	0.049	0.920	0.760	0.018	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.760	0.018	503984 Heath Spear-grass *Austrostipa exilis*
										0.760	0.018	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P31	Patch	vvp_0132	Endangered	0	no	0.216	2.176	2.176	0.909	0.750	0.822	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.750	0.822	503984 Heath Spear-grass *Austrostipa exilis*
										0.273	0.824	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P32	Patch	vvp_0132	Endangered	0	no	0.206	0.194	0.194	0.890	0.723	0.069	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.723	0.069	503984 Heath Spear-grass *Austrostipa exilis*
1-P33	Patch	vvp_0132	Endangered	0	no	0.206	0.034	0.034	1.000	0.720	0.012	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.720	0.012	503984 Heath Spear-grass *Austrostipa exilis*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.720	0.012	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P34	Patch	vvp_0132	Endangered	0	no	0.206	0.021	0.021	1.000	0.720	0.008	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.720	0.008	503984 Heath Spear-grass *Austrostipa exilis*
1-P35	Patch	vvp_0132	Endangered	0	no	0.206	0.618	0.618	0.933	0.720	0.219	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.720	0.219	503984 Heath Spear-grass *Austrostipa exilis*
1-P36	Patch	vvp_0132	Endangered	0	no	0.206	0.054	0.054	1.000	0.737	0.019	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.737	0.019	503984 Heath Spear-grass *Austrostipa exilis*
										0.082	0.019	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P37	Patch	vvp_0132	Endangered	0	no	0.206	0.042	0.042	0.890	0.725	0.015	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.725	0.015	503984 Heath Spear-grass *Austrostipa exilis*
1-P38	Patch	vvp_0132	Endangered	0	no	0.206	0.271	0.271	0.890	0.721	0.096	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.721	0.096	503984 Heath Spear-grass *Austrostipa exilis*
1-P39	Patch	vvp_0132	Endangered	0	no	0.206	0.169	0.169	0.890	0.740	0.061	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.740	0.061	503984 Heath Spear-grass *Austrostipa exilis*
1-P40	Patch	vvp_0132	Endangered	0	no	0.383	0.881	0.881	0.850	0.734	0.585	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.734	0.585	503984 Heath Spear-grass *Austrostipa exilis*
1-P41	Patch	vvp_0132	Endangered	0	no	0.206	0.515	0.515	0.890	0.736	0.184	502929 Fragrant Saltbush *Rhagodia parabolica*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.736	0.184	503984 Heath Spear-grass *Austrostipa exilis*
1-P42	Patch	vvp_0132	Endangered	0	no	0.206	0.218	0.218	0.885	0.725	0.077	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.725	0.077	503984 Heath Spear-grass *Austrostipa exilis*
1-P43	Patch	vvp_0132	Endangered	0	no	0.206	0.664	0.664	0.861	0.753	0.240	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.753	0.240	503984 Heath Spear-grass *Austrostipa exilis*
										0.753	0.240	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P44	Patch	vvp_0132	Endangered	0	no	0.206	0.034	0.034	0.901	0.756	0.012	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.756	0.012	503984 Heath Spear-grass *Austrostipa exilis*
										0.756	0.012	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P45	Patch	vvp_0132	Endangered	0	no	0.206	0.152	0.152	0.940	0.762	0.055	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.762	0.055	503984 Heath Spear-grass *Austrostipa exilis*
										0.762	0.055	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P46	Patch	vvp_0132	Endangered	0	no	0.206	0.257	0.257	0.938	0.761	0.093	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.761	0.093	503984 Heath Spear-grass *Austrostipa exilis*
										0.761	0.093	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P47	Patch	vvp_0132	Endangered	0	no	0.206	0.109	0.109	0.933	0.752	0.039	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.752	0.039	503984 Heath Spear-grass *Austrostipa exilis*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.752	0.039	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P48	Patch	vvp_0132	Endangered	0	no	0.206	0.093	0.093	0.940	0.752	0.034	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.752	0.034	503984 Heath Spear-grass *Austrostipa exilis*
										0.752	0.034	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P49	Patch	vvp_0132	Endangered	0	no	0.206	0.072	0.072	0.930	0.750	0.026	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.750	0.026	503984 Heath Spear-grass *Austrostipa exilis*
										0.750	0.026	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P50	Patch	vvp_0132	Endangered	0	no	0.206	0.019	0.019	0.920	0.731	0.007	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.731	0.007	503984 Heath Spear-grass *Austrostipa exilis*
										0.731	0.007	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P51	Patch	vvp_0132	Endangered	0	no	0.206	0.214	0.214	0.933	0.733	0.076	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.733	0.076	503984 Heath Spear-grass *Austrostipa exilis*
										0.733	0.076	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P52	Patch	vvp_0132	Endangered	0	no	0.206	0.147	0.147	0.920	0.740	0.053	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.740	0.053	503984 Heath Spear-grass *Austrostipa exilis*
										0.740	0.053	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P53	Patch	vvp_0132	Endangered	0	no	0.206	0.005	0.005	0.920	0.760	0.002	502929 Fragrant Saltbush *Rhagodia parabolica*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.760	0.002	503984 Heath Spear-grass *Austrostipa exilis*
										0.760	0.002	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P54	Patch	vvp_0132	Endangered	0	no	0.206	0.013	0.013	0.920	0.760	0.005	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.760	0.005	503984 Heath Spear-grass *Austrostipa exilis*
										0.760	0.005	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P55	Patch	vvp_0132	Endangered	0	no	0.206	0.211	0.211	0.920	0.740	0.075	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.740	0.075	503984 Heath Spear-grass *Austrostipa exilis*
										0.740	0.075	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P56	Patch	vvp_0132	Endangered	0	no	0.206	0.021	0.021	0.990	0.771	0.008	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.771	0.008	503984 Heath Spear-grass *Austrostipa exilis*
										0.771	0.008	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P57	Patch	vvp_0132	Endangered	0	no	0.206	0.064	0.064	0.990	0.777	0.023	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.777	0.023	503984 Heath Spear-grass *Austrostipa exilis*
										0.777	0.023	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-P58	Patch	vvp_0064	Vulnerable	5	no	0.490	0.509	0.509	0.990	0.788	0.446	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.788	0.446	503984 Heath Spear-grass *Austrostipa exilis*
										0.788	0.446	505136 Bacchus Marsh Wattle *Acacia rostriformis*

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-ST1	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.070	0.990	0.790	0.025	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.790	0.025	503984 Heath Spear-grass *Austrostipa exilis*
										0.790	0.025	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST2	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.070	0.990	0.795	0.025	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.795	0.025	503984 Heath Spear-grass *Austrostipa exilis*
										0.795	0.025	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST3	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.054	0.990	0.784	0.019	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.784	0.019	503984 Heath Spear-grass *Austrostipa exilis*
										0.784	0.019	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST4	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.025	0.990	0.790	0.009	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.790	0.009	503984 Heath Spear-grass *Austrostipa exilis*
										0.790	0.009	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST5	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.038	0.990	0.790	0.013	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.790	0.013	503984 Heath Spear-grass *Austrostipa exilis*
										0.790	0.013	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST6	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.067	0.990	0.790	0.024	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.790	0.024	503984 Heath Spear-grass *Austrostipa exilis*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.790	0.024	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST8	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.066	0.990	0.780	0.024	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.780	0.024	503984 Heath Spear-grass *Austrostipa exilis*
										0.780	0.024	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST7	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.050	0.990	0.785	0.018	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.785	0.018	503984 Heath Spear-grass *Austrostipa exilis*
										0.785	0.018	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST9	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.067	0.820	0.780	0.024	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.780	0.024	503984 Heath Spear-grass *Austrostipa exilis*
										0.780	0.024	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST10	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.067	0.820	0.780	0.024	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.780	0.024	503984 Heath Spear-grass *Austrostipa exilis*
										0.780	0.024	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST11	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.070	0.820	0.771	0.025	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.771	0.025	503984 Heath Spear-grass *Austrostipa exilis*
										0.771	0.025	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST12	Scattered Tree	vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.990	0.780	0.011	502929 Fragrant Saltbush *Rhagodia parabolica*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.780	0.011	503984 Heath Spear-grass *Austrostipa exilis*
										0.780	0.011	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST13	Scattered Tree	vvp_0132	Endangered	0	no	0.200	0.031	0.024	0.820	0.780	0.009	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.780	0.009	503984 Heath Spear-grass *Austrostipa exilis*
										0.780	0.009	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST14	Scattered Tree	vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.820	0.772	0.011	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.772	0.011	503984 Heath Spear-grass *Austrostipa exilis*
										0.772	0.011	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST15	Scattered Tree	vvp_0132	Endangered	0	no	0.200	0.031	0.014	0.820	0.770	0.005	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.770	0.005	503984 Heath Spear-grass *Austrostipa exilis*
										0.770	0.005	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST16	Scattered Tree	vvp_0132	Endangered	0	no	0.200	0.031	0.024	0.820	0.770	0.008	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.770	0.008	503984 Heath Spear-grass *Austrostipa exilis*
										0.770	0.008	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST17	Scattered Tree	vvp_0132	Endangered	0	no	0.200	0.031	0.004	0.820	0.770	0.002	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.770	0.002	503984 Heath Spear-grass *Austrostipa exilis*
										0.770	0.002	505136 Bacchus Marsh Wattle *Acacia rostriformis*

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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-ST18	Scattered Tree	vvp_0132	Endangered	0	no	0.200	0.031	0.011	0.820	0.770	0.004	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.770	0.004	503984 Heath Spear-grass *Austrostipa exilis*
										0.770	0.004	505136 Bacchus Marsh Wattle *Acacia rostriformis*
1-ST19	Scattered Tree	vvp_0132	Endangered	0	no	0.200	0.031	0.019	0.820	0.770	0.007	502929 Fragrant Saltbush *Rhagodia parabolica*
										0.770	0.007	503984 Heath Spear-grass *Austrostipa exilis*
										0.770	0.007	505136 Bacchus Marsh Wattle *Acacia rostriformis*

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
Bacchus Marsh Wattle	*Acacia rostriformis*	505136	Vulnerable	Dispersed	Habitat importance map	0.0102
Heath Spear-grass	*Austrostipa exilis*	503984	Rare	Dispersed	Habitat importance map	0.0060
Fragrant Saltbush	*Rhagodia parabolica*	502929	Rare	Dispersed	Habitat importance map	0.0051
Small Golden Moths	*Diuris basaltica*	501473	Endangered	Dispersed	Habitat importance map	0.0042
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	12922	Critically endangered	Dispersed	Habitat importance map	0.0034
Melbourne Yellow-gum	*Eucalyptus leucoxylon subsp. connata*	504484	Vulnerable	Dispersed	Habitat importance map	0.0030
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Top ranking map ; special site	0.0029
Brittle Greenhood	*Pterostylis truncata*	502821	Endangered	Dispersed	Habitat importance map	0.0019
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Habitat importance map	0.0014
Austral Tobacco	*Nicotiana suaveolens*	502275	Rare	Dispersed	Habitat importance map	0.0014
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*	503624	Endangered	Dispersed	Habitat importance map	0.0012
Velvet Daisy-bush	*Olearia pannosa subsp. cardiophylla*	502317	Vulnerable	Dispersed	Habitat importance map	0.0012
Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0011
Large-flower Crane's-bill	*Geranium sp. 1*	505342	Endangered	Dispersed	Habitat importance map	0.0011
Cane Spear-grass	*Austrostipa breviglumis*	503268	Rare	Dispersed	Habitat importance map	0.0010
Basalt Podolepis	*Podolepis linearifolia*	504658	Endangered	Dispersed	Habitat importance map	0.0009
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0008
Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0008

Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0008
Rye Beetle-grass	*Tripogon loliiformis*	503455	Rare	Dispersed	Habitat importance map	0.0008
Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0006
Pale-flower Crane's-bill	*Geranium sp. 3*	505344	Rare	Dispersed	Habitat importance map	0.0006
Small Scurf-pea	*Cullen parvum*	502773	Endangered	Dispersed	Habitat importance map	0.0006
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	505560	Vulnerable	Dispersed	Habitat importance map	0.0006
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Habitat importance map ; special site	0.0006
Yellow Burr-daisy	*Calotis lappulacea*	500598	Rare	Dispersed	Habitat importance map	0.0006
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Habitat importance map	0.0006
Dark Wire-grass	*Aristida calycina var. calycina*	503630	Rare	Dispersed	Habitat importance map	0.0005
Shiny Leionema	*Leionema lamprophyllum subsp. obovatum*	505478	Rare	Dispersed	Habitat importance map	0.0005
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0005
Rosemary Grevillea	*Grevillea rosmarinifolia subsp. rosmarinifolia*	504066	Rare	Dispersed	Habitat importance map	0.0004
Late-flower Flax-lily	*Dianella tarda*	505085	Vulnerable	Dispersed	Habitat importance map	0.0004
Forked Rice-flower	*Pimelea hewardiana*	502522	Rare	Dispersed	Habitat importance map	0.0003
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0003
Small Milkwort	*Comesperma polygaloides*	500798	Vulnerable	Dispersed	Habitat importance map	0.0003
Waterbush	*Myoporum montanum*	502240	Rare	Dispersed	Habitat importance map	0.0002
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0002
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0002
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0002
Clumping Golden Moths	*Diuris gregaria*	504887	Endangered	Dispersed	Habitat importance map	0.0002
Buloke	*Allocasuarina luehmannii*	500678	Endangered	Dispersed	Habitat importance map	0.0002

Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0001
Western Golden-tip	*Goodia medicaginea*	501518	Rare	Dispersed	Habitat importance map	0.0001
Austral Crane's-bill	*Geranium solanderi var. solanderi s.s.*	505337	Vulnerable	Dispersed	Habitat importance map	0.0001
Trailing Hop-bush	*Dodonaea procumbens*	501090	Vulnerable	Dispersed	Habitat importance map	0.0001
Hairy Beard-heath	*Leucopogon microphyllus var. pilibundus*	501988	Rare	Dispersed	Habitat importance map	0.0001
Port Lincoln Snake	*Parasuta spectabilis*	12813	Vulnerable	Dispersed	Habitat importance map	0.0001
Dense Mint-bush	*Prostanthera decussata*	502739	Rare	Dispersed	Habitat importance map	0.0001
Dwarf Brooklime	*Gratiola pumilo*	503753	Rare	Dispersed	Habitat importance map	0.0001
Speckled Warbler	*Chthonicola sagittatus*	10504	Vulnerable	Dispersed	Habitat importance map	0.0001
Slender Mint-bush	*Prostanthera saxicola var. bracteolata*	502750	Rare	Dispersed	Habitat importance map	0.0000
Buloke Mistletoe	*Amyema linophylla subsp. orientalis*	500217	Vulnerable	Dispersed	Habitat importance map	0.0000
Common Dunnart	*Sminthopsis murina murina*	11061	Vulnerable	Dispersed	Habitat importance map	0.0000
Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0000
Barking Owl	*Ninox connivens connivens*	10246	Endangered	Dispersed	Habitat importance map	0.0000
Striped Legless Lizard	*Delma impar*	12159	Endangered	Dispersed	Habitat importance map	0.0000
Half-bearded Spear-grass	*Austrostipa hemipogon*	503985	Rare	Dispersed	Habitat importance map	0.0000
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0000
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0000
Satin Daisy-bush	*Olearia minor*	504130	Rare	Dispersed	Habitat importance map	0.0000
Silky Kidney-weed	*Dichondra sp. 1*	505786	Rare	Dispersed	Habitat importance map	0.0000
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0000
Swift Parrot	*Lathamus discolor*	10309	Endangered	Dispersed	Habitat importance map	0.0000

Brown Toadlet	*Pseudophryne bibronii*	13117	Endangered	Dispersed	Habitat importance map	0.0000
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

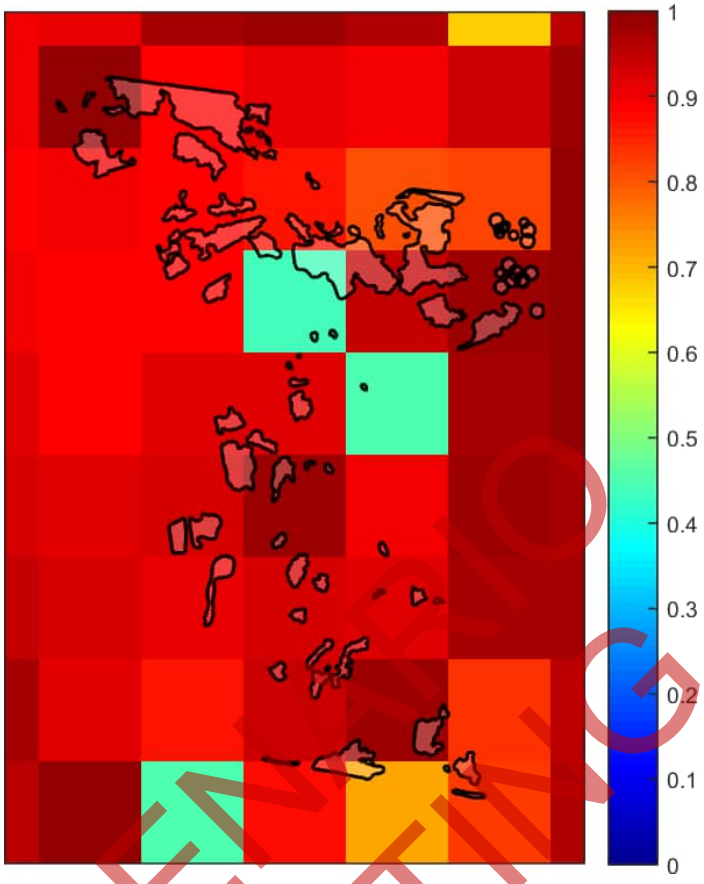
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

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

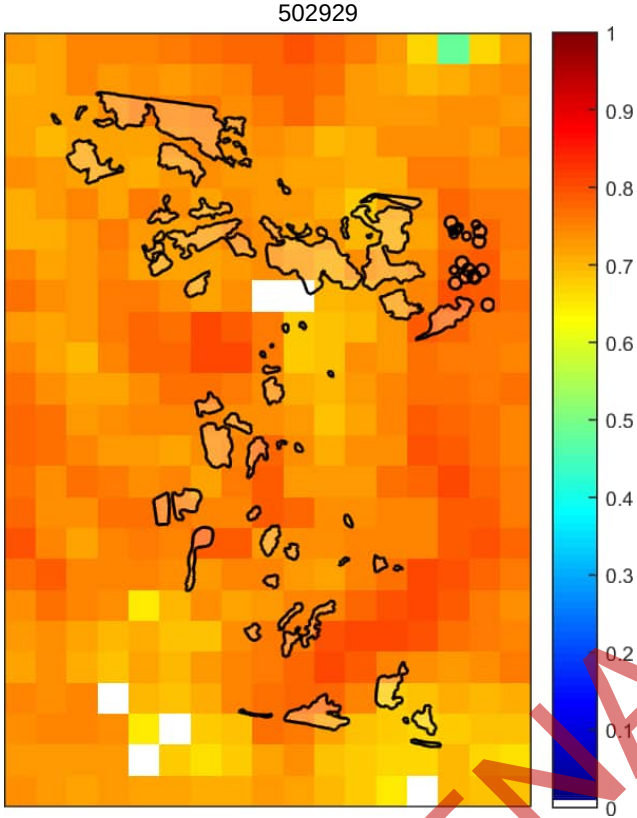
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map

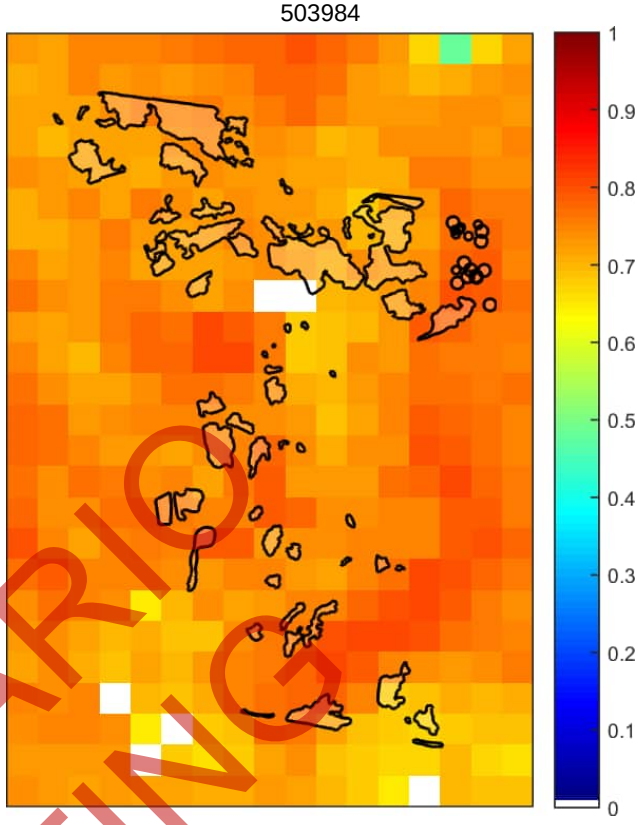


3. Habitat importance maps

Fragrant Saltbush
Rhagodia parabolica
502929



Heath Spear-grass
Austrostipa exilis
503984



Bacchus Marsh Wattle
Acacia rostriformis
505136