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Biodiversity Assessment, Viewbank Solar Farm, Girgarre East, Victoria

Final Report

Prepared for:

ERM

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Cover Photograph

A photograph of the study area taken during the current assessment.

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Executive Summary

Ecolink Consulting Pty Ltd was engaged by ERM on behalf of FRV to undertake a Biodiversity Assessment of a proposed solar farm located at Girgarre East, Victoria. The proposed solar farm is located on adjoining properties at 90 McGague Road, Girgarre East 3616, Victoria (Allot. 4 Parish of Girgarre East), and the southern parcel of 85 McGague Road, Cooma 3616, Victoria (Lot 1 TP119726). Road reserves adjacent to these properties were also assessed, to inform where vehicle access to the development should be provided to minimise impacts to ecological values, and included the Midland Highway, Poole Road, McEwan Road, and McGague Road (the study area). The study area is approximately 34 kilometres west of Shepparton in north-eastern Victoria, in a generally flat landscape. The landscape surrounding the study area is used for cropping and grazing.

The study area is zoned Farming Zone. A Floodway Schedule and Land Subject to Inundation Schedule applies to the southern portion of the study area. Department of Environment, Land, Water and Planning modelling suggests that the vegetation that would historically have occurred at the study area would most likely have been a mix of Ecological Vegetation Class (EVC) 235: Plains Woodland/Herb-rich Gilgai Wetland Mosaic, EVC 882: Shallow Sands Woodland and EVC 175: Grassy Woodland.

A site assessment was undertaken on 10 and 11 March 2020 by Principal Ecologist Dr Stuart Cooney and Senior Ecologist Dr Ross Dennis. The site assessment confirmed that the study area is largely cleared of native vegetation and dominated by pastures and exotic grasses.

Eighty species of plant were also recorded, comprising 29 indigenous species, and 51 exotic species. Dominant species within the study area included species used for agricultural purposes, such as Wheat *Triticum aestivum*, Lucerne *Medicago sativa* subsp. *Sativa*, Barley Grass *Hordeum murinum*, Stink Grass *Eragrostis cilianensis*, Toowoomba Canary-grass *Phalaris aquatica*, Wild Oats *Avena fatua*, Sterile Brome *Bromus sterilis*, and Great Brome *Bromus diandrus*. Other widespread species included environmental weeds such as Small-flowered Mallow *Malva parviflora*, Caltrop *Tribulus terrestris*, Small Nettle *Urtica urens* and Common Sow-thistle *Sonchus oleraceus*. Very few indigenous understorey species were recorded within the paddocks, except for a patch of ploughed paddock dominated by Windmill Grass *Chloris truncata*, although isolated occurrences of Berry Saltbush *Atriplex semibaccata*, Lesser Joyweed *Alternanthera denticulata* and Variable Sida *Sida corrugata* were observed. Indigenous understory persisted in fragments along adjacent roadsides and included species such as Spurred Spear-grass *Austrostipa gibbosa*, Woolly New Holland Daisy *Vittadinia gracilis*, Hairy Panic *Panicum effusum*, Bristly Wallaby-grass *Rytidosperma setaceum* and Red-leg Grass *Bothriochloa macra*.

The indigenous overstorey comprised three Gum *Eucalyptus* species and a single individual of Buloke *Allocasuarina luehmannii*. These trees were dominated by Grey Box *Eucalyptus microcarpa*, and to a lesser extent Yellow Box *Eucalyptus melliodora*. There were also a small number of River Red-gums *Eucalyptus camaldulensis* scattered through the centre of the property. Indigenous shrubs were absent within the private property, but one species was present along the roadsides, included in the study area and that species was Golden Wattle *Acacia pycnantha*.

In some of the irrigation channels which contained water, indigenous Narrow-leaf Cumbungi *Typha domingensis*, Common Swamp Wallaby-grass *Amphibromus nervosus*, Narrow-leaf Nardoo *Marsilea*

costulifera, Finger Rush *Juncus subsecundus*, Common Spike-sedge and Variable Willow-herb *Epilobium billardierianum* were recorded. Exotic Drain Flat-sedge *Cyperus eragrostis*, Water Plantain *Alisma lanceolatum* and Paspalum *Paspalum dilatatum*, were also present in these irrigation channels. There is an area of seasonal inundation in the south west of the study area, which has an overstorey of planted River Red-gums and an understorey dominated by Tall Wheat-grass *Lophopyrum ponticum*.

Despite the high level of modification within the study area, 39 remnant patches of native vegetation were observed in and adjacent to the study area. The total area of these remnant patches of vegetation is approximately 4.85 hectares. The quality of these patches was low, with Habitat Hectares scores ranging from 6 to 28 (out of 100). There were also 115 scattered trees recorded within the study area, outside these patches of native vegetation, including 82 'Large; trees, based on the relevant EVC benchmark.

The remnant vegetation and scattered trees within the study area are likely to provide habitat to a range of fauna species. Thirty-eight fauna species were recorded within the study area during the current assessment. This included 32 native and two introduced bird species, one introduced mammal species, one native frog species and two native reptiles. Hollows were observed in many of the large trees within and surrounding the study area, and these hollows are likely to be important resources within the landscape for a range of common and, potentially, rare species because they are usually in short supply.

Eight threatened flora species and 21 threatened fauna species have either been recorded within 3 kilometres of the study area, or are predicted to occur. One Buloke *Allocasuarina luehmannii* was recorded within the study area and is listed on the *Flora and Fauna Guarantee Act 1988* (Vic) and is considered Endangered within the state of Victoria. No other species were recorded or are likely to occur within the study area. Furthermore, five threatened ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) are likely to occur within three kilometres of the study area, however the vegetation within the study area was dominated by exotic vegetation and does not meet thresholds to qualify as any of these vegetation communities.

Based on the current assessment, the following constraints to the development of the study area were observed:

- The vegetation within the southern road reserve of the Midland Highway is likely to meet thresholds to be classified as Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. This area is considered highly constrained and should not be impacted by access upgrades to the study area. An EPBC Act referral is likely to be recommended, depending on the location and extent of any such impact within this location.
- The vegetation within the patches of native vegetation. Impacts to these patches of vegetation would require biodiversity offsets for their removal. They are considered a moderate constraint to development as the proponent is required to demonstrate the three step approach of avoiding, minimising and offsetting impacts to this vegetation;
- The artificial wetland in the south-west of the study area, which is likely to support a range of species from different groups, including, on occasion threatened species that persist within the study area. Although the vegetation surrounding this wetland is not classified as

native vegetation for the purposes of offsetting, the potential for this wetland to support small numbers of threatened species, makes this area an area of moderate ecological constraint;

- Eighty-two 'Large' scattered trees, and their Tree Protection Zones, also represent a moderate constraint to development, due to them being large mature trees, which contain tree hollows. Impacts to these trees would require biodiversity offsets for their removal and the proponent is required to demonstrate the three step approach of avoiding, minimising and offsetting impacts to this vegetation;
- *Flora and Fauna Guarantee Act 1988* (Vic) protected flora and communities in road reserves surrounding the study area. Impacts to these plants and communities represents a moderate constraint to development as they require a Permit to Remove Protected Flora from public land;
- Thirty-three other scattered trees and their Tree Protection Zones represent a low level of constraint. Impacts to these trees would also require biodiversity offsets for their removal; and
- Pastures and cropped land, which represent the lowest ecological constraint to development, and should be prioritised for development.

In this context, and based on the relevant legislation and policies, the following recommendations are made:

- Design the solar farm to minimise impacts to native vegetation, using the three step approach of avoiding, minimising and ultimately offsetting for residual impacts to native vegetation. Avoidance should be focussed on areas of highest ecological value (constraint) in the first instance.
- A permit will be required under Clause 52.17 of the City of Greater Shepparton Council Planning Scheme for residual impacts to native vegetation. Offsets for these losses comprise:
    - 0.114 General Habitat Units;
    - With a minimum Strategic Biodiversity Score of 0.132;
    - Located within the Goulburn Broken Catchment Management Authority area or the City of Greater Shepparton Council municipality; and,
    - Seven Large Trees;
- Prepare a Fauna Management Plan to be implemented during the construction of the solar farm. In particular this should include fauna monitoring and salvage prior to felling any trees.
- Prepare a Construction and Environmental Management Plan that recommends (as a minimum):
    - Fencing and designation of no-go areas in locations where vegetation is to be protected (such as the Midland Highway road reserve and any large scattered trees that are to be retained);
    - Seeking specialist arboricultural advice prior to the excavations within Tree Protection Zones, or if importing of materials that may adversely affect the health of trees;
    - Tree pruning to be undertaken only with Council consent, and must only be undertaken by a suitably qualified professional;

- Only permit the importation of soils and materials that are certified as weed-free to avoid the introduction of weeds into the study area;
- Undertake weed management prior to, during and post-construction. Target noxious weeds such as:
  - Weld *Reseda luteola*;
  - Spear Thistle *Cirsium vulgare*;
  - Bathurst Burr *Xanthium spinosum*;
  - Blackberry *Rubus fruticosus* spp. agg.;
  - Horehound *Marrubium vulgare*;
  - Chilean Needle-grass *Nassella neesiana*;
  - Caltrop *Tribulus terrestris*; and
  - African Love-grass *Eragrostis curvula*.
- Maintenance of vehicle hygiene of vehicles entering and leaving the study area to avoid the introduction of weed or weed pathogens into the study area;
- Implement sediment and erosion control prior to and during construction; and
- Undertake site rehabilitation post-construction, as appropriate.

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Introduction

Ecolink Consulting Pty Ltd was engaged by ERM on behalf of FRV to undertake a Biodiversity Assessment of a proposed solar farm located at Girgarre East, Victoria. The proposed solar farm is located on adjoining properties at 90 McGague Road, Girgarre East 3616, Victoria (Allot. 4 Parish of Girgarre East), and the southern parcel of 85 McGague Road, Cooma 3616, Victoria (Lot 1 TP119726). Road reserves adjacent to these properties were also assessed, to inform where vehicle access to the development should be provided to minimise impacts to ecological values, and included the Midland Highway, Poole Road, McEwan Road, and McGague Road. These two properties, 85 McGague Road, Cooma and 90 McGague Road, Girgarre East, and adjacent road reserves will hereafter be referred to as the study area (Figure 1).

The Biodiversity Assessment is required to determine the ecological values of the study area, the presence, location and the extent of native vegetation (if any) should the applicant develop the site. The assessment addresses the requirements of Clause 52.17 of the City of Greater Shepparton Council Planning Scheme by mapping and assessing the location, extent and quality of native vegetation, under the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning 2017). The Biodiversity Assessment also recommends mitigation measures and offset requirements based on relevant legislation and policies, where appropriate.

Therefore, the scope of the Biodiversity Assessment is to:

- Determine the ecological values of the study area;
- Evaluate any impacts that are likely to occur to any ecological values as a result of the potential loss of vegetation at the study area;
- Evaluate the extent and quality of native vegetation within the study area, required under the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning 2017); and,
- Make recommendations to minimise or mitigate impacts to these ecological values, based on relevant legislation and policies.

Methods

Desktop Assessment

In order to determine the ecological values that have previously been recorded within the study area, and its vicinity, the following databases and literature were consulted:

- Planning Schemes Online (Department of Environment Land Water and Planning 2020d) to identify the planning zones and overlays relating to environmental matters e.g. Vegetation Protection Overlays, or Environmental Significance Overlays;
- The NatureKit webpage from the Department of Environment, Land, Water and Planning (DELWP) to identify the historic and current Ecological Vegetation Classes (EVCs) (Department of Environment Land Water and Planning 2020c);
- The Victorian Biodiversity Atlas (Department of Environment Land Water and Planning 2020e) for records of threatened[1] flora and fauna within 3 kilometres of the study area;
- The Native Vegetation Information Management System (NVIM) to determine biodiversity offset requirements (Department of Environment Land Water and Planning 2020b);
- The 'Weeds of National Significance' database (Department of Agriculture Water and the Environment 2020b);
- The Protected Matters Search Tool from the Department of the Environment and Energy (DOEE) (Department of Agriculture Water and the Environment 2020a) to identify Matters of National Environmental Significance that may occur within 3 kilometres of the study area; and,
- Relevant legislation and policies (as required).

Field Assessment

A site assessment was undertaken on 10 and 11 March 2020 by Principal Ecologists Dr Stuart Cooney and Senior Ecologist Dr Ross Dennis. Both ecologists are suitably qualified and experienced to undertake such assessments and Simon holds a current Vegetation Quality Assessments (Habitat Hectares) Accreditation with DELWP.

All flora species observed within the study area were recorded, with the exception of planted vegetation that was not considered a 'weed' (i.e. planted vegetation that was not spreading or reproducing). Where a species was not able to be confidently identified in the field, a sample was collected and later identified. Plants were identified to species level wherever possible, however, some plants that were planted, cultivars, hybrids, or plants that did not contain suitable fertile material used for identification were recorded to genus level.

[1] Threatened flora and fauna includes species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the Victorian *Flora and Fauna Guarantee Act 1988* and the DSE Advisory Lists (Department of Environment and Primary Industries (2009; 2013; 2014a).

Vegetation communities such as EVCs and nationally significant vegetation communities were recorded (if observed) and compared with their corresponding benchmarks or thresholds to ensure that they were accurately assigned.

A list of all fauna species observed within, and immediately surrounding, the study area was produced. This list consists of species seen, heard, or identified by other evidence of their presence (e.g. feathers, scats). Leica 12 X 50 binoculars and call mimicry/playback were used to assist in the identification species.

The species, size (Diameter and Breast Height and Tree Protection Zone) and location of all indigenous trees was recorded using an iPad mini tablet that has an internal Global Positioning System (GPS) and the GIS Pro application (accuracy +/- 5 metres). The presence of hollows and birds' nests was also noted.

The presence of fauna habitat was noted, particularly in relation to potential habitats for threatened species. The greatest amount of time was spent surveying the highest quality fauna habitats (e.g. trees, water bodies, crevices or under ground debris) during the assessment.

Ecological features such as threatened flora and fauna species, vegetation communities, scattered indigenous trees, fauna habitats, or threatened species habitats were recorded onto an iPad mini tablet that has an internal Global Positioning System (GPS) and the GIS Pro application (accuracy +/- five metres).

Guidelines for the removal, destruction or lopping of native vegetation

The *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines) (Department of Environment Land Water and Planning 2017) are required to be addressed under Clause 52.17 of the Planning Scheme. The Guidelines require that information regarding the biodiversity values of the site were obtained though:

- Site-based information that was measured or observed at a site, including:
  - Extent of native vegetation patches;
  - Large trees;
  - Native vegetation condition assessed in accordance with the *Vegetation Quality Assessment Manual – Guidelines for Applying the Habitat Hectares Scoring Method* (Department of Sustainability and Environment 2004);
  - Ecological Vegetation Classes (EVC); and
  - Sensitive wetlands and coastal areas.
- Landscape scale information that cannot be measured or observed at the site and includes maps and models procured from DELWP.

The Guidelines require a Habitat Hectare assessment in instances where the impact is to be assessed under the Detailed Assessment Pathway. It was not possible to determine the risk-based pathway for the loss of native vegetation, and we therefore opted to complete the Habitat Hectare assessment in accordance with the methodology prescribed within the *Vegetation Quality*

Assessment Manual – Guidelines for Applying the Habitat Hectares Scoring Method (Department of Sustainability and Environment 2004) at patches[2] of vegetation. All indigenous vegetation was assessed, and then assigned a quality rating based on the Habitat Hectare score (Department of Sustainability and Environment 2004).

Limitations and Qualifications

The following limitations and qualifications apply to this report:

- The results of the desktop assessment are reliant on data obtained from various databases and other reports. These databases all have internal vetting procedures, however the accuracy of these historical data and some of the results provided within these reports cannot be verified. The desktop assessment does, however, rely on the most accurate data available.
- As with all ecological assessments, a greater survey effort is likely to yield additional flora and fauna records. Where these additional flora and fauna records may alter the recommendations made within this report (e.g. where additional threatened species may utilise habitats within the study area, or where threatened species may be impacted by the proposed development), further assessment has been recommended within this report, depending on the implications of relevant policies and legislation.
- Some flora and fauna species may only be recorded during certain times or seasons (e.g. plants that only contain above-ground biomass and are only visible annually, nocturnal mammals and birds, migratory birds, or fauna identified through seasonal breeding calls such as some frog species). The author has made an informed decision about the likely presence of threatened species that may be present, or that may utilise habitats within the study area, based on a detailed desktop assessment, a review of the species' biology, and an understanding of the ecological values of the local area.

Despite these limitations to the assessment, the results gained by both a desktop and a field-assessment are adequate to address the purpose of this report.

[2] A 'patch' is defined as an area with at least 25% cover abundance of perennial native vegetation, or a group (i.e. three or more) trees forming a continuous canopy.

Results

Study Area

The study area is located north east of the Stanhope township, approximately 34 kilometres west of Shepparton in north-eastern Victoria (Figure 1). It is located within a rural setting, in a generally flat landscape. The landscape surrounding the study area is primarily used for irrigated cropping, with grazing conducted in paddocks between cropping seasons. Little remnant native vegetation persists within the local area, although some remnant paddock trees and groups of trees are scattered throughout the landscape. Some, more extensive, areas of native vegetation occur in linear strips within road reserves near the study area (such as along Midland Hwy to the south and Poole Road to the east of the study area). This vegetation forms habitat corridors for birds, reptiles and mammals between areas of higher quality habitat.

The study area is largely cleared of native vegetation. The paddocks are used for crops including cereal such as wheat and barley (front cover). Some of the paddocks were in fallow or being rested between crops. Non-Victorian native, planted trees including Sugar Gum *Eucalyptus cladocalyx,* Ash *Fraxinus* sp., Peppercorn Tree *Schoenus molle,* fruit trees, and Cypress *Cupressus* sp. were observed near the dwelling in the central north portion of the study area (Plate 1). Many rows or clusters of planted Sugar Gums occur throughout the study area, in particular extending away from the house and towards the north-western corner (Plate 2), and in the central southern portion of the study area. A small cluster of non-Victorian, but native Prickly-leaved Paperbark *Melaleuca styphelioides* have been planted in the centre of the property, bordering a small dam (Plate 3). Rows of River Red-gums *Eucalyptus camaldulensis* and a mix of some indigenous tress such as Grey Box *Eucalyptus microcarpa* have been planted around the low-lying, wet area in the south west of the study area (Figure 1) (Plate 4).

Irrigation channels are a common component of the landscape and the No. 8 Drain, a major irrigation channel, is located just beyond the western boundary of the study area. Many smaller channels criss-cross the study area, most of which did not contain water at the time of the assessment. These channels are dominated by exotic vegetation including Drain Flat Sedge *Carex eragrostis*, and Couch *Cynodon dactylon,* although some native Narrow-leaf Cumbungi *Typha domingensis*, Rushes *Juncus* sp. and Common Spike-sedge *Eleocharis acuta* were also present in areas where water appeared to remain within them more permanently (Plate 5).

Flora

Flora Species

A total of 80 flora species were recorded during the current assessment. This comprised 29 indigenous species and 51 exotic (introduced) species (Table A1).

The indigenous overstorey comprised three Gum *Eucalyptus* species and a single individual of Buloke *Allocasuarina luehmannii*. These trees were dominated by Grey Box *Eucalyptus microcarpa*, and to a lesser extent Yellow Box *Eucalyptus melliodora*. There were also a small number of River Red-gums *Eucalyptus camaldulensis* scattered through the centre of the property. Indigenous shrubs were absent within the private property, but one species was present along the roadsides included in the study area and that species was Golden Wattle *Acacia pycnantha* (Plate 6).

Dominant species within the study area included species used for agricultural purposes, such as Wheat *Triticum aestivum*, Lucerne *Medicago sativa* subsp. *Sativa*, Barley Grass *Hordeum murinum*, Stink Grass *Eragrostis cilianensis*, Toowoomba Canary-grass *Phalaris aquatica*, Wild Oats *Avena fatua*, Sterile Brome *Bromus sterilis*, Great Brome *Bromus diandrus*. Other widespread species included environmental weeds such as Small-flowered Mallow *Malva parviflora*, Caltrop *Tribulus terrestris*, Small Nettle *Urtica urens* and Common Sow-thistle *Sonchus oleraceus*. Very few indigenous understorey species were recorded within the paddocks except for a patch of ploughed paddock dominated by Windmill Grass *Chloris truncata* (Plate 7), although isolated occurrences of Berry Saltbush *Atriplex semibaccata*, Lesser Joyweed *Alternanthera denticulata* and Variable Sida *Sida corrugata* were observed. Indigenous understory persisted in fragments along adjacent roadsides and included species such as Spurred Spear-grass *Austrostipa gibbosa*, Woolly New Holland Daisy *Vittadinia gracilis*, Hairy Panic *Panicum effusum*, Bristly Wallaby-grass *Rytidosperma setaceum* and Red-leg Grass *Bothriochloa macra*.

In some of the irrigation channels which contained water indigenous Narrow-leaf Cumbungi, Common Swamp Wallaby-grass *Amphibromus nervosus*, Narrow-leaf Nardoo *Marsilea costulifera*, Finger Rush *Juncus subsecundus*, Common Spike-sedge and Variable Willow-herb *Epilobium billardierianum* were recorded (Plate 8). Exotic Drain Flat-sedge, Water Plantain *Alisma lanceolatum* and Paspalum *Paspalum dilatatum*, were also present in these irrigation channels (Plate 5).

There is an area of seasonal inundation in the south west of the study area, which has an overstorey of planted River Red-gums and understorey dominated by Tall Wheat-grass *Lophopyrum ponticum*. Most of the dams within the study area contained water and dominated by exotic vegetation including Toowoomba Canary-grass *Phalaris aquatica*, Prairie Grass *Bromus catharticus*, Couch, Paspalum and Drain Flat-sedge.

Flora Habitat/Vegetation Communities

The vegetation within the study area was required to be assessed and classified against the policy and legislation stipulated by three tiers of government:

- *Local* – Where various overlays and policies may apply pursuant to the City of Greater Shepparton Council Planning Scheme (Department of Environment Land Water and Planning 2020d);
- *State* – Which includes DELWP's EVC mapping of vegetation communities (Department of Environment Land Water and Planning 2020b) and consideration under the Guidelines for the Removal, Destruction or Lopping of Native Vegetation (Department of Environment Land Water and Planning 2017); and,
- *Commonwealth* – where vegetation may meet 'thresholds' to be classified as a federally listed community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Department of Sustainability Environment Water Population and Communities 2011).

Local

The study area is zoned Farming Zone. A Floodway Overlay (FO) applies to the southern portion of the study area, and a Land Subject to Inundation Overlay (LSIO) applies to areas either side of the FO (Department of Environment Land Water and Planning 2020d). There are also road verges and road

reserves which are classified as public land. No other pertinent overlays, such as Vegetation Protection Overlays, Environmental Significance Overlays, or Significant Landscape Overlays, that are relevant to this report are applicable to the study area (Department of Environment Land Water and Planning 2020d).

State

The study area is located within the Victorian Riverina bioregion of Victoria. Historically, the vegetation within the study area would have supported the following Ecological Vegetation Classes (EVCs):

- EVC 125: Plains Grassy Wetland "is usually treeless, but in some instances can include sparse Black Box Eucalyptus largiflorens or River Red Gum *Eucalyptus camaldulensis*. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas" (Department of Environment Land Water and Planning 2020a). A small patch of this EVC is modelled on the south-western boundary of the study area. It is classified as Endangered within the bioregion.
- EVC 175: Grassy Woodland is described as "a variable open eucalypt woodland to 15 m tall or occasionally Sheoak woodland to 10 metres tall on more skeletal soils. [The] understorey includes a diverse ground layer of grasses and herbs. The shrub component is usually sparse. It occurs on sites with moderate fertility on gentle slopes or undulating hills on a range of geologies" (Department of Environment Land Water and Planning 2020a). This EVC was historically recorded in the north-west of the study area, with a further patch along the southern boundary. It is classified as Endangered within the bioregion.
- EVC 235: Plains Woodland/Herb-rich Gilgai Wetland Mosaic is an "open woodland to 15 metres tall on broad alluvial plains and along ephemeral drainage lines. Soils are generally poorly drained heavy clays which form distinctive "gilgai" crests and troughs in a fine-scale mosaic. The understorey consists of few, if any shrubs while the ground layer is made up of a combination of "dryland" herbs/grasses and amphibious herbs/grasses tolerant of seasonal inundation (Department of Environment Land Water and Planning 2020a). This EVC is modelled to occur on the north-east of the study area. It is classified as Endangered within the bioregion.
- EVC 882: Shallow Sands Woodland is described as "woodland or open-forest to 15 metres tall, with a sparse shrub layer of heathy, ericoid shrubs and a species-rich ground cover dominated by grasses and annual herbs. Typically it occurs between the heavier soils of the plains and the deep-sand aeolian dunefields which overlay these plains, but also occurs on broader areas of plains covered by shallow fluvial, outwash or aeolian sands overlaying drainage-impeding clays" (Department of Environment Land Water and Planning 2020a). This EVC is modelled to occur on the south of the study area. It is classified as Endangered within the bioregion.

Current modelling of these EVCs is limited within the study area, reflecting impression given by the aerial photography and the long history of agricultural land use within the site.

The current assessment found 39 patches of low quality native vegetation totalling 4.86 hectares comprised of 1.51 hectares of EVC 125: Plains Grassy Wetland and 3.35 hectares of 175: Grassy Woodland, within the study area.

The irrigation channels and dams are artificial waterbodies within the study area. Some of these areas contain native vegetation, such as rushes and sedges, favoured by the altered hydrology within the study area. Under the Habitat Hectare methodology, this vegetation is assigned to the EVC which "best fits" based on the soils, hydrology, aspect, vegetation species and structure. These small patches of native vegetation are therefore classified as EVC 125: Plains Grassy Wetland. This EVC "is usually treeless, but in some instances can include sparse Black Box *Eucalyptus largiflorens* or River Red Gum *Eucalyptus camaldulensis*. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas" (Department of Environment Land Water and Planning 2020a). This EVC is also listed as 'Endangered' within the bioregion.

Also within the paddocks there are instances where the dripline of canopy trees is contiguous and where this includes three or more trees, the area is considered a patch of vegetation and assigned to the appropriate EVC, in this case EVC 175: Grassy Woodland, despite the lack of midstorey or understorey indigenous species.

In some cases there were small areas where native understorey vegetation was greater than 25% cover which meets the criteria of that area considered a patch of native vegetation. In these cases these areas were assessed to be EVC 175: Grassy Woodland, despite the lack of trees or shrubs present within the patch, as there were many scattered trees in the broader landscape.

Commonwealth

The modelling used by the Protected Matters Search Tool (PMST) suggests that five threatened ecological communities listed under the EPBC Act are likely to occur within three kilometres of the study area (Department of Agriculture Water and the Environment 2020a). These five communities are:

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions (Endangered);
- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (Endangered);
- Natural Grasslands of the Murray Valley Plains (Critically Endangered);
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (Critically Endangered); and,
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).

The vegetation within the study area was dominated by exotic vegetation and the scattered trees and small artificial waterbodies, where native vegetation was present, do not meet thresholds to qualify as any of these vegetation communities.

It should be noted for the purposes of planning access to the study area that there is an area of remnant vegetation immediately adjacent to the south western boundary of the study area that,

while it was not assessed formally, is likely to be considered the endangered EPBC Act listed community, Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. This vegetation was located along the southern road reserve of the Midland Highway.

The PMST also identifies six wetlands of international importance (Ramsar wetlands) within the same catchment of the study area:

- Banrock Station Wetland Complex 400 - 500km upstream
- Gunbower Forest 50 - 100km upstream
- Hattah-Kulkyne Lakes 200 - 300km upstream
- NSW Central Murray State Forests 40 - 50km upstream
- Riverland 400 - 500km upstream
- The Coorong, and Lakes Alexandrina and Albert Wetland 400 - 500km upstream

It is unlikely that any of these wetlands will be significantly impacted by the proposed solar farm.

Vegetation Quality Assessment

There were 39 patches of native vegetation identified within the study area during the current assessment (Table 1; Figure 1). These patches fell into three groups of differing vegetation community or quality:

- Patches associated with irrigation channels that appear to retain water for longer periods of time than other channels within the study area. These wetter parts of the study area support a relatively homogenous mix of native wetland species, but where the cover abundance of perennial native vegetation exceeded 25%, they qualified as a patch of vegetation (Plates 5 and 8). The vegetation in these patches is considered to be representative of the EVC 125: Plains Grassy Wetland vegetation community, with low quality scores, ranging from 11 to 16 (out of 100) (Table 1).
- Areas deposed of trees and lacking midstorey, but which met the criteria to be considered a patch as perennial native vegetation contributed greater than 25% of the understorey cover (Plate 9). The vegetation in these patches is considered to be representative of EVC 175: Grassy Woodland vegetation community despite the lack of trees, given the fact that scattered trees exist throughout the landscape and grasslands were not modelled to have occurred within the area. The patches of this vegetation have low quality scores ranging from 6 to 9 (out of 100) (Table 1).
- Areas where drip lines of at least three trees overlap are considered a patch, however these areas often lack any midstorey or native understorey (Plate 12). Where a simplified midstorey or understorey persists, it is highly modified (Plate 10). The vegetation in these patches are considered to be representative of the EVC 175: Grassy Woodland vegetation community. In these patches the presence of large trees (Plate 11) (Table 1) and presence of logs was the main determinant of the final habitat hectares score, which ranged from between 8 and 28 (out of 100) (Table 1).

Tree Assessment

There were 115 scattered trees recorded within the study area, outside the patches of native vegetation (Table 2; Figure 1; Plates 13 and 14). The Tree Protection Zones (TPZ) of trees have been

determined in accordance with the Australian Standard for the Protection of Trees within Development Sites (AS 4970 - 2009) (Standards Australia 2009) and shown in Table 2. A tree's TPZ is a radius calculated at 12 times its diameter at breast height, but should not be less than 2 metres or greater than 15 metres (Standards Australia 2009). If an area greater than 10% of a tree's TPZ is impacted by works, that tree will be considered lost unless specialist arboricultural advice to the contrary is provided.

Many of these trees contained hollows that may provide habitat for arboreal species. Of the scattered trees, 82 are considered Large trees under the benchmark for the EVC 175: Grassy Woodland community (threshold 70 centimetres DBH for Eucalypt species and 40 centimetres DBH for Buloke).

Table 1. Habitat Hectare assessment results.

Patch			1	2	3	4	5	6	7	8	9	10
Bioregion			Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina
EVC name			Grassy Woodland	Grassy Woodland	Grassy Woodland	Plains Grassy Wetland	Plains Grassy Wetland	Grassy Woodland	Grassy Woodland	Plains Grassy Wetland	Grassy Woodland	Grassy Woodland
EVC number			175	175	175	125	125	175	175	125	175	175
Conservation rating within bioregion			Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered
Assessment Criteria		Maximum Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score
Site Condition	a. Large old trees	10	9	0	5	N/A	N/A	0	0	N/A	0	5
	b. Canopy cover	5	2	3	4	N/A	N/A	3	3	N/A	0	4
	c. Understorey	25	5	0	5	5	5	0	0	5	0	0
	d. Lack of weeds	15	4	4	4	0	0	4	4	0	4	4
	e. Recruitment	10	0	0	1	0	0	0	0	0	0	0
	f. Organic litter	5	3	3	4	2	2	3	3	2	3	3
	g. Logs	5	2	0	4	N/A	N/A	0	0	N/A	0	4
	h. Total (sum of a-g)	75	25	10	27	7	7	10	10	7	7	20
Standardised Score (x 1.36)			N/A	N/A	N/A	10	10	N/A	N/A	10	N/A	N/A
Landscape value	j. Patch size	10	1	1	1	1	1	1	1	1	1	1
	k. Neighbourhood	10	0	0	0	0	0	0	0	0	0	0
	l. Distance to core	5	0	0	0	0	0	0	0	0	0	0
m. Habitat Score (sum of i-l)		100	26	11	28	11	11	11	11	11	8	21
n. Habitat score out of 1 (m÷100)			**0.26**	**0.11**	**0.28**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.08**	**0.21**
Size (ha)			0.25791	0.049263	0.78646	0.102627	0.140321	0.041247	0.025025	0.032861	0.004921	0.553983
Large Trees			5	0	5	0	0	0	0	0	0	4

Patch			11	12	13	14	15	16	17	18	19	20
Bioregion			Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina
EVC name			Grassy Woodland	Grassy Woodland	Plains Grassy Wetland	Grassy Woodland	Plains Grassy Wetland	Grassy Woodland	Plains Grassy Wetland	Grassy Woodland	Plains Grassy Wetland	Grassy Woodland
EVC number			175	175	125	175	125	175	125	175	125	175
Conservation rating within bioregion			Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered
Assessment Criteria		Maximum Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score
Site Condition	a. Large old trees	10	9	0	N/A	9	N/A	0	N/A	9	N/A	9
	b. Canopy cover	5	2	0	N/A	4	N/A	0	N/A	2	N/A	2
	c. Understorey	25	0	0	5	0	5	0	5	0	5	0
	d. Lack of weeds	15	4	4	0	4	0	4	4	4	0	4
	e. Recruitment	10	0	0	0	0	0	0	0	0	0	0
	f. Organic litter	5	3	3	2	3	2	3	2	3	2	3
	g. Logs	5	0	0	N/A	5	N/A	0	N/A	4	N/A	0
	h. Total (sum of a-g)	75	18	7	7	25	7	7	11	22	7	18
Standardised Score (x 1.36)			N/A	N/A	10	N/A	10	N/A	15	N/A	10	N/A
Landscape value	j. Patch size	10	1	1	1	1	1	1	1	1	1	1
	k. Neighbourhood	10	0	0	0	0	0	0	0	0	0	0
	l. Distance to core	5	0	0	0	0	0	0	0	0	0	0
m. Habitat Score (sum of i-l)		100	19	8	11	26	11	8	16	23	11	19
n. Habitat score out of 1 (m÷100)			**0.19**	**0.08**	**0.11**	**0.26**	**0.11**	**0.08**	**0.16**	**0.23**	**0.11**	**0.19**
Size (ha)			0.064011	0.042432	0.013221	0.136714	0.021686	0.615159	0.014714	0.065833	0.108609	0.038653
Large Trees			2	0	0	5	0	0	0	1	0	1

Patch			21	22	23	24	25	26	27	28	29	30
Bioregion			Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina
EVC name			Grassy Woodland	Plains Grassy Wetland	Plains Grassy Wetland	Grassy Woodland	Grassy Woodland	Plains Grassy Wetland	Plains Grassy Wetland	Grassy Woodland	Grassy Woodland	Grassy Woodland
EVC number			175	125	125	175	175	125	125	175	175	175
Conservation rating within bioregion			Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered
Assessment Criteria		Maximum Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score	Patch Score
Site Condition	a. Large old trees	10	5	N/A	N/A	2	0	N/A	N/A	0	0	0
	b. Canopy cover	5	4	N/A	N/A	2	2	N/A	N/A	0	0	0
	c. Understorey	25	0	5	5	0	0	5	5	0	0	0
	d. Lack of weeds	15	4	4	0	4	4	0	0	4	4	4
	e. Recruitment	10	0	3	0	0	0	0	0	0	0	0
	f. Organic litter	5	3	2	2	3	3	2	2	4	4	4
	g. Logs	5	4	N/A	N/A	4	5	N/A	N/A	0	0	0
	h. Total (sum of a-g)	75	20	14	7	15	14	7	7	8	8	8
Standardised Score (x 1.36)			N/A	19	10	N/A	N/A	10	10	N/A	N/A	N/A
Landscape value	j. Patch size	10	1	1	1	1	1	1	1	1	1	1
	k. Neighbourhood	10	0	0	0	0	0	0	0	0	0	0
	l. Distance to core	5	0	0	0	0	0	0	0	0	0	0
m. Habitat Score (sum of i-l)		100	21	20	11	16	15	11	11	9	9	9
n. Habitat score out of 1 (m÷100)			**0.21**	**0.2**	**0.11**	**0.16**	**0.15**	**0.11**	**0.11**	**0.09**	**0.09**	**0.09**
Size (ha)			0.121462	0.103038	0.027163	0.827597	0.120709	0.012765	0.035473	0.084525	0.019415	0.008466
Large Trees			1	0	0	2	0	0	0	0	0	0

Patch			31	32	33	34	35	36	37	38	39
Bioregion			Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina
EVC name			Grassy Woodland	Grassy Woodland	Grassy Woodland	Grassy Woodland	Grassy Woodland	Grassy Woodland	Grassy Woodland	Grassy Woodland	Grassy Woodland
EVC number			175	175	175	175	175	175	175	175	175
Conservation rating within bioregion			Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered
Assessment Criteria		**Max. Score**	**Patch Score**	**Patch Score**	**Patch Score**	**Patch Score**	**Patch Score**	**Patch Score**	**Patch Score**	**Patch Score**	**Patch Score**
Site Condition	a. Large old trees	10	9	0	0	0	0	5	0	0	9
	b. Canopy cover	5	2	0	0	0	0	4	0	0	2
	c. Understorey	25	0	0	0	0	0	5	0	0	0
	d. Lack of weeds	15	4	7	0	0	0	4	4	4	4
	e. Recruitment	10	0	0	0	0	0	0	0	0	0
	f. Organic litter	5	3	5	5	5	5	3	5	5	3
	g. Logs	5	0	0	0	0	0	0	0	0	4
	h. Total (sum of a-g)	75	18	12	5	5	5	21	9	9	22
Standardised Score (x 1.36)			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landscape value	j. Patch size	10	1	1	1	1	1	1	1	1	1
	k. Neighbourhood	10	0	0	0	0	0	0	0	0	0
	l. Distance to core	5	0	0	0	0	0	0	0	0	0
m. Habitat Score (sum of i-l)		100	19	13	6	6	6	22	10	10	23
n. Habitat score out of 1 (m÷100)			**0.19**	**0.13**	**0.06**	**0.06**	**0.06**	**0.22**	**0.1**	**0.1**	**0.23**
Size (ha)			0.067954	0.010897	0.005048	0.004357	0.013304	0.118506	0.028457	0.020208	0.065
Large Trees			2	0	0	0	0	1	0	0	1

Table 2. Scattered trees recorded within the study area.

Tree Number	Species	Diameter at Breast Height (cms)	Size Class	Tree Protection zone (m)	Latitude	Longitude
1	Grey Box	135	Large	15	-36.4266	145.047
2	Grey Box	19	Small	2.28	-36.4265	145.047
3	Grey Box	102	Large	12.24	-36.4266	145.045
4	Grey Box	150	Large	15	-36.4295	145.043
5	Grey Box	34	Small	4.08	-36.4292	145.043
6	Grey Box	147	Large	15	-36.4307	145.048
7	Grey Box	162	Large	15	-36.4313	145.048
8	Grey Box	141	Large	15	-36.4308	145.048
9	Grey Box	81	Large	9.72	-36.4311	145.049
10	Dead	110	Large	13.2	-36.4317	145.049
11	Dead	63	Small	7.56	-36.4326	145.049
12	Grey Box	143	Large	15	-36.4322	145.048
13	Yellow Box	116	Large	13.92	-36.4311	145.045
14	Grey Box	136	Large	15	-36.4306	145.046
15	Grey Box	92	Large	11.04	-36.4318	145.043
16	Dead	54	Small	6.48	-36.432	145.044
17	Grey Box	111	Large	13.32	-36.432	145.044
18	Grey Box	132	Large	15	-36.4323	145.047
19	Grey Box	98	Large	11.76	-36.4325	145.047
20	Grey Box	112	Large	13.44	-36.4319	145.042
21	River Red-gum	54	Small	6.48	-36.4318	145.042
22	Grey Box	121	Large	14.52	-36.4306	145.042
23	Dead	144	Large	15	-36.4309	145.041
24	Grey Box	46	Small	5.52	-36.432	145.043
25	Grey Box	16	Small	2	-36.432	145.043
26	Grey Box	119	Large	14.28	-36.4335	145.043
27	Grey Box	159	Large	15	-36.4339	145.043
28	Grey Box	121	Large	14.52	-36.4342	145.043
29	Grey Box	91	Large	10.92	-36.4343	145.043
30	Grey Box	93	Large	11.16	-36.4348	145.043
31	Grey Box	53	Small	6.36	-36.4348	145.043
32	Grey Box	158	Large	15	-36.4347	145.043
33	Grey Box	129	Large	15	-36.4363	145.043
34	Yellow Box	38	Small	4.56	-36.4334	145.041
35	Grey Box	36	Small	4.32	-36.4325	145.041
36	Grey Box	43	Small	5.16	-36.4322	145.041
37	River Red-gum	118	Large	14.16	-36.432	145.04
38	Buloke	45	Large	5.4	-36.4323	145.041
39	Grey Box	26	Small	3.12	-36.4328	145.041

Tree Number	Species	Diameter at Breast Height (cms)	Size Class	Tree Protection zone (m)	Latitude	Longitude
40	River Red-gum	16	Small	2	-36.4317	145.04
41	Grey Box	15	Small	2	-36.4318	145.041
42	Grey Box	148	Large	15	-36.4324	145.041
43	Yellow Box	150	Large	15	-36.4397	145.035
44	Grey Box	128	Large	15	-36.4396	145.035
45	Grey Box	122	Large	14.64	-36.4382	145.035
46	Dead	185	Large	15	-36.4384	145.036
47	Grey Box	115	Large	13.8	-36.4377	145.04
48	Grey Box	116	Large	13.92	-36.4377	145.04
49	Grey Box	112	Large	13.44	-36.4376	145.04
50	Grey Box	35	Small	4.2	-36.4379	145.04
51	Grey Box	66	Small	7.92	-36.438	145.04
52	Dead	40	Small	4.8	-36.4379	145.04
53	Grey Box	94	Large	11.28	-36.4374	145.04
54	Grey Box	142	Large	15	-36.4364	145.04
55	Yellow Box	134	Large	15	-36.4374	145.039
56	Yellow Box	115	Large	13.8	-36.4374	145.038
57	Grey Box	115	Large	13.8	-36.4371	145.037
58	Grey Box	169	Large	15	-36.437	145.037
59	Dead	96	Large	11.52	-36.4368	145.038
60	Dead	89	Large	10.68	-36.4368	145.038
61	Grey Box	107	Large	12.84	-36.436	145.039
62	Grey Box	134	Large	15	-36.4356	145.04
63	Grey Box	120	Large	14.4	-36.4357	145.04
64	River Red-gum	169	Large	15	-36.4321	145.04
65	River Red-gum	101	Large	12.12	-36.4322	145.04
66	Grey Box	130	Large	15	-36.4323	145.04
67	Grey Box	124	Large	14.88	-36.4327	145.04
68	River Red-gum	124	Large	14.88	-36.4328	145.04
69	Grey Box	90	Large	10.8	-36.4328	145.04
70	Grey Box	164	Large	15	-36.4346	145.037
71	River Red-gum	98	Large	11.76	-36.4321	145.037
72	River Red-gum	126	Large	15	-36.4322	145.037
73	Grey Box	133	Large	15	-36.435	145.035
74	Grey Box	174	Large	15	-36.435	145.037
75	Grey Box	221	Large	15	-36.4313	145.037
76	Grey Box	190	Large	15	-36.4313	145.038
77	River Red-gum	52	Small	6.24	-36.4321	145.039
78	Grey Box	147	Large	15	-36.4288	145.034
79	Grey Box	98	Large	11.76	-36.4289	145.034

Tree Number	Species	Diameter at Breast Height (cms)	Size Class	Tree Protection zone (m)	Latitude	Longitude
80	Grey Box	190	Large	15	-36.4283	145.033
81	Grey Box	109	Large	13.08	-36.429	145.032
82	Grey Box	121	Large	14.52	-36.4291	145.034
83	Grey Box	120	Large	14.4	-36.4291	145.033
84	Grey Box	104	Large	12.48	-36.4293	145.033
85	Grey Box	97	Large	11.64	-36.4295	145.033
86	Grey Box	95	Large	11.4	-36.4294	145.034
87	Grey Box	133	Large	15	-36.4294	145.034
88	Grey Box	87	Large	10.44	-36.4298	145.033
89	Grey Box	118	Large	14.16	-36.4298	145.033
90	Grey Box	97	Large	11.64	-36.43	145.033
91	Grey Box	77	Large	9.24	-36.4303	145.033
92	Grey Box	118	Large	14.16	-36.4304	145.033
93	Grey Box	144	Large	15	-36.4298	145.034
94	Grey Box	150	Large	15	-36.4301	145.034
95	Grey Box	163	Large	15	-36.4305	145.034
96	Grey Box	115	Large	13.8	-36.4318	145.033
97	Grey Box	134	Large	15	-36.4318	145.033
98	Grey Box	194	Large	15	-36.4338	145.034
99	River Red-gum	140	Large	15	-36.4346	145.033
100	Grey Box	67	Small	8.04	-36.4402	145.035
101	Grey Box	122	Large	14.64	-36.4385	145.033
102	Grey Box	20	Small	2.4	-36.4265	145.032
103	Dead	43	Small	5.16	-36.4265	145.033
104	Dead	36	Small	4.32	-36.4265	145.033
105	Dead	29	Small	3.48	-36.4265	145.033
106	Grey Box	29	Small	3.48	-36.4265	145.033
107	Grey Box	64	Small	7.68	-36.4275	145.032
108	Grey Box	44	Small	5.28	-36.4314	145.032
109	Grey Box	35	Small	4.2	-36.4316	145.032
110	Dead	32	Small	3.84	-36.4323	145.032
111	Grey Box	52	Small	6.24	-36.4325	145.032
112	Dead	31	Small	3.72	-36.4405	145.032
113	Dead	61	Small	7.32	-36.4327	145.049
114	Grey Box	27	Small	3.24	-36.4293	145.049
115	Grey Box	29	Small	3.48	-36.4293	145.049

Table note: EVC 175: Grassy Woodland, EVC 235: Plains Woodland / Herb-rich Gilgai Wetland Mosaic, and EVC 882: Shallow Sands Woodland size class for large Eucalypts is 70 centimetres DBH; EVC 235: Plains Woodland / Herb-rich Gilgai Wetland Mosaic, and EVC 882: Shallow Sands Woodland size class for large *Allocasuarina* or *Callitris* trees is 40 centimetres DBH.

Threatened Flora Species

There are three threatened flora species previously recorded within three kilometres of the study area: Buloke *Allocasuarina luehmannii*, Common Joyweed *Alternanthera nodiflora* and Branching Groundsel *Senecio cunninghamii* var. *cunninghamii* (Department of Environment Land Water and Planning 2020e). A further five threatened flora species are predicted to occur within the study area based on the Protected Matters Search Tool (Department of Agriculture Water and the Environment 2020a). A consolidated list of these threatened flora species as well as their conservation status under the EPBC Act, *Advisory List of Rare or Threatened Plants in Victoria* (Department of Environment and Primary Industries 2014) and the *Flora and Fauna Guarantee Act 1988* (Vic) (FFG Act), as well as their preferred habitats and likelihood of occurrence for each species is provided in Table A3.

The current assessment recorded one Buloke in the study area, which is listed as Endangered within Victoria (Department of Environment and Primary Industries 2014) and listed under the FFG Act.

There are no historical records of threatened flora species within the study area. The high level of modification associated with agricultural development of the study area make it highly unlikely that any threatened flora species, other than the recorded Buloke, persist within the study area, or will be impacted by the proposed development of the study area.

Fauna

Fauna Species

Thirty-eight fauna species were recorded within the study area during the current assessment (Table A2). This included 32 native and two introduced bird species, one introduced mammal species, one native frog species and two native reptile. All of these species are common to the local area. Further discussion of fauna species encountered is included below.

Threatened Fauna Species and Communities

Eight threatened fauna species have previously been recorded within three kilometres of the study area: Freckled Duck *Stictonetta naevosa*, Glossy Ibis *Plegadis falcinellus*, Royal Spoonbill *Platalea regia*, Nankeen Night Heron *Nycticorax caledonicus*, Eastern Great Egret *Ardea modesta*, Latham's Snipe *Gallinago hardwickii*, Intermediate Egret *Ardea intermedia* and Pied Cormorant *Phalacrocorax varius* (Department of Environment Land Water and Planning 2020e) (Figure 2). A further nine threatened fauna species are predicted to occur within the study area, based on the PMST (Department of Agriculture Water and the Environment 2020a). A consolidated list of these threatened fauna species as well as their conservation status under the EPBC Act, Advisory Lists (Department of Sustainability and Environment 2009; Department of Sustainability and Environment 2013) and the FFG Act, as well as their preferred habitats and likelihood of occurrence for each species is provided in Table A4.

All of the species previously recorded near the study area are wetland dependent species. A moderate/high quality wetland was located in the south-western corner of the study area (albeit surrounded by planted vegetation), which may provide habitat to all of these species, on occasion, except for Freckled Duck and Pied Cormorant. These two species require open water bodies which were not observed within the study area. It is understood that this wetland will be retained in the

development of the study area, therefore there are unlikely to be significant impacts to any of these species.

The study area may also provide air space over which they may fly on occasions when moving around the landscape (White-throated Needletail *Hirundapus caudacutus,* Grey-headed Flying-fox *Pteropus poliocephalus*), however the study area itself does not provide important resources to these species, and the development of the study area is unlikely to impact these either of these species.

Other species modelled to occur near the study area are likely to be excluded by modification of natural habitats from intensive agricultural development. It is therefore unlikely that any threatened fauna species persist within the study area, or that the study area provides significant resources to any threatened fauna species.

No fauna communities listed under the FFG Act were recorded within the study area and none are likely to occur.

Fauna Habitats

Three habitat types were observed within the study area:

1. Open paddocks and grasslands;
2. Irrigation channels;
3. Mature indigenous trees;
4. Wetland

Open Paddocks and Grasslands

The majority of the study area comprised open paddocks. The vegetation was dominated by planted exotic species, including a range of pasture grasses and environmental weeds. The vegetation was generally freshly harvested and was less than 20 centimetres high.

The open paddocks potentially provide low-moderate quality habitat for a range of species including small mammals, reptiles and grassland birds. Some birds, such as Straw-necked Ibis *Threskiornis spinicollis* and White-faced Heron *Ardea novaehollandiae*, may search for molluscs and invertebrates in these areas and in wet depressions. When these areas are inundated, they are likely to provide slightly higher quality habitat to a range of shy birds, such as crakes and rails, as well as larger probing birds including herons, ibis, and egrets. Of the threatened species listed within Appendix 1 (Table A4), none are likely to use these habitats on a regular basis.

Irrigation Channels and Waterbodies

The irrigation channels and artificial dams, when they hold water, are likely to support a range of birds, fish and amphibians. No fish were observed during the current assessment, however native species such as Southern Pygmy Perch *Nannoperca australis* and Silver Perch *Bidyanus bidyanus,* as well as introduced species such as Common Carp *Cyprinus carpio*, Plague Minnow *Gambusia holbrooki* and Redfin Perch *Perca fluviatilis* may occur within larger, connected channels when they are inundated. When fish are present within the study area, piscivorous birds are also likely to occur in these artificial waterbodies, including Herons, Ibis. Spoonbills *Platalea* sp and, in larger bodies of

water, ducks and grebes *Poliocephalus* sp. A range of frogs are also likely to use the channels as primary foraging and breeding habitat, as well as dispersal habitat to move across the landscape.

Mature Indigenous Trees

More than 100 large, mature trees were recorded within the study area (Figure 1: Table 2). Fourteen of these trees were dead. Hollows were observed in many of the large trees and small stick nests were also observed in some of trees.

The trees are isolated within the landscape and the lack of other vegetation strata reduces the quality of the habitat for woodland dependent species. Nonetheless, the scattered paddock trees and large, old trees in patches are likely to provide habitat to a range of common bird and arboreal mammal species. This is likely to include gregarious bird species such as Noisy Miners *Manorina melanocephala*¸ Galahs *Eolophus roseicapilla*, Red-rumped Parrots *Psephotus haematonotus* and Eastern Rosellas *Platycercus eximius*. Smaller birds are likely to be restricted to the canopy, although very few of these were observed during the current assessment, because of the lack of mid- and understorey vegetation. Mammals such as Common Brushtail Possums *Trichosurus vulpecula* and Common Ringtail Possums *Pseudocheirus peregrinus* are also likely to forage in the canopy of these trees, whilst micro-bats are likely to use the fissures and flaking bark as diurnal roosting locations.

Scattered paddock trees are important resources within modified landscapes, such as that provided by the study area. They provide stepping stones of habitat that allow species to move across the landscape (Maron and Fitzsimons 2007). Hollows are generally a limited resource within the landscape (Gibbons and Lindenmayer 2002; Gibbons *et al.* 2002; Lindenmayer *et al.* 1994), which makes these trees of greater ecological value than younger trees that do not support hollows. The hollows varied in size, shape and location. Species likely to use these tree hollows include Common Ringtail Possums, Common Brushtail Possums and the microbats discussed above, as well as a wide variety of birds, particularly parrots and cockatoos, as well as, potentially, owls.

The bark, leaf litter, fallen branches and root structure of these trees created habitats such as crevices and burrows for invertebrates which were scarcely recorded elsewhere within the study area. Skinks are also likely to occur in these locations, including the two species identified during this assessment (Garden Skink *Lampropholis guichenoti* and Weasel Skink *Saproscincus mustelinus*).

Wetland

The wetland in the south-west of the study area is a low-lying area that has been planted with Australian native Eucalypts. Water collects in the low parts of this wetland, which is fenced, but into which stock can gain access. At the time of the assessment, water was pooling in shallow ponds near the middle of the wetland, however it is expected that it will go through both inundated and dry periods. This transitioning hydroperiod is likely to make the wetland a productive habitat type within the landscape, supporting arrange of taxa, including invertebrates, frogs, reptiles, birds and, on occasion small native fish, while the mature trees (albeit non-indigenous and planted) area likely to provide foraging and nesting resources to a range of birds and arboreal mammals.

The surrounding landscape

The landscape surrounding the study area is highly disturbed and native vegetation is fragmented and scarce. Native vegetation has largely been cleared to allow for irrigated crops and other agricultural activities to take place.

Summary of Ecological Constraints

It is concluded that the ecological constraints of the study area include:

- The vegetation within the southern road reserve of the Midland Highway is likely to meet thresholds to be classified as Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. This area is considered highly constrained and should not be impacted by access upgrades to the study area. An EPBC Act referral is likely to be recommended, depending on the location and extent of any such impact within this location.
- The vegetation within the patches of native vegetation. Impacts to these patches of vegetation would require biodiversity offsets for their removal. They are considered a moderate constraint to development as the proponent is required to demonstrate the three step approach of avoiding, minimising and offsetting impacts to this vegetation;
- The artificial wetland in the south-west of the study area, which is likely to support a range of species from different groups, including, on occasion threatened species that persist within the study area. Although the vegetation surrounding this wetland is not classified as native vegetation for the purposes of offsetting, the potential for this wetland to support small numbers of threatened species, makes this area an area of moderate ecological constraint;
- Eighty-two 'Large' scattered trees, and their Tree Protection Zones, also represent a moderate constraint to development, due to them being large mature trees, which contain tree hollows. Impacts to these trees would require biodiversity offsets for their removal and the proponent is required to demonstrate the three step approach of avoiding, minimising and offsetting impacts to this vegetation;
- FFG Act protected flora and communities in road reserves surrounding the study area. Impacts to these plants and communities represents a moderate constraint to development as they require a Permit to Remove Protected Flora from public land;
- Thirty-three other scattered trees and their Tree Protection Zones represent a low level of constraint. Impacts to these trees would also require biodiversity offsets for their removal; and
- Pastures and cropped land, which represent the lowest ecological constraint to development, and should be prioritised for development.

Discussion

A detailed summary of the legislation that was considered when preparing this report is provided in Appendix 2. The discussion presented in this section of the report does not reiterate information provided in Appendix 2, but summarises the results and recommendations arising from the interpretation of this legislation.

Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The desktop assessment identified five threatened flora and 13 threatened fauna species as well as five threatened communities, listed under the EPBC Act, which may occur within the study area. The site assessment, however, confirmed that none of these species are likely to persist within the study area due to absence of suitable habitats or the degraded nature of those habitats within the study area.

No EPBC Act-listed threatened ecological communities occur within the study area, however the vegetation within the southern road reserve of the Midland Highway is likely to meet thresholds to be classified as Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia, and should not be impacted by access upgrades to the study area.

A referral to the Commonwealth Department of Agriculture, Water and the Environment (formerly the Department of Energy and the Environment) is not recommended for the proposed development of the study area, as it is unlikely that there will be any significant impacts on any matters of national environmental significance, unless the southern road reserve of the Midland Highway is proposed to be impacted. If vegetation removal in this area is unavoidable, an EPBC Act referral is likely to be recommended, depending on the location and extent of any such impact.

Environmental Effects Act 1978 (Vic)

The *Environment Effects Act 1978* (Vic) provides for assessment of proposed projects (works) that are capable of having a significant effect on the environment. The Act does this by enabling the Minister administering the Environment Effects Act to decide that an Environment Effects Statement (EES) should be prepared.

Amongst other things, the referral criteria for projects include:

- Individual types of potential effects on the environment that might be of regional or State significance, and therefore warrant referral of a project, are:
- Potential clearing of 10 hectares or more of native vegetation from an area that:
    - is of an Ecological Vegetation Class identified endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); 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); and
    - is not authorised under an approved Forest Management Plan or Fire Protection Plan.

- Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria (Department of Sustainability and Environment 2007).

It is concluded that based on the relatively minor impacts to native vegetation and the low likelihood of impacts to threatened species, there are unlikely to be any triggers for the requirement for an Environmental Effects Statement.

Flora and Fauna Guarantee Act 1988 (Vic)

The desktop assessment identified five flora species and 14 fauna species listed under the FFG Act that may occur within the study area (Tables A3 and A4). One species, Buloke, listed as threatened under the FFG Act was recorded within the study area, but no other species or individuals are likely to occur on the basis of the modification of the vegetation within the study area, and limited fauna habitat that it supports.

The FFG Act also lists species as 'protected flora' on public land. Protected flora includes whole families or genera, (as well as species), such as daisies, heaths, orchids, and most Acacias. These species and genera are not necessarily regarded as threatened, but require an approved 'protected flora licence or permit' from DELWP prior to their removal when located on public land. If the proponent will impact road reserves or other areas of public land to provide a connection for the solar farm to the main grid, a Permit to Take Protected Flora may be required. Golden Wattle is a protected species under the FFG Act and several shrubs were recorded in adjacent road sides (Figure 1). As the proponent will need access to the study area from the neighbouring roads and will be required to build entry points, it is recommended and areas containing Golden Wattle and patches of native vegetation within the road reserves should be avoided. Where this is not possible a permit to remove FFG Act Permit to Take Protected Flora will be required.

Planning and Environment Act 1987 (Vic)

The proposed development would require a planning permit approval from the City of Greater Shepparton Council prior to the removal, destruction or lopping of native vegetation, pursuant to Clause 52.17 of the City of Greater Shepparton Council Planning Scheme (Department of Environment Land Water and Planning 2020d). The applicant is required to demonstrate the three-step approach to avoid, minimise and offset impacts to native vegetation (discussed below). Biodiversity offsets would be required for any such impacts.

Catchment and Land Protection Act 1994 (Vic)

Primary considerations of the *Catchment and Land Protection Act 1994* (Vic) relate to soil and water conservation, as well as the management of pest plants and animals. The study area contains eight weed species that are listed as 'noxious' within the Goulburn Broken Catchment Management Area: Bathurst Burr *Xanthium spinosum*; Blackberry *Rubus fruticosus* spp. agg.; Chilean Needle-grass *Nassella neesiana*; Horehound *Marrubium vulgare*; Caltrop *Tribulus terrestris* and African Love-grass *Eragrostis curvula,* which are all listed as 'Regionally Controlled'. The proponent is required to 'control the spread' of all 'Regionally Controlled' species from their property (Melville 2018). In

addition, Weld *Reseda luteola* and Spear Thistle Cirsium vulgare are listed as 'Restricted'. There are limitations on the collection and trade of these species.

In addition, Blackberry and Chilean Needle-grass are also listed as Weeds of National Significance (Australian Weeds Committee 2013), although there are no additional legislative obligations to manage weeds under this listing.

The proposed development should aim to remove these plants when construction commences, and ensure they are removed during the future the landscaping and maintenance of the study area. It is expected that weed management would form part of a Construction Environment Management Plan (or equivalent). As a minimum, this should include:

- Maintain vehicle hygiene and vehicle wash-down areas;
- Using clean fill (if required);
- Manage noxious that may establish post-construction through appropriate management techniques;
- Avoiding the use of noxious species during any landscaping of the property;
- Implement sediment and erosion control prior to and during construction; and
- Undertake site rehabilitation post-construction, as appropriate.

It is also recommended that locally indigenous species be considered within the plant palette for future rehabilitation of the site, as appropriate.

Wildlife Act 1975 (Vic)

It is likely that some locally common species of fauna will be displaced by the proposed development. Furthermore, there remains a low likelihood that animals may be accidentally injured when disturbing soil and removing vegetation. All native vertebrate wildlife is protected under the *Wildlife Act 1975* (Vic), and therefore contractors must use due care when removing vegetation and fill from the study area. It is recommended that a zoologist or wildlife handler salvage any wildlife from trees prior to their removal. It is recommended that a Fauna Management Plan be prepared to deal with encounters with native wildlife.

Guidelines for the removal, destruction or lopping of native vegetation

Three-step Approach

Applicants who wish to remove native vegetation must generally demonstrate how the application meets the three-step approach to:

1. Avoid the removal, destruction or lopping of native vegetation.
2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided; and
3. Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation (Department of Environment Land Water and Planning 2017).

Avoidance and Minimisation Statement

Preliminary advice to the proponent advised of approaches to avoid and minimise impacts to native vegetation. These approaches included:

- Avoiding patches of native vegetation within the study area;
- Avoiding Large Trees, many of which contained hollows for fauna habitats;
- Avoiding impacts to retained trees by ensuring that works affect less than 10% of the TPZ in accordance with the Australian Standard for the Protection of Trees within Development Sites (AS 4970 - 2009). A 15 metre buffer around all trees, including those within patches of native vegetation, will ensure impacts do not occur. Specialist arboricultural advice may be required if the proponent wished to impact a greater area of a tree's TPZ;
- Tree pruning to be undertaken only with Council consent, and must only be undertaken by a suitably qualified professional.

Solar farms require a minimum quantity of solar panels to be electrically connected to each inverter station. This creates a modular style of design for solar farm layouts, consisting of 'blocks' of panels, for example a 3MW inverter station should be located alongside a block of approximately 3MW of solar panels connected to it. Breaking up the layout of these 'blocks' (i.e. increasing the distance between the panels and the inverter they are connected to) requires longer distances of cabling and trenching, having a knock on effect of increased costs, more disruption to the site for trenching and poor electrical efficiency due to longer cables. In addition to disrupting continuous 'blocks' of panels, retained trees are a source of shade on the solar panels, meaning the layout must accommodate the tree that is being retained, its Tree Protection Zone, and a setback so that panels are not in the shade of the tree. This can result in a large exclusion area, depending on the height and location of the tree. FRV needed to balance the above with the requirement to avoid and minimise impacts to native vegetation

The current development design has been developed to minimise impacts to both the patches of native vegetation and the scattered trees within the study area, whilst still meeting functional requirements of the proposed Solar Farm, including a road access track, transmission connection, battery storage facility and solar arrays, as discussed above. The majority of scattered trees are being retained, and have a Tree Protection Zone of 15m applied to them to ensure their protection [3]. A 10m Protection Zone has also been applied around the native vegetation patches to be retained. A fence to protect native vegetation, and the solar farm, will surround the infrastructure of the Solar Farm, which itself curves around native vegetation to reduce impacts to the ecological values of the site. Finally, the location of the proposed footprint avoids areas of the highest ecological value which are located in the 'woodland' areas of the study area, instead removing the regenerating native vegetation that represents low quality, secondary regrowth in drains, as well as planted vegetation that is not considered native under the Guidelines (Department of Environment Land

[3] Note this is for these initial planning designs and this may be revised down to the tree's actual Tree Protection Zone for the final design

Water and Planning 2017). Removal of small trees has also been prioritised over the removal of Large trees.

The residual impacts to native vegetation are 0.273 hectares of the lowest quality native vegetation in patches (out of a total of 4.79 hectares, or 6%, of the native vegetation patches within the study area) and eight Scattered Trees, comprising seven large Scattered Trees and one small Scattered Tree (out of a total of 115 Scattered Trees, or 7%) (Figure 1). The area used by Native Vegetation Removal Report to calculate the offset for the Scattered Trees takes the total impact to native vegetation 0.769 hectares. No exemptions are being claimed to avoid offsets for this vegetation.

Offsets

Offsets were calculated using the DELWP offset calculator and creating an EnSym Scenario Test – Native Vegetation Removal report (Appendix 3). This report uses the native vegetation polygons collected during the current assessment and modelled vegetation quality scores to determine offset requirements. The Native Vegetation Removal report includes the species specific offset test, which determines if the proposed vegetation removal will have a proportional impact on any Victorian rare or threatened species habitat above a specific offset threshold, which is set at 0.005 per cent of total habitat for each species. This test was applied to current proposal, and it was determined that species specific offsets were not required. The results of the Scenario Test – Native Vegetation Removal report are summarised in Table 3.

It is expected that offsets will be achieved through a third-party offset, through a vegetation broker, as securing the offsets on site is not practicable. A quote has been received from a DELWP accredited Vegetation Broker who have confirmed that the required offset is available (Appendix 4). Two options are available, for a fee of between $14,925.00 and $17,060.00 (excl GST).

Table 3. Biodiversity Offsets for impacted native vegetation within the study area.

Offset Parameter	Result
Location Risk	Location 2
Risk Based Pathway	Detailed
Total Extent Removed	0.769 hectares
General Offset Requirements	0.114 General Habitat Units 7 Large Trees
Species Specific Offset Requirements	Nil
Minimum Strategic Biodiversity Score	0.132
Offset Location	Goulburn Broken CMA area or within the Greater Shepparton City Council municipality

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Plates

Plate 1. Planted trees along the drive way of the residence in the north of the study area

Plate 2. Planted Sugar Gum trees forming a row which extended north west of the dwelling.

Plate 3. Planted Prickly-leaved Paperbark bordering a farm dam in centre of property.

Plate 4. Planted River Red-gum trees forming rows in lowlying depression with Tall Wheat Grass planted underneath in the seasonal wetland.

Plate 5. Irrigation channels dominated by exotic vegetation including Drain Flat Sedge and Couch, although some native Rushes and Common Spike-sedge were also present in areas where water appeared to remain within them more permanently.

Plate 6. Understorey shrub Golden Wattle recorded in a patch of native vegetation in the Mccague Road roadside adjacent to the north of the study area.

Plate 7. A patch of native vegetation dominated by Windmill Grass which has been ploughed, found in the south of the study area.

Plate 8. Irrigation channel dominated by Rushes and Narrow-leaf Nardoo in the centre of the property.

Plate 9. A patch of native vegeation within the Mccague Road road reserve which contained greater than 25% relative cover of indigenous Spurred Spear-grass, Berry Saltbush and Windmill Grass.

Plate 10. Patch 10 EVC: 175 Grassy Woodland dominated by a canopy of Grey Box trees .

Plate 11. Large Grey Box trees and logs within patch 3 contributing to the highest habitat hectare score of 28 out of 100.

Plate 12. A spinney of Grey Box trees with contiuous drip line form patch 2 which does not contain a native understorey, any logs or large trees.

Plate 13. Grey Box scattered tree number 6 in a cultivated paddock.

Plate 14 Cluster of Grey Box scattered trees (trees 95, 93 and 85 in the left, centre and right of the image retrospectively) in the north west of the study area.

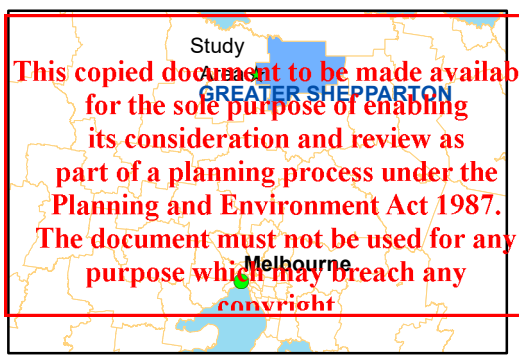
Figures

Figure 1: Location of the study area

90 McGague Road, Girgarre East, Victoria.

Legend

- Study Area
- **Proposed Development**
  - Fence
  - Inverter/Transformer Station
  - Roads
  - Solar Array
- Patches of Native Vegetation
- Large Trees in Patches
- **Scattered Trees**
  - River Red-gum
  - Buloke
  - Grey Box
  - Yellow Box
  - Dead
  - Impacted Patches
  - Impacted Trees
- **FFG Act Protected Species**
  - Golden Wattle



P/N 1594 Figure 2. Nov 2018. Aerial photography: Nearmap 2019 dated 31 October 2011.

Note: some threatened species points have been shifted for display purposes

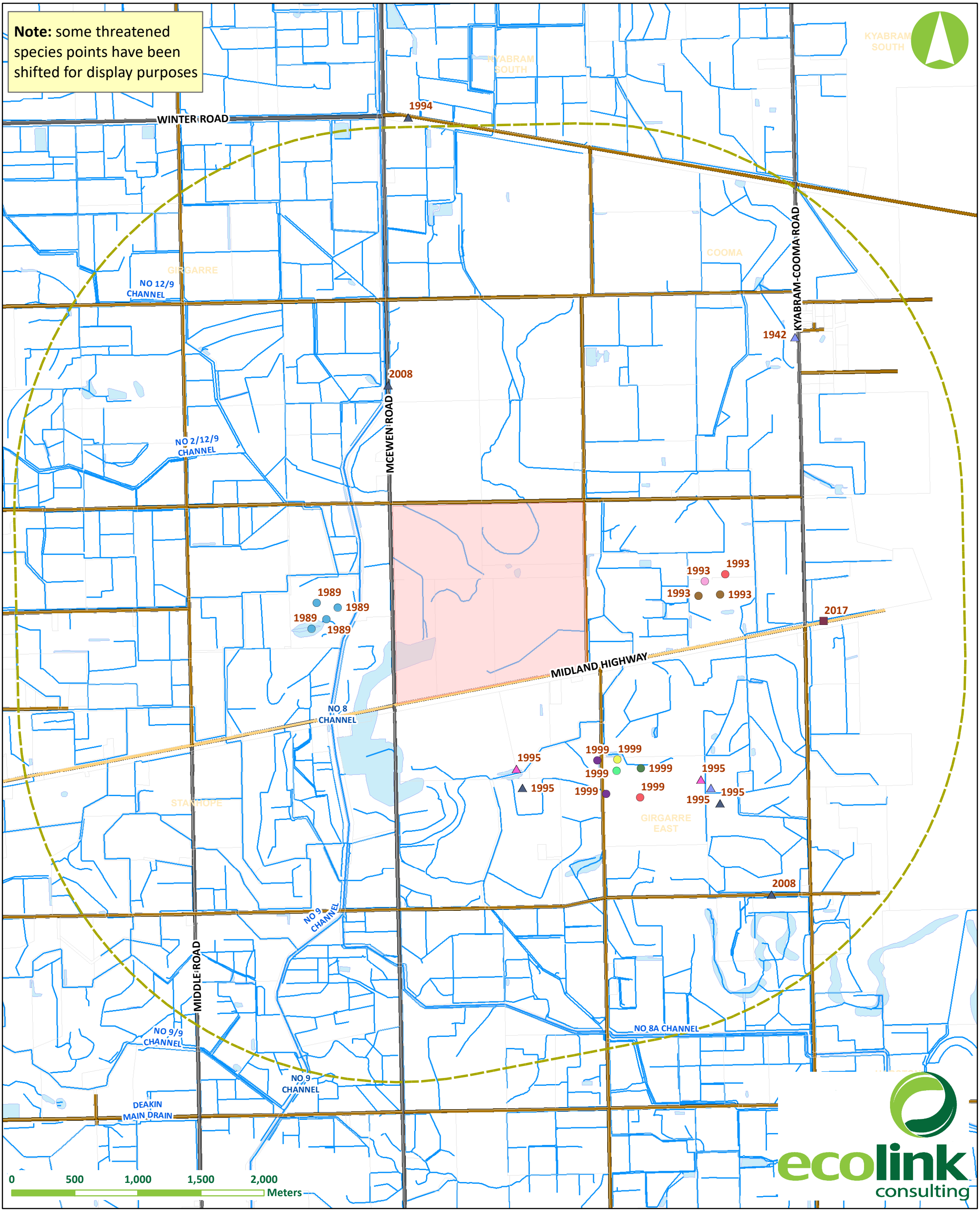


Figure 2: Threatened flora and fauna within 3kms of the study area

90 McGague Road, Girgarre East, Victoria

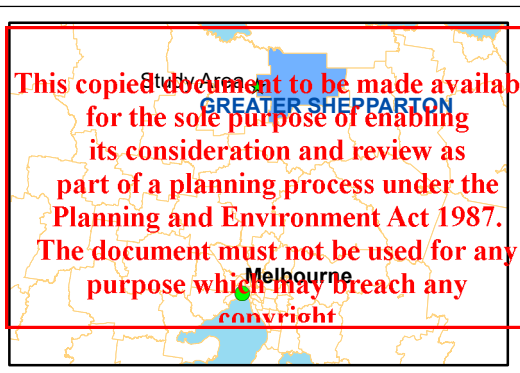
ADVERTISED PLAN

Legend

- Study Area
- 3km Study Area Buffer

Common Name

- Freckled Duck
- Glossy Ibis
- Great Egret
- Latham's Snipe
- Nankeen Night Heron
- Pied Cormorant
- Plumed Egret
- Royal Spoonbill
- Eastern Snake-necked Turtle
- Branching Groundsel
- Buloke
- Common Joyweed



Appendices

Appendix 1. Flora and Fauna Tables.

Table A1. Flora recorded within the study area

Origin	Common Name	Scientific Name	Weeds of National Significance	Noxious Weeds Classification
*	African Love-grass	*Eragrostis curvula*	-	Controlled
*	Barley Grass	*Hordeum murinum*	-	-
*	Barnyard Grass	*Echinochloa crus-galli*	-	-
*	Bathurst Burr	*Xanthium spinosum*	-	Controlled
	Berry Saltbush	*Atriplex semibaccata*	-	-
*	Black Nightshade	*Solanum nigrum*	-	-
*	Black Nightshade	*Solanum nigrum*	-	-
*	Blackberry	*Rubus fruticosus* agg.	Yes	Controlled
	Bristly Wallaby-grass	*Rytidosperma setaceum*	-	-
	Buloke	*Allocasuarina luehmannii*	-	-
*	Caltrop	*Tribulus terrestris*	-	Controlled
*	Cape weed	*Arctotheca calendula*	-	-
*	Chicory	*Cichorium intybus*	-	-
*	Chilean Needle-grass	*Nassella neesiana*	Yes	Restricted
	Common Blown-grass	*Lachnagrostis filiformis*	-	-
*	Common Heliotrope	*Heliotropium europaeum*	-	-
*	Common Heron's-bill	*Erodium cicutarium*	-	-
*	Common Peppercress	*Lepidium africanum*	-	-
	Common Purslane	*Portulaca oleracea*	-	-
*	Common Sow-thistle	*Sonchus oleraceus*	-	-
	Common Spike-sedge	*Eleocharis acuta*	-	-
	Common Swamp Wallaby-grass	*Amphibromus nervosus*	-	-
	Common Tussock-grass	*Poa labillardierei*	-	-
*	Couch	*Cynodon dactylon*	-	-
	Dock spp.	*Rumex* spp.	-	-
*	Drain Flat-sedge	*Cyperus eragrostis*	-	-
*	Early Spring-grass	*Eriochloa pseudoacrotricha*	-	-
*	Eyebane	*Euphorbia maculata*	-	-
*	Fat Hen	*Chenopodium album*	-	-
	Finger Rush	*Juncus subsecundus*	-	-
*	Flatweed	*Hypochaeris radicata*	-	-
*	Flaxleaf Fleabane	*Erigeron bonariensis*	-	-
	Golden Wattle	*Acacia pycnantha*	-	-
	Grassland Wood-sorrel	*Oxalis perennans*	-	-

Origin	Common Name	Scientific Name	Weeds of National Significance	Noxious Weeds Classification
	Grey Box	*Eucalyptus microcarpa*	-	-
	Hairy Panic	*Panicum effusum*	-	-
*	Hare's-foot Clover	*Trifolium arvense*	-	-
*	Horehound	*Marrubium vulgare*	-	Controlled
	Jersey Cudweed	*Laphangium luteoalbum*	-	-
	Lesser Joyweed	*Alternanthera denticulata*	-	-
*	Lucerne	*Medicago sativa* subsp. *sativa*	-	-
	Narrow-leaf Cumbungi	*Typha domingensis*	-	-
	Narrow-leaf Nardoo	*Marsilea costulifera*	-	-
*	Ox-tongue	*Helminthotheca echioides*	-	-
	Pacific Azolla	*Azolla rubra*	-	-
*	Paddy Melon	*Cucumis myriocarpus* subsp. *myriocarpus*	-	-
*	Paddy Melon	*Cucumis myriocarpus* subsp. *myriocarpus*	-	-
*	Panic Veldt-grass	*Ehrharta erecta*	-	-
*	Paspalum	*Paspalum dilatatum*	-	-
*	Pepper Tree	*Schinus molle*	-	-
*	Prickly Lettuce	*Lactuca serriola*	-	-
*	Prickly Paperbark	*Melaleuca styphelioides*	-	-
*	Prostrate Knotweed	*Polygonum aviculare*	-	-
*	Red-flower Mallow	*Modiola caroliniana*	-	-
	Red-leg Grass	*Bothriochloa macra*	-	-
*	Ribwort	*Plantago lanceolata*	-	-
	River Red-gum	*Eucalyptus camaldulensis*	-	-
	Rough Spear-grass (falcata)	*Austrostipa scabra* subsp. *falcata*	-	-
*	Small Nettle	*Urtica urens*	-	-
*	Small-flower Mallow	*Malva parviflora*	-	-
*	Sowbane	*Chenopodium murale*	-	-
*	Spear Thistle	*Cirsium vulgare*	-	Restricted
	Spurred Spear-grass	*Austrostipa gibbosa*	-	-
*	Sterile Brome	*Bromus sterilis*	-	-
*	Stink Grass	*Eragrostis cilianensis*	-	-
*	Strawberry Clover	*Trifolium fragiferum*	-	-
*	Tall Wheat-grass	*Lophopyrum ponticum*	-	-
*	Toowoomba Canary-grass	*Phalaris aquatica*	-	-
	Variable Sida	*Sida corrugata*	-	-
	Variable Willow-herb	*Epilobium billardierianum*	-	-
*	Water Plantain	*Alisma lanceolatum*	-	-

Origin	Common Name	Scientific Name	Weeds of National Significance	Noxious Weeds Classification
*	Weld	*Reseda luteola*	-	Restricted
*	Wheat	*Triticum aestivum*	-	-
*	White Poplar	*Populus alba*	-	-
*	Wild Oat	*Avena fatua*	-	-
	Windmill Grass	*Chloris truncata*	-	-
	Wingless Bluebush	*Maireana enchylaenoides*	-	-
	Woolly New Holland Daisy	*Vittadinia gracilis*	-	-
	Yellow Box	*Eucalyptus melliodora*	-	-
*	Yorkshire Fog	*Holcus lanatus*	-	-

Table Notes:

* – Exotic

– Non-indigenous native

This table does not include ornamental plants, trees or shrubs that were not spreading or reproducing beyond where they were planted.

Table A2. Fauna species recorded within the study area

Origin	Common Name	Scientific Name
Birds		
	Australasian Grebe	*Tachybaptus novaehollandiae*
	Pacific Black Duck	*Anas superciliosa*
	Chestnut Teal	*Anas castanea*
	Australian Wood Duck	*Chenonetta jubata*
	Australian Shelduck	*Tadorna tadornoides*
	Straw-necked Ibis	*Threskiornis spinicollis*
	Australian White Ibis	*Threskiornis molucca*
	Great Cormorant	*Phalacrocorax carbo*
	White-faced Heron	*Egretta novaehollandiae*
	Crested Pigeon	*Ocyphaps lophotes*
	Galah	*Eolophus roseicapillus*
	Long-billed Corella	*Cacatua tenuirostris*
	Musk Lorikeet	*Glossopsitta concinna*
	Red-rumped Parrot	*Psephotus haematonotus*
	Eastern Rosella	*Platycercus eximius*
	Nankeen Kestrel	*Falco cenchroides*
	Wedge-tailed Eagle	*Aquila audax*
	Striated Pardalote	*Pardalotus striatus*
	Superb Fairy-wren	*Malurus cyaneus*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Noisy Miner	*Manorina melanocephala*
	Noisy Friarbird	*Philemon corniculatus*
	Blue-faced Honeyeater	*Entomyzon cyanotis*
	White-plumed Honeyeater	*Lichenostomus penicillatus*
	Grey Fantail	*Rhipidura albiscapa*
	Willie Wagtail	*Rhipidura leucophrys*
	Pied Butcherbird	*Cracticus nigrogularis*
	Australian Magpie	*Cracticus tibicen*
	Little Raven	*Corvus mellori*
	Magpie-lark	*Grallina cyanoleuca*
	Welcome Swallow	*Hirundo neoxena*
	Australasian Pipit	*Anthus novaeseelandiae*
*	House Sparrow	*Passer domesticus*
*	Common Starling	*Sturnus vulgaris*
Mammals		
*	Hare	*Lepus capensis*
Reptiles		
	Garden Skink	*Lampropholis guichenoti*
	Weasel Skink	*Saproscincus mustelinus*
Amphibians		
	Spotted Marsh Frog	*Limnodynastes tasmaniensis*

Definitions

* - Introduced species

Table A3. Threatened flora species that have previously been recorded within, or within 3 kilometres of the study area (Department of Environment Land Water and Planning 2020e), or that has habitat that may occur within the vicinity of the study area (Department of Agriculture Water and the Environment 2020a).

Common Name	Species Name	National Status	Victorian Status	Habitat Preferences	Most Recent Record	Likelihood of Presence
Branching Groundsel	*Senecio cunninghamii* var. *cunninghamii*	-	Rare	Plains grasslands	1995 (2)	Unlikely, unless native grasslands are found in relatively undisturbed paddocks
Buloke	*Allocasuarina luehmannii*	-	FFG Listed	Woodlands on non-calcerous soils, usually associated with Grey Box	2008 (9)	Present
Common Joyweed	*Alternanthera nodiflora*	-	Poorly Known	Known in Victoria mainly from the Murray River floodplain downstream from Boundary Bend	1995 (2)	Unlikely, unless native grasslands are found in relatively undisturbed paddocks
River Swamp Wallaby-grass	*Amphibromus fluitans*	Vulnerable	-	Beside swamps in grassy low open forest, riparian scrub. Moist soils, tolerates inundation.	NPR	Unlikely, unless native grasslands are found in relatively undisturbed paddocks
Slender Darling-pea	*Swainsona murrayana*	Vulnerable	Endangered FFG Listed	Usually found in seasonally inundated flats and around lakes.	NPR	Unlikely, unless swamps are found in relatively undisturbed paddocks
Small Purple-pea	*Swainsona recta*	Endangered	Endangered FFG Listed	Grassy woodlands, but sometimes extends into grassy open-forest	NPR	Unlikely
Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*	Critically Endangered	Vulnerable FFG Listed	Grassland or open shrubland on basalt-derived soils west of Melbourne.	NPR	Unlikely, unless native grasslands are found in relatively undisturbed paddocks
Turnip Copperburr	*Sclerolaena napiformis*	Endangered	Endangered FFG Listed	Remnant grassland on clay-loam soils in north-central Victoria in the Echuca-Nathalia area, and between Donald and Stawell in the west	NPR	Unlikely, unless native grasslands are found in relatively undisturbed paddocks

Table Notes:

NPR – Not previously recorded

*** Likelihood of Presence Definitions**:

Unlikely – Site does not contain habitat and/or it is outside the species' known, current distribution.

Low –Site contains some marginal habitat, but the species was not observed and has not been recently recorded in previous surveys in the area.

Moderate – Site contains preferred habitat that may support a population of the species. However, other factors, such as fragmentation, disturbance or predators may be impacting any local population.

High - Site contains the preferred habitat which is likely to support the species.

Present – Preferred habitat is present on the site, and the species was observed on the site, or recently recorded at the site.

NPR – No previous record, modelled presence only under the EPBC Protected Matters Search results (Department of Agriculture Water and the Environment 2020a).

Threatened status based on the Advisory List of Rare or Threatened Plants in Victoria (Department of Environment and Primary Industries 2014).

Table A4. Threatened fauna species that have previously been recorded within, or within 3 kilometres of the study site (Department of Environment Land Water and Planning 2020e), or that has habitat that may occur within the vicinity of the site (Department of Agriculture Water and the Environment 2020a).

Common Name	Species Name	National Status	Victorian Status	Habitat Preferences	Most Recent Record	Likelihood of Presence
Freckled Duck	*Stictonetta naevosa*	-	Endangered, FFG Listed	Large seasonal wetlands and well-vegetated dams, wet, grasslands	1999 (1)	Unlikely, may occur on farm dams on rare occasions
Glossy Ibis	*Plegadis falcinellus*	-	Near Threatened	Well vegetated wetlands, wet pastures, rice-fields and grasslands.	1999 (1)	Low, may forage on fringes of dams when mud-flats are exposed, or nearby pastures when wet.
Royal Spoonbill	*Platalea regia*	-	Near Threatened	Larger shallow waters (inland and coastal), well-vegetated shallow freshwater wetlands, floodplains, billabongs, sewage ponds, irrigation storages, tidal mudflats, estuaries, salt marshes, salt fields, mangroves, islands.	1999 (2)	Moderate on fringes of farm dams
Australasian Bittern	*Botaurus poiciloptilus*	Endangered	Endangered	Reed beds, dense vegetation of freshwater swamps and creeks.	NPR	Unlikely unless dams contain large, dense thickets of reeds
Nankeen Night Heron	*Nycticorax caledonicus*	-	Near Threatened	A wide range of wetlands.	1993 (1)	Moderate, may use farm dams for foraging habitat within a large home range
Eastern Great Egret	*Ardea modesta*	-	Vulnerable, FFG Listed	Floodwaters, rivers and shallows of wetlands, intertidal mud flats.	1993 (1)	Moderate, may forage on fringes of dams when mud-flats are exposed, or nearby pastures when wet.
Intermediate Egret	*Ardea intermedia*	-	Endangered, FFG Listed	Freshwater wetlands, pastures and croplands, tidal mudflats and floodplains.	1999 (1)	Low, may forage on fringes of dams when mud-flats are exposed, or nearby pastures when wet.
Pied Cormorant	*Phalacrocorax varius*	-	Near Threatened	Large freshwater and saline wetlands and tidal bays along the coast.	1999 (1)	Low, may forage in larger dams that contain fish
Australian Painted-Snipe	*Rostratula australis*	Vulnerable	Critically Endangered, FFG Listed	Uncommon summer migrant to Victoria. Lowlands on shallow freshwater swamps with emergent vegetation, and flooded salt marshes.	NPR	Low, may forage on fringes of dams when mud-flats are exposed, or nearby pastures when wet.
Eastern Curlew	*Numenius madagascariensis*	Critically Endangered	Vulnerable, FFG Listed	Estuaries, tidal mudflats, mangroves, shallow river margins, coastal or inland	NPR	Low, may forage on fringes of dams when mud-flats are exposed, or nearby pastures

Common Name	Species Name	National Status	Victorian Status	Habitat Preferences	Most Recent Record	Likelihood of Presence
						when wet.
Curlew Sandpiper	*Calidris ferruginea*	Critically Endangered	Endangered, FFG Listed	Estuaries, tidal mudflats, mangroves, shallow river margins, coastal or inland	NPR	Low, may forage on fringes of dams when mud-flats are exposed, or nearby pastures when wet.
Latham's Snipe	*Gallinago hardwickii*	-	Near Threatened	Wet grasslands, open and wooded swamps.	NPR	Moderate, may forage on fringes of dams when mud-flats are exposed, or nearby pastures when wet and rank.
Plains-wanderer	*Pedionomus torquatus*	Vulnerable	Critically Endangered, FFG Listed	Sparse, treeless, lightly grazed native grasslands/herbfields with bare ground, old cereal crops, low shrubland.	NPR	Unlikely
Superb Parrot	*Polytelis swainsonii*	Vulnerable	Endangered, FFG Listed	Woodlands near rivers, also gardens and pastures in core range of NSW Riverina.	NPR	Low, may move through the area on occasion
Regent Honeyeater	*Anthochaera phrygia*	Endangered	Critically Endangered, FFG Listed	Depends on nectar and insects from Box-Ironbark Eucalypt forests. Only breeding habitat lies in Northeast Victoria and central coast of NSW	NPR	Unlikely
Painted Honeyeater	*Grantiella picta*	Vulnerable	Vulnerable, FFG Listed	Open box-ironbark forests and woodlands, particularly where trees are infested with mistletoe.	NPR	Low, unless there are large infestations of fruiting mistletoe (not observed)
Mammals						
Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable	Vulnerable, FFG Listed	Roost sites commonly occur in gullies, in vegetation with dense canopy cover and close to water.	NPR	Moderate, likely to disperse from fruit crops to surrounding areas within a very large home range
Reptiles						
Striped Legless Lizard	*Delma impar*	Vulnerable	Endangered, FFG Listed	Lowland native grasslands, typically dominated by native tussock forming grasses. Typically occurs on deep cracking clay soils.	NPR	Unlikely, unless native grasslands are found in relatively undisturbed paddocks, with embedded rock
Fish						

Common Name	Species Name	National Status	Victorian Status	Habitat Preferences	Most Recent Record	Likelihood of Presence
Flathead Galaxias	*Galaxias rostratus*	Critically Endangered	Vulnerable	Still or slow moving water bodies such as wetlands and lowland streams. They have been associated with a range of habitats including rock and sandy bottoms and aquatic vegetation.	NPR	Unlikely
Macquarie Perch	*Macquaria australasica*	Endangered	Endangered, FFG Listed	Deep, rocky holes with considerable cover and flowing water over unsilted cobble and gravel substrate.	NPR	Unlikely
Invertebrates						
Golden Sun Moth	*Synemon plana*	Critically Endangered	Endangered, FFG Listed	Tussock grasslands preferably dominated by Wallaby Grasses and Spear Grasses.	NPR	Unlikely, unless undisturbed native grasslands are found in relatively undisturbed paddocks (not recorded)

Table Notes:

This table excludes species listed exclusively as 'migratory' or 'marine' under the EPBC Protected Matters Search results (Department of Agriculture Water and the Environment 2020a).

NPR – Not previously recorded

*** Likelihood of Presence Definitions:**

Unlikely – Site does not contain habitat and/or it is outside the species' known, current distribution. Birds and bats may fly over.

Low –Site contains some marginal habitat, but the species was not observed and has not been recorded in previous recent surveys in the area. Birds and bats may fly over.

Moderate – Site contains preferred habitat that may support a population of the species. Birds and bats may opportunistically or seasonally forage at the site.

High – Site contains preferred habitat which is likely to support the species. Birds and bats are likely to regularly (at least seasonally) forage or roost at the site.

Present – Preferred habitat is present on the site, and the species was observed on the site, or recently recorded on the site.

NPR – No previous record, modelled presence only under the EPBC Protected Matters Search results (Department of Agriculture Water and the Environment 2020a).

Threatened status based on the Advisory List of Threatened Vertebrate Fauna in Victoria (Department of Sustainability and Environment 2013) and the Advisory List of Threatened Invertebrate Fauna in Victoria (Department of Sustainability and Environment 2009).

Appendix 2. Legislation

Commonwealth Legislation

***Environment Protection and Biodiversity Conservation Act 1999* (Cth)**

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) is to provide for the conservation of 'Matters of National Environmental Significance'. The Act defines eight Matters of National Environmental Significance:

- World Heritage properties;
- National Heritage Places;
- Ramsar wetlands of international significance;
- Nationally listed threatened species and ecological communities;
- Listed migratory species;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park; and,
- Nuclear actions.

Under the Act, actions that are likely to have a significant impact upon Matters of National Environmental Significance require approval from the Federal Environment Minister. This approval is sought through a referral process for a particular action. An action includes any project, development, undertaking, activity or series of activities. Consideration of the requirement for an 'EPBC Referral' to the Minister has been made within this report.

State Legislation

Environmental Effects Act

The *Environment Effects Act 1978* (Vic) provides for assessment of proposed projects (works) that are capable of having a significant effect on the environment. The Act does this by enabling the Minister administering the Environment Effects Act to decide that an Environment Effects Statement (EES) should be prepared.

The Minister might typically require a proponent to prepare an EES when:

- There is a likelihood of regionally or State significant adverse effects on the environment
- There is a need for integrated assessment of potential environmental effects (including economic and social effects) of a project and relevant alternatives, and
- Normal statutory processes would not provide a sufficiently comprehensive, integrated and transparent assessment (Department of Sustainability and Environment 2007).

Referral criteria: individual potential environmental effects

- Individual types of potential effects on the environment that might be of regional or State significance, and therefore warrant referral of a project, are:
- Potential clearing of 10 ha or more of native vegetation from an area that:
    - is of an Ecological Vegetation Class identified endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); 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); and
  - is not authorised under an approved Forest Management Plan or Fire Protection Plan
- Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria
- 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'
- Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term
- Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences
- Potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility (Department of Sustainability and Environment 2007).

***Flora and Fauna Guarantee Act 1988* (Vic)**

The *Flora and Fauna Guarantee Act 1998* (Vic) (FFG Act) provides 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 on public land. The Act lists native species, communities, and processes that threaten native flora and fauna, under Schedules of the Act. This enables the assessor and regulators to establish management measures to mitigate impacts on listed values within Victoria.

A 'Protected Flora and Fauna Licence or Permit' from DELWP is required to 'take' listed flora species that are members of listed communities or protected flora from public land. 'Taking' flora is defined as any action which results in the removal or death of a native plant. 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.

An evaluation of the likelihood of the presence of significant flora and fauna species on the subject site, including those listed under the FFG Act that have previously been recorded in the vicinity of the site, has been undertaken.

***Planning and Environment Act 1987* (Vic)**

The *Planning and Environment Act 1987* (Vic) (P&E Act), later amended by the *Planning and Environment (Planning Schemes) Act 1996* (Vic) provides the foundation of planning schemes in Victoria. Planning schemes set out policies and provisions for the development and protection of land within each municipality in Victoria.

The *Planning and Environment (Planning Schemes) Act 1996* provides for the Minister for Planning to prepare a set of standard provisions for planning schemes called the Victoria Planning Provisions (VPP). The VPP is a state-wide reference document or template from which planning schemes are

sourced and constructed. Incorporation of references such as the *Permitted Clearance of Native Vegetation – Biodiversity Assessment Guidelines* into Section 12 of the VPP ensures that all municipalities must consider this policy. Local zones and overlays, such as Environmental Significance Overlays, may be incorporated into Section 30 and 40 of the planning provisions by each Council, but only remain relevant within that municipality.

The objectives of the P&E Act are to integrate local land use, development planning and development policy with environmental, social, economic, conservation and resource management policies at State, regional and municipal levels through a set of planning schemes. The Act also establishes a clear procedure for public participation in decision making in amending planning schemes.

Some important sections of the planning scheme, in relation to the ecological values of a site, include:

- Section 12 of the State Planning Policy Framework, which identifies, and aims to protect, key biodiversity assets from inappropriate development. It directly refers to Victoria's No Net Loss policy and other legislation which must be considered when preparing a planning permit application;
- Provision 52.17 which identifies where native vegetation removal is exempt from requiring a planning permit;
- Provision 66.02 which identifies all of the mandatory referral authorities. In particular the Victorian Department of Environment and Primary Industries (DEPI) is identified as the recommending referral authority if a proponent proposes:
    - *To remove, destroy or lop native vegetation if the area to be cleared is 0.5 hectare or more.*
    - *To remove, destroy or lop native vegetation for the following class of application based on the risk-based pathway as defined in the Permitted clearing of native vegetation – Biodiversity assessment guidelines*
        - *High risk-based pathway.*
        - *To remove, destroy or lop native vegetation if a property vegetation plan applies to the site.*
        - *To remove, destroy or lop native vegetation on Crown land which is occupied or managed by the responsible authority (Department of Environment Land Water and Planning 2020d).*

***Catchment and Land Protection Act 1994* (Vic)**

The *Catchment and Land Protection Act 1994* (Vic) (CALP Act) is the principle legislation relating to the management of pest plants and animals in Victoria. Under this Act, landowners have a responsibility to avoid causing or contributing to land degradation. Where possible, landowners are required to conserve soil, protect water resources, eradicate 'regionally prohibited' weeds, prevent the growth and spread of 'regionally controlled' weeds and control pest animals. The CALP Act lists the species that are considered weeds and pest animals.

***Wildlife Act 1975* (Vic)**

Victoria's *Wildlife Act 1975* (Vic) and the *Wildlife Regulations 2002* (Vic) protect all indigenous vertebrate fauna, some non-indigenous vertebrate fauna, and some invertebrate fauna listed as 'threatened' under the FFG Act. The *Wildlife Act 1975* (Vic) prevents intentional injury to wildlife and stipulates that a licence should be granted where there is a possibility that wildlife are injured, or where wildlife is to be kept, relocated or traded.

In most cases, where the proponent is planning to develop a site, a planning permit approval provides this licencing approval, however, this report advises if an additional permit is required. Circumstances where this legislation may not be relevant is where fish are involved, on public land where additional regulatory approval is required, or where other permits are required (such as where fauna are required to undergo invasive procedures or installation of telemetry systems).

***Fisheries Act 1995 (*Vic)**

The *Fisheries Act 1995* (Vic) provides the legislative framework for the regulation, management conservation of Victorian fish species and their habitats. As with the Victorian *Wildlife Act 1975* described above, the key method to ensure compliance is through licencing. Where fish, or their habitats, are likely to be impacted, this report will identify additional requirements.

Other relevant policy

***Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning 2017c)**

The *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning 2017) were released by DELWP in December 2017. These guidelines supersede the Biodiversity Assessment Guidelines (Department of Environment and Primary Industries 2013).

A permit to remove native vegetation under clause 52.16 and 52.17 of the Victoria Planning Provisions is required unless:

- The table of exemptions to this clause specifically states that a permit is not required;
- It is native vegetation or an area specified in the schedule to the clause;
- A Native Vegetation Precinct Plan corresponding to the land is incorporated into the relevant planning scheme; or
- Bushfire exemptions apply in bushfire prone areas (Department of Environment Land Water and Planning 2017).

The Guidelines describe the permitting process for applications to remove native vegetation on private and public property within Victoria. A key strategy of the State Planning Policy Framework, relating to biodiversity, is to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This is achieved through iteratively applying the three-step approach:

1. Avoiding the removal, destruction or lopping of native vegetation.

2. Minimising impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
3. Providing an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation (Department of Environment Land Water and Planning 2017; p. 4).

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses' (Department of Environment Land Water and Planning 2017).

Native vegetation is further classified into two categories (Department of Environment Land Water and Planning 2017):

- A remnant patch of native vegetation (measured in hectares) is either:
    - An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or
    - Any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or
    - Any mapped wetland included in the *Current Wetlands Map*, available in DELWP systems and tools.

OR

- A scattered tree (measured in number of trees), is a native canopy tree that does not form a patch (Department of Environment Land Water and Planning 2017).

In addition, a canopy tree with a Diameter at Breast Height (DBH) greater than or equal to the large tree benchmark for the relevant bioregional EVC is defined as a large tree. Large trees can be either a large scattered tree or a large tree within a patch.

The contribution that is made by native vegetation to the biodiversity values of Victoria is determined through an assessment of both site-based information and landscape scale information.

At a site-based level, the contribution is determined through an assessment of:

- The extent of native vegetation;
- The number of large trees (either within a patch or scattered trees), relative to the appropriate EVC benchmark;
- The native vegetation condition, which is determined through a Habitat Hectare assessment
- The conservation status of the Ecological Vegetation Class (EVC) to which the vegetation can be classified; and,
- The presence of sensitive wetlands and coastal areas.

At a landscape scale, the value of the vegetation is determined with reference to its strategic context in the Victorian landscape (Department of Environment and Primary Industries 2013). This is determined by the vegetation's 'Strategic Biodiversity Score' (SBS) and its 'Habitat Importance Score' (HIS) for its value to rare and threatened species (Department of Environment Land Water and Planning 2017).

All native vegetation within Victoria has a SBS that has been determined through spatial modelling, based on its rarity, level of depletion, species habitats, and condition and connectivity (Department of Environment Land Water and Planning 2017). SBS scores are between 0 and 1 and are used to determine the offset required for the loss of that vegetation. Native vegetation only has a HIS score if it is habitat for a particular rare or threatened species[4] (Department of Environment Land Water and Planning 2017). There are two types of rare or threatened species habitats that may be provided by native vegetation:

- **Highly localised habitats for rare or threatened species** – where impact to this particular patch of native vegetation could result in a significant biodiversity impact, such as a breeding colony or species with a limited geographic extent.
- **Dispersed rare or threatened species habitats** – where habitat for the threatened species has become depleted or fragmented over time (Department of Environment Land Water and Planning 2017).

The HIS is used to apply the decision guidelines in relation to the removal of a patch of native vegetation and to determine offset requirements (Department of Environment Land Water and Planning 2017).

Applications to remove native vegetation are categorised against one of three assessment pathways. These pathways are categorised as:

- Basic – limited impacts on biodiversity.
- Intermediate – could impact on large trees, endangered EVCs, and sensitive wetlands and coastal areas.
- Detailed – could impact on large trees, endangered EVCs, sensitive wetlands and coastal areas, and could significantly impact on habitat for rare or threatened species (Department of Environment Land Water and Planning 2017).

This is initially determined in two ways, based on the 'location map' and the extent risk of the vegetation proposed to be removed. The location risk is determined with reference to the *Native Vegetation Location Risk* map available on DELWP's website (Department of Environment Land Water and Planning 2020b). This map shows whether native vegetation is classified as Location 1, 2 or 3.

[4] Rare or threatened species are species listed in:

- DELWP's Advisory List of Rare or Threatened Plants in Victoria (DEPI 2014a) as 'endangered', 'vulnerable', or 'rare', but does not include the 'poorly known' category.
- DELWP's Advisory List of Threatened Vertebrate Fauna in Victoria (DEPI 2013) as 'critically endangered', 'endangered' or 'vulnerable', but does not include 'near threatened' or 'data deficient' categories
- DELWP's Advisory List of Threatened Invertebrate Fauna in Victoria (DEPI 2009) as 'critically endangered', 'endangered' or 'vulnerable', but does not include 'near threatened' or 'data deficient' categories.

The extent risk is determined based on the amount of native vegetation that is proposed for removal and includes the area (in hectares) of impact to native vegetation, the number of scattered trees, and the number of large trees (Table A5).

Table A5. Assessment pathways for removal of remnant patches of native vegetation (Department of Environment Land Water and Planning 2017).

Extent	Location		
	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

All applications to remove native vegetation must include the following information:

1. Information about the native vegetation to be removed, including:
    a. The assessment pathway and reason for the assessment pathway;
    b. A description of the native vegetation to be removed;
    c. Maps showing the native vegetation and property in context;
    d. The offset requirement, determined in accordance with section 5 of the Guidelines that will apply if the native vegetation is approved to be removed.
2. Topographic and land information relating to the native vegetation to be removed;
3. Recent, dated photographs of the native vegetation to be removed;
4. Details of any other native vegetation approved to be removed, or that was removed without the required approvals, on the same property or on contiguous land in the same ownership as the applicant, in the five year period before the application for a permit is lodged;
5. An 'Avoid and Minimise' statement;
6. A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the *Conservation, Forests and Lands Act 1987* (Vic) that applies to the native vegetation to be removed;
7. Where the removal of native vegetation is to create defendable space, a written statement explaining why the removal of native vegetation is necessary;
8. If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan considerations at decision guideline 8, and
9. An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified, and can be secured in accordance with the Guidelines (Department of Environment Land Water and Planning 2017; p. 20-21).

If the application will be assessed under the Detailed Assessment Methodology, the following additional requirements apply:

10. A site assessment report of the native vegetation to be removed, including:
    a. A habitat hectare assessment of any patches of native vegetation, including the condition, extent (in hectares), Ecological Vegetation Class and bioregional conservation status.
    b. The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any large trees within patches.
    c. The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any scattered trees, and whether each tree is small or large.
11. Information about impacts on rare or threatened species habitat, including:
    a. The relevant section of the Habitat importance map for each rare or threatened species requiring a species offset.
    b. For each rare or threatened species that the native vegetation to be removed is habitat for, according to the Habitat importance maps: - the species' conservation status - the proportional impact of the removal of native vegetation on the total habitat for that species - whether their habitats are highly localised habitats, dispersed habitats, or important areas of habitat within a dispersed species habitat (Department of Environment Land Water and Planning 2017; p. 22).

Ten decisions guidelines are identified within the Guidelines that the responsible or referral authority must consider when deciding on an application to remove native vegetation. These are summarised as follows:

1. The degree to which the application avoids and minimises impacts to native vegetation, and where vegetation is proposed to be removed, the highest quality vegetation is avoided;
2. The role that the vegetation to be removed has in relation to landscape services such as erosion control, ground-water quality, waterway quality;
3. The role of the vegetation in the preservation of landscape features;
4. Whether any part of the native vegetation to be removed, destroyed or lopped is protected under the *Aboriginal Heritage Act 2006* (Vic);
5. The need to remove, destroy or lop native vegetation to create defendable space to reduce the risk of bushfire to life and property, having regard to other available bushfire risk mitigation measures;
6. Whether the native vegetation to be removed is in accordance with any Property Vegetation Plan that applies to the site;
7. Whether an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured in accordance with the Guidelines;
8. Whether the application is consistent with a Native Vegetation Precinct Plan (where relevant);
9. For applications in both the Intermediate and Detailed Assessment Pathway only, the impacts on biodiversity values that would occur as a result of vegetation removal; and,
10. For applications in the Detailed Assessment Pathway only, the impacts on habitat for rare or threatened species (Department of Environment Land Water and Planning 2017).

Offset requirements

In all cases where native vegetation is approved for removal, the proponent is liable for the security of an offset site that meets the requirements under the Guidelines. An offset can be either a:

- First party offset – on the same property as the proposed removal of native vegetation, or on another property owned or managed (in the case of Crown land) by the party requiring the offset, or
- Third party offset – on another party's property. Third party offsets are traded as native vegetation credits.

In most cases a third party offset is the simplest and most cost effective means of securing the required offset.

There are three components to offset requirements:

1. Offset type (general or species).
2. Offset amount (measured in general or species habitat units).
3. Offset attributes.

Two types of offset are identified: General Offsets and Specifies Offsets. Specific Offsets may only be required if the native vegetation to be removed is habitat for rare or threatened species that are identified in an Intermediate or Detailed Assessment Pathway application (Department of Environment Land Water and Planning 2017). To determine this, a 'Specific Biodiversity Equivalence Score' is calculated by multiplying the habitat hectares with the HIS for each species that may be impacted. For each of the species, this figure is divided by the sum of all the Specific Biodiversity Value Scores calculated for the remaining vegetation under investigation to give a specific offset threshold for each species. If the amount of vegetation removed exceeds this threshold, then a Specific Offset is required. If it does not exceed the threshold, then only a General Habitat Offset is required (Table A6)(Department of Environment Land Water and Planning 2017).

Table A6 summarises the offset requirements for each of the Assessment Pathways and offset types.

Table A6. Offset requirements for the removal of native vegetation

Assessment Pathway	Offset Type	Offset amount		Offset attributes	
		Risk Adjusted Biodiversity Equivalence	Species Habitat Requirement	Vicinity	Strategic Biodiversity Score
Basic Assessment Pathway	General offset	1.5 times the general biodiversity equivalence score[1] of the native vegetation to be removed.	No restrictions.	In the same Catchment Management Authority boundary as the native vegetation to be removed.	At least 80 per cent of the SBS of the native vegetation to be removed.
Intermediate or Detailed Assessment Pathway	General offset	1.5 times the general biodiversity equivalence score of the native vegetation to be removed.	No restrictions.	In the same Catchment Management Authority boundary as the native vegetation to be removed.	At least 80 per cent of the SBS of the native vegetation to be removed.
	Specific offset	For each species impacted, 2 times the specific biodiversity equivalence score of the native vegetation to be removed.	Likely habitat for each rare or threatened species that a specific offset is required for, according to the specific-general offset test.	No restrictions.	No restrictions.

[1] The general biodiversity equivalence score is determined by multiplying the vegetation's habitat hectare score by its SBS.

Appendix 3. Native Vegetation Removal Report

See separate document

Appendix 4. Vegetation Broker Offset Quote

vegetationlink

12 October 2020

Our Reference: VLQ-6198
Your Reference: TBA

Stuart Cooney
Ecolink
Email: stuart.cooney@ecolinkconsulting.com.au

Dear Stuart,

RE: Quotation for the supply of Native Vegetation Credits

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

Based upon the information you provided, I understand you require the following native vegetation offset:

Offset Type	Attributes	General Habitat Units (GHU)	Min. Strategic Biodiversity Value (SBV)	Large Trees
General	Goulburn Broken CMA	0.114	0.132	7

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

Option 1: CTA Pathway – offset site located in the Mitchell Shire Council area (approx. 2-5 week turnaround from acceptance of quote)	
Cost of Native Vegetation Credits – invoiced by Credit Owner	$13,760.00
Transaction Fees – invoiced by Vegetation Link	$1,165.00
Total (ex GST)	**$14,925.00**
Total (Inc. GST)	$16,417.50

Option 2: CTA Pathway – offset site located in the Greater Shepparton City Council area (approx. 2-5 week turnaround from acceptance of quote)	
Cost of Native Vegetation Credits – invoiced by DELWP	$16,040.00
Transaction Fees – invoiced by Vegetation Link	$1,020.00
Total (ex GST)	**$17,060.00**
Total (Inc. GST)	$18,766.00

If you would like to purchase credits let us know that you accept the quote, and return the attached Purchaser Details Form by email. If more than one quotation option is provided above, specify which option you choose.

Upon receipt of the form, we will begin the trade process. Further details of the process for credit allocation is in the FAQ below.

[1] Note that the Transaction Fee includes DELWP NVOR transfer and allocation fees and a Vegetation Link fee.

Should you have any queries, please do not hesitate to contact us on (03) 5470 5232 or email offsets@vegetationlink.com.au.

Sincerely,

Lisa Gormley
Biodiversity Offset Broker

FAQs:

What is a third party offset?

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

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

How is the price of Native Vegetation Offset Credits (GHUs, GBEUs etc.) determined?

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

Further information about the work some of our landowners are doing can be found here:

https://www.vegetationlink.com.au/landowner-profiles

Further information on pricing can be found here:

https://www.environment.vic.gov.au/__data/assets/pdf_file/0030/329466/Info-sheet-Pricing-native-vegetation-credits.pdf

What is the process after I accept the Quote?

After you accept the quote and return the Purchaser Table, the following steps will be undertaken:

1. We will set up a contract between the parties involved and send the contract out for signing by all parties.
2. Once the contract is signed by all parties, invoices will be issued for the fees listed in the quotation. We will send you two invoices, one for our transaction fee invoiced by

Vegetation Link and one for the credit fee, usually to be paid to DELWP or the landowner. We recommend providing remittances for your payments.

3. Once payments are received, Vegetation Link will send you an Allocated Credit Extract from the Native Vegetation Offset Register and your Executed Contract as evidence that you have purchased the offset.

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

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

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

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

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

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

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

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

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

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

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

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

For further information, see our website or look at the DELWP website:

http://www.vegetationlink.com.au/ **OR** https://www.environment.vic.gov.au/native-vegetation/native-vegetation/offsets-for-the-removal-of-native-vegetation

Stuart Cooney
Principal Ecologist
Ecolink Consulting Pty Ltd
PO Box 356
Northcote VIC 3070

Our Ref: 1611b

13 November 2020

Fiona Koutsivos
Planner
ERM
Level 6, 99 King Street
Melbourne VIC 3000

Dear Fiona,

Re: Impacted Vegetation Photographs,
Viewbank Solar Farm, Girgarre East, Victoria

After finalisation of the development plan for the Viewbank Solar Farm, at least in relation to impacts to native vegetation, Ecolink Consulting returned to the site to photograph vegetation that is proposed to be removed, in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning 2017).

The images were taken on 13 November 2020. Details of each image are provided in Table 1, and high quality versions of the photographs are accessible at the following Dropbox link: https://www.dropbox.com/sh/rt36z79s5n3b7to/AADBWNqO8h4WlB79Q2-FwtFva?dl=0. The Native Vegetation Removal report used to support the planning permit application is also attached for reference.

I trust the above meets with your expectations, but please call me if you have any queries, or require any amendments (Mobile phone no: 0419 894 948).

Kind regards,

Stuart Cooney
Principal Ecologist
Ecolink Consulting Pty Ltd

References

Department of Environment Land Water and Planning (2017). 'Guidelines for the removal, destruction or lopping of native vegetation.' (Department of Environment Land Water and Planning: Melbourne).

Table 1. Photographs if impacted native vegetation

Photo number	1
Scattered Tree Number	ST5
NVR Zone Number	A
Latitude	-36.4292
Longitude	145.043

Photo number	2
Scattered Tree Number	ST4
NVR Zone Number	B
Latitude	-36.4295
Longitude	145.043

Photo number	3
Scattered Tree Number	ST23
NVR Zone Number	C
Latitude	-36.4309
Longitude	145.041

Photo number	4
Scattered Tree Number	ST77
NVR Zone Number	D
Latitude	-36.4321
Longitude	145.039

Photo number	5
Scattered Tree Number	ST76
NVR Zone Number	E
Latitude	-36.4313
Longitude	145.038

Photo number	6
Scattered Tree Number	ST71
NVR Zone Number	G
Latitude	-36.4321
Longitude	145.037

Photo number	7
Scattered Tree Number	ST72
NVR Zone Number	H
Latitude	-36.4322
Longitude	145.037

Photo number	8
Scattered Tree Number	ST75
NVR Zone Number	F
Latitude	-36.4313
Longitude	145.037

Photo number	9
Patch Number	P23 – looking east
NVR Zone Number	I
Latitude	-36.4311
Longitude	145.039

Photo number	10
Patch Number	P5 – looking south-west
NVR Zone Number	K
Latitude	-36.4359
Longitude	145.046

Photo number	11
Patch Number	P4
NVR Zone Number	J
Latitude	-36.4357
Longitude	145.047

Notes:

- There is no Zone 'L' in the Native Vegetation Removal report
- The latitude and longitude for the trees represent the location of the trees, the latitude and longitude of the patches represents the location of the photographs

Native vegetation removal report

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

Date of issue: **19/06/2020**
Time of issue: **11:05 am**

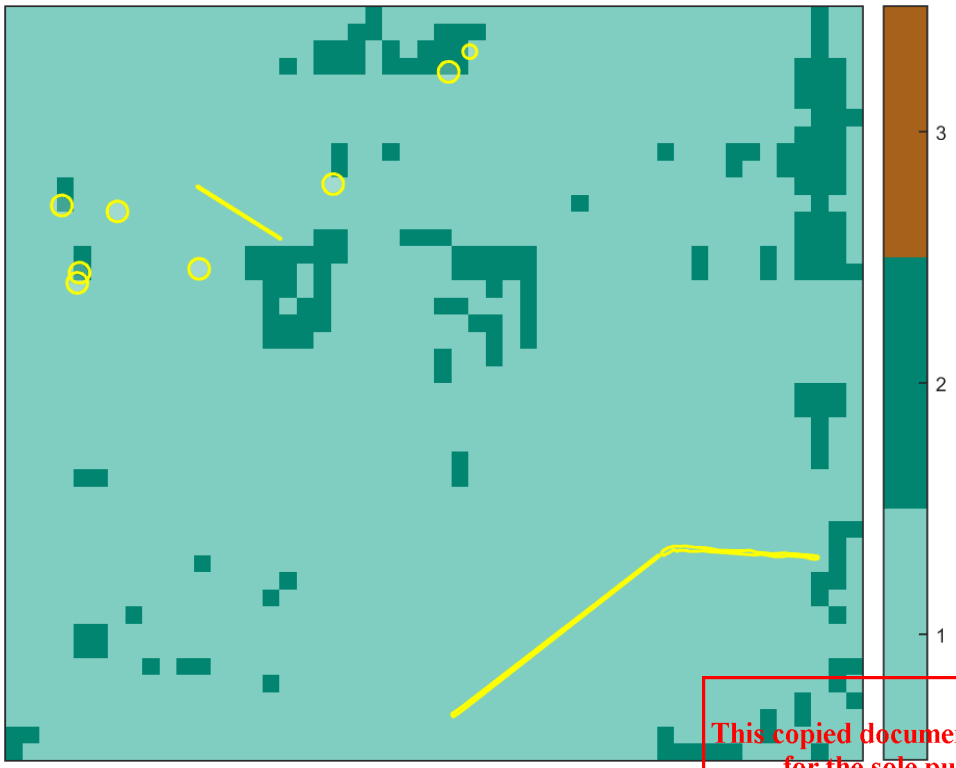
Report ID: ECL_2020_015

Project ID	1611a_Viewbank_SF

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	0.769 ha
Extent of past removal	0.000 ha
Extent of proposed removal	0.769 ha
No. Large trees proposed to be removed	7
Location category of proposed removal	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map). Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

1. Location map



Offset requirements if a permit is granted

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

General offset amount[1]	0.114 general habitat units
Vicinity	Goulburn Broken Catchment Management Authority (CMA) or Greater Shepparton City Council
Minimum strategic biodiversity value score[2]	0.132
Large trees	7 large trees

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

Appendix 1 includes information about the native vegetation to be removed

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

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

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

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

Next steps

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

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

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

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

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

Additional application requirements must be met including:

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

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

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

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

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

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

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

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

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

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

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
0-A	Scattered Tree	vriv0175_61	Endangered	0	no	0.200	0.031	0.031	0.280		0.006	General
0-H	Scattered Tree	vriv0175_61	Endangered	1	no	0.200	0.070	0.057	0.100		0.009	General
0-G	Scattered Tree	vriv0175_61	Endangered	1	no	0.200	0.070	0.057	0.100		0.009	General
0-F	Scattered Tree	vriv0175_61	Endangered	1	no	0.200	0.070	0.070	0.110		0.012	General
0-E	Scattered Tree	vriv0175_61	Endangered	1	no	0.200	0.070	0.070	0.110		0.012	General
0-D	Scattered Tree	vriv0175_61	Endangered	1	no	0.200	0.070	0.070	0.145		0.012	General
0-C	Scattered Tree	vriv0175_61	Endangered	1	no	0.200	0.070	0.070	0.170		0.012	General
0-B	Scattered Tree	vriv0175_61	Endangered	1	no	0.200	0.070	0.070	0.590		0.017	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
0-I	Patch	vriv0125	Endangered	0	no	0.110	0.027	0.027	0.120		0.003	General
0-J	Patch	vriv0125	Endangered	0	no	0.110	0.106	0.106	0.100		0.010	General
0-K	Patch	vriv0125	Endangered	0	no	0.110	0.140	0.140	0.101		0.013	General

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

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

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Yarran Wattle	*Acacia omalophylla*	500069	Endangered	Dispersed	Habitat importance map	0.0000
Silky Umbrella-grass	*Digitaria ammophila*	501041	Vulnerable	Dispersed	Habitat importance map	0.0000
Stiff Groundsel	*Senecio behrianus*	503101	Endangered	Dispersed	Habitat importance map	0.0000
Jericho Wire-grass	*Aristida jerichoensis var. subspinulifera*	504631	Endangered	Dispersed	Habitat importance map	0.0000
Pale Flax-lily	*Dianella sp. aff. longifolia (Riverina)*	507399	Vulnerable	Dispersed	Habitat importance map	0.0000
Pepper Grass	*Panicum laevinode*	504808	Vulnerable	Dispersed	Habitat importance map	0.0000
Bent-leaf Wattle	*Acacia flexifolia*	500035	Rare	Dispersed	Habitat importance map	0.0000
Yellow-tongue Daisy	*Brachyscome chrysoglossa*	503654	Vulnerable	Dispersed	Habitat importance map	0.0000
Small Scurf-pea	*Cullen parvum*	502773	Endangered	Dispersed	Habitat importance map	0.0000
Veiled Fringe-sedge	*Fimbristylis velata*	501369	Rare	Dispersed	Habitat importance map	0.0000
Umbrella Grass	*Digitaria divaricatissima var. divaricatissima*	501045	Vulnerable	Dispersed	Habitat importance map	0.0000
Broom Bitter-pea	*Daviesia genistifolia s.s.*	503813	Rare	Dispersed	Habitat importance map	0.0000
Kamarooka Mallee	*Eucalyptus froggattii*	501279	Rare	Dispersed	Habitat importance map	0.0000
Smooth Minuria	*Minuria integerrima*	502201	Rare	Dispersed	Habitat importance map	0.0000
Long Eryngium	*Eryngium paludosum*	501238	Vulnerable	Dispersed	Habitat importance map	0.0000
Dark Wire-grass	*Aristida calycina var. calycina*	503630	Rare	Dispersed	Habitat importance map	0.0000
Southern Swainson-pea	*Swainsona behriana*	504944	Rare	Dispersed	Habitat importance map	0.0000
Silky Swainson-pea	*Swainsona sericea*	504946	Vulnerable	Dispersed	Habitat importance map	0.0000
Late-flower Flax-lily	*Dianella tarda*	505085	Vulnerable	Dispersed	Habitat importance map	0.0000

Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0000
Riverina Bitter-cress	*Cardamine moirensis*	505032	Rare	Dispersed	Habitat importance map	0.0000
Slender Club-sedge	*Isolepis congrua*	501773	Vulnerable	Dispersed	Habitat importance map	0.0000
Fuzzy New Holland Daisy	*Vittadinia cuneata var. morrisii*	505060	Rare	Dispersed	Habitat importance map	0.0000
Yellow Burr-daisy	*Calotis lappulacea*	500598	Rare	Dispersed	Habitat importance map	0.0000
Dookie Daisy	*Brachyscome gracilis*	505494	Vulnerable	Dispersed	Habitat importance map	0.0000
Dwarf Brooklime	*Gratiola pumilo*	503753	Rare	Dispersed	Habitat importance map	0.0000
Waterbush	*Myoporum montanum*	502240	Rare	Dispersed	Habitat importance map	0.0000
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0000
Dwarf Bitter-cress	*Rorippa eustylis*	502944	Rare	Dispersed	Habitat importance map	0.0000
Floodplain Fireweed	*Senecio campylocarpus*	507136	Rare	Dispersed	Habitat importance map	0.0000
Lanky Buttons	*Leptorhynchos elongatus*	501941	Endangered	Dispersed	Habitat importance map	0.0000
Buloke Mistletoe	*Amyema linophylla subsp. orientalis*	500217	Vulnerable	Dispersed	Habitat importance map	0.0000
Buloke	*Allocasuarina luehmannii*	500678	Endangered	Dispersed	Habitat importance map	0.0000
Superb Parrot	*Polytelis swainsonii*	10277	Endangered	Dispersed	Habitat importance map	0.0000
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0000
Ausfeld's Wattle	*Acacia ausfeldii*	500013	Vulnerable	Dispersed	Habitat importance map	0.0000
Rosemary Grevillea	*Grevillea rosmarinifolia subsp. rosmarinifolia*	504066	Rare	Dispersed	Habitat importance map	0.0000
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0000
Delicate Crane's-bill	*Geranium sp. 6*	505347	Vulnerable	Dispersed	Habitat importance map	0.0000
Bush Stone-curlew	*Burhinus grallarius*	10174	Endangered	Dispersed	Habitat importance map	0.0000
Brolga	*Grus rubicunda*	10177	Vulnerable	Dispersed	Habitat importance map	0.0000
Grey-crowned Babbler	*Pomatostomus temporalis temporalis*	10443	Endangered	Dispersed	Habitat importance map	0.0000

Rye Beetle-grass	*Tripogon loliiformis*	503455	Rare	Dispersed	Habitat importance map	0.0000
Bearded Dragon	*Pogona barbata*	12177	Vulnerable	Dispersed	Habitat importance map	0.0000
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

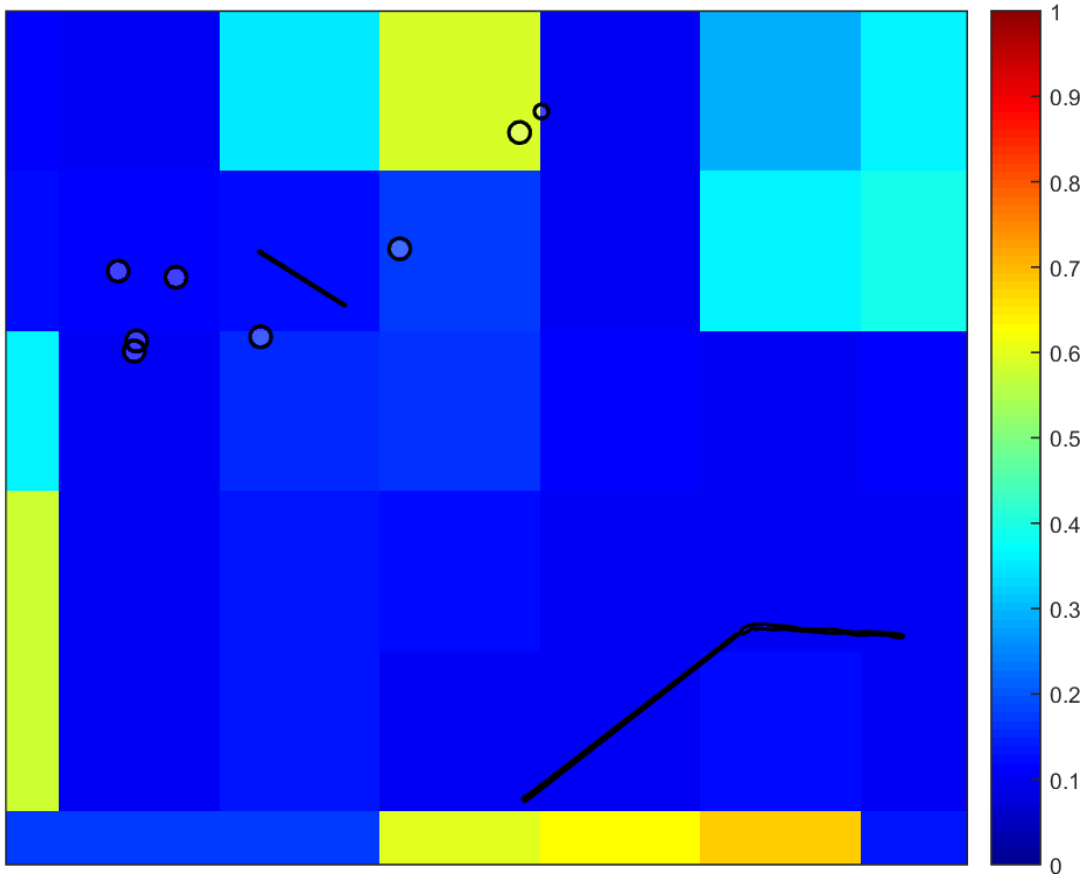
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

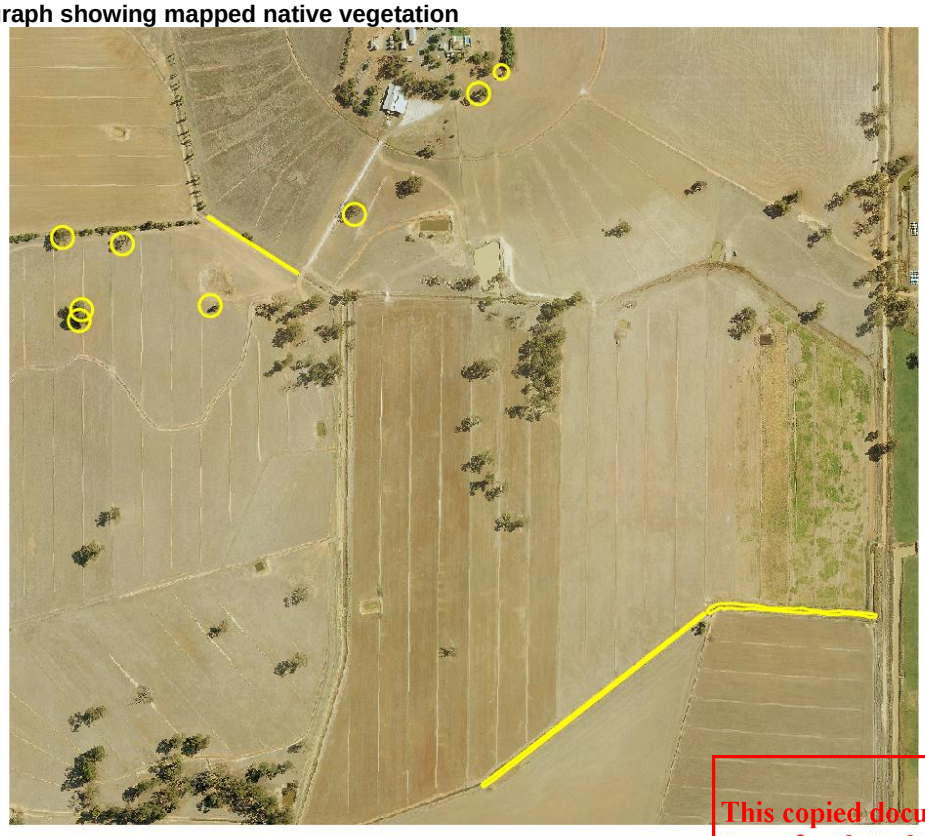
- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance 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

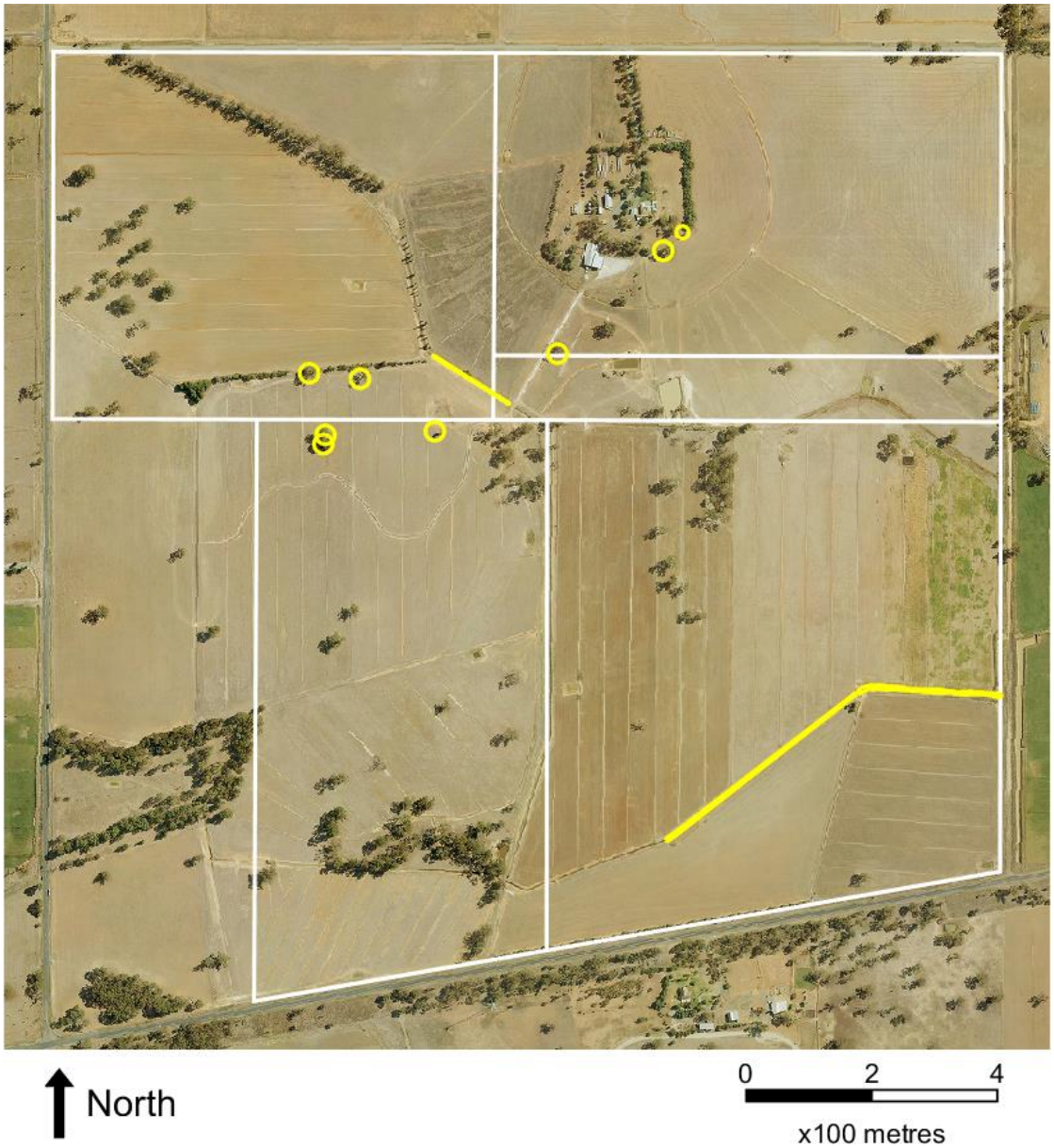
2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation



4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.