

Final

Biodiversity Assessment for the Proposed Bookaar Solar Farm, Bookaar, Victoria

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Bookaar Renewables Pty Ltd

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RELEVANT APPLICATION REQUIREMENTS

Clause 52.17 - Native Vegetation

The following responds to the application requirements under Clause 52.17 (Native Vegetation) is provided below (Table S1).

Table S1. Application requirements for a permit to remove native vegetation (Victoria Planning Provisions Clause 52.17; DELWP 2017)

No.	Application Requirement	Response
Application requirements under the Basic Assessment Pathway		
1	Information about the native vegetation to be removed, including: The assessment pathway and reason for the assessment pathway; A description of the native vegetation to be removed; Maps showing the native vegetation and property in context; and The offset requirement that will apply if the native vegetation is approved to be removed.	Refer to Section 3.1, no native vegetation is proposed to be removed
2	Topographic and land information relating to the native vegetation to be removed, showing ridges, crests and hilltops, wetlands and waterways, slopes of more than 20 percent, drainage lines, low lying areas, saline discharge areas, and areas of existing erosion, as appropriate.	Refer to Section 1.2 and Figure 1, no native vegetation is proposed to be removed
3	Recent dated photographs of the native vegetation to be removed.	Refer to Section 3.1, no native vegetation is proposed to be removed
4	Details of any other native vegetation that was permitted to be removed on the same property with the same ownership as the native vegetation to be removed, where the removal occurred in the five year period before the application to remove native vegetation is lodged.	No native vegetation has been removed by the proponent within the property within the past five years
5	An avoid and minimise statement. The statement describes any efforts to avoid the removal of, and minimise the impacts on the biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value.	Refer to Section 5.1
6	A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the <i>Conservation, Forests and Lands Act 1987</i> that applies to the native vegetation to be removed.	Not applicable
7	Where the removal of native vegetation is to create defensible space, a written statement explaining why the removal of native vegetation is necessary. This statement must have regard to other available bushfire risk mitigation measures. This statement is not required when the creation of defensible space is in conjunction with an application under the Bushfire Management Overlay.	Not applicable no native vegetation is proposed to be removed
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.	Not applicable as the application responds to Clause 52.17

No.	Application Requirement	Response
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.	Refer to Section 5.3

Clause 53.13 – Renewable Energy Facilities

A permit is required under Clause 53.13 of the Corangamite Planning Scheme to use to develop a renewable energy facility (other than a wind energy facility). This report satisfies the relevant ecological application requirements listed in Clause 53.13-2, specifically relating to native vegetation removal (Section 3.3) and the impacts of the proposal on any species listed under *the Flora and Fauna Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999* (Section 3.4, 4.1 and 4.2), with consideration of the Solar Energy Facilities Design and Development Guideline (DELWP 2019). A summary of the requirements is provided in Section 4.3.3.

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Bookaar Renewables Pty Ltd (the 'Proponent') to undertake a Biodiversity Assessment at the proposed location of the Bookaar Solar Farm, encompassing part of 520 Meningoort Road, lots 51 and 52 and Res 1 on LP4677, and adjacent parts of Meningoort Road, Bookaar, Victoria (the 'Study Area').

We understand that the Proponent submitted a planning permit application for a Solar Farm Development at the same site, which was unsuccessful (the 'Previous Development'). Despite the unsuccessful planning application, the VCAT decision broadly accepted that the selected location is suitable for solar development and noted the potential for resubmission. We understand the Proponent wishes to submit a new planning application for the Bookaar Solar Farm which will take into consideration the VCAT decision and provide additional information where necessary.

The purpose of this assessment is to confirm the extent and type of native vegetation present within the study area, provide an updated assessment under the Guidelines (DELWP 2017) and a summary of impacted vegetation and offset requirements for the proposed Bookaar Solar Farm. This report presents the results of the recent assessment and discusses the potential ecological and legislative implications associated with the proposed action, along with an assessment against the Solar Energy Facilities Design and Development Guidelines (DELWP 2019).

Ecology and Heritage Partners previously completed an ecological due diligence assessment of the study area for the Previous Application (Ecology and Heritage Partners 2018a), and a Biodiversity Assessment for the construction of culverts within the original development footprint (Ecology and Heritage Partners 2018b). Further to this and in response to the formal consultation process, the new Proposal has been redesigned to ensure that all native vegetation within the development footprint is retained. Note, all previous reports are superseded by this report.

1.2 Study Area

The Study Area is located at 520 Meningoort Road, Bookaar, including some adjacent land, and is approximately 170 kilometres south-west of Melbourne's CBD (Figure 1). The Study Area includes both the proposed location of the Bookaar Solar Farm (the 'development footprint'), associated access roads, and surrounding land which covers approximately 620 hectares. The development footprint covers approximately 588 hectares.

The Study Area is currently used for agricultural purposes (i.e. grazing and cropping). It is generally flat and gently slopes downwards towards the east in the eastern half of the study area. There is a minor drainage line (that eventually becomes Blind Creek) running east-west in the lower third of the study area (the 'east-west drainage line').

According to the Department of Environment, Land, Water and Planning (DELWP) NatureKit Map (DELWP 2020a), the Study Area is located within the Victorian Volcanic Plain bioregion, Corangamite Catchment Management Authority (CMA) and Corangamite Shire.

1.3 The Proposal

The Proponent is proposing to develop a 200MW solar energy facility (the 'Proposal') within the development footprint. The Proposal includes the following elements:

- 'Array Areas', containing Photovoltaic (PV) panels mounted on a single axis tracking system with a maximum height of 4 m above natural ground at maximum tilt. The tracking system would be supported by piles driven into the ground. Row spacing (pile to pile) is either 12.75 m (south of the 220kV transmission line) or 13 m (north of the 220kV transmission line);
- 82 inverters located centrally throughout the Site in pairs at 41 locations across the Site (inverter stations). Inverter stations are located at least 170 m from the Site boundary;
- Below ground cabling connecting the PV panels between trackers and inverters;
- Below ground cabling connecting the inverters to the substation;
- An internal track network of all-weather gravel tracks (4 m), including a perimeter track which forms part of a 10 m wide defensible Asset Protection Zone (APZ) that surrounds the Site;
- Four (4) gated main site access points via Meningoort Road;
- Four (4) gated emergency access points along the western boundary of the Site;
- Eight dedicated water tanks for firefighting (maximum of 3.6m high), located adjacent to each access point;
- A perimeter security fence 2.5 m high (chain mesh);
- Perimeter vegetation screens (20 m wide with 4 rows of trees and maintained to a height of at least 4 m), planted on the outside of the security fencing;
- A SCADA system that will gather, monitor and analyse data generated through operating the Proposal;
- On-demand, downward facing lighting (restricted to 4m in height); and
- Sensor triggered CCTV security cameras located around the perimeter of the Site and adjacent to key infrastructure.

Substation Area (1.76 ha):

- Substation connecting the Proposal to the onsite 220KV transmission line, via two (2) new high voltage (HV) 220 kV transmission lines;
- A Control building (3 m high);
- Substation Operations and Maintenance building (up to 5 m high);
- A security fence (chain mesh) up to 2.5 m high, enclosing the Substation;
- A 10 m wide defensible APZ around the perimeter of the Substation; and
- Parking for 5 vehicles.

Battery Area (0.91 ha):

- A series of separate containerised battery units, connected by underground cables to the Substation (approximately 2.5 m high);
- A separate transformer adjacent to each battery; and
- A 10m defendable APZ around the perimeter of the Battery Area.

Operations Buildings Area (0.96 ha):

- A Site office building including amenities with a height of 3.6 m;
- A maintenance building and workshop with a height of 5 m;
- 3 Storage sheds with a height of 4.1 m;
- Car parking for twelve (12) vehicles;
- A septic tank and potable water tank;
- A defendable APZ of 20 m, which allows the area to function as the nominated 'Shelter in Place' location (see the 'Bushfire Risk Assessment and Mitigation Plan').

In addition to the key components outlined above, there will be a temporary construction compound (1.44 ha) to facilitate the construction phase of the Proposal. The construction compound would include:

- Temporary construction offices (up to 5 m high);
- Car and bus parking areas for construction vehicles (51 workers cars, 5 mini vans; and additional parking space provided for delivery vehicles and construction machinery);
- Staff amenity block including portable toilets, showers and a kitchen, designed for peak staff numbers during the construction period; and
- Laydown areas.

Once the Proposal is operational, the construction compound will be decommissioned and revegetated.

The Proposal has a lifespan of 30 years. The construction phase would take approximately 12 months and require up to 150 full-time staff. The operational phase would be approximately 28 years and will generate between 8- and 12 full time positions nationally, with six (fte) positions likely to be based locally. Decommissioning is expected to take 12 months and would require a similar workforce to the construction period. Following decommissioning all infrastructure associated with the solar farm would be removed from the Site.

2 METHODS

2.1 Desktop Assessment

Relevant literature, online-resources and databases were reviewed to provide an assessment of flora and fauna values associated with the study area. The following information sources were reviewed:

- The DELWP NatureKit Map (DELWP 2020a) and Native Vegetation Information Management (NVIM) Tool (DELWP 2020b) for:
 - Modelled data for location risk, native vegetation patches, scattered trees and habitat for rare or threatened species; and,
 - The extent of historic and current Ecological Vegetation Classes (EVCs).
- EVC benchmarks (DELWP 2020c) for descriptions of EVCs within the relevant bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DELWP 2018);
- The Illustrated Flora Information System of Victoria (IFLISV) (Gullan 2017) and Atlas of Living Australia (ALA) (ALA 2020) for assistance with the distribution and identification of flora species;
- The Commonwealth Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DAWE 2020);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened (DELWP 2019a) and Protected (DELWP 2019b) Lists;
- The online VicPlan Map (DELWP 2020d) to ascertain current zoning and environmental overlays in the study area and immediate surrounds;
- Solar Energy Facilities Design and Development Guideline (DELWP 2019);
- Aerial photography of the study area; and
- Previous ecological assessments relevant to the study area, including:
 - Ecological Due Diligence: 520 Meningoort Road, Bookaar, Victoria (Ecology and Heritage Partners 2018a);
 - Biodiversity Assessment for construction of Bookaar Solar Farm at 520 Meningoort Road, Bookaar (Ecology and Heritage Partners 2018b).

2.2 Field Assessment

A field assessment was undertaken on 27 March 2020 to obtain information on flora and fauna values within the study area. A previous field assessment was undertaken on 1 November 2017 (Ecology and Heritage Partners 2018b). The study area was walked, with all commonly observed vascular flora and fauna species recorded, significant records mapped and the overall condition of vegetation and habitats noted. Ecological

Vegetation Classes (EVCs) were determined with reference to DELWP pre-1750 and extant EVC mapping (DELWP 2020a) and their published descriptions (DELWP 2020c).

Due to the nearby location of two wetlands, Lake Bookaar and Lake Colongulac, a number of wetland bird species have been recorded in the broader region (Figure 4). Habitat within the study area was assessed to determine if the study area supported habitat features suitable for wetland bird species.

Where native vegetation was identified a habitat hectare assessment was undertaken following methodology described in the Vegetation Quality Assessment Manual (DSE 2004).

2.3 Removal, Destruction or Lopping of Native Vegetation (the Guidelines)

Under the *Planning and Environment Act 1987*, Clause 52.17 of the Corangamite Planning Scheme requires a planning permit to remove, destroy or lop native vegetation. The assessment process for the clearing of vegetation follows the ‘*Guidelines for the removal, destruction or lopping of native vegetation*’ (the ‘Guidelines’) (DELWP 2017).

2.3.1 Assessment Pathway

The Guidelines manage the impacts on biodiversity from native vegetation removal using an assessment-based approach. Two factors – extent risk and location category – are used to determine the risk associated with an application for a permit to remove native vegetation. The location category (1, 2 or 3) has been determined for all areas in Victoria and is available on DELWP’s NVIM Tool (DELWP 2020b). Determination of assessment pathway is summarised in Table 1.

Table 1. Assessment pathways for applications to remove, destroy or lop native vegetation (DELWP 2017).

Extent		Location		
		1	2	3
Native Vegetation	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

Notes: For the purpose of determining the assessment pathway of an application to remove native vegetation the extent includes any other native vegetation that was permitted to be removed on the same contiguous parcel of land with the same ownership as the native vegetation to be removed, where the removal occurred in the five year period before an application to remove native vegetation is lodged.

2.3.2 Vegetation Assessment

Native vegetation (as defined in Table 2) is assessed using two key parameters: extent (in hectares) and condition. For the purposes of this assessment, both condition and extent were determined as part of the habitat hectare assessment.

Table 2. Determination of a patch of native vegetation (DELWP 2017).

Category	Definition	Extent	Condition
Patch of native vegetation	<p>An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native;</p> <p>OR</p> <p>An 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;</p> <p>OR</p> <p>any mapped wetland included in the <i>Current Wetlands map</i>, available in DELWP systems and tools.</p>	<p>Measured in hectares.</p> <p>Based on hectare area of the native patch.</p>	<p>Vegetation Quality Assessment Manual (DSE 2004).</p> <p>Modelled condition for <i>Current Wetlands</i>.</p>
Scattered tree	<p>A native canopy tree that does not form part of a native patch.</p>	<p>Measured in hectares.</p> <p>Each Large scattered tree is assigned an extent of 0.071 hectares (30m diameter).</p> <p>Each Small scattered tree is assigned a default extent of 0.31 hectares (10m diameter)</p>	<p>Scattered trees are assigned a default condition score of 0.2 (outside a patch).</p>

Notes: Native vegetation is defined in the Victoria Planning Provisions as ‘plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses’.

2.3.3 Impact Avoidance and Minimisation

All applications to remove native vegetation must demonstrate the three-step approach of avoid, minimise and offset. This is a precautionary approach that aims to ensure that the removal of native vegetation is restricted to what is reasonably necessary, and that biodiversity is appropriately compensated for any native vegetation removal that is approved.

2.3.4 Offsets

Biodiversity offsets are required to compensate for the permitted removal of native vegetation. Offset obligations and offset site criteria are determined in accordance with the Guidelines (DELWP 2017) and are divided into two categories, being General Habitat Units and Species Habitat Units.

Where applicable, the offset requirements for native vegetation removal are calculated by DELWP and presented in a Native Vegetation Removal (NVR) Report, which are based on the vegetation condition scores determined during the biodiversity assessment.

3 RESULTS

3.1 Vegetation Condition

Three small patches of native vegetation were recorded within the Study Area. The remainder of the Study Area comprised introduced and planted vegetation, present as pasture grass and windrows or blocks of planted eucalypt.

A list of all flora species recorded during the field assessment are provided in Appendix 1.1.

3.1.1 Patches of Native Vegetation

Native vegetation in the Study Area is representative of two EVCs: Plains Grassy Woodland (EVC 55) and Plains Sedgy Wetland (EVC 647). The presence of these EVCs is generally consistent with the modelled pre-1750s native vegetation mapping (DELWP 2020c), however with slight variations to the location of the EVCs. Specific details relating to observed EVCs are provided below.

The results of the habitat hectare assessment are provided in Appendix 1.2.

Plains Grassy Woodland

Two small patches of Plains Grassy Woodland were present in a modified state within the Study Area (one patch on the Site's western boundary and one at the intersection of Meningoort Road and Darlington Camperdown Road). Each patch was characterised by a Blackwood *Acacia melanoxylon* recruitment cohort located amongst planted eucalyptus trees and an exotic understory (Plate 1).

Plains Sedgy Wetland

Plains Sedgy Wetland was recorded in a narrow drain running east to west across the Study Area, which contained a low cover (25%) of one native sedge, Common Spike-sedge *Eleocharis acuta* (Plate 2). The drain was dry and highly disturbed at the time of assessment through soil pugging by cattle.



Plate 1. Modified patch of Plains Grassy Woodland present within the study area (Ecology and Heritage Partners Pty Ltd 27/03/2020).



Plate 2. Artificial drain way with native sedge present creating modified patch of Plains Sedgy Wetland (Ecology and Heritage Partners Pty Ltd 27/03/2020).

3.1.2 *Large Trees in Patches*

No Large Trees in native vegetation patches were recorded within the Study Area.

3.1.3 *Scattered Trees*

No native Scattered Trees were recorded within the Study Area.

3.1.4 *Introduced and Planted Vegetation*

Areas not supporting native vegetation had a high cover (>90%) of exotic grass species, many of which were direct-seeded for use as pasture (Plate 3). Bare areas of recently cropped land were also present (Plate 4). These areas are shown on Figure 2 where mapped native vegetation is absent.

The majority of the study area contains exotic grasses and herbs, some of which are considered environmental weeds within Corangamite Shire (such as Toowoomba Canary-grass *Phalaris aquatica*, Capeweed *Arctotheca calendula* and Spear Thistle *Cirsium vulgare*). The study area is largely dominated by Barley Grass *Hordeum leporinum*, Perennial Rye-grass *Lolium perenne*, Annual Meadow Grass *Poa annua*, Common Mouse-ear Chickweed *Cerastium glomeratum* and White Clover *Trifolium repens*. Other less commonly observed species included Capeweed, Wild Oat *Avena fatua* and Buck's-horn Plantain *Plantago coronopus*.

Two noxious weeds were present within the study area in limited numbers, Bathurst Burr *Xanthium spinosum* and Spear Thistle, located within the eastern half of the Study Area (Plate 5).

Several areas of planted vegetation with exotic understories are present, primarily located along the boundary of the Study Area (Plate 6, Figure 2). Four fenced-off densely planted revegetation areas with exotic understories are present along the western boundary (Figure 2), with the trees all being approximately 10 metres tall. These areas are all approximately 50 metres wide and range in length from approximately 170 to 400 metres. These revegetation areas contain a variety of native species, including Swamp Gum *Eucalyptus ovata*, Lightwood *Acacia implexa*, Blackwood and Swamp She-oak *Casuarina glauca*. Planted vegetation will be managed for bushfire risk in accordance with the principles outlined in Appendix D of the bushfire Risk Assessment and Mitigation Plan (Fire Risk Consultants Pty Ltd 2020).

Two small isolated areas of Sugar Gum *Eucalyptus cladocalyx*, which is native to South Australia, are identified along Meningoort Road along the Study Area's southwestern boundary (Figure 2). These are not fenced although were avoided when the paddock was planted out with crops.



Plate 3. Exotic pasture grass dominates the study area (Ecology and Heritage Partners Pty Ltd 27/03/2020).



Plate 4. Recently ploughed areas devoid of native vegetation across the majority of the southern portion of the study area (Ecology and Heritage Partners Pty Ltd 27/03/2020).



Plate 5. One noxious weed (Bathurst Burr) recorded in the eastern end of the study area (Ecology and Heritage Partners Pty Ltd 27/03/2020).



Plate 6. Planted eucalyptus is common along the western borders of the study area (Ecology and Heritage Partners Pty Ltd 27/03/2020).

3.2 Fauna Habitat

A wide range of birds were observed within the Study Area, with the three types of vegetation structures providing habitat for various types of birds.

3.2.1 *Planted eucalypts*

The planted River Red-gums throughout the Study Area are all mature, with some senescing (i.e. dying) and others dead. Hollows of various sizes, limb failure points and lifting bark are observed across the population, which provide valuable habitat for foraging, roosting and nesting that the younger revegetation areas cannot provide. Although no animals were observed using the hollows or lifting bark for nesting at the time of the assessment, they provide benefits to birds, possums, bats and insects.

3.2.2 *Fenced-off Revegetation*

The four fenced-off revegetation areas located throughout the Study Area are valuable as foraging, roosting and nesting habitat for mobile generalist fauna, including locally common birds and microbats. Species observed using this habitat include the Red Wattlebird *Anthochaera carunculata*, Crested Pigeon *Ocyphaps lophotes*, Grey Butcherbird *Cracticus torquatus* and Noisy Miner *Manorina melanocephala*.

3.2.3 *Introduced Grasslands*

The majority of the study area consists of paddocks that contain improved exotic pastures, with the southern ‘triangle’ being used for cropping. These areas are of low ecological value and provide a sub-optimal foraging resource for common generalist bird species which are tolerant of modified open areas. Birds observed using this habitat include Australian Magpie *Cracticus tibicen*, Little Raven *Corvus mellori*, Little Corella *Cacatua sanguinea*, Magpie-lark *Grallina cyanoleuca* and Australasian Pipit *Anthus novaeseelandiae*. The introduced Eurasian Skylark *Alauda arvensis* was also seen.

3.2.4 *Wetland System and Drainage Line*

A wetland system known as the Western District lakes, which includes Lake Bookaar, is located approximately one kilometre east of the study area. There is also a dam and several drainage lines within the study area (Figure 2). Two common waterbirds (White-necked Heron *Ardea pacifica* and Australian Shelduck *Tadorna tadornoides*) were observed within the study area.

The habitat within the study area is not considered suitable to provide breeding or flocking resources for state significant waterbirds such as Brolga *Grus rubicunda*. The east-west drainage line, which connects to a drainage line that runs inside and parallel to the study area’s eastern boundary heading north (the ‘north-south’ drainage line), does not connect to the wetland system (Figure 1). Likewise, water run-off from the study area does not reach the wetland system (Venant Solutions 2020), being intercepted by the north-south drainage line, or settling on either side of it during significant flood events (Figure 2). The waterbodies within and immediately adjacent to the study area provide low quality habitat for common waterbird species compared with the high-quality habitat present throughout the wetlands that form part of the Western District Lakes Ramsar Site.

3.3 Removal, Destruction or Lopping of Native Vegetation (the Guidelines)

The new Proposal has been designed to avoid the three patches of native vegetation identified within the Study Area.

The patch of Plains Sedgy Wetland recorded in the narrow east west drain running across the Site has been avoided by including two temporary prefabricated bridges in the design. The bridges will span over the top of the drain in two locations to avoid the need to remove any native sedge within the drain to facilitate the construction of an internal access track around the Site (See Site Plan). The bridges are approximately 4 m wide and 12 m long and would span comfortably over the width of the drain at the two proposed crossings (3.4 m and 3.6 m wide). The approaches of the bridges will sit on prefabricated concrete slabs placed on Geotech fabric on the ground on each side of the drain, away from areas of native vegetation. This prefabricated design avoids the need for subsurface foundations and can be easily removed at the end of the operational life of the Proposal. The native vegetation located under the two bridge structures will not be impacted by the design or placement of the bridges and its growth will not be impeded, therefore no impacts to Plains Sedgy Wetland are proposed.

Two small patches of Plains Grassy Woodland were present within the study area, one patch on the Site's western boundary and one along the access route at the intersection of Meningoort Road and Darlington Camperdown Road. The footprint of the solar farm avoids the patch within the Site and the road upgrade required for the intersection at Meningoort Road and Darlington Camperdown Road has been designed to avoid the second patch of Plains Grassy Woodland.

In summary, the Proposal will not require the removal, destruction or lopping of native vegetation as defined under the Guidelines (DELWP 2017).

3.4 Significance Assessment

3.4.1 Flora

The VBA contains records of one nationally significant and seven State significant flora species previously recorded within 10 kilometres of the study area (DELWP 2018) (Figure 3). The PMST nominated an additional 16 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DAWE 2020) (Figure 3, Appendix 1.3). Of these records, the majority were recorded at nearby Lake Bookaar, which forms a part of the Western District Lakes Ramsar site. Habitat within the development footprint does not contain suitable characteristics to support these nearby significant flora species (i.e. permanent saline waterbodies)

No national or State significant flora were recorded during the recent or previous site assessments, and based on the modified nature of the study area, landscape context and the proximity of previous records, significant flora species are considered unlikely to occur within the study area due to the and high levels of disturbance through previous agricultural activity and absence of suitable habitat.

3.4.2 Fauna

The VBA contains records of four nationally significant and 22 State significant fauna species previously recorded within 10 kilometres of the study area (DELWP 2018) (Figure 4). The PMST nominated an additional

21 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DAWE 2020) (Figure 4; Appendix 2.1).

Of the above records, numerous records relate to significant migratory waterbirds which have been recorded in several nearby wetlands. However, none of the records fall within the study area due to the lack of suitable foraging or breeding habitat. This is attributed to the modified nature of the study area through its extensive agricultural land use history, and historical lack of a large wetland waterbody. While there is the possibility that migratory waterbirds may fly over the study area on occasions, there is no important or limiting habitat for any migratory bird species within or directly surrounding the study area (e.g. species are not likely to rely on the habitat within the study area).

Impacts to significant fauna species

Several state significant bird species such as Brolga, Freckled Duck *Stictonetta naevosa* and Hardhead *Aythya australis* have been observed within close proximity to the Study Area at Lake Bookaar and Lake Colongulac (Figure 4). These species may occasionally fly over the study area when moving between areas of more suitable habitat, however they are unlikely to use the study area for foraging or breeding given the lack of suitable habitat.

Given the lack of significant habitat for other species such as terrestrial bird species or bats, the construction and operation of the solar farm is unlikely to directly or indirectly impact any significant fauna species.

3.4.3 Ecological Communities

No national or State significant ecological communities are present within the Study Area.

4 LEGISLATIVE AND POLICY IMPLICATIONS

4.1 *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)

The EPBC Act establishes a Commonwealth process for the assessment of proposed actions (i.e. project, development, undertaking, activity, or series of activities) that are likely to have a significant impact on matters of national environmental significance (NES), or on Commonwealth land. An action, unless otherwise exempt, requires approval from the Commonwealth Environment Minister if it is considered likely to have an impact on any matters of National Environmental Significance (NES).

For species listed under the EPBC Act, a 'significant impact' is defined as an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE 2013). Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is affected, and upon the intensity, duration, magnitude and geographic extent of the impacts. Importantly, for a 'significant impact' to be 'likely', it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not a remote chance or possibility (DoE 2013).

Due to the nearby location of Lake Bookaar, which is a lake included in the Western District Lakes Ramsar site, an assessment of impact against the significant impact criteria for the Western District Lakes Ramsar site is described below (Table 5), which summaries that it is highly unlikely that the Proposal will result in a significant impact on the Ramsar site.

4.1.1 Ramsar Wetlands

The Proposal is highly unlikely to have a significant impact on the Western District Lakes Ramsar site with a summary of the significant impact criteria for the Ramsar Site provided in Table 5 below.

Table 5. Significant impact assessment on Ramsar wetlands.

Will the project result in a significant impact under the EPBC Act?	
Ramsar sites will not be significantly impacted by the project.	
Significant Impact Criteria - will the activity:	Ramsar Wetlands
Areas of the wetland being destroyed or substantially modified	The Proposal will not result in a Ramsar site being destroyed or substantially modified, nor will it result in impacts to the critical components, critical processes and critical services and benefits of the Western District Lakes Ramsar site (SEWPaC 2011).
A substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland	The Potential impacts of the Proposal will be confined to the development area, with offsite / indirect impacts avoided or minimised (Venant Solutions 2021). Therefore, given the context of the development, a substantial and measurable change in the hydrological regime of the Western District Lakes Ramsar site (e.g. a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland), is highly unlikely.
The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected.	The Proposal is not linked to any waterbodies that directly flow into the Ramsar site, and therefore it is highly unlikely that the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected by the proposed development.
A substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health.	The Proposal will not result in a substantial and measurable change in the water quality of the wetland, including a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health.

<p>partners</p> <p>An invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.</p>	<p>Based on the criteria under the Ramsar wetland, the Proposal is not likely to result in any invasive species that are harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.</p>
<p>Conclusion</p>	<p>The Proposal will not result in a Ramsar site being destroyed or substantially modified, nor will it result in impacts to the critical components, critical processes and critical services and benefits of the Western District Lakes Ramsar site (SEWPaC 2011). That is, whilst there may be minor changes to groundwater and surface flows, the Proposal is not expected to have impacts on hydrology, salinity, threatened flora, waterbirds, wetland diversity, physical habitat, priority wetland species or threatened species (Table E3 in SEWPaC 2011).</p>

4.1.2 Implications

The proposed action is highly unlikely to have a significant impact on any matter of NES. As such, a referral to the Commonwealth Environment Minister is not required regarding matters listed under the EPBC Act.

4.2 *Flora and Fauna Guarantee Act 1988 (Victoria)*

The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to ‘take’ listed and/or protected flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

4.2.1 *Implications*

There are no confirmed records of species or ecological communities listed as threatened and/or protected under the FFG Act recorded within the study area.

4.3 *Planning and Environment Act 1987 (Victoria)*

The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation, unless an exemption under clause 52.17-7 of the Victorian Planning Schemes applies. In addition, Solar Farm development is subject to Clause 53.13 of the Corangamite Shire Planning Scheme, as a Renewable Energy Facility, which states within the application requirements that the extent of vegetation removal, ecological legislative implications, and an environmental management plan must be addressed, with the Minister for Planning as the responsible authority for assessment of a proposal for the use and development of land as a renewable energy facility.

Victorian Planning Provision’s Clause 19.01 ‘Energy’ outlines the policy objectives and strategies that support the development of solar energy facilities.

4.3.1 *Local Planning Scheme*

The study area is located within the Corangamite Shire. The following zoning and overlays apply (DELWP 2020d):

- Farming Zone – Schedule 1 (FZ1)
- Significant Landscape Overlay – Schedule 1 (SLO1)

4.3.2 *The Guidelines (Clause 52.17)*

The State Planning Policy Framework and the decision guidelines at Clause 52.17 (Native Vegetation) and Clause 12.01 require the Responsible Authority to have regard for the ‘Guidelines for the removal, destruction or lopping of native vegetation’ (the Guidelines) (DELWP 2017a).

Implications

No native vegetation is proposed to be impacted and offsets are not required.

4.3.3 *Renewable Energy Facility (other than Wind Facility) (Clause 53.13)*

The Renewable Energy Facility Clause of the Corangamite Planning Scheme seeks to facilitate the establishment and expansion of renewable energy facilities in appropriate locations, with minimal impact on the amenity of the area. Any applications must consider the Solar Energy Facilities Design and Development Guideline (DELWP 2019), which includes the following considerations related to ecology for any application:

- Existing vegetation types and their condition and coverage;
- Species of flora and fauna listed under the FFG Act and EPBC Act;
- Sites of flora and fauna listed under the FFG Act and EPBC Act, including significant habitat corridors, and movement corridors for these fauna;
- National parks, state parks, coastal reserves and other land subject to the *National Parks Act 1975*; and,
- Land declared a Ramsar wetland as defined under section 17 of the EPBC Act.

Implications

The study area consisted of both native and exotic vegetation, with a total of 0.575 hectares of native vegetation mapped across the study area (including the access point at Meningoort Road). All native vegetation will be retained. No species listed under the EPBC Act or FFG Act are considered likely to occur within the study area, and the study area is not considered to contain significant habitat corridors for fauna species. Therefore, the construction of the Proposal, inclusive of security fencing (see the 'Site Plan') is unlikely to impede the movement of any fauna. Overtime the additional vegetation screens, to be located around the periphery of the Proposal, are likely to contribute to increased wildlife habitat corridors, compared to existing conditions.

No land subject to the *National Parks Act 1975* is within close proximity or likely to be impacted by the Proposal. One Ramsar site, the 'Western District Lakes Ramsar site', is approximately 1 kilometre from the development footprint, although the Proposal is highly unlikely to result in a significant impact upon the wetland. An impact assessment on the Ramsar site is provided above in Section 4.1.

A permit is required under Clause 53.13 of the Corangamite Planning Scheme to develop a renewable energy facility (other than a wind energy facility). This report satisfies the relevant ecological application requirements listed in Clause 53.13-2. In accordance with Clause 72.01 of the Corangamite Planning Scheme, the Minister for Planning is the Responsible Authority for renewable energy facilities.

4.4 *Catchment and Land Protection Act 1994 (Victoria)*

Two weeds listed as noxious under the *Catchment and Land Protection Act 1994* were recorded during the assessment, Bathurst Burr and Spear Thistle. Similarly, there is evidence that the study area is currently occupied by several pest fauna species listed under the CaLP Act, mainly European Rabbit. Listed noxious weeds/pests should be appropriately controlled throughout the study area.

4.5 *Wildlife Act 1975* and *Wildlife Regulations 2013* (Victoria)

The *Wildlife Act 1975* (and associated *Wildlife Regulations 2013*) is the primary legislation in Victoria providing for protection and management of wildlife. Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*, issued by DELWP.

5 MITIGATION MEASURES

5.1 Avoid and Minimise Statement

The footprint of the Proposal is located within previously cleared agricultural paddocks, which contain little ecological value. Planted trees surrounding the edges of the Site have been avoided, with particular focus on avoidance in areas supporting larger planted River Red-gums due to the habitat value they provide within the landscape and their contribution to a native wildlife corridor. It is understood that additional vegetation screening plantings will be located surrounding the Solar Farm, which will in future contribute to the wildlife habitat corridors whilst screening the development from the surrounding environment.

The new Proposal has been strategically designed to avoid impacts to the three patches of native vegetation identified within the Study Area. This is explained in detail in Section 3.3.

5.2 Best Practice Mitigation Measures

Recommended measures to mitigate impacts upon terrestrial values present within the study are during construction may include:

- All contractors should be aware of ecologically sensitive areas to minimise the likelihood of inadvertent disturbance to areas marked for retention. Native vegetation (areas of sensitivity) should be included as a mapping overlay on any construction plans;
- Where possible, construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation; and,
- As indigenous flora provides valuable habitat for indigenous fauna, it is recommended that any landscape plantings that are undertaken as part of the proposed works are conducted using indigenous species sourced from a local provenance, rather than exotic deciduous trees and shrubs.

5.3 Offset Impacts and Strategy

Offsets are not required as no impacts to native vegetation will occur.

6 CONCLUSION

A field assessment was undertaken on 27 March 2020 to obtain information on flora and fauna values within the study area (Figure 1). A previous field assessment was undertaken on 1 November 2017 (Ecology and Heritage Partners 2018b) within the same development footprint. Current and past land use of the study area has involved intense agricultural activity, used for cropping and grazing. As a result, the study area contained limited areas of native patch vegetation and no scattered trees as defined under the Guidelines (DELWP 2017).

Three small patches of native vegetation were recorded within the study area. The remainder of the study area comprised introduced and planted vegetation, present as pasture grass and windrows or blocks of planted eucalypt. Several birds were observed within the study area, with the three types of vegetation structures providing habitat for various types of birds.

The new Proposal has been strategically designed to avoid impacts to the three patches of native vegetation identified within the Study Area. This has been achieved by locating infrastructure associated with the Proposal away from the two patches of Plains Grassy Woodland and using bridges within the Site to avoid disturbing the patch of Plains Sedgy Wetland located in the east west drain.

Given the presence of Lake Bookaar approximately 1 kilometre to the east of the Proposal (a lake forming part of the Western District Lakes Ramsar site), an assessment of impact against the significant impact criteria for the Western District Ramsar site has been undertaken (Section 4.1.1, Table 5). There is a high level of confidence that the Proposal will not significantly impact on the Ramsar site.

Finally, based on the results of the former and more recent site assessment, there are no ecological constraints within the Study Area and it is highly unlikely that the Proposal will impact any significant flora and fauna species, and ecological communities.

6.1 Summary of Planning and Approval Considerations

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided below (Table 6).

Table 6. Further requirements associated with development of the study area.

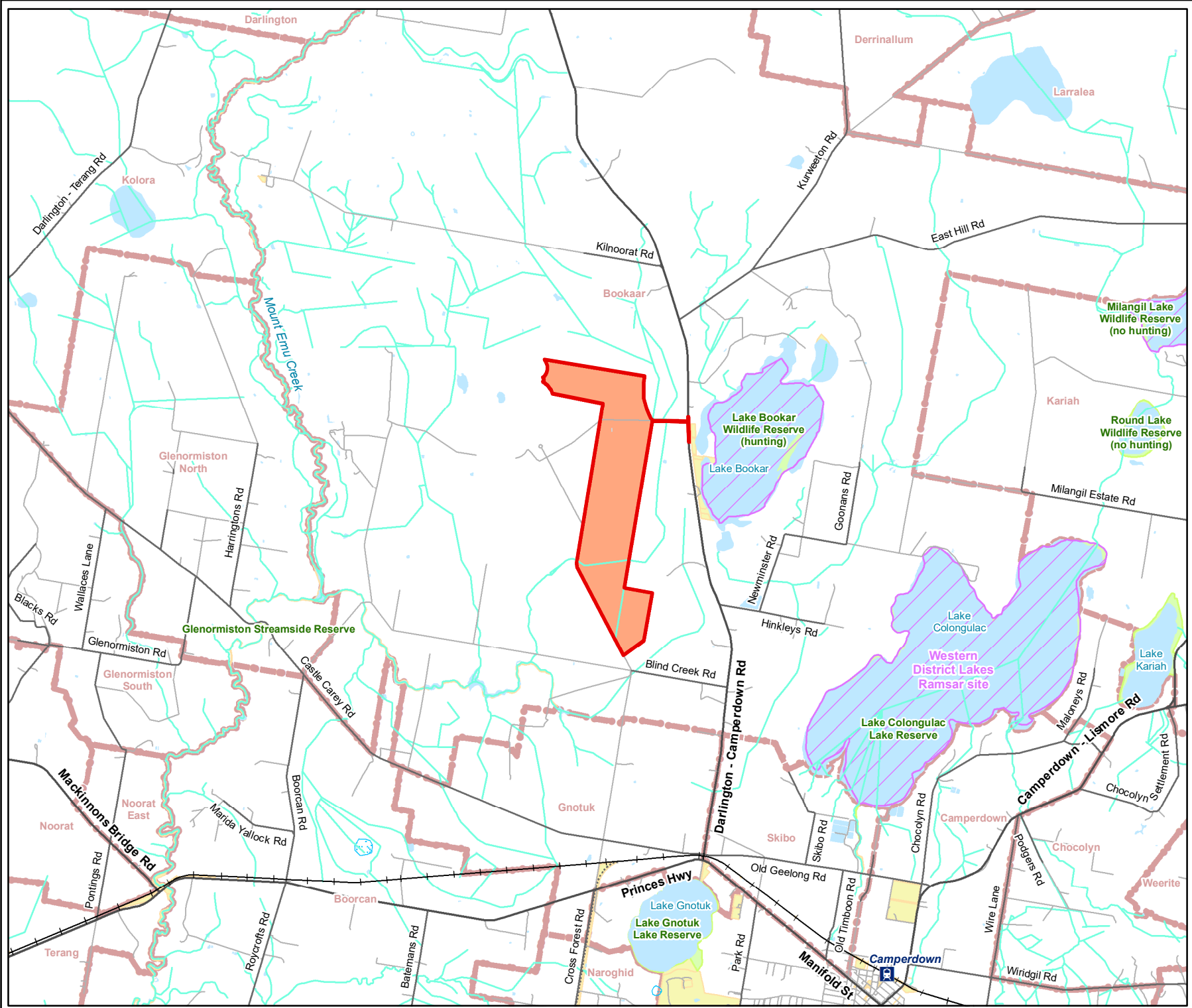
Relevant Legislation	Implications	Further Action
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	The proposed action is highly unlikely to have a significant impact on any matter of NES. As such, a referral to the Commonwealth Environment Minister is not required regarding matters listed under the EPBC Act.	No further action required.
<i>Flora and Fauna Guarantee Act 1988</i>	There are no confirmed records of species or ecological communities listed as threatened and/or protected under the FFG Act recorded within the study area.	No further action required.
<i>Planning and Environment Act 1987</i>	No native vegetation is proposed to be impacted. A permit is required under Clause 53.13 of the Corangamite Planning Scheme to use to develop a renewable energy facility (other than a wind energy facility). This report satisfies the relevant ecological application requirements listed in Clause 53.13-2. In accordance with Clause 72.01 of the Corangamite Planning Scheme, the Minister for Planning is the Responsible Authority for the use and development of land for a Solar Energy facility.	Prepare and submit a Planning Permit application to address Clause 53.13-2
<i>Catchment and Land Protection Act 1994</i>	Two weed species listed under the CaLP Act were recorded within the study area, Bathurst Burr and Spear Thistle. To meet requirements under the CaLP Act, listed noxious weeds should be appropriately controlled throughout the study area.	Listed noxious weeds and pests should be appropriately controlled throughout the study area
<i>Wildlife Act 1975</i>	Any persons engaged to conduct salvage and relocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Ensure wildlife specialists hold a current Management Authorisation.

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FIGURES

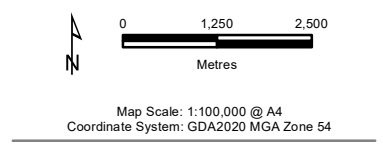


Legend

- Study Area
- Railway
- Major Road
- Collector Road
- Minor Road
- Walking Track
- Minor Watercourse
- Permanent Waterbody
- Wetland/Swamp
- Ramsar wetland
- Parks and Reserves
- Crown Land
- Localities

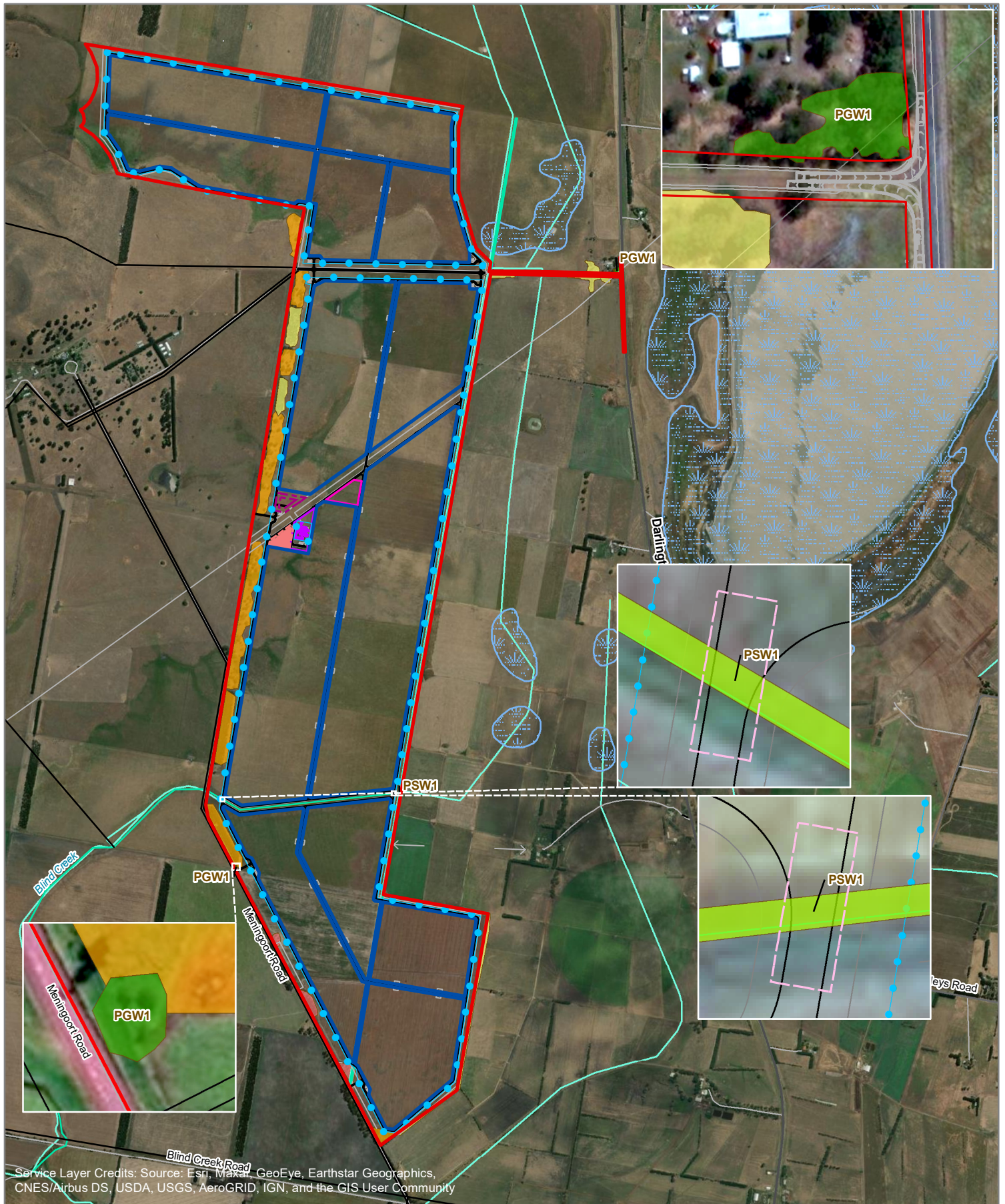


Figure 1
Location of the study area
Ecological Assessment - Bookaar Solar Farm



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13718 Fig01_StudyArea_G20_27/08/2020 melslv



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 2
Ecological features
Ecological Assessment
- Bookaar Solar Farm

Legend

Study Area

Development plan

Array Boundary

Operations Area

Laydown Area

Battery Area

Substation Area

Roads / access roads

Drains and drainage reserve

● Security Fence

Other development features including road

Bridge

Ecological Vegetation Class

Plains Grassy Woodland (EVC 55)

Plains Sedgy Wetland (EVC 647)

Current Wetlands

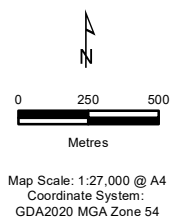
Other vegetation

Planted River Red Gum

Planted natives

Planted Sugar Gum

Planted Cyprus






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Legend

 Study Area

Significant Flora

-  Basalt Sun-orchid
-  Brackish Plains Buttercup
-  Giant Honey-myrtle
-  Large River Buttercup
-  Salt Blown-grass
-  Salt-lake Tussock-grass
-  Wind-blown Tussock-grass

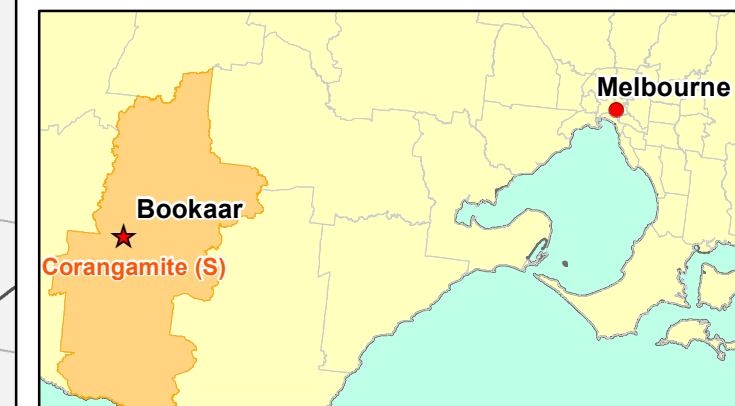
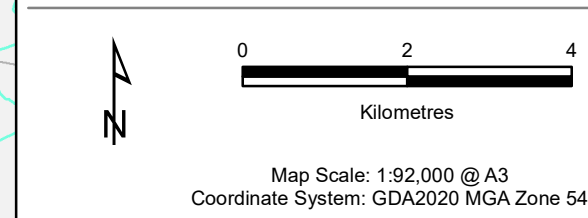
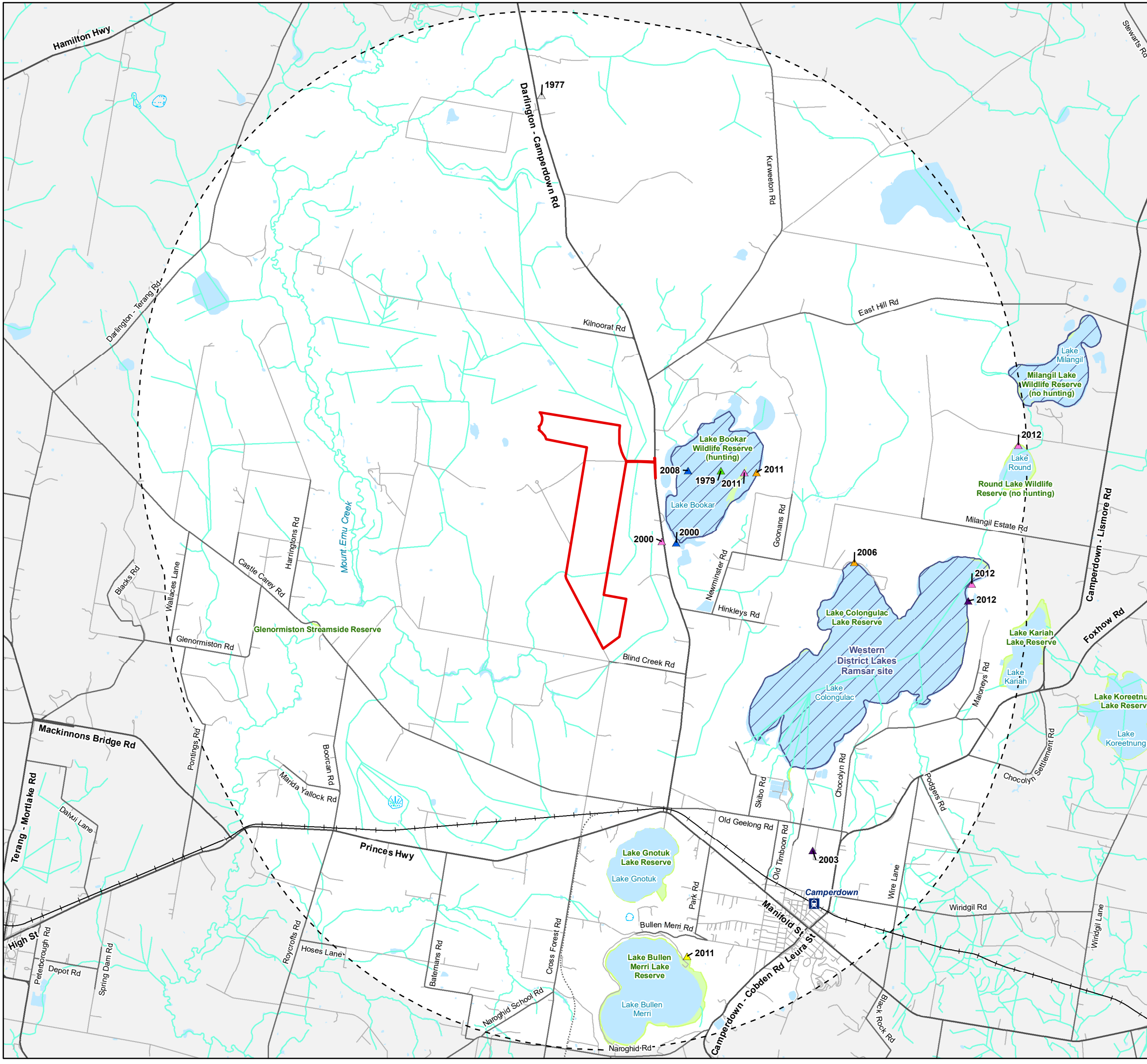


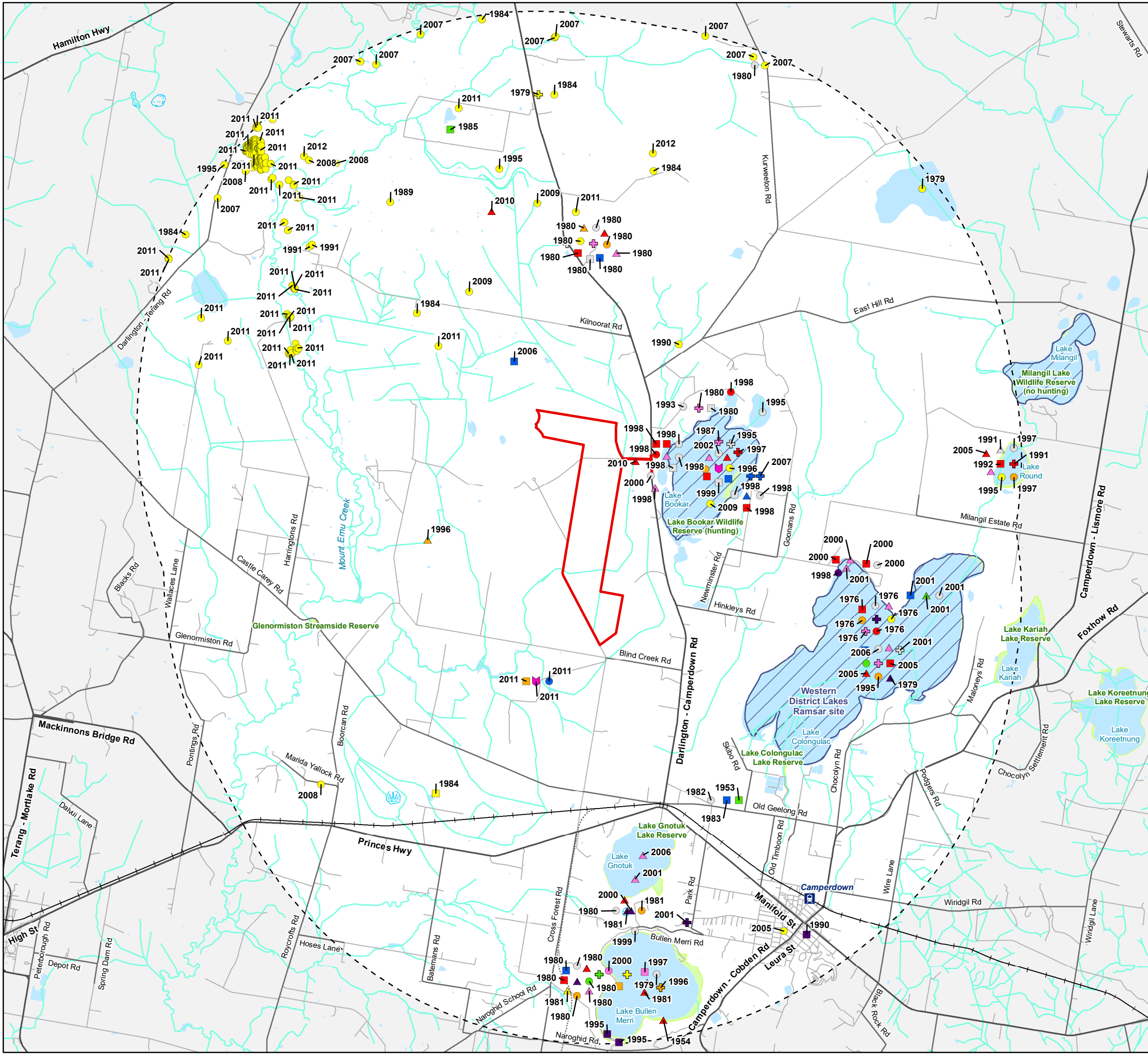
Figure 3
Previously documented significant flora within 10km of the study area
Ecological Assessment - Bookaar Solar Farm



VBA 2018. Victorian Biodiversity Atlas // Sourced from: 'VBA_FLORA25', 'VBA_FLORA100', 'VBA_FAUNA25' and 'VBA_FAUNA100'. March 2018 © The State of Victoria, Department of Environment, Land, Water and Planning. Records prior to 1949 not shown.

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- Legend**
- Study Area**
 Study Area
- Significant Fauna**
- | | |
|----------------------------------------|----------------------------------|
| ○ Australasian Shoveler | △ Gull-billed Tern |
| ● Black Falcon | ▲ Hardhead |
| ● Blue-billed Duck | ▲ Latham's Snipe |
| ● Brolga | ▲ Little Egret |
| ● Caspian Tern | ▲ Magpie Goose |
| ● Common Bent-wing Bat (southern ssp.) | ▲ Marsh Sandpiper |
| ● Common Sandpiper | ▲ Musk Duck |
| ● Corangamite Water Skink | ▲ Nankeen Night Heron |
| ■ Curlew Sandpiper | ⊕ Pied Cormorant |
| ■ Eastern Great Egret | ⊕ Royal Spoonbill |
| ■ Eastern Snake-necked Turtle | ⊕ Silver Perch |
| ■ Fairy Prion | ⊕ Southern Toadlet |
| ■ Fat-tailed Dunnart | ⊕ Spotted Harrier |
| ■ Freckled Duck | ⊕ Tussock Skink |
| ■ Golden Perch | ⊕ Whiskered Tern |
| ■ Grey Goshawk | ⊕ White-throated Needletail |
| | ⊕ Wood Sandpiper |
| | ⊕ Yellow-bellied Sheath-tail Bat |

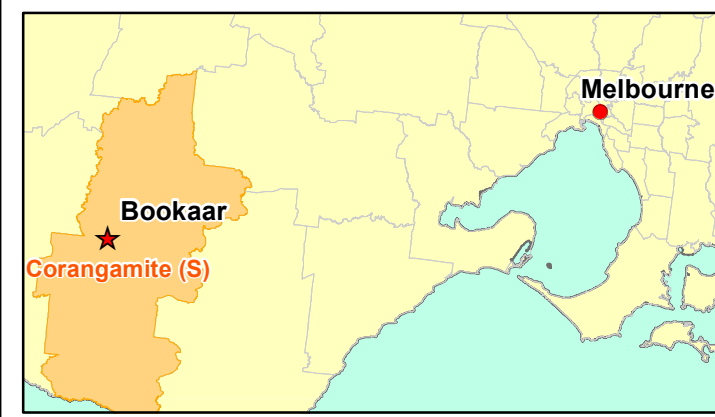
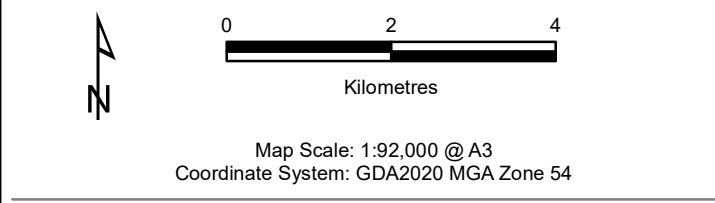


Figure 4
 Previously documented significant fauna within 10km of the study area
Ecological Assessment - Bookaar Solar Farm



VBA 2018. Victorian Biodiversity Atlas // Sourced from: 'VBA_FLORA25', 'VBA_FLORA100', 'VBA_FAUNA25' and 'VBA_FAUNA100'. March 2018 © The State of Victoria, Department of Environment, Land, Water and Planning. Records prior to 1949 not shown.

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APPENDIX 1 FLORA

Appendix 1.1 Flora Results

Legend:

- * Listed as a noxious weed under the CaLP Act;
- # Planted Victorian and non-Victorian species;
- ** Planted indigenous species in the study area.

Table A1.1. Flora within the study area.

Scientific Name	Common Name	Notes
INDIGENOUS SPECIES		
<i>Acacia melanoxylon</i>	Blackwood	-
<i>Eleocharis acuta</i>	Common Spike-sedge	-
<i>Eucalyptus camaldulensis</i>	River Red-gum	**
<i>Eucalyptus ovata</i>	Swamp Gum	**
NON-INDIGENOUS OR INTRODUCED SPECIES		
<i>Acacia implexa</i>	Lightwood	#
<i>Arctotheca calendula</i>	Cape weed	-
<i>Avena fatua</i>	Wild Oat	-
<i>Casuarina glauca</i>	Swamp She-oak	-
<i>Cirsium vulgare</i>	Spear Thistle	*
<i>Eucalyptus cladocalyx</i>	Sugar Gum	-
<i>Eucalyptus viminalis</i>	Manna Gum	#
<i>Holcus lanatus</i>	Yorkshire Fog	-
<i>Hordeum vulgare s.l.</i>	Barley	-
<i>Hypochaeris radicata</i>	Flatweed	-
<i>Lolium perenne</i>	Perennial Rye-grass	-
<i>Paspalum dilatatum</i>	Paspalum	-
<i>Phalaris aquatica</i>	Toowoomba Canary-grass	-
<i>Pinus pinaster</i>	Cluster Pine	-
<i>Plantago coronopus</i>	Buck's-horn Plantain	-
<i>Poa annua</i>	Annual Meadow-grass	-
<i>Rumex spp.</i>	Dock	-
<i>Trifolium repens var. repens</i>	White Clover	-
<i>Xanthium spinosum</i>	Bathurst Burr	*

Appendix 1.2 Habitat Hectare Assessment

Table A1.2. Habitat Hectare Assessment Table.

Vegetation Zone		PSW	PGW
Bioregion		Victorian Volcanic Plain	Victorian Volcanic Plain
EVC / Tree		Plains Sedgy Wetland	Plains Grassy Woodland
EVC Number		647	55_61
EVC Conservation Status		Endangered	Endangered
Patch Condition	Large Old Trees /10	0	0
	Canopy Cover /5	0	0
	Under storey /25	5	5
	Lack of Weeds /15	2	2
	Recruitment /10	5	5
	Organic Matter /5	4	4
	Logs /5	0	0
	Treeless EVC Multiplier	1.36	1.00
	Subtotal =	21.76	16.00
Landscape Value /25		3	3
Habitat Points /100		25	19
Habitat Score		0.25	0.19

Note: PSW = Plains Sedgy Wetland, PGW = Plains Grassy Woodland

Appendix 1.3 Significant Flora Species

Table A1.3 Significant flora recorded within 10 kilometres of the study area

Key:

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

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

DEPI Advisory List of Threatened Flora in Victoria (DEPI 2014)

EX	Extinct	X	Extinct
CR	Critically endangered	e	Endangered
EN	Endangered	v	Vulnerable
VU	Vulnerable	r	Rare
K	Poorly Known (Briggs and Leigh 1996)	k	Poorly Known
#	Records identified from EPBC Act Protected Matters Search Tool.	L	Listed
*	Records identified from the FIS		

1	Known occurrence	Recorded within the study area recently (i.e. within ten years)
2	High Likelihood	Previous records of the species in the local vicinity; and/or, The study area contains areas of high quality habitat.
3	Moderate Likelihood	Limited previous records of the species in the local vicinity; and/or, The study area contains poor or limited habitat.
4	Low Likelihood	Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a very low likelihood of presence.
5	Unlikely	No suitable habitat and/or outside the species range.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
NATIONAL SIGNIFICANCE							
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	-	-	VU	-	-	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Dianella amoena</i>	Matted Flax-lily	-	-	EN	L	e	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Dodonaea procumbens</i>	Trailing Hop-bush	-	-	VU	-	v	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Glycine latrobeana</i>	Clover Glycine	-	-	VU	L	v	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Lachnagrostis adamsonii</i>	Adamson's Blown-grass	-	-	EN	L	v	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Lepidium aschersonii</i>	Spiny Peppercross	1	1916	VU	L	e	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Lepidium aschersonii</i>	Spiny Pepper-cress	-	-	VU	L	e	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Leucochrysum albicans</i> var. <i>tricolor</i>	Hoary Sunray	-	-	EN	-	e	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower	-	-	CR	L	e	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Poa sallacustris</i>	Salt-lake Tussock-grass	4	2012	VU	L	v	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Prasophyllum frenchii</i>	Maroon Leek-orchid	-	-	EN	L	e	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Prasophyllum spicatum</i>	Dense Leek-orchid	-	-	VU	-	e	4 – Low likelihood due to lack of suitable habitat and previous records

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
<i>Rutidosia leptorhynchoides</i>	Button Wrinklewort	-	-	EN	L	e	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Senecio psilocarpus</i>	Swamp Fireweed	-	-	VU	-	v	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	-	-	EN	L	e	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Thelymitra matthewsii</i>	Spiral Sun-orchid	-	-	VU	L	v	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Xerochrysum palustre</i>	Swamp Everlasting	-	-	VU	L	v	4 – Low likelihood due to lack of suitable habitat and previous records
STATE SIGNIFICANCE							
<i>Lachnagrostis robusta</i>	Salt Blown-grass	3	2008	-	-	r	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Lawrenca spicata</i>	Salt Lawrenca	1	1946	-	-	r	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Giant Honey-myrtle	1	2011	-	-	r	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Poa physoclina</i>	Wind-blown Tussock-grass	2	2012	-	L	e	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Ranunculus diminutus</i>	Brackish Plains Buttercup	2	2011	-	-	r	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Ranunculus papulentus</i>	Large River Buttercup	1	1979	-	-	k	4 – Low likelihood due to lack of suitable habitat and previous records
<i>Thelymitra gregaria</i>	Basalt Sun-orchid	1	1977	-	L	e	4 – Low likelihood due to lack of suitable habitat and previous records

Data source: Victorian Biodiversity Atlas (DELWP 2018); Protected Matters Search Tool (DAWE 2020).

Taxonomic order: Alphabetical.

APPENDIX 2 FAUNA

Appendix 2.1 Significant Fauna Species

Table A2.1. Significant fauna within 10 kilometres of the study area.

Likelihood: Habitat characteristics of significant fauna species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area were assessed to determine their likelihood of occurrence. The likelihood of occurrence rankings is defined below.

1	High Likelihood	<ul style="list-style-type: none"> Known resident in the study area based on site observations, database records, or expert advice; and/or, Recent records (i.e. within five years) of the species in the local area (DELWP 2018); and/or, The study area contains the species' preferred habitat.
2	Moderate Likelihood	<ul style="list-style-type: none"> The species is likely to visit the study area regularly (i.e. at least seasonally); and/or, Previous records of the species in the local area (DELWP 2018); and/or, The study area contains some characteristics of the species' preferred habitat.
3	Low Likelihood	<ul style="list-style-type: none"> The species is likely to visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or, There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or, The study area contains few or no characteristics of the species' preferred habitat.
4	Unlikely	<ul style="list-style-type: none"> No previous records of the species in the local area; and/or, The species may fly over the study area when moving between areas of more suitable habitat; and/or, Out of the species' range; and/or, No suitable habitat present.

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

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

DSE *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2013); *Advisory List of Threatened Invertebrate Fauna in Victoria* (DSE 2009)

NAP *National Action Plan* (Cogger *et al.* 1993; Duncan *et al.* 1999; Garnet *et al.* 2011; Woinarski *et al.* 2014; Sands and New 2002; Tyler 1997)

EX Extinct

RX Regionally extinct

CR Critically endangered

DD Data deficient (insufficiently or poorly known)

L Listed as threatened under FFG Act

EN Endangered

Listed on the Protected Matters Search Tool
 VU Vulnerable
 LC least concern

NT Near threatened
 CD Conservation dependent
 RA Rare

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	DSE (2013)	Likelihood
NATIONAL SIGNIFICANCE							
Australasian Bittern	<i>Botaurus poiciloptilus</i>	#	1	EN	L	EN	4 – Unlikely due to lack of suitable habitat and low number of previous records
Curlew Sandpiper	<i>Calidris ferruginea</i>	1999	13	CR	-	EN	4 – Unlikely due to lack of waterbodies providing suitable habitat.
Spot-tailed Quoll	<i>Dasyurus maculatus maculatus</i>	#	-	EN	L	EN	4 – Unlikely due to lack of suitable habitat and lack of previous records.
Eastern Quoll	<i>Dasyurus viverrinus</i>	#	-	EN	L	RX	4 – Unlikely due to lack of suitable habitat and lack of previous records.
Striped Legless Lizard	<i>Delma impar</i>	#	-	VU	L	EN	4 – Unlikely due to disturbed nature creating lack of suitable habitat
Corangamite Water Skink	<i>Eulamprus tympanum marnieae</i>	1998	2	EN	L	CR	4 – Unlikely due to lack of suitable habitat
Dwarf Galaxias	<i>Galaxiella pusilla</i>	#	-	VU	L	EN	4 – Unlikely due to lack of suitable waterbodies for habitat
Painted Honeyeater	<i>Grantiella picta</i>	#	-	VU	L	VU	4 – Unlikely due to lack of previous records and suitable habitat.
Southern Brown Bandicoot	<i>Isodon obesulus obesulus</i>	#	-	EN	L	NT	4 – Unlikely due to lack of suitable habitat in form of structural understory vegetation
Swift Parrot	<i>Lathamus discolor</i>	#	-	CR	L	EN	4 – Unlikely due to limited presence of suitable habitat and low number of previous records
Growling Grass Frog	<i>Litoria raniformis</i>	#	-	VU	L	EN	4 – Unlikely due to lack of suitable waterbodies for habitat and lack of previous records
Southern Bent-wing Bat	<i>Miniopterus schreibersii bassanii</i>	2011	1	CR	L	CR	4 – Unlikely due to lack of suitable habitat
Eastern Curlew	<i>Numenius madagascariensis</i>	#	-	CR	-	VU	4 – Unlikely due to lack of waterbodies providing suitable habitat.
Fairy Prion	<i>Pachyptila turtur</i>	1984	1	VU	-	VU	4 – Unlikely due to lack of waterbodies providing suitable habitat.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	DSE (2013)	Likelihood
Plains-wanderer	<i>Pedionomus torquatus</i>	#	-	CR	L	CR	4 – Unlikely due to lack of suitable habitat
Long-nosed Potoroo	<i>Potorous tridactylus tridactylus</i>	#	-	VU	L	NT	4 – Unlikely due to lack of suitable habitat
Australian Grayling	<i>Prototroctes maraena</i>	#	-	VU	L	VU	4 – Unlikely due to lack of suitable waterbodies for habitat
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	#	-	VU	L	VU	4 – Unlikely due to lack of suitable habitat
Australian Painted Snipe	<i>Rostratula australis</i>	#	-	VU	L	CR	4 – Unlikely due to lack of waterbodies providing suitable habitat
Golden Sun Moth	<i>Synemon plana</i>	#	-	CR	L	CR	4 – Unlikely due to lack of suitable habitat
Pectoral Sandpiper	<i>Calidris melanotos</i>	#	1	-	-	NT	4 – Unlikely due to lack of waterbodies providing suitable habitat
Ruddy Turnstone	<i>Arenaria interpres</i>	#	1	-	-	VU	4 – Unlikely due to lack of waterbodies providing suitable habitat
Grey Falcon	<i>Falco hypoleucos</i>	#	1	-	L	EN	4 – Unlikely due to low occurrence of suitable habitat
Pacific Golden Plover	<i>Pluvialis fulva</i>	#	1	-	-	VU	4 – Unlikely due to lack of waterbodies providing suitable habitat
Common Greenshank	<i>Tringa nebularia</i>	#	1	-	-	VU	4 – Unlikely due to lack of waterbodies providing suitable habitat
STATE SIGNIFICANCE							
Grey Goshawk	<i>Accipiter novaehollandiae novaehollandiae</i>	1995	3	-	L	VU	4 – Unlikely due to low occurrence of suitable habitat
Common Sandpiper	<i>Actitis hypoleucos</i>	2000	2	-	-	VU	4 – Unlikely due to lack of waterbodies providing suitable habitat
Australasian Shoveler	<i>Anas rhynchotis</i>	2006	104	-	-	VU	3 – Low likelihood due to lack of waterbodies providing suitable habitat
Magpie Goose	<i>Anseranas semipalmata</i>	2001	1	-	L	NT	4 – Unlikely due to lack of waterbodies providing suitable habitat
Eastern Great Egret	<i>Ardea modesta</i>	2005	38	-	L	VU	3 – Low likelihood due to lack of waterbodies providing suitable habitat
Australian Bustard	<i>Ardeotis australis</i>	1874	1	-	L	CR	4 – Unlikely due to lack of waterbodies providing suitable habitat
Hardhead	<i>Aythya australis</i>	2010	39	-	-	VU	3 – Low likelihood due to lack of waterbodies providing suitable habitat

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	DSE (2013)	Likelihood
Silver Perch	<i>Bidyanus bidyanus</i>	1996	1	-	L	VU	4 – Unlikely due to lack of suitable habitat
Musk Duck	<i>Biziura lobata</i>	2006	90	-	-	VU	3 – Low likelihood due to lack of waterbodies providing suitable habitat. Previous records fall within Lake Bookaar and Lake Corangamite. Species may fly over on occasion, but is unlikely to rely on the study area for foraging or breeding purposes.
Little Egret	<i>Egretta garzetta nigripes</i>	1981	1	-	L	EN	3 – Low likelihood due to lack of waterbodies providing suitable habitat
Black Falcon	<i>Falco subniger</i>	1998	3	-	-	VU	3 – Low likelihood due to lack of waterbodies providing suitable habitat
Gull-billed Tern	<i>Gelochelidon nilotica macrotarsa</i>	1991	2	-	L	EN	3 – Low likelihood due to lack of waterbodies providing suitable habitat
Brolga	<i>Grus rubicunda</i>	2012	228	-	L	VU	3 – Low likelihood due to lack of waterbodies providing suitable habitat. Previous records fall within Lake Bookaar and Lake Corangamite. Species may fly over on occasion, but is unlikely to rely on the study area for foraging or breeding purposes due to lack of suitable breeding and flocking habitat (i.e. wetlands).
White-throated Needletail	<i>Hirundapus caudacutus</i>	2001	4	-	-	VU	3 – Low likelihood due to lack of suitable habitat, but may fly over on occasion.
Caspian Tern	<i>Hydroprogne caspia</i>	1987	2	-	L	NT	3 – Low likelihood due to lack of waterbodies providing suitable habitat.
Blue-billed Duck	<i>Oxyura australis</i>	2002	28	-	L	EN	3 – Low likelihood due to lack of waterbodies providing suitable habitat. Previous records fall within Lake Bookaar and Lake Corangamite. Species may fly over on occasion, but is unlikely to rely on the study area for foraging or breeding purposes.
Tussock Skink	<i>Pseudemoia pagenstecheri</i>	2007	3	-	-	VU	4 – Unlikely due to lack of native grassland habitat and previous habitat disturbance caused by agricultural activity.
Southern Toadlet	<i>Pseudophryne semimarmorata</i>	1998	7	-	-	VU	3 – Unlikely due to lack of suitable habitat.
Yellow-bellied Sheath-tail Bat	<i>Saccolaimus flaviventris</i>	2011	1	-	L	DD	3 – Low likelihood due to lack of suitable habitat.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	DSE (2013)	Likelihood
Freckled Duck	<i>Stictonetta naevosa</i>	2006	43	-	L	EN	3 – Low likelihood due to lack of waterbodies providing suitable habitat. Previous records fall within Lake Bookaar and Lake Corangamite. Species may fly over on occasion, but is unlikely to rely on the study area for foraging or breeding purposes.
Wood Sandpiper	<i>Tringa glareola</i>	1998	2	-	-	VU	4 – Unlikely due to lack of waterbodies providing suitable habitat.
Marsh Sandpiper	<i>Tringa stagnatilis</i>	1998	1	-	-	VU	4 – Unlikely due to lack of waterbodies providing suitable habitat.
REGIONAL SIGNIFICANCE							
Whiskered Tern	<i>Chlidonias hybridus javanicus</i>	1987	8	-	-	NT	3 – Low likelihood due to lack of waterbodies providing suitable habitat.
Spotted Harrier	<i>Circus assimilis</i>	2000	1	-	-	NT	3 – Low likelihood due to lack of waterbodies providing suitable habitat.
Latham's Snipe	<i>Gallinago hardwickii</i>	1996	4	-	-	NT	3 – Low likelihood due to lack of waterbodies providing suitable habitat.
Golden Perch	<i>Macquaria ambigua</i>	1997	2	-	-	NT	– Unlikely due to lack of waterbodies providing suitable habitat.
Nankeen Night Heron	<i>Nycticorax caledonicus hillii</i>	2000	8	-	-	NT	3 – Low likelihood due to lack of waterbodies providing suitable habitat.
Pied Cormorant	<i>Phalacrocorax varius</i>	2001	5	-	-	NT	4 – Unlikely due to lack of suitable habitat.
Royal Spoonbill	<i>Platalea regia</i>	1997	4	-	-	NT	4 – Low likelihood due to lack of waterbodies providing suitable habitat.
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>	1985	2	-	-	NT	3 – Low likelihood due to lack of suitable habitat.