Final Report

Ecological Investigations for the Proposed Tatura Structure Plan, Tatura, Victoria

Prepared for

Greater Shepparton City Council

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CONTENTS

1 INTRODUCTION 4
1.1 Background 4
1.2 Study Area 4
2 METHODS 5
2.1 Desktop Assessment 5
2.2 Field Assessment 5
2.3 Assessment Qualifications and Limitations 6
3 EXISTING ENVIRONMENT 8
3.1 Vegetation Condition 8
3.2 Fauna Habitat 11
3.3 Significance Assessment 12
4 SUMMARY OF ECOLOGICAL VALUES 13
5 IMPLICATIONS FOR FUTURE DEVELOPMENT 14
6 CONCLUSION 17
REFERENCES 18
FIGURES 20
APPENDIX 1. - FLORA 27
Appendix 1.1 - Flora Results 27
Appendix 1.2. - Tree Data 29
Appendix 1.3. - Patch Data 34
Appendix 1.4. - Significant Flora Species 36
APPENDIX 2 - FAUNA 39
Appendix 2.1. - Significant Fauna Species 39

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Greater Shepparton City Council to undertake ecological investigations for the proposed Tatura Structure Plan, Tatura, Victoria.

We understand that Greater Shepparton City Council has identified the precinct as a future residential growth area with the potential to support urban expansion in this area. The structure plan will guide the future development of all land yet-to-be-rezoned for residential purposes, including the extent of infrastructure required to support this growth.

The purpose of this assessment was to identify the extent and type of native vegetation present within the study area to help inform the future residential re-zonings in the north, north-east and east of Tatura. This report presents the results of the assessment and discusses the potential ecological and legislative implications associated with the proposed action.

1.2 Study Area

The study area is located immediately north and east of the Tatura township, approximately 155 kilometres north of Melbourne's CBD (Figure 1) and covers approximately 785 hectares.

The study area is currently used for agricultural purposes. It is generally flat, with no ridges, crests or waterways within or immediately adjacent to the site. However, there are several irrigation channels currently in use within the study area east of Tatura.

According to the Department of Environment, Land, Water and Planning (DELWP) NatureKit Map (DELWP 2021a), the study area is located within the Victorian Riverina bioregion, Goulburn Broken Catchment Management Authority (CMA) and Greater Shepparton City Council.

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 2021a) and Native Vegetation Information Management (NVIM) Tool (DELWP 2021b) 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 2021c) 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 2020);
- The Illustrated Flora Information System of Victoria (IFLISV) (Gullan 2017) and Atlas of Living Australia (ALA) (ALA 2021) for assistance with the distribution and identification of flora species;
- Birdlife Australia (2021) for detailed descriptions and distributions of birds (both native and exotic);
- 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 2021);
- 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 2021d) to ascertain current zoning and environmental overlays in the study area; and
- Aerial photography of the study area.

2.2 Field Assessment

A field assessment was undertaken between 16 and 17 December 2020 to obtain information on flora and fauna values within the study area. The field surveys focussed on areas potentially supporting ecological values, with small residential lots and developed and/or cropped land excluded from the assessment. Select properties were walked and driven, with commonly observed vascular flora and fauna species recorded, and 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 2021a) and their published descriptions (DELWP 2021c).

2.2.1 *Vegetation Assessment*

Native vegetation (as defined in Table 1) 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 1. Determination of a patch of native vegetation (DELWP 2017).

Category	Definition	Extent	Condition
Patch of native vegetation	An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; OR An area with three or more native canopy trees where the drip line of each tree touches the 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.	Measured in hectares. Based on hectare area of the native patch.	Vegetation Quality Assessment Manual (DSE 2004). Modelled condition for *Current Wetlands*.
Scattered tree	A native canopy tree that does not form part of a native patch.	Measured in hectares. Each Large scattered tree is assigned an extent of 0.071 hectares (15m radius). Each Small scattered tree is assigned a default extent of 0.031 hectares (10 metre radius).	Scattered trees are assigned a default condition score of 0.2 (outside a patch).

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 Assessment Qualifications and Limitations

This report has been written based on the quality and extent of the ecological values and habitat considered to be present or absent at the time of the desktop and/or field assessments being undertaken.

Not all properties within the study area were assessed. Properties identified during the desktop assessment as having potential to hold ecological values were prioritised, with ecological values within sites not accessed mapped from adjacent properties or the road reserve.

The 'snapshot' nature of a rapid ecological assessment, meant that migratory, transitory or uncommon fauna species may have been absent from typically occupied habitats at the time of the field assessment. In addition, annual or cryptic flora species such as those that persist via underground tubers may also be absent.

A comprehensive list of all terrestrial flora and fauna present within the study area was not undertaken as this was not the objective of the assessment. Rather a list of commonly observed species was recorded to assist in determining the broader biodiversity values present within the study area.

Ecological values identified within the study area were recorded using a hand-held GPS or tablet with an accuracy of +/-5 metres. This level of accuracy is considered to provide an accurate assessment of the

ecological values present within the study area; however, this data should not be used for detailed surveying purposes.

The terrestrial flora and fauna data collected during the field assessment and information obtained from relevant desktop sources is considered to adequately inform the assessment of the broad ecological values present within the study area.

3 EXISTING ENVIRONMENT

3.1 Vegetation Condition

The study area is representative of many areas within the Victorian Riverina, with large areas of improved pastures and derived native grasslands, scattered patches of remnant vegetation and regrowth from past clearing. The majority (>90%) of the study area was highly modified due to historic and current agricultural practices.

Given that much of the indigenous shrub and tree layer has been cleared throughout the study area, and there are extensive areas of planted indigenous and non-indigenous trees, it is difficult to determine whether patches of indigenous understorey species are representative of Plains Woodland or another similar EVC. In most cases, the decision for classifying patches was guided by the modelled pre-1750s native vegetation mapping (DELWP 2020c), with native flora in the study area best represented by one EVC: Plains Woodland (EVC 803).

Native vegetation mapping completed as part of this identified 60.05 hectares of native vegetation representative of Plains Woodland (Figure 2), including:

- 41.60 hectares of 'treed' Plains Woodland;
- 10.79 hectares of 'treeless' Plains Woodland (derived native grassland);
- 7.66 hectares of revegetation that is representative of Plains Woodland; and
- 151 Scattered Trees.

The remaining assessed portions of the study area were identified as being either developed or supporting non-remnant vegetation (i.e. planted indigenous and non-indigenous species, grassland/ pasture dominated by introduced species or crops).

Specific details relating to the observed EVCs and other vegetation/ habitat types are provided below.

3.1.1 Patches of Native Vegetation

Native vegetation in the study area is representative of Plains Woodland (EVC 803). The presence of this EVC is generally consistent with the modelled pre-1750s native vegetation mapping (DELWP 2021c). Specific details relating to the observed EVC are provided below.

Plains Woodland

Plains Woodland is characterised as a eucalypt woodland to 15 metres tall, with an understorey of comprised of a diversity of grassy and herbaceous flora species. Plains Woodland occurs on a range of geologies, occupying fertile clays and clay loam soils on flat or gently undulating plains at low elevations in areas with an average annual rainfall of less than 600 millimetres.

Plains Woodland patches within the study area generally consisted of small, isolated patches and isolated strips within the road reserve, predominately present as canopy trees over an exotic understorey dominated by pasture grasses (Plate 1 and Plate 2). Several patches of revegetation were also identified as being broadly consistent with the Plains Woodland EVC (Plate 3).

One large patch of remnant Plains Grassland recorded in the north-east of the study area, immediately south of the Midland Highway, consisted of a predominantly native understorey dominated by Wallaby Grasses *Rytidosperma* spp., with a canopy of large eucalypts, dominated by Grey Box *Eucalyptus macrocarpa* (Plate 4).

Plate 1. Treeless Plains Woodland (derived native grassland) under planted vegetation within the study area (Ecology and Heritage Partners Pty Ltd 16/12/2020).

Plate 2. A patch of Plains Woodland along the road reserve within the study area (Ecology and Heritage Partners Pty Ltd 17/12/2020).

Plate 3. A patch of revegetation consistent with Plains Woodland EVC within the study area. (Ecology and Heritage Partners Pty Ltd 17/12/2020).

Plate 4. A patch of high-quality Plains Woodland in the north-east of the study area (Ecology and Heritage Partners Pty Ltd 16/12/2020).

3.1.2 Scattered Trees

A total of 151 scattered trees (River Red-gum, Grey Box and Yellow Box) were recorded within the study area, which consisted of 141 large and 10 small scattered trees (Figure 2; Appendix 1.3). These trees would have once formed part of the Plains Woodland EVC; however, the understorey vegetation contained predominantly introduced species (mainly exotic pasture grasses) and the trees no longer formed a patch of native vegetation (Plate 5 and 6).

Plate 5. Scattered trees within the study area (Ecology and Heritage Partners Pty Ltd 16/12/2020).

Plate 6. A large Grey Box within the study area (Ecology and Heritage Partners Pty Ltd 16/12/2020).

3.1.3 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. Scattered native grasses were generally present in these areas, however they did not have the required 25% relative cover to be considered a patch. Native and introduced trees and shrubs were also planted for ornamental purposes within the study area, primarily around existing dwellings and sheds and in windrows (Plate 7).

Non-native areas were dominated by pasture grasses and environmental weeds such as Toowoomba Canary-grass *Phalaris aquatica*, Barley *Hordeum* spp., Rye-grass *Lolium* spp., Couch *Cynodon dactylon* var. *dactylon* and Wild Oat *Avena fatua* (Plate 8 and Plate 9).

Noxious weeds, as defined under the CaLP Act, were present within the study area, with Chilean Needle-grass *Nassella neesiana*, Bathurst Burr *Xanthium spinosum* and African Boxthorn *Lycium ferocissimum* observed throughout the study area (Plate 10). Chilean Needle-grass and African Boxthorn are also Weeds of National Significance (WoNS).

Plate 7. A row of planted trees within the study area (Ecology and Heritage Partners Pty Ltd 16/12/2020).

Plate 8. Cereal crop stubble within the study area (Ecology and Heritage Partners Pty Ltd 16/12/2020).

Plate 9. Exotic pasture grasses dominate most of the study area (Ecology and Heritage Partners Pty Ltd 16/12/2020).

Plate 10. Chilean Needle-grass within the study area (Ecology and Heritage Partners Pty Ltd 16/12/2020).

3.2 Fauna Habitat

Plains Woodland derived grasslands within the study area provides potential habitat for a diversity of fauna species. This habitat type is likely to support a range of native and introduced birds (including a diversity of raptors), mammals (e.g. Eastern Grey Kangaroo *Macropus giganteus* and Red Fox *Vulpes Vulpes*), reptiles (e.g. Eastern Brown Snake *Pseudonaja textilis*) and frogs (e.g. Spotted Marsh Frog *Limnodynastes tasmaniensis*).

Plains Woodland, including revegetated areas, within the study area provides suitable habitat for a variety of fauna guilds including arboreal mammals, microbats, birds and reptiles. During the current survey, a variety of birds were observed foraging amongst trees and shrubs in these areas. Hollows and fissures within mature eucalypts and stags (dead trees) provide roosting, nesting and sheltering habitat for hollow-dependent birds and mammals. Microbats are also likely to roost within hollows in these areas and forage within, over and around canopy vegetation. While the ground layer and mid-storey within this vegetation is relatively open, several patches support a low-moderate cover of woody ground debris, likely to be inhabited and used by a range of reptile species.

The large areas of exotic grassland within the study are likely to be utilised by common mammal and bird species. Several bird species common to modified, grassy or open habitats were recorded during the current assessment. Diurnal and nocturnal raptors are likely to forage over these areas.

Irrigation channels and farm dams (when inundated) within the study area are likely to support a range of common fauna species. The modified (irrigation channel) and ephemeral (farm dams) nature of the waterbodies, and the site's proximity to areas of high-quality habitat provided by the extensive Goulburn River system to the east, minimises the likelihood of migratory/ threatened waterbird species making significant use of these resources.

3.3 Significance Assessment

3.3.1 Flora

The VBA contains records of 13 State significant flora species previously recorded within 10 kilometres of the study area (DELWP 2020) (Figure 3). The PMST nominated an additional seven nationally significant species which have not been previously recorded but have the potential to occur in the locality (DAWE 2021) (Figure 3; Appendix 1.3).

Of these species, there is suitable habitat within the study area for Buloke *Allocasuarina luehmannii.*

3.3.2 Fauna

The VBA contains records of 10 nationally significant and 27 State significant fauna species previously recorded within 10 kilometres of the study area (DELWP 2020) (Figure 4). The PMST nominated an additional nine nationally significant species which have not been previously recorded but have the potential to occur in the locality (DAWE 2021) (Figure 4; Appendix 2.1).

Based on the modified nature of the study area, landscape context and the proximity of previous records, significant fauna species are considered unlikely to rely on habitat within the study area for foraging or breeding purposes due to the lack of suitable and/or important habitat features.

3.3.3 Ecological Communities

Five nationally listed ecological communities are predicted to occur within 10 kilometres of the study area (DAWE 2021):

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

Plains Woodland vegetation in the north-east of the study area was consistent with the description of the nationally significant (EPBC Act-listed) Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia ecological community.

One FFG Act-listed ecological community is present in the study area, being Grey Box - Buloke Grassy Woodland Community. This community corresponds to areas of Plains Woodland EVC mapped in the study area and meet the relevant description and characteristics described for this community (DELWP 2019c). Plains Woodland vegetation in the north-east of the study area contained potential habitat for woodland birds associated with the FFG Act-listed Victorian Temperate Woodland Bird Community.

4 SUMMARY OF ECOLOGICAL VALUES

The desktop review and field survey identified the following key ecological values within the study area:

- Remnant patches of native vegetation and native scattered trees:
    - 41.60 hectares of 'treed' Plains Woodland;
    - 10.79 hectares of 'treeless' Plains Woodland (derived native grassland);
    - 7.66 hectares of revegetation that is representative of Plains Woodland; and
    - 151 Scattered Trees.
- 34.59 hectares of 'high' ecological value Plains Woodland in the north-east of the study area consistent with the description of the nationally significant Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia ecological community.
- 34.59 hectares of 'high' ecological value Plains Woodland in the north-east of the study area providing potential habitat for woodland birds associated State-significant Victorian Temperate Woodland Bird Community.
- 41.60 hectares of the State-significant Grey Box - Buloke Grassy Woodland Community.
- Potential habitat for flora species of State (Buloke and Buloke Mistletoe) conservation significance.

5 IMPLICATIONS FOR FUTURE DEVELOPMENT

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table 2.

Table 2. Further requirements associated with development of the study area.

Relevant Legislation	Implications
Environment Protection and Biodiversity Conservation Act 1999	The EPBC Act establishes a Commonwealth process for the assessment of proposed actions likely to have a significant impact on matters of NES, or those that are undertaken on Commonwealth Land. An action, unless otherwise exempt, requires approval from the Commonwealth Minister for the Environment if it is likely to have an impact on any of the following matters of NES: World Heritage properties, National Heritage places, Ramsar wetlands of international significance, nationally listed threatened species and ecological communities, Migratory species protected under international agreements, Commonwealth marine areas, the Great Barrier Reef Marine Park, nuclear actions and water resources (for coal seam gas and large coal mining projects). Key ecological constraints associated with the EPBC Act relate to the known or potential presence of threatened species of flora and fauna and ecological communities (Section 4). Any action that is likely to significantly impact upon these values or any other matter of NES would need to be referred to DAWE for assessment and approval. Referrals are assessed over a period of 20 working days, including a ten-day public comment period. A referred action will subsequently be classed as one of the following: • *Not a controlled action* – approval is not required if the action is undertaken in accordance with the referral. • *Not a controlled Action 'particular manner'* – approval is not required if the action is undertaken in accordance with the manner specified. • *Controlled action* – the action is subject to the assessment and approval process under the EPBC Act. Should matters of NES be identified within the study area following a detailed ecological assessment (eg. Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia ecological community), a referral to the Commonwealth via an EPBC Act referral may be required. The Minister will decide whether the proposed action is a 'controlled action' and, if so, will require further assessment to determine whether approval will be granted under the EPBC Act. However, if the impact area avoids all known matters of NES, then it is considered unlikely that the proposed development will be a 'controlled action'.

Relevant Legislation	Implications
Environment Effects Act 1978	The *Environment Effects Act 1978* (EE Act) provides for an assessment of proposed activities that are capable of having a significant impact on the environment at a State level. The Act allows the Victorian Minister for planning to decide whether an Environment Effects Statement (EES) is required to be completed. The "*Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978*" provides triggers for which an EES is required, such as the removal of 10 or more hectares of native vegetation or potential impacts on remaining habitat or populations of threatened species. Any action that is likely to have a significant impact on State matters, as defined under the relevant guidelines, would need to be referred under the EE Act. Actions undertaken in accordance with a prescribed Precinct Structure Plan (PSP) are exempt from the requirements of the EE Act.
Flora and Fauna Guarantee Act 1988	The FFG Act is the primary legislation dealing with biodiversity conservation and the sustainable use of native flora and fauna in Victoria. The provisions of the FFG Act bind all public agencies, public landowners and land managers. The Act contains lists of threatened flora and fauna species, 'protected flora species' and threatened vegetation communities, as well as action statements to protect the long-term viability of these values. The Act applies to the removal of listed threatened species and communities, as well as protected flora species. Protected flora species include any of the Asteraceae (Daisies) family, all orchids, ferns (excluding *Pteridium esculentum*) and Acacia species (excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon* and *Acacia paradoxa*); in addition to any taxa that forms a component of a listed FFG Act vegetation community. A species may be both listed and protected. Proponents are required to apply for an FFG Act permit to 'take' listed and/or protected flora species and listed vegetation communities in areas of public land (i.e. within road reserves). An FFG Act permit is generally not required for removal of listed and/or protected flora species and communities on private land. There are currently no requirements for proponents to apply for a permit under the FFG Act where a proposed activity requires the removal of habitat for a listed terrestrial fauna species. The Act does however regulate the removal, salvage, temporary holding, translocation, taking, trading and keeping of FFG Act-listed fish species, and as such, an FFG Act permit is required if listed fish species are likely to be affected by a proposed activity. Key ecological constraints within the study area associated with the FFG Act are likely to include threatened ecological communities (e.g. Grey Box - Buloke Grassy Woodland Community and Victorian Temperate Woodland Bird community) and species of flora and fauna. The majority of land within the study area is privately owned and therefore exempt from most provisions under the FFG Act including the requirement to obtain a permit for the removal or disturbance of listed/ protected plants, ecological communities and fish species. Any such action on public land affecting these values would require a permit from DELWP.

Relevant Legislation	Implications
Planning and Environment Act 1987	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 on a site of more than 0.4 hectares, unless an exemption clause under 52.17-6 of the Victorian Planning Schemes applies, or if the proposed clearing is in accordance with a Native Vegetation Precinct Plan (NVPP) (Clause 52.16) that has been incorporated into the Planning Scheme. Permitting requirements associated with the removal of native vegetation will be dependent on the future planning process.
Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines)	The assessment process for the clearing of vegetation follows the '*Guidelines for the removal, destruction or lopping of native vegetation*' (the Guidelines) (DELWP 2017). The '*Assessor's handbook: Applications to remove, destroy or lop native vegetation*' (Assessor's handbook) (DELWP 2018) provides clarification regarding the application of the Guidelines (DELWP 2017). Any permitted clearing of native vegetation within the study area would be offset in accordance with the Guidelines.
Catchment and Land Protection Act 1994	The *Catchment and Land Protection Act 1994* (CaLP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals. The Act also provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to: • Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner; • Protect water resources; • Conserve soil; • Eradicate regionally prohibited weeds; • Prevent the growth and spread of regionally controlled weeds; and, • Prevent the spread of, and as far as possible eradicate, established pest animals. A number of weeds listed as noxious under the CaLP Act are known occur throughout the study area (Section 3). Similarly, it is likely that the region is occupied by several pest fauna species listed under the Act. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species. To meet CaLP Act requirements listed noxious weeds and pests should be appropriately controlled during any development activity to minimise their spread and impact on ecological values within the study area.
Wildlife Act 1975 and Wildlife Regulations 2013	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.

Relevant Legislation	Implications
Water Act 1989	A 'works on waterways' permit is likely to be required from the Goulburn Broken CMA where any action impacts on waterways within the study area.

6 CONCLUSION

The Tatura Structure Plan area ('study area') has been identified as a significant growth area with the potential to support population growth. The structure plan will guide the future development of all land yet-to-be-rezoned for residential purposes and it will identify all infrastructure required to support the future development of the land.

The purpose of this Ecological Assessment report was to provide a high-level assessment of the ecological values within the study area to inform the early stage of the precinct planning process. Therefore, it is recommended that detailed ecological assessments be undertaken prior to the commencement of any development within the study area.

Desktop-based assessments and field surveys were undertaken to broadly assess the biodiversity value of the study area and inform early stage of the precinct planning process. The findings of the assessment confirmed that the majority (>90%) of the study area supports non-native vegetation and is highly disturbed. Despite its modified nature, the study area supports a diversity of natural assets (Section 3), which are subject to the natural and anthropogenic pressures commonly associated with developed and fringing landscapes. Given the potential for future development within the study area to intensify existing pressures and threaten the overall viability of retained ecological values (particularly scattered trees), a precinct-wide approach is required to ensure all known values are accounted for and that management responses are consistent and implemented on a landscape-scale.

Based on the findings of this Ecological Assessment Report, it is considered that the study area can accommodate the medium and longer term growth of Tatura whilst maintaining and enhancing the key ecological values present.

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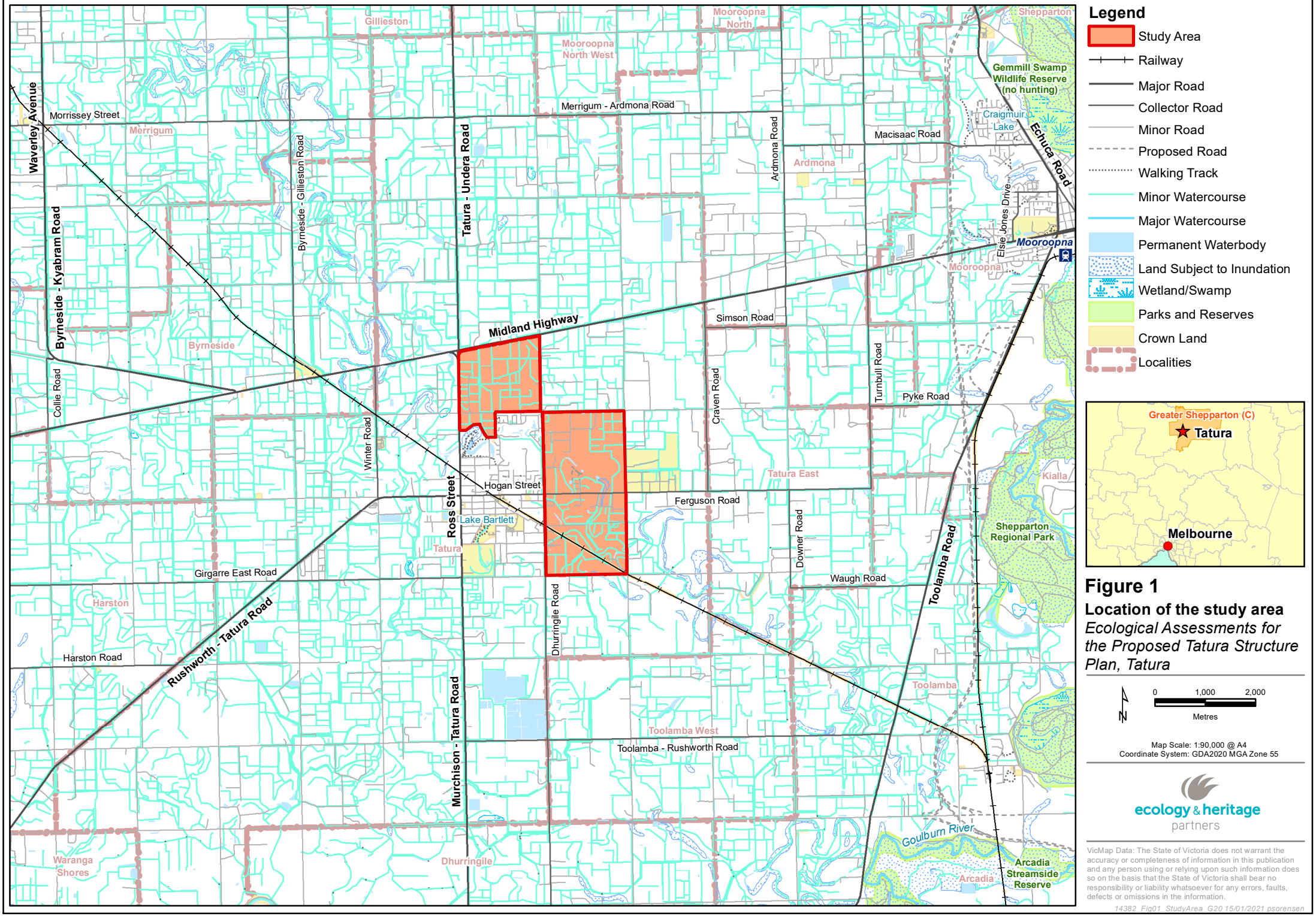


Figure 1

Location of the study area

Ecological Assessments for the Proposed Tatura Structure Plan, Tatura

0 1,000 2,000
Metres

Map Scale: 1:90,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners

14382_Fig01_StudyArea_G20 15/01/2021 psorensen

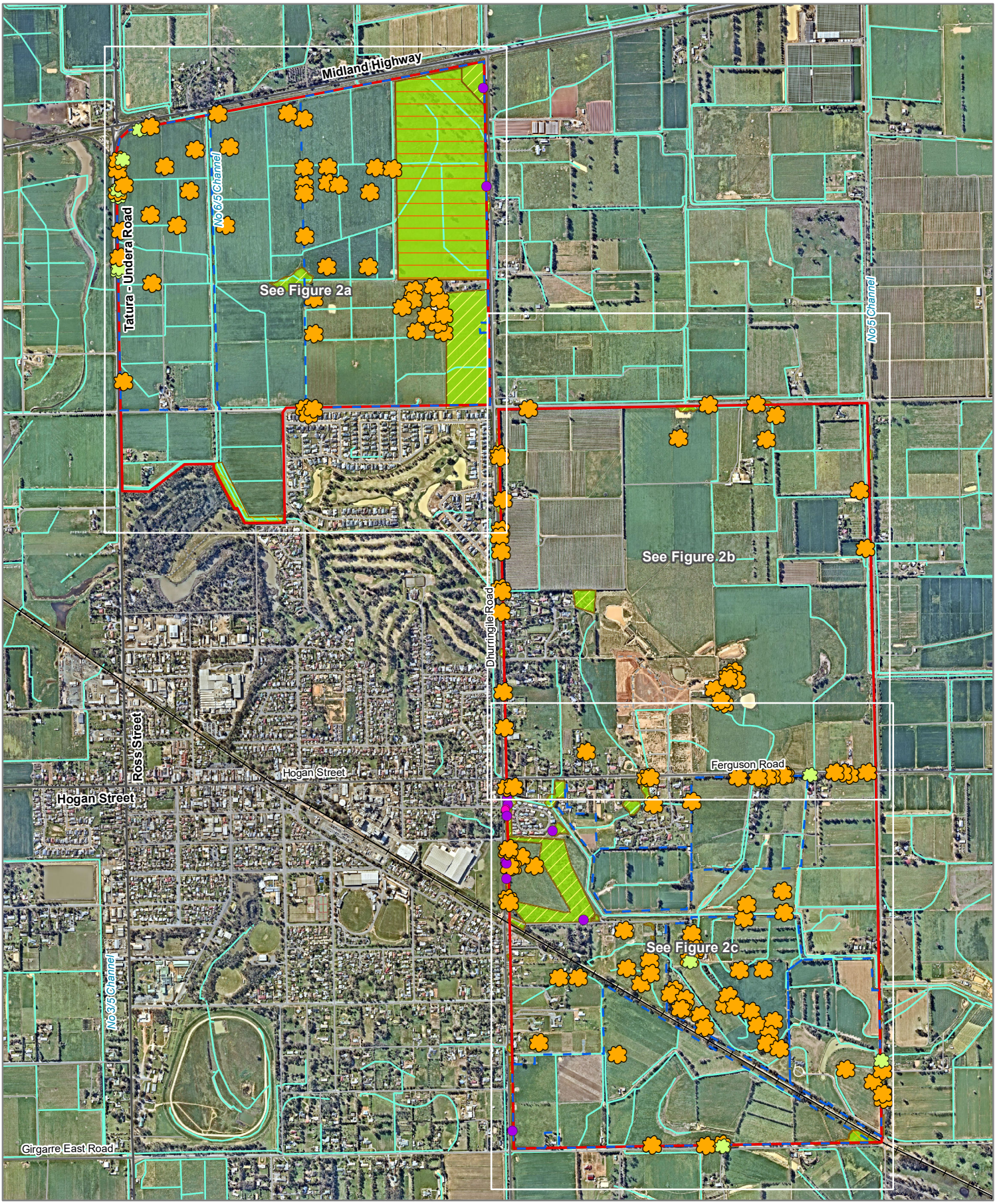


Figure 2 Overview

Ecological features

Ecological Assessments for the Proposed Tatura Structure Plan, Tatura

Legend

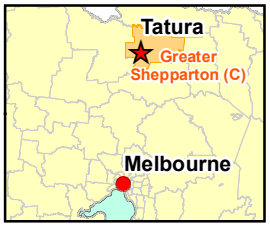
- Study Area
- Properties accessed
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Small Tree in patch

Vegetation quality

- High
- Moderate
- Low

Ecological Vegetation Class

- Plains Woodland



N

0 200 400

Metres

Map Scale: 1:22,000 @ A4
Coordinate System:
GDA2020 MGA Zone 55

14382_Fig02_EcolFeat_PMB_G20 18/03/2021 melsley

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Aerial source: Nearmap 2020

Figure 2a

Ecological features

Ecological Assessments for the Proposed Tatura Structure Plan, Tatura

Legend

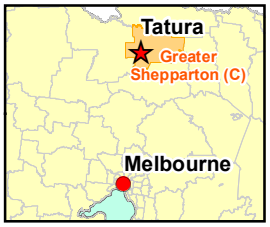
- Study Area
- Properties accessed
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch

Vegetation quality

- High
- Moderate
- Low

Ecological Vegetation Class

- Plains Woodland



N

0 80 160

Metres

Map Scale: 1:9,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

14382_Fig02_EcolFeat_PMB_G20 18/03/2021 melsley

ecology & heritage partners

Aerial source: Nearmap 2020

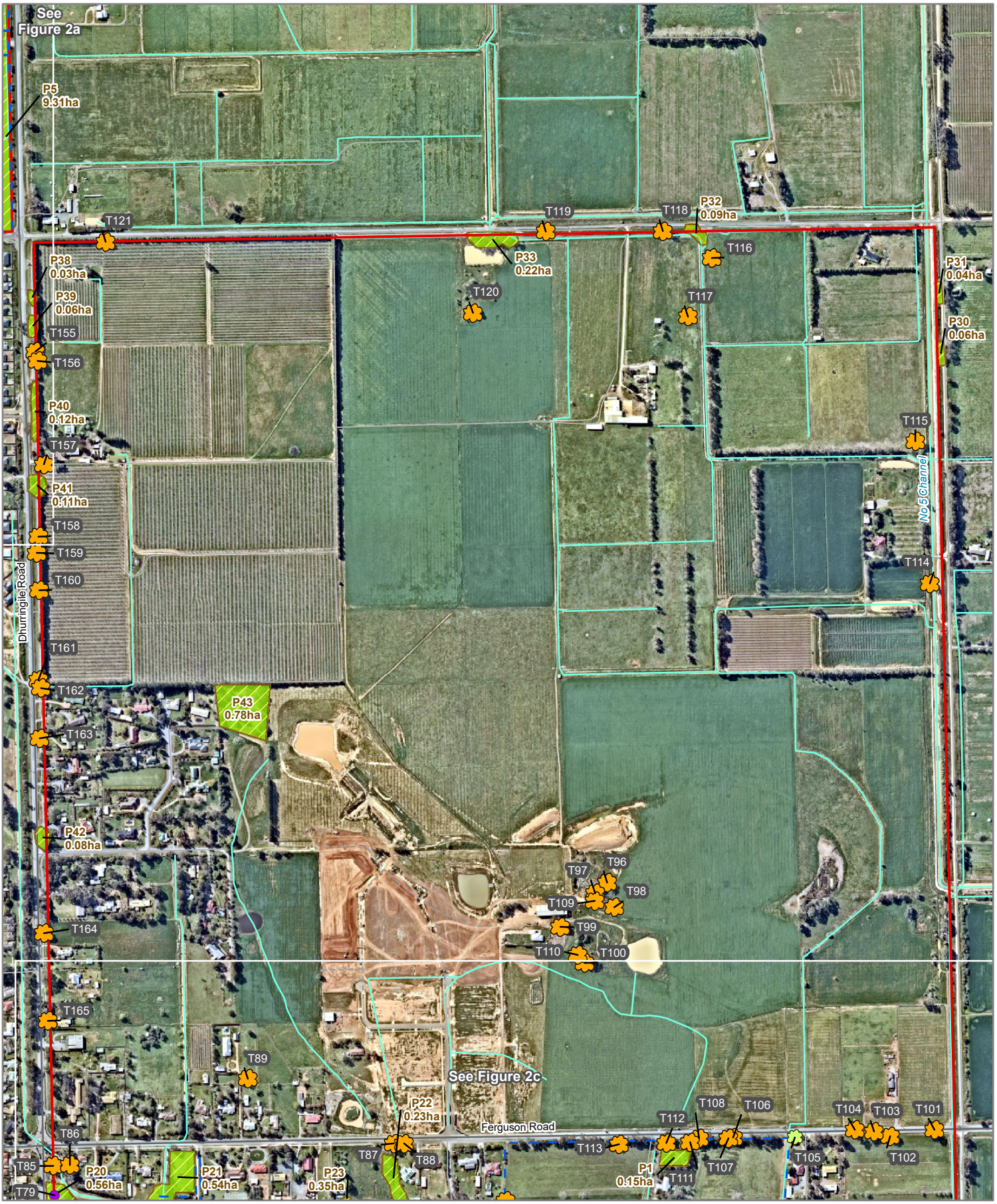


Figure 2b

Ecological features

Ecological Assessments for the Proposed Tatura Structure Plan, Tatura

Legend

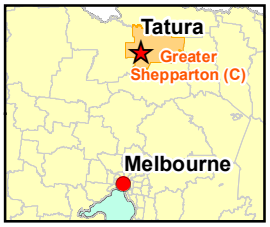
- Study Area
- Properties accessed
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch

Vegetation quality

- Moderate
- Low

Ecological Vegetation Class

- Plains Woodland



N

0 80 160

Metres

Map Scale: 1:9,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

14382_Fig02_EcolFeat_PMB_G20 18/03/2021 melsley

ecology & heritage partners

Aerial source: Nearmap 2020

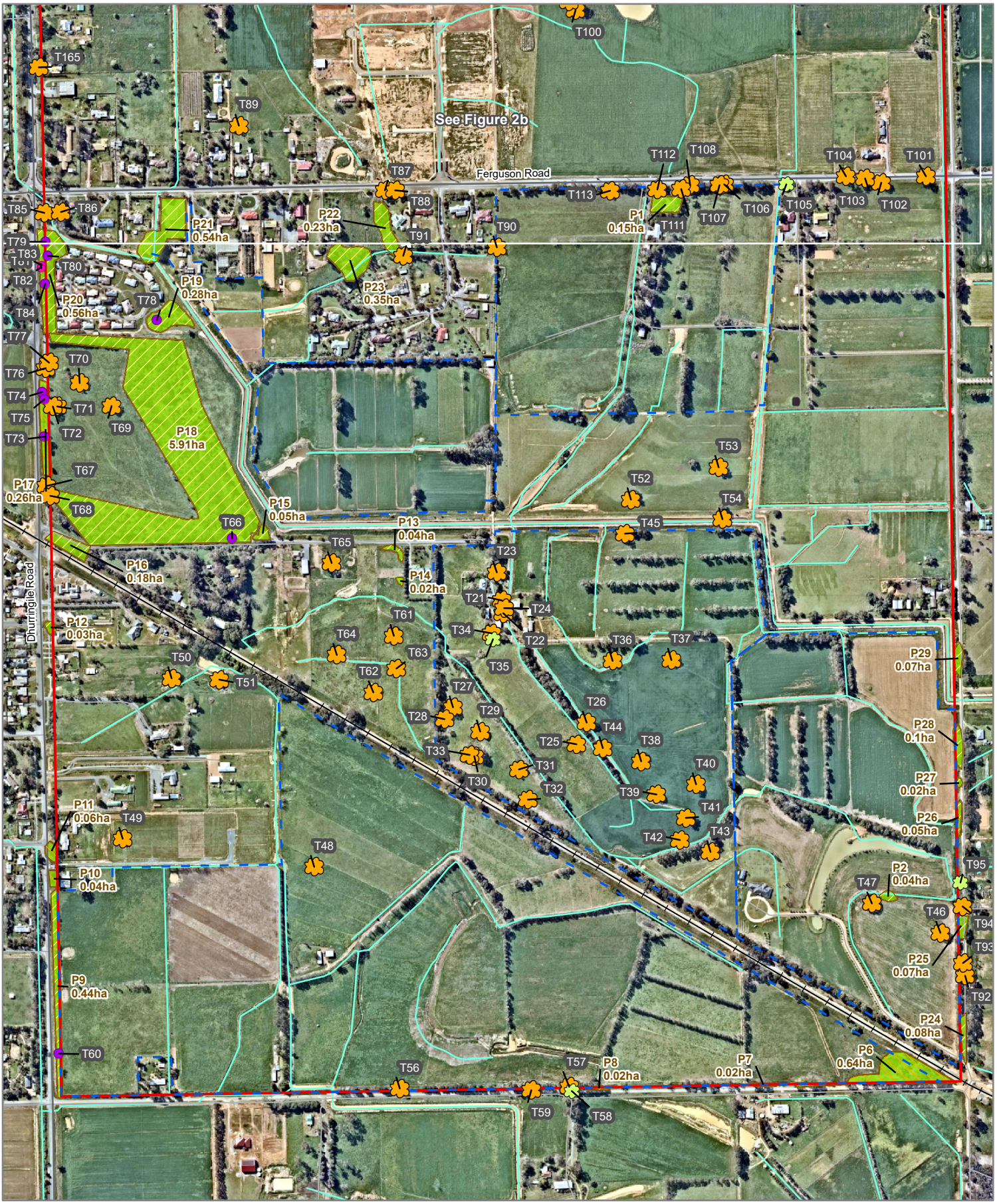


Figure 2c

Ecological features

Ecological Assessments for the Proposed Tatura Structure Plan, Tatura

Legend

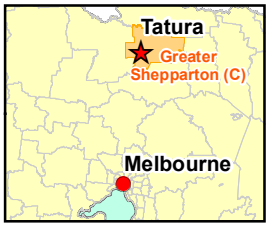
- Study Area
- Properties accessed
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Small Tree in patch

Vegetation quality

- Moderate
- Low

Ecological Vegetation Class

- Plains Woodland



N

0 80 160

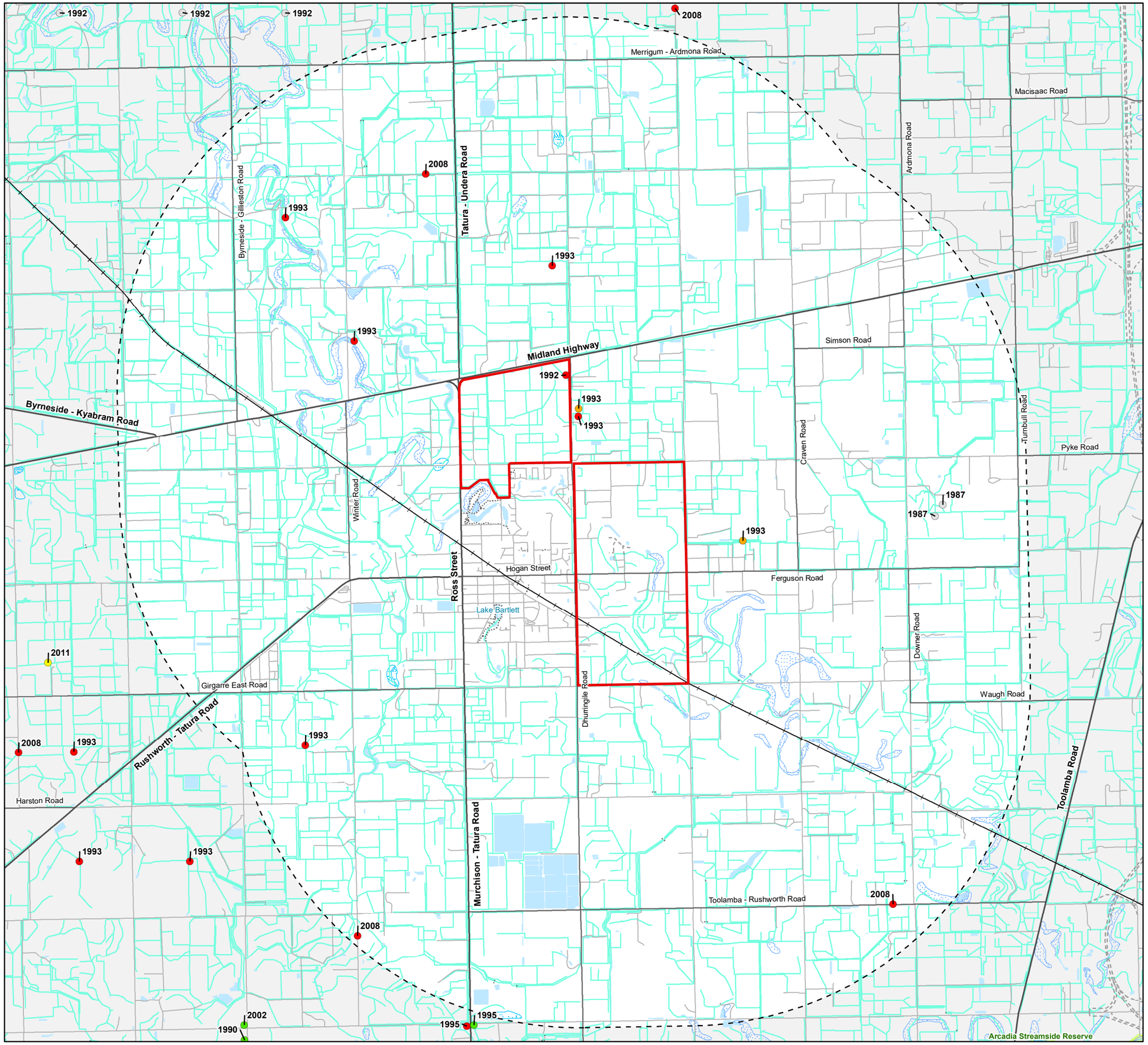
Metres

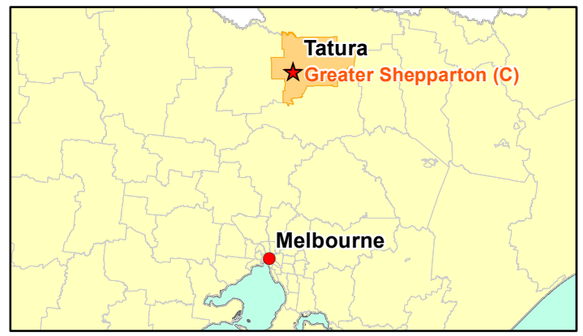
Map Scale: 1:9,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

14382_Fig02_EcolFeat_PMB_G20 18/03/2021 melsley

ecology & heritage partners

Aerial source: Nearmap 2020





Legend

Study Area

Significant flora

- Brown Beetle-grass
- Buloke
- Button Rush
- Late-flower Flax-lily
- Waterbush

Figure 3

Previously documented significant flora within 5km of the study area

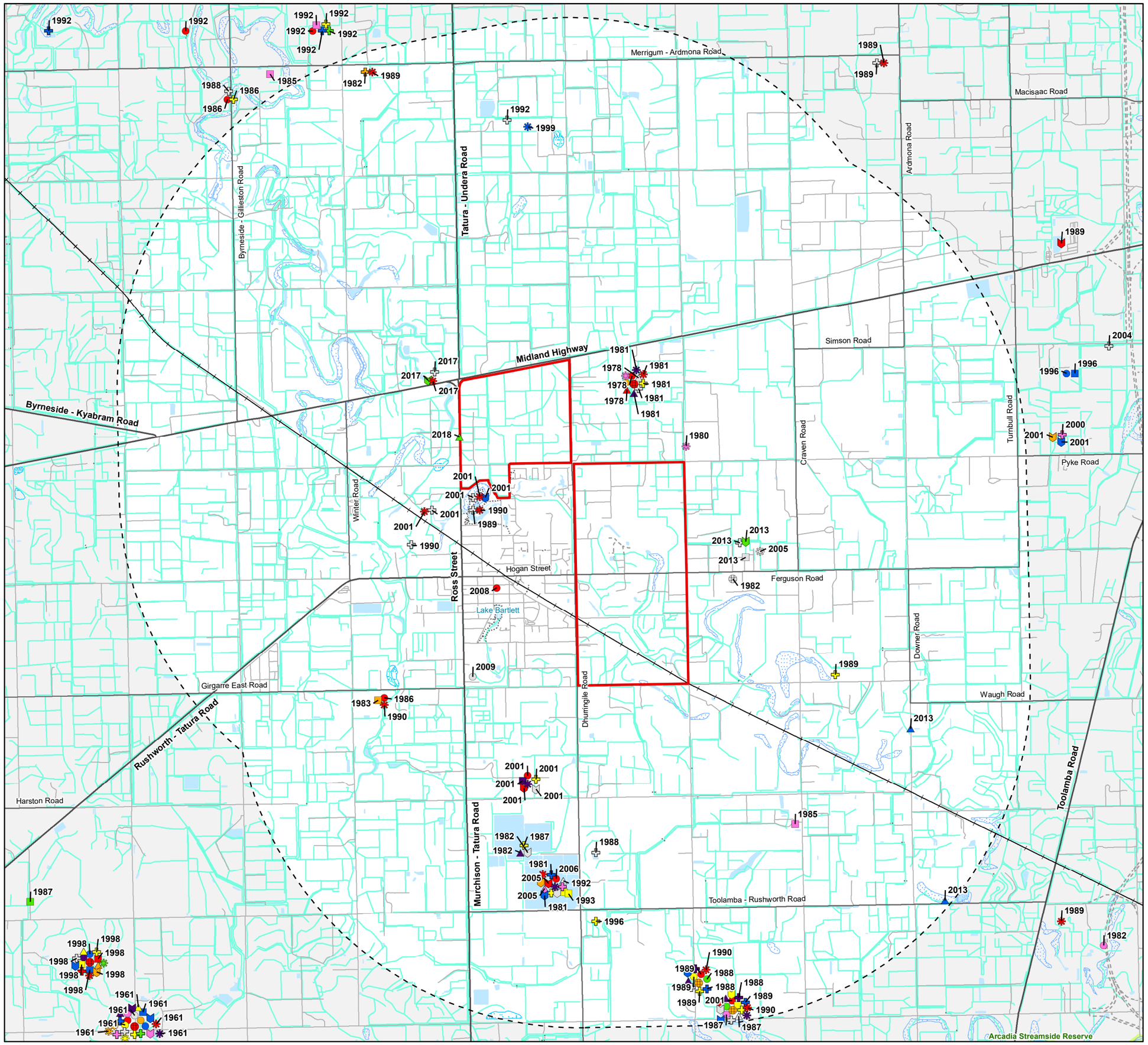
Ecological Assessments for the Proposed Tatura Structure Plan, Tatura

0 1 2

Kilometres

Map Scale: 1:53,000 @ A3
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners



Legend

- Study Area

Significant fauna

- Australasian Bittern
- Australasian Shoveler
- Australian Gull-billed Tern
- Australian Little Bittern
- Australian Painted-snipe
- Azure Kingfisher
- Baillon's Crake
- Barking Owl
- Black Falcon
- Black-eared Cuckoo
- Black-tailed Godwit
- Blue-billed Duck
- Brolga
- Brown Treecreeper
- Bush Stone-curlew
- Caspian Tern
- Common Greenshank
- Curlew Sandpiper
- Diamond Dove
- Diamond Firetail
- Eastern Great Egret
- Eastern Snake-necked Turtle
- Freckled Duck
- Glossy Ibis
- Great Egret
- Grey-crowned Babbler
- Growling Grass Frog
- Hardhead
- Hooded Robin
- Latham's Snipe
- Little Egret
- Long-toed Stint
- Marsh Sandpiper
- Musk Duck
- Nankeen Night Heron
- Pacific Golden Plover
- Pied Cormorant
- Plumed Egret
- Red-backed Kingfisher
- Regent Honeyeater
- Regent Parrot
- Royal Spoonbill
- Speckled Warbler
- Spotted Harrier
- Spotted Quail-thrush
- Square-tailed Kite
- Turquoise Parrot
- Whiskered Tern
- White-bellied Sea-Eagle
- White-throated Needletail
- Wood Sandpiper

Figure 4

Previously documented significant fauna within 5km of the study area

Ecological Assessments for the Proposed Tatura Structure Plan, Tatura

0 1 2

Kilometres

Map Scale: 1:53,000 @ A3
Coordinate System: GDA2020 MGA Zone 55

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APPENDIX 1. - FLORA

Appendix 1.1 - Flora Results

Legend:

L Listed as threatened under the FFG Act (DELWP 2019a);
I Protected under the FFG Act (DELWP 2019b);
e Listed as endangered in Victoria under the Advisory List of Rare or Threatened Plants in Victoria (DEPI 2014);
***** Listed as a noxious weed under the CaLP Act;
w Weed of National Significance;
****** Planted indigenous species in the study area;
+ Planted indigenous species that also occur in native vegetation in the study area;
Planted Victorian and non-Victorian species.

Table A1.1. Flora within the study area.

Scientific Name	Common Name	Notes
INDIGENOUS SPECIES		
Austrostipa spp.	Spear Grass	-
Bursaria spinosa	Sweet Bursaria	**
Chrysocephalum apiculatum s.l.	Common Everlasting	**
Clematis microphylla s.l.	Small-leaved Clematis	**
Dianella revoluta s.l.	Black-anther Flax-lily	+
Dodonaea viscosa	Sticky Hop-bush	**
Eucalyptus camaldulensis	River Red-gum	+
Eucalyptus leucoxylon	Yellow Gum	-
Eucalyptus melliodora	Yellow Box	-
Eucalyptus microcarpa	Grey Box	-
Rytidosperma spp.	Wallaby Grass	-
Xerochrysum viscosum	Shiny Everlasting	I **
NON-INDIGENOUS OR INTRODUCED SPECIES		
Acacia pendula	Weeping Myall	# L e
Avena barbata	Bearded Oat	-
Avena fatua	Wild Oat	-
Avena spp.	Oat	-
Cenchrus clandestinus	Kikuyu	-
Cichorium intybus	Chicory	-
Dactylis glomerata	Cocksfoot	-

Scientific Name	Common Name	Notes
Fraxinus spp.	Ash	#
Hordeum (monospecific)	Barley	-
Lactuca serriola	Prickly Lettuce	-
Lolium spp.	Rye Grass	-
Lycium ferocissimum	African Box-thorn	W *
Melia azedarach	White Cedar	#
Nassella neesiana	Chilean Needle-grass	W *
Opuntia spp.	Prickly pear	-
Phalaris aquatica	Toowoomba Canary-grass	-
Plantago lanceolata	Ribwort	-
Polygonum arenastrum	Wireweed	-
Schinus molle	Pepper Tree	#
Xanthium spinosum	Bathurst Burr	*

Appendix 1.2. - Tree Data

Table A1.2. Trees recorded within the study area.

Tree ID	Species	Common Name	Size Class	Scattered/Patch	Notes
1	*Eucalyptus microcarpa*	Grey Box	Small	Scattered	-
2	*Eucalyptus microcarpa*	Grey Box	Small	Scattered	-
3	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
4	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
5	*Eucalyptus microcarpa*	Grey Box	Small	Scattered	-
6	*Eucalyptus* sp.	Stag	Large	Scattered	-
7	*Eucalyptus* sp.	Stag	Small	Scattered	-
8	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
9	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
10	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	Hollows
11	*Eucalyptus microcarpa*	Grey Box	Small	Scattered	-
12	*Eucalyptus melliodora*	Yellow Box	Small	Scattered	-
13	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
14	*Eucalyptus* sp.	Stag	Large	Scattered	Hollows
15	*Eucalyptus* sp.	Stag	Large	Scattered	-
16	*Eucalyptus* sp.	Stag	Large	Scattered	-
17	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
18	*Eucalyptus* sp.	Stag	Large	Scattered	-
19	*Eucalyptus* sp.	Stag	Large	Scattered	-
20	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
21	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
22	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
23	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
24	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
25	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
26	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
27	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
28	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
29	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
30	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
31	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
32	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
33	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-

Tree ID	Species	Common Name	Size Class	Scattered/Patch	Notes
34	*Eucalyptus* sp.	Stag	Large	Scattered	-
35	*Eucalyptus microcarpa*	Grey Box	Small	Scattered	-
36	*Eucalyptus melliodora*	Yellow Box	Large	Scattered	Hollows
37	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	Hollows
38	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
39	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
40	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
41	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
42	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
43	*Eucalyptus* sp.	Stag	Large	Scattered	Hollows
44	*Eucalyptus* sp.	Stag	Large	Scattered	-
45	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
46	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
47	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
48	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
49	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
50	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
51	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
52	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
53	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
54	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
55	*Eucalyptus microcarpa*	Grey Box	Large	Patch	-
56	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
57	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
58	*Eucalyptus microcarpa*	Grey Box	Small	Scattered	-
59	*Eucalyptus* sp.	Stag	Large	Scattered	-
60	*Eucalyptus microcarpa*	Grey Box	Large	Patch	-
61	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
62	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
63	*Eucalyptus* sp.	Stag	Large	Scattered	-
64	*Eucalyptus* sp.	Stag	Large	Scattered	-
65	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
66	*Eucalyptus* sp.	Stag	Large	Patch	Hollows
67	*Eucalyptus* sp.	Stag	Large	Scattered	Hollows/bees
68	*Eucalyptus* sp.	Stag	Large	Scattered	Hollows
69	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
70	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-

Tree ID	Species	Common Name	Size Class	Scattered/Patch	Notes
71	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
72	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
73	*Eucalyptus microcarpa*	Grey Box	Large	Patch	-
74	*Eucalyptus microcarpa*	Grey Box	Large	Patch	-
75	*Eucalyptus microcarpa*	Grey Box	Large	Patch	-
76	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
77	*Eucalyptus* sp.	Stag	Large	Scattered	Hollows/bees
78	*Eucalyptus* sp.	Stag	Large	Patch	Hollows
79	*Eucalyptus melliodora*	Yellow Box	Large	Patch	-
80	*Eucalyptus melliodora*	Yellow Box	Large	Patch	Hollow/bees
81	*Eucalyptus melliodora*	Yellow Box	Small	Patch	-
82	*Eucalyptus melliodora*	Yellow Box	Small	Patch	-
83	*Eucalyptus melliodora*	Yellow Box	Small	Patch	-
84	*Eucalyptus microcarpa*	Grey Box	Large	Patch	Hollows/bees
85	*Eucalyptus camaldulensis*	River Red-gum	Large	Scattered	-
86	*Eucalyptus* sp.	Stag	Large	Scattered	-
87	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
88	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
89	*Eucalyptus melliodora*	Yellow Box	Large	Scattered	-
90	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
91	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
92	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
93	*Eucalyptus* sp.	Stag	Large	Scattered	-
94	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
95	*Eucalyptus melliodora*	Yellow Box	Small	Scattered	-
96	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
97	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
98	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
99	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
100	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
101	*Eucalyptus melliodora*	Yellow Box	Large	Scattered	-
102	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	Hollows/bees
103	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
104	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
105	*Eucalyptus microcarpa*	Grey Box	Small	Scattered	-
106	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
107	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-

Tree ID	Species	Common Name	Size Class	Scattered/Patch	Notes
108	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
109	*Eucalyptus* sp.	Stag	Large	Scattered	-
110	*Eucalyptus* sp.	Stag	Large	Scattered	-
111	*Eucalyptus melliodora*	Yellow Box	Large	Scattered	-
112	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
113	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
114	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
115	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
116	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
117	*Eucalyptus* sp.	Stag	Large	Scattered	-
118	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
119	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
120	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
121	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
122	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
123	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
124	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
125	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
126	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
127	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
128	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
129	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
130	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
131	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
132	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
133	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
134	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
135	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
136	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
137	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
138	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
139	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
140	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
141	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
142	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
143	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
144	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-

Tree ID	Species	Common Name	Size Class	Scattered/Patch	Notes
145	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
146	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
147	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
148	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
149	*Eucalyptus* sp.	Stag	Large	Patch	-
150	*Eucalyptus* sp.	Stag	Large	Scattered	-
151	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
152	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
153	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
154	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
155	*Eucalyptus* sp.	Stag	Large	Scattered	-
156	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
157	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
158	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
159	*Eucalyptus* sp.	Stag	Large	Scattered	-
160	*Eucalyptus camaldulensis*	River Red-gum	Large	Scattered	-
161	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
162	*Eucalyptus microcarpa*	Grey Box	Large	Scattered	-
163	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
164	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-
165	*Eucalyptus* sp.	Eucalypt	Large	Scattered	-

Appendix 1.3. - Patch Data

Table A1.3. Patches of native vegetation recorded within the study area.

Unique ID	Patch ID	EVC	Quality of Patch	Patch size (ha)
P1	PW2	Plains Woodland	Low	0.155
P2	PW1	Plains Woodland	Low	0.044
P3	PW1	Plains Woodland	High	34.587
P4	PW2	Plains Woodland	Low	1.271
P5	PW2	Plains Woodland	Low	9.306
P6	PW1	Plains Woodland	Moderate	0.641
P7	PW1	Plains Woodland	Moderate	0.020
P8	PW1	Plains Woodland	Low	0.021
P9	Reveg	Plains Woodland	Low	0.436
P10	PW1	Plains Woodland	Moderate	0.043
P11	PW1	Plains Woodland	Moderate	0.058
P12	PW1	Plains Woodland	Low	0.034
P13	PW2	Plains Woodland	Low	0.045
P14	PW2	Plains Woodland	Low	0.016
P15	PW1	Plains Woodland	Low	0.054
P16	PW1	Plains Woodland	Low	0.185
P17	Reveg	Plains Woodland	Moderate	0.262
P18	Reveg	Plains Woodland	Low	5.906
P19	Reveg	Plains Woodland	Low	0.279
P20	Reveg	Plains Woodland	Low	0.563
P21	PW1	Plains Woodland	Low	0.535
P22	PW1	Plains Woodland	Low	0.233
P23	PW1	Plains Woodland	Low	0.348
P24	PW1	Plains Woodland	Low	0.078
P25	PW1	Plains Woodland	Low	0.072
P26	PW1	Plains Woodland	Low	0.047
P27	PW1	Plains Woodland	Low	0.016
P28	PW1	Plains Woodland	Low	0.097
P29	PW1	Plains Woodland	Low	0.073
P30	PW1	Plains Woodland	Low	0.059
P31	PW1	Plains Woodland	Low	0.041
P32	PW1	Plains Woodland	Moderate	0.089
P33	PW1	Plains Woodland	Low	0.215
P34	PW1	Plains Woodland	Low	1.059

Unique ID	Patch ID	EVC	Quality of Patch	Patch size (ha)
P35	PW1	Plains Woodland	Low	0.100
P36	Reveg	Plains Woodland	Low	0.209
P37	PW1	Plains Woodland	Moderate	1.655
P38	PW1	Plains Woodland	Low	0.033
P39	PW1	Plains Woodland	Low	0.061
P40	PW1	Plains Woodland	Low	0.119
P41	PW1	Plains Woodland	Low	0.115
P42	PW1	Plains Woodland	Low	0.085
P43	PW1	Plains Woodland	Low	0.783

Appendix 1.4. - Significant Flora Species

Significant flora within 10 kilometres of the study area is provided in the Table A1.4.3 at the end of this section, with Tables A1.4.1 and A1.4.2 below providing the background context for the values in Table 1.4.3.

Table A1.3.1 Conservation status of each species for each Act/policy. The values in this table correspond to Columns 5 to 7 in Table A1.4.3.

EPBC (*Environment Protection and Biodiversity Conservation Act 1999*):		FFG (*Flora and Fauna Guarantee Act 1988*):		DELWP (Advisory List of Rare or Threatened Plants in Victoria [DEPI 2014]):	
EX	Extinct	L	Listed as threatened	x	Presumed extinct in Victoria
CR	Critically endangered	N	Nominated for listing as threatened	e	Endangered in Victoria
EN	Endangered	D	Delisted as threatened	v	Vulnerable in Victoria
VU	Vulnerable	I	Rejected for listing as threatened; taxon invalid	r	Rare in Victoria
#	Listed on the Protected Matters Search Tool	X	Rejected for listing as threatened; taxon ineligible	k	Poorly known in Victoria

Table A1.4.2 Likelihood of occurrence rankings: Habitat characteristics assessment of significant flora species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area to determine their likelihood of occurrence. The values in this table correspond to Column 8 in Table A1.4.3.

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 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.

Table A1.4.3 Significant flora recorded within 10 kilometres of the study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DELWP	Likelihood of occurrence in study area	Rationale for likelihood of occurrence
NATIONAL SIGNIFICANCE								
Amphibromus fluitans #	River Swamp Wallaby-grass	-	-	VU	-	-	4	Potential habitat, but very unlikely due to agricultural disturbance
Brachyscome muelleroides #	Mueller Daisy	-	-	VU	L	e	5	No suitable habitat
Glycine latrobeana #	Clover Glycine	-	-	VU	L	v	4	Potential habitat, but very unlikely due to agricultural disturbance and no previous records within 10km of the study area
Pimelea spinescens subsp. *spinescens #*	Spiny Rice-flower	-	-	CR	L	e	4	Potential habitat, but very unlikely due to agricultural disturbance and no previous records within 10km of the study area
Senecio psilocarpus #	Swamp Fireweed	-	-	VU	-	v	5	Outside distribution range
Sclerolaena napiformis #	Turnip Copperburr	-	-	EN	L	e	4	Potential habitat, but very unlikely due to agricultural disturbance
Swainsona murrayana #	Slender Darling-pea	-	-	VU	L	e	4	Potential habitat, but very unlikely due to agricultural disturbance and no previous records within 10km of the study area
STATE SIGNIFICANCE								
Acacia howittii	Sticky Wattle	1	2014	-	-	r	5	Outside distribution range

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DELWP	Likelihood of occurrence in study area	Rationale for likelihood of occurrence
Allocasuarina luehmannii	Buloke	35	2008	-	L	e	2	Study area contains suitable habitat
Alternanthera sp. 1 (Plains)	Plains Joyweed	3	2011	-	-	k	5	Potential habitat, but very unlikely due to agricultural disturbance
Anthosachne kingiana subsp. *multiflora*	Short-awned Wheat-grass	2	2011	-	-	k	4	Potential habitat, but very unlikely due to agricultural disturbance
Cardamine moirensis	Riverina Bitter-cress	2	2014	-	-	r	5	Potential habitat, but very unlikely due to agricultural disturbance
Cullen parvum	Small Scurf-pea	1	1995	-	L	e	4	Potential habitat, but very unlikely due to agricultural disturbance
Dianella tarda	Late-flower Flax-lily	2	2011	-	-	v	5	Poor and very limited habitat within the study area.
Diplachne fusca subsp. *fusca*	Brown Beetle-grass	6	1992	-	-	r	4	No suitable habitat
Eleocharis pallens	Pale Spike-sedge	1	2011	-	-	k	5	No suitable habitat
Fimbristylis velata	Veiled Fringe-sedge	1	2000	-	-	r	5	Poor and very limited habitat within the study area.
Geranium sp. 6	Delicate Crane's-bill	1	2011	-	-	v	5	No suitable habitat
Cyperus leptocarpus	Button Rush	5	1993	-	-	v	4	No suitable habitat
Myoporum montanum	Waterbush	4	2002	-	-	r	4	Poor and very limited habitat within the study area.

Data Sources: Victorian Biodiversity Atlas (DELWP 2020); Protected Matters Search Tool (DAWE 2021)

APPENDIX 2 - FAUNA

Appendix 2.1. - Significant Fauna Species

Significant fauna within 10 kilometres of the study area is provided in the Table A2.1.3 at the end of this section, with Tables A2.1.1 and A2.1.2 below providing the background context for the values in Table 2.1.3.

Table A2.1.1 Conservation status of each species for each Act/policy. The values in this table correspond to Columns 5 to 8 in Table A2.1.3.

EPBC (*Environment Protection and Biodiversity Conservation Act 1999*):	FFG (*Flora and Fauna Guarantee Act 1988*):
EX Extinct	L Listed as threatened
CR Critically endangered	N Nominated for listing as threatened
EN Endangered	D Delisted as threatened
VU Vulnerable	I Rejected for listing as threatened; taxon invalid or ineligible
CD Conservation dependent	
# Listed on the Protected Matters Search Tool	
DELWP (Advisory List of Threatened Vertebrate Fauna in Victoria [DSE 2013]; Advisory List of Threatened Invertebrate Fauna in Victoria [DSE 2009]):	NAP (National Action Plans for several Australian species [Cogger *et al.* 1993; Duncan *et al.* 1999; Garnet *et al.* 2011; Sands and New 2002; Tyler 1997: Woinarski *et al.* 2014)):
EX Extinct in Victoria	EX Extinct
RX Regionally extinct in Victoria	CR Critically endangered
EW Extinct in the wild in Victoria	EN Endangered
CR Critically endangered in Victoria	VU Vulnerable
EN Endangered in Victoria	NT Near threatened
VU Vulnerable in Victoria	CD Conservation dependent
NT Near threatened in Victoria	DD Data deficient (insufficient or poorly known)
DD Data deficient (insufficient or poorly known)	LC Least concern

Table A2.1.2. Likelihood of occurrence rankings: Habitat characteristics assessment of significant fauna species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area to determine their likelihood of occurrence. The values in this table correspond to Column 9 in Table A2.1.3.

1	High Likelihood	• 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	• 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	• 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	• 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.

Table A2.1.3. Significant fauna within 10 kilometres of the study area.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
NATIONAL SIGNIFICANCE								
Grey-headed Flying-fox	*Pteropus poliocephalus*	-	1	VU	L	VU	4	May visit the study area en route to more suitable habitat.
Australasian Bittern	*Botaurus poiciloptilus*	-	2	EN	L	EN	4	No suitable habitat.
Plains-wanderer	*Pedionomus torquatus*	#	1	CR	L	CR	4	No suitable habitat.
Australian Painted Snipe	*Rostratula australis*	1988	3	VU	L	CR	4	No suitable habitat.
Eastern Curlew	*Numenius madagascariensis*	#	-	CR	-	VU	4	No suitable habitat
Curlew Sandpiper	*Calidris ferruginea*	1978	1	CR	-	EN	4	No suitable habitat.
Superb Parrot	*Polytelis swainsonii*	#	-	VU	L	EN	4	No suitable habitat, edge of species range.
Swift Parrot	*Lathamus discolor*	1982	1	CR	L	EN	3	May visit the study area occasionally or on an opportunistic basis.
Regent Honeyeater	*Anthochaera phrygia*	1958	1	CR	L	CR	4	Outside species range.
Painted Honeyeater	*Grantiella picta*	2013	2	VU	L	VU	3	Some suitable habitat; may visit the area occasionally or opportunistically.
Grey Falcon	*Falco hypoleucos*	#	-	VU	L	EN	3	May visit the study area occasionally or on an opportunistic basis.
Growling Grass Frog	*Litoria raniformis*	1788	1	VU	L	EN	3	Some suitable habitat but no recent records in the area.
Flat-headed Galaxias	*Galaxias rostratus*	1980	2	CR	-	VU	4	No suitable habitat.
Bluenose Cod (Trout Cod)	*Maccullochella macquariensis*	2015	3	EN	L	CR	4	No suitable habitat.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
Murray Cod	*Maccullochella peelii*	2015	13	VU	L	VU	4	No suitable habitat.
Macquarie Perch	*Macquaria australasica*	#	-	EN	L	EN	4	No suitable habitat, outside species range.
Golden Sun Moth	*Synemon plana*	#	-	CR	L	CR	4	Potential presence within the high-quality Plains Woodland remnant within the study area. However, the nearest documented records of the species near Nagambie (several kilometres to the south west of the study area). However, there are no locally confirms records and it is outside of the species distributional range based on DEWHA (2008)
STATE SIGNIFICANCE								
Brush-tailed Phascogale	*Phascogale tapoatafa*	1995	1	-	L	VU	4	No suitable habitat
Squirrel Glider	*Petaurus norfolcensis*	2010	8	-	L	EN	4	Low quality habitat in the form of Plains Woodland. An extant population is not likely to occur within the study area and the nearest confirmed records are to the east of the study area along the Goulburn River.
Musk Duck	*Biziura lobata*	2005	37	-	-	VU	4	No suitable habitat. May fly over en route to more suitable habitat.
Freckled Duck	*Stictonetta naevosa*	2005	10	-	L	EN	3	May visit the study area en route to more suitable habitat.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
Hardhead	*Aythya australis*	2006	64	-	-	VU	4	No suitable habitat. May fly over en route to more suitable habitat.
Blue-billed Duck	*Oxyura australis*	2001	12	-	L	EN	4	No suitable habitat. May fly over en route to more suitable habitat.
Diamond Dove	*Geopelia cuneata*	1991	1	-	L	NT	4	No suitable habitat.
White-throated Needletail	*Hirundapus caudacutus*	1991	4	-	-	VU	3	May visit the study area occasionally or on an opportunistic basis.
Square-tailed Kite	*Lophoictinia isura*	1999	1	-	L	VU	4	No suitable habitat. May fly over en route to more suitable habitat.
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	1982	1	-	L	VU	4	No suitable habitat.
Black Falcon	*Falco subniger*	2013	1	-	L	VU	3	May visit the study area occasionally or on an opportunistic basis.
Bush Stone-curlew	*Burhinus grallarius*	1993	8	-	L	EN	3	Potential habitat, although very unlikely due to agricultural disturbance.
Pacific Golden Plover	*Pluvialis fulva*	1987	2	-	-	VU	4	Outside of species range; no suitable habitat.
Black-tailed Godwit	*Limosa limosa*	1983	1	-	-	VU	3	No suitable habitat. May fly over en route to more suitable habitat.
Common Greenshank	*Tringa nebularia*	1992	3	-	-	VU	3	No suitable habitat. May fly over en route to more suitable habitat.
Marsh Sandpiper	*Tringa stagnatilis*	2001	5	-	-	VU	3	No suitable habitat. May fly over en route to more suitable habitat.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
Wood Sandpiper	*Tringa glareola*	1989	10	-	-	VU	3	No suitable habitat. May fly over en route to more suitable habitat.
Caspian Tern	*Hydroprogne caspia*	2001	1	-	L	NT	3	No suitable habitat. May fly over en route to more suitable habitat.
Turquoise Parrot	*Neophema pulchella*	1980	2	-	L	NT	3	May visit the study area occasionally or on an opportunistic basis.
Powerful Owl	*Ninox strenua*	2010	1	-	L	VU	4	No suitable habitat.
Diamond Firetail	*Stagonopleura guttata*	1991	2	-	L	NT	4	Potential habitat although unlikely due to agricultural disturbance.
Murray Short-necked Turtle	*Emydura macquarii*	1982	1	-	-	VU	4	Outside of species range.
Lace Goanna	*Varanus varius*	1985	1	-	-	EN	4	No suitable habitat.
Giant Bullfrog	*Limnodynastes interioris*	2002	1	-	L	CR	4	Outside of species range, no suitable habitat.
Crimson-spotted Rainbowfish	*Melanotaenia fluviatilis*	2015	24	-	L	VU	4	Outside of species range, no suitable habitat.
Silver Perch	*Bidyanus bidyanus*	2015	5	-	L	VU	4	Outside of species range, no suitable habitat.
REGIONAL SIGNIFICANCE								
Pied Cormorant	*Phalacrocorax varius*	2017	2	-	-	NT	4	No suitable habitat.
Glossy Ibis	*Plegadis falcinellus*	1993	9	-	-	NT	4	No suitable habitat.
Royal Spoonbill	*Platalea regia*	2017	39	-	-	NT	3	May pass through study area en route to more suitable habitat.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
Spotted Harrier	*Circus assimilis*	1958	1	-	-	NT	3	Some suitable habitat, but on edge of species range.
Latham's Snipe	*Gallinago hardwickii*	2001	13	-	-	NT	2	Likely to visit the study area seasonally. Recent records nearby.
Long-toed Stint	*Calidris subminuta*	1989	3	-	-	NT	3	May visit the study area occasionally or on an opportunistic basis.
Black-eared Cuckoo	*Chrysococcyx osculans*	1991	1	-	-	NT	3	No suitable habitat. Records are also not recent.
Spotted Quail-thrush	*Cinclosoma punctatum*	1991	1	-	-	NT	3	On edge of species range, no suitable habitat.
Golden Perch	*Macquaria ambigua*	2015	19	-	-	NT	4	Outside of species range.