



Strategic Biodiversity Assessment
Plan Harcourt (Amendment C94malx)

Stage 2
April 2024

1	Introduction	4
1.1	Background	4
1.2	Proposed Amendments	5
2	Stage 1 Biodiversity Assessment	6
2.1	Potential High Value Biodiversity	6
2.2	Proposed Growth Areas	8
2.3	Stage 1 Findings	9
3	Stage 2 Biodiversity Assessment	11
3.1	Engagement and Consultation	11
3.2	Priority Fieldwork Areas	12
4	Assessment Methods	14
4.1	Habitat Hectare Assessments	14
4.2	Threatened Ecological Communities	15
4.3	Threatened Species Habitat	17
5	Results	18
5.1	Native Vegetation Assessments	18
5.1.1	Habitat Hectare Assessments	18
5.1.2	Vegetation Quality Assessments	26
5.2	Habitat Corridors	33
5.3	Threatened Communities	33
5.3.1	FFG Communities	33
5.3.2	EPBC Communities	35
5.4	Threatened Species Habitat	37
6	Fauna Surveys	40
6.1	Golden Sun Moth	40
6.2	Brown Toadlet	43
7	Results Summary and Planning Context	44
7.1	High Value Biodiversity Assets Summary	44
7.2	The Amendment	46
8	Recommendations	48
8.1	Environmental Significance Overlay	48
8.1.1	Schedule 5 (ESO5)	48
8.1.2	Schedule 8 (ESO8)	49

8.2	Vegetation Protection Overlay	49
8.2.1	Schedule 3 (VPO3)	49
8.2.2	Schedule 4 (VPO4)	50
8.3	Rural Conservation Zone	51
8.4	Township Boundary	52
8.5	Other Recommendations	53
9	References	55
Appendix 1 – Maps and Plans		57
	Map 1. The Proposed Amendment	58
	Map 2A Vegetation Assessments (North)	59
	Map 2B Vegetation Assessments (South)	60
	Map 3 – Habitat Corridors and Fauna Surveys	61
	Map 4 – Brush-tailed Phascogale Records	62
	Map 5 – Recommended Planning Controls (North)	63
	Map 6 – Recommended Planning Controls (South)	64
Appendix 2 – Flora List		65

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1 Introduction

Ranges Environmental Consulting have been engaged by *Mount Alexander Shire Council* to undertake Stage 2 of the Strategic Biodiversity Assessment in relation to a proposed planning scheme amendment (C94malx) herein referred to as 'the amendment'. This document aims to outline the results of the Stage 1 Strategic Biodiversity Assessment undertaken by *Jacobs Group* (June 2023), communicate results of fieldwork conducted by *Ranges Environmental Consulting*, and propose planning scheme controls commensurate to the value of the identified biodiversity assets.

1.1 Background

In response to the anticipated population growth and future development of the township of Harcourt, Mount Alexander Shire Council prepared and adopted Plan Harcourt (2020). The plan seeks to ensure growth and development of Harcourt is carefully managed to promote local character, recognise and protect productive agricultural land and operations, ensure adequate land supply and infrastructure, and protect natural and cultural features of the town, while allowing for increased residential settlement where appropriate.

In order to implement the land use recommendations of Plan Harcourt into the planning scheme, Mount Alexander Planning Scheme Amendment C94malx (the Amendment) was proposed. Council prepared and adopted Plan Harcourt (2020) to guide future planning and development of the township of Harcourt.

Following public exhibition of the Amendment, a subsequent panel hearing (September 2022) and report (November 2022) offered a series of conclusions in relation to biodiversity including:

- Habitat and wildlife corridors have not been adequately identified and are not adequately protected
- A strategic level biodiversity assessment is required across the whole study area before the Amendment proceeds
- A strategic level biodiversity assessment is required to ensure proposed planning provisions adequately consider biodiversity protection
- It is premature to proceed with the Amendment in the absence of a strategic level biodiversity assessment

The Panel outlined that the strategic biodiversity assessment, in the context of relevant legislative, policy and regulatory requirements will:

- Establish biodiversity objectives
- Identify high value biodiversity assets (ecosystems and species) for priority protection
- Identify and make recommendations to establish strategic habitat connections
- Identify and make recommendations to manage threats
- Recommend appropriate planning controls commensurate with the value of the asset and its contribution to ecosystem health.

1.2 Proposed Amendments

In relation to biodiversity considerations, the Amendment proposes to:

- Extend and/or refine the Township Boundary with a clearly defined interface between residential and agricultural land
- Rezone the majority of land in the Township Zone to the Neighbourhood Residential Zone Schedule 1 within the defined Township Boundary
- Rezone land in Growth Areas A and B from Farming Zone to Neighbourhood Residential Zone Schedule 1 and apply design requirements through the Development Plan Overlay Schedule 12
- Identify land for future town expansion (Area C and Area D) as per the updated Harcourt Land Use Framework Plan
- Make other minor and consequential changes to the Mount Alexander Planning Scheme

There are other minor rezonings proposed within the town centre (e.g. rezoning from Township Zone to Commercial Zone, rezoning Road Categories) that are not pertinent to biodiversity objectives.

2 Stage 1 Biodiversity Assessment

Following the recommendations from the Panel Report of November 2022, *Jacobs Group* were engaged to undertake the first stage of a strategic biodiversity assessment for the Harcourt township to guide Council on planning for biodiversity protection in the implementation of Amendment C94malx.

Stage 1 of the strategic biodiversity assessment focussed on a review of the background documents and desktop analysis of the likely high value biodiversity assets in the town of Harcourt. Stakeholder consultation and brief site assessments were also conducted to inform findings. No detailed flora and fauna assessments were undertaken for this study.

2.1 Potential High Value Biodiversity

Areas of potential high value biodiversity in the study area based on preliminary assessments were determined as defined by *Planning for Biodiversity* (DELWP 2017) and are listed in Table 1.

Table 1. High value biodiversity areas in context of *Planning for Biodiversity* (DELWP 2017)

High biodiversity value - <i>Planning for Biodiversity</i> (DELWP 2017)	Potential examples within the study area
Larger, well-connected areas of native vegetation	Woodland and forest areas in the south of the study area Market Street-Bagshaw Street woodland
Areas with higher strategic biodiversity value scores	<ul style="list-style-type: none"> • The northern portions of Barkers Creek • Vegetated areas in the central south • Along the railway line and west to the Calder Freeway • Some areas of the north-east.
Areas that are highly localised habitat for rare or threatened species, particularly if they are areas of highly localised habitat for multiple rare or threatened species	<ul style="list-style-type: none"> • Areas that support or potentially support threatened flora including: <ul style="list-style-type: none"> – along the railway line – areas of intact groundstorey in the south, e.g. where Castlemaine Spider-Orchid known to occur – Market Street-Bagshaw Street woodland – road reserves and other areas in the north-east supporting threatened Flax-lilies. • Habitat for Golden Sun Moth, potentially including areas of native grassy groundstorey: <ul style="list-style-type: none"> – along the railway line – nearby the railway line (potentially including some portions of Growth Area D) – areas in the north-east (potentially including some parts of Growth Area C)

High biodiversity value - *Planning for Biodiversity* (DELWP 2017) Potential examples within the study area

	<ul style="list-style-type: none"> Habitat for Brown Toadlet: drainage lines and depressions across the study area 								
<p>Important areas of habitat within dispersed habitats for rare or threatened species or areas of habitat for many dispersed rare or threatened species</p>	<ul style="list-style-type: none"> Potential nesting sites for Barking Owl and Powerful Owl such as large old trees along watercourses Potential nesting sites for woodland birds such as tree hollows for Brown Treecreeper Potential denning sites (hollows in large old trees) for Brush-tailed Phascogale 								
<p>Native vegetation in good condition (i.e. with higher condition scores)</p>	<ul style="list-style-type: none"> Areas in south of the study area (e.g. Harcourt Recreation Reserve Bushland and nearby) Areas along the railway line Potentially Market Street-Bagshaw Street woodland 								
<p>Waterways and sensitive wetlands and coastal areas</p>	<ul style="list-style-type: none"> Barkers Creek Picnic Gully Creek Unnamed watercourses: <ul style="list-style-type: none"> along Blackjack Road between Calder Freeway and Symes Road Mills Road/Harmony Way to Barkers Creek Drainage lines and depressions through north-east of the study area 								
<p>Significant roadsides and wildlife corridors</p>	<ul style="list-style-type: none"> Waterways Numerous roadsides including: <table border="0" data-bbox="750 1388 1482 1624"> <tr> <td>– Symes Road/Railway line</td> <td>– Leafy Lane</td> </tr> <tr> <td>– Harmony Way</td> <td>– Douglas Lane</td> </tr> <tr> <td>– Eagles Road</td> <td>– Craigie Street</td> </tr> <tr> <td>– Elys Lane</td> <td>– Mills Road</td> </tr> </table> 	– Symes Road/Railway line	– Leafy Lane	– Harmony Way	– Douglas Lane	– Eagles Road	– Craigie Street	– Elys Lane	– Mills Road
– Symes Road/Railway line	– Leafy Lane								
– Harmony Way	– Douglas Lane								
– Eagles Road	– Craigie Street								
– Elys Lane	– Mills Road								

2.2 Proposed Growth Areas

Four Key Growth Areas are proposed under the Amendment and potential biodiversity values were identified during Stage 1 within these areas as outlined in Table 2. A further 2 properties were identified during the Panel process for potential township expansion and have been included in the table.

Table 2. Growth areas and potential biodiversity value as identified by Stage 1

Growth Area	Proposal	Biodiversity Values ¹
Growth Area A	To rezone ~10 hectares from Farming Zone to Neighbourhood Residential Zone Schedule 1 and apply specific design requirements through the Development Plan Overlay – Schedule 12 (DPO12).	Remnant canopy trees in association with Picnic Gully Creek including large River Red-gums Significant Trees within Craigie Street Road Reserve and sites under HO932
Growth Area B	To rezone ~10 hectares from Farming Zone to Neighbourhood Residential Zone Schedule 1 and apply specific design requirements through the Development Plan Overlay – Schedule 12 (DPO12).	Limited although Leafy Lane and Shady Lane support Grassy Woodland remnant roadside vegetation. Potential biodiversity values in association with a drainage line and large dam.
Growth Area C	Identified for town expansion to support future residential growth. All lots are currently zoned Farming Zone (FZ)	Potential for high biodiversity values including: <ul style="list-style-type: none"> – Remnants of Grassy Woodland potentially meeting the condition threshold of an EPBC Act threatened ecological community – Remnants of endangered groundwater dependent ecosystems (Creekline Grassy Woodland EVC and Red Gum Swamp EVC) – Significant connectivity of flora and fauna habitat in association with Barkers Creek (east of Eagles Road) – Potential habitat for a range of threatened woodland birds and Brush-tailed Phascogale – Potential habitat and occurrence of the EPBC Act listed Golden Sun Moth

¹ Identified prior to detailed field assessments

Growth Area	Proposal	Biodiversity Values ¹
Growth Area D	Identified for town expansion to support future residential growth. All lots are currently zoned Farming Zone (FZ)	Substantial areas of introduced pasture with minimal native vegetation or significant fauna habitat with the possible exceptions of: <ul style="list-style-type: none"> – Potential stands of significant trees in paddocks or surrounding residential estates – Potential habitat and occurrence of the EPBC Act listed Golden Sun Moth
27 Craigie Street	Additional parcel identified for town expansion as recommended during the panel hearing. Currently zoned Farming Zone (FZ)	Substantial areas of introduced pasture with minimal native vegetation or significant fauna habitat with the exception of: <ul style="list-style-type: none"> – Remnant canopy and riparian corridors of Picnic Gully Creek and a connected stand of trees along the eastern boundary – Road reserve vegetation on the southern boundary along Market Street
1 Poplar Drive	Additional parcel identified for town expansion as recommended during the panel hearing. Currently zoned Farming Zone (FZ)	Minimal biodiversity values given the previous land use as an Orchard, although some remnant native trees may be present.

2.3 Stage 1 Findings

The Stage 1 Report by Jacobs concluded that:

- Proposed amendments to the town centre and existing residential areas are unlikely to result in increased risk to ecological values however additional provisions should be considered to manage biodiversity values that may be at risk from new development
- Rezoning of proposed new residential areas (Growth Areas A and B) is consistent with directing development away from higher value areas, some revision of proposed ordinance is suggested, including consideration of additional planning provisions
- Future town expansion areas 27 Craigie Street, 1 Poplar Drive and most of Area D could likely be developed with little impact to ecological values.
- Growth Area D has substantial areas without native vegetation and lower ecological values, however further assessment is necessary to determine the extent of scattered trees and identify if potential habitat is present for the EPBC Act listed Golden Sun Moth.
- In Growth Area C there is a considerable amount of native vegetation that could be impacted and fragmented by future residential development and there is likely a significant amount of higher value biodiversity areas that should be protected from development, including:

- remnants of Grassy Woodland are potentially consistent with the EPBC Act threatened ecological community White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, further field assessment is required to determine if these remnants meet condition thresholds to qualify for protection under the EPBC Act
 - remnants of endangered EVCs (Creekline Grassy Woodland and Red Gum Swamp) which are also groundwater dependent ecosystems
 - potential habitat for a range of threatened woodland birds and Brush-tailed Phascogales
 - further field assessment is required to identify if potential habitat for the EPBC Act listed Golden Sun Moth is present
- With regard to the proposed town boundary the values detailed in relation to Growth Area C are pertinent to the determination of its location in the north-east portion of the town.

In summary, while the Amendment attempts to avoid impact to high value areas by rezoning low value areas for development, further assessments are required to determine the extent of high value areas and means of biodiversity protection through appropriate planning controls.

3 Stage 2 Biodiversity Assessment

Stage 2 of the strategic biodiversity assessment provides detailed, targeted fieldwork in order to ground-truth potential biodiversity values outlined in Stage 1 and make recommendations in the form of appropriate planning controls to protect the identified assets.

3.1 Engagement and Consultation

Ranges Environmental Consulting collaborated with Council to consult with stakeholders, residents, local community groups and Traditional Owners to effectively identify and assess areas of high value biodiversity across the town of Harcourt.

Local residents were contacted by Council in order for *Ranges Environmental Consulting* to access land within areas affected or potentially affected by the Amendment. This allowed for thorough assessments to be undertaken in potential high value areas to properly inform required protection of biodiversity in the context of strategic growth.

The Dja Dja Wurrung (Djaara) Aboriginal Corporation was contacted by *Jacobs* during Stage 1, who identified potential need for further engagement regarding local and Traditional Ecological Knowledge specific to Harcourt. *Ranges Environmental Consulting* engaged with Council and Djaara to incorporate Traditional Knowledge into the Stage 2 assessment. While no Traditional Knowledge was provided to inform this assessment, Council is working with Djaara to gain a better understanding of Indigenous values in the region going forward.

Consultation with Harcourt Valley Landcare (HVL) was undertaken during Stage 1 to obtain knowledge of local biodiversity values. A number of important biodiversity sites were identified including Barkers Creek, Picnic Gully Creek, other unnamed waterways and Harcourt Recreation Reserve Bushland. *Ranges Environmental Consulting* contacted HVL for Stage 2 who reiterated the potential high value areas already outlined in Stage 1 and included Shady Lane and Leafy Lane as additional sites of biodiversity value. HVL also facilitated property access and raised concerns about threatened species.

Jess Lawton was consulted to provide information relating to Brush-tailed Phascogales including habitat requirements and recorded locations. Dr Lawton recently completed PhD studies on Brush-tailed Phascogales in the region.

Paul Foreman of Blue Devil Consulting was contacted regarding the expert witness report made to the planning panel. Engagement was undertaken to gain expert knowledge on groundwater dependant ecosystems and springs/soaks.

3.2 Priority Fieldwork Areas

The stage 1 biodiversity assessment outlined a number of high value or potentially high value biodiversity assets to be assessed in Stage 2 to determine appropriate methods of protection. Fieldwork undertaken during Stage 2 prioritises these areas for assessment and includes:

- Habitat Hectare Assessments (in patches of high-quality remnant vegetation)
- Determination of Endangered Ecological Vegetation Classes (EVCs)
- Determination of the presence or absence of threatened communities (FFG or EPBC)
- Assessment of threatened species habitat (Golden Sun Moth, Brown Toadlet, Brush-tailed Phascogale)
- Determining locations of fauna habitat corridors
- General vegetation and habitat quality assessments

Fieldwork was also conducted in the context of the Amendment to ensure development is being directed away from high value biodiversity areas and that the proposed planning controls will be effective in managing those identified areas.

Table 3 outlines specific assessment types conducted during stage 2 in the context of each growth area and potential asset identified during Stage 1.

Table 3. Stage 2 assessments conducted for proposed growth areas

Growth Area	Stage 1 Identified Biodiversity Values ²	Stage 2 Assessments
Growth Area A	Remnant canopy trees in association with Picnic Gully Creek including large River Red-gums Significant Trees within Craigie Street Road Reserve and sites under HO932	<ul style="list-style-type: none"> – General vegetation quality assessments – Assessment of potential fauna habitat corridor along Picnic Gully Creek
Growth Area B	Limited although Leafy Lane and Shady Lane support Grassy Woodland remnant roadside vegetation. Potential biodiversity values in association with a drainage line and large dam.	<ul style="list-style-type: none"> – Habitat Hectare Assessments for Leafy and Shady Lanes – Assessment of habitat value particularly for Golden Sun Moth and Brown Toadlet – Determine presence of endangered EVCs/vegetation communities (Red Gum Swamp/Creekline Grassy Woodland)
Growth Area C	– Potential for high biodiversity values including:	– Determine presence/ absence of threatened vegetation communities (EPBC Box Woodland communities)

² Identified prior to detailed field assessments

Growth Area	Stage 1 Identified Biodiversity Values ²	Stage 2 Assessments
	<ul style="list-style-type: none"> - Remnants of Grassy Woodland potentially meeting the condition threshold of an EPBC Act threatened ecological community - Remnants of endangered groundwater dependent ecosystems (Creekline Grassy Woodland EVC and Red Gum Swamp EVC) - Significant connectivity of flora and fauna habitat in association with Barkers Creek (east of Eagles Road) - Potential habitat for a range of threatened woodland birds and Brush-tailed Phascogale - Potential habitat and occurrence of the EPBC Act listed Golden Sun Moth 	<ul style="list-style-type: none"> - Determine presence of endangered EVCs/ vegetation communities (Red Gum Swamp/ Creekline Grassy Woodland) - Habitat Hectare Assessments for Leafy and Elys Lanes and other high-quality areas - Assessment of habitat value particularly for Golden Sun Moth and Brown Toadlet - Assessment of potential fauna habitat corridor along roadsides and Barkers Creek - General vegetation quality assessments
Growth Area D	<p>Substantial areas of introduced pasture with minimal native vegetation or significant fauna habitat with the possible exceptions of:</p> <ul style="list-style-type: none"> - Potential stands of significant trees in paddocks or surrounding residential estates - Potential habitat and occurrence of the EPBC Act listed Golden Sun Moth 	<ul style="list-style-type: none"> - Assessment of habitat value particularly for Golden Sun Moth - Determine presence/ absence of threatened vegetation communities in northeastern corner (EPBC Box Woodland communities) - General vegetation quality assessments
27 Craigie Street	<p>Substantial areas of introduced pasture with minimal native vegetation or significant fauna habitat with the exception of:</p> <ul style="list-style-type: none"> - Remnant canopy and riparian corridors of Picnic Gully Creek and a connected stand of trees along the eastern boundary - Road reserve vegetation on the southern boundary along Market Street 	<ul style="list-style-type: none"> - General vegetation quality assessments - Determine presence of endangered vegetation community along Picnic Gully Creek (possible Creekline Grassy Woodland) - Assessment of potential fauna habitat corridor along Picnic Gully Creek
1 Poplar Drive	<p>Minimal biodiversity values given the previous land use as an Orchard, although some remnant native trees may be present.</p>	<ul style="list-style-type: none"> - General vegetation quality and habitat assessments

Further assessments were undertaken during Stage 2 outside of these areas in order to thoroughly identify and assess biodiversity values throughout the study area including:

- General vegetation and habitat quality assessments throughout the existing town centre.
- Habitat Hectare Assessments of large, connected areas of vegetation identified by Stage 1 including vegetation between Market Street and Bagshaw Street and vegetation adjoining the Harcourt Recreation Reserve.
- General vegetation and fauna habitat/ corridor assessments for unnamed waterways in the south of the study area

4 Assessment Methods

Assessment of biodiversity value was undertaken using appropriate methods relative to the quality of areas being assessed. For higher quality areas of native vegetation, Habitat Hectare assessments were undertaken. For fauna corridors or patches of native vegetation with limited or no understorey, general vegetation and habitat quality was assessed.

All assessments were undertaken with consideration to locally occurring threatened species and their suitable habitat.

4.1 Habitat Hectare Assessments

Native vegetation is assessed in accordance with the *Native Vegetation Guidelines*, which defines native vegetation in two categories:

Native vegetation patch

A patch of native vegetation is either:

- an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native
- any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or
- any mapped wetland included in the current wetlands map, available in DELWP systems and tools.

Scattered tree

A scattered tree is a native canopy tree that does not form part of a Native Vegetation Patch.

Note: A canopy tree is a mature tree that is greater than three metres in height and is normally found in the upper layer of a vegetation type.

Vegetation that is neither a native vegetation patch nor a scattered tree is not applicable to the *Native Vegetation Guidelines* e.g. scattered native shrubs, introduced pasture, planted woodlots and cultivated gardens.

Ecological Vegetation Classes

An Ecological Vegetation Class (EVC) is a native vegetation type classified based on its floristic, life form, environmental and ecological characteristics (DEPI 2013). The benchmark for an EVC describes the attributes of the vegetation type in its mature natural state, which reflects conditions prior to European settlement.

Modelled 1750 EVC mapping produced by DEECA and accessible via [Nature Kit Online](#), indicates that the following EVCs may occur or previously occurred in the study area:

- Heathy Dry Forest (EVC 20)
- Grassy Woodland (EVC 175)
- Box Ironbark Forest (EVC 61)
- Alluvial Terraces Herb-rich Woodland (EVC 67)
- Red Gum Swamp (EVC 292)

Habitat Hectare Assessments

Habitat Hectare assessments apply a defined EVC benchmark as per standardised methodology (DSE 2004). The assessment combines 7 site-based measures and 3 landscape-based measures to generate a site condition score between 0 and 1 that represents vegetation quality as a percentage of the optimum benchmark.

Habitat Zones are separated where there is clear disconnection between one patch and the next, or where two types of EVCs are observed or where significant differences in condition occur within an EVC.

For the purpose of this assessment, Habitat Hectare Assessments were undertaken in large areas of intact, remnant vegetation.

Large Tree Benchmark

Large tree benchmarks for the modelled EVCs occurring in the study area are outlined in Table 4. These benchmarks are based on trunk measurements at 1.3m above the ground (diameter at breast height or DBH)

Table 4. Large Tree Benchmarks for EVCs in Study Area

Bioregion	EVC #	EVC Type	Large Tree Benchmark
Goldfields	20	Heathy Dry Forest	60cm
	67	Alluvial Terraces Herb-rich Woodland	70cm (Eucalyptus spp.) 50cm (Allocasuarina spp.)
	175	Grassy Woodland	70cm
	292	Red Gum Swamp	80cm
	61	Box Ironbark Forest	70cm

4.2 Threatened Ecological Communities

The determination of the presence of threatened communities in the study area is conducted with reference to the associated descriptions or condition thresholds for each community.

FFG Communities

Threatened communities listed under the Flora and Fauna Guarantee (FFG) Act 1988 are described in *Characteristics of Threatened Communities*. These descriptions are compared to ecological conditions during site assessments to determine the presence of the community. The following FFG listed communities were deemed to potentially occur within the study area through the Stage 1 assessment:

- Creekline Grassy Woodland (Goldfields) Community
- Victorian Temperate Woodland Bird Community

EPBC Communities

For locally occurring vegetation communities listed under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999, native vegetation patches in the study area were compared to the respective criteria and/ or condition thresholds. The following EPBC listed communities were outlined by the Stage 1 assessment as potentially occurring in the study area³:

White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland

This ecological community can occur as either a woodland or a derived grassland (a grassy woodland from which the trees have been removed). It has a native ground layer of tussock grasses and herbs and a sparse shrub layer. White box *Eucalyptus albens*, Yellow Box *Eucalyptus melliodora* or Blakely's Red Gum *Eucalyptus blakelyi* dominate the canopy.

The presence of this ecological community is determined using the condition threshold flowchart in *White Box-Yellow Box- Blakely's Red Gum grassy woodlands and derived native grasslands* (DEH 2006).

Grey Box Grassy Woodlands and Derived Native Grassland

This ecological community can occur as either a woodland or a derived grassland (a grassy woodland from which the trees have been removed). The grassy woodland contains a tree canopy that is dominated or co-dominated by Grey Box (*Eucalyptus microcarpa*) and a native understorey with a varying proportion of shrubs, grasses and herbs.

The presence of this ecological community is determined using the condition threshold flowchart in *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia* (DSEWPC 2012).

³ The potential for occurrence of potential matters of national significance including EPBC listed Ecological communities is based on a database search using the EPBC Act Protected Matters Search Tool (PMST) within 5km of the study area.

4.3 Threatened Species Habitat

Stage 1 of the Biodiversity Assessment identified 10 threatened flora species and 15 threatened fauna species with a moderate to high likelihood of occurrence within the study area. Particular consideration was given to potentially occurring threatened flora and suitable habitat for potentially occurring threatened fauna when undertaking vegetation assessments.

Suitable habitat was observed for a range of species, the majority of which have broad foraging ranges with highly dispersed habitat. Observations on this habitat is discussed in Section 5.4. Site assessments revealed suitable habitat within the study area for two species with highly localised habitat that may be placed at risk due to the amendment. These species include the Golden Sun Moth *Synemon plana* and Brown Toadlet *Pseudophryne bibronii* and subsequent targeted fauna surveys were therefore undertaken as outlined in Section 6.

5 Results

5.1 Native Vegetation Assessments

Flora Species

During the site assessments, a total of 144 flora species were recorded. This includes 56 species of exotic origin, 85 local native species and 3 Victorian natives occurring outside their natural range.

Appendix 2 provides a list of flora species observed. The purpose of the flora assessment was to identify Victorian Native Flora and introduced flora that is known to naturalise in the region. Introduced flora that is non-invasive and established through planting was not included in this list. This is consistent with the typical approach to flora assessments and data entry into the Victorian Biodiversity Atlas (VBA).

Limitations

The timing of the flora surveys over spring and summer is suitable for the identification of most but not all flora species. It is expected that further seasonal winter species would be detected if surveyed at a different time of year. However, it is predicted that assessments undertaken across different seasons would yield similar results in terms of overall flora diversity and ecological condition.

5.1.1 Habitat Hectare Assessments

Habitat Hectare Assessments were undertaken for significant patches of native vegetation within the study area in order to determine quality and extent. A total of eight native vegetation patches (referred to as habitat zones) were assessed as shown in Map 2A-B and described below:

Habitat Zone 1 – Heathy Dry Forest

Reference: Map 2B

This zone extends approximately 5.2 hectares and is located south of the Harcourt recreation area on Bingham Road. Although no signage is present, it is locally referred to as the Bingham flora and fauna reserve. A low, open canopy occurs consisting of a mix of Red Box *Eucalyptus polyanthemos*, Long-leaf Box *Eucalyptus goniocalyx* and Red Stringybark *Eucalyptus macrorhyncha*. Canopy trees are generally fair to good condition, however, no benchmark large trees are present.

The understorey supports a diverse range of lifeforms and species. A low shrub layer dominates throughout consisting predominantly of Grey Everlasting *Ozothamnus obcordatus* with Hedge Wattle *Acacia paradoxa*, Sweet Bursaria *Bursaria spinosa*, Drooping Cassinia *Cassinia arcuata* and Gorse Bitter-pea *Daviesia ulicifolia* are also present. A variety of grasses occur throughout the zone including Silvertop Wallaby Grass *Rytidosperma pallidum*, Grey Tussock-grass *Poa sieberiana* and Supple Spear-grass *Austrostipa mollis*. Herbaceous species persist at moderate levels of cover including though not limited to Shiny Everlasting *Xerochrysum viscosum* Common Raspwort *Gonocarpus tetragynus*, Chocolate Lily *Arthropodium strictum* and Sun Orchid *Thelymitra sp.*

Annual grassy weeds including Squirrel-tail Fescue *Vulpia bromoides* and Large Quaking Grass *Briza maxima* account for less than 15% of the zone. High threat weeds are present although cover is minimal. High threat species include Gorse *Ulex europaeus* and Montpellier Broom *Genista monspessulana*. Organic litter is present at benchmark levels although log cover is low to moderate.

High species diversity and landscape scores due to the continuity of the patch across multiple land tenures beyond the assessment area contribute to Habitat Zone 1 achieving a condition score of 72% of the EVC benchmark.



Figure 1. High shrub cover in Habitat Zone 1



Figure 2. Sun Orchid in Habitat Zone 1

Habitat Zone 2 – Grassy Woodland

Reference: Map 2B

Habitat Zone 2 represents approximately 10.5 hectares of remnant yet highly modified Grassy Woodland. The sparse, tall canopy is dominated by River Red-gum *Eucalyptus camaldulensis* with Grey Box *Eucalyptus microcarpa* and Yellow Box *Eucalyptus melliodora* also present. Several large trees are present although only ~15% of the per hectare benchmark.

Indigenous understorey is extremely limited with scattered herbs and graminoids present at low levels of cover including Black-anther Flax-lily *Dianella revoluta*, Kangaroo Grass *Themeda triandra* and Sheep's Burr *Acaena echinata*.

Large infestations of high threat weeds occur across the majority of the Zone including Gorse *Ulex europaeus*, Briar Rose *Rosa rubiginosa* and Bulbil Watsonia *Watsonia meriana*.

The dominant cover of high threat weeds and minimal native understorey contribute to Habitat Zone 2 receiving a condition score of 34% of the EVC benchmark.



Figure 3. Dense Watsonia infestation in Habitat Zone 2



Figure 4. Large River Red-gum in Habitat Zone 2

Habitat Zone 3 – Alluvial Terraces Herb-rich Woodland

Reference: Map 2A

Habitat Zone 3 occurs along the road reserves of Elys Lane. The assessment considered only the portion of road reserve within the study area (Eagles Road to Douglas Lane). However, landscape scores were determined based on the patch continuing east to Reservoir Road. Although modified from its original state, the location in the landscape and canopy species present are most indicative of Alluvial Terraces Herb-rich Woodland (EVC 67).

A variety of Eucalypt species occur in the canopy including Yellow Box, Grey Box, Long-leaf Box and River Red-gum. Understorey trees and shrubs occur in patches throughout the zone including Sweet Bursaria *Bursaria spinosa*, Lightwood *Acacia implexa*, Silver Wattle *Acacia dealbata* and Grey Parrot-pea *Dillwynia cinerascens*. Dense patches of Black-anther Flax-lily are present throughout the zone as are scattered patches of herbs such as Common Everlasting *Chrysocephalum apiculatum*, Milkmaids *Burchardia umbellata* and Chocolate Lily *Arthropodium strictum*. Scattered indigenous grasses also occur including Kangaroo Grass *Themeda triandra* and Supple Spear-grass *Austrostipa mollis*.

Weeds occur at over 50% cover predominantly consisting of annual grasses such as Large Quaking-grass *Briza maxima*. Perennial grasses such as Cocksfoot *Dactylis glomeratus* and Toowoomba Canary-grass *Phalaris aquatica* also occur in large patches. High threat woody weeds such as Gorse *Ulex europaeus* and Monterey Pine *Pinus radiata* are present in small numbers.

A moderate cover of habitat features (organic litter and logs) occurs throughout the zone. However, due to low landscape scores and high weed cover, Habitat Zone 3 receives a condition score of 39% of the EVC benchmark.



Figure 5. Section of diverse groundstorey in Habitat Zone 3



Figure 6. Silver Wattle recruitment cohort in Habitat Zone 3

Habitat Zone 4 – Red Gum Swamp

Reference: Map 2A

Habitat Zone 4 is a modified portion of Red Gum Swamp EVC, occurring across multiple parcels near Shady Lane. Scattered River Red-gums occur throughout the zone and demonstrate adequate recruitment with several immature individuals present.

Understorey lifeforms and species are limited and predominantly consist of species tolerant to inundation such as Gold Rush *Juncus flavidus*, Tall Sedge *Carex appressa* and Slender Dock *Rumex brownii*.

Weed cover is high with the most dominant species being exotic grasses such as Toowoomba Canary-grass *Phalaris aquatica* and Yorkshire Fog *Holcus lanatus*.

Minimal habitat features and poor landscape scores result in Habitat Zone 5 receiving a condition score of 28% of the EVC benchmark.



Figure 7. Large River Red-gum in Habitat Zone 4

Habitat Zone 5 – Red Gum Swamp

Reference: Map 2A

Habitat Zone 5 occurs across multiple private properties within Growth Area C. Multiple large River Red-gums occur throughout the site providing adequate canopy cover.

Native understorey is sparse, consisting of scattered patches of Gold Rush *Juncus flavidus*, Tall Sedge *Carex appressa* and some patches of Common Spike-sedge *Eleocharis acuta* within the more permanent water bodies. Native herbs are absent.

Weedy grasses dominate the zone including Great Brome *Bromus diandrus*, Barley Grass *Hordeum leporinum* and Wimmera Rye-grass *Lolium rigidum*. Some high threat woody weeds are also scattered throughout including Gorse *Ulex europaeus*, Hawthorn *Crateagus monogyna* and Blackberry *Rubus fruticosus* spp. agg.

Minimal habitat features and poor landscape scores contribute to Habitat Zone 6 receiving a condition score of 28% of the EVC benchmark.



Figure 8. Scattered native graminoids around a dam in Habitat Zone 5



Figure 9. Large River Red-gum in Habitat Zone 5

Habitat Zone 6 – Grassy Woodland

Reference: Map 2A

Habitat Zone 6 occurs across 2 properties on the northwest corner of Douglas Lane and Leafy Lane. Canopy species present include a mix of Yellow Box *Eucalyptus melliodora*, Long-leaf Box *Eucalyptus gonicalyx* and River Red-gum *Eucalyptus camaldulensis*.

Understorey is sparse though a number of lifeforms and species are present including understorey shrubs such as Black Wattle *Acacia mearnsii* and Lightwood *Acacia implexa*. The ground storey provides some cover of native species including Late-flower Flax-lily *Dianella tarda* (critically endangered under the FFG Act), Small St John's Wort *Hypericum gramineum*, Rough Spear-grass *Austrostipa scabra*, Supple Spear-grass *Austrostipa mollis*, Chocolate Lily *Arthropodium strictum*, Common Raspwort *Gonocarpus tetragynus* and a moderate to high cover of *Rytidosperma* species.

The majority of weed cover is comprised of annual grasses including Large Quaking-grass *Briza maxima* and Squirrel-tail Fescue *Vulpia bromoides*.

A moderate understorey and presence of habitat features contributes to Habitat Zone 6 receiving a condition score of 41% of the EVC benchmark.



Figure 10. Typical structure and composition of Habitat Zone 6



Figure 11. FFG listed *Dianella tarda* in Habitat Zone 6

Habitat Zone 7 – Alluvial Terraces Herb-rich Woodland

Reference: Map 2A

Habitat Zone 7 occurs along Leafy Lane. Canopy species consist of Bundy *Eucalyptus goniocalyx*, Yellow Box *Eucalyptus melliodora* and River Red Gum *Eucalyptus camaldulensis*.

Sparse patches of shrubs occur throughout the zone including Lightwood *Acacia implexa*, Drooping Cassinia *Cassinia arcuata* and Black Wattle *Acacia mearnsii*. The understorey is highly modified with native graminoids being the dominant persisting lifeform including patches of Supple Spear-grass *Austrostipa mollis*, Black-anther Flax-lily *Dianella revoluta* and scattered Rushes *Juncus. sp.* in drainage lines. Herb cover is limited, consisting of scattered individuals of Magenta Stork's-bill *Pelargonium rodneyanum*, Common Raspwort *Gonocarpus tetragynus* and Sweet Hound's-tongue *Hackelia suaveolens*.

The majority of weed cover is comprised of introduced grasses including Cocksfoot *Dactylis glomerata* and Wild Oat *Avena fatua*. Some small patches of Gorse *Ulex europaeus* are also present.

A moderate understorey and presence of habitat features contributes to Habitat Zone 7 receiving a condition score of 37% of the EVC benchmark.



Figure 12. Patch of *Dianella revoluta* in Habitat Zone 7



Figure 13. Group of *Acacia implexa* in Habitat Zone 7

Habitat Zone 8 – Grassy Woodland

Reference: Map 2A

Habitat Zone 8 occurs along the road reserve and rail corridor between Symes Road and the railway line. A moderate to sparse canopy cover consists predominantly of River Red-gum *Eucalyptus camaldulensis*, with scattered Yellow Box *Eucalyptus melliodora* and Bundy *Eucalyptus goniocalyx* also present. Large trees are limited.

Medium shrub and understorey tree cover varies throughout the Zone and includes groups of Drooping Cassinia *Cassinia sifton*, Hedge Wattle *Acacia paradoxa*, Black Wattle *Acacia mearnsii* and Lightwood *Acacia implexa*. The quality of groundstorey varies, with large patches of Kangaroo Grass *Themeda triandra* and Supple Spear-grass *Austrostipa mollis* scattered throughout. Other grass species occurring in the Zone include Rough Spear-grass *Austrostipa scabra* and Grey Tussock-grass *Poa sieberiana*. Herbs contribute low cover, however a number of species are present including but not limited to Yellow Rush-lily *Tricoryne elatior*, Tall Bluebell *Wahlenbergia stricta*, Common Raspwort *Gonocarpus tetragynus* and Sticky Everlasting *Xerochrysum viscosum*.

Weed cover is high and comprised mostly of grasses including Cocksfoot *Dactylis glomerata* and Paspalum *Paspalum dilatatum*. Large patches of St John's Wort *Hypericum perforatum* also occur throughout the Zone.

A moderate understorey and presence of habitat features contributes to Habitat Zone 8 receiving a condition score of 37% of the EVC benchmark.


 Figure 14. Patch of *Themeda triandra* in Habitat Zone 8

 Figure 15. Multiple *Senecio quadridentatus* with high cover of weedy grasses in background

Habitat Hectare Results

Habitat Zone		1	2	3	4	5	6	7	8	
Benchmark criteria	Max. Score	EVC 20	EVC 175	EVC 67	EVC 292	EVC 292	EVC 175	EVC 67	EVC 175	
Site condition	Large Old Trees	10	0	3	7	4	6	5	10	2
	Canopy cover	5	4	5	5	5	4	5	5	4
	Understorey	25	25	5	15	5	5	10	5	10
	Lack of weeds	15	9	0	2	4	2	4	0	2
	Recruitment	10	10	5	3	5	5	3	3	6
	Organic litter	5	5	3	3	3	3	5	5	5
	Logs	5	3	3	3	0	0	2	2	3
	1x	56	24	38	26	25	36	30	32	
Multiplier	na	56	24	33	26	25	36	30	32	
Patch Size		8	6	2	1	2	2	2	2	
Neighbourhood		4	3	1	0	0	0	0	1	
Distance to Core		4	1	3	1	1	3	1	3	
		16	10	6	2	3	5	3	6	
Habitat quality score	100	72	34	39	28	28	41	33	38	
Habitat score as above = #/100		0.72	0.34	0.39	0.28	0.28	0.41	0.33	0.38	

5.1.2 Vegetation Quality Assessments

General vegetation and habitat quality assessments were undertaken in areas of native vegetation that appeared to be of poor quality or lacking understorey.

Barkers Creek

Reference: Map 2A

Vegetation and habitat quality assessments were undertaken in three sections along Barkers Creek. Native understorey is limited in all three sections. However, the mid and northern sections have undergone some revegetation from community groups and residents, providing greater species diversity than the southern end.

The majority of Barkers Creek is dominated by high threat weeds such as Blackberry *Rubus fruticosus spp. agg.*, Japanese Honeysuckle *Lonicera japonica*, Hawthorn *Cretagus monogyna* and Willow *Salix sp.* Common Reed *Phragmites australis* occurs in dense patches in the wetter areas throughout the creek and in the northern end natural regeneration of River Red-gums has occurred allowing for a moderate cover of semi-mature trees. This, combined with revegetation of shrub and understorey tree species including Sweet Bursaria *Bursaria spinosa*, Hedge Wattle *Acacia paradoxa* and Tree Violet *Melicytus dentatus* provides habitat for locally occurring scrub and woodland birds such as Superb Fairy-wren *Malurus cyaneus*, Striated Pardalote *Pardalotus striatus*, Yellow-tufted Honeyeater *Lichenostomus melanops* and Yellow-rumped Thornbill *Acanthiza chrysorrhoa*.

Mature River Red-gums occur consistently along the corridor including several large and hollow-bearing individuals. These trees are important habitat for locally occurring birds and arboreal mammals such as the Eastern Rosella *Platycercus eximius*, Southern Boobook *Ninox boobook* and Sugar Glider *Petaurus breviceps*.



Figure 16. Large patches of Blackberry with scattered large Eucalyptus camaldulensis in Barkers Creek



Figure 17. Large areas of immature Eucalyptus camaldulensis woodland occurs in the northern end of Barkers Creek

Picnic Gully Creek

Reference: Map 2A

Approximately 500m of Picnic Gully Creek between Pippin Court and Thompsons Road, as well as the confluence with Barkers Creek was assessed to inform quality of vegetation and habitat. As with Barkers Creek, Willow *Salix sp.* infestations occur throughout the entire waterway. Montpellier Broom *Genista monspessulana* and various fruit trees *Prunus*, *Pyrus* and *Malus sp.* also occur in patches along the creek.

Groups of Silver Wattle *Acacia dealbata* occur sporadically, particularly at the confluence to Barkers Creek. Occasional patches of Rushes *Juncus sp.* and Swamp Crassula *Crassula helmsii* were observed on the waterline. As with Barkers Creek, the most valuable vegetation type along Picnic Gully Creek occurs in the form of scattered River Red-gums which occur consistently throughout and include regular large and hollow-bearing specimens. Like Barkers Creek, these trees are important habitat for locally occurring birds and arboreal mammals including though not limited to Eastern Rosella, Southern Boobook and Sugar Glider.



Figure 18. Dense *Salix sp.* infestations occur along Picnic Gully Creek



Figure 19. Scattered large *Eucalyptus camaldulensis* occur consistently along Picnic Gully Creek

Unnamed Waterway (Barkers Creek to Mills Road)

Reference: Map 2B

This waterway has been heavily modified towards the Barkers Creek end due to its location within small residential lots and associated impact from development. However, large, scattered River Red-gums *Eucalyptus camaldulensis* persist along the waterway providing a foraging and nesting corridor for birds and arboreal mammals. Canopy cover increases further south and continues within a small seasonally inundated depression within the large property south of 71 Harmony Way.

Scattered fruit trees occur along the watercourse and large infestations of Gorse *Ulex europaeus* are also present.

The presence of mature canopy trees and moderate cover of understorey along this waterway provides suitable habitat for locally occurring taxa including birds, mammals and amphibians such as the Spotted Marsh Frog *Limnodynastes tasmaniensis*.



Figure 20. Seasonally wet open area adjacent to waterway



Figure 21. Modified northern end of waterway within small residential lots

Craigie Street

Reference: Map 2A

River Red-gum dominates the canopy occurring along Craigie Street. Patches representing a moderate canopy cover are present on the western extent of the Street and to the east of the bend in the Street with some large trees present. Some scattered canopy trees also occur between these patches.

Native understorey is extremely limited along Craigie Street. Introduced grasses dominate both open areas and underneath native canopy trees with occasional woody weeds also present.



Figure 22. Eucalyptus camaldulensis dominating the western end of Craigie Street



Figure 23. Eastern end of Craigie Street dominated by introduced grasses

Harmony Way

Reference: Map 2A & 2B

Three sections of Harmony Way were assessed as shown in Map 2A and 2B. One to the south of the study area and two to the north.

The northern sections of vegetation alongside Harmony Way supports limited native understorey in the form of small, scattered patches of Kangaroo Grass *Themeda triandra* and Weeping Grass *Microlaena stipoides*. A small, seasonal drainage line in the northernmost portion of the assessment area on the corner of Gaaschs Road features scattered Rushes *Juncus sp.* and a stand of River Red-gum *Eucalyptus camaldulensis* varying in condition and maturity. Several woody weed species occur in this area including Montpellier Broom *Genista monspessulana*, Early Black Wattle *Acacia decurrens* and Fruit Trees *Malus/Pyruis sp.*

The assessment of Harmony Way to the south of the study area, between Mills Road and Poplar Drive, revealed a present yet highly modified understorey and greater diversity in the canopy with Grey Box *Eucalyptus microcarpa* and Yellow Box *Eucalyptus melliodora* present. Supple Spear Grass *Austrostipa mollis* and the critically endangered Late-flowered Flax-lily *Dianella tarda* are prominent in the understorey.



Figure 24. Drainage line containing *Juncus sp.* with adjacent fruit trees and *Eucalyptus camaldulensis*



Figure 25. The southern Harmony Way Road reserve features a diverse canopy cover

Shady Lane

Reference: Map 2A.

Shady Lane features a moderate to high canopy cover with a diverse range of species including River Red-gum *Eucalyptus camaldulensis*, Bundy *Eucalyptus goniocalyx* and Yellow Box *Eucalyptus melliodora*. Over 20 large trees are present (≥ 70 cm DBH).

Native understorey is extremely limited with introduced grasses accounting for over 90% of ground foliage cover. One patch of Tall Sedge *Carex appressa* occurs in the drainage line between the two dams on the adjacent properties.

The southern 150m of Shady Lane is largely devoid of native vegetation and tree cover.



Figure 26. Moderate to high canopy cover along Shady Lane



Figure 27. Patch of *Carex appressa* on Shady Lane

Douglas Lane

Reference: Map 2A

Douglas Lane provides a moderate cover and diverse array of Eucalypt species along its extent. A high amount of large trees are present with 28 occurring between Leafy Lane and Craigie Street alone, several of which contain habitat hollows.

Scattered native understorey species occur throughout the road reserve including patches of Blackwood *Acacia melanoxylon* and Supple Spear-grass *Austrostipa mollis*. Native understorey is best represented where Douglas Lane intersects Habitat Zone 6. This is also where the FFG listed Late-flower Flax-lily *Dianella tarda* occurs.



Figure 28. *Dianella tarda* in the Douglas Lane road reserve



Figure 29. Canopy trees along Douglas Lane

Blackjack Road/ 121 Bingham Road

Reference: Map 2B

A consistent canopy occurs along the northern side of Blackjack Road including Grey Box *Eucalyptus microcarpa* and River Red-gum *Eucalyptus camaldulensis* with Red Stringybark *Eucalyptus macrorhyncha* and Red Box *Eucalyptus polyanthemos* occurring further to the north at higher elevations.

The quality and density of native vegetation reduces in the properties along Blackjack Road particularly along the tributary to the north of the road. However, the canopy connectivity, moderate understorey cover, varied habitat types of different species composition, elevation, geology and waterways, and large area of the native vegetation patch provides opportunities for a range of locally-occurring fauna species including woodland birds, arboreal mammals and ground-dwelling mammals.

Native understorey is of a high quality at 121 Bingham Road and surrounding properties and due to the connectivity to Habitat Zone 1 and similarity in condition, could be considered part of the Zone. Visual inspections into neighbouring properties revealed a well-connected canopy and diverse native understorey.

The land from Blackjack Road to Habitat Zone 1 contains the largest area of connected native vegetation in the study area, the only patch of Heathy Dry Forest and Habitat Zone 1 which is the highest quality patch of native vegetation in the study area.



Figure 30. Bushland in and around 121 Bingham Road



Figure 31. Facing north from the western end of Blackjack Road

Bingham Road/ Mills Road Patch

Reference: Map 2B

This patch of woodland covers approximately 1.2 hectares of land in the middle of a large private block that is bordered by Mills Road on the north and Bingham Road on the west. Canopy species consist of Grey Box *Eucalyptus microcarpa* and River Red-gum *Eucalyptus camaldulensis* including more than 10 large trees, several of which contain habitat hollows.

The understorey is largely modified however habitat features such as organic litter and logs are well represented. A seasonal drainage line runs through the patch and contains scattered mature Eucalypts and immature recruits. This canopy species regeneration along the drainage line provides potential future connectivity to the large area of native vegetation that is contiguous with Habitat Zone 1.



Figure 32. Moderate canopy cover and habitat features



Figure 33. Habitat hollows in large Eucalyptus microcarpa

Non-Native Vegetation

Due to a long history of agricultural land use, the majority of vegetation within the study area is highly modified. The majority of large, cleared areas of land are dominated by a suite of introduced grasses including but not limited to Great Brome *Bromus diandrus*, Cocksfoot *Dactylis glomerata*, Wild Oat *Avena fatua*, Sweet Vernal Grass *Anthoxanthum odoratum* and Rye Grasses *Lolium spp.*

The prevalence of fruit orchards in the area has resulted in Apple and Pear trees scattered along various watercourses and in bushland. Waterways throughout the study area contain dense infestations of Willow *Salix sp.*, Gorse *Ulex europaeus*, Montpellier Broom *Genista monspessulana*, Blackberry *Rubus fruticosus* and Spiny Rush *Juncus acutus*.



Figure 34. Large infestation of *Ulex europaeus* on western bank of Barkers Creek



Figure 35. Introduced grasses dominate the vast majority of open, cleared areas.

5.2 Habitat Corridors

The Planning Panel noted that the proposed amendment had not adequately considered nor protected habitat and wildlife corridors. Stage 2 of this project has included vegetation and fauna habitat assessments with particular consideration to connectivity in the landscape and locally occurring species.

Linear vegetation such as that located along waterways and road reserves provide value habitat corridors for fauna including threatened woodland birds and the Brush-tailed Phascogale. Movement across the landscape is important for these species, particularly to and from large, well-connected areas of vegetation such as Mount Alexander Regional Park and the woodland in the south of the study area. A number of important corridors have been identified as shown on Map 3.

5.3 Threatened Communities

Native vegetation patches were assessed against listed threatened community descriptions, criteria and condition thresholds.

5.3.1 FFG Communities

Creekline Grassy Woodland

FFG Act Description

The Creekline Grassy Woodland (Goldfields) Community occurs as small remnants within the box-ironbark ecosystems of Victoria.

Two sub-communities have been identified. Both have River Red Gum (*Eucalyptus camaldulensis*) forming open overstorey canopy, often with larger old trees. Groundcover is a dense layer of grasses and sedges including Weeping Grass (*Microlaena stipoides* = *M. stipoides* var. *stipoides*), Tall Sedge (*Carex appressa*), rushes (*Juncus* spp.), Wirilda (*Acacia retinodes* = *Acacia provincialis*), Black Wattle (*Acacia mearnsii*), and Rough-barked Honeymyrtle (*Melaleuca parvistaminea*). Broome (*Bromus* spp.), Quaking-grass (*Briza* spp.) and Fescue (*Vulpia* spp.) are commonly-present weed species. Yellow Box (*Eucalyptus melliodora*) and Grey Box (*E. microcarpa*) occur in one of the sub-communities, whereas the other has a characteristic understorey dominated by Common Tussock-grass (*Poa labillardierei* = *P. labillardierei* var. *labillardierei*) and Kangaroo Grass (*Themeda triandra*).

The community occurs as a woodland interface between the undulating sedimentary rises and the geologically younger alluvial plains. It fringes shallow or ephemeral drainage lines on the lower slopes of box-ironbark forests but is distinct from the riparian vegetation found along permanently flowing streams on the alluvial plains.

Site Description

Vegetation that occurs along waterways and ephemeral drainage lines throughout the study area is heavily modified. The consistent occurrence of large old River Red-gums in these areas is characteristic of the

community and suggests that the community may have been present, particularly in areas between sedimentary rises and alluvial plains.

However, the understorey in these areas has experienced severe degradation resulting in infestations of woody weeds such as Montpellier Broom *Genista monspessulana*, Hawthorn *Crataegus monogyna* and Gorse *Ulex europaeus* and grassy weeds such as Brome species *Bromus spp.* and Toowoomba Canary Grass *Phalaris aquatica*. The FFG listed community is therefore not present in the study area.

Victorian Temperate Woodland Bird Community

FFG Description

The Victorian Temperate Woodland Bird Community has been defined as a suite of bird species, mainly associated with drier woodlands on the slopes and plains north of the Great Dividing Range, that seem to have declined markedly in numbers since records began.

The 24 species in this group are the Painted Button-quail (*Turnix varia*), Bush Stone-curlew (*Burhinus grallarius*), Red-tailed Black-Cockatoo (*Calyptorhynchus banksii graptogyne*), Little Lorikeet (*Glossopsitta pusilla*), Superb Parrot (*Polytelis swainsonii*), Swift Parrot (*Lathamus discolor*), Turquoise Parrot (*Neophema pulchella*), Barking Owl (*Ninox connivens*), Brown Treecreeper (*Climacteris picumnus victoriae*), Speckled Warbler (*Chthonicola sagittata*), Western Gerygone (*Gerygone fusca*), Regent Honeyeater (*Anthochaera = Xanthomyza phrygia*), Yellow-tufted Honeyeater (*Lichenostomus melanops meltoni*), Fuscous Honeyeater (*Lichenostomus fuscus*), Black-chinned Honeyeater (*Melithreptus gularis*), Brown-headed Honeyeater (*Melithreptus brevirostris*), Painted Honeyeater (*Grantiella picta*), Jacky Winter (*Microeca fascinans*), Red-capped Robin (*Petroica goodenovii*), Hooded Robin (*Melanodryas cucullata*), Grey-crowned Babbler (*Pomatostomus temporalis*), Ground Cuckoo-shrike (*Coracina maxima*), Apostlebird (*Struthidea cinerea*), and Diamond Firetail (*Stagonopleura guttata*).

The distributions of these birds differ between species. Many are closely associated with (but not exclusive to) northern Victorian drier woodlands dominated by box, stringybark, ironbark, yellow gum or river red gum eucalypts, or by buloke or cypress-pine. Many such woodlands originally had an open structure, a light shrubby understorey, a grassy ground cover with fallen timber, an abundance of tree-hollows and other nesting sites, and available sources of seeds, nectar and insects throughout the year. Since European settlement, most of these woodlands have been cleared for agricultural production, or fragmented and degraded, greatly reducing the resources available to these birds; many sites now also have cats and foxes present. Some species are found in other habitats: the Superb Parrot, Apostlebird and, to a lesser extent, the 21 Ground Cuckoo-shrike are mainly found in habitats along or near the Murray River, while the Red-tailed Black-Cockatoo is confined to the far south-west of the state, in woodlands on sandy soils that are dominated by Brown Stringybark (*Eucalyptus baxteri*) and Desert Stringybark (*E. arenacea*) and the nearby woodlands dominated by River Red Gum (*E. camaldulensis*), Yellow Gum (*E. leucoxylon*) or Buloke (*Allocasuarina luehmannii*).

Site Description

Although no species within the group were identified as part of the incidental fauna survey during the site assessments, a number of species have high amounts of records in the study area and surrounding landscape

as documented in the Victorian Biodiversity Atlas. Records include but are not limited to the Swift Parrot (469 records), Brown Treecreeper (26 records), Yellow-tufted Honeyeater (112 records), Fuscous Honeyeater (87 records), Brown-headed Honeyeater (85 records) and Jacky Winter (32 records).

The dry, open woodland vegetation type preferred by these species remains in very few areas throughout the study area as summarised in Table 5.

Table 5. Habitat suitable for the Victorian temperate woodland bird community

Quality	Location	Description	Habitat Present
High	77 Douglas Lane	Remnant open Grassy Woodland	Habitat hollows, sparse shrub layer, diverse Eucalypt species and fallen timber
	Binghams Street Reserve and adjoining vegetation	Remnant Heathy Dry Forest in the reserve and immediate surrounds transitioning to modified Grassy Woodland further south	Habitat hollows, moderate to sparse shrub layer, diverse Eucalypt species
	Douglas, Elys, Leafy Lanes	Herb-rich/ Grassy Woodland	Sparse shrub layer, fallen timber, habitat hollows, diverse Eucalypt species
Moderate	Barkers Creek northern riparian corridor	Poor quality riparian woodland	Habitat hollows, sparse shrub layer through revegetation
	Harmony Way Road Reserve (South)	Grassy Woodland	Habitat hollows, fallen timber, diverse Eucalypt species
Low	Market Street/ Bagshaw Street Woodland	Heavily degraded Grassy Woodland	Diverse Eucalypt species

5.3.2 EPBC Communities

Two EPBC listed Box Grassy Woodland vegetation communities were identified as having the potential to occur in the study area through the Stage 1 Biodiversity Assessment as listed below:

- White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland
- Grey Box Grassy Woodlands and Derived Native Grassland

Following vegetation assessments, two sites in the study area were compared to diagnostic criteria for nationally threatened grassy woodlands from Flowchart 1 in the *Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia* document as replicated in Table 6.

Table 6. Diagnostic criteria for possible listed communities in the study area

Threatened Grassy Woodland Diagnostic	Douglas Lane	Harmony Way
Is the site within or near the Grey Box Grassy Woodland distribution?	Yes	Yes
Is at least 50% of the plant cover in the ground layer made up of perennial native species? OR Is at least 10% of plant cover in ground layer made up of perennial native grass species?	Yes (>10% native grass species)	No
Is (or was previously) the most common tree species (or group of species) one of the following:		
Grey Box <i>Eucalyptus microcarpa</i> ?	No	Yes
White Box <i>Eucalyptus albens</i> / Yellow Box <i>Eucalyptus melliodora</i> / Blakely's Red gum <i>Eucalyptus blakelyi</i>	Yes	No

The woodland community present at Harmony Way is dominated by Grey Box. However, the groundstorey is dominated by introduced grasses, with perennial native grasses covering less than 10% of the ground layer. Therefore, the criteria of the EPBC listed Grassy Woodland community is not met.

The woodland at 77 Douglas Lane is part of Habitat Zone 6, although not the entire mapped Habitat Zone meets criteria for the listed community. The area that was subject to the condition threshold assessments contains adequate native groundstorey despite being subject to grazing and one of the most common overstorey species is Yellow Box *Eucalyptus microcarpa*. To determine if the listed ecological community is present, condition thresholds must be met as described in Table 7.

Table 7. EPBC listed vegetation community condition thresholds

White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland Diagnostic	Douglas Lane
Is, or was previously, at least one of the most common overstorey species White Box, Yellow Box or Blakely's Red Gum?	Yes (Yellow Box)
Does the patch have a predominantly native understorey?	Yes
Is the patch 0.1 ha or greater in size?	Yes
There are 12 or more native understorey species present (excluding grasses). There must be at least one important species	Yes

Although Long-leaf Box is co-dominant in the patch, Yellow Box is one of the most common canopy species. While annual grasses cover much of the patch, the condition threshold regarding native understorey only refers to perennial species, therefore this threshold is met. The patch also contains 12 native understorey species excluding grasses. Finally, important species, Kangaroo Grass *Themeda triandra*, Small St John's Wort *Hypericum gramineum*, and Magenta Storks-bill *Pelargonium rodneyanum* are present within the patch.

Therefore, the patch of Grassy Woodland at 77 Douglas Lane meets the condition threshold criteria and the EPBC listed, critically endangered vegetation community is present.



Figure 36. Grassy Woodland on private property at Douglas Lane



Figure 37. Grassy Woodland on the Harmony Way road reserve

5.4 Threatened Species Habitat

Targeted fauna surveys were conducted for species with localised habitat that may be affected by the Amendment as discussed in Section 6. For species with large ranges and dispersed habitats that were deemed during stage 2 to have a high likelihood of occurrence in the study area, assessments on suitable habitat were undertaken and are discussed below.

Brush-tailed Phascogale (FFG: Vulnerable)

The distribution of the Brush-tailed Phascogale *Phascogale tapoatafa* occurs in slightly fragmented areas from northeastern Victoria through to far western Victoria. However, this range is experiencing contraction, moving inward towards the centre of the state and experiencing regional extinctions in some areas. Recent studies have found that the Mount Alexander region in particular, is a stronghold for the species in Victoria.

The Brush-tailed Phascogale can have home ranges of up to approximately 100 hectares. Habitat types within these areas vary greatly. The preferred habitat includes large areas of dry, open foothill forest containing hollow-bearing, rough-barked trees, and an abundance of logs and organic litter. The important contribution that these habitats provide is hollows for nesting and an abundant food source of predominantly invertebrates. Linear strips of vegetation such as that of road reserves and scattered trees also provide important habitat features for the species, creating linkages and 'stepping stone' habitat opportunities between larger areas of forest which is required to maintain viable populations.

The majority of vegetation within the study area is heavily modified and largely cleared for agriculture. However, some areas remain that contain habitat features suitable for the species. In particular, the large patch of elevated vegetation in the south of the study area that connects Bingham's Reserve/ 121 Bingham's Road with vegetation along Blackjack Road and continues further south beyond the study area. Box and Stringybarked Eucalypts dominate these areas and sections with abundant organic litter and logs occur scattered

throughout, though the ground layer in some sections is highly modified due to domestic use and large trees cover is limited. This area is also connected to vegetation further south where recent records for the species occurred.

Further to this, a number of corridors contain habitat features useful to the species including:

- Barkers Creek Riparian Corridor
- Harmony Way Road Reserve (South)
- Douglas Lane
- Elys Lane
- Picnic Gully Creek Riparian Corridor
- Symes Road/ rail corridor reserve
- Leafy Lane
- Shady Lane

The Victorian Biodiversity Atlas revealed records in 3 locations in the study area. However, the most recent was recorded in 1985. More recent records, as part of a study by Dr Jess Lawton, have occurred 500 meters west of the study area, 1.1km east of the study area and 2.2km south of the study area, in vegetation that is connected with that of Habitat Zone 1. These records are shown in Map 4.

Powerful Owl (FFG: Vulnerable)

The Powerful Owl *Ninox strenua* is widespread throughout the state in foothill forests, where they particularly favour gullies and waterways containing large old hollow-bearing trees. The species have extremely large territories that can range from 300 to 1500 hectares and are known to nest at the Castlemaine Botanical Gardens.

The riparian corridor of Barkers Creek provides the most suitable habitat for the species, with consistent mature River Red-gums scattered along the watercourse, many of which contain large hollows.

Speckled Warbler (FFG: Endangered)

The Speckled Warbler *Pyrholaemus sagittatus* is predominantly found in Box-ironbark, forests, dry woodlands and wooded farmlands (especially those containing Yellow Box) where there is scattered shrub cover such as Acacias, Blackberry or low Eucalypt regrowth. Recent records have occurred in the Mount Alexander Regional Park and Walmer State Forest.

Some suitable habitat occurs within the study area including the large patch of native vegetation in the south of the study area that connects Bingham's Reserve with Blackjack Road. To a lesser extent, the road reserves of Elys Lane, Leafy Lane and Harmony Way also contain some suitable habitat features for the species.

Swift Parrot (FFG: Critically Endangered, EPBC: Critically Endangered)

The Swift Parrot migrates to the south-eastern mainland states in winter after breeding in Tasmania and is found mainly in dry forest and woodland of the box-ironbark region on the inland slopes of the Great Dividing Range. Key Eucalypt species include Yellow Gum, Red Ironbark, Yellow Box and Grey Box with particular favour given to large, mature trees. The species is also known to use large, flowering Eucalypts within urban landscapes.

Stage 1 revealed 476 VBA records in the surrounding landscape with the most recent record occurring in 2018.

Large areas of intact box-ironbark forest/ woodland within the study area are limited to the vegetation in the south from Habitat Zone 1 to Blackjack Road, although large trees are limited in this area. The high density of scattered large Eucalypts throughout the rest of the study area does provide some suitable foraging opportunities for the species. In particular, areas containing preferred Eucalypts including the southern end of Harmony Way, Habitat Zone 6, and the road reserves of Douglas Lane, Elys Lane, Shady Lane and Leafy Lane.

Brown Treecreeper (EPBC: Vulnerable)

The Brown Treecreeper occurs in dry open Eucalypt forests and woodlands throughout central Victoria from the Grampians through the inland slopes of the Great Dividing Range and to the coast. The species prefers rough-barked Eucalypts, usually in areas with a sparse shrub layer and an open grassy understorey.

Stage 1 revealed 139 VBA records in the surrounding landscape with the most recent occurring in 2021.

Suitable habitat in the study area is similar to that of the Swift Parrot, with the large, connected area of box woodland to the south providing some suitable foraging habitat although limited nesting habitat. The Market Street/ Bagshaw Street Woodland contains moderate habitat due to the presence of large, hollow bearing favoured tree species, however large patches of Gorse occur throughout the woodland. Areas containing optimal habitat with grassy understorey, sparse shrubs and a high density of hollow-bearing trees include the southern end of Harmony Way, Habitat Zone 6, and the road reserves of Douglas Lane, Elys Lane and Leafy Lane.

6 Fauna Surveys

Assessment of suitable habitat was undertaken for locally-occurring threatened species. As recommended in the Stage 1 assessment, targeted fauna surveys were undertaken for species with highly localised habitat that may be placed at risk due to the amendment. These species are Golden Sun Moth *Synemon plana* and Brown Toadlet *Pseudophryne bibronii*.

6.1 Golden Sun Moth

The Golden Sun Moth is listed as 'Vulnerable' under both the *Victorian Flora and Fauna Guarantee Act 1988* and the commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Description

The Golden Sun Moth is a medium-sized day-flying moth with a wingspan of approximately 3.1cm in females and 3.4cm in males. In males, the upper side of the forewing is dark brown with pale grey patterning and the hind wing a dark bronze-brown with dark brown patches. Females have a dark grey upper side of the forewing with pale grey patterning, and the hind wing bright orange with black submarginal spots (DEWHA 2009).



Figure 38. Female Golden Sun Moth (DEWHA 2009)



Figure 39. Male Golden Sun Moth (DEWHA 2009)

Habitat

The Golden Sun Moth (GSM) is known to occur in native grasslands and grassy woodlands containing Wallaby Grass *Rytidosperma spp.*, Spear Grass *Austrostipa spp.* and *Bothriochloa spp.* It has recently been determined that they also occur in degraded grasslands dominated by exotic Chilean Needle-grass *Nassella neesiana*. It is thought that areas containing inter-tussock space are particularly important in helping males locate females (DEWHA 2009).

Life-Cycle

The larval stage of the GSM lasts for two to three years where larvae feed underground on roots of grasses. The adult stage lasts one to four days where moths emerge for breeding. This typically occurs between October and January but is dependent on climate and geography (DEWHA 2009).

Threats

The GSMs listing as 'Vulnerable' under both state and federal biodiversity legislation is primarily due to threats from loss, degradation, modification and fragmentation of habitat. Specific threatening processes to habitat relevant to judgements on significance include vegetation removal, loss of inter-tussock space, weed invasion and soil compaction.

Survey Methodology

To maximise the chance of detection, visual-encounter surveys for GSM are required to follow DEWHA (2009) guidelines. The survey guidelines that were applied for this study included:

- Surveys conducted by experienced ecologists.
- Surveys conducted across the entire site, irrespective of vegetation condition.
- Surveys undertaken during the local flying season.
- Surveys were conducted at approximately weekly intervals providing suitable days were available.
- Suitable days were selected based on the following conditions:
 - Hot days where the temperature reached 20° by 10am
 - Clear or mostly cloudless skies
 - Still or relatively still wind conditions
 - At least 2 days since rain

Surveys were conducted utilising the transect method. Transects were walked 5m apart throughout the suitable habitat.

Survey Locations

Two properties within the Plan Harcourt study area were deemed to hold the required habitat features suitable for the Golden Sun Moth. Location 1 occurs on private property within a mostly modified environment. However, stands of remnant *Rytidosperma* species persist with ample inter-tussock space. Granitic outcrops and scattered, mature Grey Box and River-red Gum occur in the surrounding area.

Location 2 occurs on private property as a patch of remnant grassy woodland with a canopy containing a variety of Eucalypt species. A moderate cover of Bristly Wallaby Grass *Rytidosperma setaceum*, Slender Wallaby Grass *Rytidosperma racemosum*, Common Wallaby Grass *Rytidosperma caespitosum* and Rough Spear Grass *Austrostipa scabra* occurs throughout the woodland.

Survey locations are illustrated in Map 3.



Figure 40. Survey Location 1



Figure 41. Survey Location 2

Results

Survey	1	2	3	4
Date	12/01/2024	23/01/2024	30/01/2024	5/02/2024
Assessor	W. Tester	W. Tester	W. Tester	W. Tester
Reference Site/ GSM Recorded*	Broadmeadows/ 1	Broadmeadows/ No	Broadmeadows/ No	Broadmeadows/ No
Start Time	10:15	10:15	10:30	10:30
Air Temp. (°C)	26.4	21.9	22.8	22.1
Relative Humidity (%)	68	54	56	65
Wind Direction & Speed (km/h)	NW 6	NE 8	S 6	S 15
Cloud Cover (%)	<5	<5	0	80%
GSM Detected on Site	No	No	No	No

*The Ecological Consultants Association of Victoria (ECAV) Flight Diary was accessed during survey days to determine flight activity at known reference sites. For surveys 2-4, *Ranges Environmental* conducted reference site checks at a known location in Broadmeadows, resulting in no observations of GSM. Flight activity on those days was therefore not confirmed.

However, given the lack of observations on the site during survey 1, a day of known flight activity, and lack of observations during days of suitable conditions (surveys 1-3), it is expected that results would not vary during days of known flight activity and that the Golden Sun Moth are not present at the survey locations.

Limitations

Biodiversity assessments generally do not capture all fauna species present in the study area. Time and seasonal constraints, weather conditions, survey methodology used, the cryptic nature of some species, can result in some species or individuals being absent, overlooked or unable to be identified in short-term studies.

6.2 Brown Toadlet

Surveys are currently being undertaken (April 2024). However, based on results to date, it is not anticipated that further changes will be necessary to the outcomes and recommendations outlined in this report.

7 Results Summary and Planning Context

This section summarises the results in the context of the *Planning for Biodiversity* guidance (DELWP 2017) and the proposed Amendment to determine if biodiversity assets are suitably protected and, if not, inform recommendations for planning controls commensurate to the value of those assets.

7.1 High Value Biodiversity Assets Summary

Table 8 outlines the higher value biodiversity assets that were identified during the assessment in the context of DELWPs, *Planning for Biodiversity* (2017). This document is designed to assist local government in the use of the planning system to protect and conserve Victoria's biodiversity.

Table 8. Identified biodiversity values in the context of *Planning for Biodiversity* (DELWP 2017)

High biodiversity value - <i>Planning for Biodiversity</i> (DELWP 2017)	Examples within the study area
Larger, well-connected areas of native vegetation	<p>Binghams Reserve and the adjoining properties to the south and southeast to Blackjack Road form a large area of native vegetation (~35ha) which is further connected to the south of the study area all the way to Castlemaine Diggings National Heritage Park.</p> <p>The Market Street-Bagshaw Street woodland covers approximately 11 hectares. However, connectivity is currently limited.</p>
Areas with higher strategic biodiversity value scores	<ul style="list-style-type: none"> • The northern portions of Barkers Creek • Vegetated areas in the central south • Along the railway line and west to the Calder Freeway • Some areas of the north-east. <p>Site assessments confirmed the mapped high Strategic Biodiversity (SBV) areas as:</p> <ul style="list-style-type: none"> • Barkers Creek Riparian Corridor • Binghams Reserve and surrounds • Symes Road/ rail corridor • Elys and Leafy Lanes
Areas that are highly localised habitat for rare or threatened species, particularly if they are areas of highly localised habitat for multiple rare or threatened species	<ul style="list-style-type: none"> • Dianella tarda is known to occur or was observed during site assessments in the following areas: <ul style="list-style-type: none"> – Rail corridor – Elys Lane – Leafy Lane – Douglas Lane

High biodiversity value - <i>Planning for Biodiversity</i> (DELWP 2017)	Examples within the study area	
	<ul style="list-style-type: none"> • Large patch of box woodland from Habitat Zone 1 to Blackjack Road known to contain Castlemaine Spider Orchid • Habitat for Brown Toadlet: drainage lines and depressions across the study area (survey results TBC) • Habitat for Golden Sun Moth is limited. Surveys in suitable habitat areas revealed none present 	
<p>Important areas of habitat within dispersed habitats for rare or threatened species or areas of habitat for many dispersed rare or threatened species</p>	<ul style="list-style-type: none"> • The following areas within the study area contain suitable habitat for a range of threatened species with dispersed habitats (e.g. Woodland birds and Brush-tailed Phascogale). <ul style="list-style-type: none"> <li style="width: 50%;">- Elys Lane <li style="width: 50%;">- Large patch of box woodland from Habitat Zone 1 to Blackjack Road <li style="width: 50%;">- Leafy Lane <li style="width: 50%;">- Southern end of Harmony Way <li style="width: 50%;">- Douglas Lane <li style="width: 50%;">- Barkers Creek/ Mills Road Waterway <li style="width: 50%;">- Habitat Zone 6 <li style="width: 50%;">- Symes Road Rail Corridor <li style="width: 50%;">- Barkers Creek <li style="width: 50%;">- Picnic Gully Creek 	
<p>Native vegetation in good condition (i.e. with higher condition scores)</p>	<ul style="list-style-type: none"> • Bingham's Reserve (Habitat Zone 1) received a high condition score of 72% of the Heathy Dry Forest Benchmark. • Some other areas of native vegetation that are in good condition but received low scores due to poor landscape context include: <ul style="list-style-type: none"> <li style="width: 50%;">- Elys Lane <li style="width: 50%;">- Leafy Lane <li style="width: 50%;">- Habitat Zone 6 <li style="width: 50%;">- Symes Road Rail Corridor 	
<p>Waterways and sensitive wetlands and coastal areas</p>	<ul style="list-style-type: none"> • Barkers Creek • Picnic Gully Creek • Unnamed watercourse from Mills Road/ Harmony Way to Barkers Creek • Habitat Zones 4 and 5 identified as the endangered EVC Redgum Swamp (EVC 292) 	
<p>Significant roadsides and wildlife corridors</p>	<ul style="list-style-type: none"> <li style="width: 50%;">• Barkers Creek <li style="width: 50%;">• Leafy Lane <li style="width: 50%;">• Picnic Gully Creek <li style="width: 50%;">• Elys Lane <li style="width: 50%;">• Mills Road/ Harmony Way to Barkers Creek Watercourse <li style="width: 50%;">• Douglas Lane <li style="width: 50%;">• Symes Road/ Rail corridor <li style="width: 50%;">• Shady Lane <li style="width: 50%;">• Harmony Way (South) <li style="width: 50%;">• Craigie Street 	

7.2 The Amendment

As discussed in Section 6 of the Stage 1 report, the proposed measures outlined in the Amendment are targeted towards strategic growth rather than biodiversity protection. Table 9 provides review of the areas subject to the proposed Amendment and outlines high value biodiversity identified during the Stage 2 site assessments that may be at risk from the proposed amendment. Amendment proposal areas are illustrated in Map 1.

Table 9. High value biodiversity potentially impacted by the Amendment

Amendment proposal area	Amendment description	High value biodiversity
Town Centre	<ul style="list-style-type: none"> – Rezoning ~3.16ha from TZ to C1Z. – Rezoning land at Stanley Park North from RZ1 to PPRZ 	<ul style="list-style-type: none"> – Scattered Large Trees
Growth Area A	<ul style="list-style-type: none"> – Rezoning ~10 hectares from Farming Zone to Neighbourhood Residential Zone Schedule 1 – Apply specific design requirements through the Development Plan Overlay – Schedule 12 (DPO12). 	<ul style="list-style-type: none"> – Scattered Large Trees – Large trees and habitat corridor along Picnic Gully Creek
Growth Area B	<ul style="list-style-type: none"> – Rezoning ~10 hectares from Farming Zone to Neighbourhood Residential Zone Schedule 1 – Apply specific design requirements through the Development Plan Overlay – Schedule 12 (DPO12). 	<ul style="list-style-type: none"> – Scattered large trees – Large trees and habitat corridors along Leafy Lane, Shady Lane and Craigie Street
Growth Area C	<ul style="list-style-type: none"> – Identified for town expansion to support future residential growth. All lots are currently zoned Farming Zone (FZ) 	<ul style="list-style-type: none"> – Habitat Zones 4 & 5 consist of the endangered EVC; Red-gum Swamp – Large trees and habitat corridors along Elys Lane, Leafy Lane, Shady Lane and Craigie Street – Scattered large trees
Growth Area D	<ul style="list-style-type: none"> – Identified for town expansion to support future residential growth. All lots are currently zoned Farming Zone (FZ) 	<ul style="list-style-type: none"> – Scattered large trees
27 Craigie Street	<ul style="list-style-type: none"> – Additional parcel identified for town expansion as recommended during the panel hearing. Currently zoned Farming Zone (FZ) 	<ul style="list-style-type: none"> – Large trees and habitat corridor along Picnic Gully Creek – Scattered large trees – Large trees along Market Street

Amendment proposal area	Amendment description	High value biodiversity
1 Poplar Drive	<ul style="list-style-type: none"> - Additional parcel identified for town expansion as recommended during the panel hearing. Currently zoned Farming Zone (FZ) 	<ul style="list-style-type: none"> - Scattered indigenous trees
Other residential Areas throughout study area	<ul style="list-style-type: none"> - Rezoning 135ha of land from TZ or GRZ to NRZ1 	<ul style="list-style-type: none"> - Scattered large trees - Large trees and habitat corridor along Picnic Gully Creek - Large trees and habitat corridor along Barkers Creek - Large trees and habitat corridor along Unnamed waterway (Barkers Creek to Mills Road) - Large area of intact remnant vegetation north of Blackjack Road to Habitat Zone 1 and adjoining vegetation to the northeast. - Habitat corridor along southern end of Harmony Way - Woodland south of Market Street (Habitat Zone 2)
Township Boundary (northeast)	<ul style="list-style-type: none"> - Amend the proposed township boundary in the northeast corner to follow parcel boundaries rather than Eagles Channel. 	<ul style="list-style-type: none"> - Habitat Corridors of Douglas Lane, Elys Lane - EPBC listed Yellow-box Grassy Woodland (Habitat Zone 6)

8 Recommendations

A number of high value biodiversity assets were identified during Stage 1 and ground truthed during stage 2. The recommended planning controls proposed in this section are commensurate to the asset requiring protection as per the *Planning for Biodiversity* guidance (DELWP 2017) and *PPN07: Vegetation Protection in Urban Areas* (DNRE 1999).

In order to direct development away from and provide suitable protection to high value biodiversity in the study area, the following planning controls are recommended as described below and illustrated in Maps 5 and 6.

These controls will contribute to the goals and objectives set out in the Planning Policy Framework, 'To protect and enhance Victoria's biodiversity' and in the Victorian Governments, *Biodiversity 2037* that 'Victoria's natural environment is healthy'.

8.1 Environmental Significance Overlay

8.1.1 Schedule 5 (ESO5)

It is recommended that the current ESO5 that Barkers Creek is subject to be applied to Picnic Gully Creek and the Barkers Creek to Mills Road waterway as these areas provide important habitat and connectivity in the landscape. The protection of these areas will also reduce erosion and improve water quality.

Existing Objectives

to achieve the environmental objectives outlined in the schedule including:

- To maintain the quality and quantity of water within the watercourse.
- To maintain the ability of streams and watercourses to carry natural flows.
- To prevent erosion of banks, streambeds and adjoining land and the siltation of watercourses, drains and other features.
- To protect and encourage the long term future of flora and fauna habitats along watercourses.
- To ensure development does not occur on land liable to flooding.
- To prevent pollution and increased turbidity of water in natural watercourses.
- To prevent increased surface runoff or concentration of surface water run-off leading to erosion or siltation of watercourses.
- To conserve existing wildlife habitats close to natural watercourses and, where appropriate, to allow for generation and regeneration of habitats.
- To minimise the potential damage caused to human life, buildings and property by flood waters.
- To restrict the intensity of use and development of land and to activities which are environmentally sensitive and which are compatible with potential drainage or flooding hazards.

8.1.2 Schedule 8 (ESO8)

Habitat Zones 4 and 5 are remnants of the endangered EVC Red-gum Swamp (EVC 292). Considering a current schedule to the ESO does not exist for the purpose of protecting important ephemeral waterways, wetlands and associated vegetation, it is recommended that a new schedule to the ESO is created.

Environmental Significance

The extent of these vegetation communities and hydrological systems are greatly reduced due to land clearing and the modification of natural water flows. These ecological communities and systems provide habitat for threatened flora and fauna including Common Pipewort *Eriocaulon scariosum* and Brown Toadlet *Pseudophryne bibronii*. Furthermore, they provide ecosystem services including flood mitigation, groundwater recharge and erosion and siltation prevention, contributing to the health of waterways.

Environmental Objectives

The ESO8 is proposed to achieve the following environmental objectives:

- To protect depleted ephemeral waterways and wetlands
- To protect threatened species and communities
- To prevent flooding, erosion and siltation by allowing water to move slowly through natural systems

Limitations of Existing Controls

No controls currently exist in these areas that provide protection to the health of ephemeral waterway and wetlands, nor the fauna they provide habitat for and ecosystem services they provide.

Due to the current zoning of the land where the overlay is proposed being Farm Zone, a number of exemptions apply to the removal of native vegetation as described in Section 8.3.

8.2 Vegetation Protection Overlay

8.2.1 Schedule 3 (VPO3)

A VPO schedule aimed at protecting roadside vegetation does not currently exist in the Mount Alexander planning scheme. It is therefore recommended that the VPO3 is created to protect significant roadsides in the study area which could also be applied throughout the shire where appropriate. This type of VPO is not uncommon across the State. As shown on Maps 5 and 6, roadsides throughout the study area where a VPO is recommended include Elys Lane, Leafy Lane, Douglas Lane, Craigie Street, Harmony Way, Blackjack Road, Symes Road and Shady Lane (north).

Vegetation Significance

Remnant vegetation on roadsides, particularly in highly modified landscapes, provides for often what is the only remaining natural environment in the area. A diverse array flora species remain on roadsides throughout the municipality, preserving genetic diversity in the region. Many of these species are also threatened in Victoria and federally. Roadside vegetation also provides crucial habitat corridors for fauna, in some cases

providing linkages between large areas of remnant bushland, contributing to the viability of important fauna populations including threatened species such as the Brush-tailed Phascogale *Phascogale tapoatafa*.

Vegetation Protection Objectives

The VPO3 aims to achieve the following vegetation protection objectives:

- To protect remnant vegetation including threatened flora
- To protect threatened vegetation communities including Yellow and Grey Box Grassy Woodlands
- To protect habitat corridors for fauna
- To ensure population viability of fauna species by maintaining connectivity between large areas of remnant vegetation

Limitations of Existing Controls

While most of the vegetation on roadsides is protected under Clause 52.17, a number of exemptions apply as outlined in Clause 52.17-7 including 'fences' and 'vehicle access from public roads'.

The VPO also considers protection at a greater scale, ensuring threatened species, fauna habitat and landscape connectivity is not overlooked.

8.2.2 Schedule 4 (VPO4)

A separate VPO is proposed to protect important vegetation communities and habitat in areas of vegetation not specific to roadsides. Vegetation recommended to be covered by this VPO includes the Yellow Box Grassy Woodland on the corner of Leafy Lane and Douglas Lane (Habitat Zone 6), the large woodland south of Market Street (Habitat Zone 2), the Bingham Road/ Mills Road patch and unprotected scattered large trees throughout the township.

Vegetation Significance

The shire retains significant remnant patches of vegetation communities that are listed as threatened under both state and federal legislation including Yellow Box Grassy Woodland and Derived Native Grassland, listed as critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999*.

Large trees remain within these patches as well as scattered throughout cleared areas which provide 'stepping stone' habitat for foraging fauna and often contain habitat hollows crucial to the survival of a suite of birds and arboreal mammals, many of which are threatened. The Mount Alexander region has been noted as being a stronghold for the Brush-tailed Phascogale *Phascogale tapoatafa*, which is experiencing a contraction of range in other areas of the State.

Vegetation Protection Objectives

The objectives of the proposed VPO4 are:

- To protect habitat suitable for locally-occurring threatened species
- To protect habitat corridors, stepping stone habitat and connectivity in the landscape
- To protect threatened flora and vegetation communities

Limitations of Existing Controls

The Market Street woodland and the EPBC listed Yellow Box Grassy Woodland occur on land zoned as Farming Zone, which allows for a range of permit exemptions as discussed in Section 8.3 resulting in inadequate protection of biodiversity values.

The Bingham Road/ Mills Road patch is situated close to the large area of remnant vegetation adjoining Habitat Zone 1 and provides suitable habitat for threatened woodland birds and the Brush-tailed Phascogale. These threatened species and landscape habitat values are not considered under the protection of Clause 52.17.

As highlighted in the Stage 1 report, scattered large trees occur on lots less than 0.4 hectares and are therefore not protected under Clause 52.17 due to the 'site area' exemption outlined in 52.17-7. The VPO has been mapped at a radius of 15 meters around the subject trees in order to encompass the maximum possible Tree Protection Zone.



Figure 42. Significant large River Red-gum currently unprotected due to the 'site area' exemption

8.3 Rural Conservation Zone

It is recommended that the large area of connected remnant vegetation in the south of the study area from Blackjack Road to Habitat Zone 1 be rezoned to Rural Conservation Zone. This area is contiguous to large areas of native vegetation south of the study area including Castlemaine Diggings National Heritage Park where recent records of Brush-tailed Phascogale have occurred. The critically endangered Castlemaine Spider Orchid is also known to occur in this area.

According to Table 1 of the *Planning for Biodiversity* guidance (DELWP 2017), Rural Conservation Zone is the appropriate planning tool for:

"Large relatively intact natural areas where land use under the existing zone may result in the loss of important biodiversity. For example, an area that has been zoned for rural living that has not yet been subdivided/developed and contains important biodiversity values."

Limitations of Existing Controls

The existing Farming Zone does not provide adequate protection, nor does it reflect the current land use. The proposed NRZ1 affecting properties in the northern portion does not direct development away from the high value biodiversity area.

Under the Farm Zone, a number of exemptions apply to the removal of native vegetation including:

- Native vegetation removed to allow maintenance of an existing accessway, dam, utility service, building or works used for agriculture, bore and horticultural trellising, within 10m of the works.
- Native vegetation removed to allow construction of an existing accessway, dam, utility service, building or works used for agriculture and bore, up to:
 - 1 hectare of native vegetation which does not include a tree.
 - 15 native trees with a trunk diameter of less than 40 centimetres at a height of 1.3 metres above ground level
 - 5 native trees with a trunk diameter of 40 centimetres or more at a height of 1.3 metres above ground level.
- Native vegetation removed to allow construction of a dwelling up to:
 - 300 square metres of native vegetation which does not include a tree.
 - 5 native trees with a trunk diameter of less than 40 centimetres at a height of 1.3 metres above ground level.
 - 1 native tree with a trunk diameter of 40 centimetres or more at a height of 1.3 metres above ground level.
- (When under a BMO) Native vegetation removed to enable the construction, alteration or extension of a dwelling and create the required defensible space.

8.4 Township Boundary

The panel report concluded that the use of property boundaries is preferred over Eagles Channel for the township boundary. Stage 1 outlined that results of the Stage 2 assessment should be considered in determining the alignment of the township boundary.

The VPO3 has been recommended to protect high value roadsides in this area. However, access was not granted to 1 leafy lane, which appears to contain high value habitat and vegetation. It is recommended that a precautionary approach be taken, where a lack of site assessments should not justify a lack of protection. With this in mind, as well as the significance of the EPBC listed vegetation community of Habitat Zone 6, it is recommended that these properties are excluded from the township boundary.

It is considered appropriate for the township boundary to continue on Douglas Lane south of Leafy Lane to Market Street, particularly considering that 27 Craigie Street has been proposed as a future growth area. The recommended township boundary alignment is shown in Maps 5 and 6.

8.5 Other Recommendations

Controls Beyond Study Area

While the scope of this biodiversity assessment is within the identified study area, it is highly recommended that consideration of some areas outside the study area is undertaken. In particular, the VPO on Elys Lane and the ESO on Picnic Gully Creek. In order to achieve the objectives of these overlays, they should be applied beyond the study area to provide connectivity to Mount Alexander Regional Park via Coopers Road as illustrated in Maps 5 and 6.

Compliance and Enforcement

Site assessments revealed domestic use including dumping of green waste, construction of stairs and earthworks beyond the boundaries of properties adjoining Barkers Creek and Picnic Gully Creek which can result in erosion and degradation of the waterways. Further to the application of the overlays recommended in this report, Council should adequately inform residents of their obligations in relation to the overlays and follow up with compliance and enforcement.



Figure 43. Earthworks in the Barkers Creek riparian corridor



Figure 44. Cleared vegetation resulting in erosion on the south bank of Picnic Gully Creek

Binghams Reserve Management

The Council-owned public land immediately south of the Harcourt Recreation Reserve (Habitat Zone 1) known as Binghams Road Flora Reserve or the State School Plantation Reserve is currently zoned as Public Park and Recreation Zone. While this zoning is not primarily used for nature conservation, it does include a key purpose "to protect and conserve areas of significance where appropriate". It is understood that this is currently managed by Harcourt Valley Landcare and Harcourt Valley Primary School.

The vegetation persisting in this reserve is of the highest quality in the town of Harcourt and is currently under threat from high-threat weed invasion and soil disturbance through the construction of bicycle trails and jumps. It is considered that threats to this high value area are best mitigated through management actions as

opposed to planning controls. The following actions could aid in maintaining the high quality of vegetation in the reserve for the benefit of future generations:

- Inform the community of the high-quality vegetation found in the reserve
- Integrate the management of the reserve to include Council, Traditional Owners and surrounding landowners
- Provide interpretive signage in the reserve for flora and fauna education

9 References

- DEH (2006) *White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands*, Department of Environment and Heritage, Commonwealth of Australia
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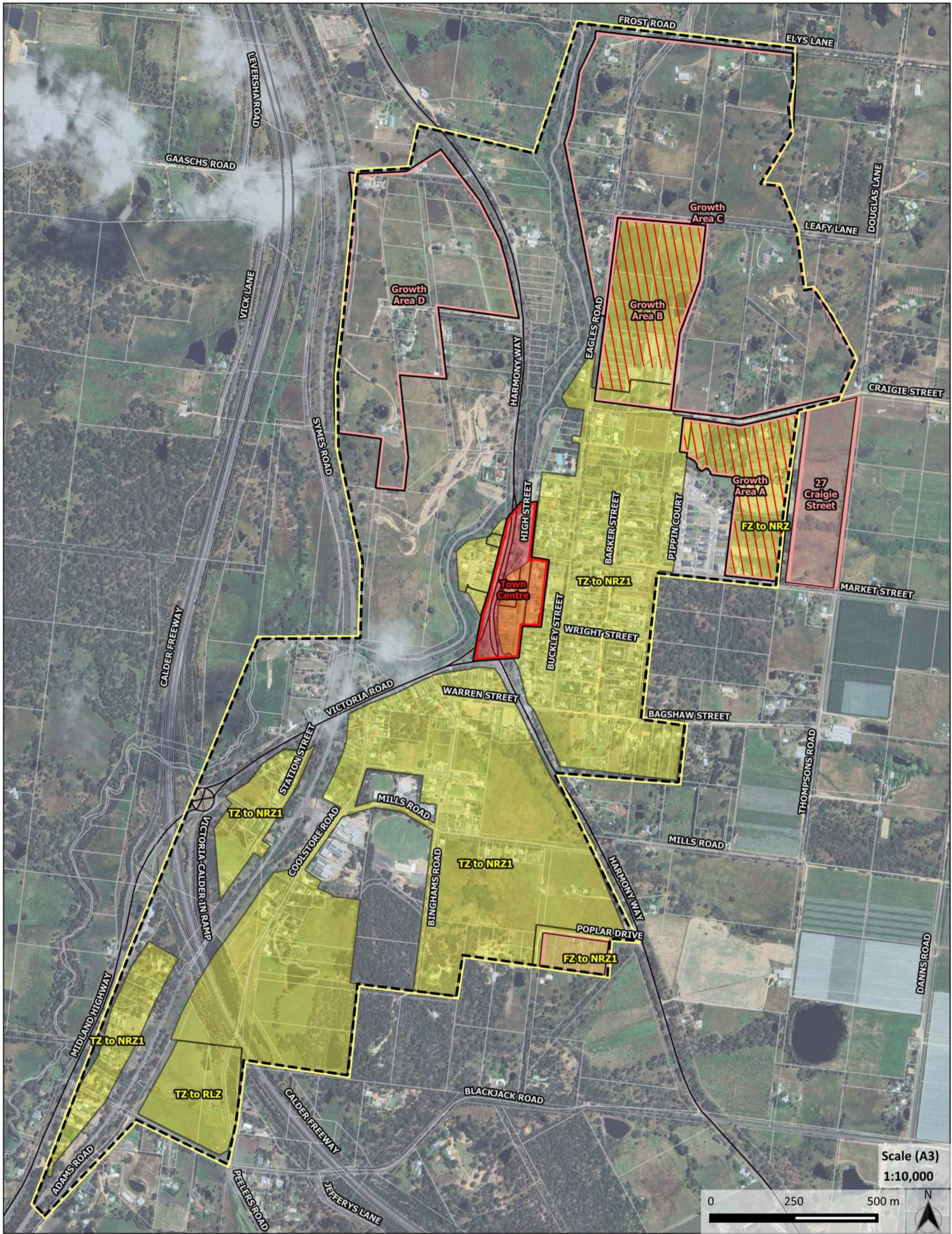
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Appendix 1 – Maps and Plans

The following maps were produced using QGIS 3.28 and developed from various datasets including:

- Aerial photography available through Google Earth (AusMap) and Metromap
- VicMap layers (Parcel, Roads, Waterways and Local Government Boundaries)
- Spatial data provided by Mount Alexander Shire Council
- GPS based data collected in the field



Map 1 - Overview of Proposed Amendment

Plan Harcourt
Amendment C94malx

Proposed Township Boundary (Subject to Change)

Growth Areas

Additional Growth Areas

Town Centre

Zone Changes

Development Plan Overlay

TZ - Township Zone
RLZ - Rural Living Zone

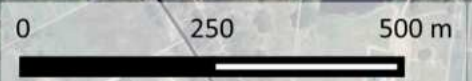
FZ - Farming Zone

NRZ1 - Neighbourhood Residential Zone 1



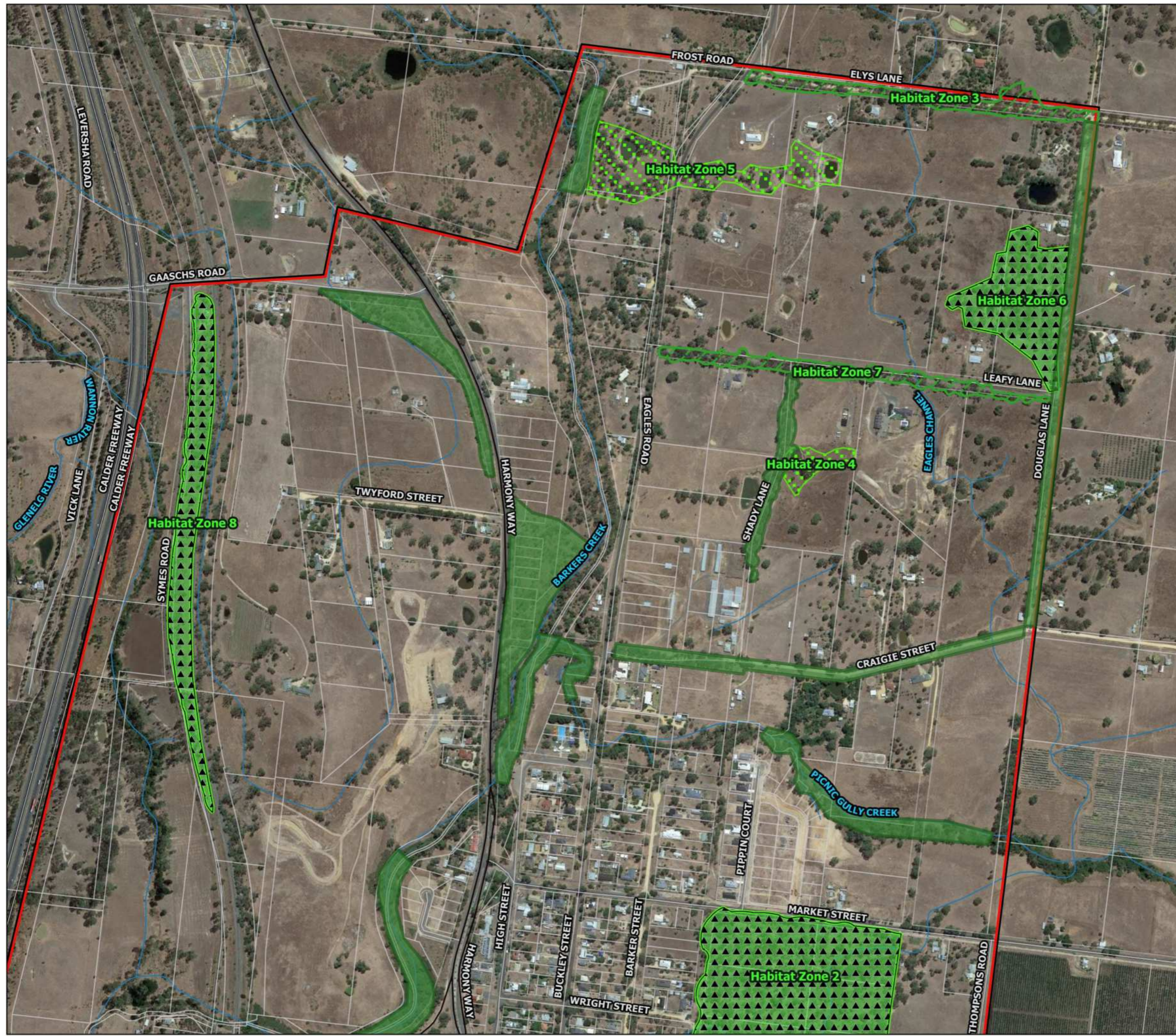
info@rangesconsulting.com

Scale (A3)
1:10,000



Map 2A - Vegetation Assessments (North)

Plan Harcourt
Amendment C94malx

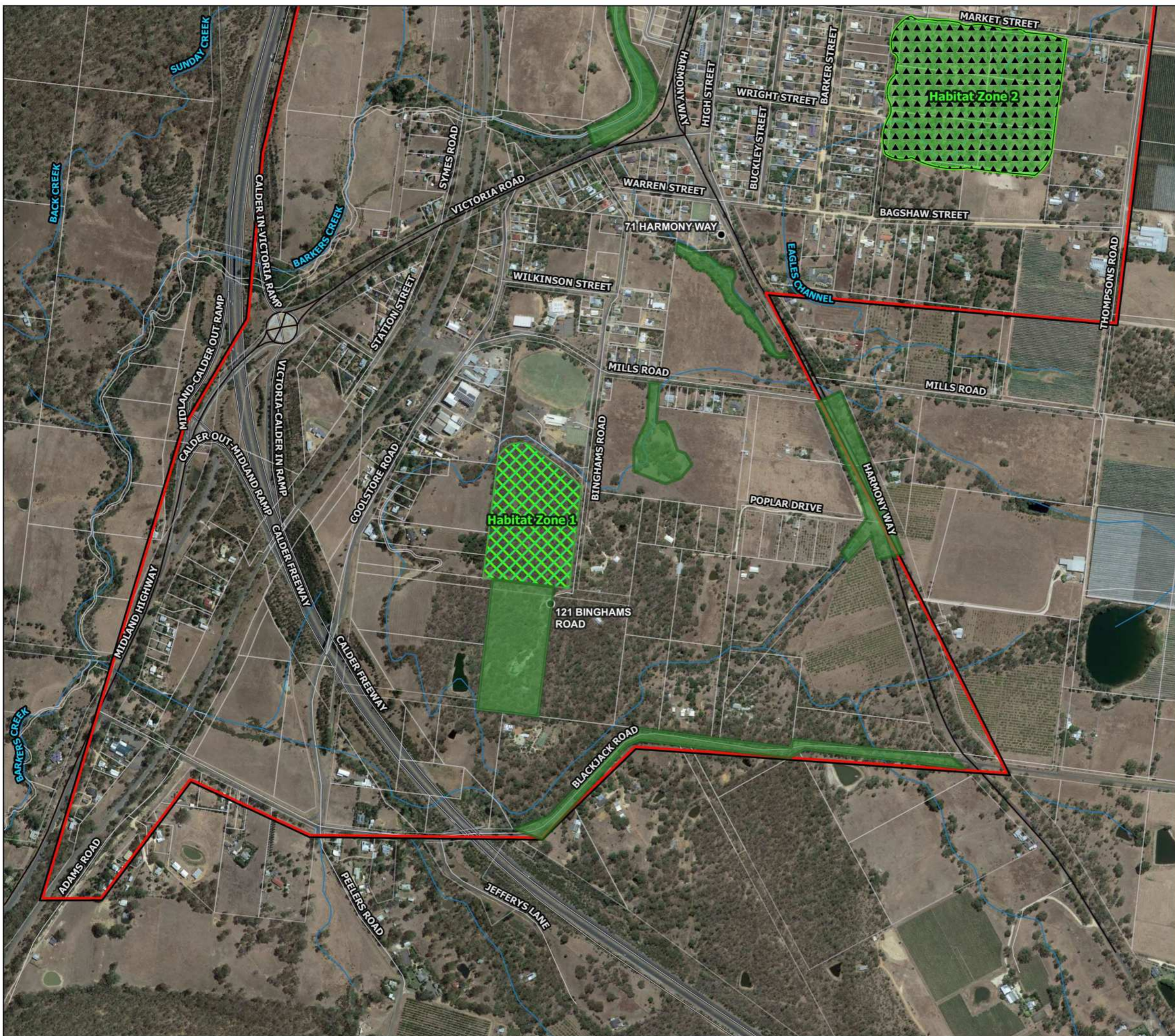


- Study Area
- Vegetation Quality Assessments
- Habitat Hectare Assessments**
 - Alluvial Terraces Herb-rich Woodland (EVC 67)
 - Grassy Woodland (EVC 175)
 - Red Gum Swamp (EVC 292)

Date: 24 January 2024
Created by: William Tester
Map Program: QGIS 3.28



Scale (A3)
1:7,000





Map 2B - Vegetation Assessments (South)

Plan Harcourt
Amendment C94malx

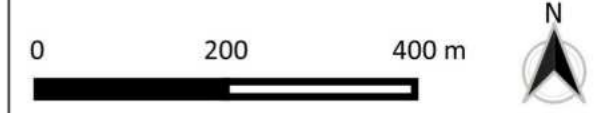
-  Study Area
-  Vegetation Quality Assessments

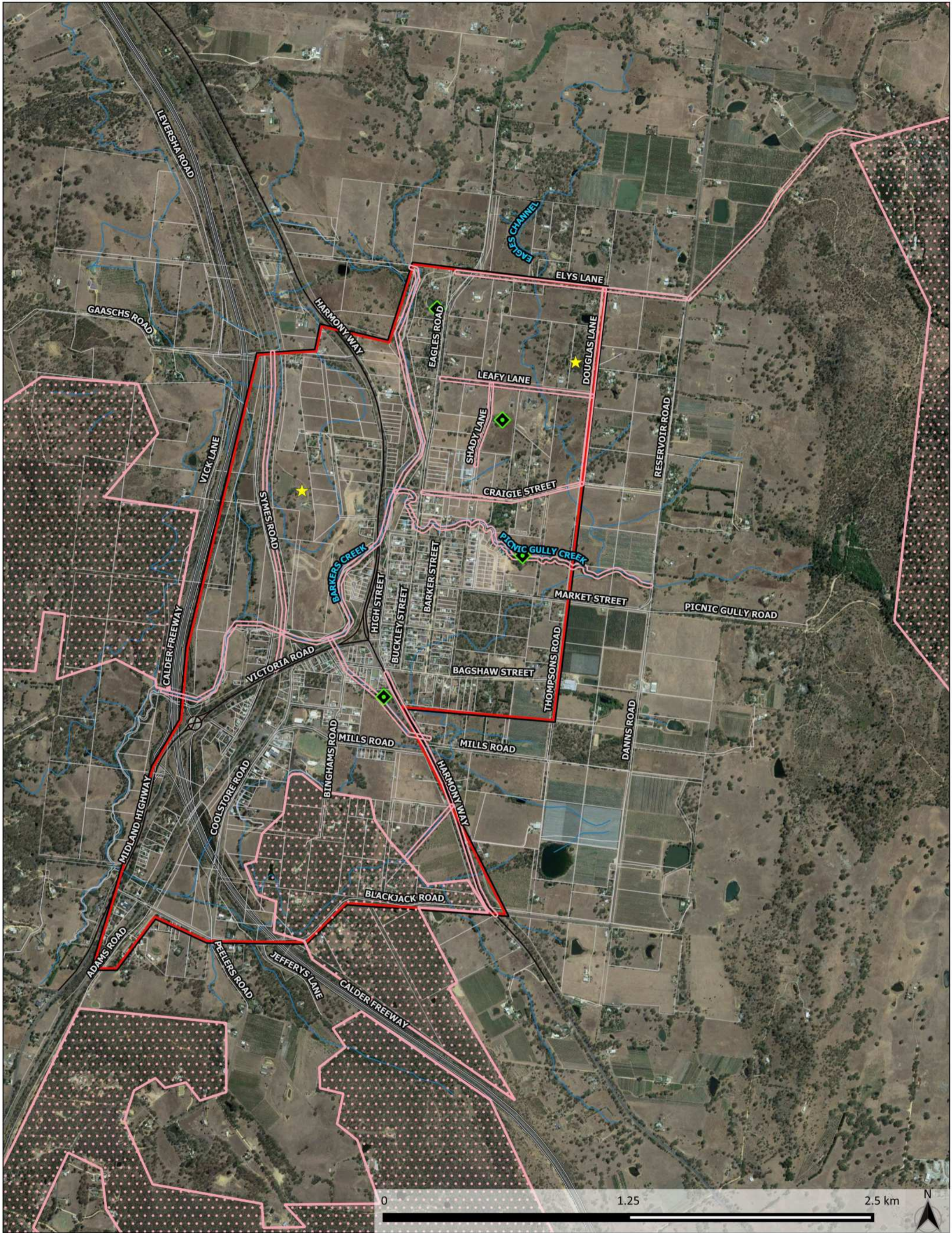
Habitat Hectare Assessments

-  Grassy Woodland (EVC 175)
-  Heathy Dry Forest (EVC 20)

Date: 24 January 2024
Created by: William Tester
Map Program: QGIS 3.28

Scale (A3)
1:8,000






Map 3 - Habitat Corridors and Fauna Survey Locations

Plan Harcourt
Amendment C94malx

Created by: William Tester
Date: 24/01/2024

 Study Area

 Native Vegetation Core Area (>50ha)

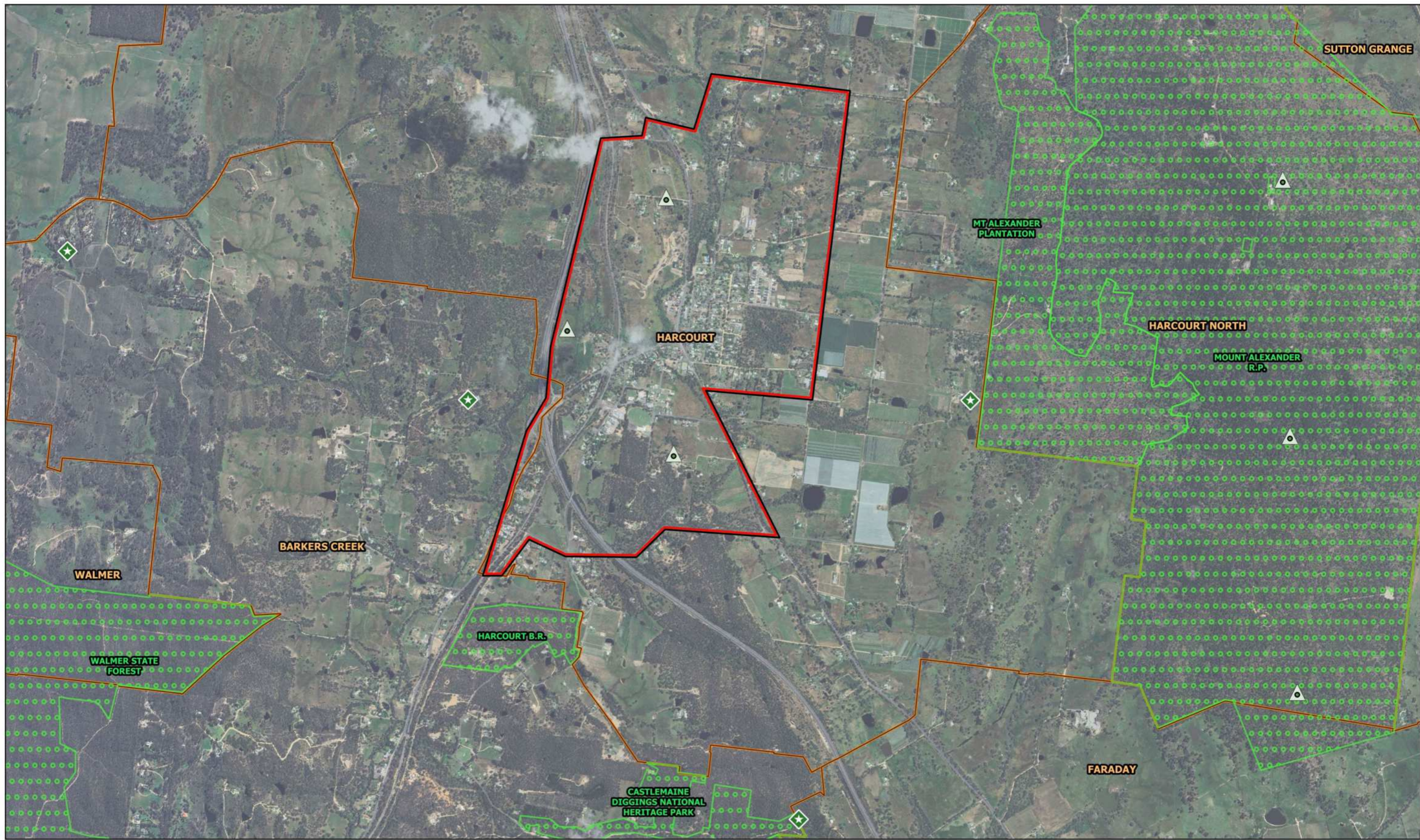
 Habitat Corridor

 Brown Toadlet Surveys



 Golden Sun Moth Surveys



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Local Phascogale Records

-  Victorian Biodiversity Atlas
-  Thesis Records (Lawton 2022)

 Study Area

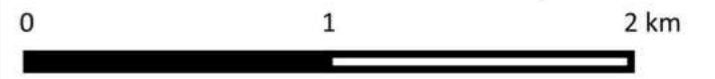
 Local Public Land Reserves

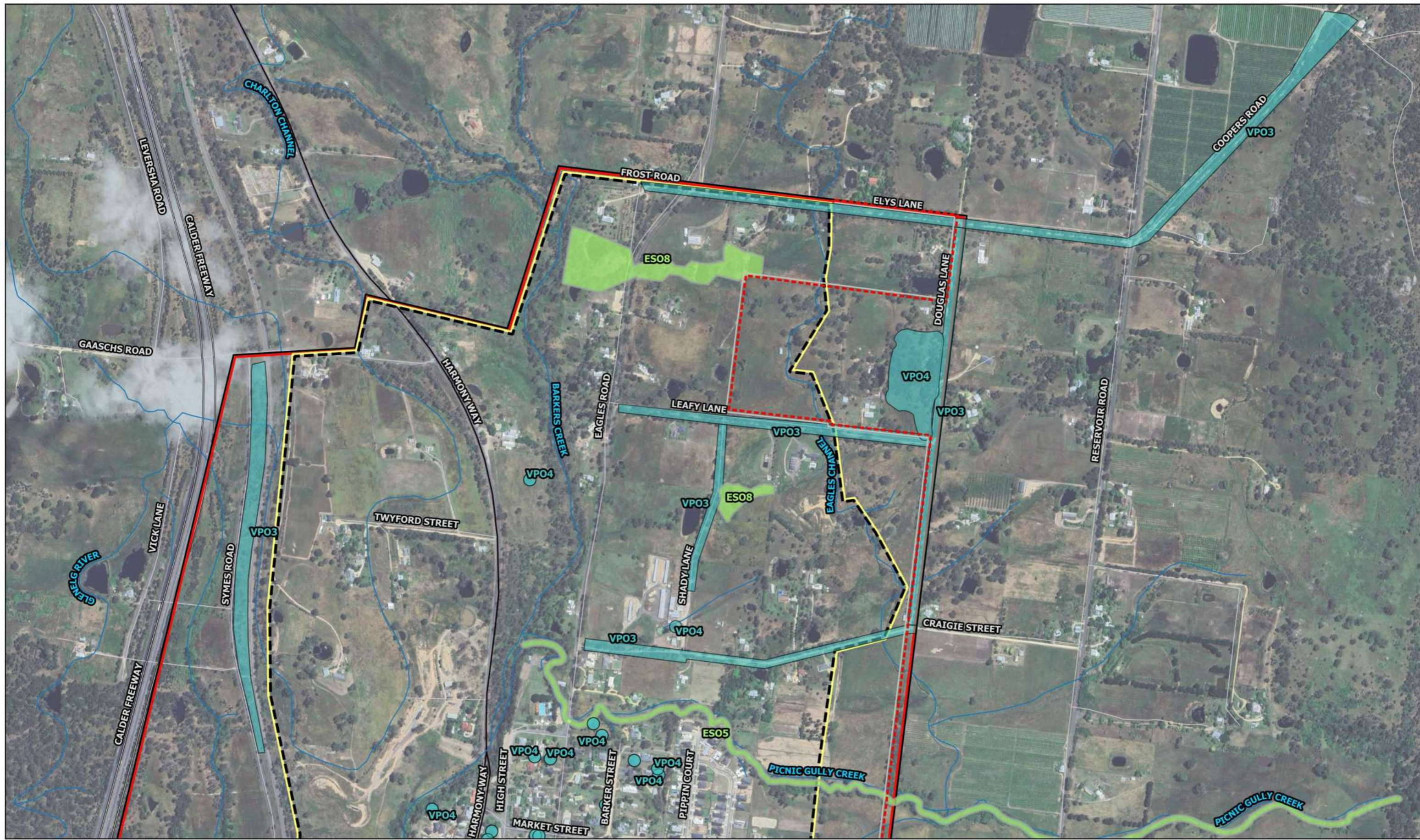
 Locality

Map 4 - Brush-tailed Phascogale Records

Plan Harcourt
Amendment C94malx

Scale (A3)
1:25,000





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Created by: William Tester
 Date: 19 April 2024
 Map Program: QGIS 3.28

- Recommended Controls**
- Vegetation protection Overlay
 - Environmental Significance Overlay
 - Study Area
 - Proposed Township Boundary
 - Recommended Alternate Alignment

Map 5 - Recommended Planning Controls (North)

Plan Harcourt
 Amendment C94malx

Scale (A3)
 1:8,500

0 250 500 m



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Created by: William Tester
 Date: 19 April 2024
 Map Program: QGIS 3.28

Recommended Controls

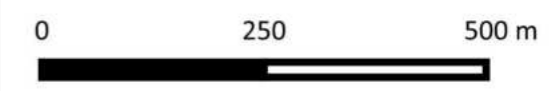
- Vegetation protection Overlay
- Environmental Significance Overlay
- Rural Conservation Zone

- Study Area
- Proposed Township Boundary
- Recommended Alternate Alignment

Map 6 - Recommended Planning Controls (South)

Plan Harcourt
 Amendment C94malx

Scale (A3)
 1:8,500



Appendix 2 – Flora List

* - Exotic Origin # - Victorian native occurring outside natural range C - CaLP Act Regionally Controlled Weed

Origin	Scientific Name	Common Name	Lifeform
*	<i>Acacia baileyana</i>	Cootamundra Wattle	Medium shrub
	<i>Acacia dealbata</i>	Silver Wattle	Understorey tree or large shrub
*	<i>Acacia decurrens</i>	Early Black-wattle	Understorey tree or large shrub
	<i>Acacia genistifolia</i>	Spreading Wattle	Medium shrub
	<i>Acacia implexa</i>	Lightwood	Understorey tree or large shrub
	<i>Acacia mearnsii</i>	Black Wattle	Understorey tree or large shrub
	<i>Acacia paradoxa</i>	Hedge Wattle	Medium shrub
	<i>Acacia pycnantha</i>	Golden Wattle	Medium shrub
	<i>Acaena echinata</i>	Sheep's Burr	Medium herb
	<i>Acaena X ovina</i>	Australian Sheep's Burr	Large herb
*	<i>Acetosella vulgaris</i>	Sheep Sorrel	Medium herb
*	<i>Agrostis capillaris</i>	Brown-top Bent	Medium to small tufted graminoid
*	<i>Aira elegantissima</i>	Delicate Hair-grass	Medium to tiny non-tufted graminoid
*	<i>Allium triquetrum</i>	Angled Onion	Medium herb
	<i>Amyema miquelii</i>	Box Mistletoe	Epiphyte
	<i>Anthosachne scabra</i> s.l.	Common Wheat-grass	Medium to small tufted graminoid
*	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	Medium to small tufted graminoid
*	<i>Arctotheca calendula</i>	Cape Weed	Medium herb
	<i>Arthropodium strictum</i> s.l.	Chocolate Lily	Large herb
*	<i>Asparagus asparagoides</i>	Bridal Creeper	Scrambler or climber
	<i>Austrostipa mollis</i>	Supple Spear-grass	Large tufted graminoid
	<i>Austrostipa scabra</i>	Rough Spear-grass	Medium to small tufted graminoid
	<i>Austrostipa</i> spp.	Spear Grass	Large tufted graminoid
*	<i>Avena fatua</i>	Wild Oat	Large non-tufted graminoid
	<i>Azolla</i> sp.	Azolla	Small or prostrate herb
	<i>Brachyloma daphnoides</i>	Daphne Heath	Medium shrub
*	<i>Briza maxima</i>	Large Quaking-grass	Medium to small tufted graminoid
*	<i>Briza minor</i>	Lesser Quaking-grass	Medium to small tufted graminoid
*	<i>Bromus diandrus</i>	Great Brome	Medium to small tufted graminoid
*	<i>Bromus hordeaceus</i>	Soft Brome	Medium to small tufted graminoid
	<i>Burchardia umbellata</i>	Milkmaids	Medium herb
	<i>Bursaria spinosa</i> subsp. <i>spinosa</i>	Sweet Bursaria	Medium shrub
	<i>Calytrix tetragona</i>	Common Fringe-myrtle	Medium shrub
	<i>Carex appressa</i>	Tall Sedge	Large tufted graminoid
#	<i>Carex inversa</i>	Knob Sedge	Medium to small tufted graminoid
	<i>Carex tereticaulis</i>	Poong'ort	Large tufted graminoid
#	<i>Cassinia sifton</i>	Drooping Cassinia	Medium shrub
*	<i>Cenchrus clandestinus</i>	Kikuyu	Large non-tufted graminoid
*	<i>Chamaecytisus palmensis</i>	Tree Lucerne	Medium shrub
	<i>Chrysocephalum apiculatum</i>	Common Everlasting	Large herb

Origin	Scientific Name	Common Name	Lifeform
	Chrysocephalum semipapposum	Clustered Everlasting	Large herb
*	Cirsium vulgare	Spear Thistle	Large herb
*	Cotula coronopifolia	Water Buttons	Medium herb
	Craspedia variabilis	Variable Billy-buttons	Medium herb
	Crassula helmsii	Swamp Crassula	Small or prostrate herb
*	Crataegus monogyna	Hawthorn	Understorey tree or large shrub
	Cynogeton procerum s.s.	Common Water-ribbons	Large tufted graminoid
*	Cynosurus echinatus	Rough Dog's-tail	Medium to tiny non-tufted graminoid
*	Cyperus eragrostis	Drain Flat-sedge	Medium to small tufted graminoid
*	Dactylis glomerata	Cocksfoot	Medium to tiny non-tufted graminoid
	Daviesia ulicifolia	Gorse Bitter-pea	Medium shrub
	Dianella revoluta s.l.	Black-anther Flax-lily	Medium to small tufted graminoid
	Dianella tarda	Late-flower Flax-lily	Medium to small tufted graminoid
	Dillwynia sericea	Showy Parrot-pea	Small shrub
*	Disa bracteata	African Weed Orchid	Medium herb
	Drosera auriculata	Tall Sundew	Medium herb
	Eleocharis acuta	Common Spike-sedge	Medium to tiny non-tufted graminoid
	Epilobium billardioreanum subsp. billardioreanum	Smooth Willow-herb	Large herb
*	Erica lusitanica	Spanish Heath	Medium shrub
	Eucalyptus camaldulensis	River Red-gum	Understorey tree or large shrub
	Eucalyptus goniocalyx s.l.	Bundy	Understorey tree or large shrub
	Eucalyptus macrorhyncha	Red Stringybark	Understorey tree or large shrub
	Eucalyptus melliodora	Yellow Box	Understorey tree or large shrub
	Eucalyptus microcarpa	Grey Box	Understorey tree or large shrub
	Eucalyptus polyanthemus	Red Box	Understorey tree or large shrub
	Eucalyptus viminalis subsp. viminalis	Manna Gum	Understorey tree or large shrub
	Exocarpos cupressiformis	Cherry Ballart	Understorey tree or large shrub
*	Fumaria bastardii	Bastard's Fumitory	Scrambler or climber
*	Galium aparine	Cleavers	Scrambler or climber
*	Genista monspessulana	Montpellier Broom	Medium shrub
	Geranium retrorsum s.l.	Grassland Crane's-bill	Medium herb
	Gonocarpus tetragynus	Common Raspwort	Medium herb
	Grevillea alpina	Cat's Claw Grevillea	Medium shrub
	Hackelia suaveolens	Sweet Hound's-tongue	Medium herb
#	Hardenbergia violacea	Purple Coral-pea	Scrambler or climber
	Hibbertia riparia	Erect Guinea-flower	Small shrub
*	Holcus lanatus	Yorkshire Fog	Large non-tufted graminoid
*	Hordeum leporinum	Barley Grass	Medium to small tufted graminoid
	Hovea heterophylla	Common Hovea	Small shrub
	Hydrocotyle laxiflora	Stinking Pennywort	Small or prostrate herb
	Hypericum gramineum	Small St John's Wort	Medium herb

Origin	Scientific Name	Common Name	Lifeform
*	<i>Hypericum perforatum</i> subsp. <i>veronense</i>	St John's Wort	Large herb
*	<i>Hypochaeris radicata</i>	Flatweed	Medium herb
*	<i>Juncus acutus</i> subsp. <i>acutus</i>	Spiny Rush	Large tufted graminoid
	<i>Juncus subsecundus</i>	Finger Rush	Medium to small tufted graminoid
	<i>Lepidosperma semiteres</i>	Wire Rapier-sedge	Medium to small tufted graminoid
*	<i>Lolium rigidum</i>	Wimmera Rye-grass	Medium to small tufted graminoid
	<i>Lomandra filiformis</i>	Wattle Mat-rush	Medium to small tufted graminoid
	<i>Lonicera japonica</i>	Japanese Honeysuckle	Scrambler or climber
	<i>Lythrum hyssopifolia</i>	Small Loosestrife	Medium herb
*	<i>Malus pumila</i>	Apple	Understorey tree or large shrub
	<i>Melicytus dentatus</i> s.l.	Tree Violet	Medium shrub
	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	Medium to tiny non-tufted graminoid
*	<i>Moraea setifolia</i>	Thread Iris	Medium to small tufted graminoid
	<i>Oxalis perennans</i>	Grassland Wood-sorrel	Medium herb
*	<i>Oxalis pes-caprae</i>	Soursob	Medium herb
	<i>Ozothamnus obcordatus</i>	Grey Everlasting	Medium shrub
*	<i>Paspalum dilatatum</i>	Paspalum	Medium to small tufted graminoid
	<i>Pelargonium rodneyanum</i>	Magenta Stork's-bill	Medium herb
*	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	Large tufted graminoid
	<i>Philotheca verrucosa</i>	Fairy Wax-flower	Small shrub
	<i>Phragmites australis</i>	Common Reed	Large non-tufted graminoid
	<i>Pimelea humilis</i>	Common Rice-flower	Small shrub
*	<i>Pinus radiata</i>	Radiata Pine	Understorey tree or large shrub
*	<i>Plantago lanceolata</i>	Ribwort	Large herb
	<i>Poa labillardierei</i>	Common Tussock-grass	Medium to small tufted graminoid
	<i>Poa sieberiana</i>	Grey Tussock-grass	Medium to small tufted graminoid
*	<i>Prunus</i> spp.	Prunus	Understorey tree or large shrub
	<i>Pultenaea pedunculata</i>	Matted Bush-pea	Small shrub
*	<i>Ranunculus muricatus</i>	Sharp Buttercup	Medium herb
*	<i>Romulea rosea</i>	Onion Grass	Medium to small tufted graminoid
*	<i>Rosa rubiginosa</i>	Sweet Briar	Medium shrub
*	<i>Rubus fruticosus</i> spp. agg.	Blackberry	Scrambler or climber
	<i>Rumex brownii</i>	Slender Dock	Medium herb
*	<i>Rumex crispus</i>	Curled Dock	Large herb
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	Medium to small tufted graminoid
	<i>Rytidosperma fulvum</i>	Copper-awned Wallaby-grass	Medium to small tufted graminoid
	<i>Rytidosperma pallidum</i>	Silvertop Wallaby-grass	Large tufted graminoid
	<i>Rytidosperma racemosum</i> var. <i>racemosum</i>	Slender Wallaby-grass	Medium to small tufted graminoid
	<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass	Medium to small tufted graminoid
*	<i>Salix</i> spp.	Willow	Understorey tree or large shrub
	<i>Schoenus apogon</i>	Common Bog-sedge	Medium to small tufted graminoid

Origin	Scientific Name	Common Name	Lifeform
	<i>Senecio phelleus</i>	Stony Fireweed	Large herb
	<i>Senecio quadridentatus</i>	Cotton Fireweed	Large herb
*	<i>Sonchus oleraceus</i>	Common Sow-thistle	Large herb
	<i>Stackhousia monogyna</i> s.l.	Creamy Stackhousia	Medium herb
	<i>Styphelia humifusa</i>	Cranberry Heath	Prostrate shrub
	<i>Tetralochea ciliata</i>	Pink-bells	Small shrub
	<i>Thelymitra</i> spp.	Sun Orchid	Medium herb
	<i>Themeda triandra</i>	Kangaroo Grass	Medium to small tufted graminoid
	<i>Tricoryne elatior</i>	Yellow Rush-lily	Large herb
*	<i>Trifolium subterraneum</i>	Subterranean Clover	Medium herb
*	<i>Ulex europaeus</i>	Gorse	Medium shrub
*	<i>Verbascum virgatum</i>	Twiggy Mullein	Large herb
	<i>Veronica plebeia</i>	Trailing Speedwell	Medium herb
*	<i>Vicia sativa</i> subsp. <i>sativa</i>	Common Vetch	Scrambler or climber
*	<i>Vinca major</i>	Blue Periwinkle	Scrambler or climber
*	<i>Vulpia bromoides</i>	Squirrel-tail Fescue	Medium to small tufted graminoid
	<i>Wahlenbergia stricta</i> subsp. <i>stricta</i>	Tall Bluebell	Large herb
*	<i>Watsonia meriana</i> var. <i>bulbillifera</i>	Bulbil Watsonia	Large tufted graminoid
	<i>Xerochrysum viscosum</i>	Shiny Everlasting	Large herb