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Dear Lucy

Lilydale Structure Plan- ecological due diligence assessment

1.0 Introduction

As you are aware, AECOM were engaged to undertake an ecological due diligence assessment of the Lilydale Structure Plan area. The purpose of the assessment was to provide an overview of the ecological values of the precinct in order to inform its future design.

This assessment incorporated a desktop review of relevant biodiversity databases, and a brief field verification where access was permitted and available. During the field assessment, the location, extent and quality of native vegetation was briefly assessed. Available habitat was also assessed for its potential to support threatened flora and fauna species and/or communities. Incidental flora and fauna species observed were also recorded.

1.1.1 Project Background

The investigation area occurs within a modified and mostly urban landscape. The obvious exception to this is the future Kinley Estate at the site of the now-closed Cave Hill Quarry. The Shire of Yarra Ranges is currently preparing a structure plan for the Lilydale Major Activity Centre (MAC).

Lilydale is a suburb of Melbourne, Victoria, Australia, 35 km north-east from Melbourne's central business district situated in the Yarra Valley. At the 2016 Census, Lilydale had a population of 16,552. It began as a town within the Shire of Lilydale and is also notable as the burial site of Dame Nellie Melba (Lilydale Cemetery).

In the Yarra Ranges Activity Network Strategy 2012, Lilydale is identified as a Major Activity Area (MAA) and is one of two MAAs in Yarra Ranges providing a range of retail, community, recreational and civic facilities and services. Straddling both sides of Maroondah Highway, Lilydale MAA serves a regional catchment of approximately 107,000 residents (2011 estimate).

Critical to the delivery of a successful structure plan is the consideration of the natural assets of the study area. This report provides an overview of the areas of ecological and vegetation value within the precinct, and documents any historical values known. The knowledge of these values, and their consideration in future design will ensure that future MAC development is sympathetic to retention of those significant values in the landscape.

2.0 Method

2.1.1 Database searches

The following State and Commonwealth-curated biodiversity datasets were reviewed, and the results synthesised:

- EPBC Act Protected Matters Search Tool (PMST) administered by the Commonwealth Department of the Environment and Energy (DoEE)
- Victorian Biodiversity Atlas 2018 (VBA) administered by the Victorian Department of Environment, Land, Water and Planning (DELWP)

- Ecological Vegetation Class (EVC) mapping on NatureKit- a biodiversity web mapping and reporting tool administered by DELWP
- DELWP's Native Vegetation Information Management (NVIM) tool and ecological strategies.

Review of spatial datasets included a 5 km buffer around the investigation area to capture highly mobile fauna species, and to account for the possibility of a lack of survey effort in the investigation area.

2.1.2 Field assessment

A rapid site assessment was undertaken in April 2019 to validate the findings of the desktop review and to identify any additional values that exist in the landscape. This field assessment was also designed to encourage the identification of these values which could be considered a priority for retention.

During the fieldwork, consideration was given to native vegetation as defined by the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017b). Under the Guidelines, native vegetation is considered to be either a patch or scattered tree.

A patch of native vegetation is:

'an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or 'an area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy' (DELWP 2017b, pg 6).

A scattered tree is:

'a native canopy tree that does not form part of a patch'

Exotic or introduced trees providing valuable amenity were also recorded and are discussed within this report.

2.1.3 Priority areas for retention assessment

Areas of vegetation were classified into two 'priority areas for retention' during the desktop assessment and the field verification- see figure 1. It is noted that a number of these areas were not subject to ground verification due to site access constraints. The retention of all mapped priority vegetation should be considered within the design of the precinct as it provides important ecological function and/or significant amenity value.

Priority Area 1

These areas were considered to support ecological values that should be given the highest priority within the precinct. They are typically defined by being continuous or near-continuous patches of native vegetation that provide significant habitat linkages through an environment that has been mostly cleared of remnant vegetation. Olinda Creek from the Lillydale Lake outfall and the vegetation associated with the Melba Avenue Drain (which flows into the Olinda Creek just north of the Lillydale Lake embankment) provide the most continuous patches of native vegetation on the precinct.

Priority Area 2

Priority 2 areas may not be dominated by native vegetation but are typically mature established trees that provide significant amenity value. They may also provide valuable fauna habitat for a range of birds and arboreal mammals. Indigenous trees, if they exist in these areas have likely been planted and may support a range of non-indigenous native species.

3.0 Results

3.1.1 Protected Matters Search Tool

The PMST identified a number of MNES that may occur, or for which suitable habitat may occur within the investigation area and associated 5 km buffer. Results of the PMST search are summarised in Table 1.

Table 1 Summary of PMST results

MNES	Number of occurrences
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance (Ramsar Sites)	None
Commonwealth Marine Area	None
Listed threatened ecological communities	1 Natural damp Grassland of the Victorian Coastal Plains
Listed Threatened Species	31 species comprised of: 21 listed fauna species 10 listed flora species
Listed Migratory Species	14

3.1.2 Victorian Biodiversity Atlas

The following section provides the results of the VBA extract. For the location of threatened species records refer to figure 1.

3.1.3 Fauna

Forty-three fauna species of conservation significance have been historically recorded within the investigation area.

In addition, seven historically recorded fauna species are recognised as migratory and/or marine under the EPBC Act. None of these species are recognised as threatened under the EPBC Act, one is recognised as threatened under the FFG Act, and one is included on the VROTS advisory list.

Species listed under the EPBC Act and recorded within the last 30 years are listed below:

- Superb Parrot *Polytelis swainsonii* (listed as Vulnerable)
- Grey-headed Flying-fox *Pteropus poliocephalus* (listed as Vulnerable)

3.1.4 Flora

Thirty-two threatened flora species have been recorded within 5 km of the investigation area.

EPBC Act listed species recorded in the last 30 years comprise:

- Maroon Leek-orchid *Prasophyllum frenchii* (Listed as Endangered)
- Matted Flax-lily *Dianella amoena* (listed as Endangered)
- Swamp Everlasting *Xerochrysum palustre* (listed as Vulnerable)

3.1.5 NatureKit (EVC modelling)

Based on DELWP EVC modelling on NatureKit, there is potential for up to 18 EVCs to be present within the investigation area. These EVC's and their Biodiversity Conservation Status (BCS) in the Highlands Southern Fall bioregion are listed in table 2, below and mapped in figure 2.

Table 2 EVC mapping as derived from DELWP 2015

EVC No.	EVC Name	BCS
7	Clay Heathland	Depleted
16	Lowland Forest	Least Concern
17	Riparian Scrub/Swampy Riparian Woodland Complex	Vulnerable

EVC No.	EVC Name	BCS
18	Riparian Forest	Least Concern
22	Grassy Dry Forest	Least Concern
23	Herb-rich Foothill Forest	Least Concern
29	Damp Forest	Least Concern
45	Shrubby Foothill Forest	Least Concern
47	Valley Grassy Forest	Vulnerable
55	Plains Grassy Woodland	Endangered
59	Riparian Thicket	Vulnerable
83	Swampy Riparian Woodland	Vulnerable
126	Swampy Riparian Complex	Endangered
127	Valley Heathy Forest	Vulnerable
128	Grassy Forest	Vulnerable
164	Creekline Herb-rich Woodland	Vulnerable
793	Damp Heathy Woodland	Depleted
937	Swampy Woodland	Endangered

3.1.6 Field assessment

Residential and commercial development within the study area has clearly impacted the quality of vegetation within the structure plan area.

For much of the investigation area, the vegetation is dominated by exotic species. Areas of the site that are subject to intensive management (such as the rail and road corridors) are dominated by grassy and broad-leaf weed species such as Toowoomba Canary-grass *Phalaris aquatica*, Flat Weed *Hypochaeris radicata*, Veldt Grasses *Ehrharta* spp., Ribwort Plantain *Plantago lanceolata* and Cocksfoot *Dactylis glomerata*. Those areas of the investigation area that are not subjected to biomass and weed control support blackberry *Rubus fruticosus* spp. agg, and other woody weed species such as gorse *Ulex europaeus*.

Indigenous vegetation within the investigation area was typically considered to be of low to moderate quality due to regular disturbance; however, a number of the patches observed have been improved through targeted revegetation works. These patches are typical found within the riparian zone of Olinda Creek and within proximity to Lillydale Lake and have been classified as priority one area in figure 1.

There are stands of mature exotic trees present within the investigation area that are of significant amenity value. These include a long stand of mature Elm *Ulmus* sp. that are growing in a 400 m long line that separates the Lillydale train station car park from the sports fields within Melba Park and the mature Oak *Quercus* sp. trees lining Cave Hill Road, Lillydale. This vegetation has been classified as priority 2 in figure 1.



Plate 1- Stand of mature Elm lining the sports fields within Melba Park (priority 2 vegetation)



Plate 2- Large Peppercorn within Melba Park



Plate 3- Plane Trees within the road reserve of Main Street, Lilydale.

A number of areas of parkland and other open space that is typically used for recreation exist within the investigation area. Vegetation origin in these areas was varied. Non-indigenous native species such as Red Ironbark *Eucalyptus sideroxylon*, Southern Bangalay *Eucalyptus botryoides*, Smooth-barked Apple *Angophora costata*, and Spotted Gum *Corymbia maculata* have been planted, and exist in a mosaic with patches of remnant vegetation dominated by a mature Manna Gum *Eucalyptus viminalis* and/or Swamp Gum *Eucalyptus ovata* overstorey.

Melba Park/Lilydale Park, although dominated by two sports fields that lack any significant vegetation, supports a mix of mature non-indigenous native and exotic species that provide both visual amenity and possibly fauna habitat. Lemon-scented Gum *Corymbia citriodora*, Peppercorn *Schinus molle* and Willow Myrtle *Agonis flexuosa* were all recorded. Maroondah Highway (referred to as Main Street where it passes through the centre of the town of Lilydale) is lined with Plane Trees *Platanus* sp., and Oak *Quercus* trees of varying maturity but all of significant amenity value in the streetscape.



Plate 4- Melba Park, Lilydale.



Plate 5- Rail corridor adjacent to Lilydale Quarry

Many patches of indigenous vegetation remain in the subject area, and many of these patches had been subjected to targeted revegetation works, utilising species representative of the EVC to which the patch belongs

These patches comprised the following two EVCs:

EVC 47- Valley Grassy Forest (BCS of Vulnerable)

EVC 83 - Swampy Riparian Woodland (BCS of Vulnerable).

The majority of these patches were classified as priority 1 for retention.

The following provides a general description of each EVC as it was observed in the field.

EVC 47 - Valley Grassy Forest

Valley Grassy Forest was the most prevalent EVC encountered during the survey. This EVC was identifiable within the landscape by an overstorey of mature Manna Gum, with Red Stringybark *Eucalyptus macrorhyncha* occasionally sub-dominant. These trees were emergent above a species-poor mid-storey of Blackwood *Acacia melanoxylon*, Black Wattle *Acacia mearnsii*, and Lightwood *Acacia implexa*. Those patches which had been subjected to revegetation activities also supported Hop Goodenia *Goodenia ovata*, Prickly Moses *Acacia ulicifolia*, Common Correa *Correa reflexa*, and Common Cassinia *Cassinia aculeata*. Veined Spear-grass *Austrostipa rudis*, Spiny-headed Mat-rush *Lomandra longifolia*, Tasman Flax-lily *Dianella tasmanica*, Black-anther Flax-lily *Dianella revoluta*, and Thatch Saw-sedge *Gahnia radula* were present in the ground layer. Patches of lesser quality were often lacking native mid and ground-layer vegetation.



Plate 6- EVC 47: Valley Grassy Forest

EVC 83 - Swampy Riparian Woodland

Patches of Swampy Riparian Woodland were all associated with the riparian zones and floodplains of the Olinda Creek. Swamp Gum was the dominant overstorey species recorded from these patches. The mid-storey along Olinda Creek was dominated by Blackwood, Black Wattle and Swamp Paperbark. Further from the creek, Blackwood and Black Wattle were dominant. Common Reed *Phragmites australis* was competing with weed species in the understorey of the creekline patches, with a diverse, revegetated understorey of Spiny-headed Mat-rush, Hop Goodenia, Tasman Flax-lily and Prickly Moses observed away from the creek banks.

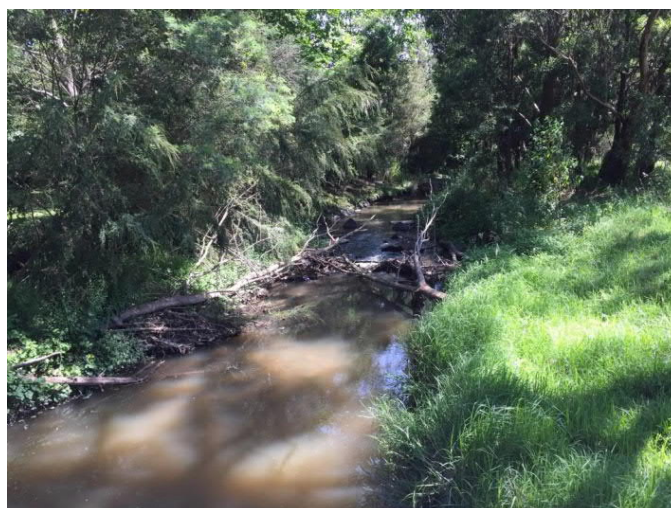


Plate 7- EVC 83- Swampy Riparian Woodland, Olinda Creek

3.1.7 Fauna habitat

Terrestrial fauna habitat within the investigation area is considered limited, both in extent and quality. The history of disturbance and modification has depleted the value of most of the investigation area for fauna species. That said, the flowering eucalypt species that are common amenity plantings through the structure plan area are considered to provide a locally significant feeding resource for a range of native bird species. Similarly, the large, remnant trees present through the study area, both within patches of vegetation or as individual trees, may provide habitat for a range of bird and arboreal mammal species. A number of these trees supported hollows, and these provide a valuable nesting resource for hollow-dependant bird and mammal species. There is the potential for mature Oak and

Elm trees to support hollows and to provide roosting habitat; however, these would likely be utilised by either exotic bird species such as Common Myna *Acridotheres tristis*, or common native arboreal mammals such as Brush-tailed Possum *Trichosurus vulpecula*.

The eastern extent of the investigation area is less developed, and contains large expanses of open grassland which have connectivity with the undeveloped land to the east of the investigation area. Eastern Grey Kangaroos were disturbed from where they were lying beneath the stand of trees associated with an area of vegetation to the east of the investigation area and this species appears to be regular visitors to this area.

Common Starling *Sturnus vulgaris*, Common Myna, Magpie-lark *Grallina cyanoleuca*, Rainbow Lorikeet *Trichoglossus haematodus*, Red Wattlebird *Anthochaera carunculata* and Australian Magpie *Cracticus tibicen* were the most commonly observed bird species. Less regularly recorded were relatively common native species including Rainbow Lorikeet *Trichoglossus haematodus*, Red Wattlebird *Anthochaera carunculata*, Crimson Rosella *Platyercus elegans*, New Holland Honeyeater *Phylidonyris novaehollandiae* and Musk Lorikeet *Glossopsitta concinna*. Australian Wood Duck and Pacific Black Duck *Anas superciliosa*.

No threatened species listed under the EPBC Act and/or FFG Act were recorded.

Olinda Creek, Lilydale

Olinda Creek is located within an urbanised setting with commercial and industrial land uses proximal to the creek corridor. Stormwater and surface runoff is likely to be a significant source of water supply to the creek.

The reach of Olinda Creek through the precinct was characterised by a mud silt substrate, mildly turbid water, organic debris, anthropogenic refuse and is largely devoid of aquatic vegetation. It was noted to get narrower and faster moving down stream. All sites were heavily shaded by a mid-storey of Melaleuca and an over-storey of both native (typically Acacia and Eucalypts) and exotic (Monterey Pine) trees. A brief habitat assessment was undertaken at three surveys sites (see figure 1) which are described further below:

Site 1 represented the narrowest and fastest flowing stretch of waterway with steep banks and a channel width of between 1 and 2 metres. The banks were undercut and dominated by exotic groundcover. Aquatic macrophyte cover was absent though trailing vegetation including Slender Knotweed *Persicaria decipens* and grasses provided some areas of refuge. Organic debris such as leaf litter and bark was present in high volumes along with a significant volume of anthropogenic debris, with litter packs forming in low flow areas and containing a variety of household items and general litter.



Plate 8- Site 1 – Olinda Creek

Site 2. In this section, the west bank was heavily vegetated and dominated by plantings of Australian native species. The eastern bank contained areas of public open space (lawn), walking tracks and a mixture of exotic and native trees, and the immediate riparian zone was planted with native groundcover. This section of creek included several stormwater outfalls and varied in structure from slow flowing deeper areas with muddy silty sediments to shallow high flowing rocky riffles. Aquatic vegetation was sparse but included isolated beds of submerged Curly Pondweed *Potamogeton crispus*, Club-rush *Schoenoplectus* sp., Slender Knotweed and the exotic Umbrella Sedge *Cyperus eragrostis*. Depth was highly variable ranging from 1.3 to 0.3 metres as was degree of channel shading. Banks were undercut.



Plate 9- Site 2 – Olinda Creek

Site 3 was the most downstream site sampled and also represented the widest (approximately 4 metres), deepest and most slow flowing section of Olinda Creek sampled. Water varied in depth from around 1 meter to above wading depth. Banks were flat and dominated by native vegetation plantings on both sides. Some isolated beds of Club Rush and Tall Sedge *Carex appressa* were noted on the banks and aquatic macrophyte cover was largely absent. Habitat was however provided by trailing bank vegetation and large woody debris such as fallen branches creating areas of slow flow and refuge.



Plate 10- Site 3 – Olinda Creek

4.0 Considerations for design

The retention and enhancement of key ecological and amenity assets should be a key focus of the design for the structure plan for the Lilydale Major Activity Centre.

Whilst the mapping of the priority areas for retention, and the Ecological Vegetation Class mapping provides an overview of the values across the precinct, detailed site assessment will be necessary to inform detailed design.

Provided below are some high level considerations and recommendations that should be considered as this project develops

- Avoid where possible any impacts to few remaining patches of native vegetation within the structure plan area. If complete avoidance is not feasible, minimise native vegetation impacts (including removal and fragmentation) during the detailed design stage.
- Avoid and minimise activities and impacts within mapped Significant Landscape Overlays and Vegetation Protection Overlays.
- Offset any native vegetation to be removed in accordance with the Guidelines (DELWP 2017b) and approval granted under the P & E Act.
- Avoid removal of protected flora species and protect areas which support protected flora.
- Ensure that the protection of the Olinda Creek Corridor through the study area is a focus of the plan.
- Avoid large hollow-bearing trees to reduce risk to Powerful Owl and other non-threatened hollow-dependent fauna.

We trust that this report provides you with the ecological information you require to inform the strategic design of the proposed precinct.

Should you have any questions on our assessment, don't hesitate to contact me.

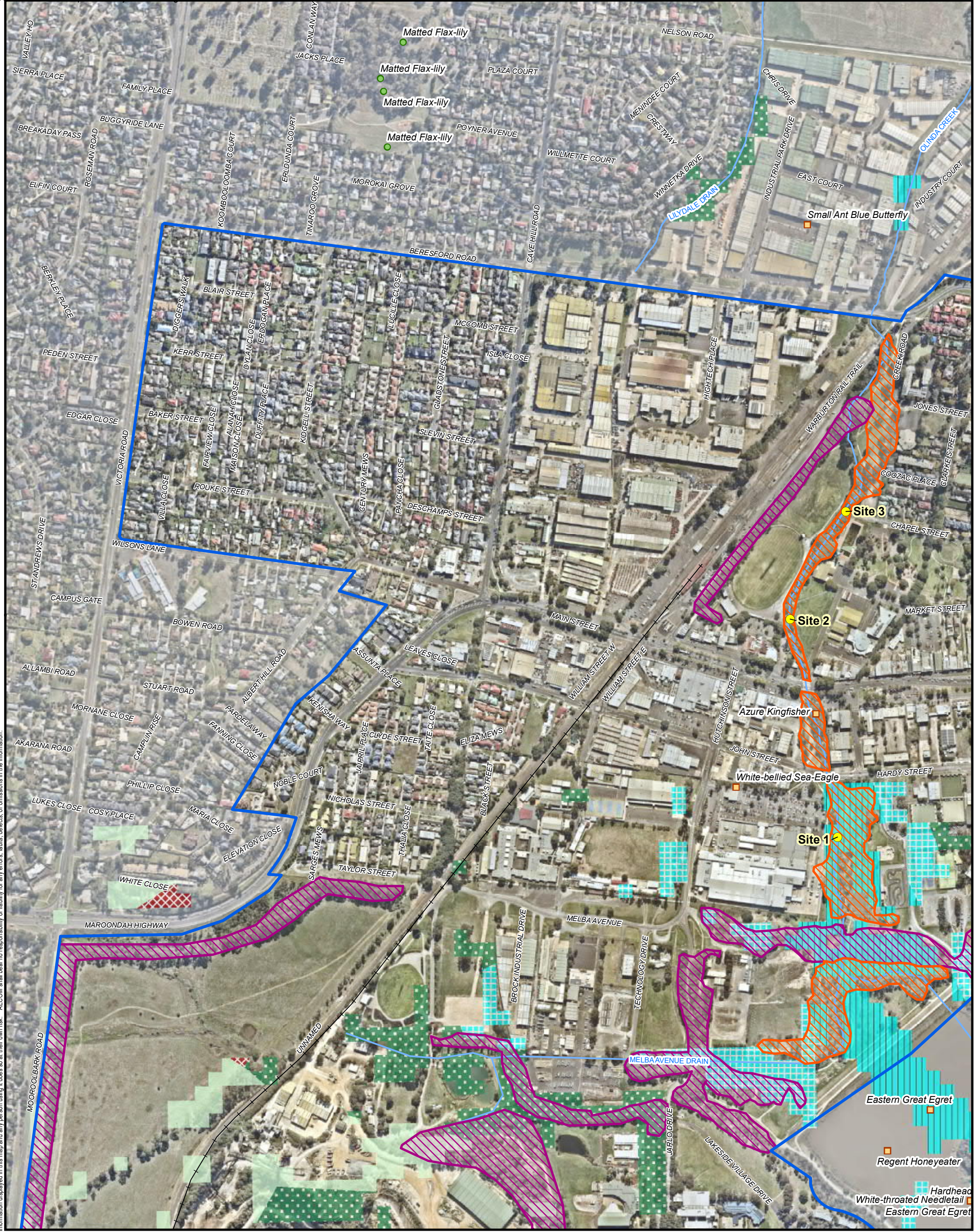
Yours faithfully



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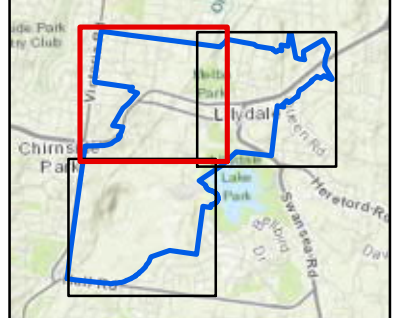
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LEGEND

- Site Boundary
- Aquatic Survey Sites
- Priority Retention Area**
- 1
- 2
- Threatened Flora Records
- Threatened Fauna Records
- Railway
- Watercourses

Ecological Vegetation Classes

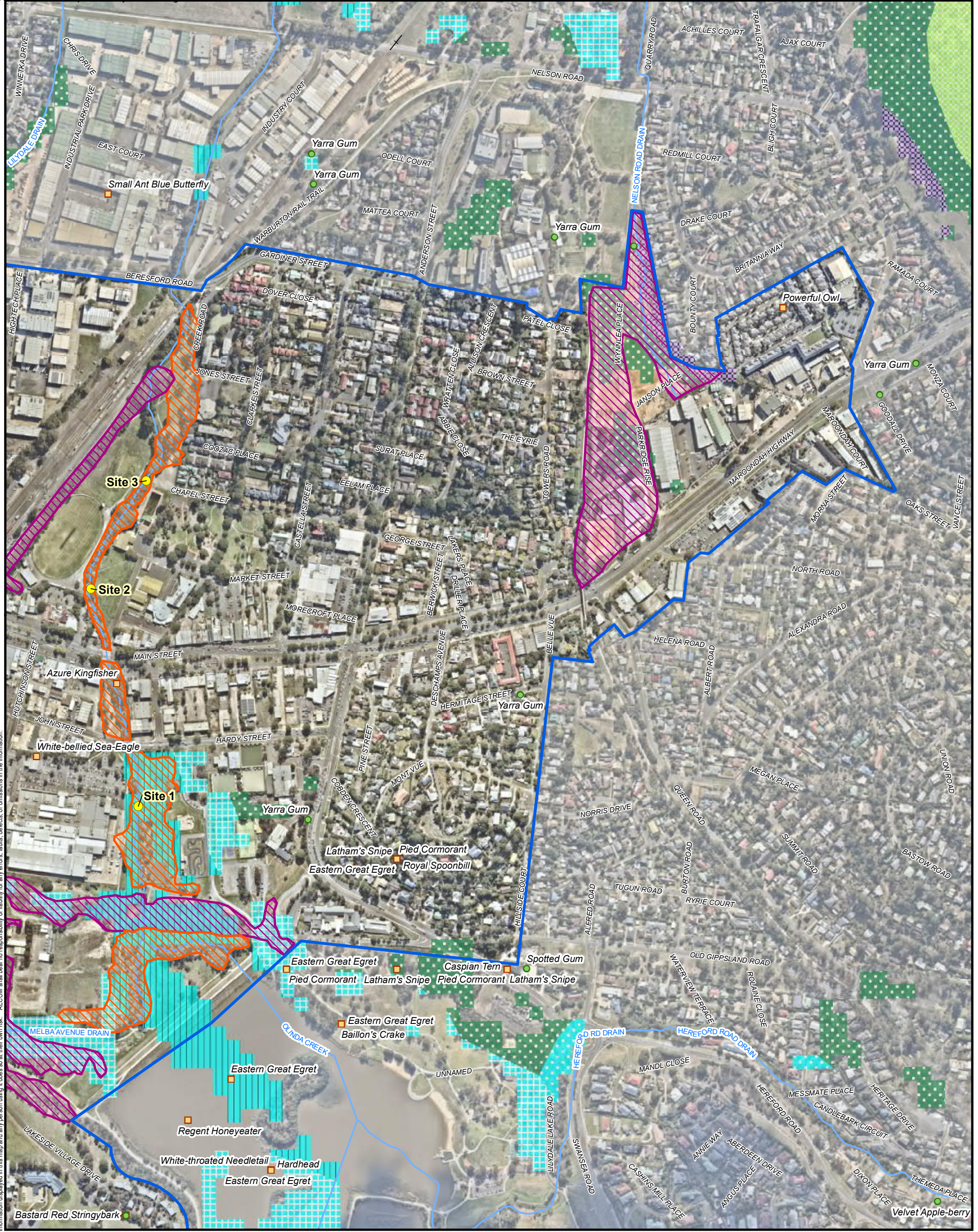
- 126 Swampy Riparian Complex
- 23 Herb-rich Foothill Forest
- 47 Valley Grassy Forest
- 55 Plains Grassy Woodland
- 83 Swampy Riparian Woodland



Ecological Desktop Assessment and Priority Retention Areas

MESH
 Lilydale Structure Plan
 Lilydale, Victoria

Figure F1



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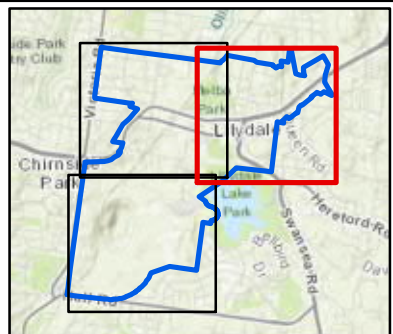
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Ecological Vegetation Classes

- 126 Swampy Riparian Complex
- 128 Grassy Forest
- 164 Creekline Herb-rich Woodland
- 17 Riparian Scrub/Swampy Riparian Woodland Complex
- 22 Grassy Dry Forest
- 47 Valley Grassy Forest
- 83 Swampy Riparian Woodland



Ecological Desktop Assessment and Priority Retention Areas

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 Lilydale Structure Plan
 Lilydale, Victoria

Figure F1



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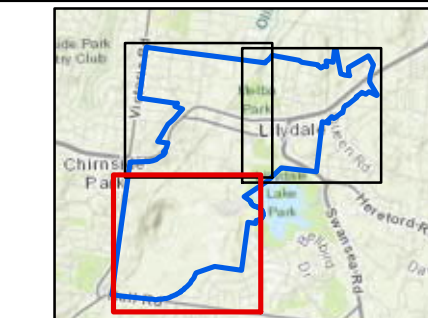
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LEGEND	
	Site Boundary
	Aquatic Survey Sites
Priority Retention Area	
	1
	2
	Threatened Flora Records
	Threatened Fauna Records
	Railway
	Watercourses
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	126 Swampy Riparian Complex
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Ecological Desktop Assessment and Priority Retention Areas

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Figure F1