# Ecological Assessment:

## Stage 1 - 7 Development Area

## 609-619 & 621 Burwood Highway, Knoxfield

**March 2021**


ECOCENTRIC Environmental Consulting
2B / 73-85 Haines Street
North Melbourne 3051
m: 0410 564 139
e: ecocentric@me.com

**TABLE OF CONTENTS:**

## LIST OF FIGURES:



## LIST OF TABLES:

## DOCUMENT CONTROL

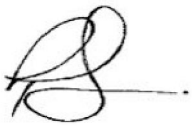
| | |
|---|---|
| Report title | Ecological Assessment: Stage 1 - 7 Development Area<br>621 & 609-619 Burwood Highway, Knoxfield |
| Client | Development Victoria |
| Authors | [redacted] |
| Date | 19th March 2021 |

## DOCUMENT HISTORY

| Revision | Recipient | Date |
|---|---|---|
| 01 | Preliminary assessment | (Ecocentric 2015) |
| 02 | 2017 assessment | (Ecocentric 2018) |
| 03 | 2020 assessment | 19 March 2021 |

## DOCUMENT PREPARATION

| | Name | Date |
|---|---|---|
| Prepared by | [redacted] | November 2020 |
| Reviewed by | [redacted] | 14 December 2020 |
| Issued by | [redacted] | 19 March 2021 |



[redacted]

ecocentric environmental consulting

2B / 73 Haines Street
North Melbourne 3051
0410 564 139
ecocentric@me.com

**Acknowledgements**

Ecocentric acknowledges the following persons, agencies and companies for their contributions to this study and report:

- [redacted]

## ACRONYMS

| | |
|---|---|
| BoM | Bureau of Meteorology |
| CaLP Act 1994 (Vic) | Victorian Catchment and Land Protection Act 1994 |
| Cwlth | Commonwealth |
| DAWE | Federal Department of Agriculture, Water and the Environment (formerly DoEE) |
| DELWP | Victorian Department of Environment, Land, Water and Planning (formerly DEPI) |
| EPBC Act 1999 (Cwlth) | Commonwealth Environment Protection and Biodiversity Conservation Act 1999 |
| FFG Act 1988 (Vic) | Victorian Flora and Fauna Guarantee Act 1988 |
| GIS | Geographical Information System (mapping system) |
| MNES | Matter of National Environmental Significance |
| PPWCMA | Port Phillip and Westernport Catchment Management Authority |
| VBA | DELWP's Victorian Biodiversity Atlas |
| Wildlife Act 1975 (Vic) | Victorian Wildlife Act 1975 |

## SPECIES SIGNIFICANCE

Significant threatened species are defined as taxa listed under:

- The EPBC Act 1999 (Cwlth);
- The FFG Act 1988 (Vic);
- DELWP's Advisory List of Rare or Threatened Plants in Victoria, either as 'endangered', 'vulnerable', or 'rare' (but not those included under the 'poorly known' category);
- DELWP's Advisory List of Threatened Vertebrate Fauna in Victoria, either as 'critically endangered', 'endangered' or 'vulnerable' (but not those included under the 'near threatened' or 'data deficient' categories); and/or
- DELWP's Advisory List of Threatened Invertebrate Fauna in Victoria, either as 'critically endangered', 'endangered' or 'vulnerable' (but not those included under the 'near threatened' or 'data deficient' categories).
-

## NATIVE VEGETATION

The Victorian Planning Provisions identify *native vegetation* as flora species that are native to Victoria. This includes species that are indigenous to the project's location and the region, as well as species that may be found further afield but within the state of Victoria. Native vegetation is defined under the *Guidelines 2017* policy (DELWP 2017) as follows:

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
- 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 on-line GIS mapping layers (DELWP 2017).

A **large** or **small scattered tree** is a native species that is found in the canopy strata, that is greater than 3m in height, and that does not form part of a remnant patch. Scattered trees have two sizes, small and large:

- a small scattered tree is less than the large tree benchmark for the species in the relevant EVC;
- a large tree is equal to or greater than the large tree benchmark for the species in the relevant EVC;
- a standing dead tree that does not form part of a patch is treated as a large scattered tree if it has a trunk diameter of 40 centimetres or more at a height of 1.3 metres above the ground (DELWP 2017).

A **large canopy tree** is a native species that is found in the canopy strata, that is greater than 3m in height AND greater than or equal to the appropriate EVC benchmark DBH for a large tree, and which is found within a patch of native vegetation (as defined above).

The current *Guidelines 2017* policy recognises that large trees are often the oldest part of an ecological system and are difficult to replace in the short term. The loss of large trees (native trees that would be found in the canopy of respective EVC with a DBH that is greater than the benchmark DBH) must be Offset with an equivalent number of large trees in order to ensure there is no net loss of biodiversity value associated with clearing.

## GLOSSARY

| TERM | DEFINITION |
|---|---|
| Bioregion | Biogeographical areas that capture the patterns of ecological characteristics in the landscape or seascape, providing a natural framework for recognising and responding to biodiversity values. |
| Bioregional Conservation Status (BCS of an EVC) | A state-wide classification of the degree of depletion in the extent and/or quality of an Ecological Conservation Class (EVC) within a bioregion in comparison to the State's estimation of its pre-1750 extent and condition. |
| Canopy tree | See 'Native Canopy Tree'. |
| Diameter at Breast Height (DBH) | The diameter of the trunk of a tree measured over bark at 1.3m above ground level. |
| Drip Line | The outermost boundary of a tree canopy (leaves and/or branches) where the water drips onto the ground. |
| Ecological Vegetation Class (EVC) | A type of native vegetation classification that is described through a combination of its floristic, life form and ecological characteristics, and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification that is based solely on groups of the same species) that occur across a biogeographical range, and although differing in species, have similar habitat and ecological processes operating. |
| EVC Benchmark | A standard vegetation quality reference point relevant to the vegetation type that is applied in habitat hectare assessments. Represents the average characteristics of a mature and apparently long-undisturbed state of the same vegetation type. |
| General Offset | A General Offset is required when the removal of native vegetation does not have a significant impact on any habitat for rare or threatened species. |
| General Habitat Unit | A General Habitat Unit is a measure of loss (and Gain in an Offset Site) in overall biodiversity value of native vegetation (both patch and scattered tree). |
| General Habitat Unit Offset target | A General Habitat Unit Offset target is that quantity of General Habitat Units that are to be secured to ensure that there is 'no net loss' in biodiversity value associated with the clearance of native vegetation (both patch or scattered tree).<br>The General Habitat Units secured for an Offset target must meet the following attribute requirements:<br>• *Minimum strategic biodiversity value score:* the strategic biodiversity value score of the Offset Credits must be at least 80 per cent of the strategic biodiversity value score of the native vegetation to be removed;<br>• *Vicinity:* the offset must be located within the same Catchment Management Authority boundary or municipal district as the native vegetation to be removed. |
| Habitat Hectare | A site-based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation type. |
| Habitat score | The score assigned to a Habitat Zone that indicates the quality of the vegetation relative to the EVC benchmark – sum of the site condition score and landscape context score usually expressed as a percentage or as a decimal fraction of 1. |
| Habitat Zone | A discrete area of native vegetation consisting of a single vegetation type (EVC) with an assumed similar quality. This is the base spatial unit for conducting a habitat hectare assessment. |
| High threat weed | Introduced plant species (including non-indigenous 'natives') with the ability to out-compete and substantially reduce one or more indigenous life forms in the longer term, assuming on going current site characteristics and disturbance regime. |

| TERM | DEFINITION |
|---|---|
| Location Category | There are three location categories that indicate the potential risk to biodiversity from removing a small amount of native vegetation. These location categories are identified by DELWP as follows:<br>• Location 3 – includes locations where the removal of less than 0.5 hectares of native vegetation could have a significant impact on habitat for a rare or threatened species.<br>• Location 2 – includes locations that are mapped as endangered EVCs and/or sensitive wetlands and coastal areas and are not included in Location 3.<br>• Location 1 – includes all remaining locations in Victoria. |
| Mapped wetlands | Mapped wetlands may or may not be visible on the ground and are treated as a patch of native vegetation for the purpose of Offsets unless they are covered by a hardened, man-made surface, for example, a roadway.<br>The location and extent of mapped wetlands are available in NVIM and other DELWP GIS mapping systems. |
| Matters of national Environmental Significance (MNES) | There are nine MNES identified under the EPBC Act 1999 (Cwlth): World Heritage properties; National Heritage places; wetlands of international importance (listed under the Ramsar Convention); listed threatened species and ecological communities; migratory species protected under international agreements (protected under international agreements); Commonwealth marine areas, the Great Barrier Reef Marine Park; nuclear actions (including uranium mines); and water resources in relation to coal seam gas development and large coal mining development. |
| Native Canopy Tree | A native canopy tree is either:<br>• a mature tree (able to flower) that is greater than three metres in height and is normally found in the upper layer of the relevant vegetation type (EVC); or<br>• a standing dead tree (stag) if it has a trunk diameter of 40 centimetres or more at a height of 1.3 metres above the ground. |
| Native Vegetation | Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. |
| No Net Loss | An outcome where a particular gain in the contribution to Victoria's biodiversity is equivalent to an associated loss in the contribution to Victoria's biodiversity from permitted clearing. |
| Offset | Protection and management (including revegetation) of native vegetation at a site to generate a gain in the contribution that native vegetation makes to Victoria's biodiversity. An Offset is used to compensate for the loss to Victoria's biodiversity from the removal of native vegetation. Offsets are to be secured in perpetuity with an on-Title conservation covenant. |
| Offset target | The amount of Offset required, measured in Habitat Units, to ensure permitted clearing of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity. |
| Protection (of a tree) | An area with twice the canopy diameter of the tree(s) fenced and protected from adverse impacts: grazing, burning and soil disturbance not permitted, fallen timber retained, weeds controlled, and other intervention and/or management if necessary, to ensure adequate natural regeneration or planting can occur. |
| Recruitment | The production of new generations of plants, either by allowing natural ecological processes to occur (regeneration etc.), by facilitating such processes, or by actively revegetating (replanting, reseeding). See revegetation. |
| Patch of native vegetation | A patch of native vegetation is either:<br>• an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; or<br>• 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<br>• any mapped wetland included in the current wetlands layer available in NVIM and other DELWP systems. |

| TERM | DEFINITION |
|---|---|
| Perennial Understorey | Plants that usually live for more than two years and are found in the lower layers of vegetation, like grasses and shrubs. |
| Plant cover | The proportion of the ground that is shaded by vegetation foliage when lit from directly above. |
| Revegetation | Establishment of native vegetation to a minimum standard in formerly cleared areas, outside of a remnant patch. |
| Scattered trees | A scattered tree is a native canopy tree (see 'Native Canopy Tree' above) that does not form part of a patch.<br>Scattered trees have two sizes, small and large:<br>• a small scattered tree is less than the large tree benchmark for the species in the relevant EVC;<br>• a large tree is equal to or greater than the large tree benchmark for the species in the relevant EVC;<br>• a standing dead tree that does not form part of a patch is treated as a large scattered tree if it has a trunk diameter of 40 centimetres or more at a height of 1.3 metres above the ground. |
| Species – General Offset Test | The species-general offset test measures the proportional impact from the removal of native vegetation on the habitat of rare or threatened species, according to the *Habitat importance maps*, and compares this to the species offset threshold. |
| Species Habitat Unit | A Species Habitat Unit is a measure of loss (and Gain in an Offset Site) in biodiversity value of native vegetation (both patch and scattered tree) for a particular rare or threatened species. |
| Species Habitat Unit Offset target | A Species Habitat Unit Offset is required when the removal of native vegetation has a significant impact on habitat for a rare or threatened species. Species Offsets must compensate for the removal of that particular species' habitat. |
| Strategic Biodiversity Value (SBV) | The Strategic Biodiversity Value is a rank of a location's complementary contribution to Victoria's biodiversity, relative to other locations across the state with regard to its condition, extent, connectivity and the support function it plays for species. |
| Tree Protection Zone (TPZ) | Calculated area (based on AS 4970-2009 (Protection of trees on development sites)) of soil volume required to encompass sufficient absorbing tree root systems to ensure the long-term survival of a tree. Trees may be considered as lost (and may require an Offset) if impacts of greater than 10% intrusion into the TPZ occur. |
| Wetlands | See 'Mapped wetlands'. |
| | |

# 1. INTRODUCTION

Ecocentric Environmental Consulting (hereafter referred to as Ecocentric) was engaged by Development Victoria in December 2014 to undertake preliminary ecological assessments at two properties; 609-619 and 621 Burwood Highway, Knoxfield, Victoria (SPI: 2258\PP3478 and 1\TP152947). Further detailed assessments including targeted survey for threatened fauna were undertaken in 2016/2017, and again in order to inform this report in 2020.

The proposed development area consists of the entire 621 Burwood Highway parcel, and a subset of the 609-619 Burwood Highway parcel, hereafter collectively referred to as *the development area* (see Map 1 in Appendix 9.8). The development area is to be developed predominantly for residential purposes, in accordance with the C160 planning scheme amendment under the *Planning and Environment Act 1987* (Vic), and includes the establishment of a wetland and Water Sensitive Urban Design (WSUD) stormwater treatment system in the northern sector of the property.

This report identifies ecological values and unavoidable impacts within the portion of the subdivision area that is identified as Stage 1 to 7 (see Figure 1 for details) and excluding an existing dam. The remainder of the property, generally described as the wetlands area (including the existing dam), is assessed in an accompanying report (Ecocentric in preparation). Similarly, a sales information centre, driveway and carparking will be developed within the southeastern corner of the property; these works are also assessed in an accompanying report (Ecocentric in preparation).

The objectives of the project were to:

- Document the ecological values of the site, including:
    - Significant flora and fauna species, and areas supporting potential habitat for them; and
    - Native vegetation, including 'remnant patches' and 'scattered trees'.
- Map these ecological values and identify their quality and extent;
- Identify potential impacts to these ecological values from the proposed development, including implications under relevant legislation and policies; and
- Outline appropriate measures to avoid, mitigate or offset potential impacts.

## 1.1 STAGE 1 – 7 DEVELOPMENT AREA

The broader development area adjoins an industrial estate to the west, Burwood Highway and commercial / office development to the south, Scoresby Road and Fairhills High School / residential development to the east, and the Blind Creek corridor and its associated recreation trail to the north. The topography of the development area slopes gently from the highest elevations in the southern sector of the site (at ~97 m above sea level (ASL)) to the lowest elevations (~77 m ASL) in the northern sector of the site.

The northern sector of the site is situated on a floodplain formation that includes a constructed dam which also functions as a minor flood retarding basin. The floodplain area and northern quadrant of the property, hereafter referred to as the *wetlands area,* is generally described as land north of the area being developed as a Comprehensive Development Zone (CDZ). The wetlands area, including an existing dam drainage swale are subject to a separate biodiversity assessment being undertaken by Ecocentric (2021 in preparation), and assessment of that area is therefore not included in this report (see also Figure 1 below for an indication of the area covered by this report).

The development of the total property will be subject to a number of Permit applications. Three Permit applications are being lodged at this time, namely:

- Access to Scoresby Road and the removal of some vegetation within the Future Mixed-use Precinct development area;
- Subdivision of Stages 1 and 2 within the Stage 1 – 7 development area; and,
- Development of wetland habitat and Water Sensitive Urban Design (WSUD) stormwater treatment systems within the Wetlands area (see also Figure 1 below for details).

The majority of the Stage 1 – 7 development area comprises cleared land south of the CDZ, and includes planted rows of exotic trees and planted native and non-native trees and shrubs. Some remnant indigenous trees and vegetation exists on site, and there are additionally trees planted at the property boundaries and within gardenbeds which are native to Victoria and that meet the definition of *native vegetation* under Clause 52.17 of the Knox Planning Scheme.

The majority of the development area is currently zoned Comprehensive Development Zone (CDZ2), and there are no overlays that apply to the Stage 1 – 7 development area.

### 1.1.1 Limitations

The targeted surveys were carried out during suitable conditions for the detection of the target species. While it is possible that some threatened vertebrate fauna species not recorded during the current surveys may occasionally visit or occur within the site, it is unlikely that any of these additional species regularly occur on, or rely upon, the site.

Please also note that surveys were not limited to the target species at the time of assessment; rather, all flora and fauna taxa observed on site were recorded and assessed for their habitat requirements, capacity to be found within the development area, and their conservation significance.

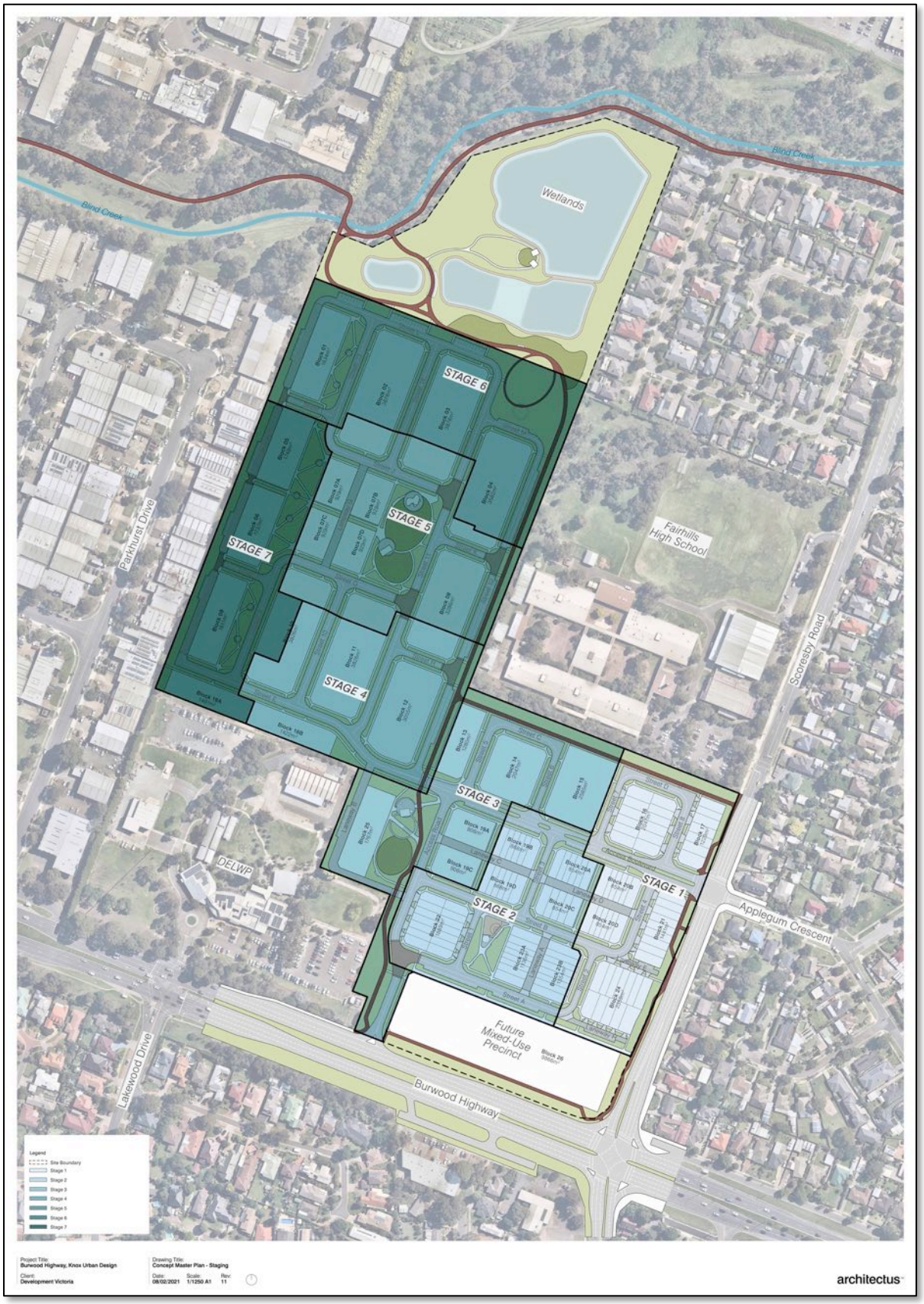
No targeted surveys for significant flora were conducted. Site assessments were undertaken utilising the 'random meander' process of undertaking assessment of suitable sites whilst selectively traversing preferred habitat for threatened species (see Section 2.1). Ecocentric is confident that this survey methodology meets the objectives of the project brief and criteria, and standards as set out in the *Vegetation Quality Assessment Manual* (DSE 2004; also commonly referred to as a Habitat Hectare Assessment).

This report does not consider development implications that relate to non-environmental zoning and overlays; including objectives set out in the CDZ and its Schedule 2. Similarly, this report does not consider development implications which may apply to the property under the Aboriginal Heritage Act 2006 (Vic).

This report relies on contributions from several consultancies and information provided by Development Victoria. Findings contained herein are therefore based on the reports provided at the date of publication; Ecocentric will not be held accountable for post-publication variations associated with report updates from external consultancies, agencies or parties.

This report assumes that the reader is familiar with the proposed development and its objectives, and the planning and financing context that brought about its instigation.

**Figure 1. Property location** (courtesy of Architectus Pty Ltd)



## 2. METHODOLOGY

A desktop review was undertaken as the first component of this project. This involved a review of on-line data resources available from relevant Victorian and Commonwealth departments, and a review of available management reports and documentation from other sites within the region. Maps of the site's indicative pre-1750 Ecological Vegetation Classes (EVCs), likely patches of remnant EVCs, and a map of the bioregion were generated on-line and were referred to on site during the assessment. An aerial photograph of the site was generated from NearMap and overlaid with the Title boundary data.

Existing datasets, modelling and mapping for the site that were reviewed and interrogated consisted of the following:

- Biodiversity Interactive Maps classifying (but not limited to) extant and pre-disturbance EVCs, Bioregion, Location Risk and Strategic Biodiversity Values (SBV) within the property and surrounds (DELWP 2020[1]; Victorian Open Data Directory 2020[2]);
- EVC benchmarks (DELWP 2020[3]);
- Victorian Biodiversity Atlas on-line database for records of significant flora and fauna in the region (DELWP 2020[4]);
- The Atlas of Living Australia on-line database for records of significant flora and fauna in the region (ALA 2020[5]);
- Commonwealth Department of Agriculture, Water and the Environment (DAWE) EPBC Act Protected Matters Search Tool database for significant flora, fauna and vegetation communities in the region (DAWE 2020[6]);
- DELWP species distribution and habitat importance models as produced for the *Guidelines 2017* policy (GIS mapping layers from Victorian Open Data Directory 2020[7]; DELWP 2017);
- Aerial imagery to determine habitat extents and linkages (NearMap 2020[8]);
- Relevant legislation, government policy and strategies (DELWP 2020[9]); and
- Publicly available geospatial datasets (including BirdData and iNaturalist).

[1] http://maps.biodiversity.vic.gov.au/viewer/?viewer=NatureKit
[2] https://www.data.vic.gov.au
[3] https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks
[4] https://vba.dse.vic.gov.au/vba/
[5] https://spatial.ala.org.au
[6] http://www.environment.gov.au/epbc/pmst/index.html
[7] https://www.data.vic.gov.au
[8] http://maps.nearmap.com
[9] http://planningschemes.dpcd.vic.gov.au

Independent assessments were also commissioned by Development Victoria for the purpose of informing the Planning Permit application, these include:

- Development Master Plan by Architectus Pty Ltd (Architectus 2021; hereafter referred to as the *Development Master Plan*).
- Arborist report conducted by Galbraith and Associates Pty Ltd (Galbraith 2020; hereafter referred to as the *Arborist Assessment* report).
- Landscape Master Plan by MDG Landscape Architects (MDG 2021; hereafter referred to as the *Landscape Plan*).

Ecocentric has also conducted ecological assessments across the broader property in support of Permit applications for the Stage 1 – 7 Development Area and the Sales Centre Development Area. Findings and recommendations are reported in the following documents (in preparation at time of publication):

- *Ecological Assessment: Wetland Development Area 609-619 & 621 Burwood Highway, Knoxfield* (Ecocentric 2021 in preparation).
- *Ecological Assessment: Sales Centre Development Area 609-619 & 621 Burwood Highway, Knoxfield* (Ecocentric 2021 in preparation).

These reports and the data behind them have been used by Ecocentric to inform this assessment.

## 2.1 FIELD SURVEYS

Ecological values on the property were assessed during several studies in 2015, 2017 and 2020 by suitably qualified and experienced ecologists. Ecocentric staff hold accreditation in the Vegetation Quality Assessment Competency Check; the company is also a DELWP Accredited Organisation for the assessment and establishment of Offset Sites, and a registered over-the-counter Native Vegetation Offset Broker.

The following techniques were utilised during the field surveys:

- All areas of *native vegetation* (see Section 2.1.1) and habitat (see Section 2.1.3) were assessed across the property;
- Mapped and extant Ecological Vegetation Classes (EVCs) on site were verified and assessed in the field to a hand-held tablet running Quantum GIS;
- Remnant habitat areas were assessed for habitat quality and conservation significance against relevant EVC benchmarks and in accordance with DELWP approved methodologies (see Section 2.1.1 for details). Where appropriate, habitat areas were also assessed against *impact threshold* criteria as documented under the EPBC Act for threatened vegetation communities (available on the Species Profile and Threats Database);
- Random meander searches for threatened flora and fauna species were completed throughout the property (see Section 2.1.3); and
- Any other incidental discussions, observations or evidence of flora or fauna were recorded.

Habitat values and quality were assessed based on significance criteria as detailed below in Table 1.

Table 1. Habitat significance

| Habitat significance category | DESCRIPTION |
|---|---|
| **Very high significance** | Site known to support long-term breeding population(s) of threatened flora or fauna; is contiguous with large areas (greater than 50ha) of remnant vegetation and habitat; and there is a very high cover (greater than 75%) of remnant, indigenous vegetation with EVC appropriate canopy structures intact. |
| **High significance** | Site provides optimal habitat conditions for rare or threatened flora or fauna; there is a high degree of connectivity to large areas (greater than 50ha) of remnant vegetation and habitat; and there is a good cover (greater than 50%) of remnant, indigenous vegetation with EVC appropriate canopy structures intact. |
| **Medium significance** | Site provides sub-optimal habitat conditions for rare or threatened flora or fauna; there is connectivity to areas (greater than 0.4ha) of remnant vegetation and habitat; and there is some cover (greater than 25%) of remnant, indigenous vegetation with EVC appropriate canopy structures intact. |
| **Low significance** | Site provides limited habitat conditions for flora or fauna, and there is some cover of remnant, indigenous vegetation on site. |

The precautionary approach was adopted for all site surveys where discretionary decisions were made. In particular, the absence of evidence of threatened flora, fauna, vegetation communities or habitat values during surveys was not interpreted as evidence of their absence on site.

### 2.1.1 Native vegetation assessment

A native vegetation assessment was undertaken to determine the extent and quality of native vegetation present at the site, and to inform potential Offset requirements if native vegetation clearance is approved.

Ecological Vegetation Classes were determined based on EVC modelling and benchmarks (DELWP 2017), and as confirmed in the field during the site surveys. Vegetation Quality Assessments (VQA; also commonly referred to as a Habitat Hectare Assessment) were undertaken for all areas of native vegetation (both remnant and as scattered trees) in accordance with the *Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectare scoring method* (DSE 2004).

Native vegetation is defined under the *Native Vegetation Permitted Clearing Regulations* as follows:

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
- 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.

A **scattered tree** is a native canopy tree that does not form part of a remnant patch. Scattered trees are classified into two different sizes, small and large:

- a small scattered tree is less than the large tree benchmark for the species in the relevant EVC;
- a large tree is equal to or greater than the large tree benchmark for the species in the relevant EVC;
- a standing dead tree that does not form part of a patch is treated as a large scattered tree if it has a trunk diameter of 40 centimetres or more at a height of 1.3 metres above the ground (DELWP 2017).

The current *Guidelines 2017* policy recognises that large trees are often the oldest part of an ecological system and are difficult to replace in the short term. To address this and to ensure the protection of large trees in the landscape, when large trees are approved to be removed, the secured Offset must include large trees. A large tree to be secured as an Offset may be either scattered or within a patch.

Native vegetation is further described in the Planning Scheme as flora native to Victoria which, in some cases, includes taxa that are not indigenous to the site. Table 2 below identifies vegetation types assessed in this study.

Table 2. Vegetation categories.

| VEGETATION CATEGORY | DESCRIPTION | PLANNING IMPLICATIONS |
|---|---|---|
| **Site indigenous** | Indigenous to a local area. Defined as 'taxa that have originated in a given area without human involvement or that have arrived there without intentional or unintentional intervention of humans from an area in which they are native'. | There are certain exemptions under all Victorian Planning Schemes. 'Planted vegetation' provides an exemption to Clause 52.17 for native vegetation that has been planted on site whereby:<br>*Native vegetation that is to be removed, destroyed or lopped that was either planted or grown as a result of direct seeding.*<br>*This exemption does not apply to native vegetation planted or managed with public funding for the purpose of land protection or enhancing biodiversity unless the removal, destruction or lopping of the native vegetation is in accordance with written permission of the agency (or its successor) that provided the funding.*<br>Much of the native vegetation at this site has been planted for aesthetic purposes at the property boundaries, as evidenced by the ornamental garden-beds and linear nature of the vegetation. It is assumed in this instance however that public funds have been used, and this exemption is therefore not applied. |
| **Native to Victoria** | Non-indigenous to the local area but native to Victoria (such as Tasmanian Blue Gum, Spotted Gum and Giant Honey-myrtle).<br>Defined in Victorian Planning Provisions – Definitions – Clause 72 as *'Plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses'.* | If vegetation is not exempt as above, it may require a permit for removal.<br>The Schedule to the Knox Planning Scheme Section 52.17 further lists species that are considered by the municipality to be environmental weeds (and native to Victoria) and which are therefore also exempted under the Clause. |
| **Native to Australia** | Non-indigenous Australian native plants or vegetation which are not indigenous to Victoria (such as Sugar Gums). | Usually do not require a permit for removal but are identified to demonstrate that these plants have not been overlooked. |
| **Exotic Vegetation** | Planted exotic vegetation, which is flora species that are not native to Australia. | Usually does not require a permit for removal, unless the vegetation is covered by an 'Environment Significance' or 'Vegetation Protection' Overlay that specifically addresses exotic vegetation. |

### 2.1.2 Native canopy trees

The project arboricultural consultant mapped the location, species, DBH and TPZ of all canopy trees and non-canopy trees (tree and shrub species that form a secondary canopy layer) to the property feature survey; further details are provided in the *Arborist Assessment* report. The TPZ for each tree was then processed by the project landscape architect and imported to the Ecocentric

GIS for analysis on site; further details are provided in the *Landscape Plan* for the project.

The tree data and GIS mapping layer were used by Ecocentric to identify all trees on site that are identified as being native to Victoria. These trees were then classified during the site assessments as being scattered or as part of a patch based on the number of trees and canopy spread.

The *Assessor's Handbook: Applications to Remove, Destroy or Lop Native Vegetation* (DELWP 2017; hereafter referred to as the *Handbook 2017*) defines a canopy tree as a mature tree (able to flower) that is greater than three metres in height, and of a species that is typically found in the upper layer of the relevant vegetation type (EVC). If impacted, significant canopy trees are to be Offset in accordance with Clause 52.17 of the Planning Scheme (see Section 6.3 for details).

For this project, assessment of canopy trees therefore included whether trees classify as 'large trees' (regardless of whether they occurred in 'patches' or as 'scattered trees') based on having a DBH of 70cm or greater, as appropriate to the Valley Heathy Forest EVC 127 or Swampy Woodland EVC 937 benchmarks (see Section 3.1.1 below), or as 'small trees' where these are greater than 3m in height but with a DBH of less than 70cm. The Knox Planning Scheme Section 52.17 schedule further lists native trees that are considered to be an environmental weed within the municipality, and which are therefore exempt of Offset requirements in accordance with the schedule. Exempted trees identified on site in this instance include the following species: Spotted Gum (*Corymbia maculata*); Blue-gum (*Eucalyptus globulus*); and Bracelet Honey-myrtle (*Melaleuca armillaris*).

The purpose of assessing and mapping the location of significant canopy trees was two-fold:

- To provide a large tree count per hectare for each defined Habitat Zone; and,
- To provide a spatial representation of significant canopy trees within close proximity of the proposed development in order to inform minor realignments where it is necessary to protect Tree Protection Zones[10] (TPZs) and thereby retain and conserve these ecological assets.

Assessments of tree health and structure were undertaken by the project arborist (Galbraith 2020); assessments of public liability for trees identified as being retained within the Stage 1 – 7 development area were not conducted as part of this study.

### 2.1.3 General flora and fauna survey

An incidental flora and fauna survey was undertaken throughout the proposed development area and property. All species of vascular flora and vertebrate and invertebrate fauna detected on the site were recorded.

The study area was assessed for its faunal habitat values and potential to support threatened flora and fauna species, and/or threatened vegetation communities. The assessment involved site-based habitat assessments, and a

[10] TPZ is a calculated area (based on AS 4970-2009 (Protection of trees on development sites)) of soil volume required to encompass sufficient absorbing tree root systems to ensure the long-term survival of a tree. Trees may be considered as lost (and may require an Offset) if impacts of greater than 10% intrusion into the TPZ occur.

review of aerial photography to gain an appreciation of habitat connectivity in a broader landscape context.

The general habitat assessment focused on the extent of native vegetation cover, composition and structure of the vegetation, as well as other features important in determining habitat quality. Habitat features observed and assessed included (but were not limited to):

- Presence of nectar-producing and hollow-bearing trees;
- Presence of ground logs, stone outcrops or exposed surface habitat;
- Level of disturbance (e.g. weed invasion) and ground-layer characteristics including leaf litter and logs;
- Size, shape and connectivity of vegetation patches;
- Presence of specific habitat features (e.g. aquatic vegetation); and
- Structural heterogeneity of the vegetation.

Habitat within the proposed development area was also assessed on site using active searching techniques. Active searching included looking for sign of fauna activity, such as (but not limited to) scats, tracks, tree marks, burrowing, surface scratching (in particular conical pits formed by foraging bandicoots and ground fauna), hair scraps (particularly on fences), game trails, nests (and dreys), burrow chimneys, feed middens and scat sites. Surface habitats, such as rocks, logs, sheets of corrugated iron and building rubble, were lifted carefully and inspected for presence of fauna or sign of habitation. Avian surveys were conducted using binoculars while on site.

Please note that there are no wetlands or waterbodies within the proposed Stage 1 – 7 impact areas, and that amphibian surveys are not required in this instance.

Any significant flora or fauna identified were mapped to the GIS spatial layers using a hand-held GPS (accurate to +/- 5m).

### 2.1.4 Likelihood of occurrence

All threatened flora and fauna species that were identified by the desktop assessment as potentially occurring within a five-kilometre radius of the property had their likelihood of occurrence on site assessed by an examination of species-suitable habitat on site (as identified through aerial imagery, previous reports and site surveys). A species was assumed to be present if suitable habitat was observed in the study area, and if that species was known to occur regionally. This is a conservative approach likely to include species that are difficult to detect.

The probability that each threatened species occurs within the study area was determined as being either Unlikely, Low, Moderate, High, Very High or Recorded, based on the criteria listed in Table 3 below.

Table 3. Likelihood of occurrence criteria

| Likelihood of occurrence | Criteria - one or more of the following conditions applies for threatened flora and / or fauna species |
|---|---|
| **Unlikely** | The species has not been recorded previously within 5km of the study area.<br>The study area is beyond the current known geographic range of the species.<br>The species has specific habitat requirements that are not present in the study area.<br>The species is considered to be extinct or regionally extinct. |
| **Low** | The species has historically (>20 years ago) been recorded within 5km of the study area.<br>The species has specific habitat requirements that are present in the study area, and these habitat areas are considered to be of Low significance (see Table 1) for the species. |
| **Moderate** | The species has been recorded more recently (<20 years ago) within 5km of the study area.<br>The species has specific habitat requirements that are present in the study area, and these habitat areas are considered to be of Low or Medium significance (see Table 1) for the species. |
| **High** | The species has been recorded more recently (<20 years ago) within 5km of the study area.<br>The species has been recorded more recently (<20 years ago) within the study site.<br>The species has specific habitat requirements that are present in the study area, and these habitat areas are considered to be of Medium or High significance (see Table 1) for the species.<br>A known population of the species with records (typically >20) is located in similar habitat within 5km of the study area. |
| **Very High** | The species has been recorded more recently (<20 years ago) within 5km of the study area.<br>The species has been recorded very recently (<5 years ago) within the study site.<br>The species has specific habitat requirements that are present in the study area, and these habitat areas are considered to be of High or Very High significance (see Table 1) for the species.<br>A known population of the species with records (typically >20) is located in similar habitat within 5km of the study area. |
| **Recorded** | The species was recorded in the study area during the current survey. |

# 3. RESULTS

The current biodiversity values of the Stage 1 – 7 development area are highly modified compared to those pre-dating European settlement, attributable to broad-scale clearing of vegetation, the planting of exotic and non-indigenous native vegetation, and alterations to drainage patterns.

The majority of the development area consists of cleared land, constructed features and planted exotic vegetation (see Appendix 9.6). The bulk of the site was formerly used for agricultural research purposes, with planted fruit trees, polytunnels and buildings and sheds – now mostly removed from site. Evidence of site clean-up remains with areas of concrete slab and building rubble still present on site, and sites of soil disturbance where fruit trees and agricultural research plots have been dug up and removed. Areas outside of remaining plantations (described below) comprise common pasture grasses that have been regularly slashed for the prevention of grass-fire and weed control.

Middle and upper canopy vegetation within the Stage 1 – 7 development area is limited to planted trees and shrubs which are not indigenous to the site. Trees and shrubs around the property boundary comprise a mix of native (to Victoria) and exotic tree species that have been planted for aesthetic purposes, which form a linear, contiguous canopy cover. There are also several patches of native (to Victoria) and exotic tree species inside the developable area that have been planted for aesthetic purposes within carpark areas and garden beds, or planted in lines for agricultural research studies.

There are no wetlands, waterways or drainage-lines within the proposed Stage 1 – 7 development area; the nearest aquatic habitat is within the constructed dam in the north of this property which is not assessed in this report (see Ecocentric 2021 in preparation).

## 3.1 NATIVE VEGETATION AND HABITAT

The following sections provide an outline of all native vegetation and habitat values assessed within the Stage 1 – 7 development area. These assessments have been roughly classified into two groups based on the presence of native flora and the quality of habitat available therein; namely:

- Scattered native trees and patches (three or more native trees with overlapping canopies) along property boundaries; and
- Patches of native trees within the developable area.

The definition of a native tree, and whether or not it is planted or exempt for Offset purposes, is provided in Section 2.1.1 above (see also Appendix 9.1 for details).

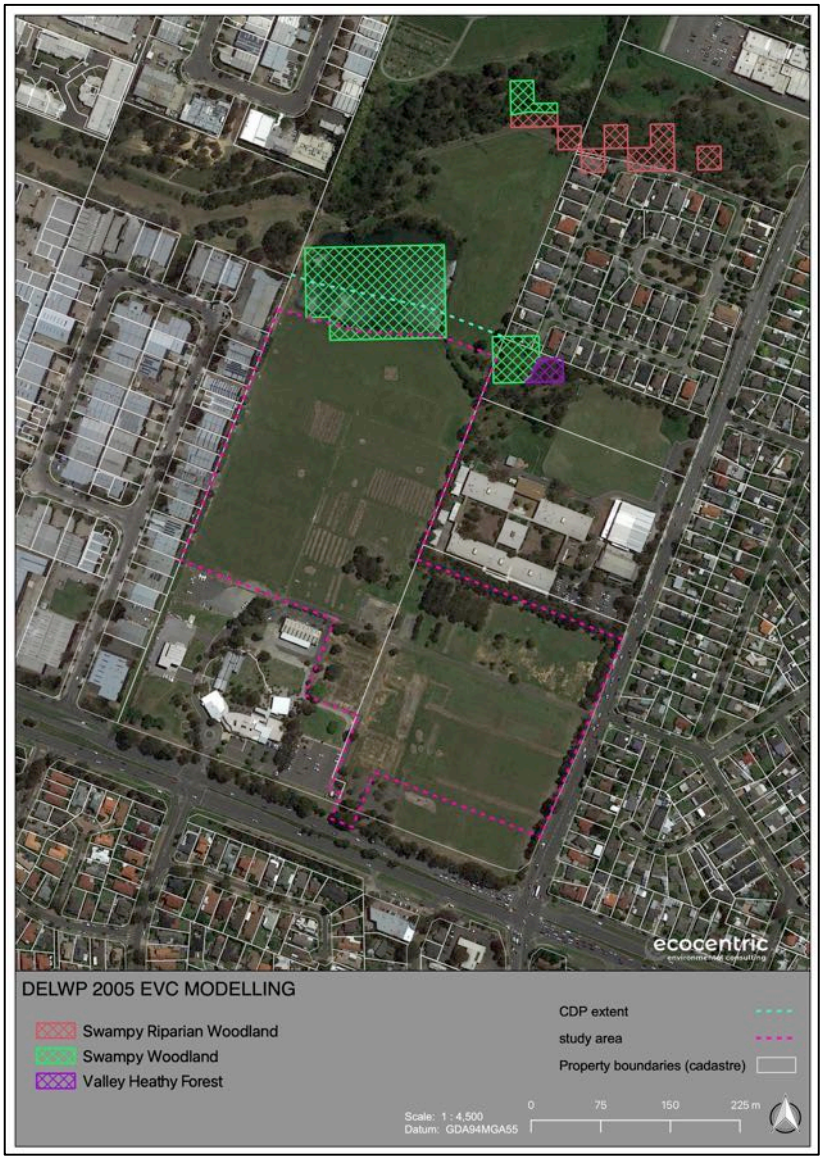
All intact native vegetation was assessed in accordance with the *Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectare scoring method* (DSE 2004; hereafter a VQA assessment), with definitions as provided in Section 2.1.1 above and in accordance with the DELWP *Assessor's Handbook: Applications to Remove, Destroy or Lop Native Vegetation* (DELWP 2017; hereafter referred to as the *Handbook 2017*).

### 3.1.1 Pre-disturbance EVCs

Determining the appropriate EVC benchmark was at times difficult due to the highly modified state of all remnant vegetation within the study area (e.g. lack of understorey in many areas). The final decision was made based on remnant canopy and understorey species, where available, landscape positioning and analysis of the 2005 EVC modelling spatial data (see Figure 2 below).

Analysis of the pre-disturbance EVC modelling, the 2005 EVC model, remnant vegetation within the proximity of the site, soils and topography identifies the Stage 1 – 7 development area as likely to have once supported a Valley Heathy Forest EVC (EVC 127); Swampy Woodland (EVC 937) may also have been present at the northern extent of the Stage 1 – 7 development area (and within the wetlands development site not considered in this report). Sites of intact native vegetation within the study area are therefore assessed against the Valley Heathy Forest EVC 127 benchmark for the Gippsland Plain bioregion with one small patch of Swampy Woodland EVC 937 in the north-eastern corner of the works area.

**Figure 2. DELWP 2005 EVC modelling** (DELWP 2020)



### 3.1.2 Intact native vegetation patches

There is little to no understorey habitat along the property boundaries, where garden beds have been mulched to prevent the establishment of environmental weeds and where regular slashing and mowing has been conducted to maintain an open 'park like' appearance. Some tree hollows are present within these areas, suitable for arboreal mammals and hollow dependent birds, and there are bark fissure and canopy roosting and feeding opportunities for bats (fruit and insectivorous taxa), passerine and honeyeater birds, and arboreal mammals. However, it is considered unlikely that these areas would support threatened or significant flora or fauna. These sites are assigned a rating of ***low habitat significance*** (see Table 1 for details).

We note also that the vast majority of trees along the property boundaries will be retained within linear reserves, with tree losses limited to the site access and egress locations for the estate and temporary sales and information centre. Trees are also assessed as being lost, although physically retained, whenever Tree Protection Zone (TPZ) impacts exceed 10% (see Appendix 9.6 for details; see also Figure 3 for representative photographs of the site). Further micro-alignment of the development sites will also be undertaken in accordance with a Construction Environmental Management Plan (CEMP) investigating options to further reduce impacts within the TPZs on a tree-by-tree basis, and/or with a qualified and experienced arborist on hand to ensure sensitive pruning of feeder tree roots.

Away from property boundaries, inside the developable area, there are 10 patches (average of only 365m$^2$ per patch) of planted native canopy species which offer limited habitat values in the form of canopy roosting and feeding opportunities for bats (fruit and insectivorous taxa) and honeyeaters, and roosting opportunities for passerine birds. Tree hollows are noticeably absent, and there is little to no recruitment of understorey species due to dense organic litter layers, the closed nature of the canopy, and regular herbicide application for weed control; one exception, Patch 3A retains a ground log that may have been placed on site for habitat values, and supports some limited regeneration of understorey species (including two Swamp Paperbark (*Melaeluca ericifolia*), two Fireweed (*Senecio* spp.) and scattered patches of Weeping Grass (*Microlaena stipoides var. stipoides*). It is considered unlikely that these patches would support threatened or significant flora or fauna. All patches of native vegetation are assigned a rating of ***low habitat significance*** (see Table 1 for details).

Table 4 below presents the results of the VQA habitat hectare assessments for the patches of native vegetation described above (see Appendix 9.6 maps for patch locations).

Table 4. Native vegetation patch VQA results

| Habitat Zone | | | 1A, 2A, 9A, 10A, 11A, 13A, 14A & 16A | 3A |
|---|---|---|---|---|
| Benchmark criteria | | Max. Score | Valley Heathy Forest | Valley Heathy Forest |
| | | | EVC 127 | EVC 127 |
| Site condition | Large Old Trees | 10 | 0 | 0 |
| | Canopy cover | 5 | 5 | 5 |
| | Understorey | 25 | 0 | 5 |
| | Lack of weeds | 15 | 4 | 4 |
| | Recruitment | 10 | 0 | 5 |
| | Organic litter | 5 | 3 | 3 |
| | Logs | 5 | 0 | 0 |
| | **Condition total:** | 1x | 12 | 22 |
| **Multiplier** | | 100% | 1 | 1 |
| | Patch Size | | 1 | 1 |
| | Neighbourhood | | 1 | 1 |
| | Distance to Core | | 0 | 0 |
| | **Landscape total:** | | 2 | 2 |
| **Habitat quality score** | | **100** | **14** | **24** |
| Habitat score as above = #/100 | | | 0.14 | 0.24 |

### 3.1.3 Intact native canopy trees

The *Handbook 2017* defines a native canopy tree as a mature tree (able to flower) that is greater than three metres in height, and of a species that is typically found in the upper layer of the relevant vegetation type (EVC). Significant canopy trees are trees which meet this description and which are greater than or equal to the large tree DBH as defined in the EVC benchmarks. If impacted, significant canopy trees are to be Offset or counterbalanced in accordance with Clause 52.17 of the Planning Scheme (see Section 6.3 for details).

For this project, canopy trees were therefore assessed against the Valley Heathy Forest EVC 127 or Swampy Woodland EVC 937 benchmarks, whereby 'large trees' are defined as those with a DBH of 70cm or greater.

The purpose of assessing and mapping the location of significant canopy trees was two-fold:

- To provide a large tree count per hectare for each defined patch; and
- To provide a spatial representation of significant canopy trees within close proximity of the Stage 1 – 7 development area and construction footprint, in order to help inform minor realignments that could better protect TPZs and thereby retain and conserve these ecological assets.

The location of all native trees within the Stage 1 – 7 development area was mapped to the site feature survey by the project arborist, and TPZ extents were added by the project landscape architect. Each tree was further assessed on site by Ecocentric and identified as being either: native to Victoria; exempt of Offset requirements as specified under Section 52.17 schedule of the Knox Planning Scheme; or exotic (non-native to Victoria and/or environmental weeds).

All options to retain all native trees were further explored with the project engineers and Development Victoria in an effort to avoid and minimise losses. Efforts to avoid impacts included re-alignment of the development footprint to minimise impacts within TPZs; details of avoidance measures are provided below in Section 6.3.3. Trees that are to be retained on site are also included within open space reserves and will be protected during the construction phase through the application of TPZ fencing (see Section 5.2 for details); investigations of tree health and structural integrity are considered by the project arborist (see also *Arborist Assessment* report for details).

A tree is considered lost in all cases where it is scheduled to be removed, and in all cases where impacts within its TPZ area exceed 10%. Table 5 below identifies all such native canopy trees, large and small, within the Stage 1 – 7 development area (see also maps in Appendix 9.6; see also the *Landscape Plan* and *Arborist Assessment* report for details). The native trees being removed or considered lost are presented as scattered small and large trees (SST and LST respectively) or as located with a patch of native vegetation (where the understorey cover of native vegetation exceeds 25% cover, or, where three or more canopy trees overlap (see also definitions in Section 2.1.1 above). These trees, as listed below, are to be Offset in accordance with the *Guidelines 2017* policy prior to the commencement of works on site (see also Section 6.3 for details). Large trees, as assessed against the benchmarks, being lost are discussed further below.

Table 5. Native canopy trees to be removed or considered lost within the Stage 1 – 7 development area.

| Tree | Species | DBH | Offset category |
|---|---|---|---|
| **4** | Eucalyptus leucoxylon (Yellow Gum) | 43 | SST |
| **7** | Eucalyptus leucoxylon (Yellow Gum) | 29 | HZ14A |
| **13** | Eucalyptus tricarpa (Red Ironbark) | 33 | HZ14A |
| **15** | Eucalyptus tricarpa (Red Ironbark) | 12 | HZ14A |
| **28** | Eucalyptus leucoxylon (Yellow Gum) x Eucalyptus tricarpa (Red Ironbark)(hybrid Eucalypt) | 57 | SST |
| **50** | Eucalyptus leucoxylon (Yellow Gum) | 85 | LST |
| **59** | Eucalyptus leucoxylon (Yellow Gum) x Eucalyptus tricarpa (Red Ironbark)(hybrid Eucalypt) | 34 | SST |
| **60** | Eucalyptus cephalocarpa (Mealy Stringybark) | 41 | HZ13A |
| **61** | Eucalyptus cephalocarpa (Mealy Stringybark) | 50 | HZ13A |
| **62** | Eucalyptus cephalocarpa (Mealy Stringybark) | 45 | HZ13A |
| **66** | Eucalyptus leucoxylon (Yellow Gum) | 21 | HZ9A |

| Tree | Species | DBH | Offset category |
|---|---|---|---|
| **67** | Eucalyptus leucoxylon (Yellow Gum) | 42 | HZ9A |
| **68** | Eucalyptus leucoxylon (Yellow Gum) | 29 | HZ9A |
| **75** | Eucalyptus leucoxylon (Yellow Gum) | 22 | SST |
| **76** | Eucalyptus leucoxylon (Yellow Gum) | 22 | SST |
| **172** | Eucalyptus sideroxylon (Red Ironbark) | 41 | SST |
| **202** | Eucalyptus viminalis (Manna Gum) | 57 | SST |
| **211** | Eucalyptus viminalis (Manna Gum) | 72 | LST |
| **252** | Eucalyptus cephalocarpa (Mealy Stringybark) | 100 | LST |
| **253** | Eucalyptus melliodora (Yellow Box) | 25 | SST |
| **254** | Eucalyptus sideroxylon (Red Ironbark) | 32 | SST |
| **261** | Eucalyptus tricarpa (Red Ironbark) | 46 | HZ16A |
| **264** | Eucalyptus melliodora (Yellow Box) | 14 | HZ16A |
| **265** | Eucalyptus melliodora (Yellow Box) | 22 | HZ16A |
| **270** | Eucalyptus sideroxylon (Red Ironbark) | 32 | HZ16A |
| **272** | Eucalyptus sideroxylon (Red Ironbark) | 66 | HZ10A |
| **274** | Eucalyptus sideroxylon (Red Ironbark) | 42 | HZ10A |
| **275** | Eucalyptus ovata (Swamp Gum) | 56 | HZ10A |
| **280** | Eucalyptus ovata (Swamp Gum) | 56 | HZ11A |
| **282** | Eucalyptus ovata (Swamp Gum) | 42 | HZ11A |
| **284** | Eucalyptus cephalocarpa (Mealy Stringybark) | 70 | HZ11A |
| **287** | Eucalyptus sideroxylon (Red Ironbark) | 38 | HZ11A |
| **288** | Eucalyptus ovata (Swamp Gum) | 21 | HZ11A |
| **293** | Eucalyptus ovata (Swamp Gum) | 50 | SST |
| **296** | Eucalyptus melliodora (Yellow Box) | 22 | SST |
| **298** | Eucalyptus ovata (Swamp Gum) | 49 | SST |
| **304** | Eucalyptus melliodora (Yellow Box) | 43 | SST |
| **305** | Eucalyptus cephalocarpa (Mealy Stringybark) | 43 | SST |
| **324** | Eucalyptus leucoxylon (Yellow Gum)x8 | Range (<70cm) | HZ1A |
| **325** | Eucalyptus leucoxylon (Yellow Gum)x8 | Range (<70cm) | HZ1A |
| **326** | Eucalyptus leucoxylon (Yellow Gum)x7 | Range (<70cm) | HZ1A |
| **327** | Eucalyptus leucoxylon (Yellow Gum)x11 | Range (<70cm) | HZ1A |
| **328** | Eucalyptus leucoxylon (Yellow Gum)x11 | Range (<70cm) | HZ1A |
| **329** | Eucalyptus leucoxylon (Yellow Gum)x2 | Range (<70cm) | HZ1A |
| **352** | Eucalyptus leucoxylon (Yellow Gum) | 16 | HZ2A |
| **353** | Eucalyptus leucoxylon (Yellow Gum) | 16 | HZ2A |
| **354** | Eucalyptus leucoxylon (Yellow Gum) | 17 | HZ2A |
| **358** | Eucalyptus sideroxylon (Red Ironbark) | 37 | HZ3A |
| **359** | Eucalyptus sideroxylon (Red Ironbark) | 31 | HZ3A |
| **360** | Eucalyptus sideroxylon (Red Ironbark) | 15 | HZ3A |

| Tree | Species | DBH | Offset category |
|---|---|---|---|
| **361** | Eucalyptus sideroxylon (Red Ironbark) | 22 | HZ3A |
| **362** | Eucalyptus sideroxylon (Red Ironbark) | 35 | HZ3A |
| **363** | Eucalyptus leucoxylon (Yellow Gum) | 18 | HZ3A |
| **364** | Eucalyptus sideroxylon (Red Ironbark) | 29 | HZ3A |
| **365** | Eucalyptus leucoxylon (Yellow Gum) | 45 | HZ3A |
| **366** | Eucalyptus sideroxylon (Red Ironbark) | 38 | HZ3A |
| **367** | Eucalyptus sideroxylon (Red Ironbark) | 24 | HZ3A |
| **368** | Eucalyptus sideroxylon (Red Ironbark) | 22 | HZ3A |
| **371** | Eucalyptus sideroxylon (Red Ironbark) | 27 | HZ3A |
| **372** | Eucalyptus sideroxylon (Red Ironbark) | 35 | HZ3A |
| **408** | Eucalyptus cephalocarpa (Mealy Stringybark) | 60 | SST |
| **413** | Eucalyptus ovata (Swamp Gum) | 50 | SST |
| **414** | Eucalyptus ovata (Swamp Gum) | 65 | SST |

**Tree ID is as per Galbraith (2020) (*Arborist Assessment* report)**
Size class based on 70cm DBH for a large tree in the Valley Heathy Forest EVC 127
SST – Small scattered tree
LST – Large scattered tree (highlighted orange)
Patch – patch of native vegetation

It is important to note that only four large (DBH ≥ 70cm) native canopy trees and five Spotted Gum (*Corymbia maculata*) are lost within the Stage 1 – 7 development area. These include the following:

**Tree #50** is a large Yellow Gum (DBH 85cm) in a neighbouring property to the west of the development area. This tree, not located on site, will not be directly impacted, but is considered lost due to TPZ impacts. There is potential to re-align a proposed shared user pathway and/or incorporate the use of pervious pavement treatments to reduce impacts to this tree's structural root systems.

**Tree #211** is a large Manna Gum (DBH 72cm) on the shared property boundary with Fairhills High School that will be retained, however is considered lost due to TPZ impacts. There is an opportunity to avoid TPZ impacts for this tree through micro-design of the development and engagement of a qualified arborist to supervise pruning of tree feeder-roots if encountered during excavation works.

**Tree #252** is a large Mealy Stringybark (DBH 100cm) in the neighbouring Fairhills High School (in the southeast corner of the school grounds). This tree, not located on site, will not be directly impacted, but is considered lost due to unavoidable TPZ impacts. This species may be indigenous to this area however it is considered likely that this tree has been planted (likely planted by the school's administration or a former owner of the land).

**Tree #284** is a large Mealy Stringybark (DBH 70cm) on the eastern property boundary abutting Scoresby Road. This tree is also considered likely to have been planted when the site was established as a government facility. While

being retained within the buffer zone along the roadside boundary, this tree is considered lost due to unavoidable TPZ impacts.

It should be noted that four Spotted Gum (*Corymbia maculata*) (Trees **#1, #2, #114, #174**) and one Tasmanian Blue Gum (*Eucalyptus globulus*) (Tree **#215**) are large (DBH ≥ 70cm) trees that are also considered lost due to TPZ impacts. However, as Spotted Gum and Tasmanian Blue Gum are considered to be environmental weeds in the City of Knox, these trees are exempt of Offsets as specified in the schedule for Section 52.17 of the Planning Scheme.

All trees identified in Table 5 above will be Offset in accordance with DELWP's *Guidelines 2017* Offset policy and the Knox Planning Scheme (Section 6.3.1). This constitutes a conservative approach to environmental protection, given that all of the trees listed in Table 5 (with the possible exception of Tree #50) are considered likely to have been planted; attributable to their location along property boundaries or within experimental plantations and their young age class (as confirmed by the low DBH range and the *Arborist Assessment* report).

The trees identified in Table 5 above are Permitted to be impacted and are to be clearly marked as such on site *prior* to commencement of works. Every effort is nevertheless to be made on site to retain these trees if possible; if retained then these will be considered ecological gains that are the result of a careful works program on site.

We also note that the majority of the site's trees that are considered to be native to Victoria are being retained on site through careful design of the Stage 1 – 7 development area.

Table 6 below identifies native canopy trees that will be retained during the development of Stages 1 – 7; large trees being retained, as assessed against the benchmarks, and are considered to be of higher significance and are discussed further below.

Table 6. Native canopy trees to be retained during development of Stage 1 – 7

| Tree | Species | DBH |
|---|---|---|
| **10** | Eucalyptus microcarpa (Grey Box) | 20 |
| **12** | Eucalyptus ovata (Swamp Gum) | 47 |
| **22** | Eucalyptus tricarpa (Red Ironbark) | 29 |
| **23** | Eucalyptus leucoxylon (Yellow Gum) | 31 |
| **69** | Eucalyptus leucoxylon (Yellow Gum) | 31 |
| **70** | Eucalyptus leucoxylon (Yellow Gum) | 29 |
| **71** | Eucalyptus leucoxylon (Yellow Gum) | 35 |
| **72** | Eucalyptus leucoxylon (Yellow Gum) | 35 |
| **73** | Eucalyptus leucoxylon (Yellow Gum) | 31 |
| **74** | Eucalyptus leucoxylon (Yellow Gum) | 22 |
| **109** | Eucalyptus leucoxylon (Yellow Gum) | 45 |
| **111** | Eucalyptus melliodora (Yellow Box) | 24 |
| **112** | Eucalyptus melliodora (Yellow Box) | 41 |
| **115** | Eucalyptus melliodora (Yellow Box) | 16 |
| **116** | Eucalyptus melliodora (Yellow Box) | 25 |
| **117** | Eucalyptus species (Eucalypt) | 48 |

| Tree | Species | DBH |
|---|---|---|
| **120** | Eucalyptus melliodora (Yellow Box) | 29 |
| **122** | Eucalyptus melliodora (Yellow Box) | 23 |
| **123** | Eucalyptus melliodora (Yellow Box) | 43 |
| **125** | Eucalyptus melliodora (Yellow Box) | 33 |
| **127** | Eucalyptus melliodora (Yellow Box) | 31 |
| **128** | Eucalyptus melliodora (Yellow Box) | 30 |
| **129** | Eucalyptus melliodora (Yellow Box) | 23 |
| **130** | Eucalyptus melliodora (Yellow Box) | 20 |
| **131** | Eucalyptus melliodora (Yellow Box) | 17 |
| **132** | Eucalyptus melliodora (Yellow Box) | 14 |
| **133** | Eucalyptus species (Eucalypt) | 21 |
| **134** | Eucalyptus melliodora (Yellow Box) | 34 |
| **135** | Eucalyptus melliodora (Yellow Box) | 27 |
| **136** | Eucalyptus melliodora (Yellow Box) | 22 |
| **138** | Eucalyptus melliodora (Yellow Box) | 21 |
| **149** | Eucalyptus melliodora (Yellow Box) | 32 |
| **156** | Eucalyptus leucoxylon (Yellow Gum) | 40 |
| **166** | Eucalyptus sideroxylon (Red Ironbark) | 12 |
| **167** | Eucalyptus melliodora (Yellow Box) | 22 |
| **169** | Eucalyptus melliodora (Yellow Box) | 24 |
| **181** | Eucalyptus sideroxylon (Red Ironbark) | 39 |
| **182** | Eucalyptus melliodora (Yellow Box) | 15 |
| **183** | Eucalyptus species (Eucalypt) | 29 |
| **184** | Eucalyptus cephalocarpa (Mealy Stringybark) | 30 |
| **185** | Eucalyptus sideroxylon (Red Ironbark) | 44 |
| **189** | Eucalyptus species (Eucalypt) | 56 |
| **190** | Eucalyptus melliodora (Yellow Box) | 16 |
| **191** | Eucalyptus viminalis (Manna Gum) | 69 |
| **196** | Eucalyptus viminalis (Manna Gum) | 59 |
| **201A** | Eucalyptus goniocalyx (Long leaved Box) | 13 |
| **202A** | Eucalyptus cephalocarpa (Mealy Stringybark) | 18 |
| **204** | Eucalyptus leucoxylon (Yellow Gum) | 18 |
| **205A** | Eucalyptus melliodora (Yellow Box) | 12 |
| **206** | Eucalyptus viminalis (Manna Gum) | 39 |
| **207A** | Eucalyptus cephalocarpa (Mealy Stringybark) | 56 |
| **208** | Eucalyptus melliodora (Yellow Box) | |
| **209A** | Eucalyptus cypellocarpa (Mountain Grey Gum) | 21 |
| **209B** | Eucalyptus cephalocarpa (Mealy Stringybark) | 23 |
| **212** | Eucalyptus sideroxylon (Red Ironbark) | 43 |

| Tree | Species | DBH |
|---|---|---|
| **213** | Eucalyptus cephalocarpa (Mealy Stringybark) | 44 |
| **214** | Eucalyptus obliqua (Messmate) | 40 |
| **216** | Eucalyptus melliodora (Yellow Box) | 26 |
| **218** | Eucalyptus viminalis (Manna Gum) | 67 |
| **219** | Eucalyptus cephalocarpa (Mealy Stringybark) | 50 |
| **221** | Eucalyptus radiata (Narrow-leaved Peppermint) | 35 |
| **224** | Eucalyptus viminalis (Manna Gum) | 69 |
| **226** | Eucalyptus viminalis (Manna Gum) | 76 |
| **228** | Eucalyptus viminalis (Manna Gum) | 59 |
| **229** | Eucalyptus cephalocarpa (Mealy Stringybark) | 16 |
| **233** | Eucalyptus viminalis (Manna Gum) | 60 |
| **234** | Eucalyptus cephalocarpa (Mealy Stringybark) | 26 |
| **236** | Eucalyptus viminalis (Manna Gum) | 68 |
| **237** | Eucalyptus cephalocarpa (Mealy Stringybark) | 17 |
| **237A** | Eucalyptus cephalocarpa (Mealy Stringybark) | 22 |
| **239** | Eucalyptus cephalocarpa (Mealy Stringybark) | 25 |
| **241** | Eucalyptus viminalis (Manna Gum) | 78 |
| **242** | Eucalyptus cephalocarpa (Mealy Stringybark) | 22 |
| **243** | Eucalyptus melliodora (Yellow Box) | 37 |
| **245** | Eucalyptus viminalis (Manna Gum) | 61 |
| **246** | Eucalyptus leucoxylon (Yellow Gum) | 33 |
| **247** | Eucalyptus melliodora (Yellow Box) | 36 |
| **248** | Eucalyptus cephalocarpa (Mealy Stringybark) | 50 |
| **250** | Eucalyptus viminalis (Manna Gum) | 70 |
| **251** | Eucalyptus melliodora (Yellow Box) | 19 |
| **292** | Eucalyptus melliodora (Yellow Box) | 14 |
| **295** | Eucalyptus melliodora (Yellow Box) | 23 |
| **389** | Eucalyptus cephalocarpa (Mealy Stringybark) | 42 |
| **390** | Eucalyptus cephalocarpa (Mealy Stringybark) | 46 |
| **391** | Eucalyptus cephalocarpa (Mealy Stringybark) | 33 |
| **392** | Eucalyptus cephalocarpa (Mealy Stringybark) | 45 |
| **393** | Eucalyptus cephalocarpa (Mealy Stringybark) | 52 |

| Tree | Species | DBH |
|---|---|---|
| **394** | Eucalyptus goniocalyx (Long-leaved Box) | 60 |
| **395** | Eucalyptus cephalocarpa (Mealy Stringybark) | 33 |
| **396** | Eucalyptus cephalocarpa (Mealy Stringybark) | 80 |
| **397** | Eucalyptus cephalocarpa (Mealy Stringybark) | 45 |
| **398** | Eucalyptus cephalocarpa (Mealy Stringybark) | 38 |
| **401** | Eucalyptus cephalocarpa (Mealy Stringybark) | 45 |
| **403** | Eucalyptus cephalocarpa (Mealy Stringybark) | 48 |
| **405** | Eucalyptus cephalocarpa (Mealy Stringybark) | 45 |
| **407** | Eucalyptus cephalocarpa (Mealy Stringybark) | 42 |
| **409** | Eucalyptus cephalocarpa (Mealy Stringybark) | 42 |
| **411** | Eucalyptus cephalocarpa (Mealy Stringybark) | 45 |
| **412** | Eucalyptus cephalocarpa (Mealy Stringybark) | 58 |
| **415** | Eucalyptus ovata (Swamp Gum) | 22 |
| **416** | Eucalyptus ovata (Swamp Gum) | 28 |
| **449** | Eucalyptus ovata (Swamp Gum) | 105 |
| **450** | Eucalyptus ovata (Swamp Gum) | 25 |
| **451** | Eucalyptus ovata (Swamp Gum) | 44 |

**Tree ID is as per Galbraith (2020) Consulting (*Arborist Assessment* report)**
Size class based on 70cm DBH for a large tree in the Valley Heathy Forest EVC or the Swampy Woodland EVC (large trees highlighted green)

There are 5 large native trees (DBH ≥ 70cm) identified for retention on the property or within neighbouring properties; as described below. These retained trees are considered to be protected through careful design of the impact footprint to areas outside of TPZs.

**Trees #226, #241 and #250** are Manna Gum (DBH 76cm, 78cm and 70cm respectively) on the property boundary adjacent to the Fairhills High School which will be retained in a boundary buffer zone.

**Tree #396** is a Mealy Stringybark (DBH 80cm) in the neighbouring Fairhills High School (southeast corner of the school grounds) which will not be impacted by works within Stages 1 – 7.

**Tree #449** is a large Swamp Gum (DBH 105cm) considered likely to pre-date clearing and agricultural landuse. This tree is to be retained in an open-space reserve, with understorey planting using species that are appropriate

to the Swampy Woodland EVC (EVC 937). Revegetation tube-stock is to be propagated from local provenance, indigenous seed sources.

Table 6 above does not include Spotted Gum or Tasmanian Blue Gum on the property's boundary as these trees are exempt of Offset requirements under 52.17 of the Knox Planning Scheme. We note however that, wherever practicable, trees of these species will also be retained for their aesthetic values.

There are several immature, self-son saplings within the Stage 1 – 7 development area that will be lost to development, including trees #82, #173, $281, #286 and #111A. Whilst these are all native canopy tree species, they are all under 3m in height and therefore their loss does not trigger Native Vegetation Offset requirements.

All trees identified for retention in Table 6 above are to be clearly marked on site *prior* to commencement of works, and are to be retained in an undisturbed state for the duration of works (Section 5.2). These trees are likely to trigger additional Native Vegetation Offset requirements if impacted on site.

Photographs below are indicative of the planted native vegetation as patches and scattered trees along the property boundaries and within the Stage 1 – 7 development area.

**Figure 3. Indicative site condition photographs**

Habitat Zone 3A

Habitat Zone 3A (log to be retained for habitat)

Tree #252 Mealy Stringybark (DBH 100cm) in the neighbouring Fairhills High School

Habitat Zone 1A (plantation Yellow Gum)

## 3.2 SIGNIFICANT FLORA

A local database analysis and habitat assessment was undertaken for flora that could potentially occur on site. A 5km search from the development site using the Victorian Biodiversity Atlas (DELWP 2019) and the Federal *Protected Matters Search Tool* (DAWE 2020) was undertaken to provide an indication of species that may possibly utilise habitats within the proposed development area. Atlas of Living Australia and iNaturalist databases were also searched for local (within 5km) records of significant species.

Appendix 9.3 lists 67 species recorded, and/or predicted to occur, within five kilometres of the project area that are classified as threatened under the EPBC Act, FFG Act, or that are listed under the Advisory List of Rare or Threatened Flora in Victoria (DEPI 2014).

Of all rare or threatened flora species recorded within five kilometres, none were recorded on site within the Stage 1 – 7 development area (NB: threatened species recorded within the wetlands development area are the subject of a separate report (Ecocentric in preparation)). Furthermore, no threatened or significant flora are expected to be found on site, attributable to the disturbed nature of available habitat due to extensive land clearance for historic agricultural uses, the use of this property for agricultural research, long-term slashing and mowing, and surface soil disturbances associated with the removal of buildings, research plots and pavements.

## 3.3 SIGNIFICANT FAUNA

A local database analysis and habitat assessment was undertaken for fauna that could potentially occur on site. A 5km search from the development site using the Victorian Biodiversity Atlas (DELWP 2019) and the Federal *Protected Matters Search Tool* (DAWE 2020) was undertaken to provide an indication of species that may possibly utilise habitats within the proposed development area. Atlas of Living Australia, BirdLife Australia and iNaturalist databases were also searched for local (within 5km) records of significant species.

Appendix 9.4 lists 100 species recorded, and/or predicted to occur, within five kilometres of the project area that are classified as threatened under the EPBC Act, FFG Act, or that are listed under either the Advisory List of Threatened Invertebrate Fauna in Victoria (DSE 2009) or the Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013).

Of all threatened fauna species recorded within five kilometres, one, Grey-headed Flying-fox (*Pteropus poliocephalus*), discussed below, was recorded flying over the Stage 1 – 7 development area (NB: threatened species recorded within the wetlands development area are the subject of a separate report (Ecocentric in preparation)). An assessment of the likelihood of occurrence of the threatened fauna species, as based on the habitat values identified on site, found no taxa with anything above a low likelihood of presence within the Stage 1 – 7 development area (see Table 2 for likelihood of occurrence categories). This is attributable to the disturbed nature of available habitat due to extensive land clearance for historic agricultural uses, the use of this property for agricultural research, long-term slashing and mowing, and surface soil disturbances associated with the removal of buildings, research plots and pavements.

**Swift Parrot (*Lathamus discolor*)**

Flowering eucalypts also provide canopy feeding opportunities for Swift Parrot (*Lathamus discolor*). Swift Parrot is listed as Critically Endangered under the EPBC Act 1999 (Cwlth) (also identified as a migratory species), is Listed under the FFG Act 1988, and is listed as endangered in the Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013). Swift Parrot is a migratory species, breeding in Tasmania during the summer months, then moving to feed on flowering eucalypts in south-eastern mainland Australia during the winter months. In Victoria, they occur more often on north side of Great Divide in Box-Ironbark forests supporting winter-flowering eucalypts (e.g. *Eucalyptus sideroxylon, E. tricarpa* and *E. microcarpa*) or psyllid-infested eucalypts (e.g. *Eucalyptus camaldulensis*). In southern Victoria, they occur in Manna Gum (*Eucalyptus viminalis*), Swamp Gum (*Eucalyptus ovata*) and Yellow Gum (*Eucalyptus leucoxylon*) habitats, and within flowering street trees or psyllid-infested eucalypts (Higgins 1999, Webster et al. 2003), but their movements (in response to food resources) are often irregular and unpredictable (likely attributable to the sporadic nature of their food sources).

Swift Parrots may occasionally utilise the site to forage on flowering eucalypts, however, given the mobility of the species and availability of abundant sources of alternate flowering canopy trees retained at the property boundaries and nearby habitat, the likelihood that site works would impact the Swift Parrot is considered to be low.

**Grey-headed Flying-fox (*Pteropus poliocephalus*)**

Despite the highly disturbed nature of the site, flowering eucalypts do provide canopy feeding opportunities for Grey-headed Flying-fox which, as noted above, was observed flying over the site. Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act 1999 (Cwlth), is Listed under the FFG Act 1988, and is listed as vulnerable in the Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013). No roosting camp (colony) was recorded on site, and given the mobility of the species and the abundant sources of alternative food sources generally found in suburban gardens, the likelihood that site works would impact the Grey-headed Flying-fox is considered to be low.

# 4. POTENTIAL IMPACTS

The Stage 1 – 7 development will result in the loss of several patches of *low habitat significance*, the physical removal of scattered trees, and the 'considered' loss of trees associated with TPZ impacts. In summary, this includes the loss of 0.996 hectares of native vegetation comprising:

- 0.3479 hectares of native vegetation within patches; and
- 4 large trees and 63 small trees within patches, scattered across the property, or, in the case of TPZ impacts, within neighbouring properties.

No significant flora or fauna are expected to be impacted by the Stage 1 – 7 development works. None-the-less, the *avoid* and *minimise* principle has been applied through careful design of the *Development Master Plan* and it is noted that approximately 1.12 hectares of native and non-native vegetation is retained around the property boundaries; we expect also that additional canopy trees can be saved during the construction program through micro-design of the development area and engagement of a qualified arborist to oversee tree root pruning.

The precautionary approach has also been applied in order to ensure that no significant ecological values are lost on site due to this development. The application of the precautionary principle was applied through:

- Adoption of the avoid and minimise principles, and retention of habitat and native vegetation wherever feasible;
- Identification of impact mitigation measures, as detailed in Section 5 below, to protect against impacts on common flora or fauna species that may be encountered on site;
- Securing of Native Vegetation Offsets prior to commencement of works in accordance with Victoria's *Guidelines 2017* policy and in order to ensure that there is *no net loss* of biodiversity values associated with this project (Section 6.3).

Unavoidable impacts are discussed in further detail below; measures aimed at the mitigation of these impacts are discussed in Section 5.

## 4.1 IMPACTS ON NATIVE VEGETATION AND HABITAT

The Stage 1 – 7 development program will result in the loss of native vegetation, as defined in the Knox Planning Scheme. These include:

- Patches of native vegetation that are the result of canopy trees being planted for agricultural research programs, and the limited understorey habitat values that these sites offer for common flora and fauna species;
- Large (DBH ≥ 70cm) and small (DBH < 70cm) native canopy trees (>3m height) that are within the patches described above, or are scattered on the property, or within linear patches along the property boundaries.

Table 7 below provides the GIS shapefile metadata used in DELWP's native vegetation impact and offset calculation software, EnSym, to calculate the required Native Vegetation Offset target to ensure that there is no net loss of

biodiversity values associated with this project. Details of Offset requirements are provided below in Section 6.3.

Table 7. GIS metadata: native vegetation full loss

| HH_SI | HH_ZI | HH_VAC | HH_EVC | BCS | LT_CNT | HH_A | map ID |
|---|---|---|---|---|---|---|---|
| **1** | A | P | GipP0127 | E | 0 | 0.1414 | 1A |
| **2** | A | P | GipP0127 | E | 0 | 0.0133 | 2A |
| **3** | A | P | GipP0127 | E | 0 | 0.0713 | 3A |
| **9** | A | P | GipP0127 | E | 0 | 0.0136 | 9A |
| **10** | A | P | GipP0127 | E | 0 | 0.0201 | 10A |
| **11** | A | P | GipP0127 | E | 1 | 0.0310 | 11A |
| **13** | A | P | GipP0127 | E | 0 | 0.0152 | 13A |
| **14** | A | P | GipP0127 | E | 0 | 0.0293 | 14A |
| **16** | A | P | GipP0127 | E | 0 | 0.0127 | 16A |
| **4** | SS | ST | GipP0127 | E | 0 | 0.0314 | 4 |
| **28** | SS | ST | GipP0127 | E | 0 | 0.0314 | 28 |
| **50** | LS | ST | GipP0127 | E | 1 | 0.0707 | 50 |
| **59** | SS | ST | GipP0127 | E | 0 | 0.0314 | 59 |
| **75** | SS | ST | GipP0127 | E | 0 | 0.0314 | 75 |
| **76** | SS | ST | GipP0127 | E | 0 | 0.0314 | 76 |
| **172** | SS | ST | GipP0127 | E | 0 | 0.0314 | 172 |
| **202** | SS | ST | GipP0127 | E | 0 | 0.0314 | 202 |
| **211** | LS | ST | GipP0127 | E | 1 | 0.0707 | 211 |
| **252** | LS | ST | GipP0127 | E | 1 | 0.0707 | 252 |
| **253** | SS | ST | GipP0127 | E | 0 | 0.0314 | 253 |
| **254** | SS | ST | GipP0127 | E | 0 | 0.0314 | 254 |
| **293** | SS | ST | GipP0127 | E | 0 | 0.0314 | 293 |
| **296** | SS | ST | GipP0127 | E | 0 | 0.0314 | 296 |
| **298** | SS | ST | GipP0127 | E | 0 | 0.0314 | 298 |
| **304** | SS | ST | GipP0127 | E | 0 | 0.0314 | 304 |
| **305** | SS | ST | GipP0127 | E | 0 | 0.0314 | 305 |
| **408** | SS | ST | GipP0127 | E | 0 | 0.0314 | 408 |
| **413** | SS | ST | GipP0937 | E | 0 | 0.0314 | 413 |
| **414** | SS | ST | GipP0937 | E | 0 | 0.0314 | 414 |

## 4.2 SIGNIFICANT FLORA AND FAUNA IMPACTS

Appendix 9.3 and 9.4 lists significant flora and fauna respectively that have been recorded within a 5km radius of the property. We note however that no significant flora was identified within the Stage 1 – 7 development area, and no significant fauna were identified as having anything above a 'low' likelihood of being encountered within the Stage 1 – 7 development area.

## 4.3 URBANISATION AND CONSTRUCTION PHASE IMPACTS

The increased level of urbanisation associated with development on site, as well as impacts associated with construction works, are likely to have an impact on ecological values on site. Potential impacts include increased environmental weed invasion, erosion and sedimentation loss impacts, light pollution impacts

associated with street and building lighting, and changes to stormwater surface flows. These potential impacts are discussed below.

### 4.3.1 Weed invasion and disease

The type of disturbance associated with the proposed development of this site can provide a window of opportunity for weeds and soil pathogens such as Phytophthora (*_Phytophthora cinnamomi_*) to establish. Clearing vegetation, earthworks, stockpiling of materials and driving on site leaves bare ground that is particularly susceptible to colonisation by weeds or introduction of disease. Weed seeds and pathogens contained within material being used for construction or within mud from vehicles may also be deposited into disturbed areas. Without effective weed and disease hygiene control protocols, contaminants from construction material and un-clean vehicles have the potential to introduce a suite of avoidable impacts to ecological values on site.

Woody weeds within the Stage 1 – 7 development area are currently confined to the swale drain in the northeast of the development area. This site retains several Willows (*Salix* spp.) and Blackberry (*_Rubus fruticosus_* spp. agg.). There is potential for the spread of these species during the redevelopment of this location as an open-space reserve (see also *Landscape Plan* for details). The remainder of the Stage 1 – 7 development area is relatively free of woody weeds.

Herbaceous / grassy weeds are common across the site, particularly where regular slashing has enabled these invasive species to colonise and dominate the groundstorey. The spread of grassy weeds off-site is to be prevented in accordance with the *Catchment and Land Protection Act 1994* (CaLP Act). It will also be necessary to ensure that weeds and soil pathogens do not spread to the wetlands development area (north of the Stage 1 – 7 development site) or neighbouring bushland areas leading to degradation or loss of threatened ecological communities and/or reduction in the value of the habitat for threatened and migratory species.

### 4.3.2 Erosion, sedimentation, and water pollutants

Bare ground, which results from clearing, stockpiling, earthworks, or driving vehicles and plant off-road, is susceptible to erosion. Given the down-slope proximity to aquatic habitat values within the dam and wetlands development area north of the Stage 1 – 7 construction footprint, it is imperative that erosion and sedimentation is carefully controlled. Similarly, there is the potential for an increase in water pollutants in wetlands at or near the project area as a result of construction works or urbanisation of the site, through spills or run-off.

The risk of erosion, sedimentation, and water pollution impacts off-site is highest in the northern sector of the property and the adjacent Blind Creek riparian corridor. Lack of appropriate erosion, sediment and pollution control may lead to death of aquatic flora and fauna, and resulting impacts to foraging wetland birds (including migratory and/or threatened species), and degradation of aquatic and Swampy Woodland areas.

### 4.3.3 Ecological light pollution

Artificial light that alters the natural patterns of light and dark in ecosystems is referred to as ‘ecological light pollution’ (Longcore & Rich 2004). Types of ecological light pollution include chronic or periodically increased illumination, unexpected changes in illumination, and direct glare (Longcore & Rich 2004).

Light pollution from the Stage 1 – 7 development area has the potential to impact fauna during the construction phase through use of high-powered artificial lighting for early morning or night work. Following the completion of construction, fauna may be impacted by light pollution on an ongoing basis from streetlights, vehicle headlights, and residential lighting. With regard to construction lighting, night work is not currently expected for the project; any required night work would likely be on an intermittent, short-term basis. Work is also not expected to occur early enough that lights are required. As such, post-construction impacts are expected to be greater than those of temporary construction lighting.

Street lighting also has potential to impact fauna on site due to light-spill into habitat areas (in particular into the wetlands development area not considered in this report). The use of directional street lighting is considered below in Section 5.2.6.

#### 4.3.4 Stormwater surface flows

Surficial stormwater flows have the potential to increase erosion across the site, and to direct sediment and chemical pollutants towards the lower lying wetlands area to the north of the Stage 1 – 7 development area. While impacts to the wetland development area are not being specifically considered in this report (see associated Ecocentric report, in preparation), stormwater impacts across the Stage 1 – 7 construction area must be contained to that area or disposed of off-site in an appropriate fashion.

The management of stormwater on site during the construction phase and once the Stage 1 – 7 development is completed is considered in the *Stormwater Management Plan* for this site, with engineering details of the wetland complex provided in the *Sediment Basin and Wetland Layout Plan and Sections* (see Section 5.2.7 for details).

# 5. IMPACT MITIGATION

The Stage 1 – 7 development will have an impact on the current limited ecological values on site. Impacts are generally categorized in this instance as the loss of *native vegetation patches and canopy trees*, and the potential for impacts on common fauna species. A process for the mitigation of these impacts is outlined below which includes (at minimum):

- Retention of native canopy trees and Valley Heathy Forest understorey habitat along the property boundaries;
- Retention of the Swamp Gum (*Eucalyptus ovata*; tree #449) and smaller native trees within the open-space reserve area in the northeast extent of the development area;
- Landscaping of open-space reserves and at the property boundaries (see also the *Landscape Plan* for details);
- Minimisation of vegetation losses to that extent necessary to construct the Stage 1 – 7 developments (see also the *Development Master Plan* for details);
- Containment and control of weeds, soil pathogens, soil erosion, sediment, water pollutants and ecological light pollution is to be implemented through the development of a Construction Environmental Management Plan (CEMP) for the Stage 1 – 7 development program.

Sections below outline requirements for mitigation of impacts on site.

## 5.1 PRELIMINARY MEASURES TO AVOID AND MINIMISE IMPACTS

A key tenet of the *Guidelines 2017* policy (DELWP 2017) is the requirement to *avoid and minimise* impacts to native vegetation; this principal is also common to legislative Acts such as the EPBC Act and the FFG Act. The principal is that preference should be given to avoidance > minimisation > mitigation > offset, and that this should be considered early in the design of the project.

Avoidance and minimisation of ecological impacts have been considered during the early design stages of this project, including:

- Careful siting and design of the open-space and buffer reserves in order to retain native vegetation and canopy trees wherever possible and minimise impacts to *low significance* habitat areas (see Table 1 for significance definition);
- Careful siting and design of the open-space and buffer reserves in order to retain approximately 1.12 hectares of native and non-native vegetation around the property boundaries;
- Ensuring that, wherever practicable, native vegetation outside of the proposed development area is retained – in particular, areas of native vegetation at the property boundaries; and
- Ensuring that there will be no native vegetation losses outside of the proposed development area through the use of TPZ fencing to clearly define the extent of the Permitted Stage 1 – 7 development footprint.

In addition, all native vegetation losses will be Offset in accordance with the *Guidelines 2017* policy to ensure that there is 'no net loss' of biodiversity values associated with this development. Details of the Native Vegetation Offset requirements are provided in Section 6.3.

Details of general mitigation measures that are to be implemented are detailed below.

## 5.2 GENERAL IMPACT MITIGATION MEASURES

A Construction Environmental Management Plan (CEMP) is required for the mitigation of impacts associated with the Stage 1 – 7 development works. A Construction Environmental Management Plan typically outlines all practicable measures to minimise and mitigate impacts on biodiversity from the construction and operation phase to the management and maintenance phases. Clear prescriptive guidelines are to be developed that detail how impacts on native vegetation, habitat and common flora and fauna species are going to be minimised.

The Construction Environmental Management will include, where appropriate, procedures around:

- Detailed design of mitigation measures associated with retention of trees and/or areas of remnant vegetation;
- Staff and contractor inductions to identify no-go-zones, the location of sensitive biodiversity values within the wetlands development area, and staff/contractor roles and responsibilities with regards to the protection and/or the minimisation of impacts to all native biodiversity; and
- Canopy tree removal, with additional requirements for trees with hollows, and native vegetation clearing protocols.

The Construction Environmental Management Plan will include clear objectives and actions including:

- Minimising human interferences to flora and fauna;
- Minimising vegetation clearing/disturbance;
- Minimising impact to threatened species and communities;
- Erosion and sediment control;
- Avoidance of artificial light spill and light pollution;
- On site stormwater and sediment controls and protection of down-slope habitat areas; and
- Handling and storage of hazardous / toxic substances.

The Construction Environmental Management Plan will therefore cover (at minimum) mitigation measures for impacts associated with the loss of native vegetation and scattered trees, the potential for the spread of, or introduction to the site, of weeds and/or soil pathogens, erosion impacts and sediment loss, impacts associated with light pollution, and the requirement to protect wetland habitat areas north of the construction footprint.

### 5.2.1 Native tree and vegetation retention

The majority of the Stage 1 – 7 development area consists primarily of cleared land that provides limited habitat for native flora or fauna species. However, modified native vegetation (i.e. patches and scattered trees) occurs throughout the development site within areas of planted native and non-indigenous trees and shrubs. All eucalypt-dominated vegetation at the site (including non-indigenous eucalypts), and particularly vegetation that is part of a larger patch of contiguous tree canopy, has some value for a limited range of arboreal fauna, including bats, possums and birds. This vegetation has therefore been retained where possible and incorporated into Public Open Space areas and reserves (see also *Development Master Plan* and *Landscape Plan* for details).

If eucalypt-dominated vegetation, including patches, scattered trees and stands of non-indigenous eucalypts cannot be retained, then individual trees that are designated for removal must be assessed for their potential to support arboreal birds and mammals (including an assessment of hollows and fissures). Trees deemed habitat for arboreal species must be removed in a manner that allows for the relocation of fauna to nearby suitable habitat or to replacement nesting boxes that are installed prior to tree removal.

A fauna relocation and salvage plan is to be incorporated into a Construction Environmental Management Plan for the site, which guides the mitigation of impacts to arboreal mammals, bats and birds. The following steps are an example of the types of mitigation measures that are to be deployed by an arborist, under the supervision of an appropriately qualified zoologist during the tree removal works:

- Engagement of a suitably qualified, experienced and licensed contractor to oversee the salvage and relocation program being conducted on site.
- Visual identification of any tree hollows, trunk fissures and/or loose bark habitat, by climbing the tree prior to removal.
- Gentle knocking of the tree with a sledge hammer or excavator bucket in an effort to expel any fauna residing in the tree hollows.
- Cutting of upper branches to a minimum diameter of 150 mm, taking care to avoid cutting within approximately 1 m of any hollows or fissures where possible (regardless of hollow size).
- Lowering branches containing visible hollows to the ground with rope (instead of allowing branches to fall to the ground) to avoid injuring animals that may be residing inside the hollows.
- Leaving all cut branches (minimum 150 mm diameter) and felled trees lying on the ground for a minimum of 48 hours, to allow animals to find alternative habitat in nearby habitat or installed nest boxes.
- Capture of immature or injured fauna by a qualified zoologist or wildlife carer, for assessment to determine whether to relocate the animal to suitable nearby habitat, or transport the animals to suitable veterinary treatment facilities.

Any eucalypt trees that are physically removed to facilitate the development program are to be retained on site for placement as habitat ground-logs within

the wetlands development area at a future date. Retained logs are to be stockpiled at an appropriate location prior to their use for habitat purposes.

### 5.2.2 Minimising damage to trees

There are numerous native and non-native trees within the Stage 1 – 7 development area which are to be retained on site. To prevent detrimental impacts to trees, the *Australian Standard for protection of trees on development sites* (AS4970-2009) (Standards Australia 2009) and the *Australian Standard for pruning of amenity trees* (AS4373-2007) (Standards Australia 2007) are to be followed during construction.

Trenching and drilling works within Tree Protection Zones (TPZs; as defined in the standards) are to be avoided; however, an encroachment of up to 10% of the TPZ without the need for an arborist assessment of the tree's future viability is permitted, as per *Defining an acceptable distance for tree retention during construction works* (DSE 2011). If the works are to be conducted inside more than 10% of a TPZ and/or within the Structural Root Zone (SRZ) of a tree, an arborist will be required to conduct a root investigation to determine if the tree will remain viable. Otherwise the tree will be considered 'removed' for the purposes of the *Guidelines 2017* policy, and will require a Native Vegetation Offset in accordance with the policy.

Appropriate TPZ fences are to be installed in consultation with an arborist around all trees that are to be retained on site. The TPZ fences must be no less than two meters in radius around the tree to be protected. All TPZ fencing is to be erected prior to the commencement of works, and maintained in good working order for the duration of the construction program on site.

### 5.2.3 Vegetation retention and protection

Construction areas are to be clearly demarcated to avoid any inadvertent or unapproved clearing or damage to areas identified as 'no-go' zones. Vegetation surrounding the construction areas that is to be retained must be clearly defined on site to all contracting staff.

Native vegetation and habitat areas that are to be retained on site are to be clearly demarcated to avoid any inadvertent or unapproved clearing or damage to areas outside of Permitted works areas. Conservation zones are to be established prior to commencement of works, and as appropriate for the phased revegetation and restoration of habitat areas, and maintained during the works program and development of the wetland complex.

To ensure that any vegetation that is to be retained is not damaged or inadvertently removed during the works program, the following steps are to be taken into consideration:

- Installation of temporary star pickets with white poly-pipe covers to demarcate conservation zone areas on site;
- Installation of temporary fencing adjacent to vegetation that is to be retained and around any large trees that are to be retained whilst native vegetation and habitat clearing works are underway and/or for the development of the open water wetland, the wetland complex in general and/or associated access routes;

- Avoidance of disturbance of the root zones of trees to be retained (feeder-root zones generally extend to the edge of the canopy plus half the radius of the canopy again);
- Briefing of contractors regarding the need to adhere to vegetation protection plans;
- Selection of the appropriate type and size of machine so that disturbance and impact to vegetation is minimised and the chances of successful rehabilitation (if applicable) are enhanced; and
- Adherence to any other construction mitigation requirements outlined by the consultant arborist.

'Conservation zones' must be well defined visually using star pickets with white poly-pipe covers within the Permitted development area, and must be identified to all works crew as part of an induction undertaken on site. Permissible works areas are also to be clearly identified on working plans and within site development schedules. Construction activity and vehicles are to remain within a defined 'Limits of Works' identified on plans prior to commencement of works, and the painted star pickets identifying the 'Limit of Works' are to be serviced and maintained throughout the duration of the development program.

### 5.2.4 Weed and soil pathogen control

Bare ground exposed by development works is particularly susceptible to invasion by weeds and soil pathogens. One of the most common forms of introduction is from mud on vehicle tyres being deposited into disturbed areas. Without effective vehicle hygiene, vehicles have the potential to introduce new weeds and pathogens that were not present prior to construction.

To ensure that weeds and diseases are not brought onto work sites, or existing weeds and diseases (if they occur) are not spread to other sites, the following steps are to be taken:

- Prepare a contractor environmental hygiene manual (or follow an existing one) outlining the necessary actions required to prevent weeds and diseases entering and/or leaving the site including:
    - All machinery and vehicles are to be free of weed propagules and/or material carrying potential diseases prior to commencement of work;
    - If possible, begin work in areas close to native vegetation and move to areas dominated by introduced species, and ensure machinery is thoroughly cleaned between sites.

These management requirements are to be included in a Construction Environmental Management Plan, developed prior to construction taking place.

### 5.2.5 Erosion control

Areas of exposed and de-stabilised soil will inevitably be created during the construction process as a result of excavation and trenching. Erosion mitigation measures are to be applied to prevent the movement of soil and sediment to areas outside of the Stage 1 – 7 development area. While vegetation provides the most effective form of erosion control, it is likely that additional interim

measures will be required. A wide variety of soil erosion techniques can be applied using a range of materials such as erosion control geotextiles and rock aggregates.

Throughout the Stage 1 – 7 development area, a number of principles should be applied in order to avoid erosion. These include:

- Limiting machinery and earthworks to construction areas only;
- Limiting the exposure of disturbed soil for the shortest possible time (e.g., do not clear an area prior to a weekend if rain is forecast);
- Diverting water away from exposed soil or loose material;
- Applying temporary silt trapping techniques, particularly at the northern end of the development site which is up-slope from the wetland development area; and
- Retaining the natural drainage lines of the site as much as possible.

These management requirements are to be included in a Construction Environmental Management Plan, developed prior to construction taking place.

### 5.2.6 Light pollution

Light pollution and light spill impacts are identified as a potential threat to the site's fauna. Consideration of lighting design, the location, direction and placement of construction lighting, and/or placement and direction of permanent streetlighting will therefore be required for the project to ensure that there is no inadvertent light pollution or light spill impacts. These considerations include (at minimum) confining light spread by using directional lighting, lowered lighting and/or screening to direct light away from habitat areas thereby reducing impacts to wildlife (Gleeson & Gleeson 2012). Controls that may be appropriate include the use of hoods or shields on construction lighting, early installation of noise-walls aimed at ongoing mitigation of both noise and light-spill impacts, and the careful siting and orientation of street lights directed away from ecological assets such as the wetlands and areas of retained habitat north of this site.

These management requirements are to be included in a Construction Environmental Management Plan, and the final development design, developed prior to construction taking place.

### 5.2.7 Stormwater, and protection of wetland habitats

There is potential during the construction phase to impact the existing dam and, once constructed, wetlands within the wetland development area (NB: the wetland development is not considered in this report). Impact avoidance and mitigation measures are therefore required at the northern extent of the Stage 1 – 7 development area.

- There is to be no loss of sediment or soil from the construction area down-slope to the wetlands development area; this includes losses into the swale drain that drains from Fairhills High School to the existing dam. All sediment and soil is to be contained to the Stage 1 – 7 construction area wherever practicable, and sediment and soil containment structures are to

be maintained for the duration of the construction works and until the site is permanently stabilised.

- There is to be no loss of stormwater, diversion of stormwater, or pumping of waters from the construction area down-slope to the dam. All stormwater is to be retained to the Stage 1 – 7 construction area wherever practicable, and stormwater containment structures are to be maintained for the duration of the construction works and until the site is permanently drained and vegetated.

- Stormwater that can be contained within the Stage 1 – 7 construction area is to be treated in a temporary sediment control structure; water from the sediment control structure is to be re-used wherever practicable within the construction footprint for suppression of dust and soil treatment. Stormwater that cannot be re-used or contained can, after treatment for sediment removal, be pumped into the open water wetland areas (if constructed) under supervision of the project's consultant ecologist or until such time that this area is to be revegetated for habitat. Stormwater that cannot be re-used or contained on site or placed in the open water wetland area is to be disposed of off-site in accordance with the *Principals of Best Practice* and as Permitted under an endorsed development plan.

- Installation and maintenance of erosion and sedimentation controls are to be in accordance with the Victorian Environment Protection Authority (EPA) best practice guidelines including *Environmental Guidelines for Major Construction Sites (1996)* and *Construction Techniques for Sediment Pollution Control (1991)*.

- Erosion and sediment controls must be adaptive and may require variations as works progress. Implementation will be conducted in accordance with the *Principals of Best Practice* of the EPA guidelines. Controls need to be monitored on a weekly basis at minimum, and additionally during and after rain events. Any defects or deficiencies in control measures identified by monitoring shall be rectified immediately. Control measures shall be cleaned, repaired and augmented as required to ensure effective control thereafter.

- Refilling of vehicles and machinery shall be done in a designated area no closer than 100 metres from any areas of retained vegetation or habitat or surface / stormwater drainage systems.

- Fuel and chemical are to be bunded to EPA guidelines and stored outside of flood zones. A contingency plan shall address containment, treatment and disposal of any spill.

- During works, clear communication must be made to construction personnel of expected mitigation measures and the importance of maintaining ecological values. Direct disturbance such as unplanned movement of construction equipment or indirect disturbances such as spills from machinery which could have a detrimental effect on retained vegetation or habitat areas are to be immediately rectified and measures put in place to prevent reoccurrences. There are to be no direct or indirect impacts on any ecological values within the wetlands development area down-slope from the construction footprint.

- Contractors are to be provided with clear instructions regarding reporting requirements around accidents (disturbance to aquatic habitat) that may impact on the wetlands or Blind Creek. A chain of command between construction personnel, Development Victoria and a qualified biologist is required for the reporting of problems and to provide immediate, appropriate on-ground responses.
- Monitoring following an incident will comprise an aquatic survey (if deemed necessary) and appropriate water quality sampling to confirm the extent of the disturbance to aquatic habitat. For spillages, post incident monitoring will be repeated at weekly intervals until the contaminant is no longer considered to be a threat.
- Monitoring will be performed by a suitably qualified aquatic biologist. An interpretative report will be prepared for each monitoring exercise and distributed to Development Victoria.

These management requirements are to be included in a Construction Environmental Management Plan, developed prior to construction taking place.

# 6. LEGISLATIVE AND POLICY IMPLICATIONS

## 6.1 ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION ACT

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), an action will require approval from the Federal Environment Minister if the action has, will have, or is likely to have a significant impact on a matter of national environmental significance.

Documentation on the referral process, including documentation requirements, can be obtained by contacting the Department of the Environment's Community Information Unit on (02) 6274 1111, or by accessing the EPBC website.

Two threatened ecological communities*; Natural Damp Grassland of the Victorian Coastal Plains* and *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*, both Critically endangered communities, were nominated by the Protected Matters Search Tool (DoE 2015) as being likely to occur within the development area. Neither of these vegetation communities were identified on site. Furthermore, the predominant remnant canopy trees found on site, namely Mealy Stringybark (*Eucalyptus cephalocarpa* s.s.) and Swamp Gum (*Eucalyptus ovata*), are not indicative of either of these communities.

Two fauna taxa listed as threatened under the EPBC Act were either recorded flying over the site, or identified as species which may utilize the site on an intermittent basis. These species include:

- Swift Parrot (*Lathamus discolor*), which may occasionally forage on flowering eucalypts at the site during migration between Tasmania and the mainland. It is unlikely that the species regularly utilises habitat at the site or is reliant upon it.
- Grey-headed Flying-fox (*Pteropus poliocephalus*) appears to periodically travel through or fly over the site, and may occasionally feed on flowering eucalypts within the study area. However, the relatively small number of eucalypts at the site and the high mobility of this species suggests that the Grey-headed Flying-fox is unlikely to be reliant upon habitat at the site.

The Federal *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (Department of the Environment 2013) sets out the process for undertaking a 'self-assessment' to decide whether or not a proposed action is likely to have a significant impact on any Matters of National Environmental Significance (MNES). Processes deemed to be potential 'significant impacts' are identified at each of the conservation significance levels in the Guidelines in order to facilitate this process.

Tables 8 and 9 below set out 'significant impact criteria' for Endangered and Vulnerable fauna identified under the EPBC Act 1999 (Cwlth) (Department of the Environment 2013). The impact criteria have been considered in relation to each of the species which may make occasional use of habitat values on site, and in the context of the proposed development and ecological values that may be impacted.

Table 8. EPBC Act Significant Impact Criteria – Swift Parrot

| Significant impact criteria | Assessment of impacts |
|---|---|
| Lead to a long-term decrease in the size of a population of a species; where a 'population' as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:<br>• a geographically distinct regional population, or collection of local populations, or<br>• a population, or collection of local populations, that occurs within a particular bioregion.<br>This may include populations identified as such in recovery plans, and/or that are:<br>• Key source populations either for breeding or dispersal;<br>• Populations that are necessary for maintaining genetic diversity; and/or<br>• Populations that are near the limit of the species range. | The site may be periodically utilised by Swift Parrots for foraging during migrations between Tasmania and the mainland (particularly central/northern Victoria and NSW). However, given the availability of a range of eucalypt species in the broader landscape and the variability of Swift Parrot movements, the species is unlikely to be reliant upon the site for foraging; hence, the proposed removal of native and exotic eucalypts, many of which were planted and generally provide limited foraging and nesting resources (see below), is considered unlikely to lead to a long-term decrease in the size of a population. |
| Reduce the area of occupancy of the species. | As noted above, the site may periodically provide foraging resources for the species, but is unlikely to be regularly occupied.<br>The majority of eucalypt trees present at the site are not considered key tree species for the Swift Parrot in the species' recovery plan (Saunders and Tzaros, 2011), with the exception of planted, non-indigenous Yellow Box *Eucalyptus melliodora*. These Yellow Box are generally small (DBH between 14 to 36 cm) and appear to provide limited foraging resources. As most of the eucalypts within the Stage 1 – 7 development site are relatively young, there were relatively few hollows recorded on the site that would support potential shelter habitat for the species.<br>Hence the proposed action is considered unlikely to reduce the area of occupancy for the species. |
| Fragment an existing population into two or more populations. | As noted above, given the availability of a range of eucalypt species in the broader landscape, the mobility of the species and variability of their movements, and the limited amount of foraging and nesting resources provided at the site, the species is unlikely to be reliant upon the site for foraging; hence, the Stage 1 – 7 development is considered unlikely to fragment an existing population. |

| Significant impact criteria | Assessment of impacts |
|---|---|
| Adversely affect habitat critical to the survival of a species, where 'habitat critical to the survival of a species or ecological community' refers to areas that are necessary:<br>• For activities such as foraging, breeding, roosting, or dispersal;<br>• For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);<br>• To maintain genetic diversity and long term evolutionary development; or,<br>• For the reintroduction of populations or recovery of the species or ecological community.<br>Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act. | As noted above, the site does not constitute habitat that is necessary for the breeding or roosting of the species based on its location and low quality of breeding/roosting habitat, and is unlikely to be necessary for foraging or dispersal due to the generally limited availability of food resources and the movement patterns of the species.<br>While the site may be utilised occasionally for foraging, i.e. whilst eucalypts are in flower, the site is not considered necessary for the long-term maintenance of the species or associated genetic processes, and does not constitute an area that is necessary for the reintroduction of a population. |
| Disrupt the breeding cycle of a population. | As noted above, the species is considered unlikely to be reliant upon or to breed at the site; combined with the relatively limited habitat resources present, the likelihood of successful breeding occurring and being disrupted is considered very low. |
| Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. | As noted above, habitat values at the site are relatively low for the Swift Parrot (e.g. few large hollows and a minority of eucalypts being 'key tree species'), and it is unlikely to be considered important for foraging, breeding, roosting or dispersal.<br>The alteration of potential habitat at the site is unlikely to cause the species to decline. |
| Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat. | The majority of the site is proposed to be developed and there will be no increase in invasive species spread post-construction; weed taxa will be controlled on site during construction. There is unlikely to be an increase in invasive species distribution within nearby habitat sites as a result of the proposed action. |
| Introduce disease that may cause the species to decline. | There is a low likelihood of the species occurring at the site, as well as a general lack of evidence for the introduction of disease (such as Psittacine Beak and Feather disease) to this species from such actions; hence it is unlikely that a novel disease would be introduced from the proposed action that would result in the decline of the species. |
| Interfere with the recovery of the species. | The site does not constitute 'priority habitat' under the Swift Parrot Recovery Plan, and the proposed action does not interfere with any the measures outlined in the recovery plan (Saunders and Tzaros 2011). |

Table 9. EPBC Act Significant Impact Criteria – Grey-headed Flying-fox

| Significant impact criteria | Assessment of impacts |
|---|---|
| Lead to a long-term decrease in the size of an important population; where an 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:<br>• Key source populations either for breeding or dispersal;<br>• Populations that are necessary for maintaining genetic diversity; and/or<br>• Populations that are near the limit of the species range. | The Grey-headed Flying-fox was recorded traversing the site; it was not recorded feeding at the site, although this may occur at other times of the year based on the flowering of eucalypts.<br>Given the availability of a range of eucalypt species in the broader landscape, and the wide-ranging foraging of the species (up to 50 km nightly flights, though usually within 15 km (Threatened Species Scientific Committee, 2001)) the species is unlikely to be reliant upon the site for foraging. Hence, the proposed removal of native and exotic eucalypts, which were largely planted and generally provide limited foraging and nesting resources (see below), is considered in and of itself unlikely to lead to a long-term decrease in the size of an important population. |
| Reduce the area of occupancy of an important population. | The Grey-headed Flying-fox appears to transit the site regularly or periodically, and may intermittently forage on flowering eucalypts at the site. The majority of eucalypt trees present at the site are relatively small (DBH < 50 cm); most of the trees are proposed to be retained under the proposed action.<br>Given the distribution of potential foraging habitat in the landscape, including the adjacent Fairhills High School and Blind Creek reserve, as well as the retention of the majority of trees in and bordering the site, the proposed action is considered unlikely to reduce the area of occupancy for the species. |
| Fragment an existing important population into two or more populations. | As noted above, given the availability of a range of eucalypt species adjacent to the site and in the broader landscape, the mobility of the species, and the limited amount of foraging resources proposed to be removed at the site, the proposed action is considered unlikely to fragment an existing important population. |

| Significant impact criteria | Assessment of impacts |
|---|---|
| Adversely affect habitat critical to the survival of a species, where 'habitat critical to the survival of a species or ecological community' refers to areas that are necessary:<br>• For activities such as foraging, breeding, roosting, or dispersal;<br>• For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);<br>• To maintain genetic diversity and long term evolutionary development; or,<br>• For the reintroduction of populations or recovery of the species or ecological community.<br>Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act. | As discussed above, the site does not constitute habitat that is considered necessary for foraging, breeding, roosting or dispersal of the species. The availability of habitat surrounding the site and the relatively small number of trees proposed to be removed suggest the proposed action is unlikely to adversely affect important habitat for the species.<br>While the site may be utilised occasionally for foraging, i.e. whilst eucalypts are in flower, the site is not considered necessary for the long-term maintenance of the species or associated genetic processes, and does not constitute an area that is necessary for the reintroduction of a population. |
| Disrupt the breeding cycle of an important population. | As discussed above, the species is considered unlikely to breed at the site, which is not proximate to a known breeding camp or colony. Combined with the relatively limited habitat resources present, the likelihood of successful breeding occurring at the site and being disrupted under the proposed action is considered low. |
| Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. | As noted above, given the distribution of foraging resources near the site and in the broader landscape, and the small number of potential foraging trees to be removed, the proposed action is unlikely to decrease the availability or quality of habitat to the extent that the species is likely to decline. |
| Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. | The majority of the site is proposed to be developed and there will be no increase in invasive species spread post-construction; weed taxa will be controlled on site during construction. There is unlikely to be an increase in invasive species distribution within nearby habitat sites as a result of the proposed action. |
| Introduce disease that may cause the species to decline. | The effects of bat pathogens on this species are unknown (TSSC 2001). There is a lack of evidence suggesting the introduction or increase of disease to this species from such actions; hence it is considered unlikely that a novel disease would be introduced from the proposed action that would result in the decline of the species. |
| Interfere substantially with the recovery of the species. | There is currently no recovery plan for this species. It is unlikely that the proposed action would interfere with any future actions for the recovery of the species. |

## 6.2 FLORA AND FAUNA GUARANTEE ACT

The Victorian *Flora and Fauna Guarantee Act 1988 (Vic)* (FFG Act) endeavours to prevent the extinction of biota and ecological communities within the state. The FFG Act applies to public land only. Under the Act, a permit is required to remove listed flora or fauna species from public land.

**Potentially threatening processes**

There are several threatening processes (as defined under the FFG Act), outlined below, that may require consideration as part of the proposed development. Schedule 3 for the FFG Act lists a range of 'Potentially Threatening Processes'. These processes have been identified as a threat to the survival of one or more species of flora or fauna or a community. Threatening processes include (amongst others):

- Invasion of native vegetation by Blackberry (**Rubus fructicosus* spp. agg.).
- Invasion of native vegetation by 'environmental weeds'.
- Predation of native wildlife by the Domestic Cat (**Felis catus*).
- Predation of native wildlife by the introduced Red Fox (**Vulpes vulpes*).
- Reduction in biomass and biodiversity of native vegetation through grazing by Rabbits (**Oryctolagus cuniculus*).
- Spread of Root Rot Fungus (**Phytophthora cinnamomi*) from infected sites into parks and reserves, including roadsides, under the control of a state or local government authority.
- Use of Root Rot Fungus-infected gravel for the construction of roads, bridges and reservoirs.

### 6.2.1 FFG Act legislative implications

The Stage 1 – 7 development area supports no critical habitats for listed species or ecological communities. It is our understanding that the proposed development would therefore not require referral to the Department of Environment, Land, Water and Planning under the FFG Act.

Please note that this report identifies ecological values and unavoidable impacts limited to the Stage 1 – 7 development area (see Figure 1 for details). The remainder of the property, generally described as the wetlands area, is assessed in an accompanying report (Ecocentric in preparation).

## 6.3 PLANNING AND ENVIRONMENT ACT 1987 (VIC)

The *Planning and Environment Act 1987 (Vic)* provides a legislative framework for the *Victorian Planning Provisions*, commonly referred to as the Planning Scheme. The Planning Scheme sets out the conditions for development within Victoria. Section 52.17 *Native vegetation* is considered below.

### 6.3.1 Guidelines for the Removal, Destruction or Lopping of Native Vegetation

The *Guidelines for the Removal, Destruction or Lopping of Native Vegetation* policy (DELWP 2017; the *Guidelines 2017* policy) have been designed to manage the risk to Victoria's biodiversity associated with the removal of native

vegetation. The *Guidelines 2017* policy is incorporated into the Victoria Planning Provisions and all planning schemes in Victoria under the *Planning and Environment Act 1987 (Vic).* The principal tenet of the *Guidelines 2017* policy is to ensure permitted clearing of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity. This is achieved through the following approach:

- Avoid the removal, destruction or lopping of native vegetation.
- Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
- Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation (DELWP 2017).

Native vegetation is defined in planning schemes as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. The *Guidelines 2017* policy further classify native vegetation as a patch or a scattered tree (see Section 2.1.1).

The three-step approach (avoid, minimise, offset) is the key policy in relation to the removal of native vegetation to achieve no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. It is a precautionary approach that aims to ensure that the removal of native vegetation is restricted to only what is reasonably necessary, and that biodiversity is appropriately compensated for in the event that native vegetation losses cannot be avoided, and where Permitted by the Responsible Authority (DELWP 2017). A combination of site-based and landscape scale information is used to calculate the biodiversity value of native vegetation to be removed. This information is used to determine the loss in biodiversity value that needs to be compensated with an offset that provides an equivalent gain in biodiversity value, and the assessment pathway that is to be applied in an application to remove native vegetation.

The assessment pathway for an application to remove native vegetation reflects its potential impact on biodiversity and is determined from the location and extent of the native vegetation to be removed. The three assessment pathways are:

**Basic** – limited impacts on biodiversity.

**Intermediate** – could impact on large trees, endangered EVCs, and sensitive wetlands and coastal areas.

**Detailed** – could impact on large trees, endangered EVCs, sensitive wetlands and coastal areas, and could significantly impact on habitat for rare or threatened species.

The assessment pathway determines the information that accompanies an application and the decision guidelines that are considered in determining the outcome of an application (DELWP 2017). The assessment pathway of an application is determined in accordance with the table below.

Table 10. Determining assessment pathway

| EXTENT | LOCATION CATEGORY | | |
|---|---|---|---|
| | **LOCATION 1** | **LOCATION 2** | **LOCATION 3** |
| <0.5 hectares and not including any large trees | Basic | Intermediate | Detailed |
| ≥0.5 hectares and including one or more large trees | Intermediate | Intermediate | Detailed |
| ≥ 0.5 hectare | Detailed | Detailed | Detailed |

### 6.3.2 Native vegetation clearance legislative and policy implications

A total area of 0.996 hectares of Valley Heathy Forest (EVC 127) within the proposed development area was identified on site as native vegetation *patch* or *scattered tree* under the *Guidelines 2017* policy (sites of native vegetation with a 25% or greater cover threshold). These patches were identified as native vegetation that would trigger a Planning Permit requirement under Section 52.17 of the Planning Scheme if impacted, and which may require an Offset under a Detailed Assessment Pathway (see Appendix 9.6 maps for details).

The extent of native vegetation loss, habitat condition and modelled species habitat mapping layers were processed using the EnSym tool in order to determine native Vegetation Offset targets; the EnSym report provides offset requirements for internal testing of different proposals to remove native vegetation. GIS shapefiles for the native vegetation loss area were further processed by DELWP to produce a Native Vegetation Removal (NVR) report identifying an Offset target for the project. This Offset target is to be secured prior to the commencement of works in order to ensure that there is 'no net loss' of biodiversity value associated with this project.

Table 11 below outlines the extent of native vegetation clearance associated with the Stage 1 – 7 development area, and identifies the commensurate Offset target as identified in the EnSym report report (see also Appendix 9.5 for details); a Native Vegetation Removal (NVR) report will be obtained as a Permit condition and once the extent of the development is finalised. These Offset targets will be purchased from a third-party Offset Credit supplier registered on the DELWP Native Vegetation Credit Register and transferred to the project with an Allocated Credit Extract. The Allocated Credit Extract is to be secured *prior* to the clearance of any native vegetation on site.

Table 11. Vegetation clearance and offset requirements

| VEGETATION CLEARANCE | |
|---|---|
| **Assessment pathway** | Detailed Assessment Pathway |
| **Extent including past and proposed** | 0.996 ha |
| **Extent of past removal** | 0.000 ha |
| **Extent of proposed removal** | 0.996 ha |
| **No. Large trees proposed to be removed** | 4 |

| | |
|---|---|
| **Location category** | Location 1<br>The native vegetation is not in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map), sensitive wetland or coastal area. Removal of less than 0.5 hectares in this location will not have a significant impact on any habitat for a rare or threatened species. |
| OFFSET REQUIREMENTS | |
| **General offset amount** | **0.175 general habitat units** |
| **Vicinity** | Port Phillip and Westernport Catchment Management Authority (CMA) or Knox City Council. |
| **Minimum strategic biodiversity value score** | 0.206 |
| **Large trees** | 4 large trees |

### 6.3.3 Native vegetation avoid and minimise statement

Every effort has been made through careful consideration of the project design and sighting of proposed building envelopes to avoid and minimise impacts associated with the loss of native vegetation on site. Avoidance measures include (but are not limited to):

- Construction of the Stage 1 – 7 development is to be constrained to the extent of the construction footprint identified in the *Development Master Plan* with no impacts to native vegetation outside of the works area other than impacts on TPZ.
- There is to be no storage of construction material, parking of vehicles, or clearing of native vegetation outside of the Stage 1 – 7 development areas as identified by the *Development Master Plan* and the existing site access corridor.
- Native vegetation losses associated with the proposed development are to be limited to the minimum extent necessary for construction of the estate, and will include:
    - Removal of native canopy trees identified in Table 5 above for the Stage 1 – 7 development areas as identified by the *Development Master Plan* and as set out in the *Arborist Assessment* report and *Landscape Plan*; as well as,
    - Retention of native canopy trees identified in Table 6 above (see Appendix 9.6 maps for details).
- With the exception of the aforementioned losses, there is to be no additional loss of canopy trees associated with this project; with the possible exception of impacts, not losses, associated with judicious pruning of selective branches under the supervision of a qualified and experienced arboriculture consultant if required to make the site safe for contractors and visitors.

We also note that no feasible opportunities exist to further avoid and minimise impacts on native vegetation without undermining the key objectives of the CDP.

The Offset target for this project is for **0.175 General Habitat Units and four (4) large trees only** (with a minimum Strategic Biodiversity Value (SBV) score of 0.206), from an Offset Site in the Port Phillip and Westernport Catchment

Management Authority (CMA) or Knox City Council; there are no waterway or wetland losses associated with this proposal.

A suitable Offset Site, listed on the DELWP Native Vegetation Credit Register (TFN-C1763_3), has been identified, and the Offset target has been reserved from that site for this project (see also Appendix 9.5 for details). These Offset Credits will therefore be purchased and secured with an Allocated Credit Extract prior to the commencement of native vegetation clearance works.

## 6.4 CATCHMENT AND LAND PROTECTION ACT

The Victorian *Catchment and Land Protection Act 1994* (CaLP Act) contains provisions relating to the integrated management and protection of catchments, encourages community participation in the management of land and water resources, and sets up a system of controls for the management of noxious weeds and pest animals. This Act also provides a legislative framework for the integrated and coordinated management of private and public land at a catchment level which:

- Focuses on long-term land productivity while also conserving the environment.
- Ensures that the quality of the State's land and water resources and their associated plant and animal life are maintained and enhanced.
- Establishes processes that can be used to assess the condition of the State's land and water resources and the effectiveness of land protection measures.
- Establishes processes to encourage and support participation of land holders, resource managers and other members of the community in catchment management and land protection.
- Establishes and supports the operation of the Victorian Catchment Management Council and the Catchment Management Authorities.
- Provides for the control of noxious weeds and pest animals.

Under the CaLP Act, declared noxious weeds are categorised into four groups depending on their known and potential impact and specific circumstances for each region. These categories include:

- State Prohibited Weeds (SP) are either currently absent in Victoria or are restricted enough to be eradicated. The Victorian Government is responsible for their control.
- Regionally Prohibited Weeds (RP) in the Port Phillip Catchment Management Authority area are not necessarily widespread, but have the potential to become widespread. It is expected that weeds that meet this criterion can be eradicated from the region. Control of weeds considered to be Regionally Prohibited is the responsibility of the land owner on their own land, although not on adjacent roadside reserves.
- Regionally Controlled Weeds (RC) are usually widespread; however, it is important to prevent their further spread. It is the responsibility of the landowner to control these weeds on their property and on adjacent roadside reserves.

- Restricted weeds occur in other states and are considered to be a serious threat to primary production, Crown land, the environment and/or community health if they were traded in Victoria.

Please note that seven noxious weeds were recorded on site. Table 12 lists noxious weeds and their CaLP Act status within the Port Phillip and Westernport Catchment Management Authority area.

Table 12. Noxious weeds recorded at the development area

| Common name | Scientific name | CaLP status |
|---|---|---|
| Angled Onion | *Allium triquetrum* | Restricted |
| Spear Thistle | *Cirsium vulgare* | Controlled |
| Artichoke Thistle | *Cynara cardunculus* | Controlled |
| Montpellier Broom | *Genista monspessulana* | Controlled |
| Blackberry | *Rubus fruticosus* spp. agg | Controlled |
| Willow | *Salix* spp. | Restricted |
| Bulbil Watsonia | *Watsonia meriana* var. *bulbillifera* | Controlled |

These species will require control at the site in order to prevent their spread from the property during and after construction, in accordance with the CaLP Act. The ultimate goal should be to completely eradicate these species from the site, in order to prevent any possibility that they would spread into adjacent natural areas.

## 6.5 ENVIRONMENT EFFECTS ACT

The Victorian *Environment Effects Act 1978 (Vic)* is the legislation that applies to the process of investigating and considering the potential environmental impacts or effects of a proposed development. The Act requires the preparation for an Environmental Effects Statement (EES) if the Minister for Planning determines that a statement is required upon review of a referral. The Minister might typically require a proponent to prepare an EES when:

- There is a likelihood of regionally or State significant adverse effects on the environment;
- There is a need for integrated assessment of potential environmental effects (including economic and social effects) of a project and relevant alternatives; and
- Normal statutory processes would not provide a sufficiently comprehensive, integrated and transparent assessment (DSE 2006).

Triggers for referral under the Act fall into two categories: potential effects on individually defined criteria; or potential effects on a combination of two or more criteria. Individual types of potential effects on the environment that might be of

regional or State significance, and therefore warrant referral of a project, include:

- Potential clearing of 10 ha or more of native vegetation from an area that:
  - is of an Ecological Vegetation Class identified as endangered by DELWP; or
  - is, or is likely to be, of very high conservation significance; and
  - is not authorised under an approved Forest Management Plan or Fire Protection Plan.
- Potential long-term loss of a significant proportion (e.g. 1 to 5 percent, depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria;
- Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia';
- Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term;
- Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences; or
- Potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility (DSE 2006).

A combination of two or more of the following types of potential effects on the environment that might be of regional or State significance, and therefore warrant referral of a project, include:

- Potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan;
- Matters listed under the Flora and Fauna Guarantee Act 1988:
  - potential loss of a significant area of a listed ecological community; or
  - potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or
  - potential loss of critical habitat; or
  - potential significant effects on habitat values of a wetland supporting migratory bird species.
- Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the National Parks Act 1975;
- Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term;

- Potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, stream-flows or regional groundwater levels;
- Potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities;
- Potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development;
- Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions;
- Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport;
- Potential extensive or major effects on Aboriginal cultural heritage;
- Potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the Heritage Act 1995 (DSE 2006).

There is potential for remnants of the Swampy Woodland EVC to be found outside of the Stage 1 – 7 development area within the wetlands development area (north of this assessment). Swampy Woodland is an Endangered EVC in the Gippsland Plain bioregion, however, due to the degraded nature of remnants on site these would not qualify as Very High Conservation Significance remnants and would therefore not trigger the *Environment Effects Act 1978 (Vic)*. Furthermore, the extent of remnant EVCs on site in its entirety is under 10 hectares in area. Hence, the proposed development would not require referral to the Minister for Planning for consideration under the Environmental Effects Act.

## 6.6 WILDLIFE ACT

The purpose of the Victorian *Wildlife Act 1975 (Vic)* is to establish procedures in order to promote the protection and conservation of wildlife, prevent wildlife from becoming extinct, and to prohibit and regulate the conduct of persons engaged in activities concerning or related to wildlife. The Act requires people engaged in wildlife research (such as fauna surveys, salvage or translocation activities) to obtain a permit in order to ensure that these activities are undertaken with appropriate conservation and protection measures.

### 6.6.1 Wildlife Regulations 2014

The objectives of the *Wildlife Regulations 2014* are:

- To provide for the management and conservation of wildlife and wildlife habitat;
- To provide for humane use of and access to wildlife;
- To make further provision in relation to the licensing system established by section 22 of the *Wildlife Act 1975*;

- To prescribe fees, offences, royalties and various other matters for the purposes of the *Wildlife Act 1975*; and
- To provide for exemptions from certain provisions of the *Wildlife Act 1975*.

Under the *Wildlife Regulations 2014* a person, unless licensed, permitted or authorised to do so under the Act:

- Must not wilfully damage, disturb or destroy any wildlife habitat;
- Must not use a bait, lure, poison, decoy, or live animal to attract wildlife for the purpose of taking that wildlife;
- Must not use a firearm from an aircraft, motor vehicle, boat, or any other vehicle to take wildlife;
- Must not use an aircraft, motor vehicle, boat, or any other vehicle to pursue, chase, or harass wildlife;
- Must not use an artificial light, electronic device, or recorded sound to hunt or take wildlife; and
- Must not use a gun, bow or other weapon, trap, or any other equipment or substance for the purpose of taking wildlife.

Authorisation to conduct wildlife research or wildlife management can be obtained under the Act, and is subject to any conditions, limitations or restrictions placed on that authorisation. Proponents must allow inspection by an authorised officer, at any reasonable time, for the purpose of monitoring compliance with this Act.

The *Wildlife Regulations 2014* supersede the *Wildlife Regulations 2002*, *Wildlife (Amendment) Regulations 2004*, and the *Wildlife Amendment Regulations 2009*.

The relocation or removal of any native wildlife from the Stage 1 – 7 development area must therefore be conducted by a qualified, licenced and experienced contractor with Permits as required to conduct these works. This includes the salvage and relocation of any wildlife from tree hollows that may be encountered during construction, or in the unlikely event that wildlife strays onto the site from neighbouring areas.

# 7. CONCLUSION

This report assesses ecological impacts associated with the Stage 1 – 7 development. This includes areas of remnant native vegetation and planted native trees that will be impacted by the construction works program.

The Stage 1 – 7 development will result in the unavoidable loss of planted and native canopy trees from the property boundaries and areas of habitat that have been formed as a result of plantations of native trees associated with historic agricultural research programs. These impacts will be Offset in accordance with Victoria's *Guidelines for the Removal, Destruction or Lopping of Native Vegetation* policy (DELWP 2017).

Native vegetation losses associated with the Stage 1 – 7 development program are to be limited to the minimum extent necessary for the construction of the estate, and will include:

- Selective removal of native scattered trees and areas that qualify as 'patches' under the *Guidelines 2017* policy that cannot be avoided;
- Retention of all other native trees and native vegetation patches where practicable to do so.

With the exception of the aforementioned losses, there is to be no additional loss of canopy trees associated with this project; with the possible exception of impacts, not losses, associated with judicious pruning of selective branches under the supervision of a qualified and experienced arboriculture consultant and as required to ensure site safety. Assessments of tree structural integrity and pedestrian safety is provided in the *Arborist Assessment* report (Galbraith 2020) and not considered in detail in this report. Tree losses associated with maintenance of public safety, if required or deemed necessary, may trigger additional Native Vegetation Offset requirements in accordance with the *Guidelines 2017* policy.

Table 13 (overleaf) provides a summary of legislative and associated policy requirements for this proposal.

Table 13. Summary of legislative and associated policy requirements

| Legislative Act and associated policy | | Planning considerations | Further actions |
|---|---|---|---|
| ***EPBC Act 1999 (Cwlth)*** | | No vegetation communities listed as threatened under the EPBC Act were identified on site.<br>No flora or fauna listed as threatened under the EPBC Act were recorded on site, and it is considered unlikely that this property would support a viable population of any threatened flora or fauna taxa.<br>Significant impact criteria, as set out in the Federal *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (Department of the Environment 2013), have been considered in relation to all fauna identified as having a moderate likelihood of presence on site or which were identified flying over site. No impacts associated with the development of this site are considered likely to result in a significant impact on a Matter of National Environmental Significance (MNES); a referral to the Federal Department of the Environment and Energy is not required in this instance. | No referral required.<br>A letter of intent appraising the Department of the proposal and development schedule is recommended. |
| ***FFG Act 1988 (Vic)*** | | No vegetation communities nor flora or fauna species listed as threatened under the FFG Act were identified on site.<br>There are several threatening processes that may have to be considered as part of the proposal's development plan and Construction Environmental Management Plan. | No referral required.<br>Consideration of threatening processes are to be incorporated in a CEMP for the development of this site. |
| **Planning and Environment Act 1987 (Vic)** | Section 52.17: *Guidelines for the Removal, Destruction or Lopping of Native Vegetation* (DELWP 2017) | Nine Habitat Zones meet the definition of a 'Patch' and twenty eucalypts meet the definition of 'Scattered Trees' under Victoria's *Guidelines for the Removal, Destruction or Lopping of Native Vegetation* policy (DELWP 2017). Any proposed removal of Patches or Scattered Trees will require a permit under Section 52.17 of the Planning Scheme, and Native Vegetation Offsets in accordance with the *Guidelines 2017* (DEPI 2017) policy. A Native Vegetation Removal (NVR) report will be required to identify Offset targets once a development plan is finalised. | Submit a Planning Permit application to Knox City Council identifying avoidance and minimisation measures adopted, and unavoidable losses and commensurate *Guidelines 2017* Offset policy targets.<br>A CEMP is to be developed for the site and implemented by the contractors to ensure that mitigation measures outlined in Section 5 are delivered on site; the CEMP is to be subject to endorsement by the Responsible Authority.<br>An Offset Management Plan is to be provided upon confirmation of an endorsed development plan; the OMP is to be subject to endorsement by the Responsible Authority. |
| **Catchment and Land Protection Act 1994 (Vic)** | | Seven Regionally Controlled or Restricted noxious weeds were recorded at the development area.<br>These species are to be controlled on site, and prevented from spreading beyond the property during and after the construction phase. | Control and/or eliminate regionally controlled or noxious weeds as part of the CEMP. |
| **Environment Effects Act 1978 (Vic)** | | No individually defined criteria, nor combinations of two or more criteria, trigger referral of this project to the Minister for Planning. | None required |
| **Wildlife Act 1975 (Vic)** | | It may be necessary to contract the wildlife rescue services of a suitably qualified and experienced zoologist – a firm or individual with a current permit to handle wildlife under the Wildlife Act 1975 (Vic) – for salvage of arboreal mammals, bats and/or birds if mature eucalypts (including exotic species) are removed. | Engage a suitably qualified and experienced contractor, if required, to manage the salvage and relocation of native fauna associated with the removal of any large trees on site. |

## 8. REFERENCES


Beardsell, C. (2014) *Vascular Flora of Yarra Valley Parklands, Including Annotation of Significant Species*. Unpublished report prepared for Parks Victoria (2014 version).

Cropper, S.C. (1993). *Management of Endangered Plants*, CSIRO Australia, Melbourne.
DELWP (2017). Victorian Biodiversity Atlas database. Accessed on-line.

DELWP (2020). Biodiversity Interactive Maps. Accessed on-line.

DELWP (2020). Benchmarks by Bioregion. Accessed on-line.

DELWP (2017). Flora and Fauna Guarantee Act 1988 Threatened List – March 2017. Accessed on-line.

DELWP (2017). *Guidelines for the Removal, Destruction or Lopping of Native Vegetation*. Department of Environment, Land, Water and Planning, Melbourne.

DELWP (2017). *Assessor's Handbook: Applications to Remove, Destroy or Lop Native Vegetation*. Department of Environment, Land, Water and Planning, Melbourne.

DEPI (2013). *Permitted Clearing of Native Vegetation: Biodiversity Assessment Guidelines*. Department of Environment and Primary Industries, Melbourne.

DEPI (2014). *Advisory List of Rare or Threatened Plants in Victoria – 2014*. Department of Environment and Primary Industries, East Melbourne Victoria.

DSE (2004). *Native Vegetation: Sustaining a Living Landscape, Vegetation Quality Assessment Manual – Guidelines for Applying the Habitat Hectares Scoring Method Version 1.3*. Department of Sustainability and Environment, Melbourne.

DSE (2003). *Native Vegetation Management: a Framework for Action*. Department of Sustainability and Environment, Melbourne.

DSE (2003). *Flora and Fauna Guarantee Action Statement No. 174 Blue-billed Duck* Oxyura australis. Department of Sustainability and Environment, Melbourne.

DSE (2006). *Native Vegetation: Vegetation Gain Approach – technical basis for calculating Gains through improved native vegetation management and revegetation*. Department of Sustainability and Environment, Melbourne

DSE (2013). *Advisory List of Threatened Vertebrate Fauna in Victoria*. Department of Sustainability and Environment, Melbourne.

DAWE (2020). *Department of the Environment. Protected Matters Search Tool database*. Department of the Environment, Canberra.

Engeny (2021). *621 Burwood Highway, Knoxfield Preliminary Stormwater Management Strategy*. Report to Development Victoria by Engeny Water Management, Melbourne.

Gleeson, J & Gleeson, D (2012). *Reducing the Impacts of Development on Wildlife*. CSIRO Publishing, Collingwood.

Higgins, P.J. (Ed.) (1999). *Handbook of Australian, New Zealand and Antarctic Birds. Volume 4 Parrots to Dollarbird*. (Oxford University Press, Melbourne.)

Longcore, T & Rich, C (2004). 'Ecological Light Pollution', *Frontiers in Ecology and the Environment*, vol. 2, no. 4, pp. 191-8.

Lorimer, G. (2010). *Sites of Biological Significance in Knox – Second Edition Volumes 1 & 2*. Report to Knox City Council by Dr Graeme Lorimer of Biosphere Pty Ltd, Melbourne.

Lorimer, G. (2017). *Preliminary Ecological Assessment of the Floodplain at 609-621 Burwood Highway, Knoxfield*. Prepared for Knox City Council.

Marchant, S. & Higgins, P. J. (eds) (1990). *Handbook of Australian, New Zealand & Antarctic Birds. Vol 1A: Ratites to Ducks*. Oxford University Press: Melbourne.

McNabb, E.G. (1996). *Observations on the biology of the Powerful Owl Ninox strenua in southern Victoria*. Australian Bird Watcher 16, 267-295.

Oates, A. & Taranto, M. (2001). *Vegetation Mapping of the Port Phillip and Westernport Region*. Department of Natural Resources and Environment, Melbourne.

Papas, P., Lyon, S. and Holmes, J. (2012). *Index of Wetland Condition Methods Manual v.14*. Victorian Department of Sustainability and Environment, East Melbourne, Victoria.

Pizzey & Knight (2012). *The Field Guide to the Birds of Australia*. Ninth Edition. Harper Collins publishing, Australia.

Saunders, D.L. and Tzaros, C.L. (2011). *National Recovery Plan for the Swift Parrot* Lathamus discolour. Birds Australia, Melbourne.

Threatened Species Scientific Committee (TSSC) (2011). *Commonwealth Listing Advice on* Botaurus poiciloptilus (Australasian Bittern). Department of Sustainability, Environment, Water, Population and Communities, Canberra, ACT.

Threatened Species Scientific Committee (2001). *Commonwealth Listing Advice on* Pteropus poliocephalus (Grey-headed Flying-fox). Department of Sustainability, Environment, Water, Population and Communities, Canberra, ACT.

Threatened Species Scientific Committee (TSSC) (2013). *Commonwealth Listing Advice on* Rostratula australis (Australian Painted Snipe). Department of Sustainability, Environment, Water, Population and Communities, Canberra, ACT.

Webster, A., Price, R., and Lowe, K. (2003). *Swift Parrot* Lathamus discolour. *Flora and Fauna Guarantee Action Statement No. 169*. Department of Sustainability and Environment, East Melbourne.

# 9. APPENDICES

## 9.1 FLORA RECORDED ON THE PROPERTY

(current surveys and Ecocentric 2015 & 2018)

| Origin | Scientific name | Common name | CaLP Act listing | Significant species^ |
|---|---|---|---|---|
| # P | *Acacia baileyana* | Cootamundra Wattle | | |
| # P | *Acacia boormanii* | Snowy River Wattle | | |
| | *Acacia dealbata* subsp. *dealbata* | Silver Wattle | | |
| # P | *Acacia floribunda* | White Sallow-wattle | | |
| # P | *Acacia howittii* | Sticky Wattle | | |
| | *Acacia mearnsii* | Black Wattle | | |
| | *Acacia melanoxylon* | Blackwood | | |
| # P | *Acacia prominens* | Gosford Wattle | | |
| P | *Acacia pycnantha* | Golden Wattle | | |
| | *Acacia stricta* | Hop Wattle | | Y |
| | *Acaena novae-zelandiae* | Bidgee-widgee | | |
| * | *Acetosella vulgaris* | Sheep Sorrel | | |
| * | *Agapanthus praecox* subsp. *orientalis* | Agapanthus | | |
| * | *Agrostis capillaris* var. *capillaris* | Brown-top Bent | | |
| * | *Allium triquetrum* | Angled Onion | Restricted | |
| P | *Allocasuarina littoralis* | Black Sheoak | | |
| # P | *Allocasuarina torulosa* | Forest Oak | | |
| P | *Allocasuarina verticillata* | Drooping Sheoak | | |
| | *Alternanthera denticulata* | Lesser Joyweed | | |
| # P | *Angophora costata* subsp. *costata* | Smooth-barked Apple | | |
| * | *Anthoxanthum odoratum* | Sweet Vernal-grass | | |
| * | *Aphanes arvensis* | Parsley Piert | | |
| * | *Arctotheca calendula* | Cape Weed | | |
| * | *Aster subulatus* | Aster-weed | | |
| | *Austrostipa rudis* subsp. *rudis* | Veined Spear-grass | | |
| # P | *Baeckea spp.* | Baeckea | | |
| # P | *Banksia integrifolia* | Coast Banksia | | |
| * | *Bellis perennis* | English Daisy | | |
| * | *Betula pendula* | Silver Birch | | |
| * | *Briza maxima* | Large Quaking-grass | | |
| * | *Bromus catharticus* var. *catharticus* | Prairie Grass | | |
| | *Bursaria spinosa* subsp. *spinosa* | Sweet Bursaria | | |
| # P | *Callistemon citrinus* | Crimson Bottlebrush | | |
| * | *Calystegia silvatica* | Greater Bindweed | | |
| * | *Cardamine hirsuta s.s.* | Common Bitter-cress | | |
| | *Cassinia arcuata* | Drooping Cassinia | | |
| * | *Cenchrus clandestinus* | Kikuyu | | |
| * | *Centaurium erythraea* | Common Centaury | | |
| * | *Cerastium glomeratum s.l.* | Common Mouse-ear Chickweed | | |
| * | *Chamaecytisus palmensis* | Tree Lucerne | | |
| * | *Cirsium vulgare* | Spear Thistle | Controlled | |
| * | *Coprosma repens* | Mirror Bush | | |
| P | *Correa glabra* | Rock Correa | | |
| # P | *Corymbia ficifolia* | Red-flowering Gum | | |
| # P | *Corymbia maculata* | Spotted Gum | | |
| * | *Cotoneaster glaucophyllus* var. *serotinus* | Large-leaf Cotoneaster | | |
| * P | *Cupressus spp.* | Cypress | | |
| * | *Cynara cardunculus* | Artichoke Thistle | Controlled | |
| * | *Cynodon dactylon* var. *dactylon* | Couch | | |
| * | *Cyperus eragrostis* | Drain Flat-sedge | | |
| * | *Dactylis glomerata* | Cocksfoot | | |

| Origin | Scientific name | Common name | CaLP Act listing | Significant species^ |
|---|---|---|---|---|
| | *Dianella laevis* | Smooth Flax-lily | | Y |
| * | *Echinochloa crus-galli* | Barnyard Grass | | |
| * | *Ehrharta erecta* var. *erecta* | Panic Veldt-grass | | |
| * | *Ehrharta longiflora* | Annual Veldt-grass | | |
| | *Einadia nutans* | Nodding Saltbush | | |
| | *Epilobium billardierianum* subsp. *billardierianum* | Smooth Willow-herb | | |
| * | *Eragrostis pilosa* | Soft Love-grass | | |
| * | *Erica lusitanica* | Spanish Heath | | |
| * | *Erigeron bonariensis* | Flaxleaf Fleabane | | |
| * | *Erigeron sumatrensis* | Tall Fleabane | | |
| * | *Erodium moschatum* | Musky Heron's-bill | | |
| # P | *Eucalyptus botryoides* | Southern Mahogany | | |
| | *Eucalyptus cephalocarpa* | Mealy Stringybark | | |
| # P | *Eucalyptus cladocalyx* | Sugar Gum | | |
| # P | *Eucalyptus cosmophylla* | Cup Gum | | |
| # P | *Eucalyptus globulus* subsp. *globulus* | Southern Blue-gum | | |
| | *Eucalyptus goniocalyx s.s.* | Bundy | | |
| # P | *Eucalyptus leucoxylon* ssp. *rosea* | Yellow Gum | | |
| | *Eucalyptus melliodora* | Yellow Box | | |
| # P | *Eucalyptus nicholii* | Narrow-leaved Black Peppermint | | |
| | *Eucalyptus ovata* var. *ovata* | Swamp Gum | | |
| # P | *Eucalyptus sideroxylon* subsp. *sideroxylon* | Mugga | | |
| | *Eucalyptus viminalis* subsp. *viminalis* | Manna Gum | | |
| | *Euchiton japonicus* | Creeping Cudweed | | |
| * | *Fraxinus angustifolia* subsp. *angustifolia* | Desert Ash | | |
| * | *Fumaria bastardii* | Bastard's Fumitory | | |
| * | *Fumaria capreolata* | White Fumitory | | |
| * | *Galium aparine* | Cleavers | | |
| * | *Gamochaeta purpurea s.l.* | Purple Cudweed | | |
| * | *Genista linifolia* | Flax-leaf Broom | | |
| * | *Genista monspessulana* | Montpellier Broom | Controlled | |
| * | *Geranium dissectum* | Cut-leaf Crane's-bill | | |
| | *Goodenia ovata* | Hop Goodenia | | |
| # P | *Grevillea robusta* | Silky Oak | | |
| # P | *Grevillea* spp. | Grevillea cultivar | | |
| # P | *Hardenbergia violacea* (shrubby form) | Purple Coral-pea (shrubby form) | | |
| * | *Hedera helix* | English Ivy | | |
| * | *Helminthotheca echioides* | Ox-tongue | | |
| * | *Holcus lanatus* | Yorkshire Fog | | |
| * | *Hypochaeris radicata* | Flatweed | | |
| | *Juncus amabilis* | Hollow Rush | | |
| | *Juncus gregiflorus* | Green Rush | | |
| | *Juncus procerus* | Tall Rush | | |
| | *Juncus sarophorus* | Broom Rush | | |
| | *Juncus subsecundus* | Finger Rush | | |
| | *Lachnagrostis filiformis* | Common Blown-grass | | |
| * | *Lamium amplexicaule* | Dead Nettle | | |
| * | *Lepidium africanum* | Common Peppercress | | |
| * | *Ligustrum lucidum* | Large-leaf Privet | | |
| * | *Lolium perenne* var. *perenne* | Perennial Rye-grass | | |
| # P | *Lophostemon confertus* | Brush Box | | |
| * | *Lotus subbiflorus* | Hairy Bird's-foot Trefoil | | |
| * | *Lysimachia arvensis* var. *arvensis* | Scarlet Pimpernel | | |
| | *Lythrum hyssopifolia* | Small Loosestrife | | |
| * | *Malus pumila* | Apple | | |
| * | *Malva nicaeensis* | Mallow of Nice | | |
| # P | *Melaleuca armillaris* subsp. *armillaris* | Giant Honey-myrtle | | |

| Origin | Scientific name | Common name | CaLP Act listing | Significant species^ |
|---|---|---|---|---|
| # P | *Melaleuca nesophila* | Showy Honey-myrtle | | |
| # P | *Melaleuca styphelioides* | Prickly Paperbark | | |
| | *Microlaena stipoides* var. *stipoides* | Weeping Grass | | |
| * | *Modiola caroliniana* | Red-flower Mallow | | |
| # P | *Myoporum insulare* | Common Boobialla | | |
| | *Oxalis exilis* | Shady Wood-sorrel | | |
| * | *Oxalis pes-caprae* | Soursob | | |
| | *Ozothamnus ferrugineus* | Tree Everlasting | | Y |
| * | *Paspalum dilatatum* | Paspalum | | |
| * | *Pelargonium X hortorum* | Zonal Pelargonium | | |
| | *Persicaria decipiens* | Slender Knotweed | | |
| | *Persicaria subsessilis* | Hairy Knotweed | | Y |
| * | *Phleum pratense* | Timothy Grass | | |
| * | *Pinus radiata* var. *radiata* | Radiata Pine | | |
| # | *Pittosporum undulatum* | Sweet Pittosporum | | |
| * | *Plantago lanceolata* | Ribwort | | |
| * | *Plantago coronopus* | Buck's-horn Plantain | | |
| * | *Poa annua* | Annual Meadow-grass | | |
| * | *Polygonum aviculare s.l.* | Prostrate Knotweed | | |
| | *Potamogeton crispus* | Curly Pondweed | | |
| | *Potamogeton ochreatus* | Blunt Pondweed | | |
| * | *Prunella vulgaris* | Self-heal | | |
| * | *Prunus cerasifera* | Cherry Plum | | |
| | *Pseudognaphalium luteoalbum* | Jersey Cudweed | | |
| * | *Ranunculus repens* | Creeping Buttercup | | |
| * | *Raphanus raphanistrum* | Wild Radish | | |
| * | *Romulea rosea* var. *australis s.s.* | Common Onion-grass | | |
| * | *Rubus anglocandicans* | Common Blackberry | Controlled | |
| * | *Rumex crispus* | Curled Dock | | |
| | *Rytidosperma fulvum* | Copper-awned Wallaby-grass | | |
| | *Rytidosperma racemosum* var. *racemosum* | Slender Wallaby-grass | | |
| | *Rytidosperma setaceum* | Bristly Wallaby-grass | | |
| | *Rytidosperma* spp. | Wallaby Grass | | |
| * | *Salix* spp. | Willow | Restricted | |
| | *Senecio campylocarpus* | Floodplain Fireweed | | Y |
| | *Senecio glomeratus* | Annual Fireweed | | |
| | *Senecio quadridentatus* | Cotton Fireweed | | |
| * | *Senecio vulgaris* | Common Groundsel | | |
| | *Solanum laciniatum* | Large Kangaroo Apple | | |
| * | *Solanum mauritianum* | Wild Tobacco Tree | | |
| * | *Solanum nigrum s.l.* | Black Nightshade | | |
| * | *Solanum pseudocapsicum* | Madeira Winter-cherry | | |
| * | *Sonchus asper s.l.* | Rough Sow-thistle | | |
| * | *Sonchus oleraceus* | Common Sow-thistle | | |
| * | *Sporobolus africanus* | Rat-tail Grass | | |
| * | *Stellaria media* | Chickweed | | |
| # P | *Syzygium smithii* | Lilly Pilly | | |
| * | *Taraxacum officinale* spp. agg. | Garden Dandelion | | |
| | *Thelymitra arenaria* | Forest Sun-orchid | | |
| * | *Trifolium fragiferum* var. *fragiferum* | Strawberry Clover | | |
| * | *Trifolium glomeratum* | Cluster Clover | | |
| * | *Trifolium repens* var. *repens* | White Clover | | |
| # P | *Tristaniopsis laurina* | Kanooka | | |
| * | *Tropaeolum majus* | Nasturtium | | |
| | *Typha ?domingensis* | Narrow-leaf Cumbungi | | Y |
| | *Vallisneria australis* | Eel Grass | | Y |
| * | *Veronica arvensis* | Wall Speedwell | | |
| * | *Vicia faba* | Broad Bean | | |

| Origin | Scientific name | Common name | CaLP Act listing | Significant species^ |
|---|---|---|---|---|
| * | *Vicia sativa* subsp. *sativa* | Common Vetch | | |
| * | *Vulpia bromoides* | Squirrel-tail Fescue | | |
| * | *Vulpia myuros* | Rat's-tail Fescue | | |
| * | *Watsonia meriana* var. *bulbillifera* | Bulbil Watsonia | Controlled | |

# = native species occurring outside of its natural range
P = planted
* = exotic species
^ = significant species described in Section 3.2.2

## 9.1 FAUNA RECORDED ON THE PROPERTY

(current surveys and Ecocentric 2015 & 2018)

| Taxon Origin | Common Name | Scientific Name | EPBC | FFG | DSE (2013) |
|---|---|---|---|---|---|
| | **Mammals** | | | | |
| Introduced | Black Rat | *Rattus rattus* | | | |
| | Common Brushtail Possum | *Trichosurus vulpecula* | | | |
| | Common Ringtail Possum | *Pseudocheirus peregrinus* | | | |
| | Grey-headed Flying-fox | *Pteropus poliocephalus* | Vu | L | vu |
| Introduced | Red Fox | *Vulpes vulpes* | | | |
| | **Frogs** | | | | |
| | Common Eastern Froglet | *Crinia signifera* | | | |
| | Southern Brown Tree-frog | *Litoria ewingii* | | | |
| | Spotted Marsh Frog | *Limnodynastes tasmaniensis* | | | |
| | **Reptiles** | | | | |
| | Garden Skink | *Lampropholis guichenoti* | | | |
| | Weasel Skink | *Saproscincus mustelinus* | | | |
| | **Fish** | | | | |
| Introduced | Goldfish | *Carassius auratus* | | | |
| | Short-fin Eel | *Anguilla australis* | | | |
| | **Birds** | | | | |
| | Australasian Grebe | *Tachybaptus novaehollandiae* | | | |
| | Australasian Hobby | *Falco longipennis* | | | |
| | Australian King-Parrot | *Alisterus scapularis* | | | |
| | Australian Magpie | *Gymnorhina tibicen* | | | |
| | Australian Raven | *Corvus coronoides* | | | |
| | Australian White Ibis | *Threskiornis molucca* | | | |
| | Australian Wood Duck | *Chenonetta jubata* | | | |
| | Black Swan ^ | *Cygnus atratus* | | | |
| | Blue-billed Duck | *Oxyura australis* | | L | en |
| | Chestnut Teal | *Anas castanea* | | | |
| Introduced | Common Blackbird | *Turdus merula* | | | |
| Introduced | Common Myna | *Acridotheres tristis* | | | |
| Introduced | Common Starling | *Sturnus vulgaris* | | | |
| | Crested Pigeon | *Ocyphaps lophotes* | | | |
| | Crimson Rosella | *Platycercus elegans* | | | |
| | Dusky Moorhen | *Gallinula tenebrosa* | | | |
| | Eastern Rosella | *Platycercus eximius* | | | |
| | Eurasian Coot | *Fulica atra* | | | |
| | Galah | *Eolophus roseicapilla* | | | |
| | Grey Butcherbird | *Cracticus torquatus* | | | |
| | Hardhead | *Aythya australis* | | | vu |
| | Hoary-headed Grebe | *Poliocephalus poliocephalus* | | | |
| | Laughing Kookaburra | *Dacelo novaeguineae* | | | |
| | Little Corella | *Cacatua sanguinea* | | | |
| | Little Lorikeet | *Glossopsitta pusilla* | | | |
| | Little Pied Cormorant | *Microcarbo melanoleucos* | | | |
| | Little Raven | *Corvus mellori* | | | |
| | Little Wattlebird | *Anthochaera chrysoptera* | | | |
| | Long-billed Corella | *Cacatua tenuirostris* | | | |
| | Magpie-lark | *Grallina cyanoleuca* | | | |
| | Masked Lapwing | *Vanellus miles* | | | |
| | Musk Lorikeet | *Glossopsitta concinna* | | | |
| Introduced | Noisy Miner | *Manorina melanocephala* | | | |
| Introduced | Northern Mallard | *Anas platyrhynchos* | | | |
| | Pacific Black Duck | *Anas superciliosa* | | | |
| | Pied Currawong | *Strepera graculina* | | | |
| | Pink-eared Duck ^ | *Malacorhynchus membranaceus* | | | |

| Taxon Origin | Common Name | Scientific Name | EPBC | FFG | DSE (2013) |
|---|---|---|---|---|---|
| | Purple Swamphen | *Porphyrio porphyrio* | | | |
| | Rainbow Lorikeet | *Trichoglossus haematodus* | | | |
| | Red Wattlebird | *Anthochaera carunculata* | | | |
| | Sacred Kingfisher | *Halcyon sancta* | | | |
| Introduced | Spotted Turtle-Dove | *Streptopelia chinensis* | | | |
| | Straw-necked Ibis | *Threskiornis spinicollis* | | | |
| | Striated Pardalote | *Pardalotus striatus* | | | |
| | Sulphur-crested Cockatoo | *Cacatua galerita* | | | |
| | Welcome Swallow | *Petrochelidon neoxena* | | | |
| | White-necked Heron | *Ardea pacifica* | | | |
| | White-plumed Honeyeater | *Lichenostomus penicillatus* | | | |
| | Willie Wagtail | *Rhipidura leucophrys* | | | |

^ recorded by the local community – not sighted during these surveys.

***EPBC Act 1999 (Commonwealth)* conservation status:** EX: Extinct, CR: Critically endangered, EN: Endangered, VU: Vulnerable, CD: Conservation dependant.

**Advisory List of Threatened Fauna (DSE 2013) status in Victoria:** ex: Extinct, rx: Regionally Extinct, wx: Extinct in the Wild, cr: Critically Endangered, en: Endangered, vu: Vulnerable, r: Rare, nt: Near Threatened, dd: Data Deficient.

***FFG Act 1988 (Vic)* conservation status:** L: Listed, N: Nominated, I: Invalid or ineligible, D: Delisted.

## 9.2 SIGNIFICANT FLORA RECORDED WITHIN 5 KM (OR PREDICTED TO OCCUR)

Refer to spreadsheet – available upon request to author.

## 9.3 SIGNIFICANT FAUNA RECORDED WITHIN 5 KM (OR PREDICTED TO OCCUR)

Refer to spreadsheet – available upon request to author.

## 9.4 ENSYM OFFSET REPORT

(overleaf; to be substituted with a DELWP NVR report upon confirmation of the development extent)

# Scenario test – native vegetation removal

This report provides offset requirements for internal testing of different proposals to remove native vegetation. **This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.** A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

**Date of issue:** **23/02/2021**
**Time of issue:** **5:17 pm**

**Report ID: Scenario Testing**

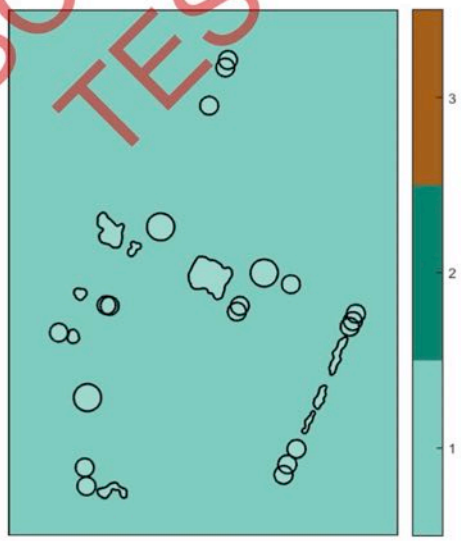
| **Project ID** | 2021-02-23_20042_S1-7losses_v4.0 |
|---|---|

## Assessment pathway

| **Assessment pathway** | **Detailed Assessment Pathway** |
|---|---|
| Extent including past and proposed | 0.996 ha |
| Extent of past removal | 0.000 ha |
| Extent of proposed removal | 0.996 ha |
| No. Large trees proposed to be removed | 4 |
| Location category of proposed removal | Location 1<br>The native vegetation is not in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map), sensitive wetland or coastal area. Removal of less than 0.5 hectares in this location will not have a significant impact on any habitat for a rare or threatened species |



**1. Location map**




Page 1

# Scenario test – native vegetation removal

## Offset requirements if a permit is granted

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

| | |
|---|---|
| **General offset amount**[1] | 0.175 general habitat units |
| Vicinity | Port Phillip and Westernport Catchment Management Authority (CMA) or Knox City Council |
| Minimum strategic biodiversity value score[2] | 0.206 |
| Large trees | 4 large trees |

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

Appendix 1 includes information about the native vegetation to be removed

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

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



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

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

# Scenario test – native vegetation removal

## Next steps

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

**This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.**

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).

## Appendix 1: Description of native vegetation to be removed

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

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

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

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

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

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

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

### Native vegetation to be removed

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| 252-LS | Scattered Tree | gipp0127 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.260 | | 0.013 | General |
| 4-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.216 | | 0.006 | General |
| 254-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.270 | | 0.006 | General |
| 304-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.023 | 0.270 | | 0.004 | General |
| 298-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.024 | 0.221 | | 0.004 | General |
| 28-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.260 | | 0.006 | General |
| 305-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.023 | 0.270 | | 0.004 | General |
| 1-A | Patch | gipp0127 | Endangered | 0 | no | 0.140 | 0.141 | 0.141 | 0.262 | | 0.019 | General |

Page 4

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| 2-A | Patch | gipp0127 | Endangered | 0 | no | 0.140 | 0.013 | 0.013 | 0.270 | | 0.002 | General |
| 3-A | Patch | gipp0127 | Endangered | 0 | no | 0.240 | 0.071 | 0.071 | 0.270 | | 0.016 | General |
| 172-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.027 | 0.270 | | 0.005 | General |
| 59-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.260 | | 0.006 | General |
| 50-LS | Scattered Tree | gipp0127 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.260 | | 0.013 | General |
| 293-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.023 | 0.254 | | 0.004 | General |
| 9-A | Patch | gipp0127 | Endangered | 0 | no | 0.140 | 0.014 | 0.014 | 0.260 | | 0.002 | General |
| 10-A | Patch | gipp0127 | Endangered | 0 | no | 0.140 | 0.020 | 0.020 | 0.270 | | 0.003 | General |
| 11-A | Patch | gipp0127 | Endangered | 1 | no | 0.140 | 0.031 | 0.031 | 0.270 | | 0.004 | General |
| 13-A | Patch | gipp0127 | Endangered | 0 | no | 0.140 | 0.015 | 0.015 | 0.260 | | 0.002 | General |
| 202-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.265 | | 0.006 | General |
| 253-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.027 | 0.270 | | 0.005 | General |
| 408-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.260 | | 0.006 | General |
| 296-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.015 | 0.234 | | 0.003 | General |
| 414-SS | Scattered Tree | gipp0937 | Endangered | 0 | no | 0.200 | 0.031 | 0.024 | 0.270 | | 0.005 | General |
| 413-SS | Scattered Tree | gipp0937 | Endangered | 0 | no | 0.200 | 0.031 | 0.024 | 0.270 | | 0.005 | General |
| 14-A | Patch | gipp0127 | Endangered | 0 | no | 0.140 | 0.029 | 0.029 | 0.158 | | 0.004 | General |

Page 5

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | Type | BioEVC | BioEVC conservation status | Large tree(s) | Partial removal | Condition score | Polygon Extent | Extent without overlap | SBV score | HI score | Habitat units | Offset type |
| 16-A | Patch | gipp0127 | Endangered | 0 | no | 0.140 | 0.013 | 0.013 | 0.270 | | 0.002 | General |
| 211-LS | Scattered Tree | gipp0127 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.260 | | 0.013 | General |
| 76-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.019 | 0.260 | | 0.004 | General |
| 75-SS | Scattered Tree | gipp0127 | Endangered | 0 | no | 0.200 | 0.031 | 0.019 | 0.260 | | 0.004 | General |





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

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

| Species common name | Species scientific name | Species number | Conservation status | Group | Habitat impacted | % habitat value affected |
|---|---|---|---|---|---|---|
| None | | | | | | |

**Habitat group**

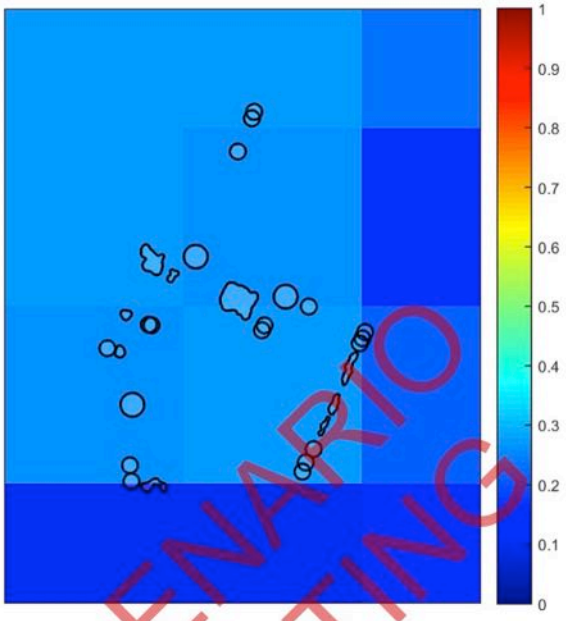
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

**Habitat impacted**

- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

## Appendix 3 – Images of mapped native vegetation

**2. Strategic biodiversity values map**



## 9.5 MAPS

The following *Native Vegetation Losses* aerial map was produced using Quantum GIS (QGIS 3.10) and were developed from various datasets including:

- Aerial photography provided by Development Victoria,
- VicMap layers (Parcel, Roads, Waterways and Contours),
- GPS based data collected in the field.

The *Existing Tree Mapping* plan was provided by MDG Landscape Architects (2021) and includes:

- *Development Master Plan* layout as provided by Architectus Pty Ltd (2021),
- Tree locations and identification details as provided by *Arborist Assessment* report (Galbraith 2020)
- Identification of retained, lost and retained where practicable tree categories as determined in collaboration by MDG Landscape Architects and Ecocentric.


# NATIVE VEGETATION OFFSETS

Native vegetation losses
(denotes patch and scattered tree numbers)

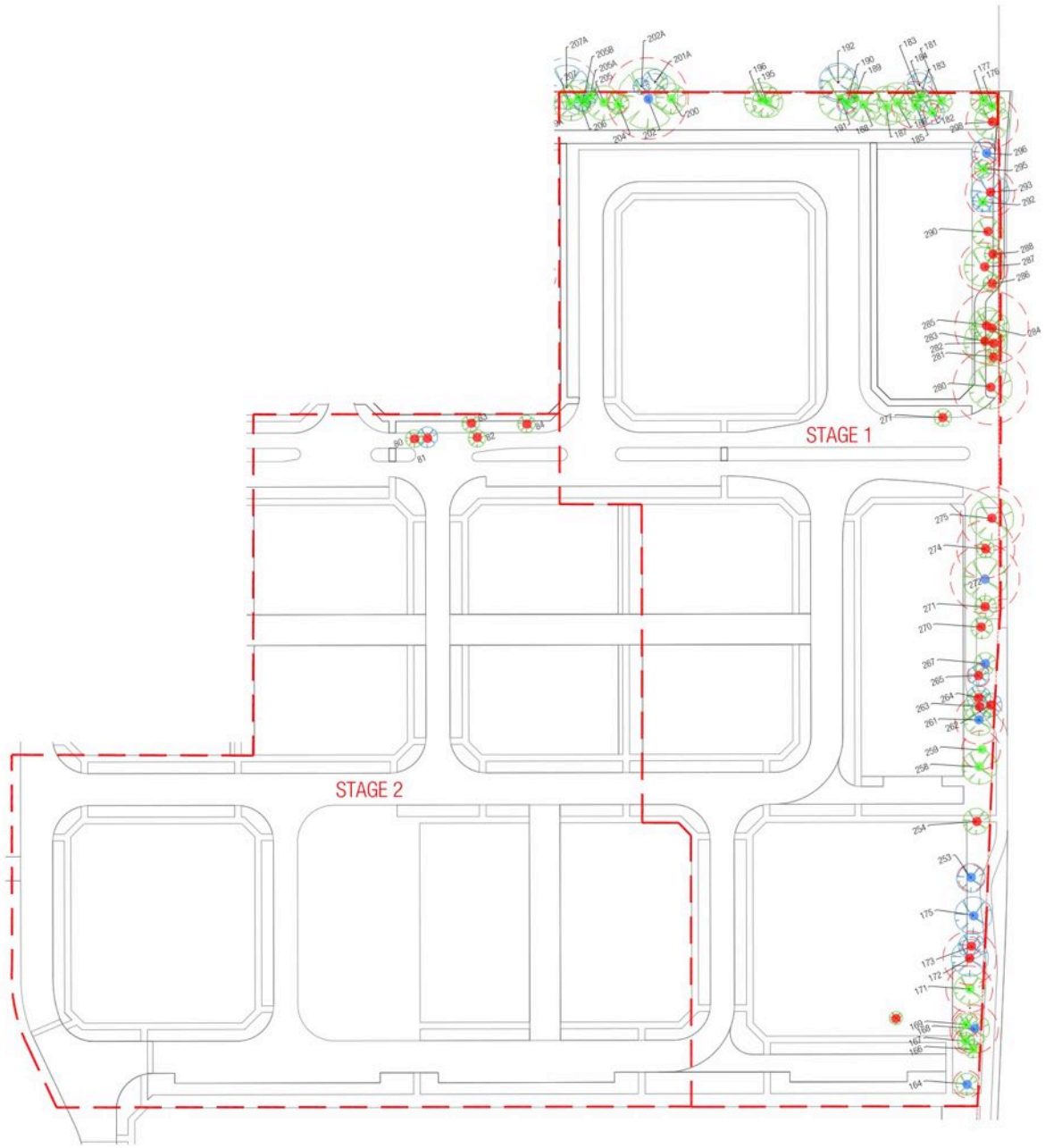
CDP extent

Stage 1 - 7 study area

Property boundaries (cadastre)

Scale: 1 : 3,000
Datum: GDA94MGA55

0 75 150 m




## LEGEND

- APPROX. CANOPY OF EXISTING TREE AS SURVEYED (CRA SURVEY VERSION 3 20.07.2017)
- APPROX. CANOPY OF EXISTING TREE AS SHOWN ON ROB GALBRAITH & ASSOCIATES TREE ASSESSMENT (14 AUG 2017)
- APPROX. CANOPY OF GROUPING OF EXISTING TREE AS SURVEYED (CRA SURVEY VERSION 3 20.07.2017)
- EXISTING NATIVE TREE & NATIVE NON-CANOPY TREE RETAINED
- EXISTING NATIVE TREE & NATIVE NON-CANOPY TREE RETAINED IF POSSIBLE
- EXISTING NATIVE TREE & NATIVE NON-CANOPY TREE REMOVED
- EXISTING TREES TPZ
- EXISTING TREES TPZ ON ADJACENT PROPERTY
- TITLE BOUNDARY

**KNOXFIELD**

EXISTING TREE MAPPING

SUBDIVISION NATIVE & NATIVE NON-CANOPY TREES

1:500 @ A1 | DATE FEB 2021 | JOB No.1878C

DWG No. 1878C LSK04 [E] J:\1878 Knoxfield\5. Design\Drawings\AutoCAD\Knoxfield Existing Native & Non Native Trees and TPZs.dwg

MDG Landscape Architects
Level 3, 141 Flinders Lane
Melbourne, Victoria 3000 Australia
T: (03) 9650 0600
E: mail@mdgla.com.au


LEGEND
APPROX. CANOPY OF EXISTING NATIVE TREE & NATIVE NON-CANOPY TREES AS SURVEYED (CRA SURVEY VERSION 3 20.07.2017)
APPROX. CANOPY OF EXISTING NON NATIVE TREE & NATIVE EXEMPT TREE AS SURVEYED (CRA SURVEY VERSION 3 20.07.2017)
APPROX. CANOPY OF GROUPING OF EXISTING NATIVE TREES AS SURVEYED (CRA SURVEY VERSION 3 20.07.2017)
APPROX. CANOPY OF GROUPING OF EXISTING NON NATIVE TREES AS SURVEYED (CRA SURVEY VERSION 3 20.07.2017)
EXISTING NATIVE VEGETATION
TITLE BOUNDARY
WETLAND RESIDENTIAL
KNOXFIELD
EXISTING TREE MAPPING - FOR INFORMATION ONLY
1:1250 @ A1
DATE FEB 2021
JOB No.1878C
DWG No. 1878C LSK01 [E]
MDG Landscape Architects
Level 3, 141 Flinders Lane
Melbourne, Victoria 3000 Australia
T: (03) 9650 6600
E: mail@mdgla.com.au
mdg

THIS PAGE LEFT BLANK