

FINAL REPORT

# Threatened Species Conservation Management Plan for 100 Vineyard Road, Sunbury, Victoria

ON BEHALF OF:

**Urban Design and Management Pty Ltd**

March 2014



**Ecology and Heritage Partners Pty Ltd**

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- Tom Milinkovic for information in regards to the project and ongoing comments and assistance with the Conservation Management Plan;
- The Department of Environment and Primary Industries for the use of the Victorian Biodiversity Atlas.

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## EXECUTIVE SUMMARY

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Ecology and Heritage Partners Pty Ltd was commissioned by Urban Design and Management Pty Ltd to prepare a Conservation Management Plan (CMP) for significant species that have been recorded or have a likelihood of occurrence within the parcel of land located at 100 Vineyard Road, Sunbury. This CMP is prompted by an *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral application to the Commonwealth Government (2008/4214) which stated that a State and Federal Government-approved CMP will be required as part of any future development relevant to Rosenthal Estate.

The purpose of this CMP is to provide a management protocol for the design, staging, construction, mitigation and monitoring during development of the Rosenthal Estate to protect, enhance and mitigate impacts to significant species and their habitats which exist within the study area. Project construction is expected to occur over several years, with multiple stages of construction likely to occur within the study area at any one time.

### Study Area

The study area is located approximately 40 kilometres north-west of the Melbourne CBD. It is a U-shaped parcel of land which encompasses the area bounded by Mitchells Lane to the north, Vineyard Road to the east, farmland to the south and residential zone to the west. The study area is relatively flat with a gentle slope from north to south. There is a farm dam located in the southwest portion of the study area, connected to an ephemeral drainage line (Harpers Creek), which dissects the property from east to west and eventually flows into Jacksons Creek, approximately two kilometres east of the study area.

### Conservation Management Plan – Phase One

Two separate areas have been outlined as requiring management actions based on key site features, the location of significant species, vegetation condition and ecological attributes. These include the proposed Conservation Reserves in the northern portion of the property. Specific information regarding the location, significance, potential impacts and mitigation measures for each of these management areas is provided.

The CMP must be carried out in accordance with the specific actions outlined in this document for the duration of Phase One, being from the date of approval of the CMP until a period of ten years after the completion of the construction. Ongoing monitoring and management reports/statements will be completed at the end of Phase One and are to be reviewed by the Department of Environment and Primary Industries (DEPI).

## **Conservation Management Plan – Phase Two**

After the completion of Phase One under this CMP (which occurs 10 years after completion of construction works), Phase Two will be implemented in perpetuity. Relevant land owners will be responsible for undertaking and funding Phase Two of this CMP.

Phase Two will require the ongoing implementation of the following:

- Maintenance of waterway corridors by Melbourne Water and Hume City Council in accordance with each organisation's standard maintenance policies and programs;
- Maintenance of the Conservation Reserves in the north-west and north-east section of the property by Hume City Council; and,
- Any ongoing monitoring and/or management of threatened species (i.e. Golden Sun Moth *Synemon plana*) in retained habitat by Hume City Council.

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# 1 INTRODUCTION

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## 1.1 Project information

Ecology and Heritage Partners Pty Ltd was commissioned by Urban Design and Management Pty Ltd to prepare a Conservation Management Plan (CMP) for significant species that have been recorded or have a likelihood of occurrence within the parcel of land located at 100 Vineyard Road, Sunbury (Figure 1). This document will be used to inform the future management requirements for the significant flora and fauna species associated with ‘Rosenthal Estate’, hereafter referred to as ‘the study area’.

The study area is primarily designated for residential development, including a commercial zone, open space and two dedicated Conservation Reserves (Appendix 1). Construction will occur in multiple stages over several years. This CMP is prompted by an *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral application to the Commonwealth (2008/4214) which stated that a State government-approved CMP will be required as part of any future development relevant to Rosenthal Estate. A request for further information from the Commonwealth Government (EPBC Ref 2008/4214, dated 11 July 2008) acknowledged the recommendation of a CMP and requested its preparation as part of preliminary documentation to assist the Commonwealth in its decision making for the referred action. In the CMP, details required as part of the additional information include how the proposed Conservation Reserves will be managed in the future to protect and enhance their ecological value, including measures such as the provision of permanent fencing and signage and specific grassland protection measures. Information regarding the land use zoning of the proposed Conservation Reserves and the mechanism for transferring management responsibilities to Council after a specified time is also required.

The management recommendations outlined in this plan are aligned with the guidelines provided by the *Biodiversity Precinct Structure Planning Kit* (DEPI 2010), which directs the preparation of a CMP for individual threatened species or communities in relation to a defined area of land and/or project. This includes detailed mapping showing Conservation Areas, No-Go Zones, buffers, fencing, road crossing structures, constructed wetlands and revegetation areas (Figure 2).

This CMP covers the protection, management, and actions required for the removal of suitable habitat areas for the Growling Grass Frog *Litoria raniformis*, Striped Legless Lizard *Delma impar* and Golden Sun Moth *Synemon plana*. It is noted that a proportion of suitable habitat in the north-west and north-east section of the study area is to be retained as Conservation Reserves, as shown in the most recent development plan, as well as the reconstruction of open space along Harpers Creek. The following information provides a review of previous works to date in order to outline the rationale for species covered by this CMP.



Previous assessments have recorded one nationally significant fauna species, Golden Sun Moth (Wlodarczyk & Williams 2006; Wlodarczyk et al. 2008; Wlodarczyk & Hatt 2009), and one state significant flora species, Rye Beetle-grass *Tripogon loliifolium* (Ecology and Heritage Partners Pty Ltd 2012) within the study area. The Flora Information System (FIS 2012) contains records of seven additional significant flora species within five kilometres of the study area (Figure 3); however suitable habitat for these was not recorded during previous surveys (Wlodarczyk & Williams 2005a; 2005b; 2005c; Wlodarczyk & Hatt 2008; Richards & Wlodarczyk 2009). Whilst no Spiny Rice-flowers *Pimelea spinescens* subsp. *spinescens* have been detected within the study area, there are two records within 500 metres of the site (FIS 2012).

The Victorian Biodiversity Atlas (DEPI 2013) contains thirteen records of significant fauna species within a five kilometre radius of the study area; the closest record being of Swift Parrot approximately 100 metres north of the northern end of the study area (Figure 4). Targeted surveys for Striped Legless Lizard (Wlodarczyk et al. 2007; Wlodarczyk & Richards 2009a) Grassland Earless Dragon (Brett Lane & Associates Pty Ltd 2011) and Growling Grass Frog (Wlodarczyk & Richards 2009b) throughout the study area failed to record these species, although suitable habitat was identified for Striped Legless Lizard and Growling Grass Frog within the site.

## 1.2 Study Area

The study area is located approximately 40 kilometres north-west of the Melbourne CBD. It is a U-shaped parcel of land which encompasses the area bounded by Mitchells Lane to the north, Vineyard Road to the east, farmland to the south and medium density residential zone to the west (Figure 1). The site is approximately 119 hectares in size and is mostly undeveloped, apart from a dwelling in the south-east portion of the property (Urban Design and Management 2013). The study area occurs within the greater Urban Growth Boundary but does not occur in a proposed or approved Precinct Structure Plan (PSP) area. Areas outside proposed or approved PSPs are subject to environmental assessments and approvals under Part 9 of the EPBC Act. Proposed PSPs in the locality include Sunbury West 1095 and Sunbury South 1074. At the time of CMP preparation, these PSPs were yet to be approved by the Victorian Government's Minister for Planning.

The study area is relatively flat, with a gentle slope from north to south. There is a farm dam located in the southwest portion of the study area, connected to an ephemeral drainage line (Harpers Creek) which dissects the property from east to west and eventually flows into Jacksons Creek, approximately two kilometres east of the study area. Vegetation throughout the study area ranges from poor to good condition. A relatively high cover of native grasses is present throughout; however, the diversity of native herbaceous species is generally poor. Ecological Vegetation Classes (EVCs) recently documented include *Heavier Soils - Plains*

Grassland (EVC 132\_61) and Creepline Tussock Grassland (EVC 654) (Ecology and Heritage Partners Pty Ltd 2012).

According to the Department of Environment and Primary Industries (DEPI) Biodiversity Interactive Map (DEPI 2013), the study area is located within the Victorian Volcanic Plains (VVP) bioregion, and is closely bordered by the Central Victorian Uplands (CVU) bioregion to the north and west. The area is currently zoned Residential 1 Zone (R1Z) and there is currently a Development Plan Overlay (DPO) covering the site (DPCD, 2013). The VVP bioregion extends from Portland in the west to Craigieburn in the east and from Clunes in the north to Colac in the south. The CVU bioregion extends from Stawell in the west to Bright in the east and from Glenrowan in the north-east to Meredith in the south.

### 1.3 Terminology

This CMP describes in detail the mitigation measures which will be undertaken throughout the pre-construction and construction stages of the development. This CMP also outlines on-going management and monitoring responsibilities.

- *Pre-construction:* This is the period prior to development occurring within the study area, i.e. prior to any permits being issued and acted upon for subdivision, buildings and any other works that are associated with the implementation of Rosenthal Estate. Where a superlot or subdivision is undertaken, this phase may continue to apply until such a time that subsequent permits are issued for works on the superlot.
- *Construction:* This is characterised by the commencement of initial disturbance (i.e. earthworks, existing building demolition, vegetation removal), up until the completion of development of individual properties or the completion of infrastructure projects such as new or upgraded roads and drainage works.
- *On-going Management and Monitoring:* This occurs in some instances immediately following approval of the CMP, whilst other management and monitoring actions occur post-construction (immediately following completion of construction works).

This CMP outlines actions for two operational phases:

- Phase One of the CMP includes requirements from the date of CMP approval until 10 years after completion of construction works; and,
- Phase Two of the CMP includes the actions to be undertaken in perpetuity for the maintenance of habitat, which will commence at the completion of Phase One.

Throughout this document, references to actions that “will” or “must” happen are required by the CMP. Actions that are recommendations or “should” happen are not required to be undertaken under the approval of the CMP, but are guidelines and/or recommended directions for future site management.

## **1.4 Background Information and Survey Methodology**

Background information on threatened fauna species including their appearance, habitat requirements, occurrence within the precinct, distribution within the surrounding area and threatening processes are outlined Appendix 1.

## 2 CONSERVATION MANAGEMENT PLAN – PHASE ONE

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### 2.1 Objectives

The purpose of this CMP is to provide a management protocol for the design, staging, construction, mitigation and monitoring during development of the Rosenthal Estate to protect, enhance and mitigate impacts to significant species and their habitats. Construction is expected to occur over several years (up to 15 years), with multiple stages of construction likely to occur at any one time. The CMP outlines management actions for the proposed Conservation Reserves. This CMP focusses on the following threatened species:

- Striped Legless Lizard;
- Growling Grass Frog;
- Golden Sun Moth;
- Spiny Rice-flower; and,
- Rye Beetle-grass.

Further information relating to the appearance, habitat requirements, legislation, occurrence of each species within the study area and surrounds as well as their threatening processes are provided in Appendix 1. Suitable habitat for Golden Sun Moth is being protected in the north-western corner of the study area via the designation of a Conservation Reserve.

The CMP outlines management actions for significant flora and fauna species prior to and during construction (Appendix 3 and 4), along with general measures to avoid and mitigate impacts to these species and their associated habitats within the study area.

The CMP has been prepared to satisfy the relevant regulatory authorities, including DEPI and the Department of Sustainability, Environment, Water, Populations and Communities (SEWPaC). The implementation of the plan will require the commitment of future public land managers, the collaboration of all relevant stakeholders and ongoing reviews by DEPI and SEWPaC (as required) to ensure the intended management outcomes are achieved.

The overall objectives of this CMP are to:

1. Identify all areas of potential habitat for populations of significant flora and fauna species;
2. Ensure the Rosenthal Estate has a negligible impact on populations of significant flora and fauna species, along with general environmental values within the study area;
3. Prescribe measures to improve the long-term viability of populations of significant flora and fauna species by augmenting and extending areas of suitable habitat; and,

4. Ensure that the ongoing survival of flora and fauna populations within the study area is perpetuated into the future.

A detailed description of each significant species relevant to this CMP is provided in Appendix 2.

## 2.2 Compliance with Legislation

### 2.2.1 State

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) aims to protect threatened flora and fauna and sets out the following conservation and management objectives:

- To guarantee that all taxa of Victoria's flora and fauna can survive, flourish and retain their potential for evolutionary development in the wild;
- To conserve Victoria's communities of flora and fauna;
- To manage potentially threatening processes;
- To ensure that any use of flora or fauna by humans is sustainable;
- To ensure that the genetic diversity of flora and fauna is maintained; and
- To encourage the conserving of flora and fauna through co-operative community endeavours.

The following species protected under the FFG Act have been identified within or in the proximity of the study area, or potentially occur based on the presence of suitable habitat:

- Growling Grass Frog;
- Striped Legless Lizard;
- Golden Sun Moth; and
- Spiny Rice-flower.

This CMP provides for the mitigation and management of these species and their habitats throughout the study area.

The *Wildlife Act 1975* (and associated Wildlife Regulations 2002) aims to promote the protection and conservation of Victoria's wildlife with the purposes of:

- Establishing procedures in order to promote the protection and conservation of wildlife;
- Prevention of taxa of wildlife from becoming extinct;
- Sustainable use of and access to wildlife; and
- Prohibit and regulate the conduct of persons engaged in activities concerning or related to wildlife.

Persons undertaking any inspection, removal or relocation of fauna species located in vegetation to be impacted upon as part of the project must be authorised and hold a current permit under the *Wildlife Act 1975*.

### 2.2.2 Commonwealth

The EPBC Act requires approval from SEWPaC for any proposal to undertake actions that could have a significant impact on matters of National Environmental Significance (NES). Matters of NES relevant to biodiversity and this project include listed threatened species and ecological communities.

The following species are listed for protection under the EPBC Act and have been identified within or in the proximity of the study area, or potentially occur based on the presence of suitable habitat:

- Growling Grass Frog;
- Striped Legless Lizard;
- Golden Sun Moth; and,
- Spiny Rice-flower.

Under Part 9 (Approval of Actions) of the EPBC Act, individual land owners are required to refer any actions that are likely to have significant impacts on any of these species to the Commonwealth Minister. In this case, the referral (2008/4214) was submitted as part of the planning process and this CMP is an outcome of recommendations from both DEPI and SEWPaC.

## 2.3 Implementation, Timeframes and Review

### 2.3.1 Management Responsibilities and Funding

Management responsibilities and the source of funding for these actions are outlined in the 'Mitigation Actions' table provided for the Conservation Reserves. (Section 3.3.2).

### 2.3.2 Timeframes

Phase One of the CMP will commence from approval of the CMP until ten years after completion of construction. As the study area may not be fully developed for 15 or more years, the 'completion of construction' will occur in different parts of the study area at different times, staggered over an extended timeframe. The 'completion of construction' is therefore defined by the date that each subdivision, road upgrade or other associated construction works are completed.

Phase Two of the CMP will commence on completion of Phase One and will be implemented in perpetuity.

### 2.3.3 Reporting and Review

Management recommendations may need to be amended if management actions are considered inappropriate or inadequate for the long-term persistence of significant species within the study area. New information may become available through ongoing monitoring procedures (i.e. through weed control measures), or following review of ongoing reporting submitted to DEPI.

An annual summary statement or report will be prepared for each stage of works to inform DEPI of relevant ecological issues, milestones and threats.

This statement/report will include:

- The progress of development within the management area;
- Any measures implemented in accordance with this CMP;
- Any incidents which may have impacted any matters of NES;
- Any mitigation measures implemented;
- Progress of management actions (e.g. weed removal, salvage and translocation works);
- Any significant findings resulting from monitoring activities; and,
- Any requested CMP amendments that may have been made during the course of the year.



In the event that through the above review process, it is proposed to extend the requirements outlined in this CMP, including changes to the current scope of proposed works, management actions and monitoring requirements, these must be determined by consultation and agreement between DEPI and the relevant land managers and owners.

## **3 MANAGEMENT AREAS**

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Two separate areas have been delineated as requiring management actions during Phase One of the CMP based on key site features, the location of significant species, vegetation condition and ecological attributes. These include the two proposed Conservation Reserves in the north-east and north-west portion of the study area (Figure 2).

### **3.1 Conservation Reserves**

The Conservation Reserves are located in the north-western and north-eastern corner of the study area (Appendix 1). In total, the reserves cover approximately 12.5 hectares, of which approximately 11.86 hectares consists of good quality remnant Plains Grassland (EVC 132\_61). This EVC is characterised by treeless vegetation with the presence of species such as Kangaroo Grass and Wallaby Grass (DEPI 2004). Golden Sun Moths have been recorded within and surrounding this remnant native vegetation patch (Włodarczyk & Williams 2006; Włodarczyk et al. 2008; Włodarczyk & Richards 2009).

The remnant patch of EVC 132\_61 corresponds with the EPBC Act listed Natural Temperate Grassland of the Victorian Volcanic Plain ecological community and FFG Act listed Western (Basalt) Plains Grasslands Community.

#### **3.3.1 Potential Impacts**

A summary of potential development impacts is provided in Appendix 5.

### 3.3.2 Mitigation Actions

A summary of actions required for the implementation of this CMP is provided in Table 1, below. Actions are described in detail within Chapter 5 (Mitigation Measures) and Appendix 3 and 4 (Salvage and Translocation of Flora and Fauna).

**Table 1.** Summary of actions required for the implementation of the CMP.

Action	Timing	Responsible Agent	Measurable Outcome
<b>PRE-CONSTRUCTION</b>			
<p><b>1. Construction Environment Management Plan (CEMP)</b></p> <p>Prepare and implement a CEMP for the project. The CEMP must include management actions relating (but not limited) to pathogen management, erosion, stockpiling, sedimentation, dust, noise and pollutants.</p>	<p>To be developed and accepted in the pre-construction phase, and implemented in the construction phase.</p>	<p>Construction Contractor, to be commissioned by landholder.</p>	<p>Ensure that the approved CEMP follows all management actions that are recommended for threatened species, as outlined in this CMP.</p>
<p><b>2. Permits and authorisations</b></p> <p>Ensure all relevant permits relating to salvage and translocation of flora and fauna have been obtained. This will include:</p> <ul style="list-style-type: none"> <li>• A permit under the FFG Act to remove or disturb native vegetation and listed flora species.</li> <li>• Management Authorisation under the <i>Wildlife Act 1975</i> to undertake any inspection, removal or relocation of fauna species.</li> <li>• Approval under the EPBC Act to remove habitat /impact Golden Sun Moth, Spiny Rice-flower, Growling Grass Frog, Striped Legless Lizard and listed communities.</li> </ul>	<p>Pre-construction.</p>	<p>Landholder and any organisation or individual responsible for the salvage and translocation of flora and fauna.</p>	<p>Permits are obtained and evidence as to their period of validity is provided prior to commencement of construction.</p>

Action	Timing	Responsible Agent	Measurable Outcome
<p><b>3. Targeted surveys for Growling Grass Frog</b></p> <p>Conduct further targeted surveys for Growling Grass Frog within the study area. Surveys must be conducted in accordance with Appendix 3.</p>	<p>Pre-construction. Two nights prior to works during the calling season for Growling Grass Frog, October-December. No nocturnal surveys required between May-August (non-active season)</p>	<p>Landholder. Surveys to be undertaken by experienced zoologists.</p>	<p>Identified areas supporting populations of Growling Grass Frog will be targeted for intensive salvage and translocation activities during construction (See Appendix 3).</p>
<p><b>4. Delineation of 'No Go' zones</b></p> <p>Identification and fencing of 'No Go' zones (Section 4). Areas identified as ecologically sensitive must be fenced off with appropriate signage prior to commencement of construction, and remain in place until the construction phase is complete. In areas of known or potential habitat for listed threatened flora and fauna species and ecological communities, protective fencing should be supplemented with a high-visibility component to indicate the sensitivity of the area.</p> <p>Areas of sensitivity that must be flagged as a 'No Go' zone have been identified in Figure 3.</p>	<p>To be developed and accepted during the pre-construction phase, and implemented during the construction phase prior to first adjoining stage of development</p>	<p>Landholder.</p>	<p>All areas identified as ecologically sensitive are fenced off with appropriate signage prior to the commencement of construction.</p>
<b>DURING CONSTRUCTION</b>			
<p><b>5. Pre-clearance surveys and salvage for significant fauna</b></p> <p>A qualified zoologist must be present for fauna salvage during the following stages:</p> <ul style="list-style-type: none"> <li>Prior to the removal of topsoil at any location where Growling Grass Frog or Striped Legless Lizard has the potential to occur. Removal of topsoil and fauna salvage must proceed in accordance with procedures outlined in Appendix 3;</li> <li>During de-watering and prior to the removal of any riparian or</li> </ul>	<p>During construction.</p>	<p>Landholder. Salvage to undertaken by a qualified zoologist or wildlife handler.</p>	<p>Salvage and translocation in grassland and riparian / wetland areas completed as per Appendix 3.</p>

Action	Timing	Responsible Agent	Measurable Outcome
<p>wetland habitat. This includes the following locations:</p> <ul style="list-style-type: none"> <li>○ Drainage line (Harpers Creek); and,</li> <li>○ Dam in north-west section of the study area (CT2).</li> </ul> <ul style="list-style-type: none"> <li>• All locations identified for salvage in Figure 2.</li> </ul>			
<p><b>6. Permanent fencing and signage of Conservation Reserves</b></p> <p>Permanent fencing (e.g. 1.0m high metal post and wire fence) and appropriate signage is to be constructed around the Conservation Reserve to help increase awareness and reduce disturbance.</p> <p>Fencing should be installed by suitable personnel.</p>	During Construction.	Landholder.	Signage and fences installed.
<p><b>7. Population monitoring for Golden Sun Moth</b></p> <p>Monitoring of Golden Sun Moth populations is required to assess the persistence of this species within the Conservation Reserve.</p>	Annually during construction activities, October to early January.	Landholder. Surveys to be conducted by a qualified ecologist.	Annual monitoring is undertaken, with success criteria based on the persistence of Golden Sun Moth within the Conservation Reserve.
<b>POST CONSTRUCTION</b>			
<p><b>8. Revegetation and rehabilitation</b></p> <p>Revegetation and rehabilitation of Harpers Creek and roadside reserves should include (Section 4):</p> <ul style="list-style-type: none"> <li>• Flora species appropriate to the local EVC including a suite of overstorey, understorey and ground cover species should be used in all revegetation and landscape plantings;</li> <li>• Aquatic species suitable for rehabilitating Harpers Creek (Appendix 8), and,</li> <li>• Grassland species favoured as a food source by Golden Sun Moth (e.g. <i>Austrodanthonia</i> spp.) in the Conservation Reserve where Golden Sun Moth populations are known to be present.</li> </ul>	Post construction.	Landholder, with this responsibility transferred to Hume City Council post 10 years.	Revegetation and rehabilitation of Harpers Creek, Conservation Reserve and roadside reserves using species representative of the local EVC.

Action	Timing	Responsible Agent	Measurable Outcome
<p><b>9. Replacement of habitat features</b></p> <p>Removed habitat features should be replaced where possible, e.g. logs and any felled trees should be relocated on site to provide additional fauna habitat.</p>	<p>Post construction.</p>	<p>Landholder/ Hume City Council.</p>	<p>Removed habitat features are replaced where possible.</p>

## 4 MITIGATION MEASURES

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The following mitigation measures are provided to reduce the impacts of development on threatened flora and fauna species and provide guidance on reducing adverse environmental impacts during construction works.

### **Air quality**

All construction works shall comply with the following requirements:

- Emissions of visible smoke to the atmosphere from construction plant and equipment shall be for periods no greater than 10 consecutive seconds;
- Emissions of odorous substances or particulates shall not create or be likely to create objectionable conditions for the public;
- Materials of any type shall not be disposed of through burning;
- Material that may create a hazard or nuisance dust shall be covered during transport; and,
- Dust generated from road construction activities shall not create a hazard or nuisance to the public, shall not disperse from the site or across roadways, nor interfere with crops, stock or dust-sensitive receptors.

### **Erosion and sediment control**

All exposed surfaces shall be treated to minimise erosion. Erosion and sediment controls may include but are not limited to:

- Minimising the amount of exposed erodable surfaces during construction including the staging of works;
- Prompt temporary and/or permanent progressive revegetation of the study area as work proceeds;
- Prompt covering of exposed surfaces (including batters and stockpiles) that would otherwise remain bare for more than 28: days - cover may include mulch, erosion control matting or seeding with sterile grass;
- Installation, stabilisation and maintenance of catch and diversion drains that segregate water runoff from catchments outside the construction site from water exposed to the construction site;
- Installation and maintenance of erosion and sedimentation controls, established in accordance with EPA best practice guidelines for the treatment of sediment laden runoff resulting from construction activities; and,
- Adequate control of runoff within the construction site through the use of appropriate sedimentation controls.

## **Fuels and chemicals**

The CEMP shall include specific procedures to mitigate environmental risk from fuels and chemicals, including herbicides and pesticides. Such procedures shall include but not be limited to:

- The designation of nominated fuel and chemical storage areas that comply with Dangerous Goods (Storage and Handling) Regulations 2000 and EPA Bunding Guidelines (EPA Publication 347) including signing of compounds and bulk storage containers;
- Nomination of points for the refuelling and fluid top up of vehicles and plant which shall be undertaken in a designated area at least 20 m from any drainage point or waterways;
- Provision of readily accessible and maintained spill kits for the purpose of cleaning up chemical, oil and fuel spillages on the site at all times;
- Ensuring that personnel trained in the efficient deployment of spill kits are readily available in the event of spillages; and,
- Development of a contingency plan that addresses the containment, treatment and disposal of any spill.

## **Flora and Fauna**

All construction works shall comply with the following requirements:

- Avoid, minimise and offset (where appropriate) the removal of native vegetation during construction;
- Avoid injury to fauna or damage to protected vegetation or habitat; and,
- The discovery of significant flora and fauna sites, species or habitat not previously identified shall be managed to protect flora and fauna.

## **Permits and Approvals**

The permits and/or approvals identified in Section 2.2 and Table 1 will need to be obtained by the landholder prior to construction works. Construction works shall comply with all permits and approvals and associated conditions. Permits from relevant authorities must be obtained prior to the disturbance of flora/fauna sites or relocation of native fauna affected by works under the Contract.



## Protection of Flora and Fauna Sites

Works shall not damage, disturb or otherwise adversely impact:

- Vegetation/habitat sites and areas of significance shown in figure 2;
- Any other significant vegetation/habitat sites, not shown in figure 2, that are not required to be removed for permanent works; and,
- Any significant native flora/fauna sites or habitat discovered during construction works without prior approval from the relevant authority and obtaining all relevant permits.

Key personnel working on site shall be trained in the identification of:

- Flora or habitat sites shown in figure 2, and other vegetation/habitat sites designated for retention; and,
- Likely significant flora and fauna species which may be present and the actions required for their management if encountered.

All sites shown in figure 2 and any additional existing vegetation and native fauna habitat identified to be retained, shall be identified as ‘**No Go Zones**’ and protected by temporary fencing and signage. All fencing of ‘No Go Zones’ shall as a minimum be:

- Erected a minimum of one metre beyond the boundary of the habitat to be protected, or the drip line of the trees, or as agreed by the DEPI;
- Constructed of star picket, paraweb one wire support;
- Communicated by signage installed on the temporary fencing at intervals no less than 20 metres apart stating ‘Protected Area – No Unauthorised Access’; and,
- Retained in place for the duration of the construction period (until practical completion).

Prior to removing any vegetation or habitat, the Contractor shall:

- Confirm and clearly identify vegetation or habitat to be removed, consistent with the development plan and any relevant permits; and
- Fence and sign all sites nominated as No Go Zones.
- Ensure that all plant, equipment, material or debris are not be placed or stored within the limit of the root zone of vegetation to be retained.

## Discovery of Significant Flora or Fauna

In the event that significant flora or fauna is discovered, the Contractor shall immediately cease operation and notify the relevant authority (DEPI or SEWPaC). An appropriately qualified ecologist shall be engaged to accurately identify and provide advice for the

management of the discovered significant flora or fauna species. The Contractor shall submit to the relevant authority a procedure/management plan for approval.

### **Project Specific Controls: Construction**

Several project-specific controls are recommended to reduce risks to flora, fauna and ecological communities, including:

- Conduct further targeted surveys for significant flora and the Growling Grass Frog prior to construction to identify the potential presence of individuals listed under the EPBC Act, FFG Act or DEPI Advisory List;
- Where possible, avoid impacts to significant species and communities as well as areas of key fauna habitat. This has been undertaken throughout the planning phase, through minor adjustments and modifications to the development plan to avoid significant species and communities, and will continue through final design. The most significant demonstration of this being the avoidance of a large patch of Plains Grassland preserved as a Conservation Reserve at the north-western section of the study area, as well as a smaller reserve in the north-eastern section of the study area;
- Prepare and implement a CEMP to introduce environmental controls with a view to protect ecological values during the construction process. The CEMP will include requirements to regularly inspect and maintain environmental controls that are implemented;

Where disturbance of remnant native vegetation cannot be avoided, native vegetation loss should be minimised where possible, with avoidance prioritised for significant flora and fauna habitats and large areas of native vegetation. Additionally, the following measures shall be undertaken:

- Minimise all disturbance to soil, vegetation and fauna habitat as far as possible, by minimising the construction footprint and protecting retained vegetation and habitat;
- Clearing prior to construction should be undertaken carefully to prevent mechanical or other damage (i.e. fuel spills) to retained vegetation. No windrows, soil or other debris should be pushed into retained vegetation;
- Material stockpiles, construction buildings and other infrastructure and access roads should be located within cleared land rather than in areas of native vegetation;

### **Revegetation and Rehabilitation**

Following the completion of construction activities, the construction site will be rehabilitated as close as possible to original conditions.

- Flora species appropriate to the local EVC including a suite of overstorey, understorey and ground cover species should be used in all revegetation and landscape plantings;

- Planted species should include native grasses favoured as a food source by Golden Sun Moth (e.g. *Austrodanthonia* spp.) where Golden Sun Moth populations are known to be present;
- Ongoing maintenance of rehabilitated areas should be addressed in the CEMP (e.g. ongoing weed management up to and beyond the point where native vegetation becomes established); and,
- All contractors should be aware of areas of ecological value through a site induction by a qualified botanist (see figures attached for locations of remnant native vegetation) to minimise the likelihood for damage to areas to be retained.

### **Weed Management**

It is recommended that a WMP is prepared prior to the commencement of construction within the study area. This plan will follow the guidelines set out in the CALP Act, and fulfil any obligations by the Project team in relation to minimising the spread of weeds as a result of construction. Weed management procedures as a minimum would include:

- Pre-construction mapping of weeds;
- Consideration of weed treatment prior to commencement of ground disturbing activities;
- The management of weed potential within imported materials;
- Provisions for cleaning of plant and equipment at the following times:
  - prior to arrival on Site;
  - prior to departure from Site;
  - prior to movement within the Site from infested to non-infested areas; and,
- Monitoring for at least three years after completion of construction.

### **Waterway Management**

Reconstruction of Harpers Creek should proceed with the following considerations:

- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with EPA guidelines;
- All waterways disturbed during project construction are to be revegetated and restored (to a condition equal to or better than pre-construction) as outlined in the Rosenthal Estate Development Plan (Urban Design and Management, 2013) after completion of construction;
- Any snags and/or logs that are removed from any waterways should be replaced in similar locations after completion of construction;
- The storage of fuel and chemicals (including the refuelling of vehicles and machinery) at a minimum of 50 metres away from all waterways; and

- Installation of sediment fencing adjacent to waterways to limit sediment discharge from soil erosion or spoil earthworks.

## **5 CONSERVATION MANAGEMENT PLAN – PHASE TWO**

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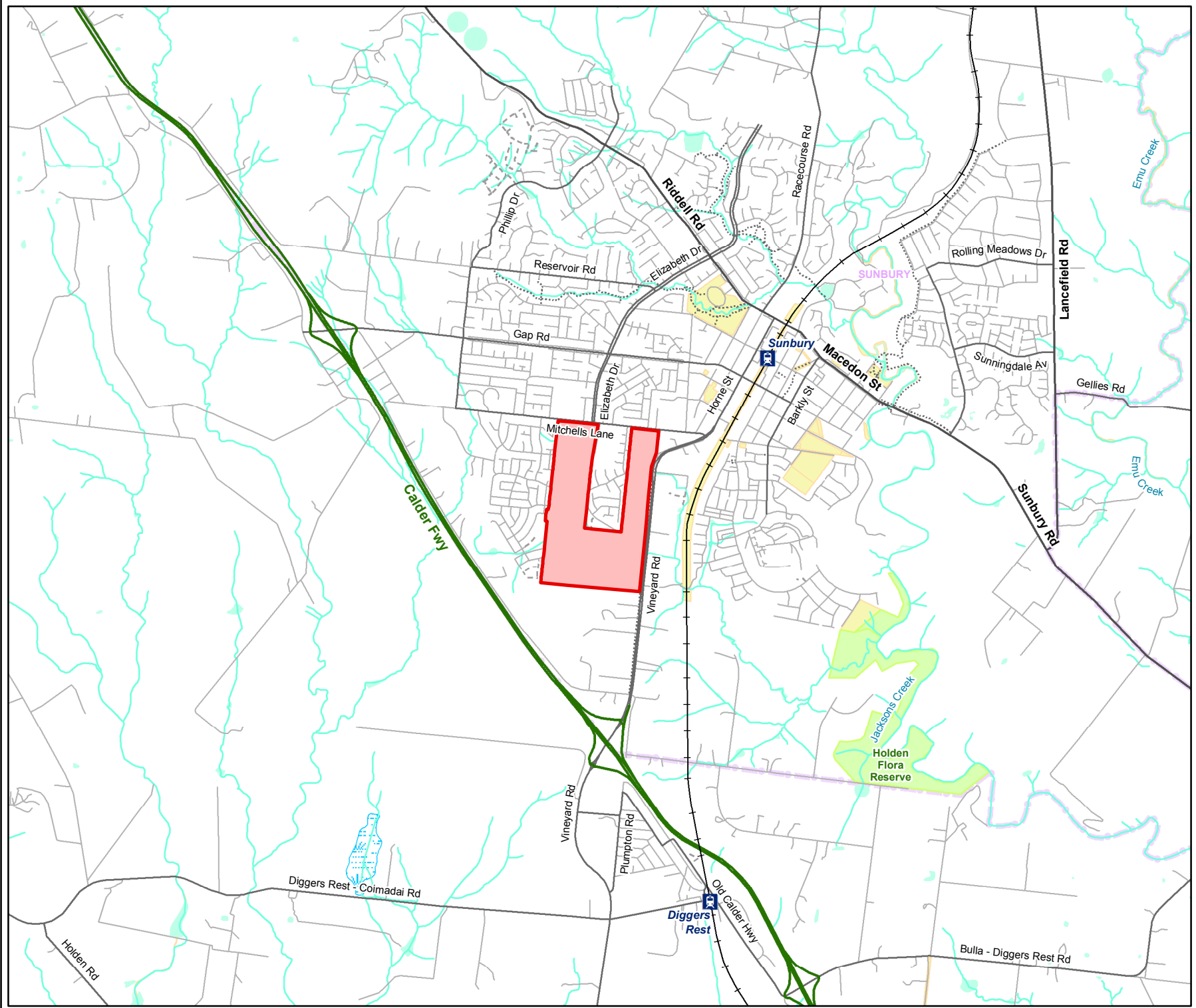
After the completion of Phase One under this CMP (which occurs 10 years after completion of construction works), Phase Two will be implemented in perpetuity.

Phase Two will require the ongoing implementation of the following:

- Maintenance of waterway corridors by Melbourne Water and Hume City Council in accordance with each organisation's standard maintenance policies and programs and maintain suitable habitat for Growling Grass Frog.
- Maintenance of retained vegetation in the Conservation Reserve by Hume City Council.
- Any ongoing monitoring and/or management of threatened species by Hume City Council.

## **FIGURES**

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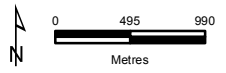


**Legend**

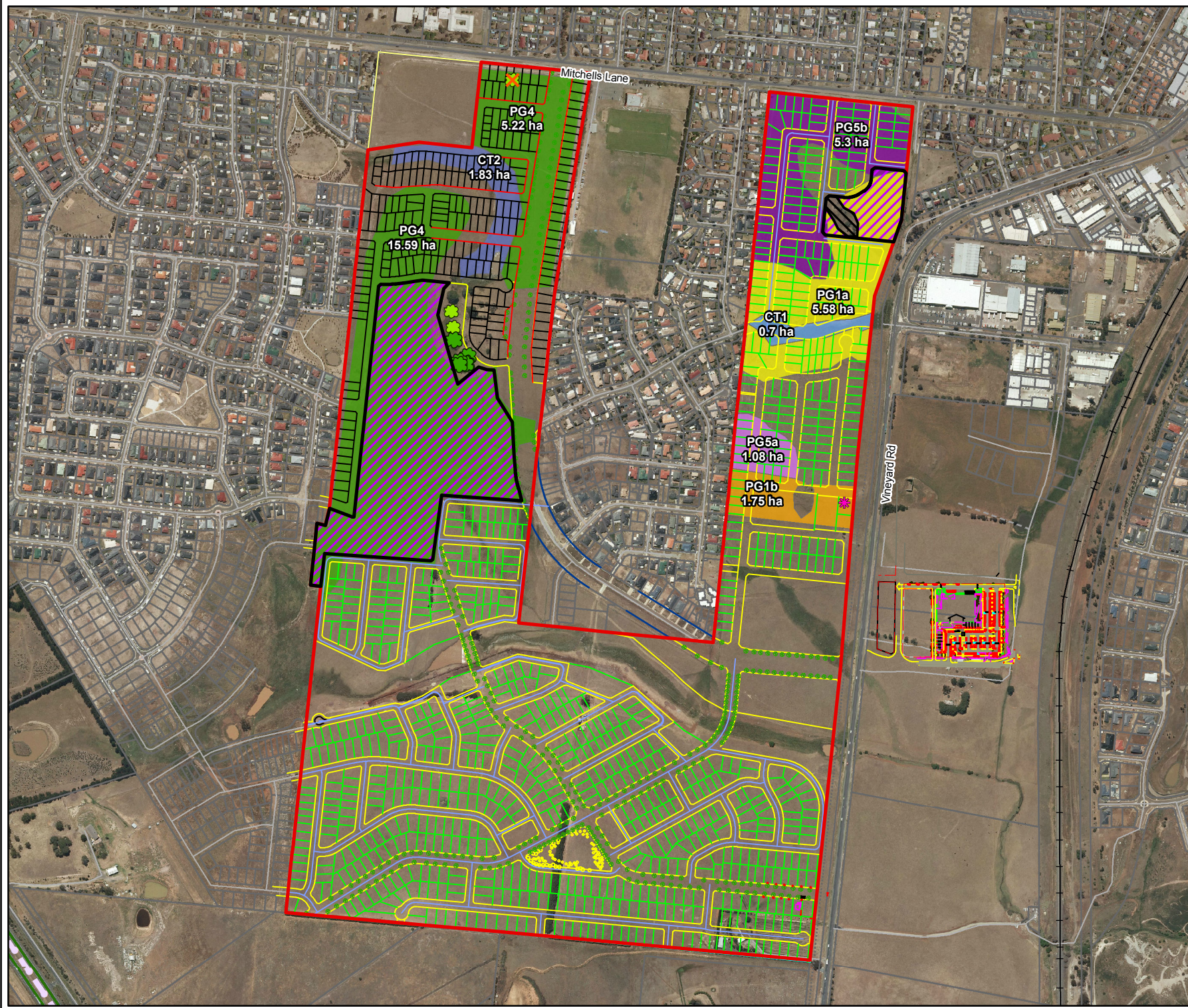
- Study Area
- Freeway
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Walking Track
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp
- Parks and Reserves
- Crown Land
- Localities



**Figure 1**  
**Location of the study area**  
*Rosenthal Estate, Sunbury*



VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

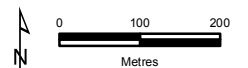


**Legend**

- Study Area
- ✱ Rye Beetle-grass
- Vegetation**
- Plains Grassland - PG1a
- Plains Grassland - PG1b
- Plains Grassland - PG4
- Plains Grassland, PG5a
- Plains Grassland, PG5b
- Creekline Tussock Grassland - CT1
- Creekline Tussock Grassland - CT2
- Scattered Trees**
- ✪ Large Old Tree
- ✪ Small Tree
- ✕ Tree to be removed
- Management Zone A (0.26ha)
- Management Zone B (12.25ha)
- Fenceline of offset sites

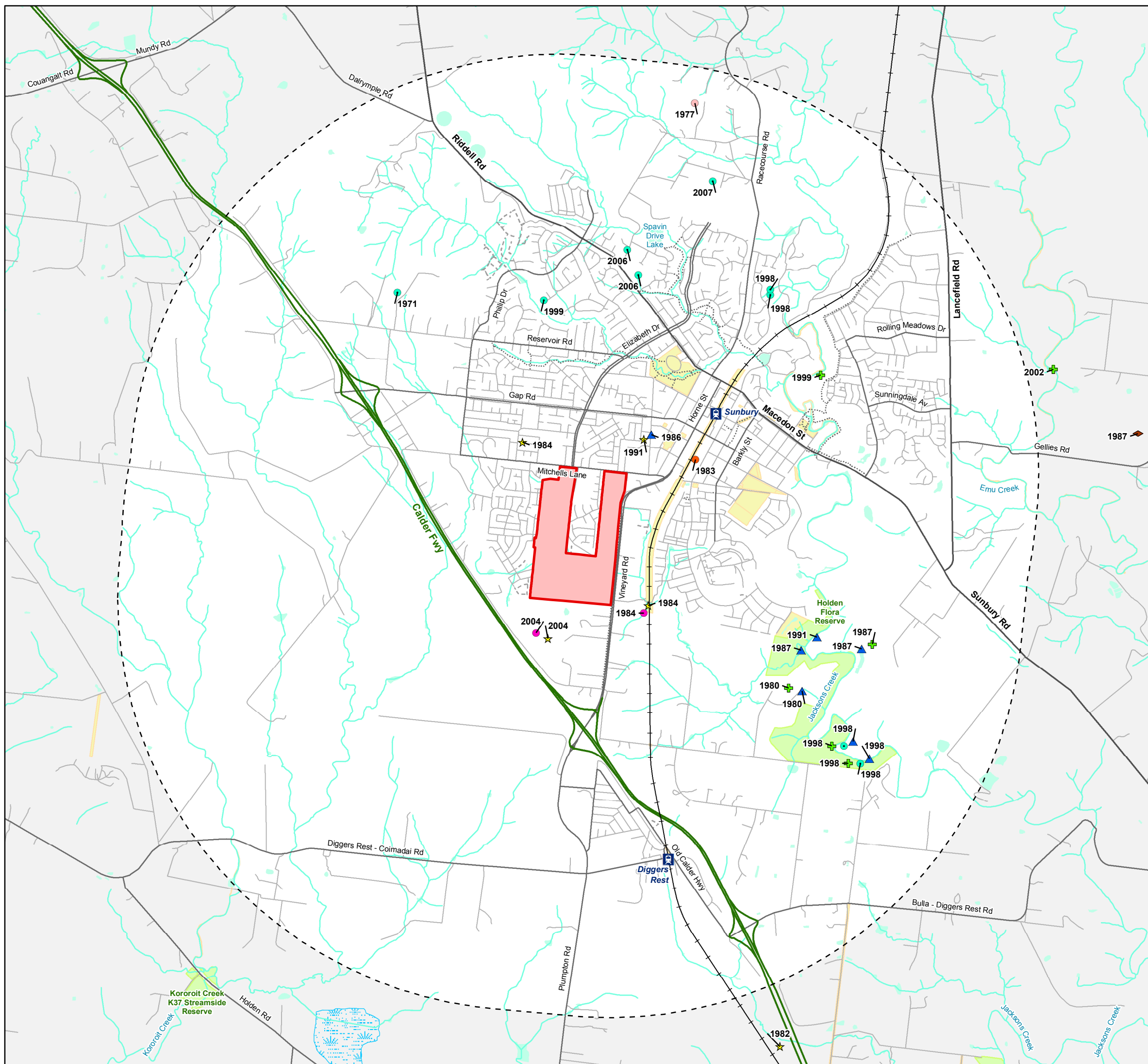


**Figure 2**  
**Ecological features,**  
**Management Areas and**  
**Development Plan**  
*Rosenthal Estate, Sunbury*



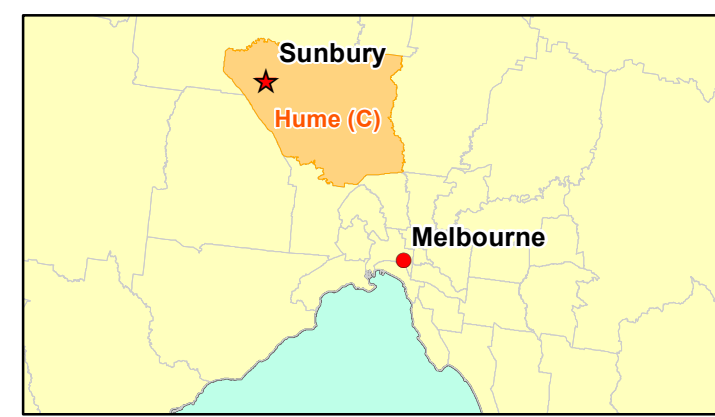
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.





**Legend**

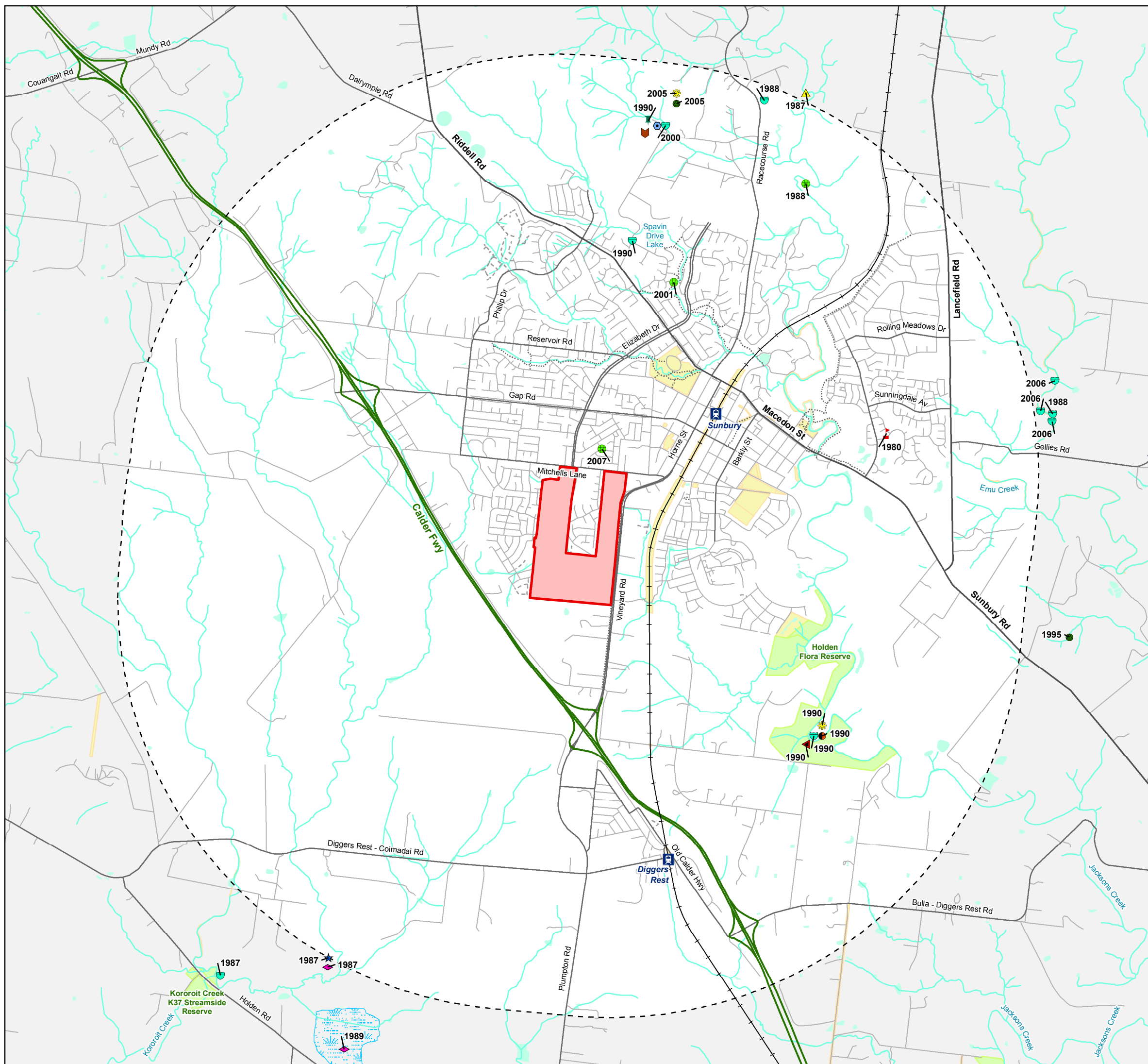
- Study Area
- Significant species**
- + Austral Tobacco
- Basalt Peppercross
- ▲ Fragrant Saltbush
- ★ Large-headed Fireweed
- Melbourne Yellow-gum
- ◆ Rye Beetle-grass
- Small Milkwort
- Spiny Rice-flower



**Figure 3**  
 Previously documented significant flora within 5km of the study area  
*Rosenthal Estate, Sunbury*

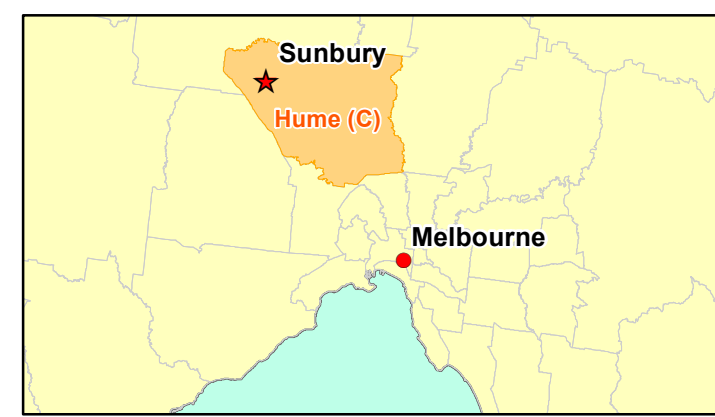


VBA 2011. Victorian Biodiversity Atlas. Sourced from: 'VBA\_FLORA25' and 'VBA\_FLORA100', August 2011 © The State of Victoria, Department of Sustainability and Environment. Records prior to 1949 not shown.  
 VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

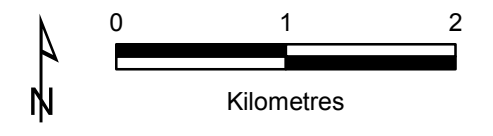


**Legend**

- Study Area
- Significant species**
- ▲ Azure Kingfisher
- ▼ Black-chinned Honeyeater
- Brown Quail
- ▲ Brown Toadlet
- ▼ Common Dunnart
- ✦ Diamond Firetail
- ▲ Eastern Great Egret
- Grassland Earless Dragon
- ▼ Growling Grass Frog
- ★ Hardhead
- ◆ Royal Spoonbill
- Speckled Warbler
- Swift Parrot



**Figure 4**  
 Previously documented significant fauna within 5km of the study area  
 Rosenthal Estate, Sunbury



VBA 2011. Victorian Biodiversity Atlas. Sourced from: 'VBA\_FLORA25' and 'VBA\_FLORA100', August 2011 © The State of Victoria, Department of Sustainability and Environment. Records prior to 1949 not shown.  
 VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

# APPENDICES

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Key

[Light Green Box]	Residential
[Medium Green Box]	Medium density
[Brown Box]	Mixed use
[Dark Brown Box]	Commercial
[Light Green Box]	Open space
[Dark Green Box]	Conservation reserve
[Blue Box]	Harpers Creek Drainage Reserve (below 1 in 100 year flood line)
[Green Box]	Linear open space vegetated pedestrian link
[Light Green Box]	Existing open space
[Yellow Box]	Activity centre (subject to more detailed plan)
[Orange Box]	Shared path

NOTE: OVERLAND FLOW ROUTE SUBJECT TO DETAILED DESIGN, MAY REQUIRE A DRAINAGE RESERVE.

NOTE: FURTHER DETAILED ANALYSIS IS REQUIRED TO CONFIRM DRAINAGE CAPACITIES AND IMPACT OF ROSENTHAL DEVELOPMENT DOWNSTREAM.

**Rosenthal Estate, Sunbury**  
Development Plan

Appendix 1

Date: Mar 2013  
Ref: UDM01  
Opt: 1 Rev: 3

Scale: 1:5000 @A3

0 50 100 150

Urban Design and management

## Appendix 2: Species of Conservation Significance

### Growling Grass Frog *Litoria raniformis*

The Growling Grass Frog is listed as Vulnerable under the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act), Threatened under the *Flora and Fauna Guarantee Act 1988* (FFG Act), Vulnerable under the National Action Plan for Australian Frogs (Tyler 1997) and Endangered in the *Advisory List of Threatened Vertebrate Fauna in Victoria* (DEPI 2007a). It is one of the largest frog species in Australia. It reaches up to 104 mm in length, with females usually larger (60–104 mm) than males (55–65 mm) (Barker et al. 1995). Growling Grass Frogs vary in colour and pattern, but are generally olive to bright emerald green, with irregular gold, brown, black or bronze spotting (Plate 1).

This species is largely associated with permanent or semi-permanent still and slow flowing water bodies (i.e. streams, lagoons, farm dams and old quarry sites) (Barker et al. 1995). Individuals can also use temporarily inundated water bodies for breeding purposes providing they contain water over the breeding season (Heard et al. 2004). The species is typically associated with water bodies supporting extensive cover of emergent, submerged and floating vegetation (Robertson et al. 2002; Heard et al. 2010). Emergent vegetation provides basking sites for frogs and protection from predators, while floating vegetation provides suitable calling stages for adult males, breeding and oviposition (egg deposition) sites (Heard et al. 2004). Terrestrial vegetation (grasses, sedges), rocks and other ground debris around a wetland perimeter provide foraging, dispersal and over-wintering sites for frogs (Heard et al. 2010).



Plate 1. Growling Grass Frog (Source: Ecology and Heritage Partners Pty Ltd)

Recent studies have revealed that the spatial arrangement of water bodies across the landscape is one of the most important habitat determinants influencing the presence of the species at a given site (Robertson et al. 2002; Heard et al. 2010). Water bodies supporting the aforementioned habitat characteristics, and which are located within close to each other are more likely to support a population of Growling Grass Frogs, compared with isolated sites lacking important habitat features.

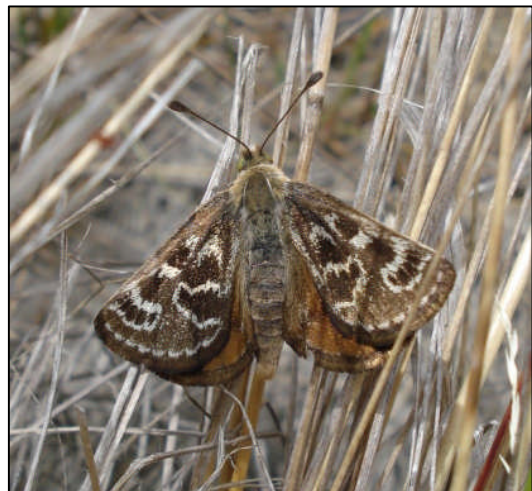
Although formerly widely distributed across southern eastern Australia, including Tasmania (Littlejohn 1963; 1982; Hero et al. 1991), the species has declined markedly across much of its former range (Mahony 1999). Historically, the Growling Grass Frogs have been recorded from most regions of Victoria, with the exception of mallee and alpine areas (Littlejohn 1963; 1982; Hero et al. 1991). The known range of this species has contracted dramatically over the past two decades and in many areas, particularly in south and central Victoria,

populations have experienced serious declines and local extinctions. The key factors in decline are habitat destruction and fragmentation, drought, increased predation by vertebrate predators, and adverse impacts from the water-borne fungal pathogen *Batrachochytrium dendrobatidis*, which causes chytridiomycosis (Heard et al. 2012a, 2012b). This highlights the importance of preserving the species by protecting or enhancing remnant or intact habitat areas, particularly those surrounded by high density or impending development.

### **Golden Sun Moth *Synemon plana***

Golden Sun Moth is listed as Critically Endangered under the EPBC Act, listed as Threatened under the FFG Act and critically endangered on the *Advisory List for Threatened Invertebrate Fauna in Victoria* (DEPI 2009a).

Golden Sun Moth typically occurs in native grassland, grassy woodland, dominated by greater than 40% cover of wallaby-grass, in particular Wallaby-grasses *Austrodanthonia* spp. (DEPI 2004), but may also inhabit areas dominated by Kangaroo Grass *Themeda triandra* (Endersby and Koehler 2006) and introduced grassland dominated by Chilean Needle-grass *Nassella neesiana* and other introduced species.



**Plate 1.** Golden Sun Moth *Synemon plana*  
(Source: Clio Gates Foale, Ecology and Heritage Partners Pty Ltd)

Male flight is typically low, to about a metre above the ground, fast and can be prolonged, but they are generally not recorded flying more than 100 metres from suitable habitat (Clarke and O'Dwyer 2000). Small, disjunct populations are vulnerable as there is little likelihood of recolonisation in the event of a local extinction. For example, Dear (1996) suggested that many of the sites where Golden Sun Moths have previously been recorded are less than 40 metres x 40 metres in size, and therefore the species long-term survival within small sites is problematic. Indeed, habitat patches need to be sufficiently large to accommodate enough moths to maintain a genetically viable population (Plate 1).

Prior to European settlement, Golden Sun Moths were widespread and relatively continuous throughout their range, inhabiting grassy open woodlands and grassland, although now mainly inhabiting small, isolated sites (DEPI 2004). The species is threatened by habitat loss, disturbance and fragmentation due to agricultural expansion and urbanisation. Many populations are isolated and fragmented, impeding the ability of the relatively immobile females to recolonise areas, thereby reducing the likelihood of genetic exchange (DEPI 2004).

Golden Sun Moths are known to occupy at least 40 sites in New South Wales and 32 sites in the Australian Capital Territory and, until recently, only six active sites in Victoria. Recent targeted surveys around Melbourne (between 2007 and 2010) have located the species in at least an additional 60 sites (Biosis Research Pty Ltd 2007; 2008; DEPI 2009b). Individuals have also been recently recorded during the 2010/11 and 2011/12 flight period at sites outside of the Urban Growth Boundary (i.e. regional Victoria).

### **Striped Legless Lizard *Delma impar***

The Striped Legless Lizard is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), listed as threatened under the *Flora and Fauna Guarantee Act 1999* (FFG Act) and is considered to be endangered in Victoria (DEPI 2007) (Plate 1).

The Striped Legless Lizard is a member of the family Pygopodidae, the legless or flap-footed lizards (Cogger 1996). As with other members of the legless lizard family, Striped Legless Lizards lack forelimbs and have only vestigial hind limbs, in the form of scale ‘flaps’ either side of their vent. Superficially, these animals resemble snakes, but can be readily distinguished from the latter by the presence of external ear openings, a fleshy undivided tongue and a tail which is longer than the body (Cogger 1996). Striped Legless Lizards are readily distinguished from other legless lizards by body colouration, body size and head scalation.



**Plate 2** Striped Legless Lizard © Ecology and Heritage Partners Pty Ltd

The Striped Legless Lizard is a pale-grey lizard up to 30 centimetres in length, with a maximum snout-vent length (SVL) of approximately 12 centimetres. Striped Legless Lizards have a long thin body and the tail, when unbroken, is about twice the length of the body. They have a series of stripes on their sides and the sides of their back, becoming diagonal bands on the tail (Cogger 1996). These stripes are dark-brown or blackish and extend the whole length of the individual from the neck to the tail. However, in some individuals, particularly juveniles, these stripes may be very faint or absent (Cogger 1996).

Striped Legless Lizards generally feed only on invertebrate prey and are considered a selective arthropod feeder. While the main prey types of the species in Victoria were found to be crickets and noctuid moth larvae, spiders were found to be the predominant prey type within the ACT (O’Shea 2005).

Before European settlement, the species was presumed to be common across many grassland areas in north-eastern, central and south-western Victoria, south-eastern NSW, the ACT, and,

possibly, south-eastern South Australia (Smith and Robertson 1999), but it has suffered a substantial contraction in both geographic range and abundance over the past 100 years. A combination of factors, including clearing of grasslands for urban development, more intense agricultural practices (e.g. pasture improvement, cropping, and prolonged grazing), inappropriate fire regimes and weed invasion (e.g. Chilean Needle-grass) threaten the long-term survival of the species (Cogger et al. 1993).

The range contraction and resultant reduction in population size is likely to continue, due to the ongoing removal, fragmentation and deterioration of suitable grassland habitat (Smith and Robertson 1999). Current populations in Victoria persist primarily in the basalt plains to the west of Melbourne, and areas around Ballarat and Bendigo (Hadden 1995; DEPI 2013).

The Striped Legless Lizard inhabits lowland native grasslands, typically dominated by native tussock-forming grass species. In Victorian populations, the species frequents habitats with exposed basalt rocks in grassland and areas of cracking clay soils, where the species can seek refuge under rocks and in earth cracks (Dorrough et al. 1995). Although Striped Legless Lizards have been reported from areas of relatively undisturbed native grasslands, with a dense cover of perennial tussock grasses (Kukolic 1991; Kukolic & Osborne 1993), they are also known to inhabit areas of non-native grassland (Smith & Robertson 1999). This has been shown at several sites throughout the Basalt Plains in western Victoria, which are currently grazed at various stock densities (Rohr & Peterson 2003).

Within the study area, there are small remnants of the Ecological Vegetation Class (EVC) Plains Grassland, some of which qualifies as the federally listed community; Natural Temperate Grassland of the Victorian Volcanic Plain. These vegetation communities are strongly associated with Striped Legless Lizard habitat, particularly in areas where there is embedded and surface basalt rock. Other areas of modified grassland habitat which have a higher percentage cover of perennial pasture grasses may still provide structural habitat characteristics suitable for the species and linkages between higher quality grassland remnants.



### **Grassland Earless Dragon *Tympanocryptis pinguicolla***

The Grassland Earless Dragon *Tympanocryptis pinguicolla* is listed as Endangered under the Environment Protection and Biodiversity Conservation Act 1999. This species is also critically endangered in Victoria (DEPI 2007) and is listed as threatened under the *Flora and Fauna Guarantee Act 1988*.

The Grassland Earless Dragon is a small Agamid dragon which lacks a visible ear opening and functional tympanum, making it distinct from other members of the family. It is light to dark brown dorsally, with three thin white lines running down the length of the body. It has a maximum snout-vent length (SVL) up to 15cm with some individuals displaying bright orange or yellow colouration on the underside of the body (Robertson & Evans 2009).



**Plate 3** Grassland Earless Dragon (Source: museumvictoria.com.au)

The Grassland Earless Dragon is distributed along the eastern seaboard of Australia, in three isolated populations which occur in south-east Queensland, ACT/NSW Southern Tablelands and southern Victoria (Robertson & Cooper 2000). In Victoria, there have been five sightings of this species between 1988 and 1990: one from the upper reaches of the Merri Creek north of Donnybrook, one on the Jackson Creek at Holden Flora Reserve and three sightings at the Little River Gorge, west of Werribee (DEPI 2003).

Typical habitat for the Grassland Earless Dragon consists of rocky native tussock grassland where tree and shrub cover is sparse or absent. The most recent sightings in Victoria have occurred on exposed stony knolls in *Themeda* spp. dominated areas (DEPI 2003). Lizards were mostly observed sheltering under surface rocks or rocky outcrops. In less rocky areas, they have been recorded sharing wolf spider holes with wolf spiders, but appeared to seldom emerge, as the entrances were webbed over each time they were surveyed. The species has also been observed using artificial burrows (such as pitfall traps) as habitat (Evans & Ormay 2002). Populations of the species have demonstrated severe declines in the past 100 years, predominantly due to fragmentation of habitat, or habitat degradation through intensive cultivation or livestock grazing (Dimond et al 2012).

### **Spiny Rice-flower *Pimelea spinescens***

The Spiny Rice-flower *Pimelea spinescens* subspecies *spinescens* is listed as Critically Endangered under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and Threatened under the Victorian Flora and Fauna Guarantee Act 1988 (FFG Act) (Carter and Walsh 2006).

*Pimelea spinescens* Spiny Rice-flower belongs to the Family Thymelaecaceae, Genus *Pimelea*, of which there are 90 species in Australia, with a further 18 species found on Lord Howe Island, New Zealand and Chatham Island (Entwistle & Walsh 1996). It is a small (up to 30 cm high) shrub, with small elliptic leaves, arranged opposite. It is distinctive from other *Pimelea* species because of its stunted and often procumbent form and crowded small leaves (Entwistle & Walsh 1996). The occasional spinescent branchlets are another quite distinctive feature (although can be present in other species and not always present in the species). The related taxa, the Wimmera Rice-flower *Pimelea spinescens* subsp. *pubiflora* was considered extinct until it was relocated in the mid-2000s. It does not occur in the Melbourne area.



**Plate 4** Spiny Rice-flower (Source: Ecology and Heritage Partners Pty Ltd )

The Spiny Rice-flower is endemic to Victoria and largely confined to the Victorian Volcanic Plains and Northern Plains with some occurrences in the southern Wimmera. It is found as far north as Echuca, with significant populations located near Mitambo and as far west as Horsham. Populations recorded from the western suburbs of Melbourne (Keilor) to Skipton in the west, Stawell in the north-west and Tandarra in the north (Plate 3). The distribution is largely found in western sections of the State with no known localities either north of the Murray River or east of the Goulburn River. Based on known localities, the species appears to occur in areas of mild climatic conditions, with an annual rainfall envelope of 485 – 639 mm, an altitude range of 86 metres to 304 metres above sea level, a minimum winter monthly temperature average of 3-5 °C, and summer maximum of 25 to 29 °C (FIS 2013). The species occurs on soils predominately of Quaternary aged alluviums.

The species can occur in large populations when found in good to high quality remnant native vegetation patches. A population near Castlemaine covering an area greater than 3000 m<sup>2</sup> is an example. In the west of Melbourne, there are many species records. This is in part due to the suitability of habitat, but is also a product of survey intensity due to the legislative requirements for Melbourne’s residential and infrastructure growth.

The National Recovery Plan (Carter and Walsh 2006) suggests that individuals may live to be in excess of 100 years old, and that individuals may recover following burning. It is thought that populations are in decline with on-going threats by weed invasion, transport infrastructure maintenance, grazing, inappropriate fire regimes, and changing land uses. Relevant to this study site, is that the Plan (Carter and Walsh 2006) considers where biomass increases “... plants are eventually crowded out by native grasses and weeds”.

### Rye Beetle Grass *Tripogon loliiformis*

Rye Beetle-grass is a small tufted annual graminoid listed as Rare on the Victorian Flora Species Advisory List (DEPI 2005). Rye beetle-grass has the capacity to grow to approximately 35 centimetres in height; however it rarely exceeds 15 centimetres. Its leaves grow to 5 centimetres long and 1.5 millimetres wide and are closely folded with fine hairs or rarely glabrous. The inflorescence is a slender spike with spikelets 6 – 14 flowered and 3 – 12 millimetres long and flowers throughout the year (Walsh and Entwistle 1994).

Rye Beetle-grass is what is known as a resurrection plant typically associated with dry rocky soils and bare patches on drier sites across Victoria. It is typically found over embedded rock in bare shallow soil which other plants cannot tolerate due to unfavourable conditions. Rye Beetle-grass has evolved to grow in these conditions by adapting a life cycle that is similar to that of a bryophyte (Just & Evans 2010). The plant will die back to a rootstock and rehydrate its foliage after sufficient rainfall and quickly flower (Walsh and Entwistle 1994).



**Plate 4** Rye Beetle-grass (Source: Ecology and Heritage Partners Pty Ltd )

Currently, a total of 78 records exist for the species on the FIS (2011). Rye Beetle-grass is known from all mainland states in Australia. There are scattered occurrences across Victoria, generally central and northern Victoria from Mt Arapiles in the states west to the dry rain shadow area of Suggan Buggan. Including the basalt plains of Melbourne west (Walsh and Entwistle 1994). More recently, a large population (approximately 1500 plants) of the species was discovered on land proposed for development in Deer Park, west of Melbourne (Just & Evans 2010).

## Appendix 3: Salvage and Translocation Plan for Significant Species

### Growling Grass Frog

Tasks pertaining to the salvage and translocation of Growling Grass Frogs from the study area will be prior to habitat removal and associated activities. These tasks have been outlined specifically to avoid and minimise the potential threats and impacts from the proposed construction of Rosenthal Estate.

#### Translocation site

Jacksons Creek contains Growling Grass Frog habitat and is a suitable translocation site if any individuals should be detected and salvaged from the study area during staged construction. This area is herein referred to as the 'translocation site'.

The translocation site has been identified as suitable for the following reasons:

- The translocation site possesses habitat attributes and landscape context commonly associated with Growling Grass Frog occurrence, ability to breed and ability to disperse; and,
- The translocation site is known habitat of Growling Grass Frog;

Prior to any salvage and translocation activities, approval will be required from DEPI to translocate individuals to the translocation site.

#### Site Induction for Staff and Contractors

Suitably qualified and experienced zoologists will conduct site inductions for key personnel engaged to work on site throughout the duration of the habitat removal and associated activities (including relevant activities undertaken pre, during and post habitat removal). The induction will include the following:

- Information regarding the environmental values within and surrounding the study area, including the significance of Jacksons Creek and the local region for Growling Grass Frog.
- Diagnostic, ecological and behavioural information relating to the Growling Grass Frog.
- An outline of the Duty of Care of all persons on site to avoid and minimise the occurrence and extent of potential impacts to the environment and the Growling Grass Frog.
- The key objectives and measures outlined in this plan.

- An information pamphlet (Appendix 6) outlining the above will be distributed during the inductions and will be available on site.

### **Pre-construction Salvage and Translocation Tasks**

The general order of tasks undertaken as part of the salvage and translocation of Growling Grass Frogs from the study area will be as follows:

1. Nocturnal survey, salvage and translocation (if required) prior to construction works (only applicable during the active season); and,
2. Pre-construction diurnal survey, with salvage and translocation (if required) prior to habitat removal and the initial earthworks.

### **Pre-construction Nocturnal Survey, Salvage and Translocation**

If habitat removal and associated activities are scheduled to be undertaken during the Growling Grass Frog active season (September to April), nocturnal surveys, salvage and translocation will be conducted at the study area over the two nights immediately preceding the works. This will be undertaken by at least two suitably qualified and experienced zoologists and will involve the following.

- A minimum of 90 minutes searching for, and capturing, Growling Grass Frogs in and around waterbodies and low-lying areas. The search area will extend for at least 50 metres from the edge of the pond, and will include actively searching through aquatic and terrestrial vegetation, and under rocks, logs and other refuge (e.g. plastic, scraps of sheet metal).
- If Growling Grass Frogs are detected and captured, the duration of the survey and salvage will continue for as long as required to capture all individuals. Upon capture of the last individual, a further 30 minutes of searching will be undertaken. If Growling Grass Frogs are not detected over two nights of survey then this component of the salvage effort will cease.
- A minimum of 60 minutes of dip netting for Growling Grass Frog tadpoles will be undertaken immediately prior to de-watering of the pond in the north-west section of the study area.
- All frogs captured will be assessed for signs of injury or illness, particularly for signs of Chytrid Fungus infection, in accordance with DECC (2008). If any individuals show signs of illness, they will not be translocated and released at the recipient site, and the actions outlined in DECC (2008) will be implemented.
- On the same evening of capture, all frogs deemed fit and healthy will be transported to the translocation site and released.
- Prior to release, morphological data of each specimen will be recorded. This data will include body size, sex and reproductive condition.

- Frogs will be released at the recipient site into favourable micro-habitats (e.g. those with suitable rock, debris and or dense vegetation providing adequate refuge, around the perimeter of a waterbody).

### **Diurnal Salvage and Translocation during De-watering (active and non-active season)**

Diurnal salvage and translocation during any proposed de-watering of inundated areas of Harpers Creek or the pond in the north-west portion of the study area (Figure 2) will be undertaken prior to any habitat (vegetation and other refugia) removal, regardless of the time of year. The de-watering process, and the subsequent diurnal salvage and translocation will involve the following:

- The timing of the de-watering will preferably be in the early phase of the active season when there is likely to be less abundance of tadpoles.
- A zoologist will be present as the pond is being drained. Any Growling Grass Frogs and tadpoles, or other species of frog detected will be captured.
- All individuals captured will be assessed for signs of injury or illness, particularly for signs of Chytrid Fungus infection, in accordance with DECC (2008). If any individuals show signs of illness, they will not be translocated and released at the recipient site, and the actions outlined in DECC (2008) will be implemented.
- All frogs deemed fit and healthy will be transported to the translocation site and released on the day of capture.
- Prior to release, morphological data of each specimen will be recorded. This data will include body size, sex and reproductive condition.
- Individuals will be released at the recipient site into favourable micro-habitats (e.g. those with suitable rock, debris and or dense vegetation providing adequate refuge, around the perimeter of a waterbody).

### **Striped Legless Lizard**

The following salvage and translocation plan is derived from the *Salvage & Translocation of Striped Legless Lizard in the Urban Growth Area of Melbourne Operational Plan* (DEPI 2011). The salvage and translocation plan includes a DEPI approved template for the appropriate methods required to classify and map Striped Legless Lizard priority habitat, as well as activities required for safe removal of the species and its habitat and a process for calculating offset costs associated with habitat removal. The salvage and translocation plan is located in Appendix 7. It is a requirement by DEPI for the proponent to undertake a habitat assessment for Striped Legless Lizard and arrange to have a zoologist on site for salvage and

translocation, if Priority 1 or Priority 2 habitat is identified on site. This is outlined in detail in the Salvage and Translocation Plan (Appendix 7).

### **Grassland Earless Dragon**

The following contingency plan is derived from the *Salvage & Translocation of Striped Legless Lizard in the Urban Growth Area of Melbourne Operational Plan* (DEPI 2011). Appendix 7 outlines the procedures to follow if Grassland Earless Dragon is detected prior to or during construction works within the study area.

There is a slight possibility of the continued existence of the nationally endangered Grassland Earless Dragon *Tympanocryptis pinguicolla* in the study area. Habitat from which it has been recorded both in Victoria, and the ACT where it is still known to exist, often coincides with that of the Striped Legless Lizard. If a Grassland Earless Dragon is found, DEPI must be notified immediately and all salvage and any other works on-site must cease immediately. Specimens should be captured and retained alive for verification of the species' identity. Information regarding the species at the site must be provided to DEPI immediately. DEPI will then determine the appropriate course of action to be taken.

### **Golden Sun Moth**

#### **Salvage and translocation**

As outlined in the Golden Sun Moth EPBC Act Policy Statement (DEWHA 2009a) and Background Paper to the EPBC Act Policy Statement 3.12 (significant impact guidelines) (DEWHA 2009b), salvage and translocation does not reduce the impact of an action below the significance threshold. Furthermore, 'Salvage translocation may be tried as an experiment in addition to mitigating measures in circumstances where damage to the habitat of the species is unavoidable' (DEWHA 2009a, 2009b). 'Any translocation experiment of the species should be undertaken in association with a fully costed and funded monitoring and adaptive management strategy with clearly stated criteria for identifying success' (DEWHA 2009a, 2009b). Furthermore, translocation of the species is not considered a mitigation measure to offset the impact of an action, as it is unlikely to result in a positive conservation outcome for the species (DEWHA 2009b).

In light of the above, salvage and translocation of Golden Sun Moth is not proposed for the project.

#### **Population and Habitat Monitoring**

Golden Sun Moth populations are known to vary on spatial and temporal scales depending upon habitat conditions at a particular site. It is therefore important that monitoring is

undertaken prior to the commencement of construction, during construction activities and for at least three years after completion of construction.

Monitoring is required to determine if Golden Sun Moth has persisted in the Conservation Reserve to determine reproductive success and to ensure that management actions and habitats are suitable for a viable Golden Sun Moth population in the future. Specific survey procedures will follow those used to monitor the species elsewhere (i.e. timed surveys, generally along transects). Data collected during monitoring for at least three years after the Conservation Reserve is established will be used to guide decisions upon the success of habitat reservation and management.

At least four days of survey over the flight season (i.e. typically between October and early January) of Golden Sun Moth will be conducted to collect data on habitat variables, and to ensure that the grassland areas in the reserve remain suitable for the species. This is particularly pertinent given that the Conservation Reserve will experience high levels of disturbance from traffic and other threats such as increased water, nutrient and gross pollutant run-off, accumulation of rubbish, and inappropriate slashing or mowing regimes (i.e. season and frequency).

The following will be undertaken as part of population monitoring and habitat monitoring of suitable grassland habitats proposed to be retained for Golden Sun Moth:

- A survey will be carried out by qualified zoologists in areas of suitable habitat within the study area. The survey will focus on areas of indigenous grassland (namely those areas dominated by wallaby-grass *Austrodanthonia* spp., but also in areas of Needle Grass *Nassella* spp. which is a known food source for the species) and areas where the species has previously been recorded;
- Transects will be identified and walked in any potential habitat present on site over four separate days. This survey methodology is approved by regulatory authorities (i.e. DEPI), maximises detection of the species and provides an estimate of the number of individuals occurring in the study area;
- The surveys will be undertaken during optimal conditions suitable for detecting species. The male of this species generally flies between 11am and 3pm on calm, warm (over 20°C), sunny days, emerging between October and early January; and,
- All transects and Golden Sun Moths observed during the surveys will be marked with a hand held GPS (accuracy of +/- 5 meters).

Several site-specific habitat variables will also be assessed during the monitoring period, specifically:



- Vegetation diversity, structure, composition and percentage of cover (percentage cover of particular grassland species such as wallaby grass and/or Kangaroo Grass);
- Density of grass and height (providing an indication of when it was last slashed or potentially grazed);
- Presence of other natural features such exposed rock; and,
- Presence of pollutants, rubbish and other threatening processes as outlined above.

### **Habitat Management and Maintenance**

In areas proposed for retention, ongoing maintenance of weeds will be essential to ensure that habitat becomes established and remains as tussocky grassland for Golden Sun Moth and associated species. The control of pest plants is a major requirement for management, as the study area is under continual pressure from weed invasion (e.g. Chilean Needle-grass and Serrated Tussock). Pest plant control should proceed in accordance with an approved WMP.

In areas proposed for revegetation and rehabilitation, landscape plantings should include:

- Flora species appropriate to the local grassland EVC including a suite of understorey and ground cover species, to be used in all revegetation and landscape plantings; and,
- Grassland species favoured as a food source by Golden Sun Moth (e.g. *Austrodanthonia* spp.) where Golden Sun Moth populations are known to be present.

### **Flora**

#### **Rye Beetle-grass and incidental discoveries of other threatened species**

Where Rye Beetle-grass (or other threatened flora species) is to be removed, seeds should be collected and propagated in a local nursery. These propagated seedlings should then be planted at suitable sites.

#### **Removal Technique**

Plant translocation will be supervised by a qualified botanist. All vegetative material from patches proposed to be disturbed will be removed from the impact site. The procedure for removal will be:

1. All plants to be removed will be identified with marker paint, and plants will be recorded against the monitoring sheet;
2. Plants will be watered the day before the proposed removal to loosen the soil and to ensure the plants are not drought stressed during salvage and movement;
3. Material will be dug from the ground by hand using spades clean of dirt;

4. During excavation, soil will be maintained around the root system, however plants will survive if exposed to air for short periods; and,
5. Specimens will be transferred to a nursery for management and provided to community groups for replanting.

### **Nursery Management**

Disease and pest controls are important to ensure no diseases or pests are introduced to the recipient site. Any plants suspected of being diseased will be treated according to nursery guidelines and/or destroyed appropriately. At no time will plants suspected of carrying a disease or having pests, be introduced to the recipient site. Weeding of pots will also be undertaken periodically and correct hygiene procedures practiced at all times within the nursery.

If plants become pot bound, division and correct labelling must be undertaken. Before planting into the recipient site, plants need to be hardened off to ensure they are not stressed by a sudden change in conditions including frost, wind and reduced water.

## Appendix 4: Birds, Mammals, Reptiles and Amphibians: Capture and Release Standard Procedures

### Capture

- Animals will only to be captured if deemed necessary i.e. if they are considered to be at risk of death, injury, significant distress, or displacement that leaves them vulnerable to predation.
- Animals will only be captured by a suitably qualified and experienced zoologist or ecologist.
- Animals will only to be captured if there is no other suitable or feasible measure to remove them from harm. If an animal is relocating itself safely (e.g. moving into adjacent vegetation out of harm's way when disturbed), it should be allowed to do so without interference. If an animal can be encouraged to relocate itself (e.g. moving a hollow that has a possum sheltered within it into adjacent vegetation out of the construction zone, for it to emerge unassisted in the evening) this is to take precedence over capture.
- Captured birds and mammals will be covered as soon as possible with a towel or pillow case to remove external stimuli and avoid undue stress until placed in appropriate holding conditions and/or relocated.

### Handling

- Birds will be handled gently yet firmly (to avoid them injuring themselves) and for the shortest time possible before being released or placed into appropriate holding conditions.
- Frogs and tadpoles are to be handled as little as possible as handling removes skin secretions and predisposes the frog to fungal infections. Zoologists will wear clean latex gloves to handle frogs. Gloved hands should be dipped in the local water or along wet grass/vegetation in the immediate area so that loss of skin secretions is minimised when frogs are first picked up. Each pair of gloves is to be replaced between handling frogs to limit the potential for transmission of disease, in accordance with the guidelines for frog handling (DECC 2008).
- Reptiles will be handled gently but firmly and for the shortest time possible before being released or placed into appropriate holding conditions.
- Small and medium mammals will be handled gently yet firmly, with appropriate gloves that prevent the Zoologist being bitten.
- Micro-bats will be handled with latex gloves, very gently and for the shortest time possible before being placed into the appropriate holding conditions.

## Holding

- Birds to be held in a dark ventilated container, wrapped loosely with a towel. The container to be relative to the bird's size: large enough for it to be comfortable but not so large that it can move around too much causing injury to itself. The box will be kept in a dark, quiet, ventilated area.
- Frogs to be held in a sterile, ventilated plastic container (e.g. terrarium) with a moist sponge, and stored in a dark, quiet, ventilated area.
- Reptiles to be held in a sterile, ventilated plastic container (e.g. terrarium) and stored in a dark, quiet, ventilated area.
- Small mammals to be held in a dark cardboard box/small pet carrier with a towel or similar. The box to be relative to the animal's size for comfort and containment (as per birds). The box to be kept in a dark, quiet, ventilated area.
- Medium sized mammals (e.g. possums; flying-foxes) to be held in a secure animal handling carrier, such as a cat carrier, with a towel. The carrier will be kept in a dark, quiet, ventilated area, with an additional piece of material (such as a dark coloured sheet that still allows ventilation) over the top to reduce stress to the animal caused by visual stimulation.
- Microbats to be held in a light Calico drawstring bag, that will be hung by the drawstring (to allow bats hang upside down) in a dark, well ventilated, quiet area. No more than three bats per bag.

## Releasing

- Animals are to be released into habitat nearby that is both suitable and scheduled for retention. This cannot be greater than 150 meters from capture point without prior approval from the DEPI. For the relocation of frogs from wetland habitat, they must be moved into the nearest suitable habitat within 500 metres of the point of capture.
- Ground dwelling animals (e.g. reptiles, frogs) to be released as close as possible to logs, tussocks, dense shrubs or rocks so they can find refuge immediately upon release.
- Arboreal animals (e.g. possums, birds) to be released onto nest-boxes, trees, shrubs or other suitable micro-habitats so they can find refuge immediately upon release. Where suitable habitat is not immediately evident, some mammals may be required to be held until dusk to minimise the potential for predation during daylight hours (i.e. Sugar Gliders)
- Bats are to be released on the same evening of date of capture, at the point of capture, to ensure that they are not vulnerable to predation.

- All animals to be visually monitored after release to ensure that they do not show signs of stress or vulnerability. If they do show such signs, re-capture and monitor the animal in captive conditions, seeking veterinary attention as required.

### **Recognition of stress indicators in captured animals**

It is important for the zoologist undertaking the salvage and relocation of native fauna to recognise the indicators of mild-moderate stress in animals. Such recognition informs the judgement to intervene. The following are indicators of mild-moderate stress in animals: vocalization, fast and shallow breathing, temporarily unresponsive to stimuli (listless) and extra or reduced urination or defecation. If an animal is displaying greater than one of these indicators at the same time, or an extreme of one of these indicators, then the zoologist should prepare themselves for intervention (e.g. call for a pause on construction to suitably deal with the animal; capture the animal to place it in a dark, quiet environment to monitor; take the animal to a veterinarian, etc.).

### **Injured animals**

- Prior to the commencement of habitat removal, the zoologist is to locate and obtain the contact details of the closest wildlife shelter and veterinarian.
- If an animal is injured or sick, the zoologist is to call for a pause on construction and immediately make arrangements for the animal to be taken care of. Depending on the severity of injury or illness, this may mean organising the animal to be transported to a wildlife shelter for rehabilitation; or to a veterinarian for medical attention or euthanasia.
- Any of the costs associated with the aforementioned action will be the responsibility of the landholder. If an animal is taken to a wildlife shelter (usually volunteers or non for profit organisations) this is to be accompanied by a donation to the shelter to assist in the care of the injured animal.
- In the event that an animal is severely injured and requires euthanasia immediately (i.e. on site) this is to be undertaken at the zoologists discretion using methods outlined in their Animal Ethics Permit.

### **Prevention of disease transmission**

There is evidence to suggest that the decline of many frog species in Australia and elsewhere could be related to a disease caused by the water-borne fungal pathogen *Batrachochytrium dendrobatidis* (Chytrid fungus). To reduce the potential spread of this disease the zoologists undertaking the salvage and relocation of frogs are to follow the guidelines set out in the: “*Hygiene Protocol for the Control of Disease in Frogs*” (DECC 2008). This includes but is not exclusive to:

- all frogs to be handled with the use of latex gloves, which will be disposed of after each individual frog is handled; and

- any equipment used for salvage and relocation (i.e. waders, nets, gum boots, buckets etc.) will be dried completely between uses (minimum of 3 hours), or disinfected with a 5% active chlorine solution (e.g. Bleach) at the beginning and end of each day and between sites.

## Appendix 5: Potential Impacts

### Potential Impacts

The following section lists the potential impacts to significant flora and fauna which may arise during the development of the Rosenthal Estate.

### Habitat Loss, Degradation and Modification

As many roadsides and drainage lines provide dispersal habitat for amphibians and reptiles, severance of habitat links may adversely impact fauna species' ability to colonise, or re-colonise other areas supporting suitable habitat. Impacts are likely to be minimised through implementation of the 'Salvage and Translocation Protocol – Fauna' (Appendix 4).

The removal, reduction or modification of vegetation patches within the study area may also:

- Influence the survival, persistence and reproduction of significant flora and fauna species;
- Decrease the amount of available habitat for significant flora and fauna species, whilst potentially creating small isolated populations that may become less viable with regards to population dynamics or genetic diversity;
- Loss of potential habitat may have an impact on the survival, persistence and reproduction of significant fauna which have may reside within areas of the study area;
- Lead to a loss of breeding, foraging and dispersal habitat through ground disturbance activities, which may displace common native fauna species into less suitable habitat with insufficient cover and refugia (e.g. stones and logs), and may lead to an increase in the likelihood of mortality or predation;
- Increase the risk of predation in exposed open areas due to the removal of vegetation and refugia (e.g. stones and logs) favoured by significant fauna species; and,
- Affect fauna species ability to disperse and colonise or re-colonise other areas of suitable habitat within and outside of the study area.

### Construction Activities

Due to the patchiness and small areas of suitable habitat within the study area, construction works have the potential to further reduce available habitats for native flora and fauna species. Some of these potential impacts may include:

- The further reduction and fragmentation of existing habitat areas, limiting fauna dispersal capabilities, as well as the potential increase to the severity of edge effects to significant flora and fauna species;
- If best practice sedimentation and erosion control measures are not in place when undertaking construction activities, there may be various physical and chemical consequences. This may affect the overall ecosystem health through increased sediment and erosion levels along roadsides and drainage lines which could ultimately influence significant species within the study area;
- The use of excavating machinery and heavy equipment has the potential to injure or fatally harm significant fauna species which may be seeking refuge in grass tussocks, under rocks/ logs or in the soil cracks or sub-surfaces in areas containing potential habitat;
- Accidental fuel spillages from construction machinery has the potential to pollute soils and deteriorate remnant vegetation throughout the study area;
- Construction activities may cause changes in hydrology within Harpers Creek, and increase erosion and sedimentation;
- If appropriate fencing and signage is not set up around the perimeter of the property then human disturbance from construction in adjoining areas may result in inappropriate access which may potentially affect ecological values throughout the study area; and,
- If ‘No Go’ zones are not marked out correctly then construction material may be dumped onto areas of native vegetation or other sensitive areas.

## **Weeds**

The study area has been subject to historical land uses that have caused significant disturbance to the natural ecosystem.

Remnant vegetation throughout the study area is surrounded by a modified agricultural landscape where exotic plant species dominate. Consequently, weed diversity and density is high within the study area.

Increased weed encroachment into areas of indigenous or planted terrestrial and aquatic vegetation throughout drainage lines may occur due to runoff from surrounding disturbed areas. Weeds may also be transported via construction equipment and machinery, and people/animals entering the study area. Invasion of native vegetation by ‘environmental weeds’ is a threatening process under Schedule 3 of the FFG Act. Excessive weed growth



may smother amphibian and reptile habitat, rendering it unsuitable for breeding, foraging or dispersal.

Exotic weed species can have a detrimental effect on remnant vegetation, especially on significant flora species, as they are easily outcompeted and smothered. Potential impacts of exotic weed species as a result of the development of the study area may include;

- Increased weed encroachment may occur during and after construction as a result of disturbance to the weed seed bank during excavations. This may have a detrimental effect on the health of native vegetation which is to be retained in-situ within the study area (i.e. roadside reserves, conservation reserve, creekline);
- Weeds may be transported via construction equipment and machinery, and people/ animals entering the site. Weeds may further spread, dominate and outcompete native species such that there is an overall decline in biodiversity if not managed appropriately; and,
- Significant species within the property may be outcompeted and smothered if weed densities are not monitored and controlled appropriately (i.e. routine maintenance).

The study area contains a variety of annual and perennial weed species. It is important to prevent the further spread of these species during construction;

### **Human Access**

Currently human occupation within the study area is relatively low due to its semi-rural setting. However, a large increase in human occupancy will occur following development of the study area, and the likelihood of potential impacts to significant flora and fauna will increase. Potential impacts of human access as a result of the development may include;

- Scattered occurrences of litter throughout the study area which is likely to be attributed to roadside littering or wind-blown litter;
- Population increases where litter levels could increase throughout the study area. This may reduce the overall habitat quality for significant flora and fauna species in the long term;
- With the increase in human activity as a result of the development of the study area, there will also be increased impacts to vegetation due to visitor access (i.e. compaction via trampling and spread of weeds), as well as an increased level of vehicle access (i.e. truck, cars and motorbikes) during and post construction;
- An increase in mowing/slashing practices (i.e. during spring and summer) within the study area may further degrade habitat quality or directly injure significant flora and fauna species;

- Humans can also introduce and spread the waterborne Chytridiomycosis disease, caused by the fungal pathogen *Batrachochytrium dendrobatidis* which can be lethal to many amphibians, including the Growling Grass Frog;
- The increase in human activity as a result of the development of the study area is likely to cause an increased impact on vegetation and soils as a result of increased visitor access (e.g. compaction via trampling and the spread of weeds); and,
- Indirect or direct impacts resulting from weed management actions (i.e. harmful waste spillages or misused herbicide application and spray drift) may also result in a reduction in habitat quality or the direct mortality of threatened flora and fauna species within the property.

### **Hydrology and Water Quality**

Construction activities associated with the development have the potential to result in sedimentation of nearby waterways and produce sediment-laden runoff into drainage lines and creeks. Once the development is complete stormwater runoff from roads and paved surfaces may be of a higher volume and velocity than the existing runoff. This may be transported to areas containing potential habitat for significant fauna species. There is also the potential for accidental spillage of chemicals from the construction area, which may runoff into culverts and drainage lines. Increases to sediment input and the input of toxic substances into Victorian rivers and streams due to human activities are both threatening processes under Schedule 3 of the FFG Act.

### **Pest Animals**

Unrestrained dogs and cats are likely to roam through the study area. Cats in particular are known to prey upon dispersing or sheltering mammals, amphibians and reptiles. Predation of native wildlife by cats is a threatening process under Schedule 3 of the FFG Act. Cat predation is also listed as a threatening process under the EPBC Act (DEWHA 2008a).

The presence of pest animals such as European Rabbits may also result in the alteration of existing habitat conditions and vegetation composition. In many instances, both common native and significant fauna species can be adversely affected by habitat degradation as a result of European Rabbit activities (i.e. burrowing and grazing).

The introduced Plague Minnow has been identified as a possible factor in the decline of species in the “bell frog species complex”, which includes the Growling Grass Frog (Mahony 1999; White & Pyke 1996; Hamer et al. 2002). The Plague Minnow eats the eggs and tadpoles of these frogs and can eliminate them from ponds in which they both live (Morgan & Buttermer 1996). There is a high likelihood of predation from Plague Minnow on all frog species potentially occurring within Harpers Creek.

While Plague Minnow can reduce the potential of a site to support breeding populations of frogs, the extent of predation depends on the aquatic vegetation and habitat complexity, and waterbody permanency (Hamer et al. 2002). This fish potentially occurs in drainage lines and some farm dams in the area. The presence of this fish limits the habitat potential for amphibian species.

The Red Fox is known to eat adult members of the bell frog species complex (NSW DEC 2005) and is likely to prey on other frog species occurring within the local area. Fox predation is also outlined as a threatening process in the Action Statement developed under the *FFG Act* (Mansergh and Markes 1993) in addition to being listed as a threatening process under the EPBC Act (DEWHA 2008b).

## Appendix 6: Staff and contractor induction: Growling Grass Frog at 'Rosenthal Estate' 100 Vineyard Rd, Sunbury

### Background

Growling Grass Frog is listed as vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and threatened under the Victorian *Flora and Fauna Guarantee Act 1988*. The species is also protected under the *Wildlife Act 1975*.

This species of frog has previously been recorded at Jacksons Creek and suitable habitat has been identified on site. As a result, extensive measures to avoid and minimise the occurrence and extent of potential impacts to Growling Grass Frog individuals, populations, and the species, that may be associated with the proposed action, are required. One of these measures is to undertake the salvage and translocation of individuals from the construction area, during all activities related to dewatering, habitat removal and earthworks.

It is imperative that all persons working at the Rosenthal Estate assume a duty of care to avoid and minimise impacts to Growling Grass Frog.

### Species description

Growling Grass Frogs:

- are bright emerald to dull green frog, with brown to gold blotches and a warty back (Plate 1 and Plate 2);
- can vary in size from 55 – 100 mm depending upon maturity;
- are active during the months of September to April, and generally inactive during the rest of the year (hiding under logs and rocks, in soil cracks, in dense vegetation);
- make a distinctive call, resembling 'growling' or a far-off motorbike, between October and December;
- can be found in a range of habitats including, creeks, drainage lines, wetlands, dams, quarry holes; and
- can move quite long distances during the active season (e.g. 2 km);



**Plate 1.** Growling Grass Frog *Litoria raniformis*    **Plate 2.** Growling Grass Frog *Litoria raniformis*

### Salvage and Translocation

At least two zoologists will be on site during the dewatering, habitat removal and earthwork activities associated with the construction of the estate. The zoologists will guide all persons managing and undertaking these activities, and will salvage and translocate any individuals encountered. No persons other than the zoologists are to intervene with the salvage and translocation activities, unless specifically requested to do so by the zoologists.

### What to do if you find a Growling Grass Frog

Should a Growling Grass Frog be encountered by persons on site other than the zoologists engaged to carry out the salvage and translocation, the following protocol applies:

- The person encountering the frog will report it to the site supervisor, upon which a stop works will be initiated. The zoologist will be contacted immediately.
- No one may attempt to capture the frog unless it is directly within harm's way. If possible, a photo of the frog will be taken and sent it to the zoologist via mobile phone messaging for identification.
- If feasible, the zoologist will attend the site, and capture and relocate the frog, in accordance with all procedures and protocols outlined in the Conservation Management Plan.
- If this is not feasible, the site supervisor will use the emergency frog handling kit available at the estate's site office, to capture the frog and place it in the container provided, until the zoologist can attend to assess the frog and relocate it.
- The emergency frog handling kit will include:
  - at least 3 plastic holding containers, 20 x20 centimetres in size, sealable but with adequate aeration (i.e. several holes in the lid of the container to provide some air flow);
  - a box of disposal latex gloves;
  - a laminated fact sheet of how to handle and store the frog.

**The contacts at Ecology and Heritage Partners Pty Ltd for this project is:**

Aaron Organ, Director, 03 9377 0100 or 0425 873 159

# APPENDIX 7

## Plan for salvage of Striped Legless Lizard from [NAME OF SITE / PROJECT]

[DATE OF THIS PLAN]

This plan has been prepared on behalf of [DEVELOPER/PROPONENT] by [HERPETOLOGICAL CONSULTANT]. It provides details of the planned salvage of Striped Legless Lizard from [SITE DESCRIPTION INCLUDING PROPERTY NAME / C/A NUMBER/S].

This document has been prepared to address the requirements for a site-specific plan as outlined in the *Salvage & Translocation of Striped Legless Lizard in the Urban Growth Areas of Melbourne: Operational Plan* (DSE 2011).

### Summary project details are as follows:

Project/Development name: \_\_\_\_\_

Location: \_\_\_\_\_

#### Developer

Company name: \_\_\_\_\_

Contact name: \_\_\_\_\_

Contact no: \_\_\_\_\_

#### Herpetological Consultant

Company name: \_\_\_\_\_

Contact name: \_\_\_\_\_

Contact no: \_\_\_\_\_

**A checklist for the proposed salvage has been completed and is included as Attachment 1.**

**A map indicating the location of the site is attached as Figure 1.**

**A map indicating areas of relevant vegetation on site is attached as Figure 2.**

**Approved by: \_\_\_\_\_ Date: \_\_\_\_\_**

**Name of DSE Officer: \_\_\_\_\_**

## Requirement for SLL salvage

The requirement for salvage of Striped Legless Lizard (*Delma impar*) at the site has been determined on the basis of information in the *Prescription for Striped Legless Lizard* (DSE 2010), pursuant to *Delivering Melbourne's Newest Sustainable Communities Program* (DPCD 2009).

Salvage of SLL is required at the site because

1. The permit granted for subdivision, buildings and/or works on a site stipulates that a fully costed Striped Legless Lizard translocation / salvage plan must be prepared.
2. The site location (**Figure 1**) is within the area subject to *Delivering Melbourne's Newest Sustainable Communities Program* (DPCD 2009).
3. The site does not meet criteria for habitat to be retained and clearing is thus permitted.
4. Vegetation mapping of the site shows that it supports suitable SLL habitat.

A vegetation assessment of the site was undertaken by [HERPETOLOGICAL CONSULTANT] on [DATE]. A map of the site, showing areas of the relevant vegetation is attached to this plan (**Figure 2**). The assessment shows that the site contains the following areas of SLL habitat:

Priority 1 (higher intensity salvage): areas of vegetation that have more than 25% understorey plant cover that is indigenous \_\_\_\_\_ # ha

Priority 2 (lower intensity salvage regime): – areas of vegetation that have less than 25% understorey plant cover that is indigenous that is suitable habitat for SLL \_\_\_\_\_ # ha

Area/s that will not be developed but are to be retained as reserve/s for SLL or for other purposes [INSERT AS REQUIRED] are shown on Figure 2

## Salvage timing

Salvage of SLL is proposed to be undertaken at the site between [DATE] and [DATE]. This is during the optimal / suboptimal [DELETE AS APPLICABLE] period of the year for salvage.<sup>1</sup>

## Salvage method/s

The site has been inspected by [HERPETOLOGICAL CONSULTANT] with [QUALIFIED EARTHMOVING PLANT OPERATOR] on [DATE]. The

<sup>1</sup> The optimal period is October to March (inclusive) when the animals are active and can be easily salvaged. The suboptimal period is April to September (inclusive) when the animals are inactive and difficult to detect.

inspection evaluated the on-ground site conditions including extent of surface rock and vegetative cover to determine the most appropriate salvage method/s to be used. The results of that inspection are as follows:

- Surface rock cover is present in approximately [XX] % of Priority 1 area/s.
- Surface rock cover is present in approximately [XX] % of Priority 2 area/s.

On the basis of that inspection the areas suitable for initial use of a grader and where primary use of an excavator for SLL salvage are shown in Figure 2. [OR SEPARATE MAP AS REQUIRED].

It is anticipated that a grader will be deployed to initially rip the soil in the entire areas of approximately [XX] ha of Priority 1 area/s and [XX] ha of Priority 2 area/s within the site. It is noted that at any location where an SLL is found while using a grader, an excavator will be deployed to intensively salvage a minimum plot of 20 x 20 m surface area, until a minimum of 20 x 20 m surface area has been searched without locating any additional SLL.

The extent and density of surface rock and/or of dense vegetative cover precludes effective use of a grader in approximately [XX] ha of Priority 1 area/s and [XX] ha of Priority 2 area/s within the site. In these areas an excavator/s will be used for salvage of SLL. The salvage regime has been calculated according to the following intensities prescribed for use of an excavator as the primary salvage method: [DELETE FROM BELOW AS APPLICABLE]

#### **Within optimal salvage season (October to March inclusive)**

- Priority 1 areas: minimum of 20 x 5x5 m excavation plots per hectare evenly spread over the entire salvage area.
- Priority 2 areas: minimum of 10 x 5x 5 m excavation plots per hectare evenly spread over the entire salvage area.

#### **Sub-optimal salvage season (April to September inclusive)**

- Priority 1 areas: minimum of 40 x 5x5 m excavation plots per hectare evenly spread over the entire salvage area.
- Priority 2 areas: minimum of 20 x 5x 5 m excavation plots per hectare evenly spread over the entire salvage area.

On the basis that there are [XX] ha of Priority 1 habitat to be salvaged; that salvage is to occur during the optimal/suboptimal [DELETE AS APPLICABLE] period of the year for salvage; and the required number of salvage plots per hectare, a total of [XX] plots in Priority 1 habitat will be searched using an excavator.

On the basis that there are [XX] ha of Priority 2 habitat to be salvaged; that salvage is to occur during the optimal/suboptimal [DELETE AS APPLICABLE] period of the year for salvage; and the required number of salvage plots per hectare, a total of



[XX] plots in Priority 2 habitat will be searched using an excavator.

The following team leader/s with relevant herpetological expertise will supervise team/s deployed to work with individual earthmoving machines/s: [NAMES OF TEAM LEADERS]

The herpetologist/s and assistants will work along with each earthmoving machine to observe for, and collect, SLL detected. The methods for actual salvage operations will be undertaken using methods detailed in the *Salvage & Translocation of Striped Legless Lizard in the Urban Growth Areas of Melbourne: Operational Plan*.

Area/s that will not be developed but are to be retained as reserve/s for SLL or for other purposes [INSERT AS REQUIRED] will be fenced &/or clearly marked on-site to ensure that area/s is not disturbed by salvage operations. The following methods will be used for this purpose and will be maintained in serviceable condition throughout the salvage operation: [DESCRIBE E.G. TYPE OF FENCE ETC.]

### **Responsibilities**

Overall supervision of the salvage operation will be the responsibility of [HERPETOLOGICAL CONSULTANT] who will ensure that salvage complies with the *Salvage & Translocation of Striped Legless Lizard in the Urban Growth Areas of Melbourne: Operational Plan*.

[NAME OF HERPETOLOGICAL CONSULTANT] holds a current Management Authorisation [NUMBER & EXPIRY DATE] under the Wildlife Act 1975 to undertake salvage of SLL.

[NAME OF HERPETOLOGICAL CONSULTANT] will provide the following for management of the salvage operation:

- Obtain DSE approval of Salvage Plan prior to commencement
- Notify DSE and Melbourne Zoo Reptile Department of the impending SLL salvage operation at least four weeks prior to commencement of salvage operations.
- Provide team/s comprised of four personnel to work as observers with each excavator and/or two personnel to work as observers with each grader (safety permitting). Each team will include an ecologist with herpetological expertise appropriate to the salvage operation who will supervise the team members.
- Complete a Job Safety Analysis for aspects of the salvage operation involving herpetologists and assistants.
- Provide induction to machine operators on what is involved in SLL salvage.
- Notify DSE immediately in the event that Grassland Earless Dragon (capture for confirmation) or any other threatened species is encountered during salvage operations.

- Provide written confirmation of completion of salvage to the Developer and DSE.
- Obtain DSE sign-off that Salvage works is complete.
- Document habitat parameters for each excavator plot (whether 5 x5 m or 20x20 m plot) and/or for a minimum of each 1000 m<sup>2</sup> surface area of soil ripped by a grader on the DSE habitat record data sheet (Appendix 2).
- Compile a report on the results of salvage and submit it to DSE and the Developer within one month of completion of the salvage operation. The report will document salvage effort, including time spent, number of zoologists, salvage method and surface area/s of habitat disturbed during salvage.

When SLL are found during salvage, [HERPETOLOGICAL CONSULTANT] will:

- Document location of collection, using hand-held GPS, and other data for each SLL salvaged on the DSE SLL record data sheet (Appendix 2).
- Transfer any SLL caught during salvage to securely tied cloth bags (one animal only per bag). Bags containing lizards will be kept in a rigid insulated container ('Esky') in a secure and cool, shaded location where there is no risk of animals being crushed. Cloth bags will be used with seams on the outside to avoid entanglement of SLL in loose threads.
- Expeditiously deliver any obviously injured SLL to Melbourne Zoo with notification that the animal requires veterinary attention. On-site euthanasia may be appropriate on welfare grounds in circumstances where animals have sustained obviously severe abdominal or head injuries that are preventing normal movement and righting reflex, or organs are exposed and there is obvious bleeding. In-field euthanasia should be carried out by a sudden crushing blow to the head and decapitation. Note that tail loss (autotomy) as a natural anti-predator mechanism may occur and does not constitute injury.
- Transfer uninjured SLL to [DESIGNATED RECIPIENT SITE] / MELBOURNE ZOO [AS PRE-DETERMINED BY DSE] on the same day that they are salvaged.
- Retain preserved specimen of whole or any part of SLL recovered dead, including autotomised tails, and offer them to Museum of Victoria along with all data for the individual.

## Attachment 1

### Site-specific salvage and translocation checklist for SLL

Project/Development name: \_\_\_\_\_

Location: \_\_\_\_\_

Developer: \_\_\_\_\_ Herpetological Consultant: \_\_\_\_\_  
 Company name: \_\_\_\_\_ Company name: \_\_\_\_\_  
 Contact name: \_\_\_\_\_ Contact name: \_\_\_\_\_  
 Contact no: \_\_\_\_\_ Contact no: \_\_\_\_\_

Vegetation assessment:

Priority 1 - areas with >25% indigenous understorey plant cover \_\_\_\_\_ # ha  
 Priority 2 – suitable SLL habitat with <25% indigenous understorey plant cover \_\_\_\_\_ # ha

SLL habitat confirmed by herpetological consultant? Y / N Date assessed: \_\_\_\_\_

On-ground site conditions (determined by (who & how): \_\_\_\_\_

Rocky (approx # ha): \_\_\_\_\_ of Priority 1 area \_\_\_\_\_ of Priority 2 area  
 Not rocky (approx. # ha): \_\_\_\_\_ of Priority 1 area \_\_\_\_\_ of Priority 2 area

Timing proposed for salvage: \_\_\_\_\_ Optimal season: October to March (inclusive)  
 Sub-optimal season: April to September (inclusive)

Are retained areas clearly identified? Y / N By what means? \_\_\_\_\_

Note: retained areas must be clearly identified before salvage can commence.

Earthmoving equipment appropriate for site:

Motor Grader (rubber tires, 5 shanks on ripper) Hydraulic Excavator (900-950mm toothed bucket)

Salvage regime applicable to site based on ground conditions and season:

	Optimal season	√	Suboptimal season	√
<b>Priority 1 areas:</b>				
Grader	All suitable habitat		All suitable habitat	
Excavator	20 5x5m plots/ha		40 5x5m plots/ha	
<b>Priority 2 areas:</b>				
Grader	All suitable habitat		All suitable habitat	
Excavator	10 5x5m plots/ha		20 5x5m plots/ha	

Note: it is not possible to predict total area to be covered by excavator as this will be determined by how many SLL are found by the grader and the resulting 20x20m excavator plots that ensue.

**Attach a plan indicating vegetation mapping & approx. areas for grader/excavator to salvage, and any areas marked for retention.**

Notification to DSE and Melbourne Zoo Reptile Department of the impending SLL salvage operation has been made on (date): \_\_\_\_\_

Recipient site (not applicable during 2011): \_\_\_\_\_

Access information / other notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DSE Approval: .....Signature Block of DSE Officer

# HABITAT DATA

To be completed for each excavator plot (whether 5x5 m or 20x20 m plot) & for a minimum of each 1000 m<sup>2</sup> surface area of soil ripped by grader. Multiple plots with the same vegetation characteristics/quality can be included in a single data sheet, but sites with SLL must be completed individually.

Site / property name / description:

Salvage plot number(s):

Size (m<sup>2</sup>) of salvage plot/area:

Salvage using: Tying approach with grader/excavator OR excavator only

Date:	Observer/s:		
Site location co-ordinates:	E		N
Area of overall site (ha):	Area of available habitat:		

## VEGETATION

(a) What is the dominant tussock-forming species?

Kangaroo Grass	Wallaby-grass Native Spear grass both	Serrated Tussock	Other: e.g. Needle-grass		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>1) Foliage projective cover:</b>	<5%	6-25%	26-50%	51-75%	76-100%
(b) % cover of tussocks	<5%	6-25%	26-50%	51-75%	76-100%
(c) % cover of other vegetation	<5%	6-25%	26-50%	51-75%	76-100%
(d) % of bare ground	<5%	6-25%	26-50%	51-75%	76-100%
(e) % cover of thatch/litter	<5%	6-25%	26-50%	51-75%	76-100%
<b>2) % cover of native species</b>	<5%	6-25%	26-50%	51-75%	76-100%
<b>3) Mean tussock height</b>	<5cm	5-10cm	10-20cm	20-40cm	>40cm
<b>4) Mean inter-tussock spaces</b>	<5cm	5-10cm	10-20cm	20-40cm	>40cm

## SOIL

1) Type

Basalt derived  Other

2) Structure

(a) Cracks? Yes  No

(b) Crack size (mean crack width at surface)

(c) Density of cracks (mean distance between adjacent cracks)

(d) Presence/frequency of invertebrate/other burrows

**Other Soil Notes?**

**ROCKS**

**Ground covered by rocks:**

<5 %       6-25%       26-50%       51-75%       76-100%

**Proportion of embedded versus surface rock:**

Embedded	<5 %	<input type="checkbox"/>	6-25%	<input type="checkbox"/>	26-50%	<input type="checkbox"/>	51-75%	<input type="checkbox"/>	76-100%	<input type="checkbox"/>
Surface	<5 %	<input type="checkbox"/>	6-25%	<input type="checkbox"/>	26-50%	<input type="checkbox"/>	51-75%	<input type="checkbox"/>	76-100%	<input type="checkbox"/>

Notes on distribution of rocks across the site:

**TOPOGRAPHY**

Approx slope of plot	Flat	<input type="checkbox"/>	<5 %	<input type="checkbox"/>	6-25%	<input type="checkbox"/>				
Slope aspect	N/A	<input type="checkbox"/>	E	<input type="checkbox"/>	N	<input type="checkbox"/>	W	<input type="checkbox"/>	S	<input type="checkbox"/>

Proximity to waterway/s:

**LAND MANAGEMENT**

**Has the site been subject to:**

	Grazing	Slashing	Burning	Ploughing/cultivation	Fertilizer	Herbicide	Insecticide
Currently?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regularly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Historically?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Have SLL been recorded from the site?      Yes / No**

**How many?**

## **STRIPED LEGLESS LIZARD DATA**

**To be completed for each Striped Legless Lizard found.**

**Site / property name or description:**

**Salvage plot co-ordinates (easting & northing):**

**Animal collected alive / dead / autotomised tail only / euthanized on site**

**Specimen field number:**

**Snout – vent length (mm):**

**Weight (g):**

**Age class: adult / juvenile**

**Sex: male / female (difficult to determine in field – to be done at ZOO)**

***Dorsal head photograph taken? (not mandatory) Yes / No***

**Photograph number:**

**Photograph copy is attached below. Yes / No**

**Notes:**

## Indicative cost estimates for captive housing of Striped Legless Lizards at Melbourne Zoo

Outlined below are current indicative cost estimates for the housing and care of salvaged Striped Legless Lizards (SLL) held at Melbourne Zoo. Zoos Victoria will directly invoice the Developer for these costs when animals from a salvage operation are held in captive housing.

### Housing Parameters at Melbourne Zoo

The housing options are based on the following requirements:

1. SLLs will be held in groups, not individually, but the Zoo will be required to identify the groups.
2. SLLs will be held in captivity for the minimum period needed, ie. likely to be a maximum of seven months, or as advised by DSE.
3. The Zoo will not be required to track individual SLLs during holding, although individual animals will be photographed prior to release.
4. Lizards will only be held at Melbourne Zoo in the first instance. Holding at Werribee Open Range Zoo may be considered in the future, noting that this property presents potential opportunities as a recipient release site and for broader community engagement and interpretation.
5. Captive management of SLLs differs between the summer/active period and the winter/inactive period. The costs set out apply to 2011-12 and may be adjusted in future years via the *Operational Plan's* annual review process.

NOTE that the enclosure material costs will be adequate for one year and are not a monthly cost. Similarly, the cost of building additional enclosures is a one-off cost.

Number of SLLs	Estimated fixed costs: veterinary expenses & cost of enclosures	Estimated food & staff costs per active month (September-March)	Estimated food & staff costs per inactive month (April-August)
Each group of up to 10 SLL	\$480	\$160	\$56

In addition to these costs, two further issues will need to be determined and costed more fully as the project develops:

#### 1. Additional holding area in the Zoo.

The current off-display area immediately behind the Reptile House can accommodate up to 12 enclosures, which allows for 250-300 SLLs. If more lizards are needed to held, then another area in the Zoo will need to be allocated. This has not been identified, nor the costs determined for allocating an area for this purpose. However, it is reasonable to estimate a cost of approximately \$8,000 to prepare and secure such a space.

#### 2. Additional staff

If the Zoo is required to hold more than 100 SLLs, the consideration will have to be given to employing an additional keeper. The degree to which full-time or part-time is necessary will depend on the number of SLLs and, hence, the impact on staff time. The full annual cost of one mid-level keeper is \$56,300 (including on-costs).

# Salvage & translocation of Striped Legless Lizard in the urban growth area of Melbourne

## Contingency for Grassland Earless Dragons

The Grassland Earless Dragon (GED, *Tympanocryptis pinguicolla*) is officially listed as Endangered nationally and Critically Endangered in Victoria. The last confirmed record of this species from Victoria dates back to the late 1960s. However, apparently suitable habitat persists within the probable historical range of the species, including in areas of more recent putative sightings of GEDs. Many of the areas where this potential habitat exists are likely to be destroyed during works associated with the expansion of Melbourne's Urban Growth Boundary (UGB). Consequently, it is possible that this species may be found during these works.

The Department of Sustainability & Environment (DSE) has a protocol in place for managing Striped Legless Lizards (SLL, *Delma impar*, another threatened grassland-dependent lizard) encountered during the UGB expansion works. This protocol is documented in the *Salvage and Translocation of Striped Legless Lizard in the Urban Growth Areas of Melbourne: Operational Plan* (SLL Operational Plan).

The following protocol for GEDs is in place to satisfy Section 2.7 (p.10) of the SLL Operational Plan, which outlines a contingency plan if GEDs are found. It assumes that a herpetological consultant will be present during works in habitat where SLLs and GEDs may occur, which is a requirement of the SLL Operational Plan.

### Process to be followed when Grassland Earless Dragons are found

When GEDs are found during salvage (whether dead or alive) the herpetological consultant will:

- Immediately cease all disturbance operations at the site and contact DSE Biodiversity Services Port Phillip (see over for key contacts), who will determine the appropriate course of action to be taken in the interim. DSE will respond as soon as practicable and ensure that any necessary work stoppages are minimised.
- Document exact location of each survey and salvage operation using a GPS unit and mark the location where the animal(s) was found with stake and flagging tape.

- Transfer any GED caught during survey or salvage to securely tied cloth bags (1 animal only per bag). Bags containing lizards must be kept in a secure and cool, shaded location where there is no risk of animals being crushed (eg Esky). Cloth bags are to be used inside out to avoid entanglement of GED in loose threads.
- Contact Melbourne Zoo to arrange for delivery (see over for key Melbourne Zoo contacts).
- Transfer uninjured GEDs to Melbourne Zoo - Reptile Section as pre-determined by DSE. In order to ensure immediate care for GEDs at the Zoo, ensure that they arrive at the Zoo no later than 3pm (if not possible, hold until the following morning).
- In the event that a GED is injured, immediately advise Melbourne Zoo - Reptile Section that an injured GED is on the way and requires veterinary attention. Expeditiously deliver any obviously injured GED to Melbourne Zoo - Reptile Section.
- Any dead specimens (or part thereof) are to be submitted immediately to Melbourne Zoo in the first instance, along with all collection and site data for the individual. DSE will liaise with Melbourne Zoo prior to lodging with Museum Victoria.

Pro-forma data sheets for SLL (Appendices 2 & 3 from SLL Operational Plan) should be used as GED data sheets for documentation of all requisite data. All required data must be recorded for each GED captured and all data must be forwarded to DSE within 10 working days.

- Document numbers and age-classes (adults, juveniles) for all GED captured.
- Record key micro-habitat characters for all GED captured (following Appendix 2 in the SLL Operational Plan). This will include data for soil, vegetation and other micro-habitat parameters to a pre-determined set of measurable variables.
- Document survey and salvage effort, including time spent, number of zoologists, survey method and surface area of habitat disturbed.



# Contingency for Grassland Earless Dragons

## Key Contacts

DSE Biodiversity Services Port Phillip

Group Manager Biodiversity Services - Port Phillip  
Mark Winfield 0419 751006

Project Leader - Land Use Planning  
Alan Webster 0409 548014

Project Leader - Threatened Species  
Bram Mason 0437 100852

Melbourne Zoo

In the first instance contact Melbourne Zoo -  
Reptile Section on 9285 9443.

If no response, call Melbourne Zoo Reception on  
9285 9300 and then 0, and ask them to contact  
Reptile Keeper by radio.

If no response to that request, call the following:

Jon Birkett 0411 638 787

Peter Courtney 0400 906 593

Chris Banks 0417 374 895



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## Appendix 8: Aquatic plant species list suitable for Growing Grass Frog

Botanical Name	Common Name	Essential Species	Melbourne Water Preferred species
<i>Potamogeton ochreatus</i>	Blunt Pondweed	X	X
<i>Potamogeton tepperi</i>	Floating Pondweed	X	X
<i>Eleocharis acuta</i>	Common Spike-sedge	X	X
<i>Vallisneria americana</i>	Ribbon-weed	X	
<i>Triglochin procerum s.l.</i>	Water Ribbons	X	X
<i>Ottelia ovalifolia</i>	Swamp Lily	X	
# <i>Eleocharis sphacelata</i>	Tall Spike-sedge		
<i>Melaleuca ericifolia</i>	Swamp Paperbark		
<i>Poa labillardierei</i> var. <i>labillardierei</i>	Common Tussock-grass		X
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Calystegia sepium</i>	Large Bindweed		
<i>Carex appressa</i>	Tall Sedge		X
<i>Carex fascicularis</i>	Tassel Sedge		
<i>Carex bichenoviana</i>	Plains Sedge		X
<i>Carex tereticaulis</i>	Poong'ort		X
<i>Epilobium billardierianum</i>	Smooth Willow-herb		
<i>Juncus amabilis</i>	Hollow-rush		
<i>Juncus gregiflorus</i>	Green Rush		
<i>Juncus procerus</i>	Tall Rush		
<i>Juncus sarophorus</i>	Broom Rush		
<i>Juncus flavidus</i>	Gold Rush		X
<i>Urtica incisa</i>	Scrub Nettle		
<i>Crassula helmsii</i>	Swamp Crassula		X
<i>Hydrocotyle sibthorpioides</i>	Shining Pennywort		
<i>Carex gaudichaudiana</i>	Fen Sedge		
<i>Persicaria praetermissa</i>	Spotted Knotweed		
<i>Persicaria subsessilis</i>	Hairy Knotweed		
<i>Ranunculus inundatus</i>	River Buttercup		
<i>Alisma plantago-aquatica</i>	Water Plantain		X
<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass		X
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass		
<i>Baumea articulate</i>	Jointed Twig-sedge		X
<i>Cladium procerum</i>	Leafy Twig-sedge		
<i>Glyceria australis</i>	Australian Sweet-grass		
<i>Lycopus australis</i>	Australian Gypsywort		
<i>Lythrum salicina</i>	Small Loosestrife		
<i>Myriophyllum crispatum</i>	Upright Water-milfoil		
<i>Myriophyllum simulans</i>	Amphibious Water-milfoil		
<i>Neopaxia australasica</i>	White Purslane		
<i>Persicaria decipiens</i>	Slender Knotweed		
<i>Ranunculus amphitrichus</i>	Running Marsh Flower		
<i>Rumex bidens</i>	Mud Dock		
<i>Schoenoplectus tabernaemontani</i>	River Club-sedge		X
<i>Villarsia reniformis</i>	Running Marsh Flower		
<i>Myriophyllum caput-medusae</i>	Coarse Water-milfoil		X
<b># limit use of this species, it can become invasive.</b>			
<b>NOTE – Species belonging to the <i>Typha</i> genus have been excluded from this list and should not be used in any revegetation works.</b>			

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