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# O'Herns Road Project: Flora and Fauna Assessment

Prepared for VicRoads July 2017

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# **Summary**

Biosis Pty Ltd was commissioned by VicRoads to undertake a flora and fauna assessment, including targeted surveys for Golden Sun Moth *Synemon plana*, Growling Grass Frog *Litoria raniformis* and Matted Flax-lily *Dianella amoena*, of the construction footprint for the proposed O'Herns Road Interchange, widening and signalisation works at O'Herns Road, Epping. The study area is located in a peri-urban landscape approximately 20 kilometres north of Melbourne, and is partly located within land covered by the Melbourne Strategic Assessment (MSA). The project will be delivered in two stages. Stage 1 is an upgrade of the existing roundabout at the intersection of O'Herns Road and High Street. Stage 2 is the duplication of O'Herns Road, the O'Hern's Road/Hume Freeway Interchange and associated auxiliary lanes.

# **Ecological values**

Key ecological values identified within the study area are as follows:

#### Stage 1 Area

- One 0.115 hectare patch of modified Plains Grassy Woodland.
- A total of 3 scattered River Red-gums *Eucalyptus camaldulensis*.

#### Stage 2 Area

- Four patches of Stony Knoll Shrubland, totalling 0.108 hectares.
- A total of 17 scattered River Red-gums Eucalyptus camaldulensis.
- Confirmed presence of the nationally significant Golden Sun Moth.
- Presence of three FFG Act protected flora species Black Wattle Acacia mearnsii, Drooping Cassinia Cassinia arcuata and Cotton Fireweed Senecio quadridentatus.
- Habitat for the nationally significant Growling Grass Frog along Edgars Creek.
- Habitat present for six species listed as threatened under the *Flora and Fauna Guarantee Act 1988* (FFG Act) – Lewin's Rail *Lewinia pectoralis*, Baillon's Crake *Porzana pusilla*, Intermediate Egret *Ardea intermedia*, Eastern Great Egret *Ardea modesta*, Freckled Duck *Stictonetta naevosa*, Blue-billed Duck *Oxyura australis*.
- Fauna habitat connectivity associated with Edgars Creek.

# **Government legislation and policy**

An assessment of the project in relation to key biodiversity legislation and policy is provided and summarised below.



Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
EPBC Act	Golden Sun Moth present throughout the study area. Potential Growling Grass Frog habitat present in created wetlands, farm dams and Edgars Creek within and immediately adjacent to the study area. Targeted surveys did not detect Growling Grass Frog in any waterbodies in the study area.	Referral required for impacts to Golden Sun Moth due to the proposed removal of 10.409 ha of habitat.	There are no MNES in Stage 1 area. Stage 2 will result in a significant impact to Golden Sun Moth. Project considered unlikely to result in a significant impact to Growling Grass Frog, provided the mitigation measures outlined in this report are implemented including the adoption of DELWP crossing standards for Growling Grass Frog at Edgars Creek.
Planning & Environment Act	All indigenous vegetation to be cleared.	Planning permit required, including permission to lop or remove native vegetation.	Permit application needs to address provisions of VPO2 and ESO4. Under the Schedule to Clause 52.17 in the Whittlesea Planning Scheme a Planning Permit is not required to remove native vegetation within areas zoned Road 1 Zone or designated with a Public Acquisition Overlay (PAO2) being land forming the Hume Freeway between the Metropolitan Ring Road and Mount Ridley Road. For areas that fall outside of this area a planning permit is required to remove native vegetation under Clause 52.17. While parts of the study area are exempt under the Schedule, there are still areas supporting native vegetation that fall outside Schedule to Clause 52.17
Melbourne Strategic Assessment (MSA)	The section of the Hume Freeway reserve north of O'Herns Road is located within the MSA.	No EPBC Act approval required for impacts within this area. Impacts outside the MSA cannot be captured under this approval due to extent of impacts to Golden Sun Moth and the Melbourne Urban Development Policy does not apply.	Habitat compensation fees payable for removal of modelled habitat for Golden Sun Moth, Growling Grass Frog, native vegetation and Matted Flax-lily, in accordance with the Biodiversity Conservation Strategy for Melbourne's growth corridors.



Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
FFG Act	Three protected flora species and remnants of two listed flora communities present.	Protected Flora Permit required.	The majority of the study area is public land.
CaLP Act	Noxious weeds identified on site. Potential for the state prohibited weed Lobed Needle-grass <i>Nassella</i> <i>charruana</i> to be present.	Permit may be required from DEDJT&R to transport soil/rock off site, should Lobed Needle- grass be present.	VicRoads may need to establish a protocol with DEDJT&R for the management of the likely presence of Lobed Needle-grass and any permit requirements for noxious weeds. Comply with requirements to control/eradicate weeds or obtain permits to transport soil, if required.
Water Act (Victoria)	Edgars Creek	Referral to Melbourne Water – Works on Waterways permit.	Implications for specific waterways. Discuss project design with Melbourne Water.
Environment Protection Act (State Environmental Protection Policy – Waters of Victoria)	Edgars Creek		Impacts to surface water quality must not result in changes that impact on beneficial uses. VicRoads will need to ensure appropriate sediment and pollution controls are in place.
River Red-gum Protection Policy (City of Whittlesea)	Scattered River Red-gums present	Comply with policy, which requires as many trees as possible to be retained.	Arborist report required to support planning permit application.

# Permitted clearing of native vegetation: Biodiversity assessment guidelines (the Guidelines)

Under the Guidelines, there are three risk-based pathways for assessing an application for a permit to remove native vegetation: low, moderate and high. Based on the nature of the proposed works and the extent of native vegetation identified within the study area that is subject to offsetting under Victoria's Permitted Clearing Regulations the planning application for removal of native vegetation is to be assessed on the low risk-based pathway.

The current assessment provides information on the location and extent of native vegetation identified within the study area, and specifically within the section of the study area outside the MSA. Based on the proposed impact area outside the MSA, the Guidelines will require general offsets only and these need to be sourced from within the administrative boundaries of the Port Phillip and Westernport Catchment Management Authority or the City of Whittlesea.

#### **Mitigation measures**

The primary measure to reduce impacts to biodiversity values within the study area is to minimise removal of native vegetation and terrestrial and aquatic habitat.

Based on significant impact thresholds in EPBC Policy Statements, the proposed works will result in a significant impact to Golden Sun Moth, and an EPBC referral will therefore be required. The primary measure to reduce impacts to this species is to minimise the project footprint and clearly demarcate all areas of retained habitat as 'no-go' zones. It is also recommended that a hygiene protocol be established to ensure that no new weeds or pests become established that could adversely impact on retained areas of habitat. Revegetation of disturbed areas should focus on utilising known Golden Sun Moth food plants such as Wallaby Grasses *Rytidosperma spp.* 

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The assessment of impacts to Growling Grass Frog have been made on the reasonable assumption that the species moves along Edgars Creek. This is based on the occurrence of the species within the creek upstream and downstream of the O'Herns Road crossing. Targeted survey within the study area failed to detect the species. While supporting known Growling Grass Frog habitat features the large waterbody in the Hume Freeway reserve north of Cooper Street, is subject to a high level of vehicular noise and significant road light pollution. Overall it is considered unlikely that the species would make significant use of this waterbody given existing barriers to colonisation and the level of disturbance from the freeway. To avoid a significant impact to Growling Grass Frog, the following measures should be implemented:

- Retained areas of native vegetation and wetland habitat will be clearly identified as 'no-go' zones and communicated to all construction personnel during site inductions. This includes tree protection zones of remnant scattered trees.
- The Edgars Creek crossing should be designed to be broadly in accordance with *Growling Grass Frog Crossing Design Standards: Melbourne Strategic Assessment* (DELWP 2017). These standards provide guidance on the design of passages under infrastructure (primarily roads) crossing Growling Grass Frog areas, to ensure that populations can continue to interact through migration
- Plant to be washed down prior to entering site. Works to follow guidelines set out in *Hygiene protocols for the control of diseases in Australian frogs* (Murray et al. 2011) relevant to the works being undertaken, such as cleaning and disinfection of machinery and equipment before first entering the site.
- Sedimentation will be reduced through retention of riparian vegetation, and implementation of sediment and chemical control measures. Controls should be established in accordance with EPA 'best practice' environmental management guidelines for construction.
- Indirect impacts, such as sedimentation and run-off, will be detailed in a Construction Environmental Management Plan (CEMP) to ensure that retained wetland areas are not adversely impacted.

# 1. Introduction

# 1.1 Project background

Biosis Pty Ltd was commissioned by VicRoads to undertake a flora and fauna assessment, including targeted surveys for Golden Sun Moth *Synemon plana*, Growling Grass Frog *Litoria raniformis* and Matted Flax-lily *Dianella amoena*, for the proposed O'Herns Road Interchange, widening and signalisation works at O'Herns Road, Epping.

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The project will be delivered in two stages. Stage 1 is an upgrade of the existing roundabout at the intersection of O'Herns Road and High Street. Stage 2 is the duplication of O'Herns Road, the O'Hern's Road/Hume Freeway Interchange and associated auxiliary lanes.

The following works are proposed for the study area (both Stages):

- Construction of a full diamond interchange connecting O'Herns Road to the Hume Freeway
- Widening of O'Herns Road east of the interchange
- Freeway auxiliary lanes between O'Herns Road and Cooper Street
- Replacement of the roundabout at the intersection of Epping Road, Findon Road, High Street and O'Herns Road with traffic signals (Epping Road / O'Herns Road roundabout).

The study area and adjacent areas of private land have been subject to a number of previous ecological assessments. The study area was subject to a flora and fauna assessment in 1998, prior to the construction of the Craigieburn Bypass (Ecology Australia 1998). A series of artificial drainage wetlands were constructed within the road reserve, which were monitored in 2007 for Growling Grass Frog (Ecology and Heritage Partners 2007) and surveyed as part of the current assessment. Residential and commercial developments underway in the local area have also been informed by numerous ecological assessments, including the Aurora residential development (Biosis Research 2006) and the Melbourne Wholesale Market relocation development (Biosis Research 2008a; 2008b). The biodiversity values of the local area are therefore well-documented. The current assessment reviews available existing information and builds on this by documenting the ecological features currently present within the study area.

# 1.2 Scope of assessment

The objectives of this investigation are to:

- Describe the vascular flora (ferns, conifers, flowering plants) and vertebrate fauna (mammals, birds, reptiles, frogs, fishes).
- Map native vegetation and other habitat features.
- Undertake targeted surveys for the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed Golden Sun Moth, Growling Grass Frog and Matted Flax-lily.
- Review the implications of relevant biodiversity legislation and policy, including Victoria's Permitted clearing of native vegetation: Biodiversity assessment guidelines ('the Guidelines') and the EPBC Act.
- Determine offset requirements for impacts to native vegetation in accordance with the Guidelines.
- Identify potential implications of the proposed development and provide recommendations to assist with development design and to mitigate impacts to ecological values.

# 1.3 Location of the study area

The study area is located within the City of Whittlesea, approximately 20 kilometres north of the Melbourne central business district (Figure 1). It encompasses the existing road reserve for O'Herns Road and the Hume Freeway, along with associated areas required for the widening and roundabout upgrade works (Figure 1). The study area covers a number of zones including Road Zone (RDZ1 & 2), General Residential Zone (GRZ1), Special Use Zone (SUZ4), Farm Zone (FZ), Rural Conservation Zone (RCZ1) and Comprehensive Development Zone (CDZ1). Overlays relevant to biodiversity values within the study area include a Vegetation Protection Overlay (VPO2) and an Environmental Significance Overlay (ESO4).

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The section of the Hume Freeway reserve located north of O'Herns Road is located within the Melbourne Strategic Assessment (MSA) area - an area approved for development under Part 10 of the EPBC Act.

The study area is within the:

- Victorian Volcanic Plain bioregion
- Yarra River Basin (Edgars Creek catchment)
- Management area of Melbourne Water and the Port Phillip and Westernport Catchment Management Authority (CMA)



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# 2. Methods

# 2.1 Database review and information sources

In order to provide a context for the study area, information about flora and fauna from within 5 kilometres of the study area (the 'local area') was obtained from relevant biodiversity databases. Records from the following databases were collated and reviewed:

- Flora Information System (FIS) which includes records from the Victorian Biodiversity Atlas VBA\_FLORA25, FLORA100 & FLORA Restricted' August 2015 © The State of Victoria, Department of Environment, Land, Water and Planning (DELWP).
- Victorian Biodiversity Atlas 'VBA\_FAUNA25, FAUNA100 & FAUNA Restricted' August 2015 © The State of Victoria incorporating records from Birdlife Australia
- DELWP Biodiversity Interactive Map (BIM)
- DELWP Habitat Importance Models
- Protected Matters Search Tool of the Australian Government Department of the Environment and Energy for matters protected by the EPBC Act.

Other sources of biodiversity information were examined including:

- DELWP Native Vegetation Information Management (NVIM) system which generates a Biodiversity Assessment Report (BAR) for the study area.
- DELWP NaturePrint; accessed through the Biodiversity Interactive Map
- Planning Scheme overlays relevant to biodiversity based on <a href="http://planningschemes.dpcd.vic.gov.au/index.html">http://planningschemes.dpcd.vic.gov.au/index.html</a>.
- Previous/current reports and policy documents relevant to the project including:
  - Biosis (2017) Biodiversity Assessment Report of 165-195 O'Herns Road, Epping
  - Biosis Research (2006) Flora and fauna of Aurora, Epping North.
  - Biosis Research (2008a) Habitat hectare assessment for the Melbourne Wholesale Market site, Epping.
  - Biosis Research (2008b) Survey of the Golden Sun Moth at the proposed Melbourne Wholesale Market site, Epping.
  - Ecology Australia (1998) Detailed Flora and Fauna Investigation of Route Options, Mahoneys Road to Craigieburn, Hume Freeway.
  - Ecology Partners (2007) Monitoring of crossing structures for the Growling Grass Frog, Craigieburn Bypass.
  - Numerous unpublished annual monitoring reports for Places Victoria and Lend Lease
     Communities Aurora spanning 10 years of monitoring Golden Sun Moth and Growling Grass
     Frog within the Aurora Estate
  - Commonwealth of Australia 2009a; 2009b) Significant impact guidelines for Golden Sun Moth and associated background paper.

- Recovery plan and significant impact guidelines for Growling Grass Frog (Clemann and Gillespie 2012; Commonwealth of Australia 2009c)

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In addition to the information sources listed above, contact was made with the following people for further information:

- Alan Webster, Program Manager Healthy Landscapes, DELWP (Port Phillip Region). Alan was
  contacted to find out further information on the drainage wetlands within the Hume Freeway
  reserve.
- Jessica Fero, DELWP MSA team, to determine MSA habitat compensation obligations for the section of the study area subject to the MSA, as well as clarification on the scattered tree obligations in the absence of a scattered tree survey requirement.

# 2.2 Definitions of significance

The significance of a species or ecological community is determined by its listing status under Commonwealth or State legislation / policy. The sources used to categorise significance of species and communities in this report are summarised below in Table 1.

# Table 1 Criteria for determining significance of species & ecological communities

Significance	
National	Listed as critically endangered, endangered or vulnerable under the EPBC Act
State	Listed as critically endangered, endangered or vulnerable in Victoria on a DELWP Advisory List, or listed as rare for flora species (DSE 2009, DSE 2013; DEPI 2014a) Listed as threatened under the FFG Act

Lists of significant species generated from the databases are provided in Appendix 1 (flora) and Appendix 2 (fauna) and the species have been assessed to determine their likelihood of occurrence based on the process outlined below.

# 2.3 Determining likelihood of occurrence of significant species

Likelihood of occurrence indicates the potential for a species or ecological community to occur regularly within the study area. It is based on expert opinion, information in relevant biodiversity databases and reports, and an assessment of the habitats on site. Likelihood of occurrence is ranked as negligible, low, medium, high or recorded. The rationale for the rank assigned is provided for each species in Appendix 1 (flora) and Appendix 2 (fauna). Those species for which there is little or no suitable habitat within the study area are assigned a likelihood of low or negligible and are not considered further.

Only those species listed under the EPBC Act or listed as threatened under the FFG Act (hereafter referred to as 'listed species') are assessed to determine their likelihood of occurrence. The habitat value for species listed on the DELWP Advisory Lists is calculated by the Habitat Importance Modelling produced by DELWP (DEPI 2013a). Where DELWP Advisory List species are recorded in the study area this is noted in Appendix 1 (flora) and Appendix 2 (fauna).

Listed species which have at least medium likelihood of occurrence are given further consideration in this report. The need for targeted survey for these species is also considered. For those species identified as having a medium or higher likelihood of occurrence, habitat within the study area that meets the requirements of these species is referred to as 'potential habitat'. If the species has been confirmed as

present within these areas, either through targeted survey or from existing records (e.g. VBA records), these areas are referred to as 'known habitat' or 'confirmed habitat'.

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# 2.4 Site investigation

#### 2.4.1 Flora assessment

The flora assessment was undertaken on 6 July 2016, 13 February 2017 and 6 March 2017, in response to project design changes. A consolidated list of flora species was collected (# T25607). This list will be submitted to DELWP for incorporation into the Victorian Biodiversity Atlas. Planted species have not been recorded unless they are naturalised.

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses' (Clause 72).

The Guidelines classify native vegetation into two categories (DEPI 2013a):

- A remnant patch of native vegetation (measured in hectares) is either:
  - An area of native vegetation, with or without trees, where at least 25 percent of the total perennial understorey cover is native plants.
  - An area with three or more indigenous canopy trees where the tree canopy cover is at least 20 percent.

Remnant patch vegetation is classified into ecological vegetation classes (EVCs). An EVC contains one or more floristic (plant) communities, and represents a grouping of broadly similar environments. Definitions of EVCs and benchmarks (condition against which vegetation quality at the site can be compared) are determined by DELWP.

- A scattered tree is defined as (extent measured by number of trees):
  - An indigenous canopy tree that does not form part of a remnant patch of native vegetation.

A canopy tree is a mature tree that is greater than three metres in height and is normally found in the upper layer of a vegetation type. Ecological vegetation class descriptions provide a list of the typical canopy species. A condition score and extent is applied to each scattered tree based on information provided by DELWP's NVIM.

A Vegetation Quality Assessment was undertaken for all remnant patch native vegetation identified in the study area. This assessment is consistent with DELWP's Habitat hectare method (DSE 2004) and the Guidelines (DEPI 2013a). For the purposes of this assessment the limit of the resolution for the Habitat hectare assessment process is taken to be 0.001 Habitat hectares (Hha). That is, if native vegetation is present with sufficient cover but its condition and extent would not result in the identification of at least 0.001 Habitat hectares then that vegetation will not be mapped or assessed as a separate habitat zone. The results of the Vegetation Quality Assessment are summarised in Section 5.1.2.

The flora assessment incorporated an assessment on the potential for the proposed works to trigger additional requirements to manage the spread of plant pests and pathogens including phylloxera and phytophthora.

Species nomenclature for flora follows the VBA.

#### 2.4.2 Fauna assessment

The study area was investigated on 6 July 2016, 13 February 2017 and 6 March 2017 to determine its general values for fauna. These were determined primarily on the basis of the types and qualities of habitat(s)

present. All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This included direct observation, searching under rocks and logs, examination of tracks and scats and identifying calls. Particular attention was given to searching for significant species and their habitats. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

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Fauna records will be submitted to DELWP for incorporation into the Victorian Biodiversity Atlas.

# 2.4.3 Permits

Biosis undertakes flora and fauna assessments under the following permits and approvals:

- Research Permit/Management Authorisation and Permit to Take Protected Flora & Protected Fish issued by DELWP under the *Wildlife Act 1975, Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975* (Permit number 10007569).
- Approvals 07.15 and 14.12 from the Wildlife and Small Institutions Animal Ethics Committee.

# 2.5 Targeted surveys

A preliminary inspection of the study area on 6 July 2016 identified potential habitat for three EPBC Act listed threatened species: Golden Sun Moth, Growling Grass Frog and Matted Flax-lily. Some areas within and in close proximity to the study area were identified as known habitat for Golden Sun Moth based on previous records obtained from the VBA and/or Biosis incidental records not yet entered into the VBA. Targeted surveys were therefore undertaken to determine the presence and extent of occurrence of these species.

# 2.5.1 Matted Flax-lily targeted survey

A preliminary assessment of the study area identified potential habitat for Matted Flax-Lily adjacent to the Epping Cemetery. Survey for Matted Flax-lily was undertaken on 6 December 2016 by two botanists experienced with identifying the species by thoroughly searching all areas of potential habitat. Surveys were conducted during the flowering period of the species, which was confirmed by visiting known populations located at Aurora and Epping Cemetery. Matted Flax-lily was not detected within the study area during targeted surveys. Further information regarding the survey results is provided in Section 3.1.1.

# 2.5.2 Golden Sun Moth targeted survey

A preliminary assessment of the study area identified areas of known and potential habitat for Golden Sun Moth in areas of grassy vegetation dominated by Chilean Needle-grass *Nassella neesiana*. The species is known to occur in similar habitat in the local area (DSE 2010; Biosis Research 2006; Biosis Research 2008b, Biosis 2017).

To determine presence and extent of Golden Sun Moth within the study area, targeted surveys were undertaken during the 2016/17 Golden Sun Moth flight season. As the timing of the flight season varies annually and geographically, the best indicator of key survey period is the presence of flying males at known local sites. Reference sites at Epping were monitored at the start of the expected flight season and used to guide survey timing within the study area. Golden Sun Moth activity was monitored throughout Victoria during the flight season through communication between Biosis and other ecological consultants, using the Golden Sun Moth email group maintained by Biosis.

Targeted Golden Sun Moth surveys were undertaken at the study area on 7, 12 and 26 December 2016 and 4 January 2017. As per the EPBC Act survey guidelines for Golden Sun Moth, the surveys were undertaken at approximately weekly intervals to allow for variations in emergence patterns. Surveys took place when



conditions were suitable for male flight (generally >20°C, bright, clear days, full sun or sparse cloud, absence of rain and wind other than a light breeze) between 10:00 hrs and 15:00 hrs.

On the first two surveys, all habitat within the study area (with the exception of the Hume Freeway median strips) was searched systematically by walking a series of transects, spaced approximately 50 metres apart through all areas of habitat. Subsequent surveys focussed on determining whether the species was present within the Hume Freeway median strip. Due to traffic and safety constraints, the median strip was surveyed by searching through binoculars from the O'Herns Road overpass or the sides of the Hume Freeway.

The locations of all Golden Sun Moths observed were recorded using a hand-held GPS. Weather conditions, including temperature, humidity and wind speed, were measured on site using a Kestrel Weather Meter (Model 4000). Areas of Golden Sun Moth habitat were mapped based on the presence of the species and/or suitable habitat characteristics. Where Golden Sun Moth were recorded, all contiguous areas of land demonstrating the same tenure, management and habitat characteristics were determined as the extent of confirmed habitat. The Golden Sun Moth survey results are provided in Section 3.1.2.

# 2.5.3 Growling Grass Frog targeted survey

A preliminary assessment of the study area identified areas of potential habitat for Growling Grass Frog and the species is known to be present in suitable habitat along Edgars Creek (Biosis Research 2006; Biosis 2017). Known populations occur north of Cooper Street in the Northpoint Wetlands and Vearings Road Drain Pond between Gateway Boulevard and Willandra Drive. These populations are approximately 120 metres from the Hume Freeway Reserve.

Targeted surveys for Growling Grass Frog were undertaken at four survey sites: O'Herns Road Farm Dam south, O'Herns Road Farm Dam north, Hume Drainage and Hume Wetland. O'Herns Road Farm Dam south (on 165-195 O'Herns Road) was surveyed on 17 November 2016 and 16 January 2017. The remaining sites were surveyed over two nights on 15 and 16 February 2017. Survey sites are displayed in Figure 3. The survey nights were selected on the basis of projected weather conditions and were compliant with the EPBC Act guidelines for Growling Grass Frog survey, which require night time temperatures greater than 12°C and little to no wind (Commonwealth of Australia 2009). Each survey site was surveyed for a period of approximately 60 person-minutes over the two nights.

As per the guidelines, targeted surveys began by quiet listening from the water-line for approximately 10 minutes to detect calling males. After this period, call playback was used in an attempt to illicit a response from males. Active searching was then conducted with the aid of spotlights to locate any frogs which may not have been calling, such as females and metamorphs. All accessible areas of the waterbody were surveyed, including the banks, open water, submerged, floating and emergent vegetation. Weather conditions were recorded on site using a Kestral weather meter.

No Growling Grass Frogs were detected within the study area, therefore reference sites where Growling Grass Frog are known to occur were checked on all nights to confirm that conditions were conducive for survey. For the first three surveys, Growling Grass Frog were confirmed calling at Northpoint Wetlands on Edgars Creek. Growling Grass Frog were confirmed to be active the fourth evening further north in a wetland located in the Aurora residential development where Edgars Creek runs beneath Eaststone Avenue.

# 2.6 Qualifications

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as low abundance, patchy distribution, species dormancy, seasonal conditions, and migration and breeding behaviours. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The initial flora and fauna assessment was conducted in winter, which is not an optimal time for survey. Subsequent surveys of additional areas were conducted in summer and autumn, which is an optimal time for survey. Targeted surveys for Matted Flax-lily and Golden Sun Moth were undertaken at optimal times of the year, which was confirmed by visiting nearby reference sites to confirm detectability. The current assessment was therefore sufficient to detail the ecological values present within the study area and survey for Golden Sun Moth and Matted Flax-lily.

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Growling Grass Frog surveys were conducted in accordance with the EPBC Act survey guidelines (Commonwealth of Australia 2009c) but were undertaken late in the active season. Known Growling Grass Frog wetland sites were visited to confirm that the species could be detected in the local area on the survey nights. Survey late in the active season has the benefit of enabling the detection of metamorphling and juvenile frogs and can therefore identify waterbodies where the species has successfully bred. The Growling Grass Frog survey undertaken within the study area is therefore considered to be appropriate.

Biodiversity Assessment Reports (BAR) and Biodiversity Impact Offset Requirement (BIOR) reports are prepared through DELWP's NVIM system or requested through DELWP's NVIM team. Biosis supplies relevant site-based spatial information as inputs to DELWP and we are entirely reliant on DELWP's output reports for moderate and high risk pathway applications. Biosis makes every effort to ensure site and spatial information entered into the NVIM, or supplied to DELWP, is an accurate reflection of proposed native vegetation removal.

The study area contains areas of amenity plantings within the Hume Freeway reserve. Such plantings have limited ecological value and do not require a planning permit for removal. As such, planted vegetation within the study area was not mapped and is not considered in further detail within this report.

# 2.7 Legislation and policy

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- Matters listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), associated policy statements, significant impacts guidelines, listing advice and key threatening processes
- Threatened taxa, communities and threatening processes listed under Section 10 of the *Flora & Fauna Guarantee Act 1988* (FFG Act); associated action statements and listing advice
- Permitted Clearing of native vegetation: Biodiversity assessment guidelines (DEPI 2013a)
- Native Vegetation Management Plans prepared by Catchment Management Authorities
- *Planning and Environment Act 1987* specifically Clauses 12.01-2, 52.17 and 66.02 and Overlays in the Whittlesea Planning Scheme
- Noxious weeds and pest animals lists under the Catchment and Land Protection Act 1994 (CaLP Act)
- Environment Effects Act
- Fisheries Act 1995
- Water Act 1989
- Environment Protection Act 1971: State Environmental Protection Policy (Waters of Victoria) 2003.

# 2.8 Mapping

Mapping was conducted with a GPS enabled Samsung SM-T550 Tablet using the Collector for ArcGIS Android app and aerial photo interpretation. Hand-held (uncorrected) GPS units (WGS84) were also used in



conjunction with aerial photo interpretation. When used in combination with detailed aerial photography, the accuracy of hand-held GPS units and GPS enabled tablets is increased to approximately  $\pm$  1 metre. This is also dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files which contain our flora and fauna spatial data are available to incorporate into design concept plans.



# 3. Results

The ecological features of the study area are described below and mapped in Figure 2 (flora) and Figure 3 (fauna). Species recorded during the flora and fauna assessment and targeted surveys are listed in Appendix 1 (flora) and Appendix 2 (fauna). Those species recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area.

# 3.1 Targeted survey results

# 3.1.1 Matted Flax-lily

No Matted Flax-lilies were recorded within the study area during the targeted survey. The likelihood of this species occurring within the study has therefore been downgraded to low, and the proposed works will not impact on this EPBC Act listed species. A population of Matted Flax-lily is present within the Epping Cemetery, located to the immediate south of the proposed O'Herns Road roundabout removal and upgrade works. The proposed works will not impact on this population.

# 3.1.2 Golden Sun Moth

Golden Sun Moths were recorded throughout the study area in areas dominated by Chilean Needle-grass on 7 and 12 December 2016. This included all sections of the Hume Freeway reserve and the O'Herns Road reserve and adjacent private land that is dominated by Chilean Needle-grass. Binocular searches undertaken on all four surveys (7, 12 and 26 December 2016 and 4 January 2017) were unable to detect Golden Sun Moth within the Hume Freeway median strip (the centre median) when viewed from the north-east side of the Hume Freeway, however based on the results from adjacent areas it is assumed the species occurs within these areas. The location and number of all Golden Sun Moths recorded during targeted surveys is displayed in Figure 3, along with the extent of confirmed and likely habitat for the species.

In total, targeted surveys confirmed the presence of approximately 590 Golden Sun Moth within 24.9 hectares of exotic grassland dominated by Chilean Needle-grass (Figure 3). A further 4.2 hectares, mostly located within median strips of the Hume Freeway, is likely to support Golden Sun Moth based on the presence of suitable habitat features. These areas could not be confirmed during the targeted assessment due to access restrictions, or due to revisions of the impact area following completion of targeted surveys. Of the confirmed and likely habitat located within the study area, 6.4 hectares is located within the Melbourne Strategic Assessment area and requires no further consideration. Habitat Compensation Fees will be automatically calculated for impacts to Golden Sun Moth within this area (refer to Section 4.1.2 for further detail). For impacts located outside the MSA area, the proposed works will require the removal of 10.98 hectares of Golden Sun Moth habitat. Of this, 0.662 hectares of Golden Sun Moth habitat located at 188A O'Herns Road has already been subject to assessment, approval and offsetting under the EPBC Act for the Aurora residential development. The proposed works will therefore result in the removal of **10.318 hectares** of Golden Sun Moth habitat that will require assessment and approval under the EPBC Act (Commonwealth of Australia 2009b). Further consideration and assessment against the relevant EPBC Act significant impact criteria is provided in Section 4.1 and Appendix 3.

Golden Sun Moth is known to occur within similar habitat throughout the local area, particularly in grassy paddocks and road verges. The adjacent properties to the north-west, north-east and south-east of the proposed interchange are all known to support or have supported Golden Sun Moth (Biosis Research 2006; Biosis unpublished data; Biosis Research 2008b), while the species is also known from the property to the

west of the Hume Freeway between Cooper St and O'Herns Road (Biosis 2017; Biosis unpublished data). The species has also been previously observed along Cooper St (M. Venosta pers. obs.) near the Hume Freeway interchange. Our results in this assessment concur with the known adjacent occurrences above.

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# 3.1.3 Growling Grass Frog

Growling Grass Frog was not recorded during the current survey. All surveys were conducted at an appropriate time of year and during suitable weather conditions when the species would be expected to be active and readily detectable. A known reference site was visited each evening (see Section 2.5.3) which confirmed that Growling Grass Frogs were detectable at occupied sites at the time of the surveys. It is therefore unlikely that any of the sites surveyed currently support a breeding population of Growling Grass Frog. This is consistent with previous surveys undertaken within the Hume Freeway reserve, which did not record the species (A. Webster, DELWP, pers. comm.; Ecology and Heritage Partners 2007). However, these surveys were undertaken during an extended drought.

All four survey sites are in close proximity to wetlands currently occupied by the species. However, the wetland located adjacent to the Hume Freeway is subject to significant amounts of light and noise pollution from the freeway and is partly isolated from nearby populations by industrial development.

# 3.2 Vegetation & fauna habitat

The majority of the study area has been highly modified and supports predominantly introduced vegetation, however the study area was also found to support a range of ecological features including small patches of Stony Knoll Shrubland (EVC 649) of 0.108 hectares and Plains Grassy Woodland (EVC 55\_61) of 0.115 hectares. Remnant native vegetation identified within the study area is mapped in Figure 2. Golden Sun Moth was found to be present throughout the majority of the study area, with the exception of areas near the O'Herns Road roundabout and the median strip of the Hume Freeway. Created wetlands, farm dams and Edgars Creek within and adjacent to the study area provide potentially (yet unoccupied) habitat for Growling Grass Frog. These ecological features are described further below and mapped in Figure 2 (flora) and Figure 3 (fauna).

# **Introduced vegetation**

The vegetation of the O'Herns Road reserve consists almost entirely of introduced grasses including Toowoomba Canary-grass *Phalaris aquatica*, Oat *Avena* spp., Chilean Needle-grass, Veldt-grass *Ehrharta* spp., Large Quaking-grass *Briza maxima* and Brome *Bromus* spp. The highly invasive introduced Chilean Needlegrass is widespread. Other exotic herbs such as Clovers *Trifolium* spp. are abundant. There are scattered native species at low densities such as Kangaroo Grass *Themeda triandra* and wallaby-grasses *Rytidosperma* spp. Woody weeds such as Montpellier Broom *Genista monspessulana*, Sweet Briar *Rosa rubiginosa*, Hawthorn *Crataegus monogyna*, African Boxthorn *Lycium ferocissimum* and thistles (Spanish Artichoke *Cynara cardunculus* and Spear Thistle *Cirsium vulgare*) are prominent throughout. Planted non-indigenous eucalypts occur along much of the road reserve including Sugar Gum *Eucalyptus goniocalyx*.

The Hume Freeway reserve is similarly dominated by introduced grassy vegetation which is subject to regular mowing (Plate 1). Eucalypts, including River Red-gums *Eucalyptus camaldulensis* have been extensively planted. The batters of the Hume Freeway overpass have been revegetated with native trees and shrubs including Fragrant Saltbush *Rhagodia parabolica*, which is listed as rare under the DELWP *Advisory List of Rare or Threatened Plants in Victoria* (DEPI 2014a).





Plate 1 Introduced vegetation located within the Hume Freeway reserve

Introduced vegetation within the study area, particularly areas containing a high cover of Chilean Needlegrass, was confirmed to support populations of the EPBC Act listed Golden Sun Moth *Synemon plana* (Figure 4).

# **Scattered trees**

A number of scattered River Red-gums occur within the study area (Figure 4; Plate 2; Appendix 1). Large remnant trees provide a foraging, roosting and breeding resource for locally common fauna species.



Plate 2 Scattered River Red-gum located within the study area

# Plains Grassy Woodland (EVC 55\_61)

A small patch of Plains Grassy Woodland EVC is present in the median strip of O'Herns Road, immediately north of the Epping Cemetery (Figure 2; Plate 3). This patch is characterised by a canopy cover of River Redgums over an understorey dominated by introduced grasses and herbs and is 0.11 hectares in size.





Plate 3 Plains Grassy Woodland EVC located on O'Herns Road median strip

# Stony Knoll Shrubland (EVC 649)

Two patches of Stony Knoll Shrubland occur on rocky rises at the southern side of O'Herns Road, to the west of the Hume Freeway overpass and a further two were mapped to on either side of the freeway at the northern extent of the study area (Figure 4) totalling 0.12 ha. These patches are dominated by Black Wattle *Acacia mearnsii* and Hedge Wattle *Acacia paradoxa* with a small number of Tree Violet *Melicytus dentatus*. The ground cover on the knolls is dominated by grasses such as Supple Spear-grass *Austrostipa mollis*, Kangaroo Grass *Themeda triandra*, wallaby grasses *Rytidosperma* spp. and Weeping Grass *Microlaena stipoides*. Herbs are moderately common and include Chocolate Lily *Arthropodium strictum*, Spreading Crassula *Crassula decumbens*, Grassland Wood-sorrel *Oxalis perennans* and Yellow Rush-lily *Tricoryne elatior*. Interestingly, two locally uncommon pea species were observed growing on the knolls: Running Postman *Kennedia prostrata* and the rare (DEPI 2014a) Western Golden-tip *Goodia medicaginea*. These species are poorly represented in the local area and are typically only confined to better quality remnants. Introduced plants are common to abundant, especially on the margins of the knolls where they dominate the ground layer.

# Wetlands

Drainage lines crossing the freeway reserve support scattered native aquatic plants. A stormwater treatment wetland complex on the east side of the Hume Freeway, south of O'Herns Road has been planted out with native macrophytes and the margins of these wetlands have been revegetated with a variety of native trees, shrubs and grasses (Plate 4). Wetlands identified within the study area contained potentially suitable habitat for the EPBC Act listed Growling Grass Frog, which is known to occur within the local area including Edgars Creek north of O'Herns Road and Merri Creek to the west (DSE 2010). The species was not detected during targeted survey of these habitats. These areas also provide suitable habitat for a number of FFG Act listed waterbirds such as Eastern Great Egret *Ardea modesta* and Baillon's Crake *Porzana pusilla*.





Plate 4 Large constructed wetland in the Hume Freeway reserve.

# **Drystone walls**

A number of drystone walls were identified within the study area (Figure 5). These drystone walls are loosely constructed from basalt surface rock and provide habitat for common and introduced ground-dwelling fauna species. Drystone walls within the study area are unlikely to support habitat for any EPBC or FFG Act listed fauna species.

# 3.3 Landscape context

The study area occurs within a highly modified and rapidly urbanising landscape with few scattered remnants of indigenous vegetation. Broad areas have been developed for agriculture and otherwise developed for residential and industrial purposes. Narrow corridors of habitat along existing creek-lines typically provide the greatest level of habitat connectivity within this degraded landscape. Native vegetation is largely restricted to isolated patches on stony knolls and scattered remnant River Red-gums. Remaining areas are largely dominated by introduced grasses, such as Chilean Needle-grass. Many of these areas support populations of Golden Sun Moth, but otherwise contain limited ecological values. Conservation Area 33 of the Biodiversity Conservation Strategy is adjacent to the project area at the north-west intersection of the Hume Freeway and O'Hern's Road.