

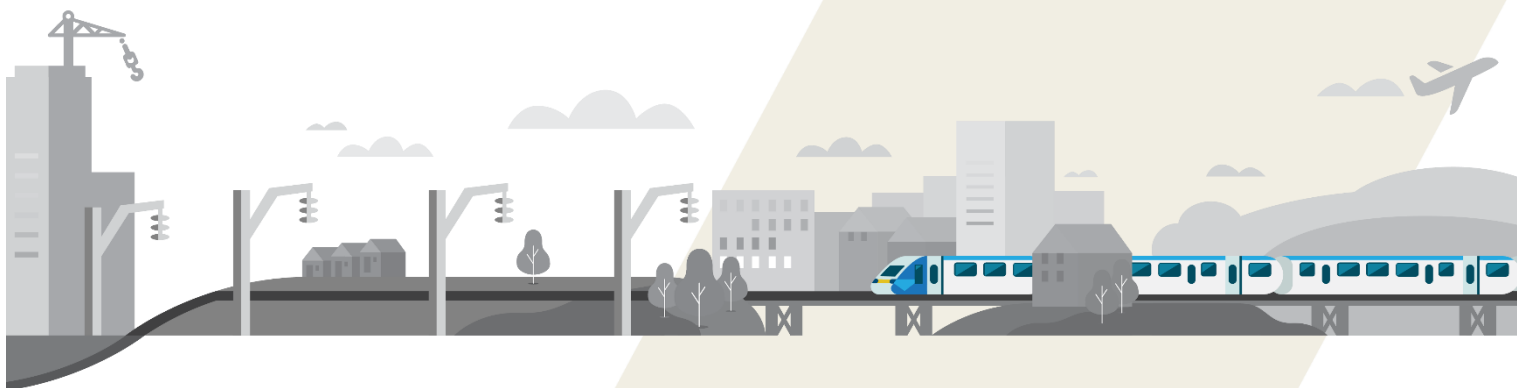
MELBOURNE AIRPORT RAIL

**CORRIDOR SECTION PRELIMINARY
DOCUMENTATION (EPBC 2021/9081)**
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 222 Exhibition Street
Melbourne VIC 3000

 PO Box 23061
Docklands VIC 8012
Australia

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Author Signature	Signed at AJM JV internal Verification and Approval process	Approver Signature	Signed at AJM JV internal Verification and Approval process
Name	Justin Sullivan	Name	Ruth Macdonald

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This document should be read in full and no excerpts are to be taken as representative of the findings.

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Executive Summary

The AJM Joint Venture (AJM-JV) on behalf of Rail Projects Victoria (RPV) has prepared this Preliminary Documentation for the proposed Melbourne Airport Rail Project – Corridor Section (EPBC 2021/9081).

On 24th November 2021, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) ('the Department') advised that the Corridor Section Project is a Controlled Action and that works require approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) ('the Act') as the action is likely to have significant impacts on listed threatened species and communities (section 18 and 18A of the Act). On the 22nd December 2021 the Department advised that the proposed action will be assessed by Preliminary Documentation.

The Melbourne Airport Rail (MAR) Project is a once-in-a-generation transformation of Victoria's transport network, connecting Melbourne Airport with a rail service for the first time. The MAR Project comprises of three sections, Corridor Section, Sunshine Section and Commonwealth Section. This report discusses proposed impacts of the MAR Project on Matters of National Environmental Significance (MNES) for the Corridor Section only.

This Preliminary Documentation specifically considers works and construction activities in the Corridor Section of the MAR Project, which is situated along the Albion-Jacana rail corridor between Jacana Station and north of Barwon Avenue, Sunshine North, as well as land between Sharps Road, Tullamarine and the Albion-Jacana rail corridor.

The proposed works within the Corridor Section study area generally include:

- Construction of approximately 8 km of new dual track railway and associated overhead lines and maintenance access points
- Signalling works along pre-existing rail corridor from Albion to Jacana and new MAR corridor north of the Western Ring Road
- Construction upgrades to Digital Train Radio Systems (DTRS), in addition to relocation, modification and replacement of utilities and underground existing infrastructure
- Replacement of a shared use path (SUP) at Calder Freeway/Fullarton Road, the provision of a new SUP at Cranbourne Avenue and a Strategic Cycling Corridor link between the Western Ring Road and Airport Drive
- Establishment of temporary construction infrastructure including laydown areas, site offices, worksite, storage, car parking and access roads

Detailed efforts to avoid and minimise impacts to ecological values have been undertaken during the planning process for the project. This has included the early identification and removal of key areas from the Corridor Section Project Boundary as well as the establishment of 16 No Go Zones, with priority given to the avoidance of impacts to MNES. Since the time of the submission of the EPBC Act referral, further refinement of the Corridor Section Project Boundary and works area has been undertaken with the aim to further reduce impacts to ecological values, with a particular emphasis on reducing impacts to MNES. This included the relocation of Pier 8 for the Maribyrnong River Bridge to further away from the waterway, and relocation of the Shared User Path alignment at M80 North Zone to minimise impacts to Striped Legless Lizard habitat.

Mitigation measures to reduce impacts to MNES are documented in the Corridor Section Threatened Species Management Plan (CSTSMP). Key mitigation measures include:

- Delineation and implementation of 16 No Go Zones for areas of high ecological value, including minimising or avoiding unintended impacts on retained and/or adjacent vegetation and habitat including tree protection zones through the implementation of fencing and signage.
- Salvage and translocation protocols for Striped Legless Lizard, Tussock skink and Growling Grass Frog
- Protective fencing in specific areas to restrict Golden Sun moth flying into construction areas during the flying season

- Dust suppression fencing adjacent to areas of high ecological value
- Restrictions to construction timing to reduce impacts to threatened species
- Strategic revegetation of specific areas subject to temporary disturbance, including along the Maribyrnong River Bridge, at the M80 North Zone and along Steele Creek and Steele Creek North

Following significant efforts to avoid and minimise impacts to MNES within the Corridor Section Project Boundary, the proposed action will result in the following direct impacts to MNES:

- Removal of eight (8) individuals of Spiny Rice-flower (*Pimelea spinescens subsp. spinescens*) (from an 0.150 ha area of habitat).
- Removal of 1.144 ha of habitat for Striped Legless Lizard (*Delma impar*), a reduction from 1.147 ha impact as reported in the Corridor Section Referral (EPBC 2021/9081). As well as fragmentation resulting in the isolation of a 0.46 ha patch of Striped Legless Lizard habitat from the core remaining habitat area of 3.55 ha.
- Removal of 0.221 ha of Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)
- Permanent removal of 0.268 ha and temporary removal (with revegetation) of 0.932 ha of habitat for Growling Grass Frog (*Litoria raniformis*), as well as temporary loss of a non-breeding wetland at the M80 retention basin and localised reduction in habitat suitability in the vicinity of the Maribyrnong River due to noise and vibration during the construction of the Maribyrnong River Bridge
- Direct removal of 0.319 ha of habitat for Golden Sun Moth (*Synemon plana*)
- Localised disturbance to habitat for Australian Grayling (*Prototroctes maraena*) due to noise and vibration at the Maribyrnong River, limited to outside the critical migration period of the species.

Of the above listed impacts, the MAR Corridor Section Project Works have been assessed to result in a significant impact on Spiny Rice-flower and Striped Legless Lizard. Offsets have been proposed as part of this Preliminary Documentation package to compensate for the significant impacts to Spiny Rice-flower and Striped Legless Lizard from the Project. In addition to the proposed offsets, Spiny Rice-flower plants to be removed for the MAR Corridor Section Project will be translocated to a location to be determined in discussions with the Victorian Department of Environment, Land, Water and Planning (DELWP). A Spiny Rice-flower translocation plan prepared in accordance with the Spiny Rice-flower Translocation Protocol (*Pimelea spinescens* Recovery Team 2013) will be submitted to DAWE prior to any impacts to Spiny Rice-flowers.

All other information requested by the Commonwealth for the assessment of the Corridor Section has been provided as part of this Preliminary Documentation.

1 Introduction

1.1 Project Background

The AJM Joint Venture (AJM-JV) on behalf of Rail Projects Victoria (RPV) has prepared this Preliminary Documentation for the proposed Melbourne Airport Rail (MAR) Project – Corridor Section (EPBC 2021/9081). On 24th November 2021, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) ('the Department') advised that the Corridor Section Project is a Controlled Action and that works require approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) ('the Act') as the action is likely to have significant impacts on listed threatened species and communities (section 18 and 18A of the Act). On the 22nd December 2021 the Department advised that the proposed action will be assessed by Preliminary Documentation.

The Sunshine Section of the MAR Project (referred separately as EPBC Ref 2021/9040) was determined to be Not a Controlled Action based on the lack of impacts to MNES.

Preparatory Works for the Corridor Section have been excluded from the proposed action based on the lack of potential impacts to MNES. Further details on Preparatory Works are provided in Section 2.4.

1.1.1 Project Details

Melbourne Airport handled more than 37 million passenger movements in 2018-19 and by 2038, this figure is projected to almost double to more than 67 million, which is an average growth of 3.2% per annum. Transport connectivity from Melbourne Airport to Melbourne's Central Business District (CBD) is currently limited to the Tullamarine Freeway, and therefore, the Victorian Government is committed to delivering an efficient, competitive alternative to cater for the ongoing increase in passenger numbers at Melbourne Airport.

In 2002, the Victorian Government considered possible corridor and alignment options for a MAR, ultimately selecting the Sunshine route as the preferred option. At this time, land was reserved between the Albion-Jacana rail corridor and extending through to Sharps Road, Tullamarine for the construction of a rail link.

In 2018, the Victorian Government released the MAR Link Sunshine Route Strategic Appraisal, which confirmed that the Sunshine route remains the best solution for an airport rail link. The Sunshine route would provide superior connections to regional Victoria, Melbourne's growth areas in the north and west and Melbourne's south eastern suburbs and could be delivered sooner and at a significantly lower cost than other route options.

1.1.2 Request for Additional Information – EPBC Act Assessment by Preliminary Documentation

On 22 December 2021, DAWE issued a Notification of Referral Decision for the MAR Project Corridor Section. This included determination that the proposed action is a controlled action, and request for additional information to enable assessment by preliminary documentation. The notification requested the following information:

- The information contained in the original referral;
- Further information provided on the impacts of the action and the strategies proposed to avoid, mitigate and/or offset those impacts; and
- Any other relevant information on the matters protected by the EPBC Act.

This report addresses the matters set out under Attachment A on the Department's Notification of Referral Decision. Sections 2 to 9 of this report provides response to the information requested for the assessment by preliminary documentation to allow the Minister (or delegate) to make an informed decision on whether or not to approve, under Part 9 of the EPBC Act, the taking of the action for the purposes of each controlling provision. Table 1.1 below details the relevant matters included within this report that has been prepared for the assessment by preliminary documentation.

Table 1.1 Matters addressed within preliminary documentation

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2 Description of the action

2.1 Project Location, boundaries and size

The Corridor Section Project Boundary is within the municipalities of Brimbank, Moonee Valley, Moreland and Hume. Main works and construction activities for the Corridor Section are to be contained to:

- Parcels of land between Sharps Road, Tullamarine and the Albion-Jacana rail corridor, crossing Steele Creek and the Western Ring Road
- The Albion-Jacana rail corridor between Jacana station and Barwon Avenue, Sunshine North
- Additional land outside the Albion-Jacana rail corridor along the Maribyrnong River including part of the Western Ring Road
- Several local roads outside the Albion-Jacana rail corridor for access purposes.

The Corridor Section Project Boundary currently occupies the following land:

- Development footprint: 361 hectares (ha)
- Avoidance footprint: 241 ha
- Disturbance footprint: 120 ha of which 27 ha is construction works and 93 ha is permanent works

A map of the proposed action, showing the extent of the Corridor Section Project Boundary is provided in Figure 2.1.

2.2 Project Scope

The Corridor Section Project (this action) includes the following main works:

- Construction of the new MAR tracks, comprising an approximately 8 km dual track railway and associated overhead line equipment (OHLE), combined services route (CSR) and track drainage works, including:
 - > A 2.3 km long elevated twin track viaduct structure between Sharps Road, Tullamarine and the Albion-Jacana rail corridor, crossing Steele Creek and the Western Ring Road including emergency and maintenance access points.
 - > New at-grade MAR tracks within the existing Albion-Jacana rail corridor, located on the Western side of the existing Australian Rail Track Corporation (ARTC) tracks.
 - > An elevated twin track viaduct structure across the Maribyrnong River valley, adjacent to the Western side of the existing state significant heritage bridge.
 - > Slewing of ARTC tracks between Keilor Park Drive and the Calder Freeway.
- Signalling works along the Albion-Jacana rail corridor between Jacana Station and Barwon Avenue, Sunshine North and within the new MAR corridor North of the Western Ring Road.
- Construction of an intake supply substation at Terror Street or the Northeast area of Brimbank Park and two traction substations at Fullarton Road and within the McIntyre Sidings, Sunshine North.
- Construction of two new Digital Train Radio System (DTRS) facilities one North or South of Keilor Park Drive, Keilor East and a second at Airport Drive, Tullamarine.
- Diversion, relocation and replacement works associated with utilities and underground services, including the existing ARTC CSR, high voltage (HV) transmission lines and numerous miscellaneous assets
- Protection works associated with the Exxon Mobil jet fuel pipeline along the Albion-Jacana rail corridor.

- Modifications to existing structures, including structural modifications and strengthening works at Calder Freeway inbound and outbound bridges, Fullarton Road bridge, Western Ring Road on-ramp and off-ramp bridges, Keilor Park Drive and McIntyre Road bridges.
- Replacement of shared use path (SUP) connections at Calder Freeway / Fullarton Road, provision of a new SUP overpass at Cranbourne Avenue, and provision of a Strategic Cycling Corridor link between Western Ring Road and Airport Drive via Steele Creek.
- The provision of retention basins at several locations along the Albion-Jacana rail corridor
- Establishment of temporary construction laydown areas, site offices, worksites, storage, parking areas and access roads

2.3 Timing and Duration of Project Phases

Anticipated timing and duration of the Corridor Section works are detailed in Table 2.1 below.

Table 2.1 Melbourne Airport Project Corridor Section, anticipated timing and duration of construction works

Phase	Timing and approximate duration of works
Construction Phase	January 2023 – December 2028
Operation Phase	2029 - ongoing

2.4 Preparatory Works

As set out in the referral, the following investigative and preparatory works do not form part of the proposed action as they could occur in their own right independent of the MAR Project without warranting approval under the EPBC Act, and have been assessed and determined not to have a direct or indirect impact upon MNES:

- Activities associated with designing and assessing the potential impacts of Corridor Section Project such as geotechnical and environmental investigations, site surveys and establishing the location and integrity of existing utilities and services
- The protection, modification or relocation of utilities and services, rail signalling, cabling and associated infrastructure where such activities are comparable in scope and scale to replacement, renewal and/or maintenance and are undertaken in accordance with applicable Victorian planning and environmental approval processes
- Salvage of Aboriginal cultural heritage material and other management actions required to be undertaken in compliance with the MAR Project specific cultural heritage management plans approved under the Victorian Aboriginal Heritage Act 2006 or other compliance with that Act, and to the satisfaction of the relevant Registered Aboriginal Party (RAP) for the area
- Site establishment works, including site offices, traffic and environmental controls (e.g. sediment fencing), access points, access ways, temporary car parking, work platforms and hardstand and laydown areas undertaken in accordance with applicable Victorian planning and environmental approval processes
- Vegetation removal to facilitate the above enabling works, where the vegetation removal will not have a potential direct or indirect impact to MNES.

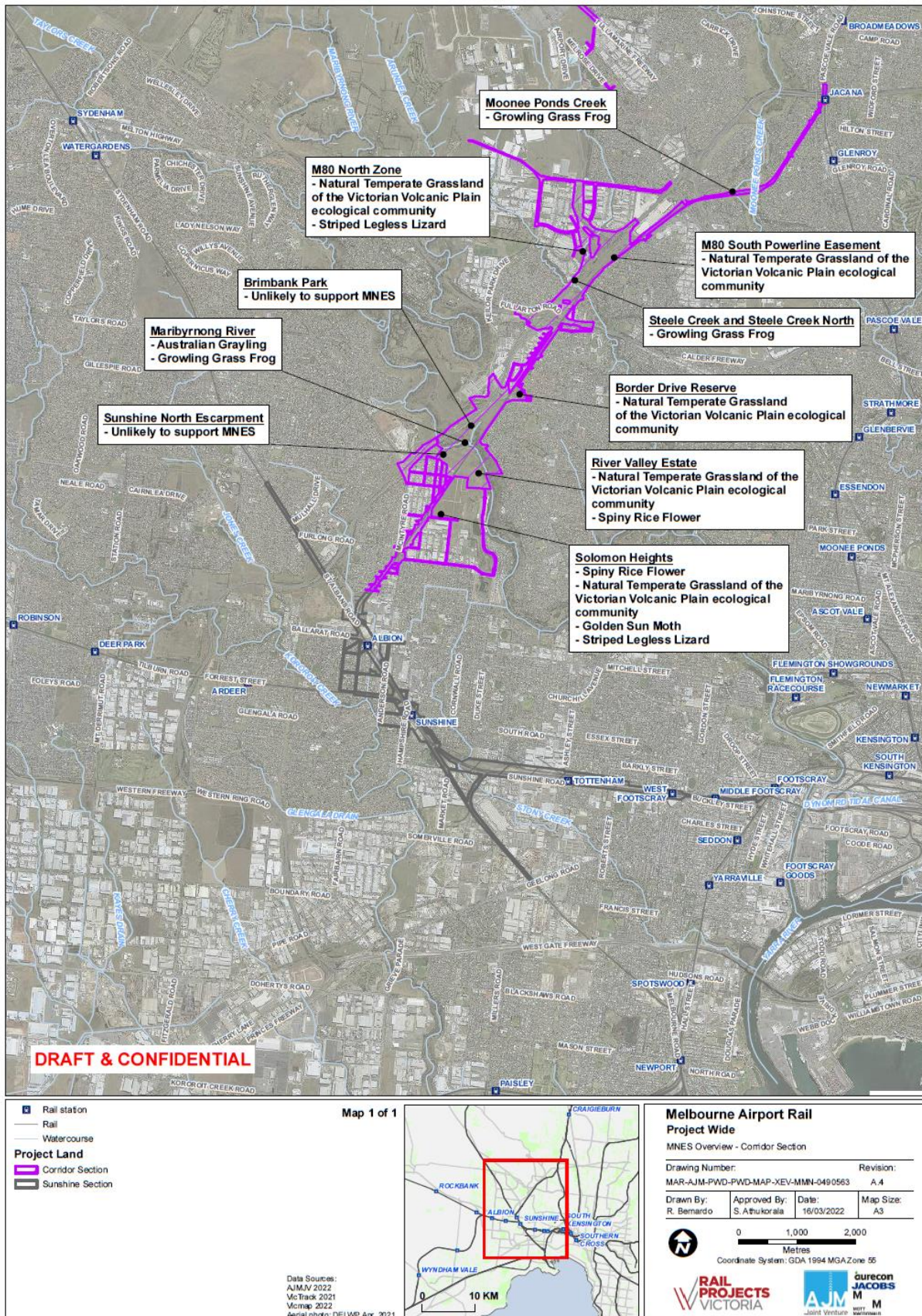


Figure 2.1 Corridor Section Project Boundary and MNES

2.5 Cumulative impact

AJM Joint Venture (AJM-JV) on behalf of Rail Projects Victoria (RPV) prepared and submitted two separate referrals for the Melbourne Airport Rail Project under the EPBC Act, the Corridor Section (EPBC Ref: 2021/9081) and Sunshine Section (EPBC Ref: 2021/9040).

The assessment of the MAR Project State Land across two separate referrals has considered the guidance detailed in the EPBC Act Policy Statement: Staged Developments – Split referrals: Section 74A of the EPBC Act (DSEWPC 2013). The justification for seeking assessment of the State Land portion of the MAR Project via two referrals is as follows:

- The two sections of the MAR Project (Sunshine and Corridor) are two geographically distinguished areas
- Separate referrals for State main works does not reduce the ability to effectively mitigate against potential impacts to MNES
- Separate referrals for State main works does not inhibit the ability to assess potential cumulative impacts on any MNES
- There is a distinct difference in likely impacts to MNES between the Sunshine Section and Corridor Section Projects on MAR Project State Land. While the Corridor Section has been assessed as resulting in significant impact on Spiny Rice-flower and Striped Legless Lizard populations, the Sunshine Section Project does not have a significant impact on any MNES as outlined in the referral 2021/9040 submitted in September 2021. Importantly the Sunshine Section Project does not result on any impacts to MNES.

Land supporting Spiny Rice-flower plants and Striped Legless Lizard habitat identified within the Sunshine Section Project referral area have been designated as No Go Zones. Therefore, Spiny Rice-flower and Striped Legless Lizard will not be subject to any direct impacts by the Sunshine Section of the Project. Additional mitigation measures will be undertaken to manage the potential for indirect impacts on Spiny Rice-flower and Striped Legless Lizard within the referral area.

3 Relevant impacts

3.1 Survey methodology

A comprehensive program of desktop, field and targeted ecology assessments were completed to inform the ecological impact assessment for the MAR Project and are detailed in the MAR State Land Terrestrial Ecology Impact Assessment (AJM-JV 2021a). A summary of the methods used to inform the Ecology Impact Assessment specific to MNES within the MAR Corridor Section are provided as follows:

- **Desktop assessment** - This included a review of previous assessments and relevant databases including the Victorian Biodiversity Atlas (VBA) and Commonwealth Protected Matters Search Tool (PMST) to identify all EPBC Act listed threatened species and communities with potential to occur within 5 kilometres of the Corridor Section Project Boundary.
- **Initial site survey** to broadly characterise the ecological character of the MAR Corridor Section Project Land.
- **Detailed ecological site assessment** (including mapping and assessment of native vegetation and habitat for threatened species) throughout the Corridor Section Project Boundary. This initial assessment involved all sections of the Corridor Section Project Boundary being surveyed by two ecologists (including areas of native and non-native vegetation). Determinations were made during this assessment for the entire Corridor Section Project Boundary as to whether areas supported native vegetation and/or habitat for threatened species.
 - > The presence of native vegetation was determined as per the definitions of native vegetation (patches and scattered trees) defined in Victoria's *Guidelines for the removal, destruction or lopping of native vegetation*;
 - > Consideration of potential habitat for threatened species was determined based on a combination of factors including:
 - The presence of preferred habitat features for threatened species considered from the desktop assessment, i.e. rocky habitat (including areas of embedded rock), grassy habitats (irrespective of native or non-native origin), waterways, or treed habitats (irrespective of whether trees were remnant or planted).
 - Evidence of significant soil disturbance suggested by areas that had been subject to clearing, excavation, rock rolling, soil mounding, illegal dumping or other activities that alter the ground layer. Sites that were deemed as having been subject to soil disturbance were considered unlikely to support threatened species.
 - The density and species of weeds present. Particularly, the dominance of species like Galenia, African Box-thorn, Artichoke Thistle were considered to represent areas that are likely to have been subject to some form of soil disturbance and were considered unlikely to support threatened flora. Areas that were dominated (i.e. were distinguished by a cover of >80%) of Serrated Tussock, Chilean Needle-grass, Toowoomba Canary-grass and/or Cocksfoot were also considered unlikely to support threatened flora. These species often formed a dense smothering cover, resulting in a lack of inter tussock space, and recruitment opportunity for native and/or threatened flora. This was often seen in the lack of native herbs in these areas.
- **Targeted surveys** - Based on the results of the desktop and detailed ecological site-based assessment, a likelihood of occurrence analysis was undertaken for threatened species listed under the EPBC Act. This assessment considered the above factors. Threatened species determined as having a moderate or high likelihood of occurrence in the Corridor Section Project Boundary and the potential for impact from the Corridor Section Project Works, were then subjected to targeted surveys in areas of potential habitat (irrespective of whether these areas supported native or non-native vegetation). Full details of the methodology and extent of targeted surveys undertaken for threatened species in the Corridor Section is provided in Appendix A and summarised in Table 3.1. Details of the relevant published Commonwealth guidelines for each targeted threatened species is provided in Table 3.1, along with the detail of the method applied during the investigation to provide clarity of appropriateness

of survey methodology. Mapping of the locations of targeted surveying undertaken for threatened fauna is provided in Appendix B. Detail of the results of targeted surveys is provided in Section 3.3 and 3.4.

No field based aquatic survey was undertaken for the waterways that intersect the State Project Boundary. Rather an assessment of potential impacts to threatened aquatic species that may use the waterways was undertaken in a separate aquatic ecology assessment (AJM-JV 2021b). This was based on review of desktop information and general observations during site visits of the relevant waterways, and considered threatened fish species including Australian Grayling.

Table 3.1 Summary of targeted surveys for threatened flora and fauna undertaken for the MAR Corridor Section

Threatened species	Conservation Status under EPBC Act	Published survey guidelines and flowering Time / active season	MAR Corridor Section Survey Details			Results (individuals / habitat recorded within the Corridor Section)
			Location of targeted surveys conducted within the MAR Corridor Section	No. of survey days / nights	Survey method and timing undertaken	
Flora						
Spiny Rice-flower (<i>Pimelea spinescens</i> subsp. <i>spinescens</i>)	Critically Endangered	The Commonwealth <i>Referral guidelines for Spiny Rice-flower</i> state transect surveys should be undertaken when the plant is in flower (April to August) in areas containing suitable habitat for the species (DEWHA 2009a).	<ul style="list-style-type: none">Road and rail reserve adjacent to Solomon HeightsRiver Valley Estate and adjacent rail corridorM80 North Zone and adjoining road reserve	5	Transect surveys between June and August (2019/20) in all areas of suitable habitat. Survey method was undertaken as per Commonwealth survey guidelines for Spiny Rice-flower.	56 individual plants recorded (including at/adjacent to River Valley Estate, and at/adjacent to Solomon Heights)
Matted Flax-lily (<i>Dianella amoena</i>)	Endangered	Survey guidelines as documented in the Commonwealth Species Profile and Threats Database (SPRAT) for Matted Flax-lily states surveys should be conducted between November and February (DCCEEW 2022a).	<ul style="list-style-type: none">Road and rail reserve adjacent to Solomon HeightsRiver Valley Estate and adjacent rail corridorM80 North Zone	3	December (2019/20), January 2021 Survey method was undertaken as per Commonwealth survey guidelines for Matted Flax-lily	Not recorded in Corridor Section, therefore considered unlikely to occur
Button Wrinklewort (<i>Rutidosia leptorhynchoidea</i>)	Endangered	No Commonwealth survey guidelines exist for this species. Flowers November – January.	<ul style="list-style-type: none">Road and rail reserve adjacent to Solomon HeightsRiver Valley Estate and adjacent rail corridorM80 North Zone	3	December (2019/20), January 2021 Survey method was undertaken within the known flowering time of the Button Wrinklewort.	Not recorded in Corridor Section, therefore considered unlikely to occur
Small Golden Moths Orchid (<i>Diuris basaltica</i>)	Endangered	The Commonwealth <i>Survey Guidelines for Australia’s Threatened orchids</i> states targeted surveys should occur in the flowering time of the target species, and notes the flowering time of Small Golden Moths orchid as September – October (DoE 2013).	<ul style="list-style-type: none">Road and rail reserve adjacent to Solomon HeightsRiver Valley Estate and adjacent rail corridorM80 North Zone	3	September – October (2019/20) Survey method was undertaken as per the Commonwealth survey guidelines for Small Golden Moths Orchid	Not recorded in Corridor Section, therefore considered unlikely to occur

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Threatened species	Conservation Status under EPBC Act	Published survey guidelines and flowering Time / active season	MAR Corridor Section Survey Details			Results (individuals / habitat recorded within the Corridor Section)
			Location of targeted surveys conducted within the MAR Corridor Section	No. of survey days / nights	Survey method and timing undertaken	
Large-headed Fireweed (<i>Senecio macrocarpus</i>)	Vulnerable	Survey guidelines documented in the Commonwealth Species Profile and Threats Database (SPRAT) for Large-headed Fireweed state that the optimal time to survey for the species is when the plants are flowering which is usually September to November (DCCEEW 2022b).	<ul style="list-style-type: none"> Road and rail reserve adjacent to Solomon Heights River Valley Estate and adjacent rail corridor M80 North Zone 	3	September – October (2019/20) Survey method was undertaken as per Commonwealth survey guidelines for Large-headed Fireweed	Not recorded in Corridor Section, therefore considered unlikely to occur
Fauna						
Striped Legless Lizard (<i>Delma impar</i>)	Vulnerable	The Commonwealth <i>Referral Guidelines for the vulnerable Striped Legless Lizard (DSEWPC 2011)</i> state that artificial shelter site surveys must be installed by August, at least one month prior to any tile checks are undertaken. Checks must be undertaken at least twice a month (ideally once a week) from early September to December.	<ul style="list-style-type: none"> Rail Corridor adjacent to Solomon Heights River Valley Estate and adjacent rail corridor M80 South Powerline Reserve Brimbank Park Sunshine North Escarpment M80 North Zone 	54	<p>Tile grids were set up prior to August 2019 for 2019/2020 surveys and between 7-12th August 2020 for 2020-2021 surveys. Each round of survey tile checks commenced one month after tile grids were set up, with checks being undertaken at least twice a month for September to December. Specifically, tiles were checked fortnightly for the 2019-2020 surveys, resulting in 11 checks between September 2019 and January 2020. For the 2020-2021 surveys, tiles were checked weekly to fortnightly between September and December, and then fortnightly until February, resulting in a total of 16 checks for each grid between September and February.</p> <p>Survey method was undertaken as per the Commonwealth survey guidelines for Striped Legless Lizard.</p>	<p>Striped Legless Lizard individuals were recorded at M80 North Zone in targeted surveys.</p> <p>2.145 ha of habitat for Striped Legless Lizard was mapped (at M80 North Zone and at/ adjacent to Solomon Heights).</p>

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Threatened species	Conservation Status under EPBC Act	Published survey guidelines and flowering Time / active season	MAR Corridor Section Survey Details			Results (individuals / habitat recorded within the Corridor Section)
			Location of targeted surveys conducted within the MAR Corridor Section	No. of survey days / nights	Survey method and timing undertaken	
Golden Sun Moth (<i>Synemon plana</i>)	Vulnerable	<i>The Significant impact guidelines for the critically endangered golden sun moth</i> (DEWHA 2009b) states that targeted survey for the species be undertaken during the local flying season (noted as late October to early January), over at least four survey days, at approximately weekly intervals. Conditions should be warm to hot, clear, relatively still days, with at least two days since rain.	<ul style="list-style-type: none"> Rail corridor adjacent to Solomon Heights River Valley Estate and the adjacent rail corridor M80 South Powerline Easement Border Drive Reserve 	15	<p>Targeted surveys for Golden Sun Moth involved walking transects no greater than 5 m apart with the intent of flushing Golden Sun Moth from the grass and observing them in flight. Surveys were undertaken during the species flying season (between November and January) over four separate visits, spaced at least one week apart.</p> <p>Surveys were conducted during the middle of the day, between 10 am and 2 pm, when temperatures were above 20°C, cloud-cover and wind were minimal, and after at least 48 hours since last rainfall. Details of the Survey method was undertaken as per the Commonwealth survey guidelines for Golden Sun Moth.</p>	<p>No Golden Sun Moth were recorded in the Corridor Section during targeted surveys.</p> <p>0.657 ha of habitat for Golden Sun Moth was mapped at /adjacent to Solomon Heights based on habitat suitability and previous records.</p>
Growling Grass Frog (<i>Litoria raniformis</i>)	Vulnerable	<i>The Significant impact guidelines for the vulnerable growling grass frog</i> (DEWHA 2009c) states targeted surveys for Growling Grass Frog be undertaken between November and March (in temperate regions), over at least two nights, under suitable conditions (ie when daytime temperatures are >15 degrees C and night time temperatures are > 12 degrees C with moderate to no wind).	<ul style="list-style-type: none"> Stony Creek West Maribyrnong River Steele Creek M80 North Zone retention basin Moonee Ponds Creek 	8	<p>Targeted surveys for Growling Grass Frog were undertaken between November to December, across two separate survey nights, after sunset, during suitable weather conditions (being warm and with little wind).</p> <p>Survey method was undertaken as per the Commonwealth survey guidelines for Growling Grass Frog.</p>	<p>Recorded within the Maribyrnong River, and from one call in the M80 North retention basin.</p> <p>Known to occur in the Maribyrnong River and Moonee Ponds Creek based on previous records.</p>

Based on the methodology detailed above including the findings of the targeted surveys, six MNES were identified within the Corridor Section Project Boundary. A description of the potential impact to each of these MNES as a result of the Corridor Section of the MAR Project is provided in Section 3.3. MNES identified in the Corridor Section include:

- Threatened ecological communities:
 - > Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)
- Threatened flora:
 - > Spiny Rice-flower (*Pimelea spinescens subsp. spinescens*)
- Threatened fauna
 - > Striped Legless Lizard (*Delma impar*)
 - > Golden Sun Moth (*Synemon plana*)
 - > Growling Grass Frog (*Litoria raniformis*)
 - > Australian Grayling (*Prototroctes maraena*).

While either deemed unlikely to occur or unlikely to be subject to impacts from the Corridor Section Project works, assessment of potential impacts to the following additional MNES is provided in Section 3.4:

- Matted Flax-lily (*Dianella amoena*)
- Button Wrinklewort (*Rutidosia leptorhynchoidea*)
- Small Golden Moths Orchid (*Diuris basaltica*)
- Large-headed Fireweed (*Senecio macrocarpus*)
- Clover Glycine (*Glycine latrobeana*)
- Basalt Peppercreep (*Lepidium hyssopifolium* s.s.)
- Seasonal Herbaceous Wetlands of the Temperate Lowland Plains
- Grey-headed Flying Fox (*Pteropus poliocephalus*)

3.2 Potential impacts

The following potential impacts to MNES were considered as part of the impact assessment undertaken for the proposed action:

- Direct removal and/or destruction of MNES or associated habitats from construction activities, resulting in habitat loss and fragmentation
- Facilitating the spread of noxious weeds, pest animals and pathogens (including Chytrid Fungus) through the transport of propagules, that would result in disturbance or degradation to MNES
- Temporary barriers to dispersal of MNES created by construction activities such as fences. This is considered to be most relevant at the Maribyrnong River bridge, where substantial construction works will need to occur across both important terrestrial and aquatic habitats.
- Works near waterways causing sedimentation through the exacerbation of erosion or through surface runoff, which may result in impacts to MNES that use these waterways. This is particularly relevant at the Maribyrnong River, Steele Creek and Steele Creek North, where rail viaducts will be constructed over these waterways.
- Temporary reduction in water quality due to the release of construction runoff at the Maribyrnong River, Steele Creek and Steele Creek North, which may result in impacts to MNES that use these waterways
- Increased noise and vibration that may result in reduced habitat suitability for MNES and potential disruptions to migration of Australian Grayling

- Temporary dust impacts to MNES
- Potential injury or death to MNES (namely Striped Legless Lizard, Growling Grass Frog and Golden Sun Moth) during construction activities.
- Permanent barriers to dispersal of MNES associated with new infrastructure or clearance of vegetation that constituted a fauna dispersal corridor
- Ongoing absence of permanently removed vegetation causing a net reduction in available habitat, and dispersal potential for MNES
- Increase light and noise that may impact MNES
- Impacts to MNES (namely Striped Legless Lizard) associated with the shading of habitat due to the construction of the viaduct at the M80 North Zone.

The above potential impacts are considered for each MNES as relevant in the following sections.

3.3 MNES identified in the Corridor Section

3.3.1 Natural Temperate Grassland of the Victorian Volcanic Plain

NTGVVP is a critically endangered ecological community that is associated with the Victorian Volcanic Plain (VVP) bioregion (DEWHA 2011a). It is commonly associated with the Victorian Ecological Vegetation Class (EVC) of Plains Grassland (EVC 132).

Within the Corridor Section Project Boundary, a total of 3.816 ha of NTGVVP has been identified across the following locations:

- Solomon Heights and adjacent rail corridor (0.360 ha)
- River Valley Estate and adjacent rail corridor (2.401 ha)
- M80 South Powerline Easement (0.073 ha)
- M80 North Zone (0.290 ha)
- Border Drive Reserve (0.692 ha).

The following Sections detail the planned and potential impacts to NTGVVP as a result of the Corridor Section Project Works. The extent of NTGVVP in the Corridor Section Project Boundary, as well as impacts to NTGVVP from the proposed action is shown in Appendix C.

3.3.1.1 Assessment of Loss

The proposed action will have a direct impact on 0.221 ha of NTGVVP. This direct removal will occur within the following locations across the Corridor Section:

- Rail Corridor to the west of Solomon Heights (0.021 ha)
- Munro Avenue to the south of Solomon Heights (0.110 ha)
- River Valley Estate (0.040 ha); and
- M80 North Zone (0.050 ha).

Removal of NTGVVP at and adjacent to Solomon Heights and the River Valley Estate is unavoidable as these locations form part of critical access routes for the Maribyrnong River Bridge construction. Impacts to NTGVVP in these locations are limited to degraded examples of the community that occur on the edge of broader patches at Solomon Heights proper and the River Valley Estate. Impacts to adjacent, high-quality remnants of NTGVVP have been avoided.

Removal of NTGVVP at the M80 North Zone is unavoidable due to the location of the proposed rail alignment and viaduct. Impacts to NTGVVP in the M80 North Zone are limited to small, disconnected patches of this community. Impacts to other areas of NTGVVP in the M80 North Zone have been avoided through the implementation of No Go Zones in the area.

Given the low quality (degraded and/or disconnectedness) and small quantum (0.221 ha) of NTGVVP being removed in the Corridor Section, it is concluded that this impact is unlikely to result in a significant impact on the listed ecological community.

3.3.1.2 Duration of Impacts

Table 3.2 outlines the proposed construction program and duration, and the potential impacts to NTGVVP associated with each phase of the construction program.

Table 3.2 Proposed construction Program for Corridor Works and associated Impacts to NTGVVP

Phase	Duration (approx.)	Proposed Start Date	Proposed Works	Impacts/ Potential Impacts to NTGVVP
Construction	3.5 – 4 years	Jan 2023	Works associated with the construction of the Maribyrnong River Bridge	<ul style="list-style-type: none"> Removal of NTGVVP at Solomon Heights and the River Valley Estate.
	4.5 years	November 2023	Works associated with the construction of the M80 North Zone Viaduct	<ul style="list-style-type: none"> Removal of NTGVVP at the M80 North Zone
	3 years	Feb 2024	Construction of rail alignment	<ul style="list-style-type: none"> For the total duration of construction of the Steele Creek Viaduct, patches of NTGVVP will be isolated from one another by the construction footprint, which is aligned between the two patches.

3.3.1.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

Direct impacts to NTGVVP are known and predictable as a small area of the ecological community is to be cleared. The impact to the area of NTGVVP is considered irreversible as the area that currently supports the community will be permanently removed for the construction access and/or rail infrastructure upgrades.

All potential indirect impacts on NTGVPP have been considered as part of the impact assessment and are listed as follows:

- Dust impacts
- Increase in fragmentation and reduction of extent
- Weed invasion
- Disturbance and modification.

While the level of impact on the community from the above indirect impacts is somewhat unpredictable/unknown, mitigation measures have been provided to manage these potential impacts on retained areas of the community.

3.3.1.4 Conclusion

Project works will result in the removal of 0.221 ha of NTGVVP, with areas of removal restricted to small fragments of the community along degraded edges of larger patches that will persist following construction.

The minor impact to NTGVVP is not considered to interfere with the recovery of the community or influence substantial changes in species composition of remaining NTGVVP across the Corridor Section. Given the low quality (degraded and/or disconnectedness) and small quantum (0.221 ha) of NTGVVP being removed in the Corridor Section, it is concluded that this impact is unlikely to result in a significant impact on the listed ecological community.

Although the Corridor Section will result in minor impact to NTGVVP, additional mitigation measures including best practice weed hygiene, dust barriers, adherence to construction footprint and No Go Zones (detailed in Section 4.4.3) will be implemented to ensure potential indirect impacts to NTGVVP are minimised.

3.3.2 Striped Legless Lizard

Striped Legless Lizard is a long, thin-bodied lizard that lacks forelimbs and has reduced vestigial hind limbs (Cogger 2014). The species is known to inhabit native grasslands dominated by Kangaroo Grass and introduced pasture grass and inhabits cleared woodland areas (Cogger 2014; TSSC 2016). The species' primary habitat is encompassed by four nationally threatened ecological communities including NTGVVP which occurs in the Corridor Section Project Boundary. The Striped Legless Lizard is listed as Vulnerable under the EPBC Act. Targeted surveys for Striped Legless Lizard in the Corridor Section were undertaken in all areas of suitable habitat (irrespective of whether the areas comprised native or non-native vegetation) as detailed in Appendix A and as summarised in Table 3.1.

A total of 2.145 ha of Striped Legless Lizard habitat was mapped within the Corridor Section and is considered to occur in the following locations:

- Solomon Heights (including Munro Avenue in the South and the adjacent rail corridor) (0.712 ha) – habitat for Striped Legless Lizard was mapped in this area based on habitat suitability and presence of previous records.
- M80 North Zone (1.433 ha) – habitat for Striped Legless Lizard was mapped in this area based on recording of several individuals during targeted surveys.

The extent of Striped Legless Lizard habitat in the Corridor Section Project Boundary, as well as impacts to Striped Legless Lizard habitat from the proposed action is shown in Appendix C.

3.3.2.1 Assessment of Loss

A total of 1.144 ha of Striped Legless Lizard habitat is to be removed from the Corridor Section Project Boundary including:

- 0.375 ha of habitat at Munro Avenue in the South of Solomon Heights, which forms a critical access path for the Maribyrnong River Bridge construction. As above, utilisation of Munro Avenue has allowed the avoidance of Solomon Heights proper, minimising impacts to habitat for this species and eliminating fragmentation.
- 0.768 ha of habitat within the M80 North Zone, where Striped Legless Lizard habitat is intersected by the viaduct alignment.

Neither of these locations are considered to form habitat critical to the survival of the Striped Legless Lizard as per the definitions outlined in the MNES Significant impact guidelines 1.1 (DoE 2013).

In addition to direct removal of habitat, the Corridor Section Project works will have the following impacts on the species:

- Fragmentation of Striped Legless Lizard habitat at the M80 North Zone resulting in the isolation of a 0.46 ha patch of habitat from the core remaining habitat area of 3.55 ha. It is noted that fragmentation in this area will be temporary, and be limited to the construction phase of the Project. Following construction, the area under the rail viaduct in this area will be subject to strategic revegetation with tussock forming grasses which will effectively re-connect existing areas of Striped Legless Lizard habitat through this area.
- Potential localised reduction in habitat suitability due to noise and vibration associated with the construction of the M80 North Zone Viaduct.
- Potential injury or death of some Striped Legless Lizard individuals which may occur during the habitat clearance within the M80 North Zone.

The proposed impacts to Striped Legless Lizard from the Corridor Section Project works have been assessed as resulting in a significant impact to the species.

3.3.2.2 Duration of Impacts

Table 3.3 outlines the proposed construction program and duration, and the potential impacts to Striped Legless Lizard associated with each phase of the construction program.

Table 3.3 Proposed construction Program for Corridor Works and associated Impacts to Striped Legless Lizard

Phase	Duration (approx.)	Proposed Start Date	Proposed Works	Impacts/ Potential Impacts to Striped Legless Lizard
Construction	3.5 – 4 years	January 2023 Spring and Autumn (September – March)	Works associated with the construction of the Maribyrnong River Bridge	<ul style="list-style-type: none"> Removal of Striped Legless Lizard habitat at Munro Avenue Potential for indirect impacts to retained areas of Striped Legless Lizard habitat during construction
	3.5 - 4 years	November 2023	Works associated with the construction of the M80 North Zone Viaduct	<ul style="list-style-type: none"> Removal and fragmentation of Striped Legless Lizard habitat Potential for indirect impacts to retained areas of Striped Legless Lizard habitat during construction
Operation	Lifetime of project	N/A	N/A	<ul style="list-style-type: none"> Shading as a result of overhead rail alignment and viaduct at M80 North Zone

3.3.2.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

Impacts to Striped Legless Lizard are largely known and predictable as habitat for the species is to be cleared. The impact to the area of habitat is considered irreversible as the area that currently supports the Striped Legless Lizard will be permanently removed for construction access and/or rail infrastructure upgrades.

All further potential impacts on Striped Legless Lizard have been evaluated within the impact assessment and include the following:

- Temporary fragmentation
- Potential injury or death during habitat clearance works
- Temporary reduction in habitat suitability during construction due to noise and vibration
- Degradation of retained and rehabilitated habitat through shading at M80 North Zone

Although impacts such as shading, noise and vibration are largely unknown/unpredictable, previous assessments have deemed these listed impacts unlikely to adversely affect habitat critical to the survival of Striped Legless Lizard. This is evident as Striped Legless Lizard have been shown to persist in urban habitat fragments in close proximity to areas where major civil construction has taken place. This includes the Striped Legless Lizard population present within the M80 North Zone where individuals have been recorded as part of targeted surveys (AJM-JV 2021), which have persisted to date despite the construction of the nearby M80 bridge over Steele Creek and continual traffic noise from adjoining major roads nearby.

As populations of Striped Legless Lizard are known to persist in the vicinity of construction works of a similar scale, it is considered unlikely that the construction and associated noise and vibration would have a permanent effect on the population of Striped Legless Lizard currently at the M80 North Zone. Additionally, localised and intermittent noise and vibration disturbance across a three-year period will be restricted to one (breeding) season to further reduce impact to the species. Mitigation measures, as detailed in Section 4.4.3, have been provided to further manage and reduce the likelihood of unknown/unpredictable impacts on Striped Legless Lizard.

3.3.2.4 Conclusion

A total of 2.145 ha of Striped Legless Lizard habitat was mapped within the Corridor Section. Throughout the planning and design phases of the MAR project, planning and environmental specialists and design engineers have continually refined the project design to avoid, protect and manage impacts to Striped Legless Lizard and Striped Legless Lizard habitat. Based on avoidance, mitigation and the implementation of No Go Zones, 0.998 ha of Striped Legless Lizard habitat will be unimpacted and protected from the proposed Project Works. Mitigation measures as detailed in Section 4.4.3, in addition to No Go Zones within remaining habitat, will be implemented to minimise additional impact to Striped Legless Lizard.

The remaining 1.144 ha of habitat will be directly removed as a result of the Corridor Section works and offsets have been proposed in Section 5.2 to compensate for the significant impact to Striped Legless Lizard from the Project.

Although, the clearance of habitat within the M80 North Zone will also result in temporary fragmentation and reduced occupancy of Striped Legless Lizard during the construction phase, these impacts are considered temporary as following construction this area will be subject to revegetation with tussock forming grasses which will effectively re-connect existing areas of Striped Legless Lizard habitat through this area. Additionally, the removal of habitat at Munro Avenue in the South of Solomon Heights is unlikely to result in fragmentation or long-term impact to Striped Legless Lizard populations given removal is limited to the outer edges of grassland habitat.

3.3.3 Spiny Rice-flower

Spiny Rice-flower is a small spreading perennial shrub that grows to 50 centimetres (cm) in height. The species is endemic to Victoria where it predominately grows on basalt soils and is associated with Kangaroo Grass (*Themeda triandra*) grasslands (DEWHA 2009a). Spiny Rice-flower is listed as Critically Endangered under the EPBC Act. Targeted surveys for Spiny Rice-flower in the Corridor Section were undertaken in all areas of suitable habitat as detailed in Appendix A and as summarised in Table 3.1.

A total of 56 Spiny Rice-flower plants have been identified in the Corridor Section Project Boundary from the following locations:

- River Valley Estate (48 individuals recorded in this area during targeted surveys)
- Rail corridor adjacent to the River Valley Estate (6 individuals recorded in this area during targeted surveys).
- Solomon Heights (2 individuals recorded in this area during targeted surveys)

The extent of Spiny Rice-flower in the Corridor Section Project Boundary, as well as impacts to the species from the proposed action is shown in Appendix C.

3.3.3.1 Assessment of Loss

Eight (8) Spiny Rice-flower plants will be removed as a result of the proposed works across the following locations:

- Two plants within the Munro Avenue Road Reserve in the south of Solomon Heights. These two Spiny Rice-flowers are associated with a 0.110 ha area of grassland habitat in this area.
- Six plants within the rail reserve adjacent to River Valley Estate. These six Spiny Rice-flowers are associated with a 0.040 ha area of grassland habitat in this area.

Removal of Spiny Rice-flower (and associated grassland habitat) at Munro Avenue (along the southern boundary of Solomon Heights) is considered unavoidable as it forms part of the critical access route for the Maribyrnong River Bridge construction. Solomon Heights proper supports a large population of Spiny Rice-flower. The chosen access route along Munro Avenue has allowed avoidance of the numerous Spiny Rice-flower to the north. This has minimised the number of Spiny Rice-flower plants lost and restricted removal only to the edge of the population, eliminating any fragmentation to the population.

Removal of Spiny Rice-flower (and associated grassland habitat) in the rail reserve adjacent to River Valley Estate is considered unavoidable as it also forms part of the critical access route for the Maribyrnong River Bridge construction. Restricting construction to the rail corridor has avoided the larger population of Spiny Rice-flower located in the adjacent private property and avoided fragmentation of that large population.

One of the key impact thresholds for a significant impact to Spiny Rice-flower is the loss of >5 individuals (DEWHA 2009a). Given the Corridor Section will result in the removal of 8 individuals of Spiny Rice-flower, the Corridor Section Project works will result in a significant impact to the species.

3.3.3.2 Duration of Impacts

Table 3.4 outlines the proposed construction program and duration, and the potential impacts to Spiny Rice-flower associated with each phase of the construction program.

Table 3.4 Proposed construction Program for Corridor Works and associated Impacts to Spiny Rice-flower

Phase	Duration (approx.)	Proposed Start Date	Proposed Works	Impacts/ Potential Impacts to Spiny Rice-flower
Construction	3.5 – 4 years	January 2023	Works associated with the construction of the Maribyrnong River Bridge	<ul style="list-style-type: none"> Removal of Spiny Rice-Flower at Munro Avenue and within the rail reserve adjacent to River Valley Estate. Potential for indirect impacts to retained Spiny Rice-flower individuals during construction

3.3.3.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

Impacts to Spiny Rice-flower are known and predictable as eight individuals of this species are to be removed. The impact to Spiny Rice-flower is considered irreversible as eight individuals of the species will be permanently removed for the construction access and/or rail infrastructure upgrades.

All potential indirect impacts on other Spiny Rice-flower individuals have been considered as part of the impact assessment and are listed as follows:

- Weed invasion
- Road and rail maintenance
- Dust
- Disturbance and modification.

Although the level of impact on remaining individuals from the above listed indirect impacts is somewhat unpredictable/unknown, mitigation measures have been provided to manage these potential impacts on retained habitat where the species is known to occur.

3.3.3.4 Conclusion

A total of 56 Spiny Rice-flower plants were identified within the Corridor Section and throughout the planning and design phases of the MAR project, planning and environmental specialists and design engineers have continually refined the project design to avoid, protect and manage impacts to Spiny Rice-flower. Based on avoidance, mitigation and the implementation of No Go Zones, 48 individual Spiny Rice-flower plants will be unimpacted and protected from the proposed Project works.

The remaining eight (8) Spiny Rice-flower plants will be directly removed as a result of the Corridor Section Project works. Given the proposed impact is above the impact threshold (loss of >5 individuals) (DEWHA 2009a), the Corridor Section Project works will result in a significant impact to the species. The area of impact to Spiny Rice-flower habitat has been determined as 0.150 ha, based on the area of grassland habitat being impacted where Spiny Rice-flower occurs. Offsets have been proposed in Section 5.2 to compensate for the significant impact to Spiny Rice-flower from the Project.

Although the Corridor Section will permanently remove eight (8) Spiny Rice-flower individuals, it is considered unlikely that the remaining population will be fragmented or disjoined from contiguous habitat as a result of Project works. This is largely due to the configured removal of Spiny Rice-flower plants from the outer edges of supporting populations. Several mitigation measures, as detailed in Section 4.4.3, will be implemented to further minimise impacts on remaining populations of Spiny Rice-flower within the Corridor Section.

3.3.4 Golden Sun Moth

Golden Sun Moth is a medium sized diurnal (day flying) moth and is sexually dichromatic in wing colour (DEWHA 2009b). The forewings of females are brown and grey while the hind wings are yellow with black spots. Male Golden Sun Moth have dark brown forewings with grey scales and bronze-coloured hind wings. The species is known to occupy native grassland or grassy woodland habitat and has also been found within degraded grassland and patches invaded with weedy and introduced flora. The Golden Sun Moth is listed as Vulnerable under the EPBC Act. Targeted surveys for Golden Sun Moth in the Corridor Section were

undertaken in all areas of suitable habitat (irrespective of whether the areas comprised native or non-native vegetation) as detailed in Appendix A and as summarised in Table 3.1.

A total of 0.657 ha of Golden Sun Moth habitat has been identified within the Corridor Section Project Boundary, all of which is at Solomon Heights (including Munro Avenue to the South). Habitat for Golden Sun Moth was mapped in this area based on the presence of habitat suitability and presence of previous records.

The extent of Golden Sun Moth habitat in the Corridor Section Project Boundary, as well as impacts to Golden Sun Moth habitat from the proposed action is shown in Appendix C.

3.3.4.1 Assessment of Loss

0.319 ha of Golden Sun Moth habitat will be removed at Munro Avenue to the South of Solomon Heights. This habitat is considered to be contiguous with the broader area of Golden Sun Moth habitat present at Solomon Heights, which exceeds 10 ha in total. This impact is considered unavoidable as it forms part of the critical access route for the Maribyrnong River bridge construction. As above, utilisation of Munro Avenue has allowed the avoidance of Solomon Heights proper, minimising impacts to habitat for this species and eliminating fragmentation.

The relevant threshold for a significant impact to Golden Sun Moth in an area of large/continuous habitat is the loss/degradation or fragmentation of >0.5 ha (DEWHA 2009b). Based on the proposed loss of 0.319 ha of Golden Sun Moth habitat in the Corridor Section, it is concluded that the Corridor Section Project works will not result in a significant impact to the species.

3.3.4.2 Duration of Impacts

Table 3.5 outlines the proposed construction program and duration, and the potential impacts to Golden Sun Moth associated with each phase of the construction program.

Table 3.5 Proposed construction Program for Corridor Works and associated Impacts to Golden Sun Moth

Phase	Duration (approx.)	Proposed Start Date	Proposed Works	Impacts/ Potential Impacts to Golden Sun Moth
Construction	3.5 – 4 years	January 2023	Works associated with the construction of the Maribyrnong River Bridge	<ul style="list-style-type: none"> Removal of Golden Sun Moth Habitat at Munro Avenue Potential for indirect impacts to retained areas of Golden Sun Moth habitat during construction

3.3.4.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

Impacts to Golden Sun Moth are known and predictable as habitat for the species is to be cleared. The impact to the area of habitat is considered irreversible as the area that currently supports the Golden Sun Moth will be permanently removed for construction access and/or rail infrastructure upgrades.

All potential indirect impacts on Golden Sun Moth have been considered as part of the impact assessment and are listed as follows:

- Dust
- Potential injury or death to individuals
- Weed invasion
- Disturbance and modification to adjacent habitat

While the level of impact on Golden Sun Moth from the above listed indirect impacts is somewhat unpredictable/unknown, mitigation measures have been provided to manage these potential impacts on retained areas of habitat.

3.3.4.4 Conclusion

Project works will result in the removal of 0.319 ha of Golden Sun Moth habitat within the Corridor Section. This impact is not considered to constitute a significant impact under the EPBC Act as it falls below the 0.5

ha significant impact threshold (DEWHA 2009b). Habitat for removal is largely restricted to small fragments of grassland along the broader edge of larger patches at Munro Avenue (within the Corridor Section).

The minor removal of Golden Sun Moth habitat is not considered to interfere with dispersal or long-term impact to the species. Additional mitigation measures including No Go Zones and exclusion fencing (detailed in Section 4.4.3) will be implemented to ensure potential indirect impacts to Golden Sun Moth are minimised.

3.3.5 Growling Grass Frog

The Growling Grass Frog is a large frog that can reach up to 10 centimetres (cm) in length. The species is usually found among vegetation within or at the edges of permanent water such as slow flowing streams, swamps, lagoons and lakes. In disturbed areas the species also commonly occurs in artificial waterbodies such as farm dams, irrigation channels, irrigated rice crops and disused quarries, particularly where natural habitat is no longer available. Favoured sites frequently have a large proportion of emergent, submerged and floating vegetation, and slow-flowing or still water (Hamer and Organ 2008). The Growling Grass Frog is listed as Vulnerable under the EPBC Act. Targeted surveys for Growling Grass Frog in the Corridor Section were undertaken in all areas of suitable habitat for the species, including within all three waterways that intersect the MAR Corridor Section, as detailed in Appendix A and as summarised in Table 3.1.

The Growling Grass Frog is known to utilise the following waterways to varying degrees within the Corridor Section Project Boundary:

- The Maribyrnong River
- Steele Creek/Steele Creek North
- Moonee Ponds Creek.

The Maribyrnong River and Moonee Ponds Creek are important dispersal corridors for the species that incorporate pockets of suitable breeding habitat along their length. The utilisation of Steele Creek/Steele Creek North by the species is considered to be more sporadic, with utilisation within the Corridor Section Project Boundary likely limited to dispersal.

The extent of Growling Grass Frog habitat in the Corridor Section Project Boundary, as well as impacts to the species from the proposed action is shown in Appendix C.

3.3.5.1 Assessment of Loss

A total of 1.200 ha of Growling Grass Frog habitat is to be removed from the Corridor Section Project Boundary including:

- 0.268 ha of permanent removal (0.256 ha at the Maribyrnong River and 0.012 ha within M80/Steele Creek)
- 0.932 ha of temporary removal (with revegetation) (0.388 ha at the Maribyrnong River and 0.544 ha at Steele Creek)

Additionally, the Project will result in the temporary loss of a non-breeding wetland at the M80 retention basin and localised reduction in habitat suitability in the vicinity of the Maribyrnong River due to noise and vibration during the construction of the Maribyrnong River Bridge.

Since the preparation of the EPBC referral for the Corridor Section (EPBC Ref 2021/9081), further design refinements have been made to avoid and minimise impacts to Growling Grass Frog. Specifically, this has involved the relocation of Pier 8 to slightly further away from at the Maribyrnong River. An updated assessment of the Corridor Section against the significant impact guidelines for Growling Grass Frog has been provided to reflect the current proposed impact to the species in Section 3.3.5.4.

3.3.5.2 Duration of Impacts

Table 3.6 outlines the proposed construction program and duration, and the potential impacts to Growling Grass Frog associated with each phase of the construction program.

Table 3.6 Proposed construction Program for Corridor Works and associated Impacts to Growling Grass Frog

Phase	Duration (approx.)	Proposed Start Date	Proposed Works	Impacts/ Potential Impacts to Growling Grass Frog
Construction	2.5 years	January 2023	Works associated with the construction of the Maribyrnong River Bridge	Permanent and temporary removal of riparian habitat
	3 years	November 2023	Works associated with the construction of the M80 North Zone Viaduct	Potential for indirect impacts to Growling Grass Frog habitat during construction

3.3.5.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

Impacts to Growling Grass Frog are known and predictable where habitat for the species is to be cleared. The impact to the area of habitat is considered irreversible as the area that currently supports the Growling Grass Frog will be permanently removed for construction access and/or rail infrastructure upgrades.

All potential indirect impacts on Growling Grass Frog have been considered as part of the impact assessment and are listed as follows:

- Potential injury or death to individual Growling Grass Frogs
- Weed invasion
- Disturbance and modification to adjacent habitat
- Chytrid Fungus
- Temporary reduction in habitat suitability during construction (noise and vibration)

While the level of impact on Growling Grass Frog from the above is somewhat unpredictable/unknown, mitigation measures have been provided (see Section 4.4.3) to manage these potential impacts.

3.3.5.4 Conclusion

1.200 ha of Growling Grass Frog habitat is to be removed from the Corridor Section Project Boundary. Of this, 0.932 ha is temporary removal, whilst the remaining 0.268 ha will be permanent removal of habitat.

Table 3.7 provides an updated assessment against the Significant Impact Thresholds (DEWHA 2009c) for the Growling Grass Frog. As detailed in Table 3.7, project works within the Corridor Section are unlikely to have a significant impact on the species. Although the removal of riparian habitat at the Maribyrnong River is likely to result in temporary impacts to Growling Grass Frog occupancy within the project area, this habitat is considered to be sporadically utilised by the species for overwintering, and non-critical foraging and dispersal only. Importantly, the temporary removal of this habitat and the Corridor Section Works themselves will not form a barrier to dispersal for the species or have a detrimental impact on population dynamics. It is therefore unlikely that the proposed works will result in immediate or long-term isolation, fragmentation, or impact to Growling Grass Frog populations.

Additionally, robust and detailed mitigation measures including design refinements, exclusion fencing, scheduling planned works outside breeding seasons and strategic revegetation following construction will be implemented to ensure the Project will not interfere with species movements and dispersal capability within and adjacent to proposed works.

Table 3.7 Significant Impact Assessment for the Growling Grass Frog within the Corridor Section

Ecological Element Affect	Significant Impact Threshold	Likelihood of significant impact to Growling Grass Frog within the Corridor Section
Habitat degradation in an area supporting an important population	Permanent removal or degradation of terrestrial habitat (for example between ponds, drainage lines or other temporary/permanent habitat) within 200 metres of a water body in temperate regions, or 350 metres of a water body in semi-arid regions, that results in the	Unlikely: The Corridor Section of the MAR Project will remove 1.200 ha of Growling Grass Frog habitat within 200 m of a water body. Of this, 0.932 ha is temporary removal and 0.268 ha is permanent removal. Whilst habitat removal will occur adjacent to the Maribyrnong River, a known dispersal corridor for the species, it is unlikely to result in any disruption to dispersal

Ecological Element Affect	Significant Impact Threshold	Likelihood of significant impact to Growling Grass Frog within the Corridor Section
	loss of dispersal or overwintering opportunities for an important population.	or overwintering opportunities given proposed works are limited to the southern side of the river and will not form a barrier for dispersal.
	Alteration of aquatic vegetation diversity or structure that leads to a decrease in habitat quality.	Unlikely: Anticipated impacts within the Corridor Section are limited to terrestrial vegetation, therefore aquatic vegetation diversity and structure within the Maribyrnong River will not be impacted or affected.
	Alteration to wetland hydrology, diversity and structure (for example any changes to timing, duration or frequency of flood events) that leads to a decrease in habitat quality.	Unlikely: Anticipated impacts within the Corridor Section are limited to terrestrial vegetation, therefore wetland hydrology, diversity and structure within the Maribyrnong River will not be impacted or affected.
	Introduction of predatory fish and/or disease agents	Unlikely: The Corridor Section of the MAR Project is unlikely to result in the introduction of predatory fish or disease given works are limited to terrestrial land.
Isolation and fragmentation of populations	Net reduction in the number and/or diversity of water bodies available to an important population.	Unlikely: The Corridor Section of the MAR Project will not impact or intrude on the Maribyrnong River, therefore the project is unlikely to interfere with the number or diversity of available waterbodies for Growling Grass Frog.
	Removal or alteration of available terrestrial or aquatic habitat corridors (including alteration of connectivity during flood events).	Unlikely: Although riparian terrestrial habitat is to be removed from the Maribyrnong River, connectivity between aquatic habitat and terrestrial corridors are unlikely to be impacted.
	Construction of physical barriers to movement between water bodies, such as roads or buildings.	Unlikely: Proposed works for the Corridor Section do not involve the construction of physical barriers including roads or buildings that will inhibit or block dispersal or movement of species between water bodies. This will allow the movement of Growling Grass Frog within the Maribyrnong River throughout the construction period.

3.3.6 Australian Grayling

The Australian Grayling is a small to medium sized (170-300 mm) slender fish and requires certain waterway conditions to allow for feeding, movement, and spawning (Backhouse *et al.* 2008). The species is distributed within streams and coastal rivers from the Shoalhaven River (NSW) south and west to the Hopkins River system (Vic) (Backhouse *et al.* 2008). Australian Grayling is listed as Vulnerable under the EPBC Act.

The Maribyrnong River is known to support Australian Grayling, with records of the species known from as recently as 2015 approximately 2.5km upstream from where the Maribyrnong River intersects the Corridor Section State Project Boundary. The species is unlikely to occur in Steele Creek and Moonee Ponds Creeks as the species has not been recorded in these catchments.

3.3.6.1 Assessment of Loss

No direct impacts are proposed to Australian Grayling. Potential impacts have been considered in the EPBC Act referral and are presented in the following sections. Based on the lack of impacts proposed to the Australian Grayling, the Corridor Section Project works will not result in a significant impact to the species.

3.3.6.2 Duration of Impacts

Table 3.8 outlines the proposed construction program and duration, and the potential impacts to Australian Grayling associated with each phase of the construction program.

Table 3.8 Proposed construction Program for Corridor Works and associated Impacts to Australian Grayling

Phase	Duration (approx.)	Proposed Start Date	Proposed Works	Potential Impacts to Australian Grayling
Construction	3.5 – 4 years	January 2023	Works associated with the construction of the Maribyrnong River Bridge	<ul style="list-style-type: none"> Temporary and localised disturbance to habitat (noise and vibration)

Phase	Duration (approx.)	Proposed Start Date	Proposed Works	Potential Impacts to Australian Grayling
		Restricted to December – March or July – August		<ul style="list-style-type: none"> Shading Erosion and Sedimentation
Operation	Lifetime of project	N/A	N/A	Shading

3.3.6.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

No proposed works for the Project will directly impact or remove habitat for the Australian Grayling.

All potential impacts on Australian Grayling have been evaluated within the impact assessment and include the following:

- Temporary reduction in habitat suitability during construction (noise and vibration)
- Shading
- Erosion and Sedimentation in adjacent waterways

Although potential impacts from shading, noise and vibration are largely unknown/unpredictable, previous assessment have deemed these listed impacts unlikely to adversely affect habitat critical to the survival Australian Grayling. Given predicted works are temporary and highly localised around the Maribyrnong River, it is unlikely that Australian Grayling habitat and populations will be fragmented as a result of construction works. Importantly, project works will allow for maintained dispersal and movement of Australian Grayling within the Maribyrnong River, therefore the migration and breeding of the species will be uninterrupted.

Further mitigation measures as detailed in Section 4.4.3, including limiting works adjacent to the Maribyrnong River to outside the critical migration period of Australian Grayling, have been provided to manage and reduce the likelihood of unknown/unpredictable impacts on the species.

3.3.6.4 Conclusion

The Corridor Section is unlikely to result in a significant impact on the Australian Grayling.

Proposed works are likely to cause some localised reduction in habitat suitability in the vicinity of the Maribyrnong River due to noise and vibration during the construction of Pier 8. However, given works are temporary and will occur outside the critical migration, it is unlikely that Australian Grayling will experience interrupted breeding, fragmentation, or reduced dispersal capability within the Maribyrnong River.

3.4 MNES unlikely to occur or unlikely to be subject to impacts from the Corridor Section of the MAR Project

3.4.1 Matted Flax-lily

Matted Flax-lily is a medium (20-90 cm) perennial tufted lily endemic to Victoria. The species is patchily distributed from eastern to south-western Victoria and largely confined to drier grassy woodland and grassland communities. Matted Flax-lily flowers from November to January (Carter 2010). Matted Flax-lily is listed as Endangered under the EPBC Act. Targeted surveys for Matted Flax-lily in the Corridor Section were undertaken in all areas of suitable habitat as detailed in Appendix A and as summarised in Table 3.1.

Previous investigations at River Valley Estate recorded Matted Flax-lily in 2001 (DELWP 2022). However, Spring/Summer targeted surveys conducted for the MAR Project within all areas of potential habitat did not record the species. Such records of this species in the area are likely to be mis-identifications, namely with other *Dianella* species, particularly *Dianella longifolia* var. *grandis* which was recorded in various locations throughout the Corridor Section Project Boundary. Based on these findings, Matted Flax-lily is considered unlikely to occur within the Corridor Section Project Boundary.

3.4.1.1 Assessment of Loss

As Matted Flax-lily is unlikely to occur in the Corridor Section Project Boundary, the Project is unlikely to result in adverse impacts on the species.

3.4.1.2 Duration of Impacts

N/A

3.4.1.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

N/A

3.4.1.4 Conclusion

The Corridor Section Project is unlikely to result in an adverse impact on Matted Flax-lily.

3.4.2 Button Wrinklewort

Button Wrinklewort is a medium (30-35 cm) perennial tufted or simple herb (Humphries and Webster 2003). The species is confined to basalt grasslands between Rokewood and Melbourne (RBGV 2014). Button Wrinklewort is listed as Endangered under the EPBC Act. Targeted surveys for Button Wrinklewort in the Corridor Section were undertaken in all areas of suitable habitat as detailed in Appendix A and as summarised in Table 3.1.

No previous records of Button Wrinklewort exist adjacent to the Corridor Section (DELWP 2022). High-quality native grassland and suitable non-native habitat for this species was identified within the Corridor Section. Targeted surveys were conducted in all areas considered to have the potential to support the species and no individuals were recorded within the Project area. Therefore, Button Wrinklewort is considered to have a low likelihood of occurrence within the Corridor Section Project Boundary.

3.4.2.1 Assessment of Loss

As Button Wrinklewort is unlikely to occur in the Corridor Section Project Boundary, the Project is unlikely to result in adverse impacts on the species.

3.4.2.2 Duration of Impacts

N/A

3.4.2.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

N/A

3.4.2.4 Conclusion

The Corridor Section Project is unlikely to result in an adverse impact on Button Wrinklewort.

3.4.3 Small Golden Moths Orchid

Small Golden Moths is a small (6-15 cm) perennial orchid endemic to Victoria (Backhouse and Lester 2010). This species is extremely rare and has a limited distribution within the basalt plains to the west of Melbourne. Small Golden Moths is listed as Endangered under the EPBC Act. Targeted surveys for Small Golden Moths in the Corridor Section were undertaken in all areas of suitable habitat as detailed in Appendix A and as summarised in Table 3.1.

Targeted spring/summer flora surveys within areas of suitable habitat in the Corridor Section Project Boundary did not record this species. Therefore, Small Golden Moths is considered to have a low likelihood of occurrence within the Corridor Section Project Boundary.

3.4.3.1 Assessment of Loss

As Small Golden Moths Orchid is unlikely to occur in the Corridor Section Project Boundary, the Project is unlikely to result in adverse impacts on the species.

3.4.3.2 Duration of Impacts

N/A

3.4.3.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

N/A

3.4.3.4 Conclusion

The Corridor Section Project is unlikely to result in an adverse impact on the Small Golden Moths Orchid.

3.4.4 Large-headed Fireweed

Large-headed Fireweed is a medium to large (40-70 cm) perennial daisy that occurs in grassland, sedgeland, woodland and shrubland on basalt-derived loamy clay soils. The species is widely distributed across western Victoria, though the species is largely confined to Themeda grasslands from Melbourne west to Skipton area. Large-headed Fireweed is listed as Vulnerable under the EPBC Act. Targeted surveys for Large-headed Fireweed in the Corridor Section were undertaken in all areas of suitable habitat as detailed in Appendix A and as summarised in Table 3.1.

Targeted surveys for Large-headed Fireweed within all areas of potential habitat for the species in the Corridor Section Project Boundary did not record this species. Therefore, Large-headed Fireweed is considered unlikely to occur within the Corridor Section Project Boundary.

3.4.4.1 Assessment of Loss

As Large-headed Fireweed is unlikely to occur in the Corridor Section Project Boundary, the Project is unlikely to result in adverse impacts on the species.

3.4.4.2 Duration of Impacts

N/A

3.4.4.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

N/A

3.4.4.4 Conclusion

The Corridor Section Project is unlikely to result in an adverse impact on Large-headed Fireweed.

3.4.5 Clover Glycine

Clover Glycine is a decumbent or ascending herb. While the species has a widespread distribution, it is of sporadic occurrence and rarely encountered. It grows mainly in grasslands and grassy woodlands. Clover Glycine is listed as Vulnerable under the EPBC Act. It flowers September to December.

Clover Glycine has not been recorded within 5 km of the MAR Corridor Section Project Land within the last 30 years. As such, it was considered to have a low likelihood of occurrence in the MAR Corridor Section Project Land. While this species was not the main subject of targeted surveys undertaken for the Project, targeted flora surveys undertaken for other threatened flora species in grassy habitats in the MAR Corridor Section Project Land during December 2019, December 2020 and January 2021 would have recorded this species if it was present (as the survey timing coincides with the known flowering time of the Clover Glycine).

Based on the reasons presented above, Clover Glycine is considered unlikely to occur within the Corridor Section Project Boundary.

3.4.5.1 Assessment of Loss

As Clover Glycine is unlikely to occur in the Corridor Section Project Boundary, the Project is unlikely to result in adverse impacts on the species.

3.4.5.2 Duration of Impacts

N/A

3.4.5.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

N/A

3.4.5.4 Conclusion

The Corridor Section Project is unlikely to result in an adverse impact on Clover Glycine.

3.4.6 Basalt Peppercress

Basalt Peppercress is a perennial herb to 50 cm high. In Victoria, this species is known from a small number of main populations in western Victoria including at Moorabool, Trentham, Bolwarrah and Spargo Creek. Original habitat types for this species included grassy woodlands, casuarina woodlands and grasslands. Basalt Peppercress is listed as Endangered under the EPBC Act. It flowers summer to autumn.

Given the lack of preferred habitats and high level of disturbance in the MAR Project Land, it is considered that this species has a low likelihood of occurrence. While this species was not the main subject of targeted surveys undertaken for the Project, targeted flora surveys undertaken for other threatened flora species in grassy habitats in the MAR Corridor Section Project Land during December 2019, December 2020 and January 2021 would have recorded this species if it was present (as the survey timing coincides with the known flowering time of the Basalt Peppercress).

Based on the reasons presented above, Basalt Peppercress is considered unlikely to occur within the Corridor Section Project Boundary.

3.4.6.1 Assessment of Loss

As Basalt Peppercress is unlikely to occur in the Corridor Section Project Boundary, the Project is unlikely to result in adverse impacts on the species.

3.4.6.2 Duration of Impacts

N/A

3.4.6.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

N/A

3.4.6.4 Conclusion

The Corridor Section Project is unlikely to result in an adverse impact on Basalt Peppercreess.

3.4.7 Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

The Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains is an ecological community. It is listed as Critically Endangered under the EPBC Act. This ecological community was not considered in the ecological assessment report that supported the EPBC referral for the Project (EPBC 2021/9081), as this community was not listed on the EPBC Act Protected Matters Report that was generated for the Project area.

The published distribution map of this ecological community (DSEWPC 2012) shows this community does not occur within the project area or surrounds, with the closest suggested occurrence of the community well west of the Project area, near Point Cook. Furthermore, no portion of the Project area supported wetlands that met the published key diagnostic characteristics and condition thresholds for classification as the ecological community (TSSC 2012).

Based on the above information, it is considered that this ecological community does not occur within the MAR Corridor Section Project Boundary.

3.4.7.1 Assessment of Loss

As this ecological community does not occur in or adjacent to the Project area, no impacts are proposed to this ecological community.

3.4.7.2 Duration of Impacts

N/A

3.4.7.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

N/A

3.4.7.4 Conclusion

The Corridor Section Project will have no impacts on the Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains ecological community.

3.4.8 Grey-headed Flying Fox

Grey-headed Flying-fox is a large fruit-eating bat, which occurs along Australia's east coast from Rockhampton in Queensland, south to Victoria. It is listed as vulnerable under the EPBC Act.

Two camps of this species exist in the greater Melbourne region, one at Yarra Bend Park in Kew and one on the Dandenong Creek at Doveton, in Melbourne's east. While numbers of Grey-headed Flying-fox in Melbourne fluctuate across the varying seasons, a large number of individuals remain at the Yarra Bend and Doveton camps throughout the year. The species breeds and sleeps at these two camp locations, and then forages broadly at night-time, being known to travel up to 50 km in a night. While the primary food source is blossom from Eucalyptus and related genera, Grey-headed Flying-fox also feed on a wide range of rainforest fruits, and the species has adapted to feeding on planted fruit trees in suburban and urban areas.

Given the relative close proximity of the Corridor Section Project Boundary to the permanent Grey-headed Flying-fox camp at Yarra Bend (~15 km), the species is likely to forage within and adjacent to the Corridor Section Project Boundary. However, such foraging activity in the Project area would be largely restricted to the following three heavily treed habitats:

- River Red-gum dominated Floodplain Riparian Woodland along the Maribyrnong River;
- Planted trees and Plains Grassy Woodland vegetation at Brimbank Park; and
- Variably treed habitats along Steele Creek.

Other mature eucalypts (remnant and planted) that occur within the Corridor Section Project Boundary would present additional foraging opportunities, though are likely to only be utilised occasionally/sporadically by the species. Other extensive areas of foraging habitat exist beyond the Corridor Section Project Boundary, such as treed habitats along the Yarra River and Melbourne's other waterways.

3.4.8.1 Assessment of Loss

The key foraging habitats for the species outlined above are largely being retained, with only minor clearing of treed vegetation being required at each of the three above mentioned locations, discussed further below.

- Impacts to potential foraging habitat for Grey-headed Flying-fox adjacent to the Maribyrnong River are limited to a narrow band of remnant tree removal/trimming for the allowance of construction access along the existing Shared User Path north of the Maribyrnong River (See Map 8 of Appendix C).
- Impacts to potential foraging habitat for Grey-headed Flying-fox at Brimbank Park are limited to a narrow band of planted tree removal in the north of the Brimbank Park area (See Map 12 of Appendix C).
- Impacts to potential foraging habitat for Grey-headed Flying-fox near Steeles Creek are limited to removal of a small number of scattered River Red-gums to the south of Steeles Creek where the viaduct is planned to be located (See Map 17 of Appendix C).

This small reduction in potential foraging habitat is considered unlikely to result in any adverse impacts on the Melbourne population or the species as a whole, particularly due to the extensive foraging opportunities that will remain within and beyond the Corridor Section Project Boundary.

3.4.8.2 Duration of Impacts

Minor loss of potential foraging habitat will occur during the construction phase of the project.

3.4.8.3 Unknown, Unpredictable, Indirect or Irreversible Impacts

The minor loss of potential foraging habitat is considered irreversible, particularly in the case where large trees are required for removal.

3.4.8.4 Conclusion

Given the minor extent of impact to potential foraging habitat, the Corridor Section Project will not result in a significant adverse impact on the Grey-headed Flying-fox.

4 Proposed avoidance and mitigation measures

An extensive process of avoiding and minimising impacts through design modifications and mitigating potential impacts has been undertaken in accordance with RPV's Environmental Management Governance workflow. This process is detailed below.

4.1 Rail Projects Victoria (RPV) Environmental Management Governance Workflow

The RPV Environmental Management Governance Workflow (Appendix D) together with approval requirements under Commonwealth and State legislation, enable Victorian Rail Infrastructure projects, such as the MAR Project to avoid and minimise impacts to biodiversity and other environmental values, where possible. This assessment has been completed in accordance with this framework.

The RPV Environmental Management Governance Workflow includes a method of how environmental values, including biodiversity, are to be assessed and considered through the design, planning approvals and environmental processes, and construction processes for projects. The framework allows for the implementation of the following steps:

- Avoid and minimise impacts first
- Mitigate impacts where avoidance is not possible
- Offset where residual impacts cannot be avoided.

The following sections detail how RPV's Environmental Management Governance Workflow has been implemented to avoid and mitigate impacts from the MAR Corridor Section.

4.2 Description of Avoidance

Detailed efforts to avoid and minimise impacts to ecological values have been undertaken during the site level planning process. Following identification of the route alignment, extensive desktop and field based ecological assessment has been undertaken by AJM-JV to identify native vegetation and ecological values within and adjacent to the Corridor Section Project Boundary. Detailed ecological assessment (including native vegetation and habitat assessments, as well as various targeted surveys for threatened species) has been conducted throughout the Corridor Section Project Boundary between 2018 and 2021. This assessment resulted in the identification of various significant ecological values, including EPBC Act listed threatened species and ecological communities. The identification of these significant ecological values prompted the early recommendation for removal of key areas from the Corridor Section Project Boundary and establishment of No Go Zones within the Corridor Section Project Boundary, with priority given to the avoidance of impacts to MNES. These design refinements and No Go Zones have since been incorporated into the project design and have resulted in the avoidance of a significant proportion of the MNES identified as detailed below.

The implementation of No Go Zones will involve the fencing off and restriction to these areas to protect the ecological values present. The Project will be designed and constructed to avoid impacts to the ecological No Go Zones. Ecological No Go Zones must encompass a buffer around the perimeter of the identified area of threatened ecological communities, mapped threatened species habitat and threatened flora species. Perimeters and buffer distances are to be approved by an appropriately qualified ecologist. Indirect impacts to No Go Zones will be managed as part of the Flora and Fauna Management Plan for the Project which must be implemented by the Delivery Partner as requirement of the Project EMF. It is also important to note that indirect impacts to ecological values within No-Go Zones and/or adjacent vegetation and habitat will also be protected via best practice environmental management measures as detailed in the CSTSMP, including dust management, sedimentation control and weed monitoring and control where relevant.

Details of further design refinements which were made since the submission of the EPBC Referral are provided in Section 4.3.

- **Solomon Heights (north side of Munro Avenue) (No Go Zones 7-8):**

- > The implementation of No Go Zones 7-8 result in the avoidance of impacts to an area of NTGVPP that supports habitat for Striped Legless Lizard and Golden Sun Moth. An area of NTGVPP which is also habitat for Golden Sun Moth, as well as two Spiny Rice-flower in this area cannot be avoided.
- **Solomon Heights (adjacent to rail corridor) (No Go Zone 9):**
 - > The implementation of No Go Zone 9 results in the avoidance of impacts to the western edge of a large area of NTGVPP at Solomon Heights that also supports habitat for Striped Legless Lizard and Golden Sun Moth. A small area of NTGVPP of lower quality (which does not support habitat for threatened fauna) will be required for removal in the rail corridor. The retention of vegetation in Solomon Heights been prioritised here to minimise impacts to the higher quality vegetation and habitat for MNES.
- **River Valley Estate (No Go Zone 10 and 11):**
 - > The implementation of No Go Zones 10 and 11 results in the avoidance of impacts to an extensive area of NTGVPP and large population of Spiny Rice-flower within River Valley Estate. A narrow area of NTGVPP and six Spiny Rice-flower in the adjacent rail corridor cannot be avoided.
- **Sunshine North Escarpment (No Go Zone 12):**
 - > N/A - This No Go Zone has been implemented to protect state listed ecological values only.
- **Maribyrnong River (No Go Zones 13, 14 and 15):**
 - > Access to the Maribyrnong River is required to bring construction materials for the new bridge crossing. Impacts to this area have been minimised by the decision to utilise the existing SUP on the north side of the river. Some vegetation that forms habitat for Growling Grass Frog adjoining the Maribyrnong River will be temporarily impacted during construction to allow for the required widening of the existing SUP to allow for construction vehicles to utilise this access route. The implementation of No Go Zones 13 to 15 either side of the Maribyrnong River have been incorporated to avoid any further impacts to Growling Grass Frog, and also to avoid impacts to the Australian Grayling that disperses through this waterway.
 - > Some tree canopy impacts exist at this location underneath the Maribyrnong River bridge which overlap with No Go Zones 13 and 15. The location and implementation of these No Go Zones are to protect the aquatic habitat values at the ground layer and within the waterway.
- **Brimbank Park (No Go Zone 16):**
 - > N/A - This No Go Zone has been implemented to protect state listed ecological values only.
- **Steele Creek and M80 North Zone (No Go Zones 17 to 19):**
 - > The M80 North Zone supports a large area of habitat for the Striped Legless Lizard, small disjunct patches of NTGVPP and a low value reach for Growling Grass Frog along Steeles Creek. This area presents one of the most challenging locations for the Project in regards to potential for impacts on ecological values including MNES, namely due to the amount of significant works required in a currently undeveloped area. Extensive workshops, project meetings and other communications have been undertaken with the design and ecology teams relevant to this area with the aim to avoid and minimise impacts to ecological values, while still meeting the objectives of the Project. The outcome for this area has been to constrain the works corridor through this area to the minimum required for construction (55m) and to route this in a way that avoids fragmentation of the larger areas of Striped Legless Lizard habitat. While some habitat for Striped Legless Lizard will be required to be removed for this construction corridor, a large proportion of this habitat will be avoided in No Go Zones either side. A large portion of the habitat area identified for Striped Legless Lizard has also been since removed from the Corridor Section Project Boundary. Further to this a new SUP is required as part of the Project delivery in this area. Three options were considered for this SUP, and the southern option that has the least impact on Striped Legless Lizard habitat was chosen. This southern option will result in reduced fragmentation of the larger habitat area. No Go Zones will also be implemented along a large proportion of Steeles Creek which provides a low value reach for the Growling Grass Frog. Some tree canopy impacts as assessed under the Guidelines exist at this location underneath the proposed viaduct which

overlap with No Go Zone 17. The location and implementation of these No Go Zones are to protect the aquatic habitat values at the ground layer and within the waterway.

- **M80 South Powerline easement (No Go Zone 20):**
 - > The implementation of No Go Zone 20 results in the avoidance of a small area of NTGVVP.
- **Moonee Ponds Creek (No Go Zone 21):**
 - > The implementation of No Go Zone 21 will result in the avoidance of potential impacts to an area that been identified as a high value reach Growling Grass Frog in Moonee Ponds Creek.
- **Border Drive Reserve (No Go Zone 22):**
 - > An area of NTGVVP is considered to occur within the central portion of the Border Drive Reserve in Keilor East as noted by ABZECO (2021) in an assessment undertaken in January 2021. This area, while notably disturbed, and utilised for recreation (football field) has conservatively been deemed a No Go Zone (NGZ 22) to avoid any potential impacts to NTGVVP in this area.

The above details provided highlight how the Project has been designed to avoid and minimise impacts on MNES. Summary of avoidance measures implemented within the Corridor Section Project Boundary is presented in Table 4.1. Mitigation measures to further mitigate impacts to MNES are detailed in Section 4.3.

Table 4.1 Summary of No Go Zones to be implemented in the Corridor Section Project Boundary

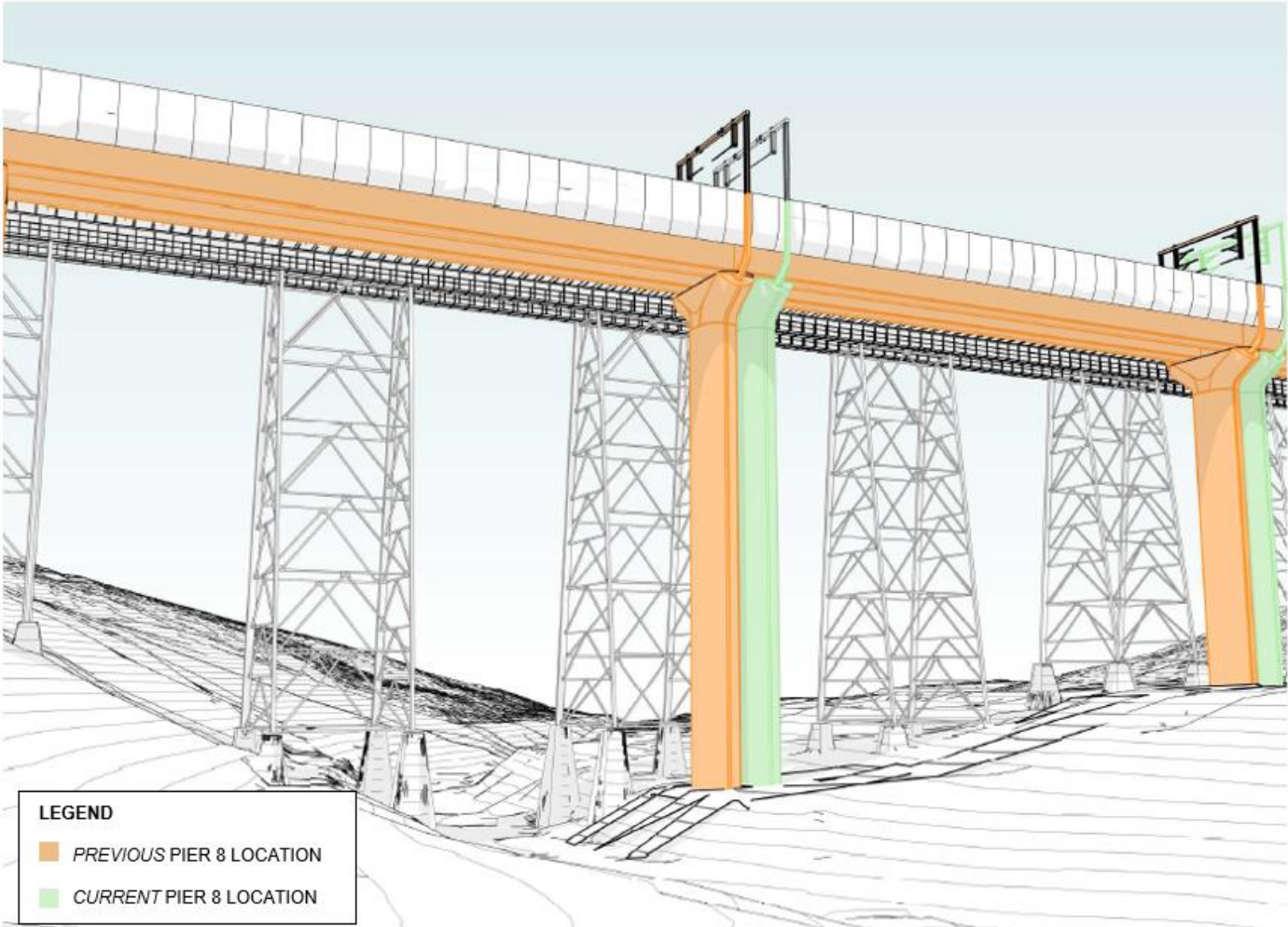

No Go Zone Number	Location	MNES to be protected in No Go Zone
No Go Zones		
7	Solomon Heights	<ul style="list-style-type: none"> NTGVVP Threatened Ecological Community Golden Sun Moth habitat Striped Legless Lizard habitat
8	Solomon Heights	<ul style="list-style-type: none"> Golden Sun Moth habitat Striped Legless Lizard habitat
9	Solomon Heights	<ul style="list-style-type: none"> NTGVVP Threatened Ecological Community Golden Sun Moth habitat Striped Legless Lizard habitat
10	Solomon Heights	<ul style="list-style-type: none"> NTGVVP Threatened Ecological Community
11	Solomon Heights	<ul style="list-style-type: none"> NTGVVP Threatened Ecological Community Spiny Rice-flower
12	Sunshine North Escarpment	N/A - (State significant values only)
13, 14, 15	Maribyrnong River	<ul style="list-style-type: none"> Growling Grass Frog – High Value Reach Major fauna dispersal corridor Floodplain Riparian Woodland with many large trees
16	Brimbank Park	N/A - (State significant values only)
17, 18, 19	Steele Creek and M80 North Zone	<ul style="list-style-type: none"> NTGVVP Threatened Ecological Community Striped Legless Lizard habitat Growling Grass Frog habitat
20	M80 South Powerline Easement	<ul style="list-style-type: none"> NTGVVP Threatened Ecological Community
21	Moonee Ponds Creek	<ul style="list-style-type: none"> Growling Grass Frog habitat
22	Border Drive Reserve	<ul style="list-style-type: none"> Potential NTGVVP Threatened Ecological Community

*Note: No Go Zones 1-6 are associated with the Sunshine Section of the MAR Project and are not detailed here.

4.3 Recent design refinements

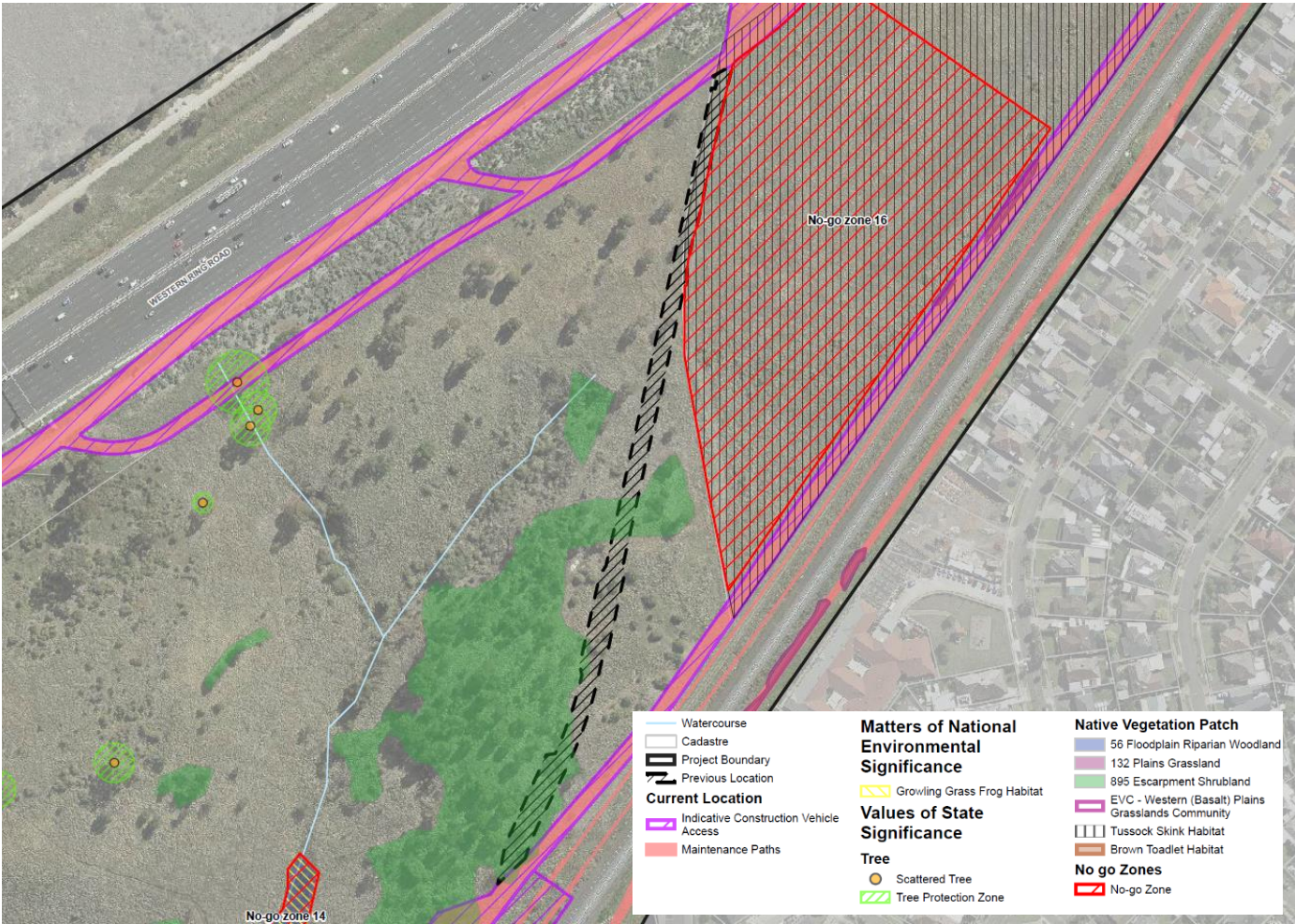
Since the time of the submission of the EPBC Referral of the Corridor Section, further refinement of the Corridor Section Project Boundary and works area has been undertaken with the aim to further reduce impacts to ecological values, with a particular emphasis on reducing impacts to MNES where possible. Table 4.2 summarises these design refinements and the avoidance of ecological values achieved.

Table 4.2: Summary of design refinements

Design refinement	Reduced impact to native vegetation and threatened biodiversity
<p>Relocation of Pier 8 by 4 metres away from the Maribyrnong River</p>  <p>LEGEND</p> <ul style="list-style-type: none">PREVIOUS PIER 8 LOCATIONCURRENT PIER 8 LOCATION	<ul style="list-style-type: none">Further avoidance of riparian Growling Grass Frog habitat at the Maribyrnong River.Reduced impact to the Maribyrnong River water channel which is known to support Australian Grayling.
<p>Relocation of the Shared User Path alignment at M80 North</p>  <p>Watercourse</p> <p>Cadastral</p> <p>Project Boundary</p> <p>Previous Location</p> <p>Current Location</p> <p>Shared User Path</p> <p>Matters of National Environmental Significance</p> <ul style="list-style-type: none">Striped Legless Lizard HabitatGrowling Grass Frog Habitat <p>Values of State Significance</p> <ul style="list-style-type: none">EVC - Natural Temperate Grassland of the Victorian Volcanic PlainDianella longifolia var. grandisTree<ul style="list-style-type: none">Canopy TreeScattered TreeTree Protection Zone <p>Native Vegetation Patch</p> <ul style="list-style-type: none">132 Plains Grassland851 Stream Bank ShrublandEVC - Western (Basalt) Plains Grasslands CommunityTussock Skink HabitatBrown Toadlet Habitat <p>No go Zones</p> <ul style="list-style-type: none">No-go ZoneNo-go Zone under infrastructure	<ul style="list-style-type: none">Reduction in the removal of Striped Legless Lizard habitat by refinements to No Go Zone 17 and the Corridor Section Project Boundary.Reduction in the removal of native vegetation.

Design refinement

Relocation of a permanent maintenance access path and construction access path at Brimbank Park



Reduced impact to native vegetation and threatened biodiversity

- Reduction in the removal of native vegetation.

Reduction of the State Project Land near Moonee Ponds Creek



- Avoidance of native vegetation.

4.4 Mitigation Measures

A summary of the mitigation measures that have been stipulated to minimise or avoid impacting on all MNES within the Corridor Section referral area is included within this preliminary documentation. These mitigation measures are applied through the MAR Corridor Section Environmental Management Framework (EMF). The EMF details specific Environmental Management Requirements (EMRs) and performance-based environmental standards/outcomes that must be implemented by the Delivery Partner such as measures to minimise impacts to the MNES before, during and following construction.

Mitigation measures to reduce potential impacts on MNES in the Corridor Section Project Boundary include:

- Implementation of 16 No Go Zones within the Corridor Section Project Boundary to protect MNES and other ecological values
- General best-practice construction measures
- Timing of works in sensitive areas to reduce potential noise and vibration impacts to MNES. This includes piling activities closest to Maribyrnong River that will be timed to avoid the critical migration period of the Australian Grayling, and piling activities at the M80 North Zone that will be limited to one Striped Legless Lizard active season.
- Specific construction methodology. This includes limiting piling at Pier 8 (adjacent to the Maribyrnong River) to bored piling to reduce potential noise and vibration impacts to Growling Grass Frog.
- Pre-emptive salvage and relocation of Striped Legless Lizard in areas where habitat will be removed prior to works
- Fauna salvage and relocation prior to removal of native vegetation and habitat
- Erosion and sediment controls
- Dust management
- Strategic revegetation to rehabilitate areas after construction

4.4.1 Environmental Management Framework

The Environmental Management Framework (EMF) is an environmental governance document utilised by RPV. The EMF provides a transparent and integrated governance framework to manage the environmental aspects of the Project. Particularly, the EMF has been prepared to address Clause 52.36 of the Victoria Planning Provisions, which must be approved by the Victorian Minister for Planning. The preparation of an EMF for the Project was also a condition of the referral decision under the Victorian *Environment Effects Act 1978* (EE Act) detailed in Section 6.1. The purpose of the EMF is to ensure that works are planned and performed so that the adverse effects on the environment are either avoided or minimised and are carried out in accordance with the approved Environmental Management Requirements (EMRs).

4.4.2 Environmental Management Requirements

The EMF includes EMRs which provide guidance on the environmental risk areas to be considered, and the minimum management standards to be achieved during design and construction. The EMRs are informed by site specific investigations and feedback from key stakeholders, including the Department of Environment, Land, Water and Planning (DELWP). The EMRs are not intended to prescribe how environmental outcomes are to be achieved, but rather set out an approach for delivering the works that is flexible and encourages innovation and use of best practice methodologies by the Delivery Partner. Compliance to the EMRs is a contractual requirement and key performance indicator for the Delivery Partner; this will be regularly monitored through inspections, reports, and independent audits.

Environmental Management Requirements proposed to form part of the EMF for this project that are relevant to the Preliminary Documentation are included in Table 4.3, Table 4.4 and Table 4.5. Note these are currently in draft format and are subject to change through the Minister for Planning review and approval process.

Table 4.3 Relevant Environmental Management EMRs from the MAR EMF

EMR #	Environmental Management Requirement	Applicable Guidance, Policy and Legislation	Project Phase
EMF1	<p>Deliver project in general accordance with an Environmental Management System</p> <p>The Delivery Partner must develop, implement, and maintain an EMS that conforms to Australian Standard AS/NZS ISO 14001:2015 Environmental Management Systems – requirements with guidance for use through design and construction of the Project.</p> <p>The EMS shall be maintained by the Delivery Partner, including surveillance auditing, until their works are complete.</p>	<p><i>Environment Protection Act 2017 and Environment Protection Regulations 2021</i></p> <p>Australian Standard AS/NZS ISO 14001:2015</p> <p>Environmental management systems – requirements with guidance for use.</p> <p>Australian Standard AS/NZS ISO 31000:2015 Risk Management Guideline</p> <p>EPA Victoria Publication 1834: Civil construction, building and demolition guide.</p>	Pre-construction & Construction
EMF2	<p>Undertake an Environmental Risk Assessment (ERA)</p> <p>Prior to a Delivery Partner commencing its work package to which this EMF applies the commencement of works the Delivery Partner must undertake an ERA specific to its their works package in accordance with ISO 31000: 2009 Risk management – principles and guidelines (or later revision) to identify key environment, heritage and amenity risks.</p> <p>The Delivery Partner is responsible for coordination of the ERA process and must consult with the Project Owner (as relevant). The ERA shall inform the Delivery Partner's approach to compliance with applicable EMRs and other relevant regulatory requirements.</p> <p>The ERA shall be reviewed and given any necessary updates every 12-month period, or after any significant project design changes.</p> <p>The ERA must be approved by the Project Owner prior to the commencement of works.</p>	As above	Pre-construction & Construction
EMF3	<p>Deliver project in accordance with a Construction Environmental Management Plan (CEMP)</p> <p>The Delivery Partner must prepare and implement a CEMP and Site Environmental Implementation Plans (SEIP) for the design and construction phases. The CEMP must also reference other plans as required by the EMRs and in accordance with the EMF.</p> <p>The CEMP and SEIPs must be developed in consultation with any relevant stakeholders under any statutory approvals or project obligations. The CEMP must be prepared in general accordance with measures outlined in EPA Victoria Publication 1834: Civil construction, building and demolition guide.</p> <p>The CEMP must include an environmental monitoring plan, including auditing and surveillance activities. CEMPs shall be reviewed and given any necessary updates every 12-month period. The SEIPs must be updated to reflect to the current site conditions and necessary site-specific controls to manage site environmental risks.</p> <p>The CEMP (and any subsequent revisions) must be approved by the Project Owner.</p>	As above	Pre-construction & Construction
EMF4	<p>Environmental management documentation program</p> <p>Prior to a Delivery Partner commencing its work package to which this EMF applies the Delivery Partner must prepare a program for the development of all environmental management documentation required by the EMF to a sufficient standard and outline how each EMR (where applicable) will be addressed and complied with.</p> <p>The program must address Delivery Partner documentation approval/ review requirements and timing (as listed in Section 4.3), including ERA, CEMP, management plans, SEIPs and other plans as required by the EMRs and as relevant to any stage of the works.</p> <p>This must be completed prior to any works commencing on site and provided to the Project Owner for approval.</p>	As above	Pre-construction

Table 4.4 Relevant Aquatic Ecology and Geomorphology EMRs from the MAR EMF

EMR #	Environmental Management Requirement	Applicable Policy and Legislation	Project Phase
AE1	<p>Working on Waterways - Protect Aquatic Habitat</p> <p>For all works in the vicinity (within 50m of named waterways, or as otherwise agreed by Project Owner and the Delivery Partner) of waterways managed by Melbourne Water, plans must be prepared that address mitigation measures to habitat, including where temporary and permanent structures are located and how they are designed, in consultation with Melbourne Water and relevant authorities.</p> <p>Each plan must address protection of fauna habitat values in existing waterbodies that are to be modified for drainage purposes. Structures and other work activities causing impacts to riparian, riverbed and aquatic habitat shall be designed and delivered in a manner that minimise impacts to the greatest extent practicable. This includes short and long-term impacts on in Stony Creek, Maribyrnong River and Steele Creek.</p> <p>Any plan(s) must be approved by the Project Owner.</p>	<p><i>Environment Protection Act 2017 and Environment Protection Regulations 2021</i></p> <p><i>Environment Protection and Biodiversity Conservation Act 1999</i></p> <p>Environmental Reference Standard</p> <p>Draft EPA Publication 1739: Urban Stormwater Management Guidance</p> <p>EPA Publication 1896: Working within or adjacent to waterways</p> <p>National Recovery Plan for Australian Grayling <i>Prototroctes maraena</i>. Department of Sustainability and Environment, Melbourne (2008)</p> <p>Sunshine Section Threatened Species Management Plan (SSTSMP) – FF6</p> <p>Corridor Section Threatened Species Management Plan (CSTSMP) – FF6 (AJM-JV 2021c)</p>	Design, Pre-construction & Construction
AE2	<p>Australian Grayling</p> <p>For all works in the vicinity of the Maribyrnong River, measures must be detailed that address potential impacts to the Australian Grayling. This must include the following:</p> <ul style="list-style-type: none"> Assess impacts to the Australian Grayling from any design changes in the detailed design phase and develop appropriate mitigation measures. Maintain waterway and riparian dispersal corridors: Construction activities (including any temporary works such as the removable single span footbridge, and any No Go Zone fencing) are restricted to outside the low flow channel ensuring movement of the species is unimpeded. Where there are potential impacts from construction noise and vibration (e.g. construction of piles and pile caps) for the construction of pier 8 and associated safe working platform to the Australian Grayling, works must be undertaken between December to March or July to August, which are outside the critical migration periods of the Australian Grayling. This will reduce the risk of noise and vibration immediately adjacent to the River channel disrupting the migration of the species. All areas not required for the construction footprint within the riparian zone of the Maribyrnong River have designated No Go Zones and must be fenced to ensure there is no unintentional egress into or damage to these areas or removal that may cause additional fragmentation. Any additional requirements from the EPBC Act approval decision. 	As above	Design, Pre-construction & Construction

Table 4.5 Relevant Flora and Fauna EMRs from the MAR EMF

EMR #	Environmental Management Requirement	Applicable Policy and Legislation	Project Phase
FF1	<p>Flora and Fauna Management Plan</p> <p>Prepare and implement a flora and fauna management plan to avoid and minimise impacts on ecological values. Through detailed design, avoid, or where avoidance is not feasible, minimise to the greatest</p>	<p><i>Environment Protection Act 2017 and Environment Protection Regulations 2021</i></p>	Design, Pre-construction & Construction

EMR #	Environmental Management Requirement	Applicable Policy and Legislation	Project Phase
	<p>extent reasonably practicable, the removal of native vegetation and fauna habitat and impacts on habitat connectivity, in particular in relation to EPBC Act (Cth) and <i>Flora and Fauna Guarantee Act 1988</i> (FFG Act) listed threatened species and ecological communities.</p> <p>The plan must consider the following:</p> <ul style="list-style-type: none"> Managing fauna that may be displaced due to vegetation removal or encountered on site during construction works and in consultation with public land managers where relevant. Undertaking pre-clearing surveys and inspections to confirm the on-site location of fauna immediately prior to habitat removal or, where relevant, works on waterways, and to assist fauna to safety as necessary. Contingency and reporting procedures for the event that a listed threatened species is identified in order to mitigate any potential for significant impacts on the listed threatened species. Outline protection measures of native vegetation and listed species, including establishment of No-Go Zones to protect vegetation and habitat to be retained. Surveys, inspections and management actions must be undertaken by a qualified wildlife ecologist or aquatic ecologist with all necessary authorisations obtained prior to removal of fauna habitat. Minimise or avoid unintended impacts on retained and/or adjacent vegetation and habitat including tree protection zones, environmental No Go Zones through the implementation of fencing and signage, directional lighting, and best practice spill, sedimentation and water runoff management. Procedures if unexpected listed threatened ecological communities or threatened species are identified. <p>This plan must be approved by the Project Owner.</p>	<p><i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i></p> <p><i>Flora and Fauna Guarantee Act 1988</i></p> <p><i>Wildlife Act 1975</i></p> <p><i>Fisheries Act 1995</i></p> <p><i>Planning and Environment Act 1987</i></p>	
FF2	<p>Establishment of No Go Zones</p> <p>No Go Zones must be established to protect ecological values present within the Project Boundary. No Go Zones must be implemented to protect known ecological values within the following locations (note No Go Zones 1 – 6 are relevant to the Sunshine Section and No Go Zones 7-22 are relevant to the Corridor Section):</p> <ul style="list-style-type: none"> Sunshine Railway Line Linear Reserve (No Go Zone 1) Rail corridor adjacent to Sunshine Triangle Ecological Site (No Go Zone 2) Old Sunshine Tip Site (No Go Zone 3) St Albans Road Biosites (No Go Zones 4, 5 and 6) Solomon Heights (No Go Zones 7, 8 and 9) River Valley Estate (No Go Zones 10 and 11) Sunshine North Escarpment (No Go Zone 12) Maribyrnong River (No Go Zones 13, 14 and 15) Brimbank Park (No Go Zone 16) Steele Creek and M80 North Zone (No Go Zones 17, 18 and 19) M80 South Powerline Easement (No Go Zone 20) Moonee Ponds Creek (No Go Zone 21) Border Drive Reserve (No Go Zone 22) <p>No Go Zones must encompass a buffer around the perimeter of the identified area of threatened ecological communities, mapped threatened species habitat and threatened flora species. Perimeters and buffer distances are to be approved by an appropriately qualified ecologist.</p> <p>The extent of the above No Go Zones, and the values to be protected in each No Go Zone is detailed and mapped in the EMF.</p> <p>No Go Zone protection measures must be monitored and maintained for the duration of works in each Project area.</p>	As above	Design, Pre-construction & Construction

EMR #	Environmental Management Requirement	Applicable Policy and Legislation	Project Phase
FF3	Compliance with EPBC Act requirements All works must be undertaken in accordance with Commonwealth EPBC Act referral decisions and approvals, including: <ul style="list-style-type: none"> • EPBC 2021/9040 (not a controlled action). • EPBC 2021/9081 and any associated compliance conditions with the proposed action being a <u>controlled action</u>. 	As above	Construction
FF4	FFG Act permits Where any removal or destruction of flora species listed as threatened or protected under the FFG Act (or any plants that make up an FFG Act listed threatened community) is required on public land, a 'Permit to Take' must be obtained from the Department of Environment, Land, Water and Planning (DELWP). Where this is required, species to be removed and the associated number of individuals must be documented on the permit application. This may include (but is not limited to) the following: <ul style="list-style-type: none"> • FFG Act listed threatened communities, including Western (Basalt) Plains Grassland Community. • FFG Act listed threatened flora species including Spiny Rice-flower and Fragrant Saltbush. • FFG Act listed protected flora species, including but not limited to taxa in the Orchidaceae, Asteraceae, Ericaceae families, and specified taxa in the Acacia genus. 	As above	Pre-construction & Construction
FF5	Weed and Pest Management Plan Prepare and implement a Weed and Pest Management Plan (or as detailed in the CEMP) in accordance with relevant legislation and best practice guidance. This shall include measures to avoid the spread or introduction of weeds and pathogens management measures in relation to listed weeds and pests. The plan will include processes around vehicle hygiene to prevent weeds and pathogens spreading. This plan must be approved by the Project Owner.	As above	Construction
FF6	Threatened Species Management Plans Implement all mitigation measures detailed within the two following Threatened Species Management Plans that have been prepared for the project: <ul style="list-style-type: none"> • Sunshine Section Threatened Species Management Plan (SSTSMP) • Corridor Section Threatened Species Management Plan (CSTSMP) (AJM-JV 2021c) 	As above	Design, Pre-construction & Construction

4.4.3 Mitigation Measures

Mitigation measures to reduce impacts have been separated into pre, during and post construction stages and are aimed at reducing impacts to threatened biodiversity values within the Corridor Section. Mitigation measures will be implemented as per the EMF.

Key mitigation measures include:

- Delineation and implementation of 16 No Go Zones for areas of high ecological value
- Salvage and translocation protocols for Striped Legless Lizard, Tussock skink and Growling Grass Frog
- Protective fencing in specific areas to restrict Golden Sun moth flying into construction areas during the flying season
- Dust suppression fencing adjacent to areas of high ecological value
- Restrictions to construction timing to reduce impacts to threatened species
- Strategic revegetation of specific areas subject to temporary disturbance, including along the Maribyrnong River Bridge, at the M80 North Zone and along Steele Creek and Steele Creek North

4.4.3.1 Detailed Design

These measures are to be carried out prior to the finalisation of the construction footprint and commencement of works. Detailed design management measures must be enacted such that impacts to MNES as a result of Corridor Section Works are restricted to those outlined in Section 5.1. Table 4.6 details design management measures to mitigate impacts to MNES within the Corridor Section. The requirement to implement these measures is outlined in the EMF.

Table 4.6 Detailed Design Management Measures

Objective			
Action	Timing	Responsibility	Measurable Outcome
Avoid any additional direct removal of any individuals or habitat for MNES beyond those identified in Section 5.1.	Detailed design	Delivery Partner	No unapproved, additional impacts to MNES beyond those identified in Section 5.1.
Avoid and minimise impacts to MNES by designation of No Go Zones for MNES within the Corridor Section Project Boundary	Planning/design	Delivery Partner	No further impacts to MNES beyond those identified in Section 5.1.
Further reduce impacts to MNES by additional avoidance of key habitat areas where possible	Detailed design	Delivery Partner	Reduced impacts to MNES below those identified in Section 5.1.

4.4.3.2 Pre-Construction

Management measures relating to pre-construction activities must be undertaken by the Delivery Partner as detailed in Table 4.7. The requirement to implement these measures is outlined in the Project EMF, and particularly in the CSTSMP (Appendix E).

Table 4.7 General Pre-Construction Management Measures

Objective			
Action	Timing	Responsibility	Measurable Outcome
All approvals and permits to be obtained prior to construction commencing. Any conditions associated with those approvals and permits will be adhered to.	Prior to construction commencing.	Primary approvals ¹ – RPV Secondary approvals ² – Delivery Partner	Compliance with all approval and permit conditions.
A total of 16 No Go Zones (No Go Zones 7-21 and 23) have been identified for Corridor Section Project Boundary, many of them to protect MNES and associated/adjacent habitats. No Go Zones are to be included on all site maps, including all Environmental Management Plans and related documentation (including the CEMP).	Prior to construction commencing.	Primary approvals – RPV Secondary approvals – Delivery Partner	All No Go Zones are clearly identified.

4.4.3.3 Construction

Measures implemented during construction aimed at reducing impacts to threatened biodiversity values within the Corridor Section Works are detailed in Table 4.8. The requirement to implement these measures is outlined in the Project EMF, and particularly in the CSTSMP (Appendix E).

¹ Primary approvals are those upon which the overall approval for the Project is contingent.

² Secondary approvals are those upon which overall approval for the whole Project is not contingent. Approval permits or consents under relevant legislation can be sought after the primary approvals have been obtained, prior to, or during, construction.

Table 4.8 Construction Management Measures

Objective			
Action	Timing	Responsibility	Measurable Outcome
Adherence to Project Footprint			
<ul style="list-style-type: none"> The current Corridor Section footprint as outlined in this document is to be adhered to throughout the construction process wherever possible. Deviations outside of the construction footprint are subject to re-evaluation by a suitably qualified ecologist to ensure the findings of the impact assessment remain valid following any change. 	For the duration of Works	Delivery Partner and Project Ecologist	No deviation of works beyond the project footprint
General Construction Measures			
<ul style="list-style-type: none"> The spread of noxious weeds and pest animals must be controlled in accordance with the <i>Catchment and Land Protection Act 1994</i>. A dedicated Pest and Weed Management Plan (PWMP) under CEMP must be drafted and implemented with a focus on targeted control of woody weeds in favour of tussock-forming native species. The PWMP is to include provisions for monitoring and treatment of weeds until project's hand-over and/or successful revegetation with tussock-forming species is achieved 	For the duration of Works.	Delivery Partner	No spread of noxious weeds into any of the identified areas of habitat for MNES
<ul style="list-style-type: none"> Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the MAR State Project Boundary through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease must be provided within the CEMP. 	For the duration of Works.	Delivery Partner	Entry, exit and access points defined.
<ul style="list-style-type: none"> Installation of rumble strips and/or washdown facilities as required to minimise transport of soil/mud/weeds/pathogens from plant and vehicles 	For the duration of Works.	Delivery Partner	No spread of noxious weeds into any of the identified areas of habitat for MNES
<ul style="list-style-type: none"> Construction stockpiles, machinery, roads, and other infrastructure are to be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas. 	For the duration of Works.	Delivery Partner	All stockpiles and construction infrastructure to be located outside of areas of habitat for MNES.
<ul style="list-style-type: none"> Avoid placement of hazardous substances (including fuel) in the vicinity of mapped MNES and No Go Zones. Any dangerous/hazardous substances must be adequately stored/bunded in accordance with AS1940-2004. Plant and equipment, in particular hydraulic hoses, to be well-maintained and checked regularly for damage. 	For the duration of Works.	Delivery Partner	No spills/leaks occur in the vicinity of MNES; No Go Zones
<ul style="list-style-type: none"> Deep pits, open trenches and construction areas will be covered overnight to ensure that species that enter site are dispatched without harm and injury. Where trenches are unable to be 'closed' for the night, open trenches will be checked each morning for fauna presence, and egress structures left in place for fauna to exit. If animals are within the trench, an ecologist/wildlife handler will be called to remove the animal. If it is a snake, a snake catcher will be called. 	For the duration of Works.	Delivery Partner	No fauna remain trapped in trenches or construction areas
Exclusion Fencing around waterways			
<ul style="list-style-type: none"> Wherever the construction footprint comes within 200 m of a waterway, exclusion fencing must be set up between the construction footprint and that waterway such that frogs are excluded from the construction footprint. Exclusion fencing will be 	Prior to commencing Works	Delivery Partner	Exclusion fencing erected to restrict access to waterways within 200 metres of construction

Objective			
Action	Timing	Responsibility	Measurable Outcome
implemented to ensure there is no unintentional egress of personnel, machinery, and equipment onto these areas, therefore reducing the risk of weed invasion, impact or damage to threatened biodiversity values and habitat.			
Site Personnel Induction			
<ul style="list-style-type: none"> All staff to be inducted. The induction must include training in the identification and specific management procedures relevant to the various ecologically significant values present (including but not limited to MNES). Site offices must include images of relevant threatened species to aid and educate staff in identification. Following induction, site personnel will be able to identify MNES on site if encountered. The induction of all staff to the site must include a discussion of the importance of No Go Zones and must clearly outline activities which are prohibited from these areas. Ongoing communications and training after site induction (e.g. via toolbox presentations, crib posters) to reinforce awareness of environmental mitigation measures during construction 	Prior to commencing Works and for the duration of Works	Delivery Partner	All personnel inducted to site and aware of management procedures specific to MNES present.
No Go Zones			
<ul style="list-style-type: none"> The No Go Zones identified in this management plan are to be avoided by construction works, with no admittance to the areas by construction personnel, vehicles or machinery. Any foot access of personnel into No Go Zones must be accompanied by a qualified ecologist. No Go Zones are to be included on all site maps, including all Environmental Management Plans and related documentation (including the CEMP). 	For the duration of Works.	Delivery Partner	No admittance into No Go Zones. No Go Zones marked clearly on all site maps.
<ul style="list-style-type: none"> No Go Zones must encompass a buffer around the perimeter of the identified area of threatened ecological communities, mapped threatened species habitat and threatened flora species. Perimeters and buffer distances are to be approved by an appropriately qualified ecologist. No Go Zones must be fenced with high-visibility safety bunting or temporary construction fencing (including erosion fencing if necessary). The area is to be signed as a 'No Go Zone'. Fencing should enable fauna to move through areas of habitat. The erection of the fencing surrounding No Go Zones for MNES must be supervised or reviewed by a qualified and experienced ecologist to ensure that the values supported within that No Go Zone are not impacted. The fencing is to be maintained for the duration of the works. 	For the duration of Works.	Delivery Partner	No Go Zones fenced prior to construction, and fencing maintained throughout construction.
<ul style="list-style-type: none"> Where a No Go Zone is to be established to protect EPBC Act listed NTGVVP, additional solid construction fencing (e.g. geofabric, shade cloth or similar solid fabric) is required to be erected to prevent dust impacts. 	For the duration of Works.	Delivery Partner	Solid fabric to be installed to protect areas of NTGVVP.
<ul style="list-style-type: none"> Avoid conducting hot works (e.g. welding) during extreme hot/dry conditions to minimise fire risk. No re-fuelling to take place in close proximity to No Go Zones 	For the duration of Works.	Delivery Partner	No project related fire ignitions reported

Objective			
Action	Timing	Responsibility	Measurable Outcome
Erosion and sediment controls			
<ul style="list-style-type: none"> Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 1834 and 1896) will be implemented for works in the vicinity of waterways and wetlands such that water quality of waterways and wetlands that intersect the MAR State Project Boundary are maintained at pre-construction levels. 	For the duration of Works.	Delivery Partner	Erosion and sediment controls established prior to construction.
Fauna salvage and relocation			
<ul style="list-style-type: none"> A contingency plan must be in place for salvage and translocation of any Striped Legless Lizard, Tussock Skink and/or Growling Grass Frog in the event that any individuals are recorded during construction. Measures for salvage and translocation will be outlined in a Striped Legless Lizard and Tussock Skink Salvage and Translocation Plan, and a Growling Grass Frog Management Plan. 	For the duration of Works.	Delivery Partner	<p>In the event of a Striped Legless Lizard or Tussock Skink being identified in an area of works during construction, the Striped Legless Lizard and Tussock Skink Salvage and Translocation Plan must be implemented appropriately.</p> <p>In the event of a Growling Grass Frog being identified in an area of works during construction, the Growling Grass Frog Management Plan must be implemented appropriately.</p>
<ul style="list-style-type: none"> Where woody habitat is identified for removal (including single trees) an ecologist/ wildlife handler will be engaged to check for fauna occupancy. Where fauna are identified, fauna will be safely relocated to outside the construction footprint prior to the removal of habitat. 	For the duration of Works	Delivery Partner and Project Ecologist	Fauna occupancy identified and relocated prior to habitat removal.
<ul style="list-style-type: none"> Where non-woody habitat is identified for removal, including grasslands, introduced tussock grasslands or any vegetation in the riparian zone, a wildlife handler will supervise habitat clearance. Any fauna disturbed in the process will be safely relocated to adjacent habitat outside the construction footprint. 	For the duration of Works	Delivery Partner and Project Ecologist	A wildlife handler to supervise any habitat clearance.
<ul style="list-style-type: none"> Any interaction with wildlife through habitat clearing activities, dewatering, decommissioning and trench works will be undertaken by a person holding a Section 28A <i>Wildlife Act 1975</i> authorisation. 	For the duration of Works	Delivery Partner and Project Ecologist	Interaction with wildlife undertaken by a qualified handler.
Mitigation measures specific to the Golden Sun Moth			
<ul style="list-style-type: none"> At Solomon Heights, where Golden Sun Moth habitat occurs adjacent to the project footprint, shade cloth fencing to a height of 1.8 m will be used to prevent Golden Sun Moth from entering the construction footprint for the duration of the flying season (late October – early January). 	For the duration of Works	Delivery Partner	Solid fabric to be installed between the edge of the project footprint and adjoining Golden Sun Moth habitat at Solomon Heights.
Mitigation measures for the Growling Grass Frog			
<ul style="list-style-type: none"> Chytrid Fungus standard hygiene controls for frog handling, footwear and vehicles will be included in the CEMP and Growling Grass Frog Management Plan and must be implemented for all works in and around waterways. 	For the duration of Works	Delivery Partner	Chytrid Fungus controls to be implemented
<ul style="list-style-type: none"> Before construction, a protocol will be developed for frog salvage and re-location and included in the contractor CEMP and/or Growling Grass Frog Management Plan if required. 	Prior to commencing Works	Delivery Partner and Project Ecologist	Growling Grass Frog Management Plan and/or Growling Grass Frog mitigation measures

Objective			
Action	Timing	Responsibility	Measurable Outcome
<ul style="list-style-type: none"> Only a qualified wildlife handler/ecologist with the appropriate ethics approval and DELWP scientific permit will undertake the surveys and salvage protocol. A Section 28A Wildlife Act 1975 authorisation is required to handle native fauna. The permit will also specify salvage and re-location controls that will need to be followed and included in the Growling Grass Frog Management Plan. As part of the Growling Grass Frog Management Plan, a Growling Grass Frog induction to all site personnel will be required. 			identified in CEMP prior to construction.
<ul style="list-style-type: none"> Prior to construction activities commencing, where the construction footprint is adjacent to the key waterways, an Ecologist will attend site during the day to undertake a Growling Grass Frog habitat suitability. Any changes in conditions will be noted, and these mitigation recommendations updated if required. 	Prior to commencing Works	Delivery Partner and Project Ecologist	Pre-construction Growling Grass Frog habitat check undertaken
<ul style="list-style-type: none"> Immediately prior to construction activities being undertaken at the M80 North Zone, Growling Grass Frog survey will be undertaken at the M80 retention basin with the purpose of capturing and relocating any dispersing Growling Grass Frog individuals to outside the construction footprint, and the already set-up exclusion fencing that will prevent relocated Growling Grass Frog from re-entering the construction footprint. Surveys will be undertaken in accordance with the survey guidelines for the species (DEWHA 2009c). This measure is in addition to the below Growling Grass Frog salvage and relocation measures which will be enacted for the duration of the construction. 	Prior to commencing Works and for the duration of Works	Delivery Partner and Project Ecologist	Survey undertaken to relocate any Growling Grass Frog outside the construction footprint prior to construction.
<ul style="list-style-type: none"> Fencing suitable for the exclusion of Growling Grass Frog will be erected to exclude waterways from construction areas and access tracks within 200m of the waterway. During construction, daily checks of frog fencing will be undertaken by a suitably qualified environmental representative. 	For the duration of Works.	Delivery Partner and Project Ecologist	Growling Grass Frog fencing erected prior to construction.
<ul style="list-style-type: none"> Open trenches will be closed at the end of each workday to prevent fauna from becoming stuck in trenches. Where trenches are unable to be 'closed' for the night, open trenches will be checked each morning for fauna presence, and egress structures left in place for fauna to exit. If animals are within the trench, an ecologist/wildlife handler will be called to remove the animal. If it is a snake, a snake catcher will be called. 	For the duration of Works	Delivery Partner and Project Ecologist	Site trenches closed at the end of each day.
<ul style="list-style-type: none"> Construction activities, including the removable footbridge over the Maribymong River, must not encroach upon the low flow channel of any waterway, and further, must leave sufficient terrestrial space within the riparian zone so as to ensure that the Growling Grass Frog has the capacity to disperse overland along the riparian corridor. 	For the duration of Works	Delivery Partner	Dispersal capability maintained.
<ul style="list-style-type: none"> Piling activities associated with pier 8 of the Maribymong River Bridge will be limited to bored piling to minimise noise and vibration to Growling Grass Frog at the Maribymong River. 	For the duration of Works	Delivery Partner	Bored piling to be used for pier 8 adjacent to Maribymong River
Mitigation measures for Australian Grayling			

Objective			
Action	Timing	Responsibility	Measurable Outcome
<ul style="list-style-type: none"> Piling activities associated with pier 8 of the Maribyrnong River Bridge will be restricted to December to March or July to August (outside the critical migration period of the Australian Grayling which is April to June and September to November) to minimise noise and vibration impacts and reduce interference with migration of the species. 	For the duration of Works	Delivery Partner	Piling activities restricted to December to March or July to August (outside the critical migration period of the species).
<ul style="list-style-type: none"> The dispersal capability of the Australian Grayling will be maintained throughout the Corridor Section Works through ensuring that all permanent infrastructure and construction activities (including fences and the removable footbridge over the Maribyrnong River) remain clear of the low flow channel. 	For the duration of Works	Delivery Partner	Permanent infrastructure and construction activities remain clear of the low flow channel.
Mitigation measures for Striped Legless Lizard			
<ul style="list-style-type: none"> To reduce the potential for noise and vibration impacts to Striped Legless Lizard at the M80 North Zone, piling activities between the M80 and Steele Creek North will be restricted to a 17 month period and namely will not extend across more than one Striped Legless Lizard active period of September to March (DSEWPac 2011). 	For the duration of Works	Delivery Partner	Piling activities between M80 and Steele Creek restricted to one Striped Legless Lizard active period.
<ul style="list-style-type: none"> Pre-construction Striped Legless Lizard Survey will be implemented in areas where known Striped Legless Lizard habitat has been approved for removal at the M80 North Zone and Munro Avenue: <ul style="list-style-type: none"> Prior to the clearance of Striped Legless Lizard Habitat at the M80 North Zone and Munro Avenue, artificial shelter survey will be used to capture and relocate Striped Legless Lizards detected within the construction footprint to outside the construction footprint, and the already set-up exclusion fencing. The artificial shelter survey technique will be employed as per the survey guidelines of the species (DEWHA 2011b) and include weekly checks for at least three months within the peak detection period of the species, during the active season prior to construction. Reptile-proof fencing will be installed around the Striped Legless Lizard habitat that is identified to be removed to ensure that relocated lizards do not re-enter the habitat area to be cleared. Fencing will be plastic sheeting both above and below ground. Trenching associated with burying fencing will be confined to areas of habitat that are to be removed as part of the Corridor Section Works. Trenching and installation of reptile-proof fencing is to be supervised by a suitably qualified ecologist to minimise the risk of harm to Striped Legless Lizard. All appropriate permits will be in place prior to commencing the Striped Legless Lizard relocation. 	Prior to commencing works	Delivery Partner and Project Ecologist/ Zoologist	Pre-construction Striped Legless Lizard Survey implemented in all areas of Striped Legless Lizard habitat removal
<ul style="list-style-type: none"> Once construction commences, a qualified and experienced zoologist with the appropriate permits will be available on site to undertake any fauna salvage and release for individuals found during initial earthworks. 	For the duration of works	Delivery Partner and Project Ecologist/ Zoologist	Any identified fauna are relocated prior to major works and habitat removal
Mitigation measures for Spiny Rice-flower and Natural Temperate Grassland of the Victorian Volcanic Plain			

Objective			
Action	Timing	Responsibility	Measurable Outcome
<ul style="list-style-type: none"> Where dust has the potential to impact areas immediately adjacent to the construction footprint that support NTGVVP and Spiny Rice-flower, installation and maintenance of temporary construction fencing (e.g. geofabric, shade cloth or similar solid fabric) will be undertaken to create a dust barrier between the construction footprint and areas of concern. 	For the duration of Works	Delivery Partner	Installation and maintenance of temporary construction fencing that acts as a dust barrier
<ul style="list-style-type: none"> Dust monitoring will be implemented to determine if additional protocols need to be enacted, such as dampening of vegetation and other materials. 	For the duration of Works	Delivery Partner	Dust monitoring implemented
<ul style="list-style-type: none"> Avoid conducting hot works (e.g. welding) during extreme hot/dry conditions so as to minimise fire risk. No re-fuelling to take place in close proximity to No Go Zones 	For the duration of Works	Delivery Partner	No project related fire ignitions reported

4.4.3.4 Post Construction

Post construction mitigation measures aimed at reducing impacts and enhancing remaining habitat after completion of proposed works are detailed Table 4.9. The requirement to implement these measures is outlined in the Project EMF, and particularly in the CSTSMP (Appendix E).

Table 4.9 Post construction mitigation measures aimed at reducing impacts to threatened biodiversity values within the Corridor Section.

Objective			
Action	Timing	Responsibility	Measurable Outcome
Strategic revegetation			
<ul style="list-style-type: none"> Revegetation of areas of ground disturbance, that do not support permanent infrastructure, will be undertaken to minimise the impacts of the project to ecological values. These locations are discussed below: <ul style="list-style-type: none"> The Maribyrnong River Riparian Zone: All areas of the construction footprint, that do not support permanent infrastructure, within the riparian zone of the Maribyrnong River, including the construction footprint of associated access tracks and maintenance paths, will be revegetated with site-indigenous species such that the area supports EVC 56: Floodplain Riparian Woodland. The M80 North Zone: All areas of the construction footprint, that do not support permanent infrastructure, within the M80 North Zone will be revegetated with site indigenous species such that the area supports the Plains Grassland EVC. The viaduct construction footprint is expected to result in an increase in shade below the structure, as such, only more shade-tolerant C3 grasses (such as Wallaby Grasses and Spear Grasses) should be used in the revegetation process rather than Kangaroo Grass, the lone site-indigenous C4 grass species. Further, monitoring will be required beneath the viaduct to determine the success of grassland revegetation. With the increase in shade (some areas receiving 3 additional hours of shade per day – mostly at the centre of the viaduct footprint) meaning that grassland vegetation may not take in some locations. Should grassland revegetation not take in those shadier locations, then more shade tolerant tussock-forming plantings will be utilised. 	Post-construction operating phase.	Delivery Partner or Operator, ecologist	Revegetation/establishment of indigenous species along Maribyrnong River and Steele Creek in any disturbed areas.

Objective			
Action	Timing	Responsibility	Measurable Outcome
<ul style="list-style-type: none"> – Steele Creek and Steele Creek North: All areas of the construction footprint, that do not support permanent infrastructure, within the riparian zone of the Steele Creek and Steele Creek North, including the area surrounding the M80 retention basin, will be revegetated. Revegetation will comprise site-indigenous flora species including species from EVC 851_61: Treed Stream Bank Shrubland, as well as indigenous floating and emergent aquatic species to provide habitat for Growling Grass Frog. • Ongoing targeted weed monitoring and treatment to be integrated with revegetation plans so as to promote establishment of indigenous flora over woody weeds. 			

Post Construction Revegetation Timeframe

Revegetation will be undertaken as soon as practicable in a staged manner as each construction package is completed. An allowance for additional time following completion of construction (approximately 6 months) has been included to allow appropriate seasonal conditions for successful revegetation to occur. All disturbed areas will be regressed with non-invasive grass species. Anticipated timing of revegetation is detailed in Table 4.10 below.

Table 4.10 Post construction mitigation measures aimed at reducing impacts to threatened biodiversity values within the Corridor Section.

Location	Anticipated Start including duration of works	Anticipated completion of construction package	Proposed revegetation
Maribyrnong River Riparian Zone	January 2023 (2.5 years)	July 2025	July to December 2025
M80 North Zone	November 2023 (4.5 years)	April 2028	April to October 2028
Steele Creek and Steele Creek North	February 2024 (3 years)	February 2027	March to September 2027

4.4.4 Assessment of Expected and Predicted Effectiveness of Proposed Mitigation Measures

To protect and limit impacts to MNES, No Go Zones will be implemented within the Corridor Section. No Go Zones will be physically fenced, included in all mapping and communicated to all project personnel. The identification and management of No Go Zones is now commonplace on infrastructure projects and is the most effective mitigation measure for avoiding impacts to ecological values.

Indirect impacts to No Go Zones will be managed as part of the Flora and Fauna Management Plan for the Project which must be implemented by the Delivery Partner as requirement of the Project EMF.

Specifically, the suite of measures to be implemented through the Corridor Section Threatened Species Management Plan (TSMP) (AJM-JV 2021c) are well tested mitigation measures including:

- Adhering to the project footprint
- Construction hygiene measures
- No Go Zones
- Fauna salvage and relocation protocols prior to clearing habitat
- Dust barriers
- Species specific fencing to prevent threatened species entering the construction footprint

- Reinstatement and restoration of habitat.

These measures have been developed with reference to best practice management guidelines for MNES within the Corridor Section. Monitoring activities listed in Table 4.11 will ensure the effectiveness of mitigation measures are routinely assessed throughout the duration of the project. Where any deficiencies are identified in meeting the objectives of the TSMP (AJM-JV 2021c), the need for changes to the management regime will be considered to ensure the objectives of the TSMP are able to be met.

4.4.5 Monitoring and Compliance

To ensure that impacts to MNES identified within the Corridor Section are minimised through the implementation of mitigation measures as described in Table 4.6 - Table 4.9, the following monitoring schedule will be implemented (Table 4.11).

Table 4.11 Required Monitoring Activities

Frequency	Monitoring Activity	Delegated Responsibility
Daily, for sites where construction is underway	Inspection of the Works Area to ensure that all mitigation measures within this report are being adhered to and operating effectively	Project Manager or Site Environmental Officer
Weekly, at sites adjacent to areas of known and potential impacts	Inspection of high visibility or temporary fencing (No Go and exclusion Zones) and signage to ensure it is in good condition	Project Manager or Site Environmental Officer
Daily, during clearing activities of MNES habitat	Inspection of work processes to ensure an Ecologist is on site and specified activities are being followed	Project Manager or Site Environmental Officer
Monthly, during construction at potential and known habitat sites adjacent and close to the Work Area	Ensure levels of weeds and evidence of pest animals have not increased within these areas	Site Environmental Officer or Ecologist

5 Residual impacts and proposed offsets

5.1 Residual Impacts

While significant efforts have been made in the design phase of the Project Boundary to avoid and minimise impacts to MNES within the Corridor Section Project Boundary, residual impacts to MNES are planned for the Corridor Section Project Works. These are summarised in the mitigation measures presented in Section 4 which will be implemented to minimise any further impacts to MNES beyond those listed in Table 5.1.

Table 5.1 Summary of residual impacts to MNES within the Corridor Section Project Boundary

Ecological Value	Summary of Residual Impacts
Matters of National Environmental Significance	
Threatened Ecological Communities	<ul style="list-style-type: none"> NTGVVP: Direct removal of 0.211 ha
Threatened Flora	<ul style="list-style-type: none"> Spiny Rice-flower: Direct removal of eight (8) plants (considered to result in a significant impact to Spiny Rice-flower). Note the area of impact to Spiny Rice-flower habitat has been determined as 0.150 ha, based on the area of grassland habitat being impacted where Spiny Rice-flower occurs.
Threatened Fauna	<ul style="list-style-type: none"> Striped Legless Lizard: <ul style="list-style-type: none"> Direct removal of 1.144 ha of habitat, and fragmentation resulting in the isolation of a 0.46 ha patch of Striped Legless Lizard habitat (considered to result in a significant impact to Striped Legless Lizard) Exacerbation of fragmentation of Striped Legless Lizard Habitat at the M80 North Zone Possible, localised reduction in habitat suitability due to noise and vibration associated with the construction of the M80 North Zone viaduct. Potential injury or death of some Striped Legless Lizard individuals during the habitat clearance within the M80 North Zone. Growling Grass Frog: <ul style="list-style-type: none"> Permanent removal of 0.268 ha of Growling Grass Frog riparian habitat (including removal of 0.256 ha of riparian habitat at the Maribyrnong River associated with the construction of bridge pier 8 and shared user path widening, and 0.012 ha of riparian habitat (Stream Bank Shrubland) at Steele Creek North associated with the M80/Steele Creek viaduct pier bases, and a permanent access track beneath the viaduct. Temporary removal of 0.932 ha of terrestrial riparian overwintering habitat (including 0.388 ha at the Maribyrnong River, 0.039 ha at the M80 North Zone retention basin and 0.465 ha at Steele Creek/Steele Creek North). Following works these areas will be revegetated. Temporary loss of a wetland (the M80 retention basin) that does not support breeding from the Steele Creek/Steele Creek North Reach, known to be utilised for dispersal. This wetland will be isolated from the Steele Creek/Steele Creek North reach for the duration of the M80 North Zone Viaduct construction – estimated to be three years. Localised reduction in habitat suitability in the vicinity of the Maribyrnong River due to noise and vibration during the construction the Maribyrnong River Bridge. Golden Sun Moth: Direct removal of 0.319 ha of habitat Australian Grayling: Localised reduction in habitat suitability in the vicinity of the Maribyrnong River (outside of the critical migration period) due to noise and vibration during construction

5.2 Proposed Offsets

To compensate for the residual significant impacts proposed to Spiny Rice-flower and Striped Legless Lizard, offsets that meet the objectives of the EPBC Act Environmental Offset Policy and Offset Assessment Guide have been identified for these MNES. Full details of the proposed offsets are provided in the following standalone documents:

- MAR Corridor Section (EPBC 2021/9081) **MNES Offset Strategy** – Doc No. MAR-AJM-PWD-PWD-REP-XLP-NAP-0002738 (Appendix F); and
- MAR Corridor Section (EPBC 2021/9081) **MNES Offset Management Plan, Spiny Rice-flower** – Doc No. MAR-AJM-PWD-PWD-REP-XLP-NAP-0002739 (Appendix G); and

- MAR Corridor Section (EPBC 2021/9081) **MNES Offset Management Plan, Striped Legless Lizard** – Doc No. MAR-AJM-PWD-PWD-REP-XLP-NAP-0002826 (Appendix H).

A brief description of the proposed offset sites and summary of the offset strategy for each MNES is provided below.

5.2.1 Description of the proposed offset site

The purchase of offset credits at two offset sites is proposed to meet the direct offset for impacts to Spiny Rice-flower and Striped Legless Lizard. Both proposed offset sites are part of broader offset parcels that are currently secured through existing agreements with the Secretary to DELWP under Section 69 of the *Conservation, Forests and Lands Act 1987*. To ensure the offset trade process occurs a Memorandum of Understanding (MoU) has been entered into between the Secretary to the Department of Transport (as a representative for RPV) and the Offset Owners.

5.2.1.1 Spiny Rice-flower

The offset site proposed for Spiny Rice-flower for EPBC 2021/9081 is a 0.5523 ha area of Grey Box Grassy Woodland located at [REDACTED], [REDACTED], Victoria (Figure 5.1). The offset site is located within the south east limit of a larger 31.25 ha offset parcel which is protected under an existing landowner agreement [REDACTED] (See Figure 5.1). The offset site proposed to offset impacts to Spiny Rice-flower is identified as [REDACTED] in the landowner agreement [REDACTED].

The broader offset parcel is located within the Northern Grampians Shire Local Government Area and the Goldfields Bioregion. It is located within a Rural Living Zone – Schedule 2 (RLZ2) and is affected by a Bushfire Management Overlay (BMO). [REDACTED]

The broader offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreement with the Secretary to DELWP under section 69 of the *Conservation, Forests and Lands Act 1987*. The broader offset parcel is known to support a large population of Spiny Rice-flower (approximately 400 Spiny Rice-flower plants, based on a count undertaken by the land manager in early March 2022).

The offset site [REDACTED] which is 0.5523 ha in area comprises 79 Spiny Rice-flower plants (based on a count undertaken by AJM-JV ecologists on the 6th April 2022). The offset site [REDACTED] for the MAR project therefore supports approximately 20% of the Spiny Rice-flower population within the broader offset parcel. The offset site [REDACTED] has not been allocated for the provision of any other offsets, either under the EPBC Offset Policy or for provision of native vegetation offsets in Victoria. Offset credits in HZ1I would be exhausted with the proposed trade for this offset.

The [REDACTED] adjoins the offset site to the east, separated only by the ARTC railway line (See Figure 5.1). The ARTC railway corridor is currently managed to protect and sustain Spiny Rice-flower plants that form a large and important contiguous population with individuals in the offset site. To minimise impacts to this area, ARTC have installed security gates, signage and large concrete barriers to prevent vehicular access to this section of the rail corridor. This action has resulted in improved protection of Spiny Rice-flower within the rail corridor, reduced the possibility of disturbance and encouraged the growth of native understorey shrubs and trees in this area. The offset site is located approximately 200 km north-west of the Spiny Rice-flower impact site in the Melbourne Airport Rail Corridor Section.

Several potential offset options were investigated to identify a suitable offset for the impacts proposed to Spiny Rice-flower from the Corridor Section of the MAR Project. The offset site at [REDACTED] has been selected for the following reasons:

- The offset site forms part of a broader area of land that is protected and managed for the purpose of conservation. This includes the broader offset parcel which is protected under a Section 69 Covenant, as well as land to the east within [REDACTED].
- The property supports a significant population of Spiny Rice-flower, several of which are in an area that is currently unallocated in the state based native vegetation offset system. The protection and

management of Spiny Rice-flower plants in the offset site is important to the management of the overall Spiny Rice-flower population that occurs across the broader offset parcel.

- There is extensive space adjoining the offset site that will allow Spiny Rice-flower the opportunity to recruit into over time, with appropriate management.
- There are limited threats on site and immediately adjacent to the site. Key potential threats identified included the low threat of grazing by European Rabbits as well as the threat of biomass levels reducing recruitment opportunity, both of can and will be monitored and managed as required.
- Limited alternative sites have been identified that support a suitable population of Spiny Rice-flower closer to the impact site.

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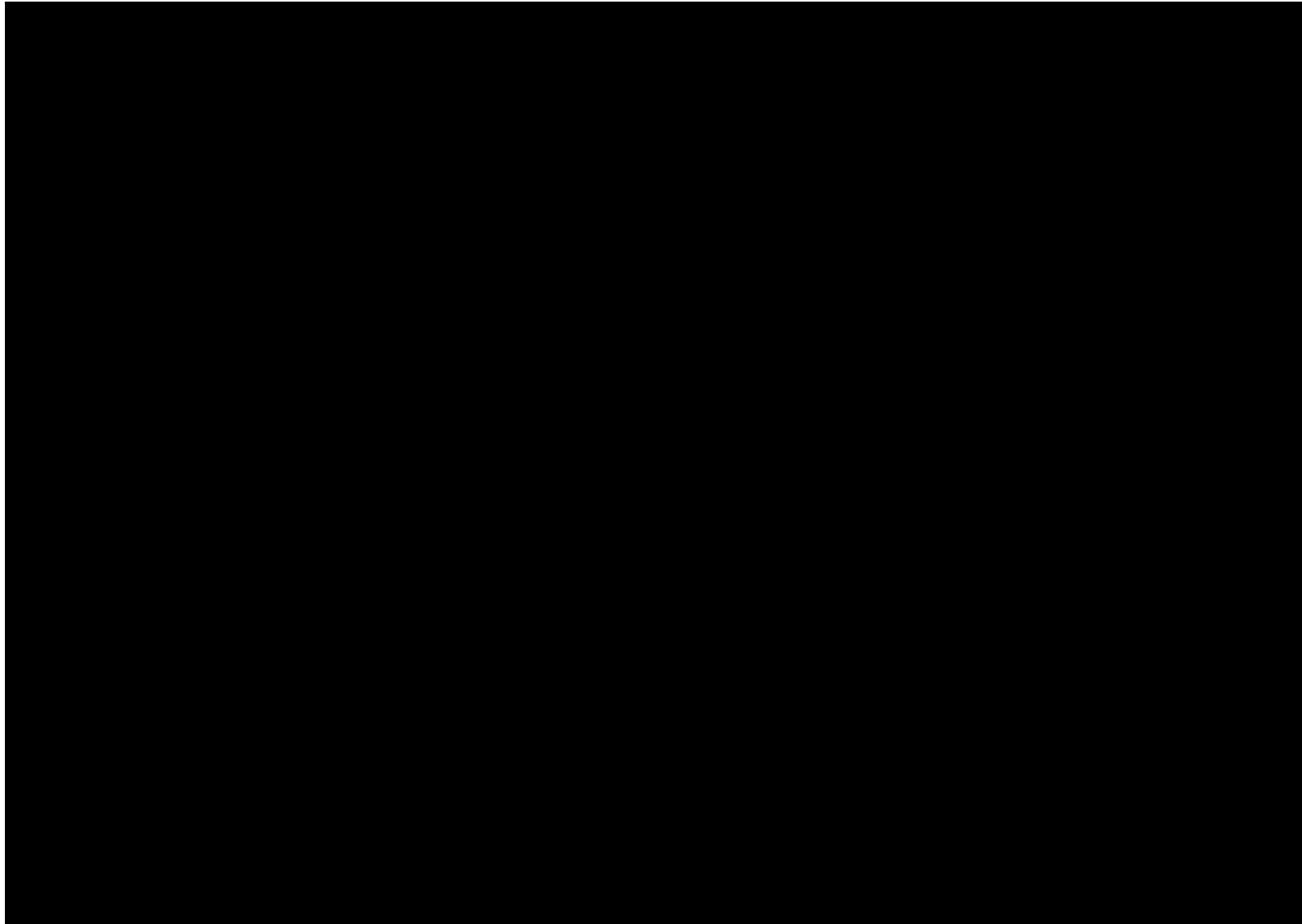


Figure 5.1 Map of Spiny Rice-flower offset site, [REDACTED]

Summary of the Offset Strategy

Consideration of the proposed offset for Spiny Rice-flower against the EPBC Act Environmental Offsets Policy and Principles is provided in Table 5.2 below.

Table 5.2 Consideration of the proposed offset location for Spiny Rice-flower against the EPBC Act Environmental Offsets Policy and Offset Principles

Offset Principles	Response
A suitable offset must:	
1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	The proposed Spiny Rice-flower offset at [REDACTED] will protect and improve a population of Spiny Rice-flower, adding to the maintained viability of this species. The protection and management of Spiny Rice-flower plants in the offset site is important to the management of the overall Spiny Rice-flower population that occurs across the broader offset parcel.
2. Be built around direct offsets but may include other compensatory measures	The proposed offset is a direct offset. Based on the EPBC Act Offset Assessment Guide (Offset Calculator) the proposed offset site mitigates 106% of the impact, which well exceeds the 90% direct offset requirement. Details of the offset calculator for Spiny Rice-flower and justification of values is provided in the MAR Offset Strategy (Appendix F).
3. Be in proportion to the level of statutory protection that applied to the protected matter	The EPBC Act Offset Assessment Guide (Offset Calculator) has been used to determine the offset requirements to compensate for the proposed impacts to Spiny Rice-flower which considers the conservation status of the species. The offset site will exceed the requirement for direct offset
4. Be of a size and scale proportionate to the residual impacts on the protected matter	The residual impact from the Corridor Section Project works is the removal of eight (8) Spiny Rice-flower plants from a 0.150 ha area of habitat. The security and protection of 79 Spiny Rice-flower plants within a 0.5523 ha area of habitat at [REDACTED] is appropriate to account for the impact.
5. Effectively account for and manage the risks of the offset not succeeding	Given the population of Spiny Rice-flower and presence of Spiny Rice-flower habitat has been confirmed within the [REDACTED] offset site in a recent site visit, and the threats to the species are low, it is considered likely that the offset will succeed. Management actions and monitoring will be undertaken at the offset site to maintain the viability of the population of Spiny Rice-flower and allow for the recruitment of the species.
6. Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see Section 7.6)	While the offset site is part of a broader existing offset on the Victorian Native Vegetation Offset Register, the particular area subject to this offset occurs along the south east edge of the broader offset site and is currently unallocated.
7. Be efficient, effective, timely transparent, scientifically robust and reasonable	The offset site proposed at [REDACTED] is ready to be implemented as per the details in the Spiny Rice-flower Offset Management Plan (Appendix G). The offset site will require ongoing management and monitoring as detailed in the Offset Management Plan.
8. Have transparent governance arrangements including being able to be readily measures, monitored, audited and enforced	An Offset Management Plan for the [REDACTED] site has been prepared that will fulfil the management actions required to maintain and improve the Spiny Rice-flower population over time. The Offset Management Plan specifies that the management actions being proposed are reported to the Department.

5.2.1.2 Striped Legless Lizard

The offset site proposed for Striped Legless Lizard for EPBC 2021/9081 is a 5 ha area of native grassland which supports a known population of Striped Legless Lizard at [REDACTED]. The site is located approximately 100km west of Melbourne within the [REDACTED] and is situated within the Victorian Volcanic Plain Bioregion.

The offset site is part of a broader 160 ha offset parcel which is protected under an existing landowner agreement [REDACTED]. The offset site proposed to offset impacts to Striped Legless Lizard is identified as a 5 ha portion of [REDACTED] as identified in the landowner agreement [REDACTED].

The broad 160 ha offset parcel supports a known population of Striped Legless Lizard, evidenced by a recent monitoring report that recorded the species across the property.

The site is located within a Farming Zone (FZ) and is affected by an Environmental Significance Overlay - Schedule 2 (ESO2). Ferrers Creek and land immediately adjacent is subject to a Land Subject to Inundation Overlay (LSIO) and is also recognised as an Area of Aboriginal Cultural Heritage Sensitivity.

The broader offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing Section 69 agreement. The 5 ha offset site identified has not been allocated for the provision of any other offsets, either under the EPBC Offset Policy or for provision of native vegetation offsets in Victoria. Offset credits in this area would be exhausted with the proposed trade for this offset.

The offset site is located approximately 100 km west of the Striped Legless Lizard impact site in the Corridor Section.

Several potential offset options were investigated to identify a suitable offset for the impacts proposed to Striped Legless Lizard from the Corridor Section of the MAR Project. The offset site at [REDACTED] has been selected for the following reasons:

- The site supports a known population of Striped Legless Lizard, a proportion of which is in an area that is currently unallocated in the state based native vegetation offset system.
- Well established offset, allowing for a streamlined process for securing and implementing the offset management plan.
- Limited alternative sites have been identified that support a suitable population of Striped Legless Lizard closer to the impact site.

Key management actions include fencing, weed control through spot spraying of noxious weeds, namely Spear Thistle and Serrated Tussock which are currently under control, and biomass management/reduction through seasonal grazing by sheep and the occasional ecological burn.

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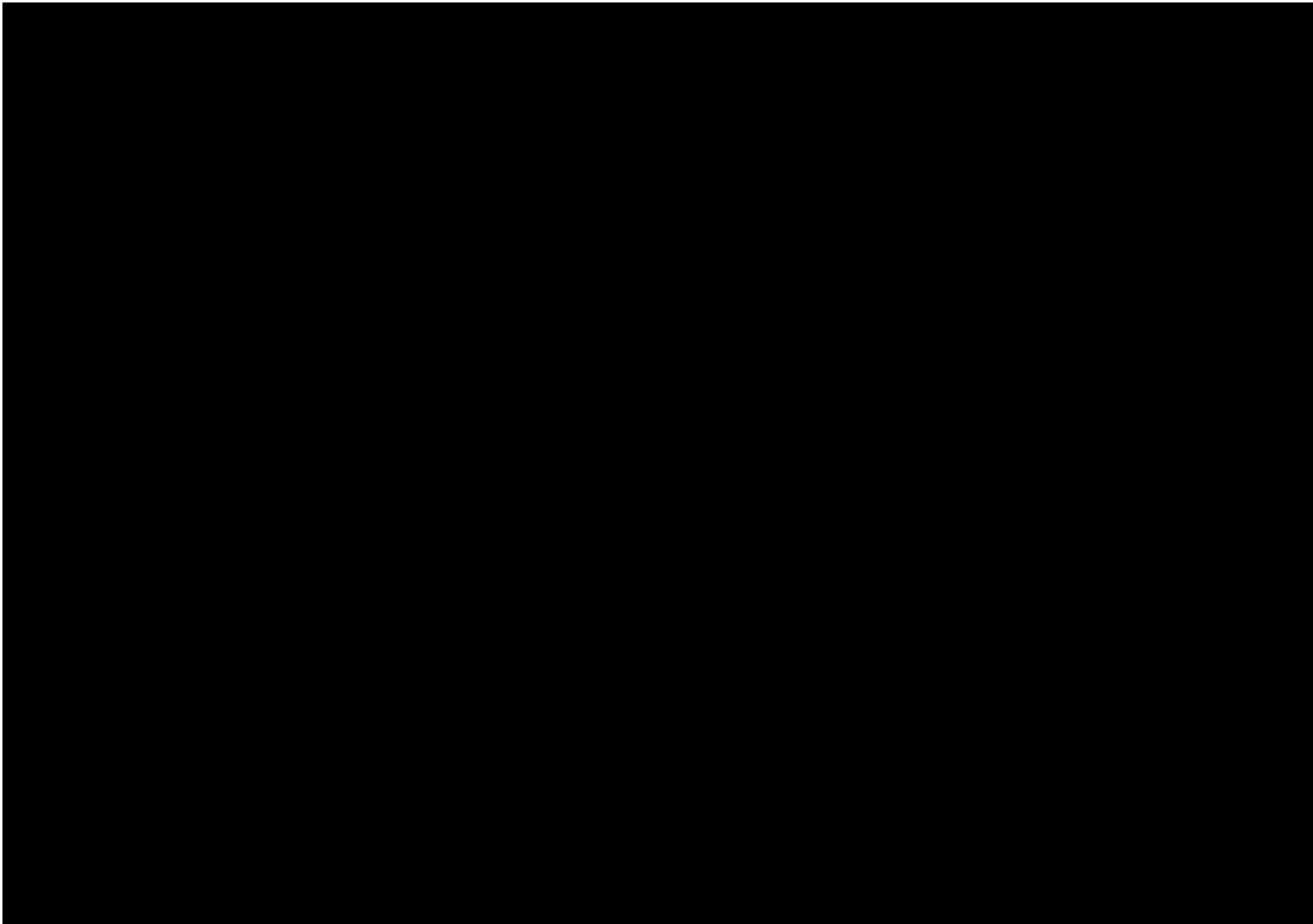


Figure 5.2 Map of Striped Legless Lizard offset site, [REDACTED]

Summary of the Offset Strategy

Consideration of the proposed offset for Striped Legless Lizard against the EPBC Act Environmental Offsets Policy and Principles is provided in Table 5.3 below.

Table 5.3 Consideration of the proposed offset location for Striped Legless Lizard against the EPBC Environmental Offsets Policy and Offset Principles

Offset Principles	Response
A suitable offset must:	
1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	The proposed Striped Legless Lizard offset at [REDACTED] will protect and improve the condition of known habitat for Striped Legless Lizard within an area of high biodiversity value, adding to the maintained viability of this species.
2. Be built around direct offsets but may include other compensatory measures	The proposed offset is a direct offset. Based on the EPBC Act Offset Assessment Guide (Offset Calculator) the proposed offset site mitigates 129.48% of the impact, which well exceeds the 90% direct offset requirement. Details of the offset calculator for Striped Legless Lizard and justification of values is provided in the MAR Offset Strategy (Appendix F).
3. Be in proportion to the level of statutory protection that applied to the protected matter	The EPBC Act Offset Assessment Guide (Offset Calculator) has been used to determine the offset requirements to compensate for the proposed impacts to Striped Legless Lizard which considers the conservation status of the species. The offset site will exceed the requirement for direct offset.
4. Be of a size and scale proportionate to the residual impacts on the protected matter	The residual impact from the Corridor Section Project works is the removal of 1.144 hectares of habitat for Striped Legless Lizard. The security and protection of five (5) hectares of known habitat for Striped Legless Lizard at [REDACTED] is appropriate to account for the impact.
5. Effectively account for and manage the risks of the offset not succeeding	Given that the [REDACTED] offset site supports a known Striped Legless Lizard population and has first year monitoring data showing evidence of Striped Legless Lizard presence, it is considered likely that the offset will succeed. Management actions and monitoring will be undertaken at the offset site to maintain the viability of the Striped Legless Lizard population at the site.
6. Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see Section 7.6)	While the [REDACTED] offset site is part of a broader 160 hectare offset area on the Victorian Native Vegetation Offset Register, the particular area subject to this offset is currently unallocated.
7. Be efficient, effective, timely transparent, scientifically robust and reasonable	The offset site proposed at [REDACTED] is ready to be implemented as per the details in the Striped Legless Lizard Offset Management Plan (Appendix H). The offset site will require ongoing management and monitoring as detailed in the Offset Management Plan.
8. Have transparent governance arrangements including being able to be readily measures, monitored, audited and enforced	An Offset Management Plan for the [REDACTED] site has been prepared that will fulfil the management actions required to maintain and improve habitat for Striped Legless Lizard overtime. The Offset Management Plan specifies that the management actions being proposed are reported to the Department.

5.3 Additional mitigation for impacts to Spiny Rice-flower

Spiny Rice-flower plants to be removed for the MAR Corridor Section Project will be translocated to a location to be determined in discussions with the Victorian Department of Environment, Land, Water and Planning (DELWP). A Spiny Rice-flower translocation plan prepared in accordance with the Spiny Rice-flower Translocation Protocol (Pimelea spinescens Recovery Team 2013) will be submitted to DAWE prior to any impacts to Spiny Rice-flowers.

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It is noted that translocation does not make up the proposed offset for impacts to Spiny Rice-flower, and that rather >100% of the direct offsets for Spiny Rice-flower are being achieved through the proposed [REDACTED] Spiny Rice-flower offset site, as summarised above in Section 5.2.1.1, and detailed in the Offset Strategy (Appendix F) and Spiny Rice-Flower Offset Management Plan (Appendix G).

Seed will also be collected from all Spiny Rice-flower plants to be removed. Seed collection will be undertaken by hanging stockings and/or paper bags over Spiny Rice-flower plants to be removed from July-August, and then collecting them in late October. Seed collected will be provided to the Spiny Rice-flower Recovery Team.

6 Other approvals and conditions

6.1 Victorian Environment Effects Act

A referral was submitted for the Project for a decision on the need for assessment under the Victorian *Environment Effects Act 1978* (EE Act) on 20 October 2021 ([EE Act Referral Number 2021-R05](#)).

On 5 December 2021, the Minister for Planning published the decision that an Environment Effects Statement (EES) is not required for the MAR Project, subject to conditions. Conditions include the preparation of an Environment Report to document the impacts on threatened biodiversity values from the MAR Project works, as well as the preparation of an Environmental Management Framework (EMF) which is to be informed by the findings and conclusions of the Environment Report. Conditions also specify that the Environment Report can be submitted in stages to correspond with staged components of the Project works.

A Stage 1 Environment Report for the Preparatory Works of the MAR Project has been submitted and approved by DELWP. A Stage 2 Environment Report for the Main Works of the MAR Project was submitted to DELWP in early April 2022. The Environment Reports provide a consideration of impacts to threatened biodiversity values including those listed under the EPBC Act and FFG Act.

6.2 Victorian Native Vegetation assessment

Separate Native Vegetation Reports for the MAR Project have been prepared and submitted to DELWP to address Clause 52.36-8 (Native Vegetation Requirements) of the Victorian Planning Scheme. The Native Vegetation Reports provide an assessment of impact to native vegetation from the MAR Project, and details of how the project has aimed to avoid and minimise impacts to native vegetation through the planning process. The Native Vegetation Reports also outline the state native vegetation offset requirements as per the Guidelines (DELWP 2017) for the MAR Project. Separate offsets will be secured to achieve the state and Commonwealth offsets.

7 Social and economic

7.1 Public Consultation Undertaken and Outcomes

RPV has developed a program of engagement with regulatory stakeholders, local councils, Registered Aboriginal Parties, key institutions, community groups and local residents that has been underway since 2018.

The purpose of engagement was to build public awareness and understanding of the main works scope, the timeframe for the Project and to gather feedback about potential issues, opportunities, benefits and impacts related to the Project.

RPV is undertaking a phased engagement approach for MAR. Table 7.1 provides an overview of the engagement phases undertaken to support planning approvals as they relate to the overall Project stages, including the engagement required at each stage and the key communications and engagement tools and activities undertaken.

All subsequent engagement (phase four) is ongoing and will be undertaken in line with the MAR Communication and Stakeholder Engagement Management Framework.

Table 7.1 Engagement approach 2018 to 2022 onwards

Project phases	Planning and development 2018 to 2021		Design development, approvals and procurement 2021-2022		Construction 2022 onwards
Engagement phases	0. Project introduction and preferred design Late 2018 – November 2020	1. Awareness raising December 2020 – March 2021	2. Scope and construction June to October 2021	3. Approvals and procurement December 2021 to February 2022	4. Design update and construction Mid-2022 - onwards
Engagement focus	<ul style="list-style-type: none"> Awareness raising on Project alignment and benefits Gather initial insights from key stakeholders 	<ul style="list-style-type: none"> Awareness raising Feedback on what is important to stakeholders and the community Gather information to inform planning and scope development 	<ul style="list-style-type: none"> Engagement on specific areas of scope and construction impacts Engagement with impacted landowners Understand and identify mitigation for potential stakeholder and community concerns 	<ul style="list-style-type: none"> Formal approvals engagement Ongoing stakeholder and community engagement 	<ul style="list-style-type: none"> Ongoing engagement and communications Introduction of delivery partners
Key engagement activities	<ul style="list-style-type: none"> Establish online content and channels Pop-up sessions at stations and shopping centres Stakeholder meetings Social research Media releases 	<ul style="list-style-type: none"> Online engagement on Engage Victoria website Social research Virtual information room MP briefings Stakeholder meetings Landowner engagement Information in HQ 	<ul style="list-style-type: none"> Community events/pop-ups Virtual information room Recruit for DoT Stakeholder Reference Group MP briefings Stakeholder and community meetings Landowner engagement Information in HQ 	<ul style="list-style-type: none"> Industry briefings Information in HQ DoT Stakeholder Reference Group meetings MP briefings Stakeholder and community meetings Landowner engagement 	<ul style="list-style-type: none"> Community newsletters Media releases Community events/pop-ups Digital communication Disruption notices Landowner engagement Information in HQ

Figure 7.1 provides a high-level summary of the volume of communication materials that were issued, and the number of people engaged as of April 2022.

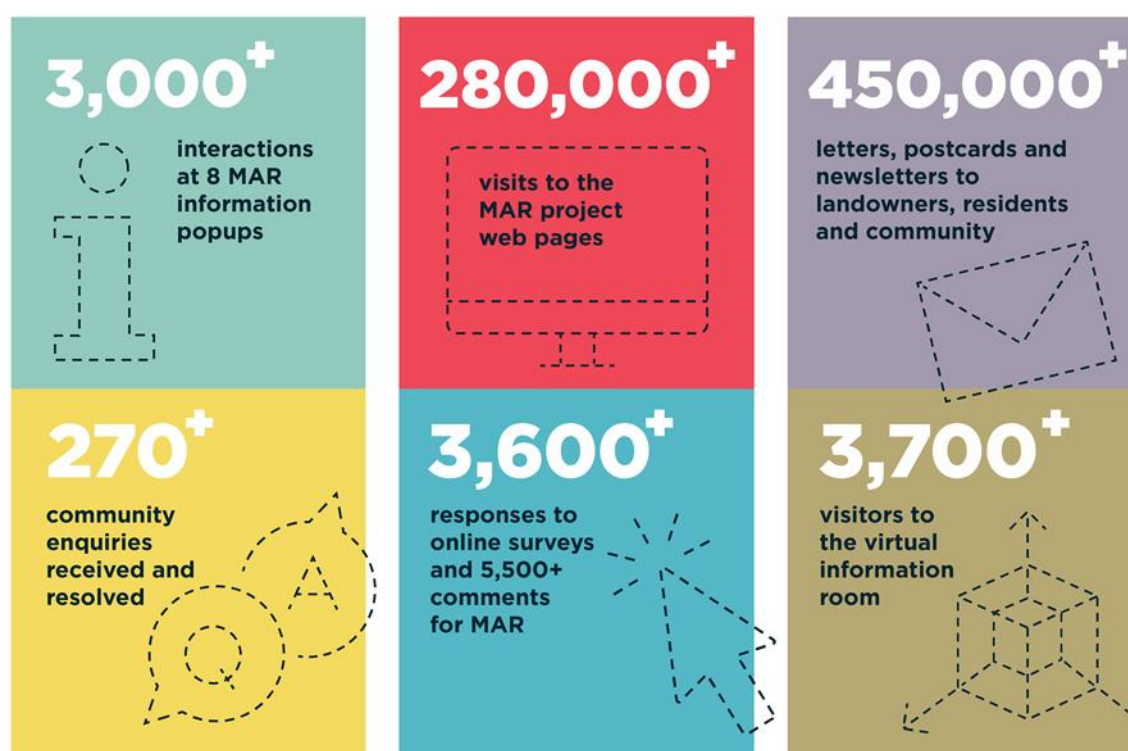


Figure 7.1 High-level summary of communications and engagement activities

Consultation has been undertaken with the following approval agencies:

- First People – State Relations (formally Aboriginal Victoria)
- Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation (Wurundjeri)
- Department of Environment, Land, Water and Planning (DELWP)
- Environment Protection Authority
- Heritage Victoria
- Department of Agriculture, Water and Environment (DAWE)

Consultation has been undertaken with the following agencies:

- Brimbank City Council
- Maribyrnong City Council
- Moonee Valley City Council
- Moreland City Council
- Hume City Council
- Bunurong Land Council Aboriginal Corporation (BLCAC)
- Department of Transport (formerly Department of Economic Development, Jobs, Transport and Resources)
- Melbourne Water
- Parks Victoria
- Greater Western Water
- Utility providers
- VicRoads

- VicTrack
- V/Line
- Australian Rail Track Corporation (ARTC)
- Melbourne Metro Trains (MTM)

Consultation has been undertaken with the following other stakeholders:

- Brimbank Heritage Advisory Committee
- LeadWest
- Melbourne Airport (APAM)
- Victoria University (VU)
- Western Melbourne Tourism (WMT)
- Directed affected landowners, occupiers, and managers

Consultation has been undertaken with the following Members of Parliament:

- Josh Bull MP (Member for Sunbury)
- The Hon. Ben Carroll MP (Minister for Public Transport)
- Katie Hall MP (Member for Footscray)
- Ingrid Stitt MP (Member for Western Metropolitan Region)
- Natalie Suleyman MP (Member for St Albans)

Consultation has been undertaken with the following community interest groups:

- Albion Ardeer Community Club
- Bicycle Network (BN)
- Friends of HV McKay Memorial Gardens
- Friends of Maribyrnong Valley (FoMV)
- Friends of Steele Creek (FoSC)
- Friends of Stony Creek (FSC)
- Grassy Plains Network
- Greater Sunshine Community Alliance
- Keilor Historical Society
- Maltese Cultural Association of Victoria Inc (MCAV)
- Scouts Victoria – Barclay Reserve
- Sunshine Baseball Club
- Sunshine Flycasting Club
- Sunshine Business Association

Comments and feedback received throughout the general engagement process has been documented and shared for review and consideration to the relevant project manager or technical specialist. A number of workshops and presentations were held with the design, planning and environment teams to review the feedback and consider changes.

Much of the feedback was general in nature and has been responded to by reference to general strategies or performance requirements for management and mitigation. This task was completed with the assistance of technical specialists.

From an environmental perspective there were large number of public comments received as summarised below:

- preserving local flora and fauna for biodiversity
- retaining as much vegetation as possible
- safe and appropriate soil management practices.

RPV's ongoing engagement with key stakeholders and the community has already helped to shape the design and construction methodology for MAR, well ahead of major works getting underway.

The key changes are summarised below:

- Reduced the size of proposed site compounds on public open space
- Responded to community and stakeholder feedback about height and bulk of gateway feature at Albion by refining the design and updating contractor requirements to include integrated artwork and gateway design
- Spacing of the piers on the Maribyrnong River Bridge altered to improve view lines to existing heritage bridge and minimise potential environmental impacts
- Updated the Urban Design Strategy to refine the Place Objectives for contractors to follow at Maribyrnong River Bridge reflecting community feedback about importance of design and heritage
- Strong feedback about the importance of walking and cycling connections along the corridor have resulted in:
 - > Bringing forward the construction of the shared user path south of the Western Ring Road to minimise disruption to the network
 - > Changing the alignment of the shared user path north of the Western Ring Road to minimise potential impacts on local flora and fauna
 - > Upgrading shared use paths in the Albion area to provide through connections and improve safety

Further to this, the appointed delivery partner(s) will be required to develop and implement a Community and Stakeholder Engagement Plan that includes:

- Regular community updates
- Face to face engagement with stakeholders
- Clear processes for informing stakeholders, road users, transport users, residents and businesses of upcoming works and potential disruption
- Complaints resolution process
- Engagement to inform the detailed design process.

7.1.1 Costs and Benefits of the Proposed Action

MAR will take passengers from Melbourne's Tullamarine Airport to the CBD in around 30 minutes, using Victoria's new High Capacity Metro Trains. The project will enable most Victorians to reach Tullamarine with just one interchange, while those in south-east Melbourne will be able to travel directly to the airport.

As Victoria's gateway to the world, Melbourne Airport is a key component of this success with access to interstate and international markets. It connects our businesses and institutions to knowledge, education and innovation. It also brings people to Victoria, allowing the State to capitalise on growing domestic and international travel markets.

Melbourne Airport is Australia's second busiest airport in terms of passenger movements and freight volume. In 2016-17, Melbourne Airport:

- Handled more than 35 million passenger movements
- 460,000 tonnes of freight
- Directly contributed some 3 per cent to the Victorian economy.

By 2038, airport passenger movements are expected to reach almost 70 million annually. Although the Airport is geographically well positioned, it is heavily reliant on an arterial road network that is susceptible to fluctuating demand. As access is entirely road-based with limited public transport options, the employee catchment within a 45-minute commute will increase only moderately between 2016 and 2031. The State Government is currently planning for this growth with significant investments in rail and road upgrades to alleviate the pressure on Victoria's transport network.

7.1.1.1 Social Impacts

For all passengers, MAR will provide:

- access to the entire public transport network including trains on the Geelong, Ballarat, Bendigo and Gippsland lines with a single interchange
- direct access to Melbourne Airport from 30 stations without the need to change trains, for passengers travelling from the CBD and the booming south-eastern suburbs
- a new premium station at Melbourne Airport with train services every 10 minutes
- seamless travel to the heart of Melbourne's CBD in around 30 minutes
- direct access to key sites including Melbourne University, the Parkville medical precinct and the St Kilda Road business precinct.

RPV received thousands of surveys and comments from communities along the MAR corridor, as well as from wider Melbourne and around Victoria. The feedback received has shown that the overwhelming majority of the community believe MAR will benefit all Victorians. Over two thirds of respondents believe that MAR will benefit their local community, and over 90 per cent of people agreed or strongly agreed that the project will benefit the broader Victorian community.

The potential benefits rated highest were:

- Easier and more convenient travel options to and from the airport
- Less congestion compared to travelling on roads
- A faster way to get to the airport

The investment in the MAR project will result in faster journey times, as summarised below:

- Connecting MAR into the Metro Tunnel provides passengers with 10 minute turn-up-and-go services into the CBD in around 30 minutes.
- From Melbourne Airport, trips to Sunshine and Footscray are expected to take 11 and 18 minutes respectively.
- The investment in major projects such as the Metro Tunnel, Melbourne Airport Rail and Geelong Fast Rail will support a turn-up-and-go timetable, enabling peak-hour trains every 2 to 3 minutes from Sunshine and peak-hour trains every 2 minutes from Footscray and Caulfield.

7.1.1.2 Economic Impacts

MAR is a transformational public transport project and will support up to 8000 jobs during construction and ongoing employment at Melbourne Airport, Western Melbourne and the CBD.

The Australian and Victorian governments have committed \$5 billion each to deliver MAR.

MAR has the potential to unlock further economic growth connections to key health, research and education, development and employment precincts at Dandenong, Monash, Parkville, Sunshine and Werribee.

Lowering the cost of doing business is critical to Victoria's competitiveness. By improving access and travel time reliability, input costs are reduced and Victorian businesses can be more competitive in interstate and international markets. Increasing the coverage of the transport network servicing Melbourne Airport will also mean more businesses from more locations can get access to markets outside of the State. By shifting more in-and-outbound airport traffic to alternative routes and modes, the broader productivity and competitiveness of the State will also be improved.

The State's 11 priority industries and sectors are expected to add more than \$70 billion in additional economic output and more than 400,000 additional jobs by 2025. However, many of these sectors are deeply reliant upon integration with national and international markets. Efficient and reliable access to Melbourne Airport is key to their performance. The visitor economy will also benefit from more cost-effective and efficient access to and from the airport.

By improving connectivity to Melbourne Airport, surrounding suburbs can also gain significant benefit. Greater public transport network coverage and capability will promote economic development of Melbourne's inner north-west by attracting commercial and residential development, leading to the greater availability of jobs locally and stimulating economic activity in the area.

7.1.1.3 National Benefits of MAR

The Australian Government has committed \$5 billion to deliver MAR.

The MAR Project aligns with the Victorian and Australian Government's commitment to infrastructure investment to support economic growth. It broadly seeks to improve the efficiency and quality of transport links to the airport, boost productivity, create jobs and build a stronger and more prosperous economy.

The project aligns with the National Rail Program (NRP), where the Australian Federal Government committed to investing to improve rail connections into our cities and between our cities and their surrounding regional centres.

The MAR Project will transport thousands of passengers each day, reducing congestion by encouraging mode-shift to rail and reducing travel times for motorists, particularly those using the Tullamarine Freeway.

8 Environmental record of person proposing to take the action

8.1 Record of Responsible Environmental Management

There have been no updates, such as proceedings, change in proponent or new referrals submitted, that may affect the environmental record of RPV since the submission of the Corridor Section Referral 2021/9081 on 20 October 2021.

9 Conclusion

The AJM Joint Venture on behalf of Rail Projects Victoria has prepared Preliminary Documentation for the proposed Melbourne Airport Rail Project – Corridor Section (EPBC 2021/9081). On 24th November 2021, the Department advised that the works require approval under the EPBC Act as the action is likely to have significant impacts on listed threatened species and communities (section 18 and 18A of the Act). On the 22nd December 2021 the Department advised that the proposed action will be assessed by Preliminary Documentation. The MAR Corridor Section Project Works have been assessed to result in a significant impact on Spiny Rice-flower and Striped Legless Lizard.

The Corridor Section extends over 8km of dual track railway from Sunshine North to Tullamarine and Jacana.

The following values protected under the EPBC Act were identified within the study area:

- Critically Endangered Natural Temperate Grassland of the Victorian Volcanic Plain located in patches throughout the Corridor Section between Solomon Heights and the M80 South Powerline Easement
- Critically Endangered Spiny Rice-flower plants located in and adjacent to Solomon Heights and River Valley Estate
- Vulnerable Striped Legless Lizard individuals and habitat within the M80 North Zone
- Vulnerable Growling grass frog habitat along the Maribyrnong River and Steele Creek North
- Vulnerable Golden Sun Moth habitat at Solomon Heights
- Vulnerable Australian grayling habitat and dispersal corridors along the Maribyrnong River

Extensive measures that focus on avoiding and reducing potential impacts to these ecological values, protected under the EPBC Act, ensure that direct and indirect impacts to threatened species and threatened species habitat are minimised. This has been achieved through continuous design modifications, in combination with robust and detailed mitigation measures implemented at each project stage that protect and manage ecological values within the Corridor Section of the MAR Project.

With the adoption of all proposed measures, residual impacts associated with the Corridor Section are restricted to the following:

- Removal of 0.221 ha of Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)
- Removal of eight (8) individuals of Spiny Rice-flower (*Pimelea spinescens subsp. spinescens*) (from a 0.150 ha area of habitat)
- Removal of 1.144 ha of habitat for Striped Legless Lizard (*Delma impar*), as well as fragmentation resulting in the isolation of a 0.46 ha patch of Striped Legless Lizard habitat from the core remaining habitat area of 3.55 ha
- Permanent removal of 0.268 ha and temporary removal (with revegetation) of 0.932 ha of habitat for Growling Grass Frog (*Litoria raniformis*), as well as temporary loss of a non-breeding wetland at the M80 retention basin and localised reduction in habitat suitability in the vicinity of the Maribyrnong River due to noise and vibration during the construction of the Maribyrnong River Bridge
- Direct removal of 0.319 ha of habitat for Golden Sun Moth (*Synemon plana*)
- Localised disturbance to habitat for Australian Grayling (*Prototroctes maraena*) due to noise and vibration at the Maribyrnong River, limited to outside the critical migration period of the species.

Offsets to account for the loss of Spiny Rice-flower individuals and Striped Legless Lizard habitat have been identified. An Offset Strategy has been prepared to detail how the proposed offset sites meet the offset obligations generated by the removal of eight (8) Spiny Rice-flower plants and 1.144 ha of Striped Legless Lizard habitat, in accordance with the EPBC Act Environmental Offsets Policy. In addition to the proposed offsets, Spiny Rice-flower plants to be removed for the MAR Corridor Section Project will be translocated to a location to be determined in discussions with the Victorian Department of Environment, Land, Water and Planning (DELWP). A Spiny Rice-flower translocation plan prepared in accordance with the Spiny Rice-flower Translocation Protocol (*Pimelea spinescens* Recovery Team 2013) will be submitted to DAWE prior to any impacts to Spiny Rice-flowers.

Two separate Offset Management Plans have been prepared for the proposed offsets for Spiny Rice-flower and Striped Legless Lizard.

The controlled action for the proposed MAR Project – Corridor Section (EPBC 2021/9081) should be approved under the EPBC Act, with impacts to MNES having adequately being addressed through avoidance and mitigation measures, the implementation of the Environmental Management Framework (EMF) and significant impacts to Spiny Rice-flower and Striped Legless Lizard being offset as per the attached Offset Strategy and Offset Management Plans.

The following conditions are proposed to be applied for the approval:

- The approval holder must not remove more than eight (8) Spiny Rice-flower plants and 1.144 hectares of Striped Legless Lizard habitat within the action area.
- Prior to the commencement of the action, to compensate for the loss of up to eight (8) Spiny Rice-flower plants and 1.144 hectares of Striped Legless Lizard habitat, the approval holder must implement management plans for both the [REDACTED] and [REDACTED] offset sites, and submit written evidence to the Department that it has commenced implementing the management plans.
- Within 12 months of the date of this approval, the approval holder must secure both the [REDACTED] and [REDACTED] offset sites and submit to the Department written evidence that the offset sites have been secured and supply shapefiles containing the offset attributes for the offset sites.
- Prior to any impacts to Spiny Rice-flower, a Spiny Rice-flower translocation plan will be prepared to the satisfaction of the Department. The Spiny Rice Flower Translocation Plan will be prepared in accordance with the Spiny Rice-flower Translocation Protocol (Pimelea spinescens Recovery Team 2013).
- The action must be taken in accordance with the MAR Corridor Section Threatened Species Management Plan (TSMP) (AJM-JV 2021c).

10 Information sources

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APPENDIX A DETAILS OF TARGETED SURVEYS FOR MNES IN THE CORRIDOR SECTION



A.1 Appendix A: Details of targeted surveys for MNES in the Corridor Section

A.1.1 Targeted surveys for threatened flora

Spiny Rice-flower

Targeted surveys for Spiny Rice-flower were undertaken within all areas of potential habitat for the species in the Corridor Section Project Boundary. Dates and locations of targeted surveys for Spiny Rice-flower undertaken in the Corridor Section Project Boundary are outlined below:

- Rail corridor adjacent to Solomon Heights (3 and 4 June 2019)
- Rail corridor adjacent to River Valley Estate (3 and 4 June 2019)
- River Valley Estate (12 and 13 August 2020)
- Road reserve of M80 North Zone (3 and 4 June 2019)
- M80 North Zone proper (7 July 2020)

Targeted surveys for Spiny Rice-flower were undertaken in accordance with the published survey guidelines for the species (DEWHA 2009a) and involved two or three ecologists walking parallel transects 5 m apart through areas of suitable habitat. Locations of Spiny Rice-flower were recorded, and the sex of individual plants was determined where possible. Targeted surveys coincided with the known flowering time for Spiny Rice-flower (April to August).

Despite the presence of potential habitat, targeted surveys for Spiny Rice-flower were not undertaken at Solomon Heights, as the species had recently been recorded in previous targeted surveys at this location. Mapped records of Spiny Rice-flower in this area were verified by AJM-JV to confirm presence at these locations.

Large-headed Fireweed

Targeted surveys for Large-headed Fireweed were undertaken within all areas of potential habitat for the species in the Corridor Section Project Boundary. Dates and locations of targeted surveys for Large-headed Fireweed undertaken in the Corridor Section Project Boundary are outlined below:

- Munro Avenue road reserve south of Solomon Heights (24 September 2020)
- Rail reserve Adjacent to Solomon Heights (27 September 2019)
- River Valley Estate and adjacent rail corridor (24 September 2019)
- M80 North Zone (7 October 2020)

Targeted surveys for Large-headed Fireweed involved two ecologists walking transects spaced approximately 5 m apart while recording any threatened flora species observed. Targeted surveys coincided with the known flowering time for Large-headed Fireweed (August to October).

Matted Flax-lily

Targeted surveys for Matted Flax-lily were undertaken within all areas of potential habitat for the species in the Corridor Section Project Boundary. Dates and locations of targeted surveys for Matted Flax-lily undertaken in the Corridor Section Project Boundary are outlined below:

- Munro Avenue road reserve south of Solomon Heights (27 January 2021)
- Rail reserve Adjacent to Solomon Heights (11 December 2019)
- River Valley Estate (15 December 2020)

- Rail corridor adjacent to River Valley Estate (11 December 2019)
- M80 North Zone (15 December 2020)

Targeted surveys for Matted Flax-lily involved two ecologists walking transects spaced approximately 5 m apart while recording any threatened flora species observed. Targeted surveys coincided with the known flowering time for Matted Flax-lily (November to January).

Button Wrinklewort

Targeted surveys for Button Wrinklewort were undertaken within all areas of potential habitat for the species in the Corridor Section Project Boundary. Targeted surveys for Button Wrinklewort followed the same methodology and were undertaken concurrently with targeted surveys for Matted Flax-lily (See above). Targeted surveys coincided with the known flowering time for Button Wrinklewort (November to January).

Small Golden Moths

Targeted surveys for Small Golden Moths were undertaken within all areas of potential habitat for the species in the Corridor Section Project Boundary. Targeted surveys for Small Golden Moths followed the same methodology and were undertaken concurrently with targeted surveys for Large-headed Fireweed (See above). Targeted surveys coincided with the known flowering time for Small Golden Moths (September to October).

A.1.2 Targeted surveys for threatened fauna

Striped Legless Lizard

Targeted surveys for Striped Legless Lizard were undertaken within all areas of potential habitat identified for the species in the Corridor Section Project Boundary (irrespective of whether the areas comprised native or non-native vegetation). Dates and locations of targeted surveys for Striped Legless Lizard undertaken in the Corridor Section Project Boundary are outlined below:

- Spring-summer 2019-2020 (September 2019 to February 2020):
 - > Rail Corridor Adjacent to Solomon Heights
 - > Rail corridor adjacent to River Valley Estate
 - > M80 South Powerline Reserve
- Spring-summer 2020-2021 (September 2020 to February 2021):
 - > River Valley Estate
 - > Sunshine North Escarpment
 - > Brimbank Park
 - > M80 North Zone

Targeted surveys for Striped Legless Lizard were conducted in accordance with the published survey guidelines (DSEWPC 2011) and were detailed as follows:

- Tile arrays were established prior to August 2019 for the 2019-2020 surveys, and between 7 and 12 August 2020 for the 2020-2021 surveys.
- Each grid or transect contained 50 artificial shelter sites (roofing tiles, 'French Terracotta' style with dimensions of 430 mm x 340 mm), used to provide temporary habitat for the species. Tiles were placed in 10 rows of five tiles or along a single row of 50, placed at intervals of 5 m apart. The location of Striped Legless Lizard surveys is shown in Appendix B.
- Tile checks commenced from early September, approximately one month after they were established. Tiles were checked at an approximately fortnightly frequency for the 2019-2020 surveys, resulting in 11

checks between September 2019 and January 2020. For the 2020-2021 surveys, tiles were checked weekly to fortnightly between September and December, and then fortnightly until February, resulting in a total of 16 checks for each grid between September and February. Tile checks were typically undertaken in early to late morning, sometimes extending into the afternoon, depending upon the prevailing conditions. Checks were conducted during appropriate seasonal and daily climate conditions, during the known activity period of the species (DSEWPC 2011).

Details of the weather conditions of the targeted surveys for Striped Legless Lizard are provided below in Table A.1. Details of the results are provided in Table A.2. The location of Striped Legless Lizard targeted surveys undertaken in the Corridor Section Project Boundary are shown in Appendix B.

Table A.1 Striped Legless Lizard targeted survey details

Date	Start Time	Temp (°C)	Relative Humidity (%)	Cloud Cover (%)	Wind Speed (km/h)	End Time	Temp (°C)	Relative Humidity (%)	Cloud Cover (%)	Wind Speed (km/h)
2019-2020 Survey Season (MR0 transect at Solomon Heights, V1, V2, and V3 grids at the M80 South Powerline Easement)										
09/09/2019		20.5	39	15	6.3					
19/09/2019		21.6	46.4	0	21.2					
02/10/2019		26.6	23.1	35	15.9					
16/10/2019		17	65.6	100	8					
30/10/2019		27.9	41.9	0	4.1					
12/11/2019		19.4	37	75	11					
26/11/2019		16.2	58	75	6					
02/12/2019-		16.2	58	75	6					
11/12/2019-		21.7	49.9	35	7.9					
09/01/2020		20.9	68	0	11					
24/01/2020		21.7	51	25	1.2					
2020-21 Survey Season (AL1 and AL2 at River Valley Estate, MR1: Sunshine North Escarpment, PV1 and PV2 at Brimbank Park and SC1-5 at M80 North Zone)										
07/09/2020	09.00	19.2	43	40	15	12:30	21.8	40	0	31
08/09/2020	09.00	15.4	62	90	26	13:30	17.2	58	70	27
09/09/2020	09.00	14.4	53	60	11	13:00	13	51	60	22
10/09/2020	09.00	17.2	53	90	6	13:48	20.5	53	20	18
14/09/2020	09.30	13.4	54	90	11	14:15	16.7	48	20	20
15/09/2020	10.30	14.2	58	10	7	14:30	17.8	53	0	7
16/09/2020	10.00	17.2	49.4	10	24	13:20	20	37.2	90	30
07/10/2020	10.30	14.2	72.7	100	0	13:00	14.1	68.3	100	0
09/10/2020	10.30	14.1	62.8	100	6.7	16:15	18.5	48.6	75	15.7
12/10/2020	10.37	16.7	54.2	90	10	14:26	27.7	31.2	0	19
13/10/2020	10.35	14.8	68.7	100	17	14:40	18.6	60	90	20
14/10/2020	09.15	14.8	72.7	100	9	11:15	22.5	50	0	11
20/10/2020	09.00	13.2	67	-	1.3	15:30	16.5	37	-	0.6
21/10/2020	09.00	22.5	44.8	-	1.2	13:40	18.4	48.4	-	0.8
27/10/2020	10.27	18.1	51.4	60	28	14:30	19.7	46.8	95	33
28/10/2020	09.39	17.5	58.7	40	17	13:45	19.9	58.4	5	11
29/10/2020	10.07	23.8	45.7	0	7	13:54	28.5	30.5	90	17

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Date	Start Time	Temp (°C)	Relative Humidity (%)	Cloud Cover (%)	Wind Speed (km/h)	End Time	Temp (°C)	Relative Humidity (%)	Cloud Cover (%)	Wind Speed (km/h)
02/11/2020	09.08	14.3	73	95	2.1	13:11	27.1	42	0	27
04/11/2020	09.23	23.2	48.1	100	13	12:45	20.5	75.5	100	8
06/11/2020	10.37	15.1	57.8	100	15	14:15	20.4	47.9	100	13
09/11/2020	07.21	13.5	68	0	6	10:32	27.3	34.1	0	17
10/11/2020	07.15	20.9	44.1	0	13	09:28	26.9	36.3	0	32
11/11/2020	08.15	24.6	38.2	0	28	11:42	26	37.7	100	13
16/11/2020	08.30	20.8	42.8	0	39	11:50	22	42.5	70	41
17/11/2020	08.15	15.3	59.9	0	19	11:01	19	44.1	70	20
18/11/2020	07.47	17	65	0	6	09:55	24.2	43.5	0	13
23/11/2020	09.44	17.3	88.1	100	17	12:37	19	76.6	70	20
24/11/2020	09.19	17.5	57.4	50	19	11:55	20	48.5	100	25
25/11/2020	08.05	20.8	65.1	0	7	09:45	25.5	46.6	0	13
10/12/2020	10.12	16	49.8	90	23	13:30	16.6	43	30	25
11/12/2020	09.05	16.1	53	-	11	13:20	19	53	-	22
21/12/2020	08.17	13.3	93	100	6	10:55	17	71	100	5
11/01/2021	07.54	24	32	-	27	12:05	34.4	20	0	30
12/01/2021	08.30	13	72	-	5	11:27	21	45	-	24
15/01/2021	08.30	14.8	70	100	11.8	14:50	20.7	34	20	14.6
19/01/2021	08.30	17.1	50.1	100	2.5	12:00	19.3	43.8	80	3.4
20/01/2021	08.30	18.3	51.7	0	5	10:50	20.2	45.9	0	2.6
21/01/2021	07.30	14.8	77.5	0	29	11:30	28.2	66.3	60	12
01/02/2021	09.46	18.8	60.7	0	7	12:43	20.4	67.9	100	16
03/02/2021	08.40	19.8	56.4	10	14.8	14:10	25.9	53.5	10	1.6
16/02/2021	07.30	16.6	80.1	25	2.4	12:30	27.8	44	0	7.3
17/02/2021	07.49	17.6	86	0	7	13:00	27	58	0	12
22/02/2021	07.30	22.2	39.8	40	7.3	9:00	22.2	40.4	50	3.5

. N.b. Weather at end time was not collected for the Spring/Summer 2019-2020 survey season as the tile checks lasted under an hour.

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Table A.2 Striped Legless Lizard targeted survey details

Tile array	Count of vertebrate fauna observed at each tile array																	
	Blue Tongue Lizard	Brown Snake	Delicate Skink	Eastern Blue-tongue	Eastern Brown Snake	Eastern Common Froglet	Garden Skink	Grass Skink	House Mouse	Lowland Copperhead	Shingleback	Striped Legless Lizard	Striped Legless Lizard skin	Tiger Snake	Tussock Skink	Unidentified Skink	Weasel Skink	Whip Snake
MR0 (rail corridor adjacent to Solomon Heights and RVE)								8							3			
MR1 (Sunshine North Escarpment)			1		2		1				1					2		
MR2 (River Valley Estate)					4				4						3	1		
MR3 (River Valley Estate)									7									
PV1 (Brimbank Park)					1				17									
PV2 (Brimbank Park)									10						1			
SC1 (M80 North Zone)			29	6								1	1		8	3	4	
SC2 (M80 North Zone)			85	1		1				10		1			6	9	8	
SC3 (M80 North Zone)			33							5		9			5			
SC4 (M80 North Zone)			45	1								2	1		5		1	

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Tile array	Count of vertebrate fauna observed at each tile array																	
	Blue Tongue Lizard	Brown Snake	Delicate Skink	Eastern Blue-tongue	Eastern Brown Snake	Eastern Common Froglet	Garden Skink	Grass Skink	House Mouse	Lowland Copperhead	Shingleback	Striped Legless Lizard	Striped Legless Lizard skin	Tiger Snake	Tussock Skink	Unidentified Skink	Weasel Skink	Whip Snake
SC5 (M80 North Zone)			38	1					1	7		4	1		11	4	5	
V1 (M80 South Powerline easement)																		
V2 (M80 South Powerline easement)															2			
V3 (M80 South Powerline easement)	1							3						1	6			

Growling Grass Frog

Targeted surveys for Growling Grass Frog were undertaken within all areas of potential habitat identified for the species in the Corridor Section Project Boundary. Dates and locations of targeted surveys for Growling Grass Frog undertaken in the Corridor Section Project Boundary are outlined below:

- Summer 2018-2019:
 - > Maribyrnong River (5/12/2018 and 18/12/2018)
 - > Steele Creek (5/12/2018 and 18/12/2018)
 - > M80 retention basin at the M80 North Zone (8/12/2018 and 17/01/2019)
- Spring 2019:
 - > Steele Creek North (20/11/2019 and 25/11/2019)
- Summer 2020-2021
 - > M80 retention basin at the M80 North Zone (14/12/2020 and 16/12/2020)
 - > Moonee Ponds Creek (14/12/2020 and 16/12/2020)

The location of Growling Grass Frog surveys is shown in Appendix B.

Targeted surveys for Growling Grass Frog were undertaken in accordance with the published Commonwealth survey guidelines for the species (DEWHA 2009c). Surveys were undertaken after sunset, during suitable weather conditions (being warm and with little wind). At the beginning of each survey, 10 minutes was spent listening for frog calls at the water's edge. Within the last five minutes of the listening period a pre-recorded Growling Grass Frog call was played. The perimeter of the wetlands were then systematically searched by two ecologists using spotlights. Details of the weather conditions and results of the targeted surveys for Growling Grass Frog are provided below in Table A.3. The location of Growling Grass Frog surveys undertaken in the Corridor Section Project Boundary are shown in Appendix B.

Table A.3 Growling Grass Frog targeted survey details

Site	Date	Survey Start Time and Duration	Weather at Start	Species Recorded
Upper Maribyrnong River	5/12/2018	11:05pm – 30 minutes	Temperature 17.4 ° Celsius Wind 13 km/hr W Humidity 72% No rain since 2/12/2018	-
	18/12/2018	12:00am – 15 minutes	Temperature 17.3 ° Celsius Wind 13 km/hr SSE Humidity 96% No rain since 17/12/2018	-
Middle Maribyrnong River	5/12/2018	11:37pm – 30 minutes	Temperature 17.1 ° Celsius Wind 17 km/hr WNW Humidity 72% No rain since 2/12/2018	Striped Marsh Frog – <i>Limnodynastes peronii</i>

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Site	Date	Survey Start Time and Duration	Weather at Start	Species Recorded
	18/12/2018	12:34am – 13 minutes	Temperature 16.0 ° Celsius Wind 9 km/hr SSE Humidity 86% No rain since 17/12/2018	Eastern Common Froglet – <i>Crinia signifera</i>
Lower Maribyrnong River	5/12/2018	12:00am – 20 minutes	Temperature 16 ° Celsius Wind 13 km/hr W Humidity 78% No rain since 2/12/2018	Spotted Marsh Frog – <i>Limnodynastes tasmaniensis</i>
	18/12/2018	12:54am – 20 minutes	Temperature 17.3 ° Celsius Wind 13 km/hr SSE Humidity 99% No rain since 17/12/2018	Eastern Banjo Frog – <i>Limnodynastes dumerilii</i> Growling Grass Frog – <i>Litoria raniformis</i> Spotted Marsh Frog – <i>Limnodynastes tasmaniensis</i>
Steele Creek	5/12/2018	8:59pm – 46 minutes	Temperature 19.5 ° Celsius Wind 19 km/hr SW Humidity 68% No rain since 2/12/2018	Eastern Banjo Frog – <i>Limnodynastes dumerilii</i>
	18/12/2018	9:08pm – 20 minutes	Temperature 18.0 ° Celsius Wind 17 km/hr SSE Humidity 87% No rain since 17/12/2018	Eastern Common Froglet – <i>Crinia signifera</i> Eastern Banjo Frog – <i>Limnodynastes dumerilii</i>
Steele Creek North	20/11/2019	10:15pm – 50 minutes	Temperature 29.8 ° Celsius Wind 2.3/hr NNE Humidity 11% No rain in last 48 hours	Eastern Banjo Frog – <i>Limnodynastes dumerilii</i>
	25/11/2019	9:20pm – 60 minutes	Temperature 29.8 ° Celsius Wind 2.3/hr NNE Humidity 11% No rain in last 48 hours	Striped Marsh Frog – <i>Limnodynastes peronii</i>
M80 Retention Basin	18/12/2018	10:09pm – 35 minutes	Temperature 17.5 ° Celsius Wind 13 km/hr S Humidity 94% No rain since 17/12/2018	Eastern Common Froglet – <i>Crinia signifera</i> Growling Grass Frog – <i>Litoria raniformis</i> Spotted Marsh Frog – <i>Limnodynastes tasmaniensis</i> Striped Marsh Frog – <i>Limnodynastes peronii</i>
	17/01/2019	9:17pm – 90 minutes	Temperature 29.0 ° Celsius Wind 0 km/hr Humidity 41% No rain in 48 hours	None

Site	Date	Survey Start Time and Duration	Weather at Start	Species Recorded
	14/12/2020	8:30 pm – 60 minutes	Temperature: 28 °C Wind: 1 km/hr Humidity: 27.1% Cloud cover: Cloudless No rain in last 48 hours	None
	16/12/2020	8:35 pm – 56 minutes	Temperature: 19.9 °C Wind: 5.5 km/hr Humidity: 69.2% Cloud cover: Overcast No rain in last 48 hours	None
Moonee Ponds Creek	14/12/2020	9:40 pm – 60 minutes	Temperature: 23.2 °C Wind: 0 km/hr Humidity: 62.6% Cloud cover: Cloudless No rain in last 48 hours	Pobblebonk - <i>Limnodynastes dumerilii</i> Striped Marsh Frog <i>Limnodynastes peronii</i>
	16/12/2020	9:45 pm – 45 minutes	Temperature: 20.6 °C Wind: 2.8 km/hr Humidity: 63.8% Cloud cover: Overcast No rain in last 48 hours	30x Eastern Common Froglet - <i>Crinia signifera</i> Striped Marsh Frog - <i>Limnodynastes peronii</i>

Golden Sun Moth

Targeted surveys for Golden Sun Moth were undertaken within all areas of potential habitat identified for the species in the Corridor Section Project Boundary (irrespective of whether the areas comprised native or non-native vegetation). Dates and locations of targeted surveys for Golden Sun Moth undertaken in the Corridor Section Project Boundary are outlined below:

- 2019-2020 survey season:
 - > Rail Corridor Adjacent to Solomon Heights (11/12/2019; 19/12/2019, 09/01/2020 and 17/01/2020)
 - > Rail corridor adjacent to River Valley Estate (11/12/2019, 19/12/2019, 09/01/2020 and 17/01/2020)
 - > River Valley Estate (19/11/2020, 25/11/2020, 15/12/2020 and 11/01/2021)
 - > M80 South Powerline Easement (20/11/2019, 25/11/2019, 19/12/2019, 09/01/2020)
- 2020-2021 survey season:
 - > M80 North Zone (19/11/2020, 25/11/2020, 15/12/2020, 11/01/2021)
- 2021-2022 survey season:
 - > Border Drive Reserve (13/12/2021, 17/12/2021, 24/12/2021, 30/12/2021 and 10/01/2022)

Targeted surveys for Golden Sun Moth were completed in accordance with the published survey guidelines for the species (DEWHA 2009b), and involved walking transects no greater than 5 m apart with the intent of flushing Golden Sun Moth from the grass and observing them in flight. The surveys were spaced at least one week apart to capture any variation in emergence patterns. Golden Sun Moth activity was confirmed at a reference site on each day when targeted surveys were undertaken. Key reference sites utilised across the three survey seasons included Craigieburn Grassland Nature Conservation Reserve, Broadmeadows Valley Park and Longforest Nature Conservation Reserve.

Surveys were conducted during the middle of the day, between 10 am and 2 pm, when temperatures were above 20°C, cloud-cover and wind were minimal, and after at least 48 hours since last rainfall. Details of the weather conditions, reference sites and results of the Golden Sun Moth surveys are provided below in Table A.4. The location of Golden Sun Moth surveys undertaken in the Corridor Section Project Boundary are shown in Appendix B.

Despite the presence of potential habitat, targeted surveys for Golden Sun Moth were not undertaken at Solomon Heights, as the species had recently been recorded in previous targeted surveys at this location. As such, Solomon Heights has been classified as Golden Sun Moth habitat for the purpose of this assessment.

Table A.4 Golden Sun Moth targeted survey details

Site	Date	Survey Time	Weather	Flying at Reference Site	Golden Sun Moth Recorded
Rail Corridor adjacent to Solomon Heights and the River Valley Estate	11/12/2019	12:30pm – 1:00pm	Temperature: 20 °C Wind: 27 km/h Humidity: 52% Cloud cover: 30% No rain in last 48 hours	Yes (Craigieburn Grassland Nature Conservation Reserve)	No
	19/12/2019	10:55am-12:00pm	Temperature: 20.3 °C Wind: 20 km/h Humidity: 64% Cloud cover: 30% No rain in last 48 hours	Yes (Craigieburn Grassland Nature Conservation Reserve)	No
	09/01/2020	10:45am – 11:15am	Temperature: 23.1 °C Wind: 7 km/h Humidity: 60% Cloud cover: 0% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No
	17/01/2020	12:00pm -12:30pm	Temperature: 25.0°C Wind: 20 km/h Humidity: 54% Cloud cover: 70% No rain in last 12 hours	No	No
River Valley Estate	19/11/2020	12:40pm - 1:55pm	Temperature: 32.2 °C Wind: 13.3 km/h Humidity: 23.8% Cloud cover: 0% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No
	25/11/2020	1:35pm – 2:03pm	Temperature: 29.5 °C Wind: 14 km/h Humidity: 40.4% Cloud cover: 0% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No
	15/12/2020	10:13am- 11:14am	Temperature: 31 °C Wind: 7.2 km/h Humidity: 46.4% Cloud cover: 30% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No

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Site	Date	Survey Time	Weather	Flying at Reference Site	Golden Sun Moth Recorded
	11/1/2021	10:00am-10:26am	Temperature: 32.1 °C Wind: 9.8 km/h Humidity: 29% Cloud cover: 10% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No
M80 South Powerline Easement	20/11/2019	1:40pm – 2:30pm	Temperature: 29.9 °C Wind: 26 km/h Humidity: 26% Cloud cover: 30% No rain in last 48 hours	Yes (Craigieburn Grassland Nature Conservation Reserve)	No
	25/11/2019	2:00pm- 3:00pm	Temperature: 28.2 °C Wind: 2.5 km/h Humidity: % Cloud cover: 100% No rain in last 48 hours	Yes (Craigieburn Grassland Nature Conservation Reserve)	No
	19/11/2019	10:05am -11:00am	Temperature: 18.9 °C Wind: 17 km/h Humidity: 69% Cloud cover: 50% No rain in last 48 hours	Yes (Craigieburn Grassland Nature Conservation Reserve)	No
	09/01/2020	9:50am-10:50am	Temperature: 20.9 °C Wind: 9 km/h Humidity: 69% Cloud cover: 0% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No
M80 North Zone	19/11/2020	10:10am- 12:04pm	Temperature: 27.9 °C Wind: 10.6 km/h Humidity: 34.1% Cloud cover: 0% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No
	25/11/2020	11:57am-1:11pm	Temperature: 27 °C Wind: 6 km/h Humidity: 47.2% Cloud cover: 0% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No
	15/12/2020	12:13pm-1:28pm	Temperature: 31.5 °C Wind: 8.7 km/h Humidity: 40.8% Cloud cover: 30% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No
	11/01/2021	10:57am-12:00pm	Temperature: 33.9 °C Wind: 10.4 km/h Humidity: 27% Cloud cover: 5% No rain in last 48 hours	Yes (Broadmeadows Valley Park)	No
Border Drive	13/12/2021	12:41pm-1:19pm	Temperature: 30.7 °C Wind: 3.3 km/h Humidity: 33%	Yes (Broadmeadows valley Park)	No

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Site	Date	Survey Time	Weather	Flying at Reference Site	Golden Sun Moth Recorded
			Cloud cover: 5% No rain in last 48 hours		
	17/12/2021	12:42pm-12:53pm	Temperature: 23 °C Wind: 3.5 km/h Humidity: 42% Cloud cover: 5% No rain in last 48 hours	Yes (O'Herns Rd, Craigieburn and Craigieburn Grassland NCR)	No
	24/12/2021	4:34pm-4:55pm	Temperature: 25 °C Wind: 6 km/h Humidity: 45% Cloud cover: 5% No rain in last 48 hours	Yes (Longforest NCR and Craigieburn Grassland NCR)	No
	30/12/2021	1:55pm-2:11pm	Temperature: 29.4°C Wind: 1.8 km/h Humidity: 42% Cloud cover: 5% No rain in last 48 hours	Yes (Longforest NCR)	No
	10/01/2022	3:15pm-3:47pm	Temperature: 28.9°C Wind: 3.8 km/h Humidity: 51% Cloud cover: 5% No rain in last 48 hours	Yes (Broadmeadows valley park and Longforest NCR)	No

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APPENDIX B TARGETED FAUNA SURVEY MAPPING





Rail

Watercourse

Project Land (Corridor Section)

Project Land (Sunshine Section)

Map 1 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:
A.4

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

070140

Metres

Coordinate System: GDA 1994 MGA Zone 55

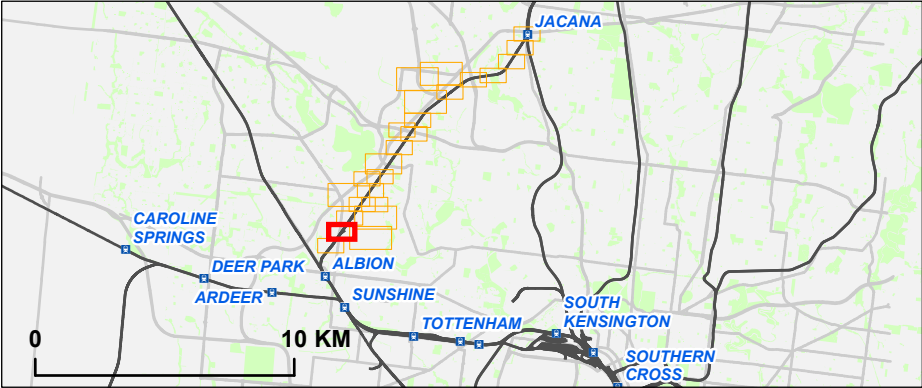
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- Rail
- ▬ Project Land (Corridor Section)
- Native Vegetation**
- ▬ 132 Plains Grassland

Map 2 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:
A.4

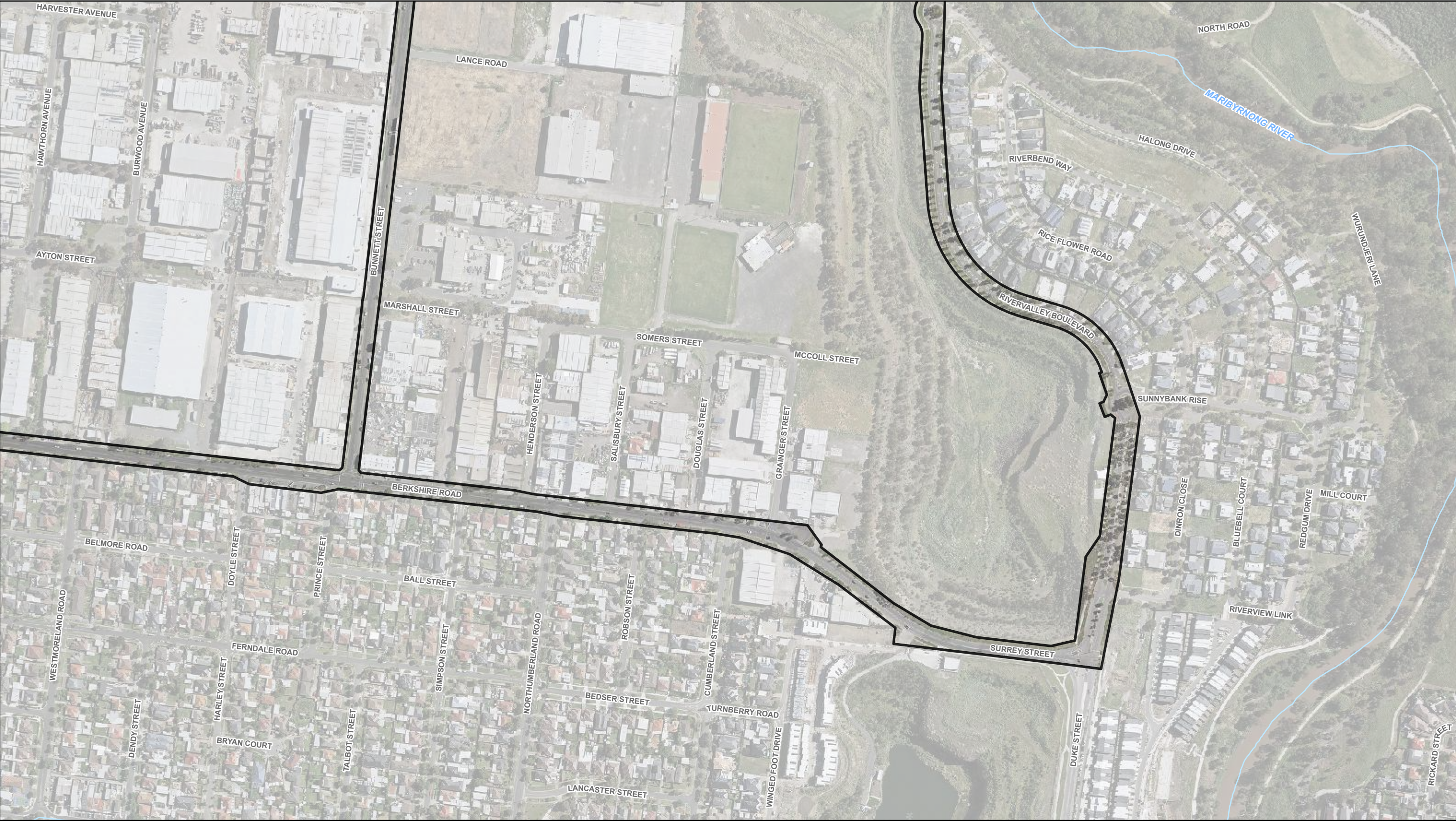
Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

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Metres
Coordinate System: GDA 1994 MGA Zone 55



Watercourse

Project Land (Corridor Section)

Map 3 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Targeted Fauna Survey Locations - Corridor Section

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Drawn By:
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Approved By:
J. Sullivan

Date:
21/04/2022

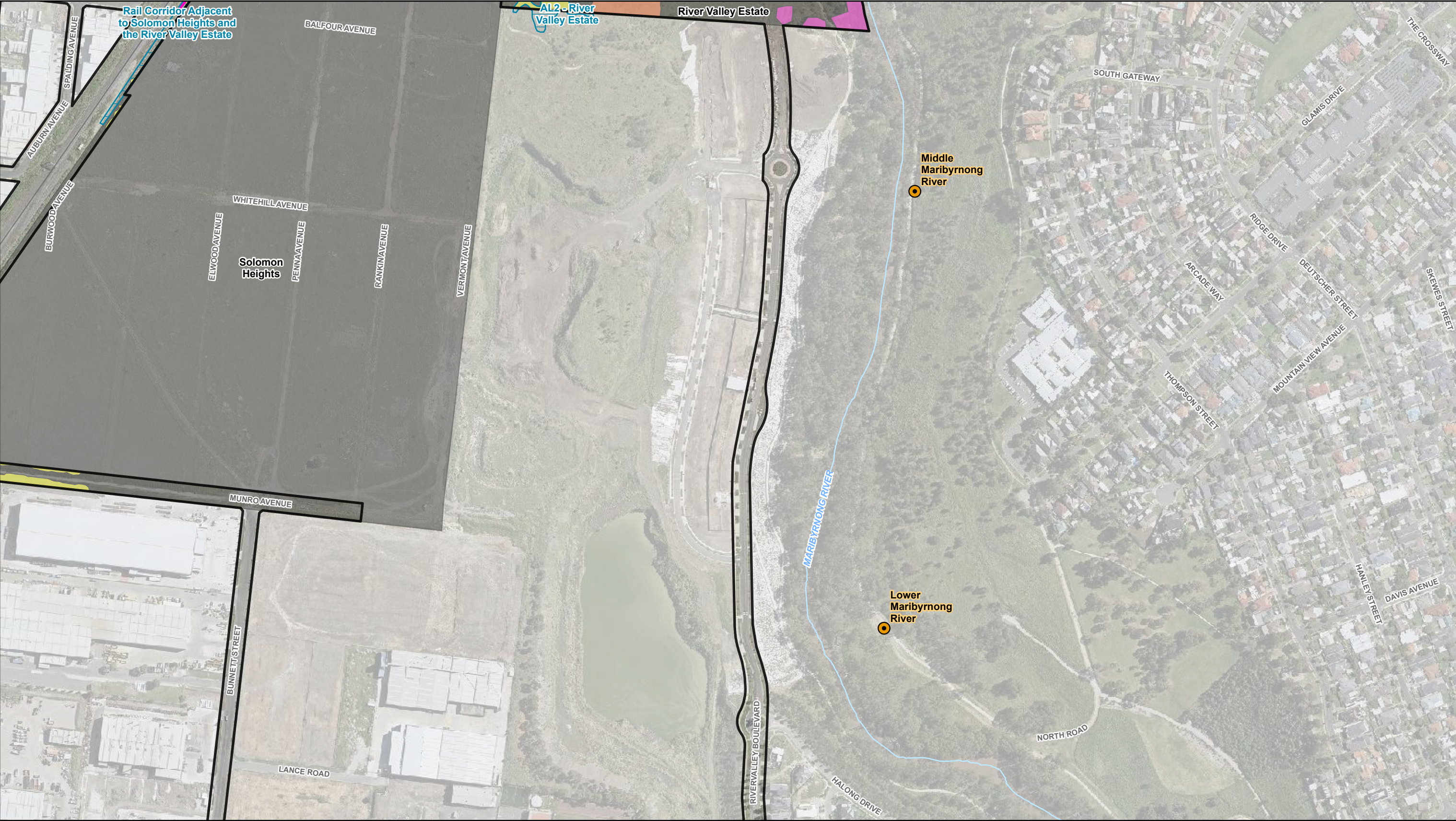
Map Size:
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Metres

Coordinate System: GDA 1994 MGA Zone 55

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Rail

Watercourse

Project Land (Corridor Section)

Key Assessment Areas

Striped Legless Lizard Tile Array

Golden Sun Moth Survey Area

Growing Grass Frog Survey Location

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Map 4 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Targeted Fauna Survey Locations - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:

A.4

Drawn By:

J. Rivera

Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

A3

N

0110220

Metres

Coordinate System: GDA 1994 MGA Zone 55

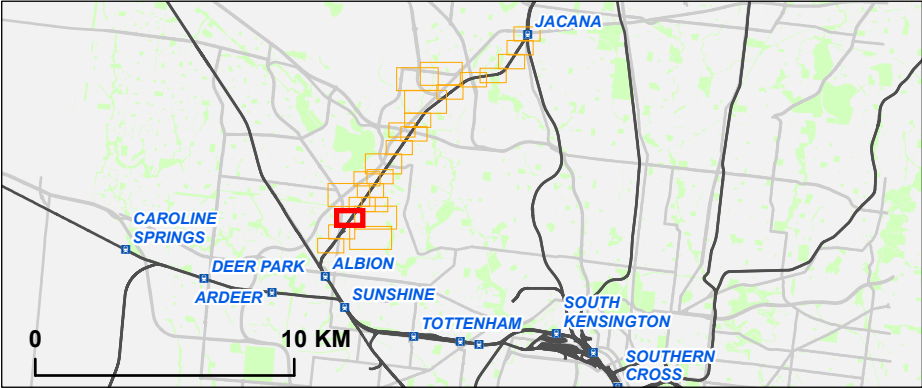
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- Rail
- ▭ Project Land (Corridor Section)
- ▭ Key Assessment Areas
- Native Vegetation**
- ▭ 132 Plains Grassland

Map 5 of 25

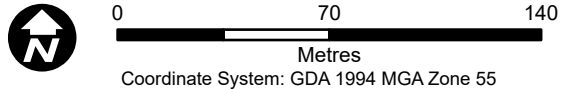
Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:		Revision:	
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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3





Rail

Project Land (Corridor Section)

Key Assessment Areas

Striped Legless Lizard Tile Array

Striped Legless Lizard Tile Array

Golden Sun Moth Survey Area

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Map 6 of 25

Data Sources:

AJMJV 2022

VicTrack 2021

Vicmap 2021

Aerial photo:

DELWP Oct. 2021

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Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:

A.4

Drawn By:

J. Rivera

Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

A3

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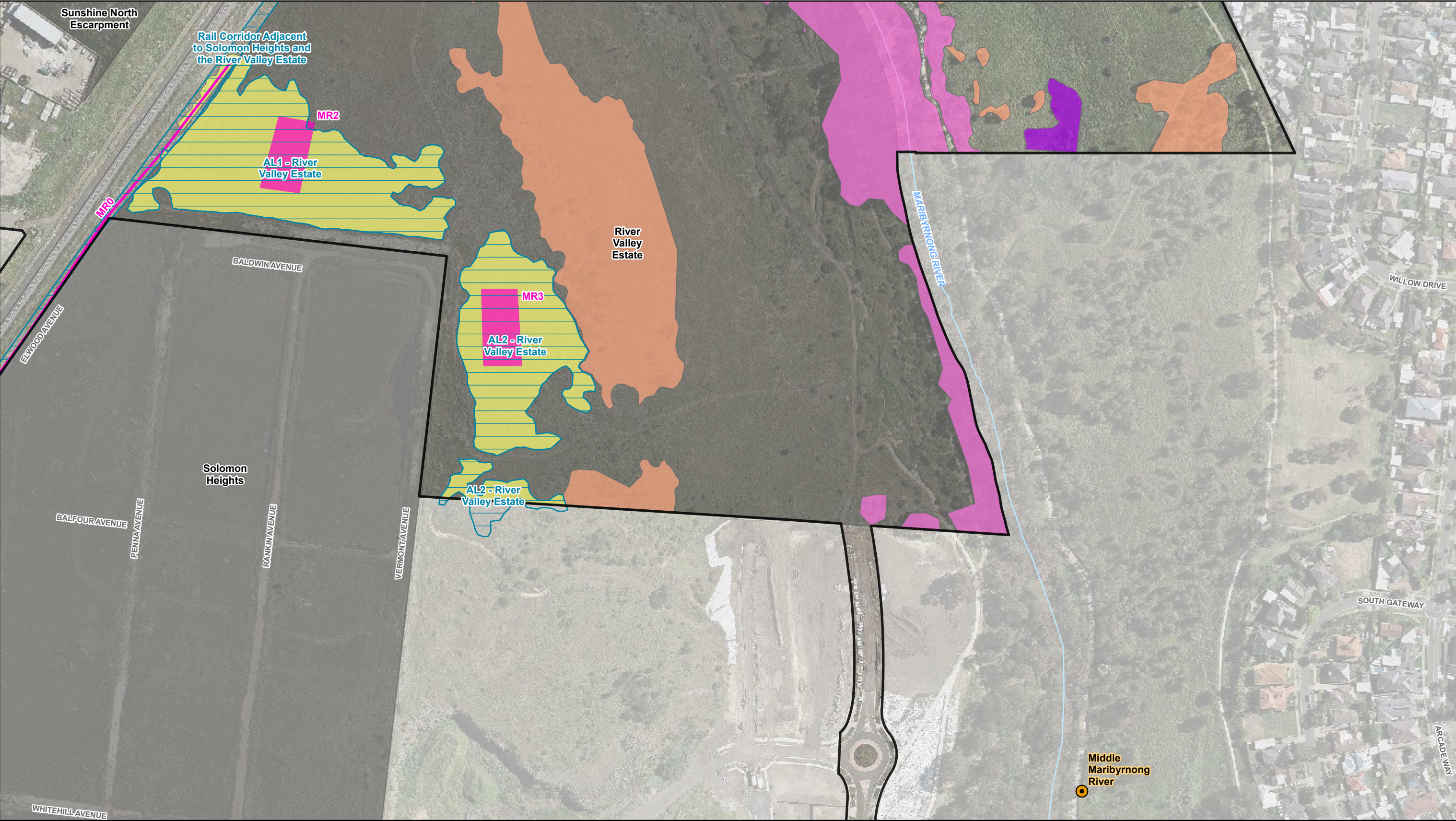
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140

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Rail

Watercourse

Project Land (Corridor Section)

Key Assessment Areas

Striped Legless Lizard Tile Array

Striped Legless Lizard Tile Array

Golden Sun Moth Survey Area

Growing Grass Frog Survey Location

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

821 Tall Marsh

895 Escarpment Shrubland

Map 7 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

RAIL PROJECTS VICTORIA

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JACOBS

M

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Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:
A.4

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

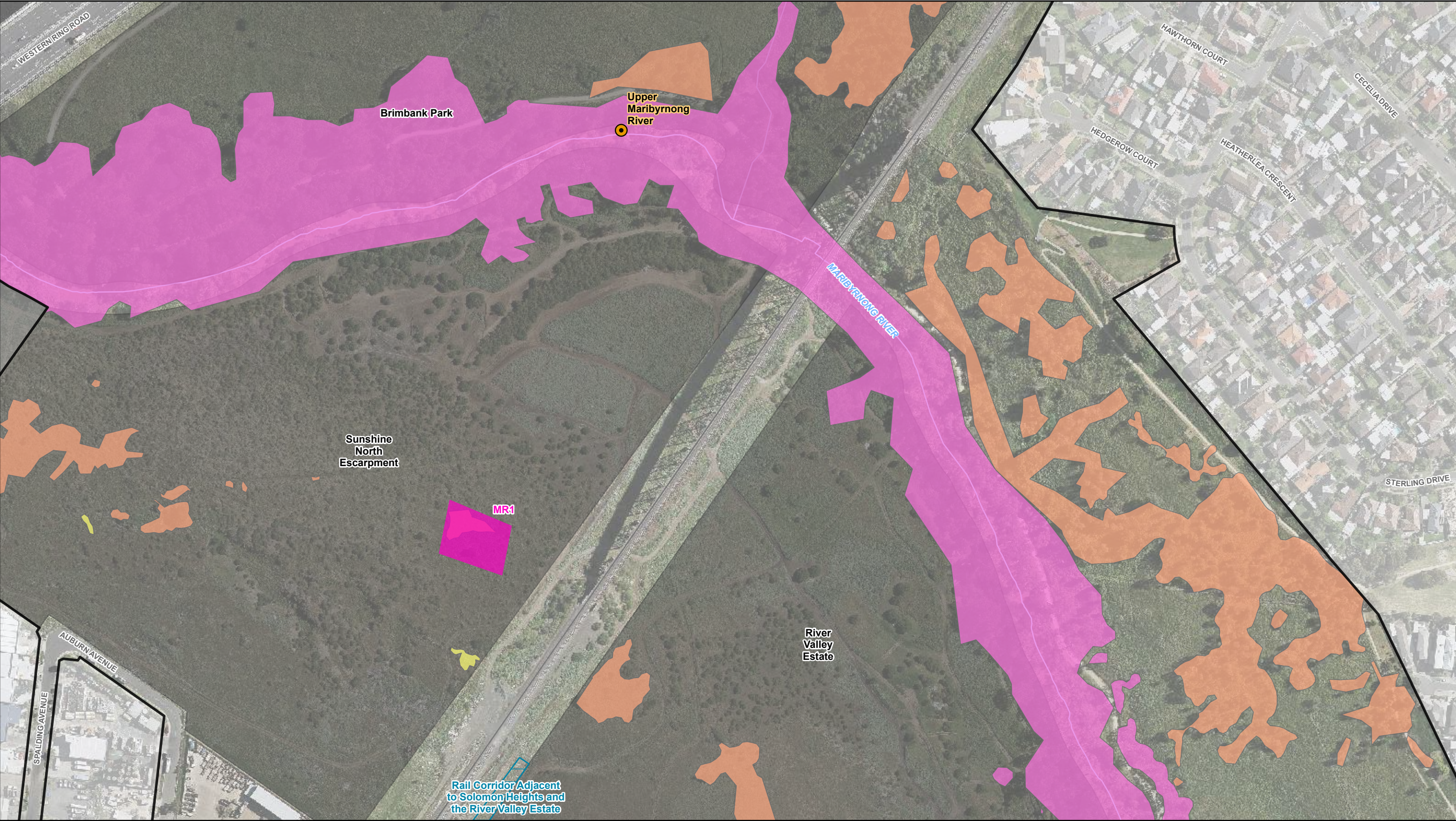
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Coordinate System: GDA 1994 MGA Zone 55

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Rail

Watercourse

Project Land (Corridor Section)

Key Assessment Areas

Striped Legless Lizard Tile Array

Golden Sun Moth Survey Area

Growing Grass Frog Survey Location

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Map 8 of 25

Data Sources:
AJM JV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

RAIL PROJECTS

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Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:
A.4

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

0

70

140

Metres

Coordinate System: GDA 1994 MGA Zone 55

C:\Users\Joe.Rivera\1\AJM JV\MAR GIS Team - Documents\640_Site_Plans\VRIP_0361_Ecology_EPBCReferralDocumentation\VRIP_0361_Ecology_EPBCReferralDocumentation.aprx



Rail

Watercourse

Project Land (Corridor Section)

Key Assessment Areas

Striped Legless Lizard Tile Array

Striped Legless Lizard Tile Array

Golden Sun Moth Survey Area

Growing Grass Frog Survey Location

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Map 9 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

RAIL PROJECTS

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M

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Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:
A.4

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

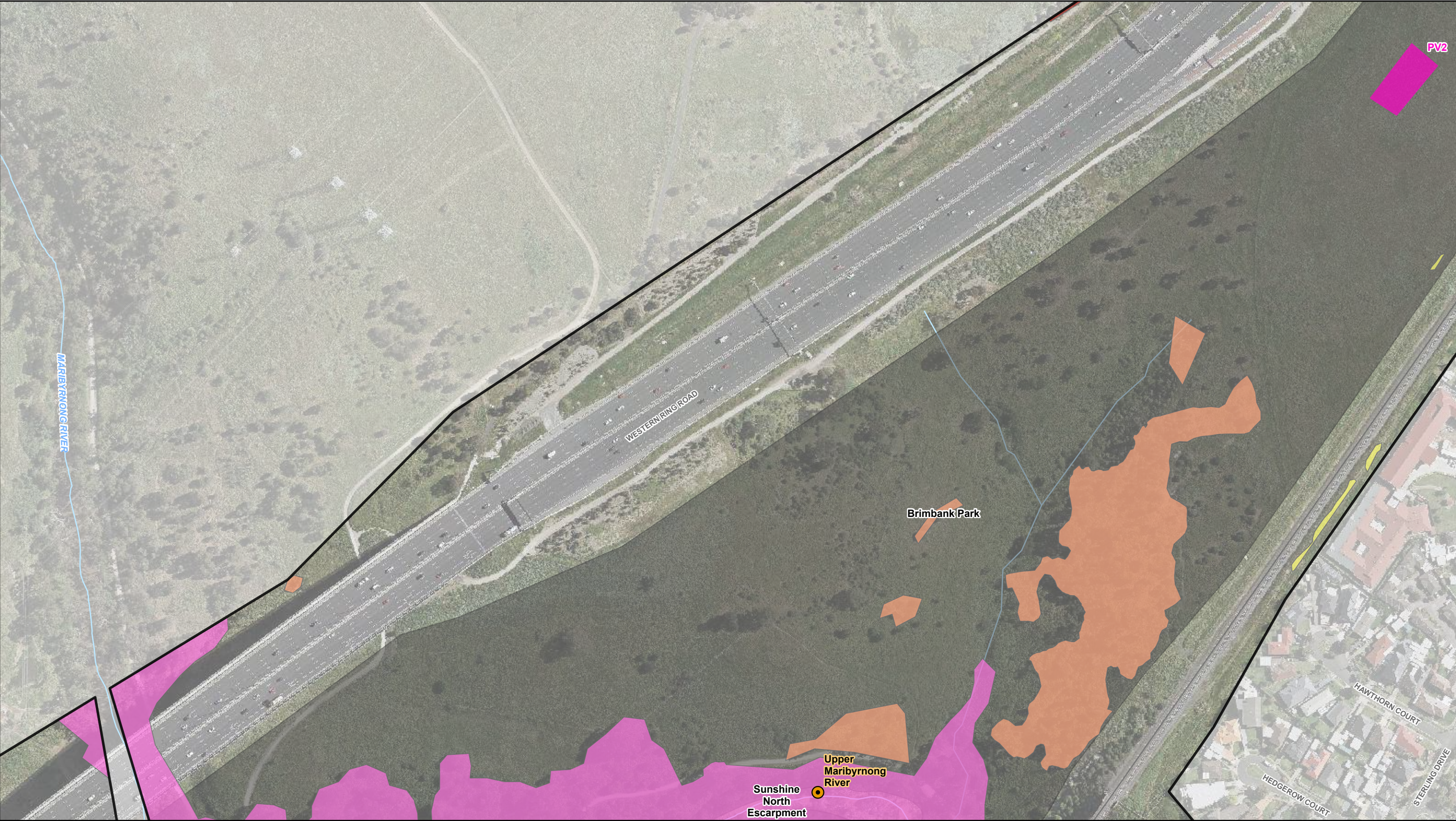
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Coordinate System: GDA 1994 MGA Zone 55

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Rail

Watercourse

Project Land (Corridor Section)

Key Assessment Areas

Striped Legless Lizard Tile Array

Growing Grass Frog Survey Location

Native Vegetation

132 Plains Grassland

55 Plains Grassy Woodland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Map 10 of 25

Data Sources:

AJMJV 2022

VicTrack 2021

Vicmap 2021

Aerial photo:

DELWP Oct. 2021

RAIL PROJECTS VICTORIA

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Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:

A.4

Drawn By:

J. Rivera

Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

A3

N

0

70

140

Metres

Coordinate System: GDA 1994 MGA Zone 55

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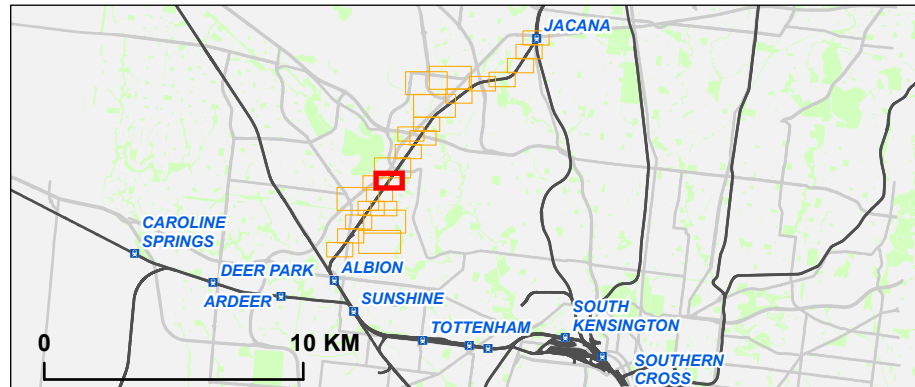
- Rail
- Watercourse
- ▬ Project Land (Corridor Section)
- ▬ Key Assessment Areas
- ▬ Striped Legless Lizard Tile Array

Native Vegetation

- 132 Plains Grassland
- 55 Plains Grassy Woodland
- 56 Floodplain Riparian Woodland
- 895 Escarpment Shrubland

Map 11 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



RAIL PROJECTS VICTORIA

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Melbourne Airport Rail Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number: MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627
Revision: A.4

Drawn By: J. Rivera
Approved By: J. Sullivan
Date: 21/04/2022
Map Size: A3



0 70 140
Metres

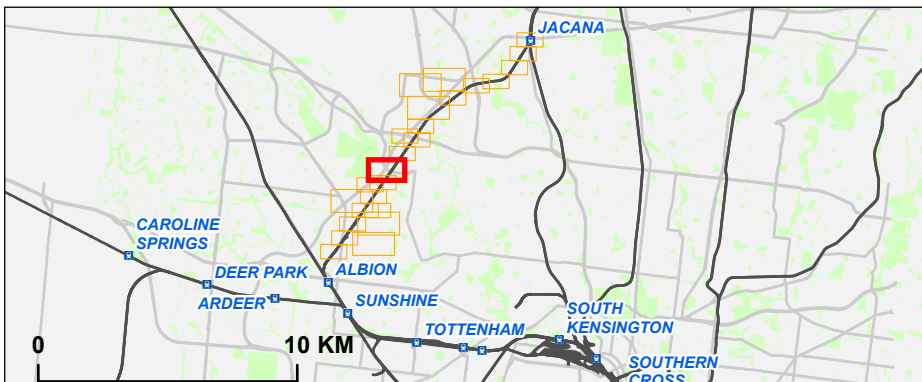
Coordinate System: GDA 1994 MGA Zone 55







- Rail
- ▭ Project Land (Corridor Section)
- ▭ Key Assessment Areas
- ▭ Striped Legless Lizard Tile Array
- Native Vegetation**
- ▭ 132 Plains Grassland
- ▭ 55 Plains Grassy Woodland

Map 12 of 25

Data Sources:
AJM JV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



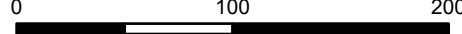



Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627		A.4	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3



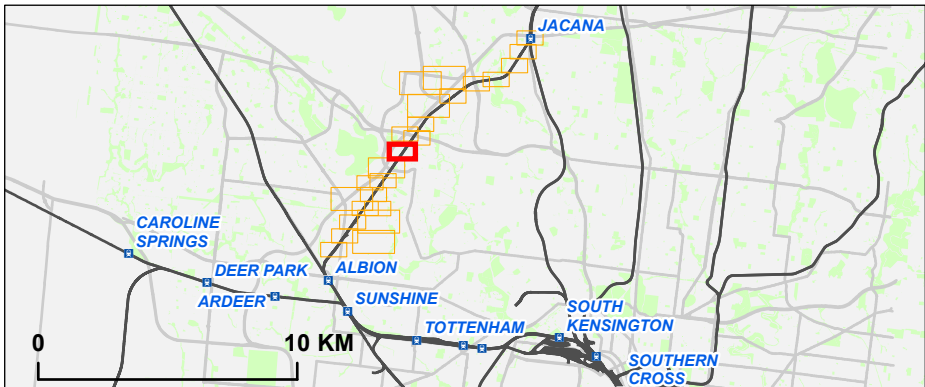
Coordinate System: GDA 1994 MGA Zone 55



— Rail
▬ Project Land (Corridor Section)

Map 13 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627		A.4	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

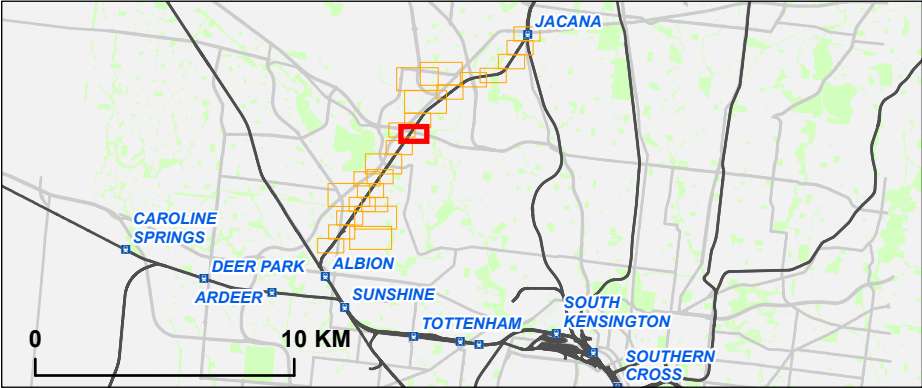
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Metres
Coordinate System: GDA 1994 MGA Zone 55



- Rail
- Watercourse
- ▭ Project Land (Corridor Section)

Map 14 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021





Joint Venture



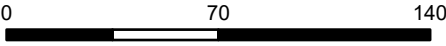

MOTT MACDONALD

Melbourne Airport Rail

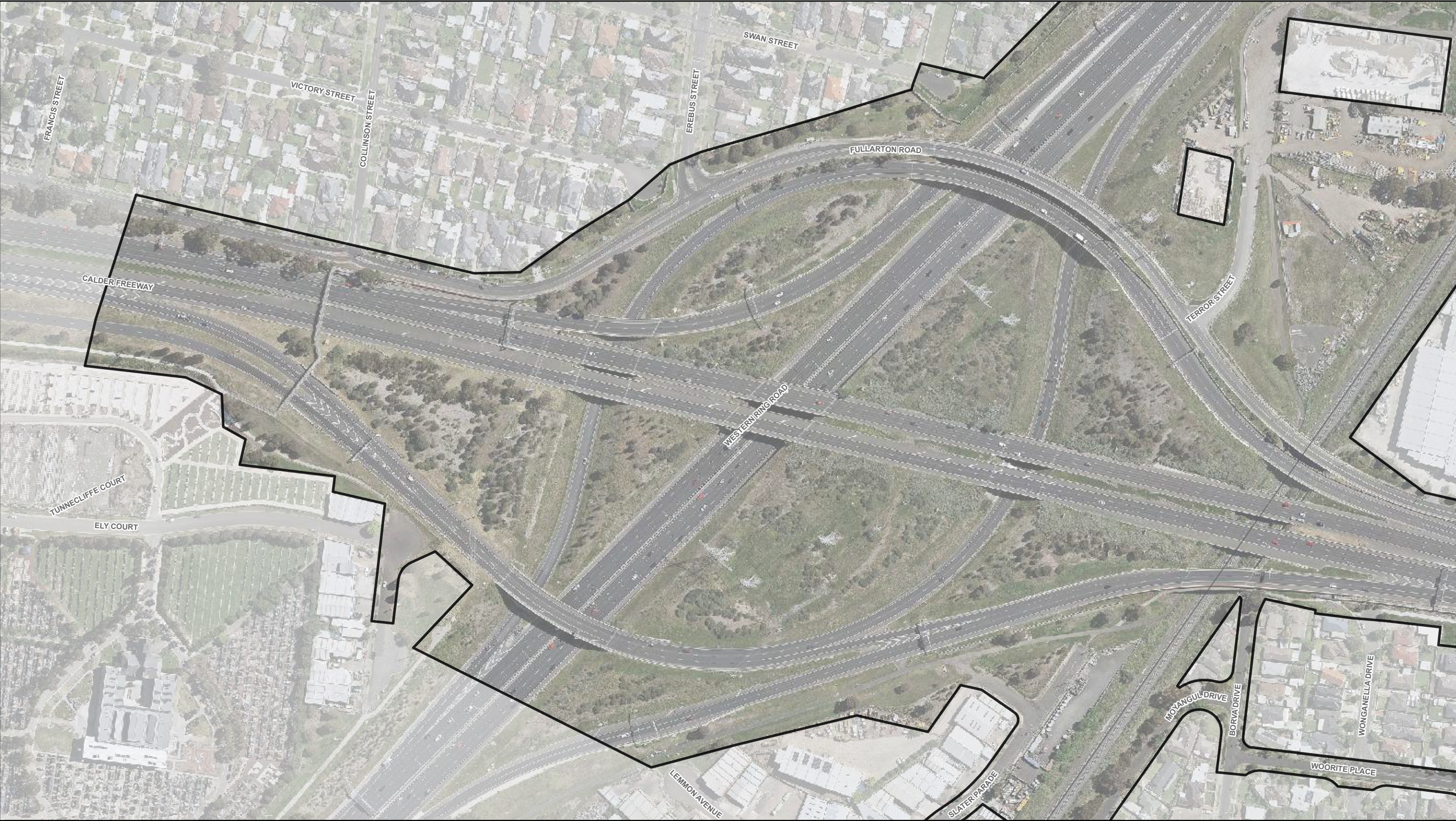
Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627		A.4	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3



Coordinate System: GDA 1994 MGA Zone 55



Rail

Project Land (Corridor Section)

Map 15 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:
A.4

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

070140

Metres

Coordinate System: GDA 1994 MGA Zone 55

C:\Users\Joe.Rivera\1\AJMJV\MAR GIS Team - Documents\640_Site_Plans\VRIP_0361_Ecology_EPBCReferral\Documentation\VRIP_0361_Ecology_EPBCReferral\Documentation.aprx



— Rail

— Watercourse

▬ Project Land (Corridor Section)

▬ Key Assessment Areas

▬ Golden Sun Moth Survey Area

● Growing Grass Frog Survey Location

Native Vegetation

▬ 821 Tall Marsh

▬ 851 Stream Bank Shrubland

Map 16 of 25

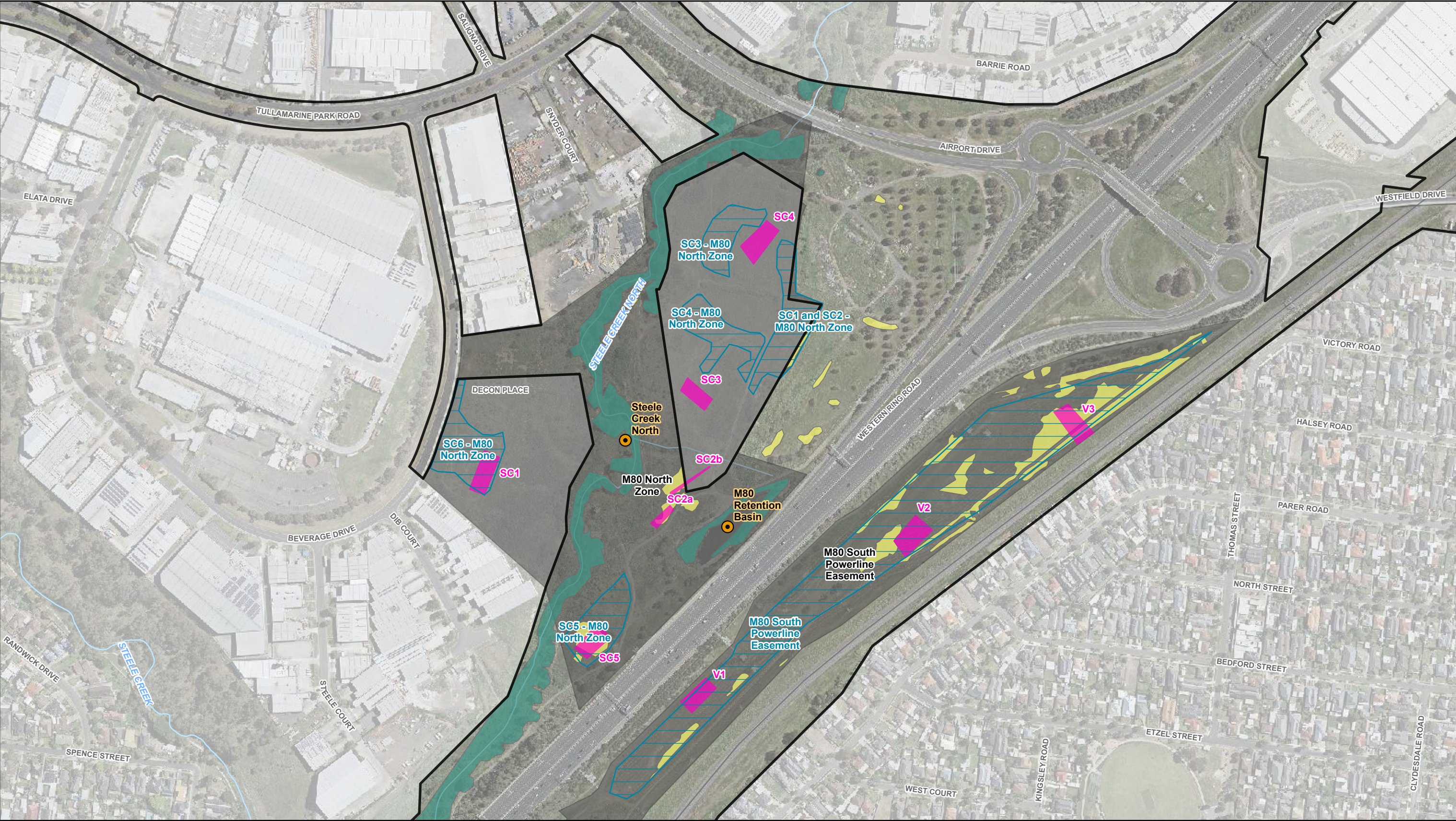
Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

Melbourne Airport Rail
Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627		A.4	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

Coordinate System: GDA 1994 MGA Zone 55



Rail

Watercourse

Project Land (Corridor Section)

Key Assessment Areas

Striped Legless Lizard Tile Array

Golden Sun Moth Survey Area

Growing Grass Frog Survey Location

Native Vegetation

132 Plains Grassland

851 Stream Bank Shrubland

Map 17 of 25

Data Sources:

AJMJV 2022

VicTrack 2021

Vicmap 2021

Aerial photo:

DELWP Oct. 2021

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Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:

A.4

Drawn By:

J. Rivera

Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

A3

N

0

125

250

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Watercourse

Project Land (Corridor Section)

Map 18 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627		A.4	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

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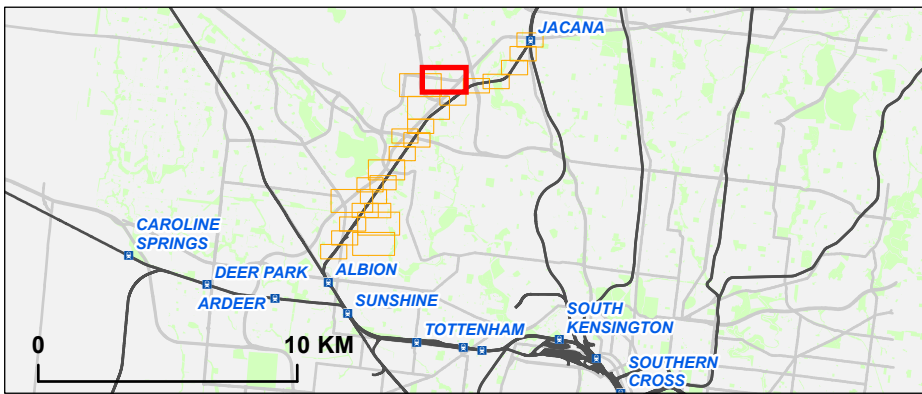
Coordinate System: GDA 1994 MGA Zone 55







- Rail
- Watercourse
- ▭ Project Land (Corridor Section)

Map 19 of 25

Data Sources:
AJM JV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

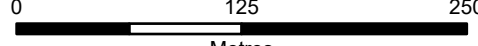





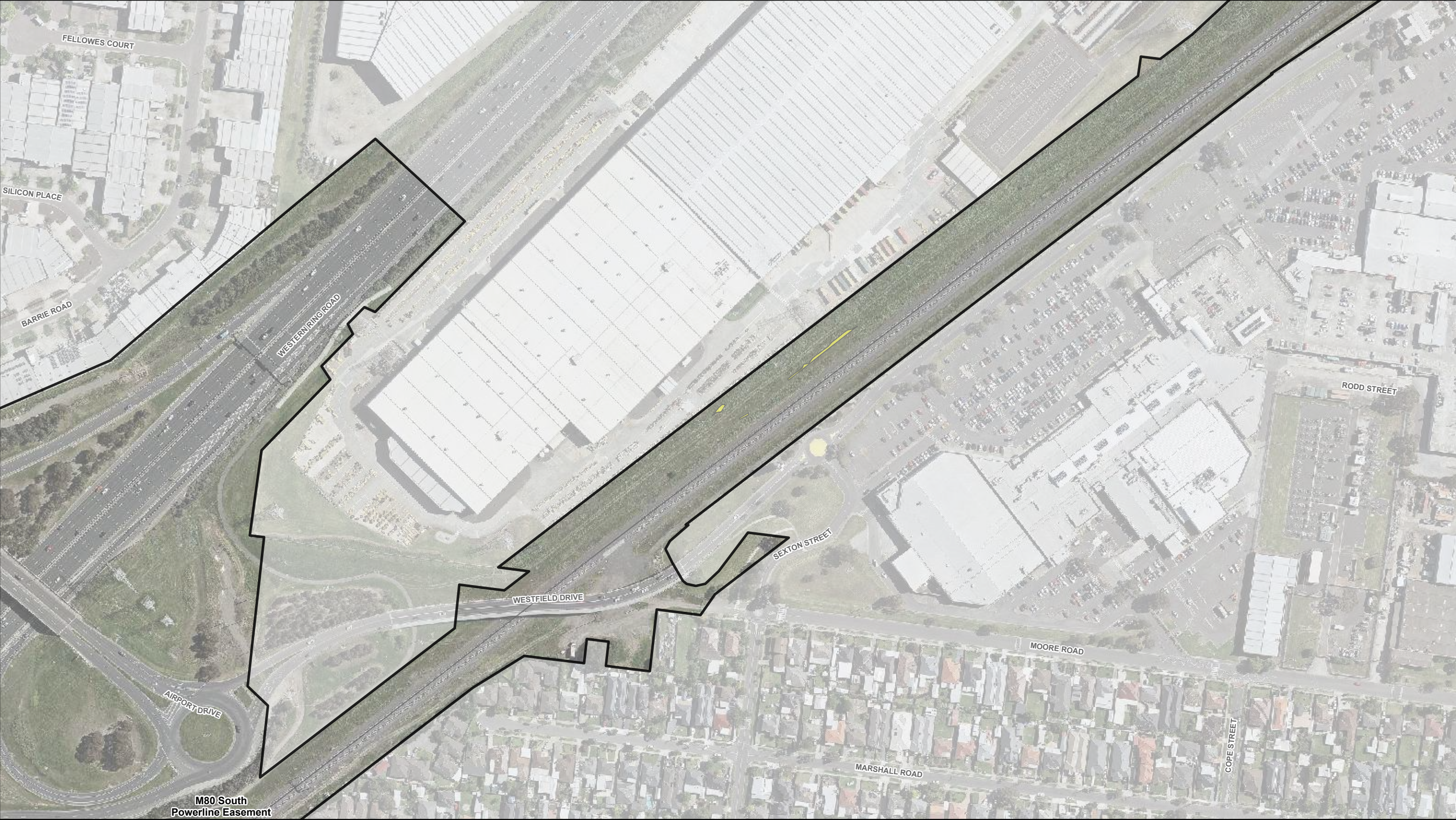
Melbourne Airport Rail Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:		Revision:	
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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3



Coordinate System: GDA 1994 MGA Zone 55



Rail

Project Land (Corridor Section)

Key Assessment Areas

Native Vegetation

132 Plains Grassland

Map 20 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

RAIL PROJECTS VICTORIA

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Melbourne Airport Rail
Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Drawn By:
J. Rivera

Revision:
A.4

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
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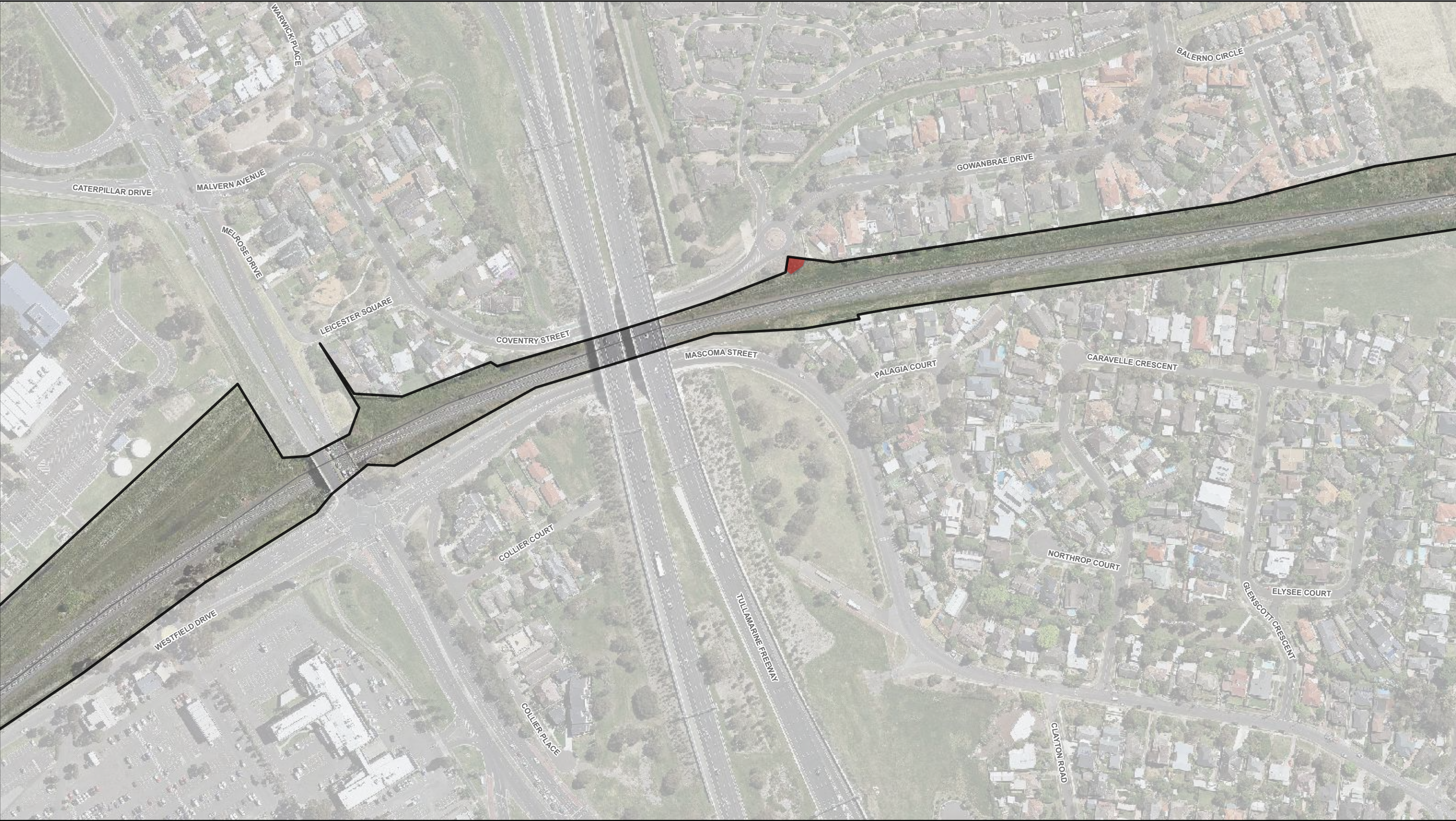
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070140

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Rail

Project Land (Corridor Section)

Native Vegetation

55 Plains Grassy Woodland

Map 21 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

Joint Venture

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Melbourne Airport Rail
Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:
A.4

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

070140

Metres

Coordinate System: GDA 1994 MGA Zone 55

C:\Users\Joe.Rivera\AJMJV\MAR GIS Team - Documents\640_Site_Plans\VRIP_0361_Ecology_EPBCReferral\Documentation\VRIP_0361_Ecology_EPBCReferral\Documentation.aprx



Rail

Watercourse

Project Land (Corridor Section)

Growing Grass Frog Survey Location

Native Vegetation

55 Plains Grassy Woodland

641 Riparian Woodland

821 Tall Marsh

Map 22 of 25

Data Sources:

AJM JV 2022

VicTrack 2021

Vicmap 2021

Aerial photo:

DELWP Oct. 2021

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Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Revision:

A.4

Drawn By:

J. Rivera

Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

A3

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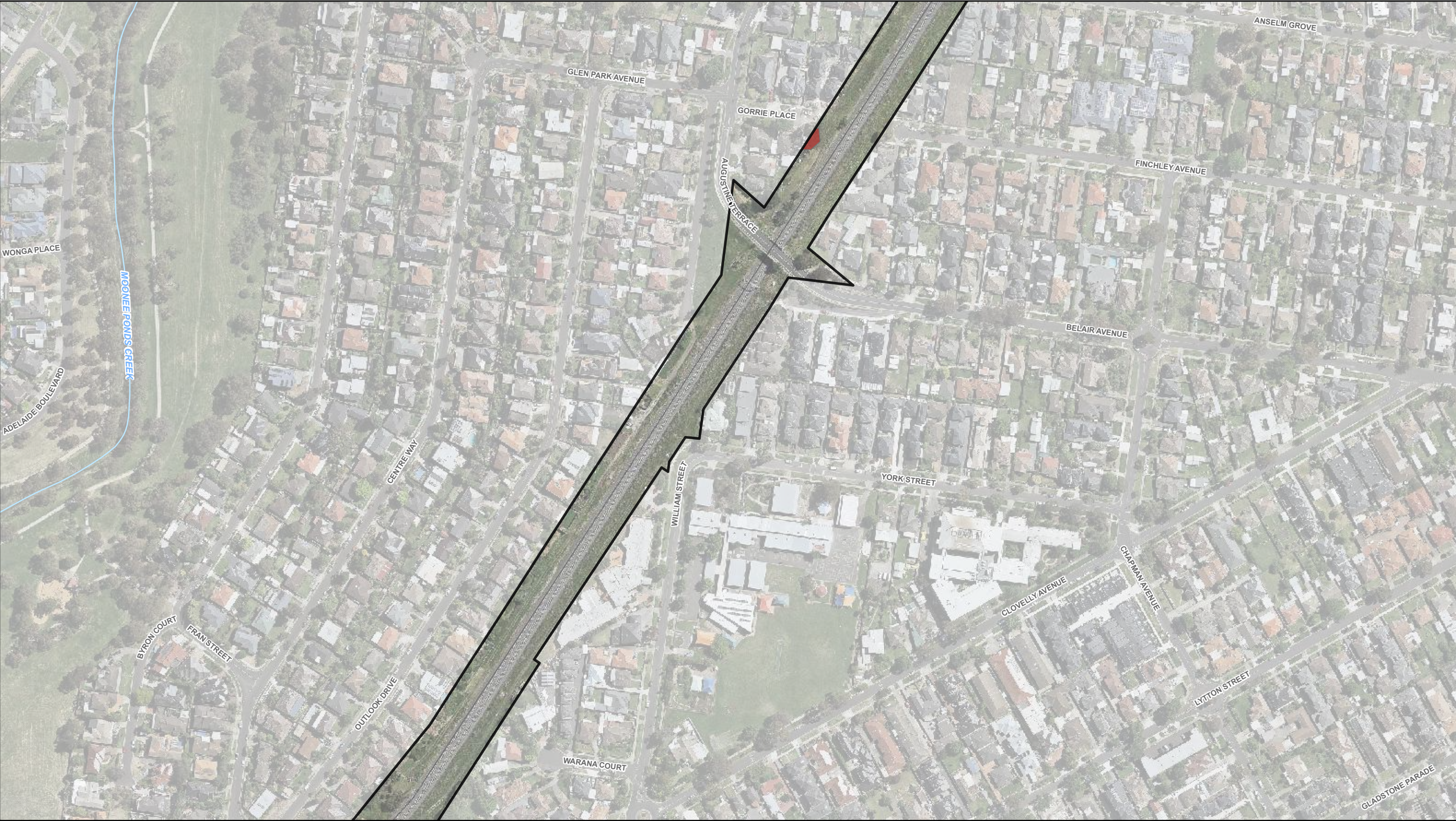
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Metres

Coordinate System: GDA 1994 MGA Zone 55

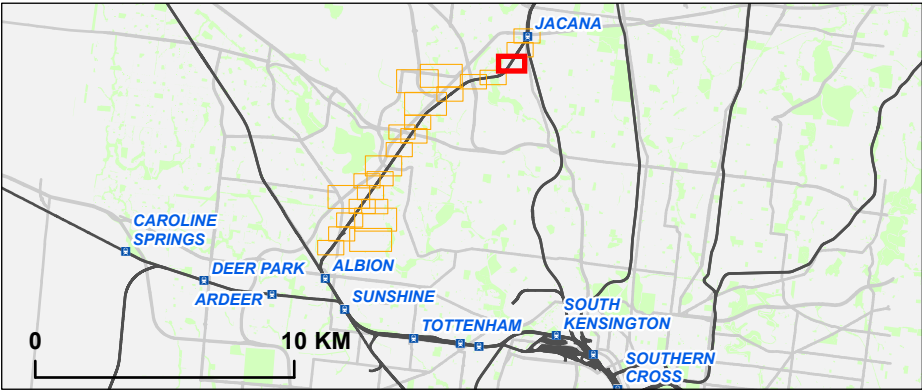
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- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- Native Vegetation**
- 55 Plains Grassy Woodland

Map 23 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

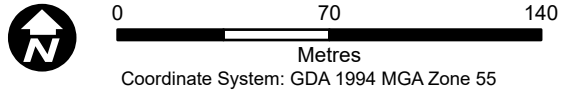






Melbourne Airport Rail
Project Wide
Targeted Fauna Survey Locations - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627		A.4	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3





Rail

Project Land (Corridor Section)

Map 24 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627

Drawn By:
J. Rivera

Revision:
A.4

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

070140

Metres

Coordinate System: GDA 1994 MGA Zone 55

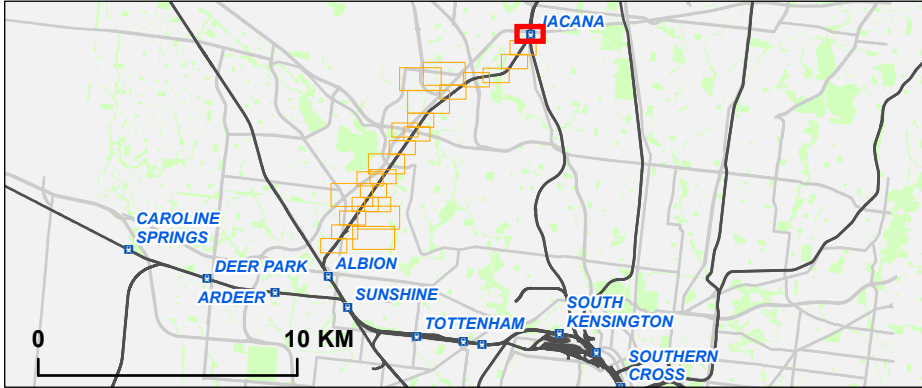
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- Rail station
- Rail
- Project Land (Corridor Section)

Map 25 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail

Project Wide

Targeted Fauna Survey Locations - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490627		A.4	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

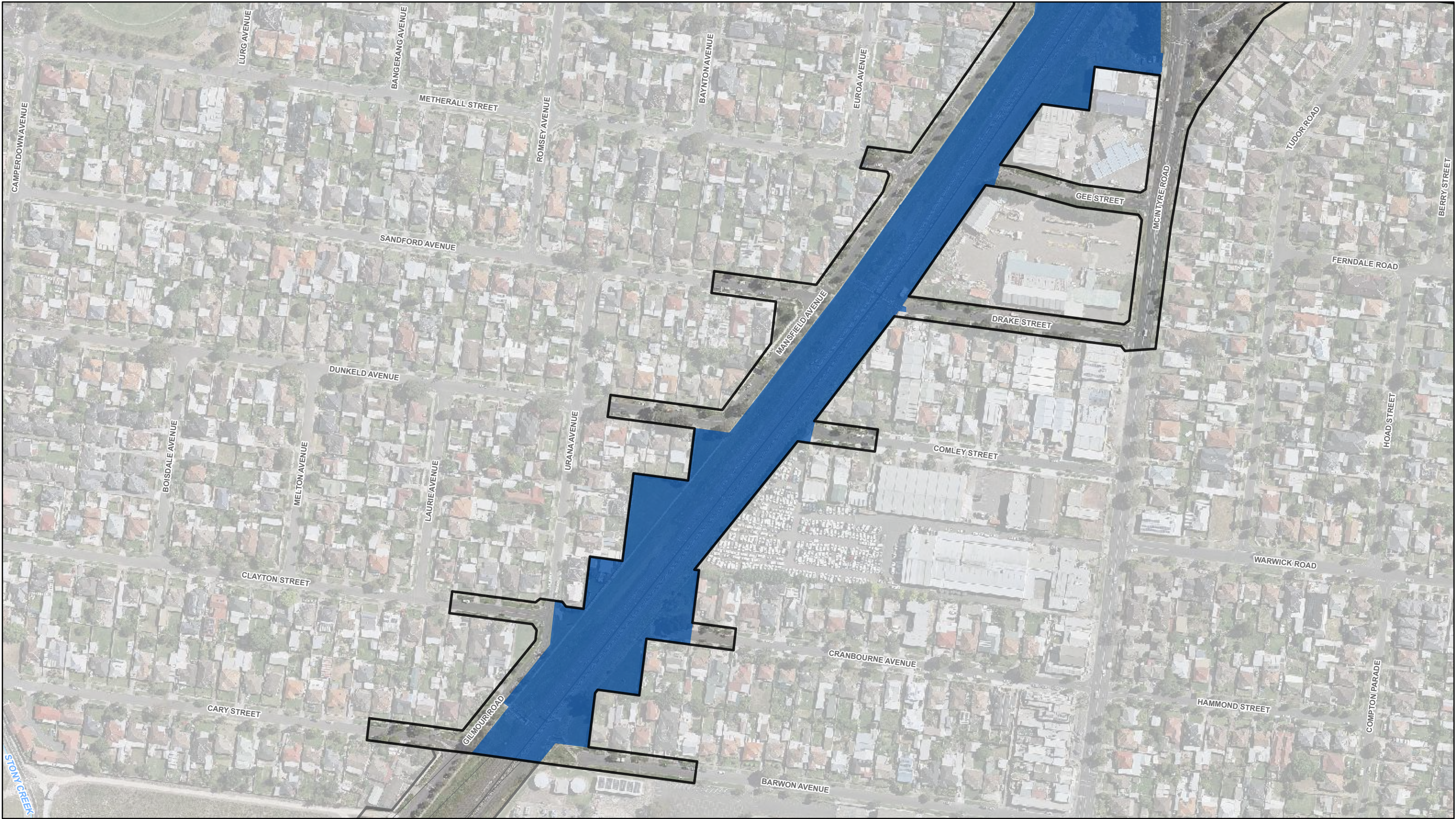
Coordinate System: GDA 1994 MGA Zone 55

OFFICIAL: Sensitive

APPENDIX C

MNES IMPACT MAPPING

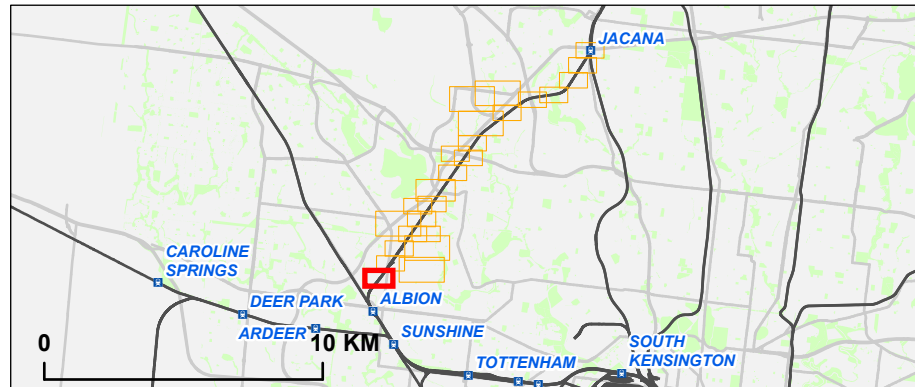




- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- ▭ Project Land (Sunshine Section)
- Construction Footprint (Corridor Section)

Map 1 of 25

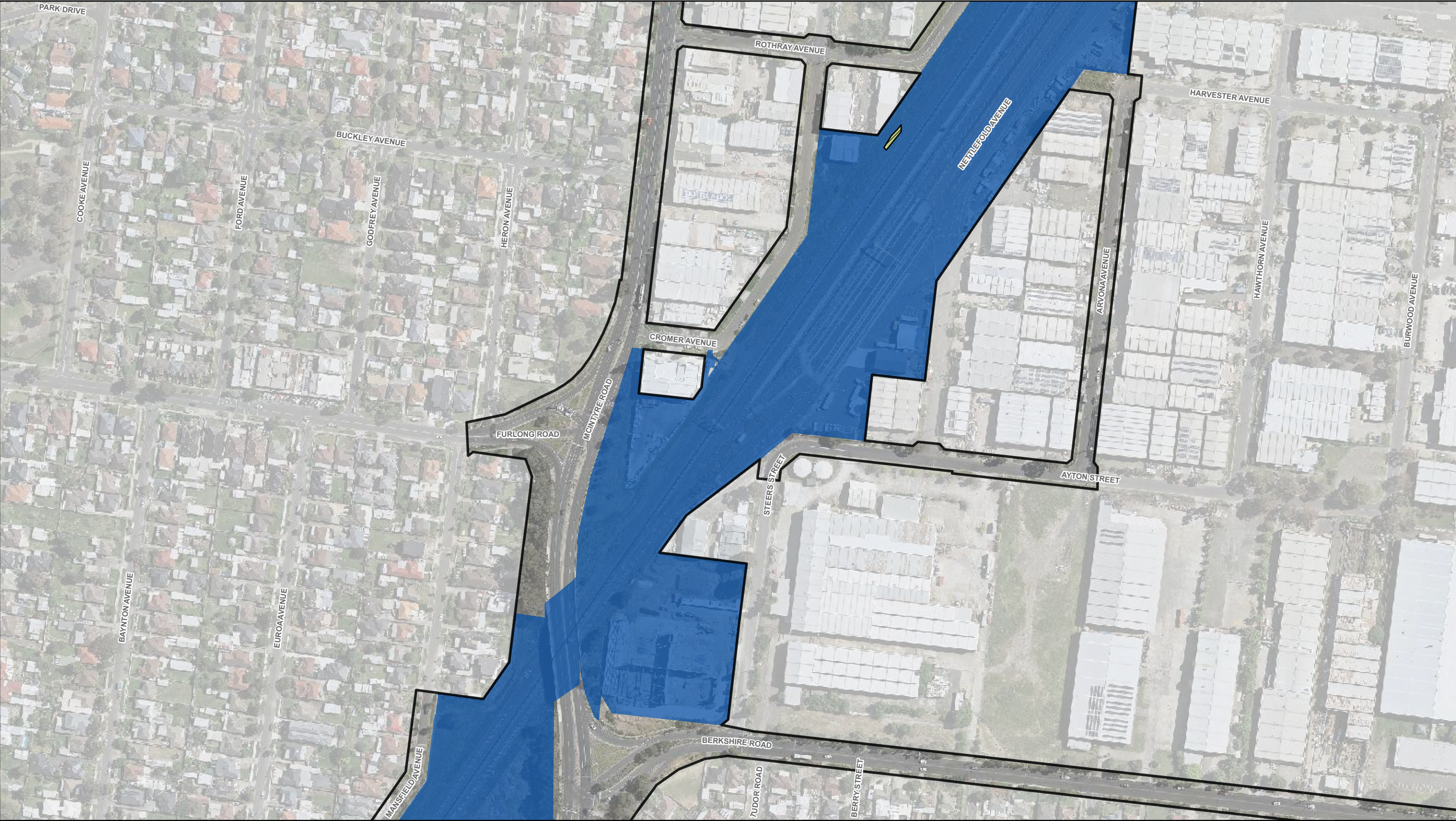
Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

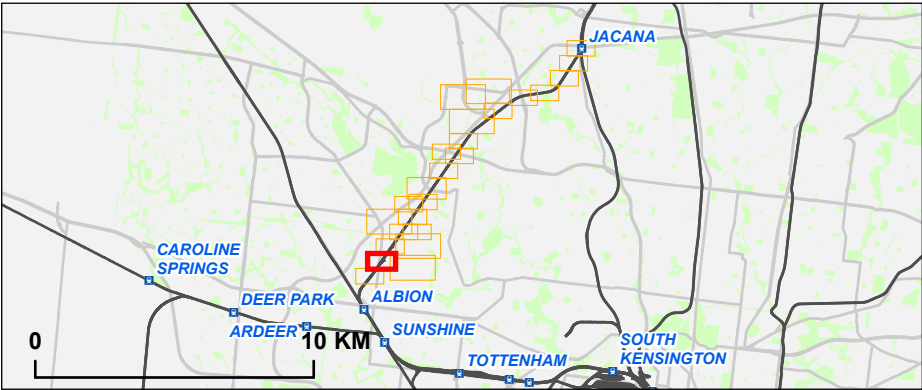
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Metres
Coordinate System: GDA 1994 MGA Zone 55



Map 2 of 25

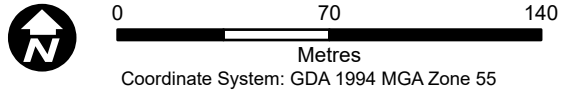
- Rail
- ▬ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)
- ▨ Removed Native Vegetation
- Native Vegetation**
- 132 Plains Grassland

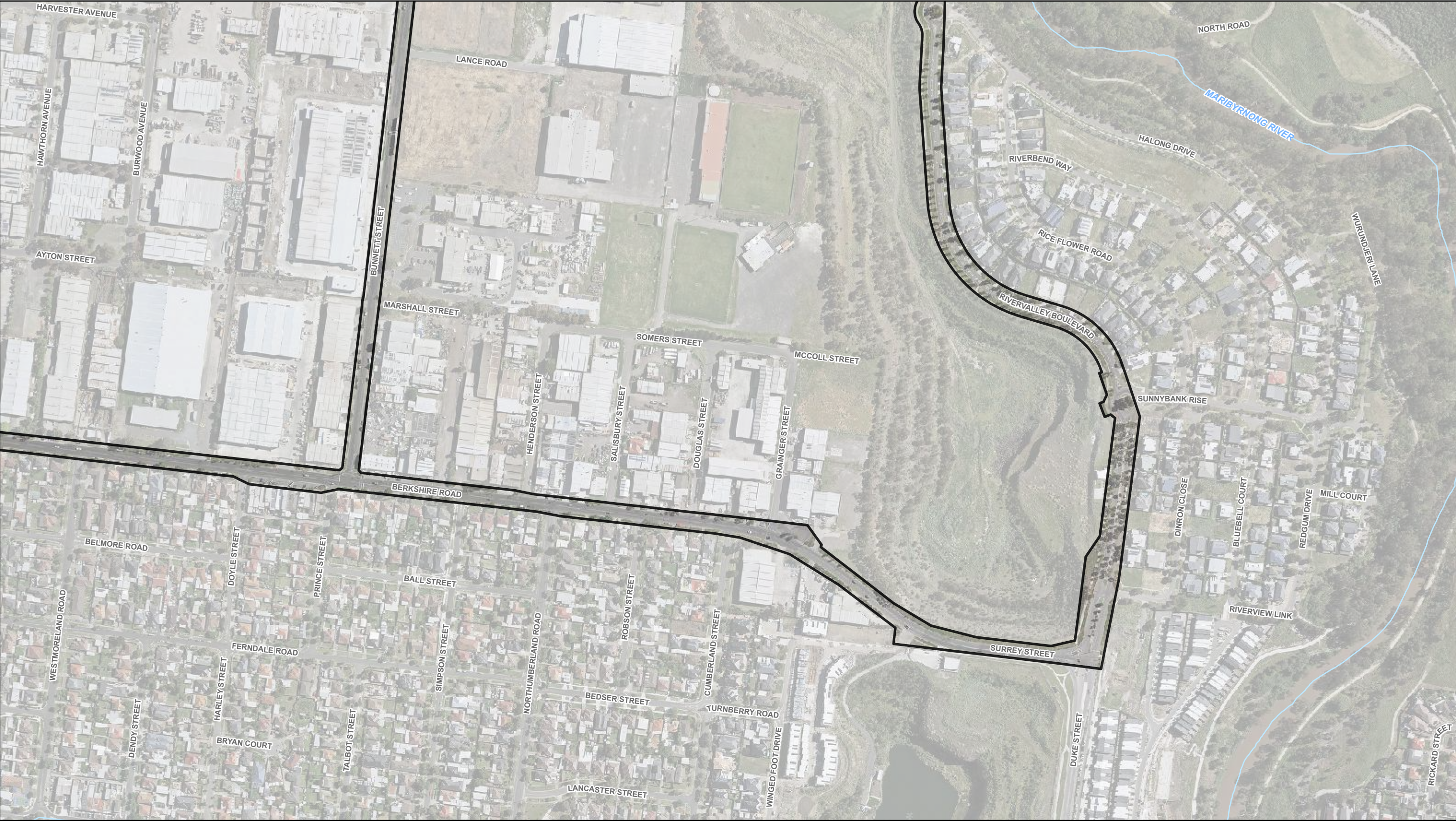
Data Sources:
AJM JV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

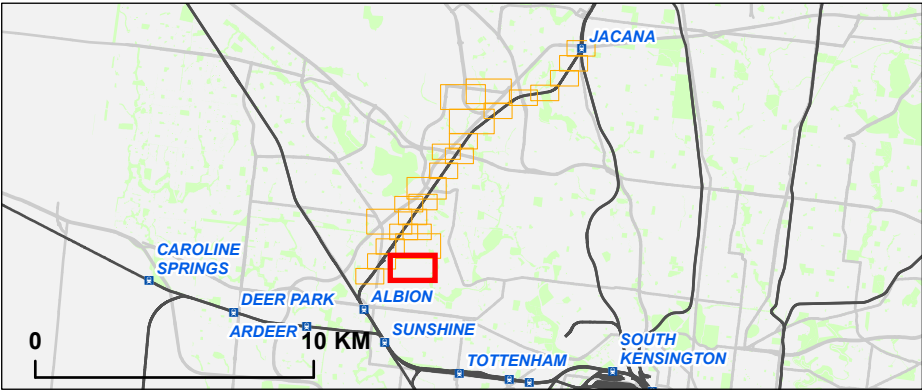




- Watercourse
- Project Land (Corridor Section)

Map 3 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021





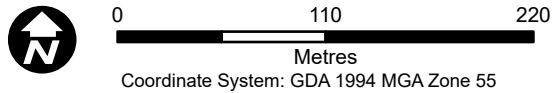
Joint Venture



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Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3





Rail

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Spiny Rice-flower to be removed

Spiny Rice Flower

Removed Native Vegetation

Golden Sun Moth Habitat

Striped Legless Lizard Habitat

Native Vegetation

132 Plains Grassland

Natural Temperate Grassland of the Victorian Volcanic Plain

Map 5 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

RAIL PROJECTS VICTORIA

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Melbourne Airport Rail
Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:
A.5

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

N

070140

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Rail

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Spiny Rice-flower to be removed

Spiny Rice Flower

Removed Native Vegetation

Golden Sun Moth Habitat

Striped Legless Lizard Habitat

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Natural Temperate Grassland of the Victorian Volcanic Plain

Map 6 of 25

Data Sources:
AJM JV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:
A.5

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

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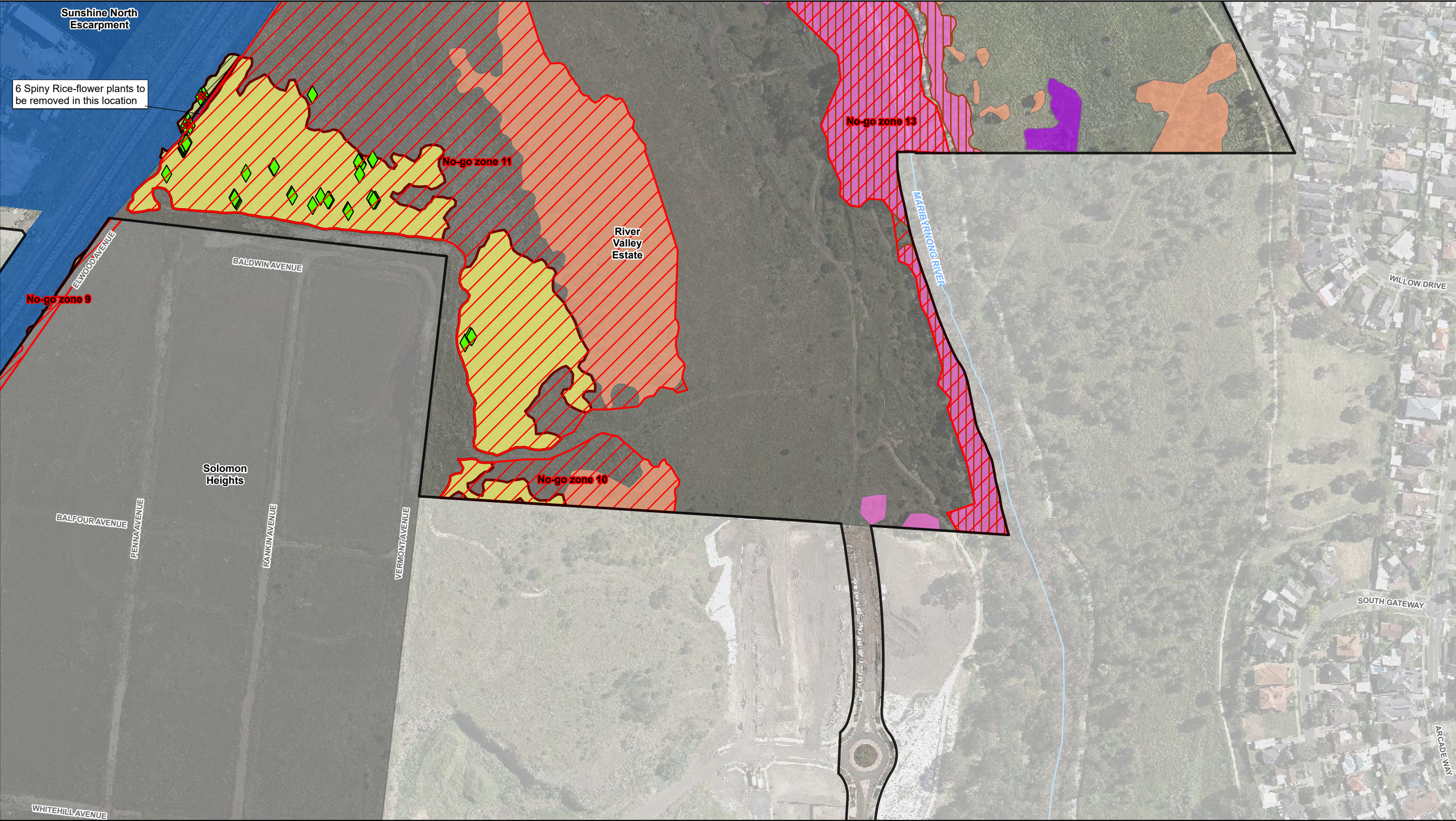
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140

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

Spiny Rice-flower to be removed

Spiny Rice Flower

Removed Native Vegetation

Striped Legless Lizard Habitat

Growing Grass Frog Habitat

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

821 Tall Marsh

895 Escarpment Shrubland

Natural Temperate Grassland of the Victorian Volcanic Plain

Map 7 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:
A.5

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

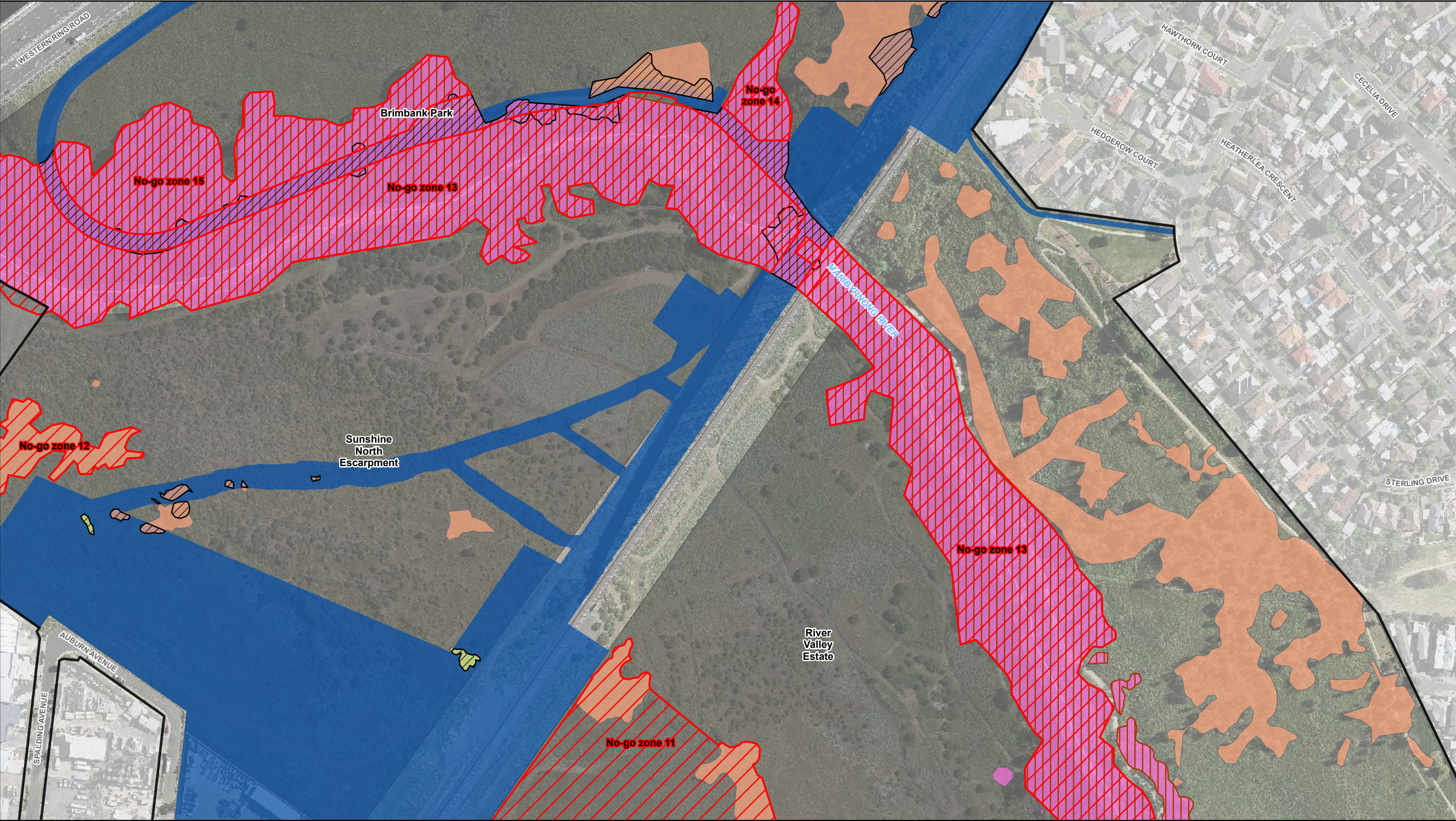
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070140

Metres

Coordinate System: GDA 1994 MGA Zone 55

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Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Removed Native Vegetation

Growling Grass Frog Habitat

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Map 8 of 25

Data Sources:
AJM JV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Project Wide

MNES Impacts Mapping - Corridor Section

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MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:
A.5

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

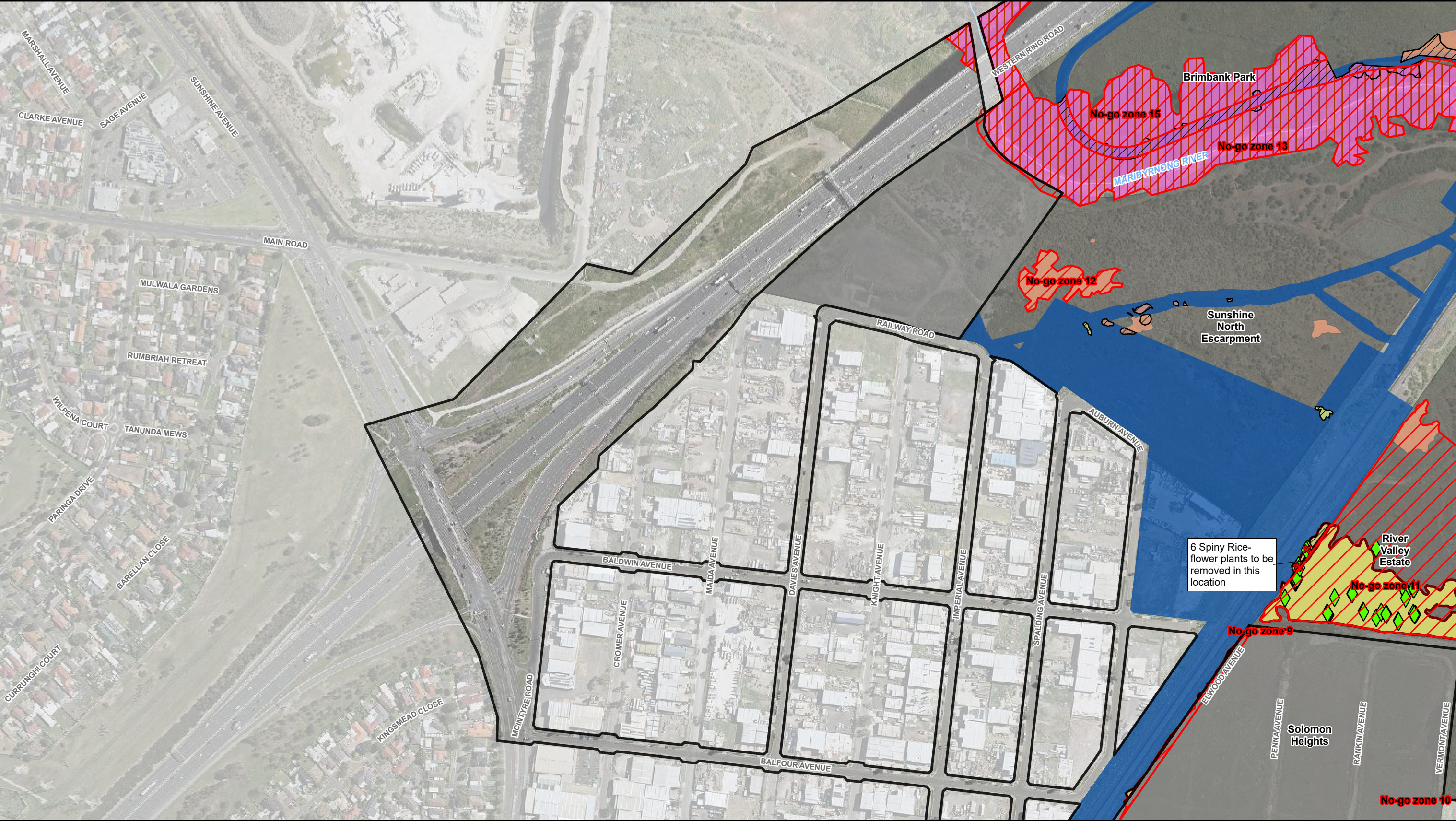
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Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Spiny Rice-flower to be removed

Spiny Rice Flower

Removed Native Vegetation

Golden Sun Moth Habitat

Striped Legless Lizard Habitat

Growing Grass Frog Habitat

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Natural Temperate Grassland of the Victorian Volcanic Plain

Map 9 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:
A.5

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
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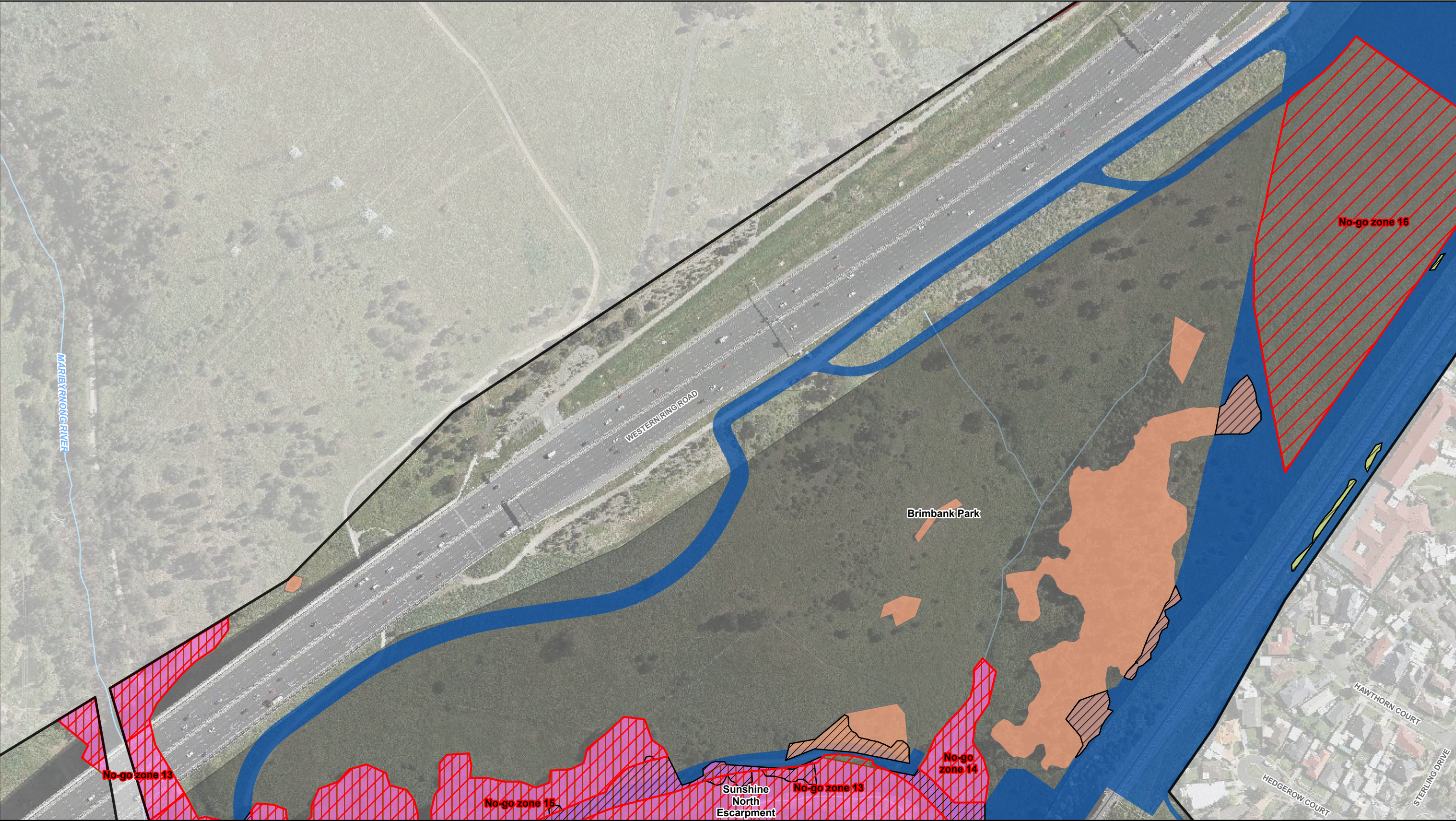
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Coordinate System: GDA 1994 MGA Zone 55

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Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Removed Native Vegetation

Growing Grass Frog Habitat

Native Vegetation

132 Plains Grassland

55 Plains Grassy Woodland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Map 10 of 25

Data Sources:
AJM JV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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MNES Impacts Mapping - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:
A.5

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

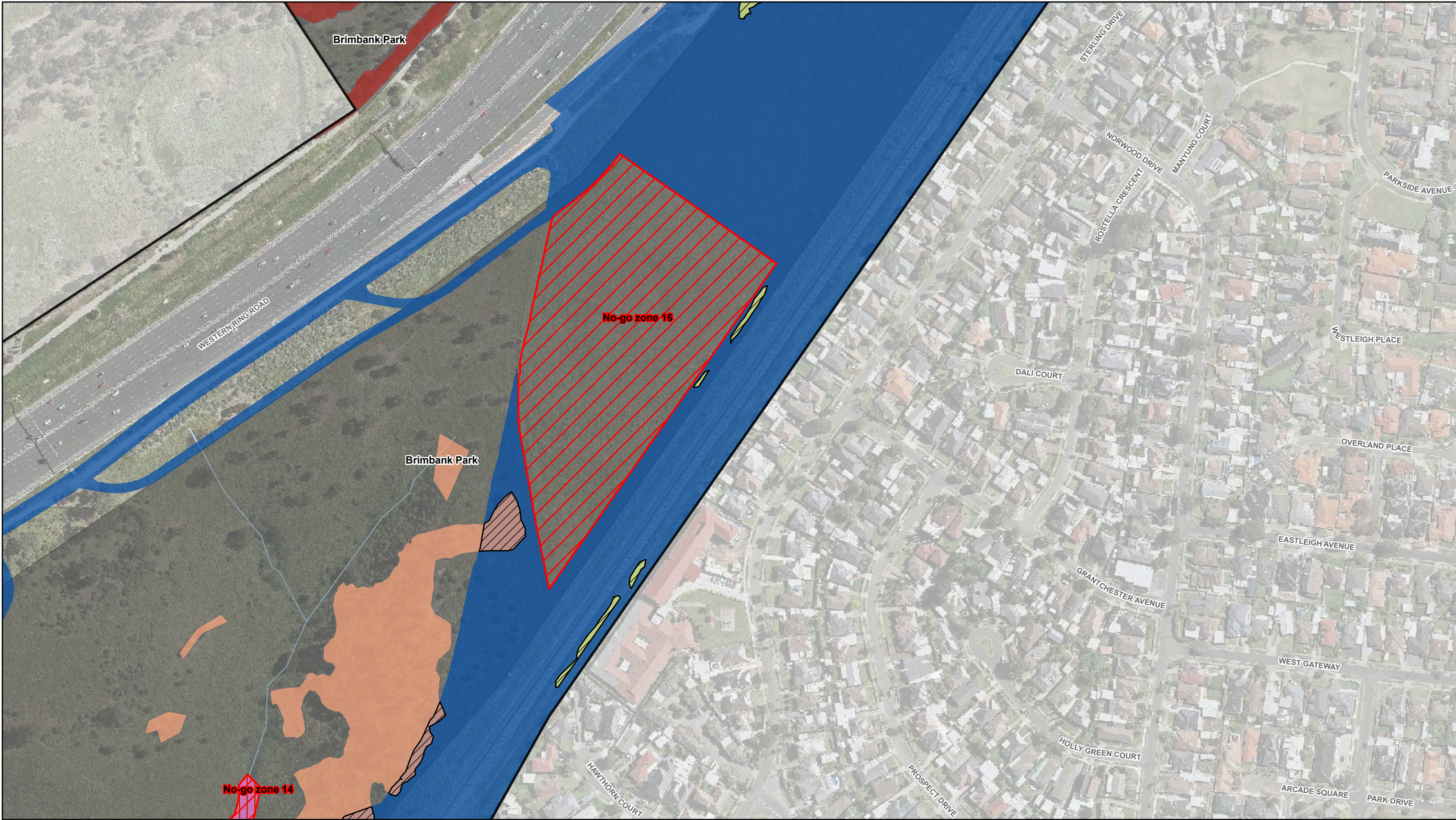
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Coordinate System: GDA 1994 MGA Zone 55

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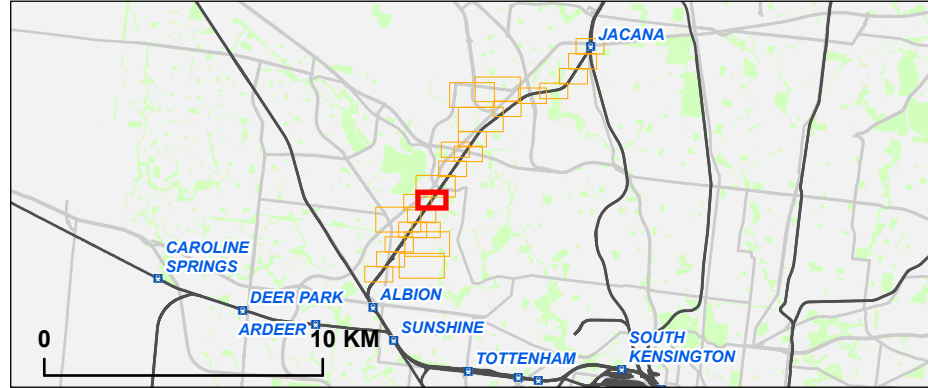






- Rail
- Watercourse
- ▬ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)
- Key Assessment Areas
- No-go Zones**
- ▬ No-go Zone

- ▬ Removed Native Vegetation
- ▬ Growing Grass Frog Habitat
- Native Vegetation**
- 132 Plains Grassland
- 55 Plains Grassy Woodland
- 56 Floodplain Riparian Woodland
- 895 Escarpment Shrubland

Map 11 of 25

Data Sources:
AJM JV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



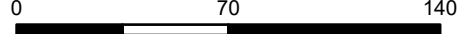



Melbourne Airport Rail

Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3



0 70 140
Metres
Coordinate System: GDA 1994 MGA Zone 55



Rail

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Removed Native Vegetation

Native Vegetation

132 Plains Grassland

55 Plains Grassy Woodland

Natural Temperate Grassland of the Victorian Volcanic Plain

Map 12 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:

A.5

Drawn By:

J. Rivera

Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

A3

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Metres

Coordinate System: GDA 1994 MGA Zone 55

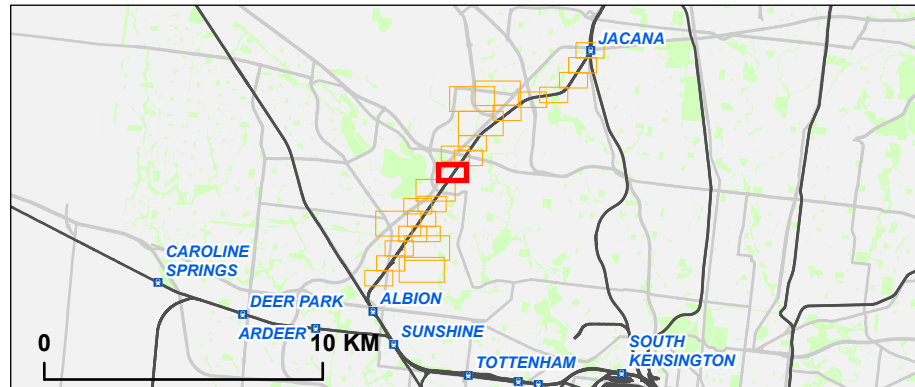
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- Rail
- ▬ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)

Map 13 of 25

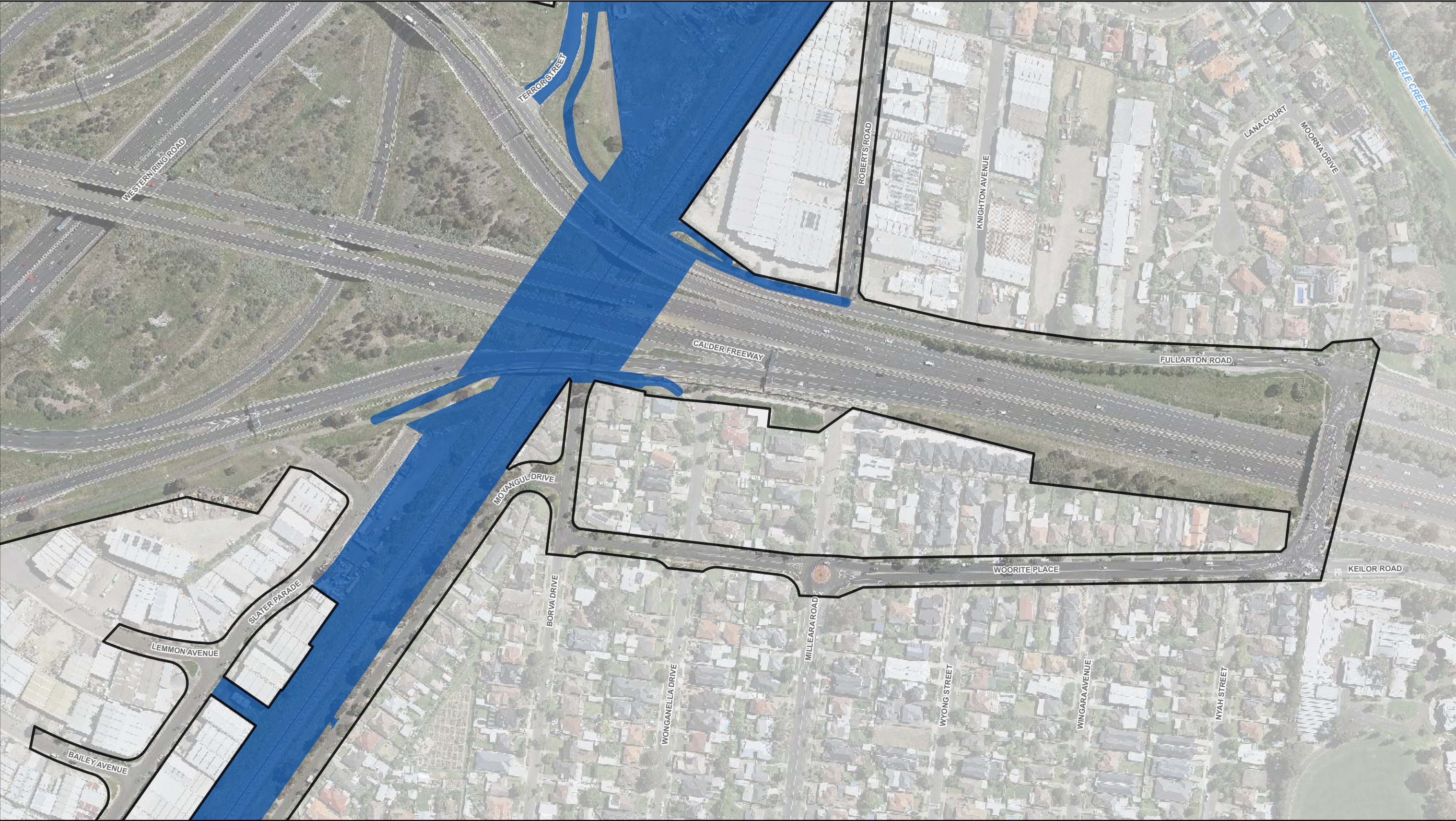
Data Sources:
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Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

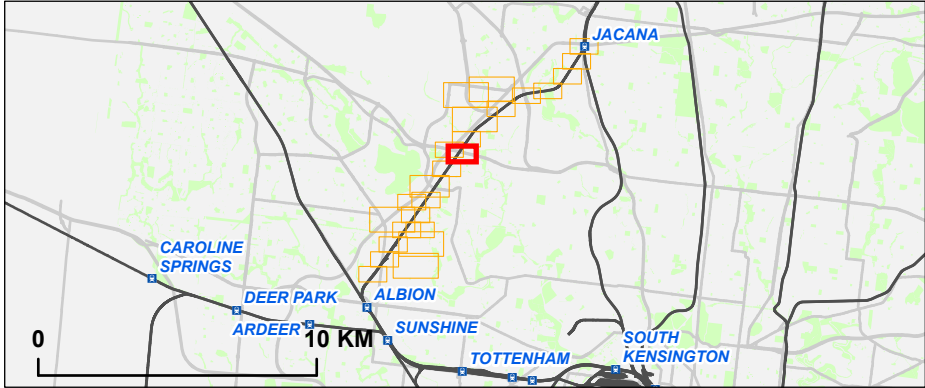
0 70 140
Metres
Coordinate System: GDA 1994 MGA Zone 55



- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- ▭ Construction Footprint (Corridor Section)

Map 14 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021





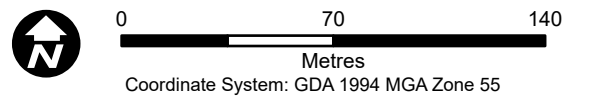
Joint Venture

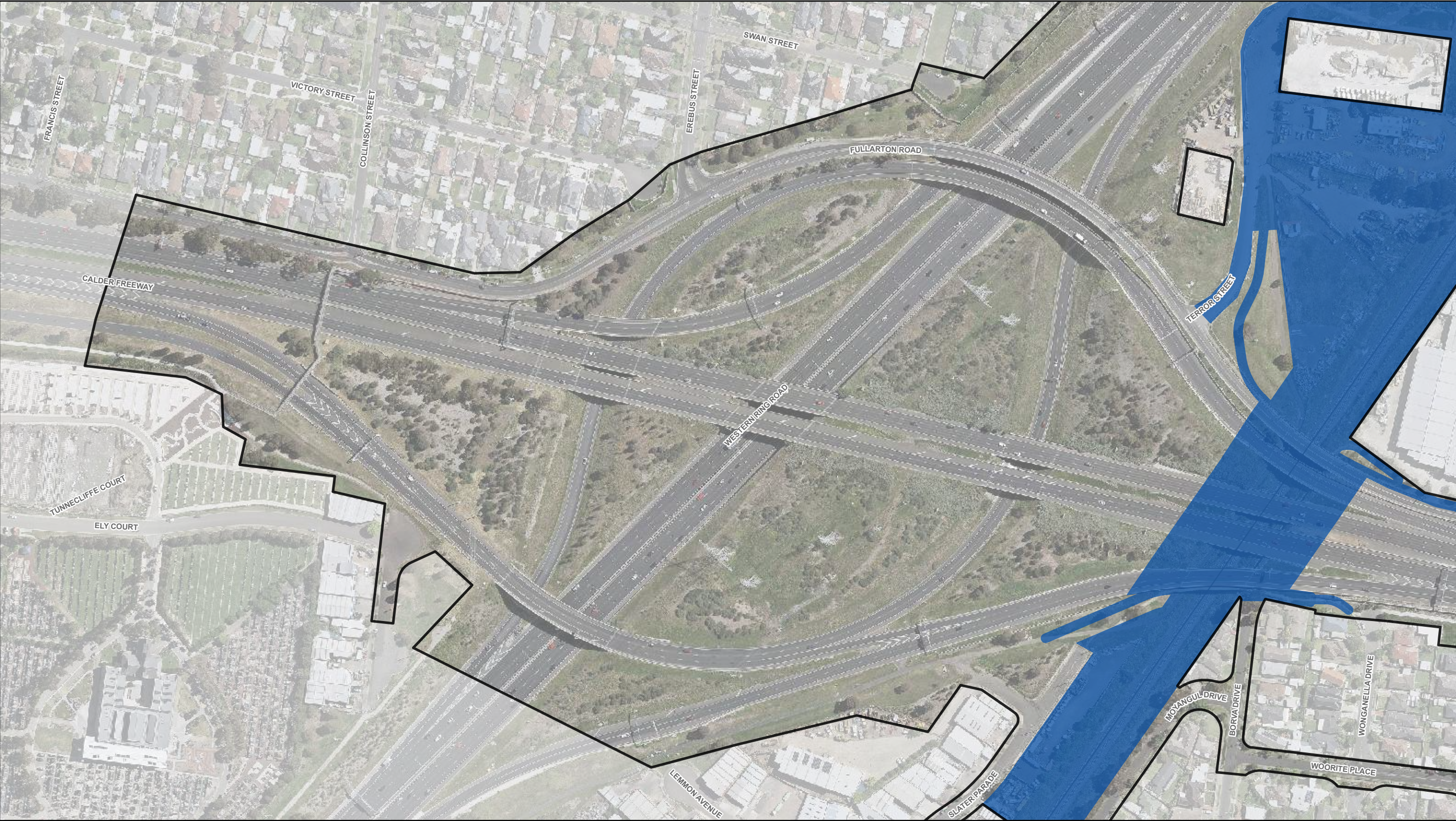


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Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

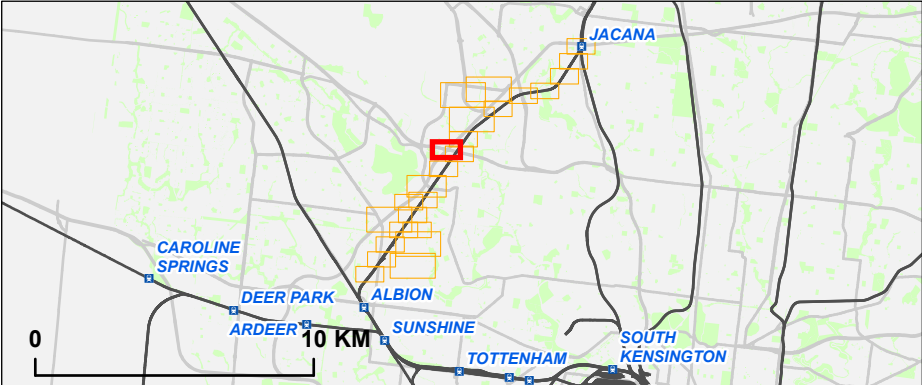




- Rail
- ▬ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)

Map 15 of 25

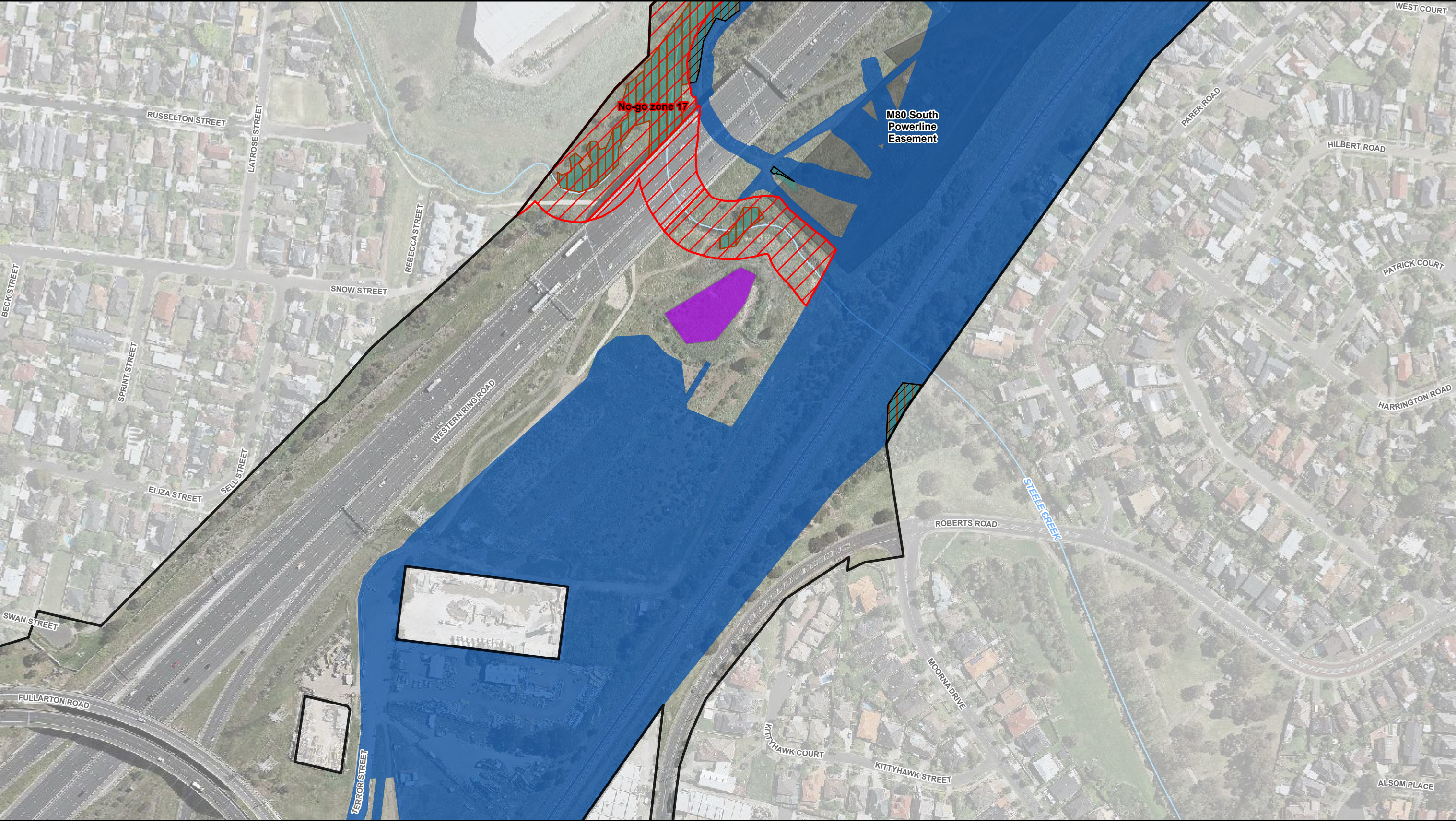
Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

0 70 140
Metres
Coordinate System: GDA 1994 MGA Zone 55



Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Removed Native Vegetation

Growing Grass Frog Habitat

Native Vegetation

821 Tall Marsh

851 Stream Bank Shrubland

Map 16 of 25

Data Sources:

AJMJV 2022

VicTrack 2021

Vicmap 2021

Aerial photo:

DELWP Oct. 2021

RAIL PROJECTS VICTORIA

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Melbourne Airport Rail

Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:

A.5

Drawn By:

J. Rivera

Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

A3

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140

Metres

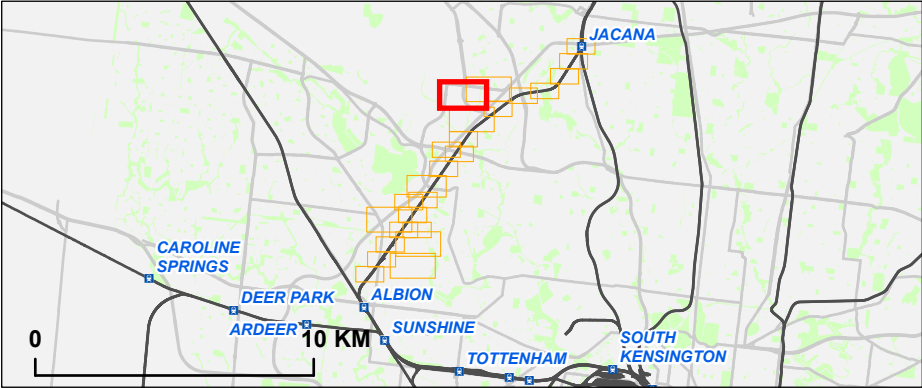
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Map 18 of 25

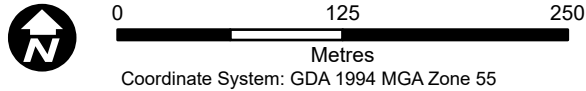
Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021





Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

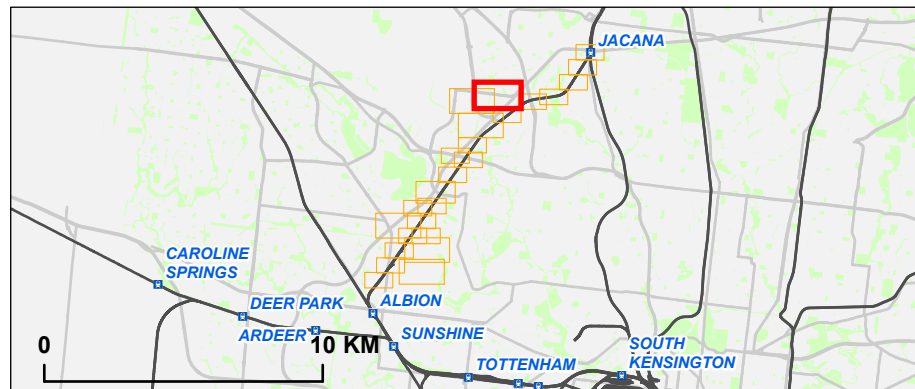




- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- ▭ Construction Footprint (Corridor Section)

Map 19 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



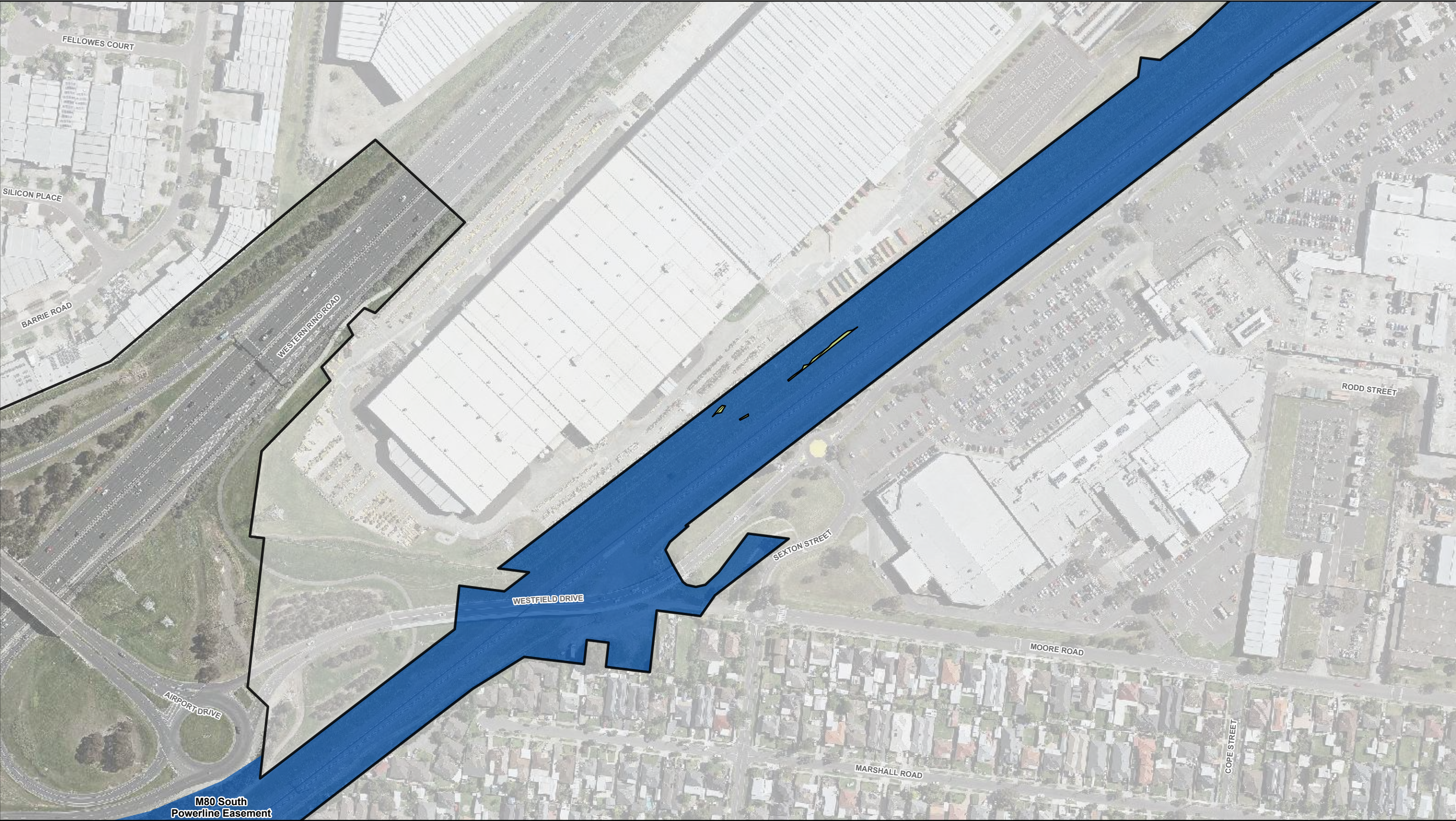
Melbourne Airport Rail Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3



0 125 250
Metres
Coordinate System: GDA 1994 MGA Zone 55



Rail

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

Removed Native Vegetation

Native Vegetation

132 Plains Grassland

Map 20 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Melbourne Airport Rail

Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:
A.5

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

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070140

Metres

Coordinate System: GDA 1994 MGA Zone 55

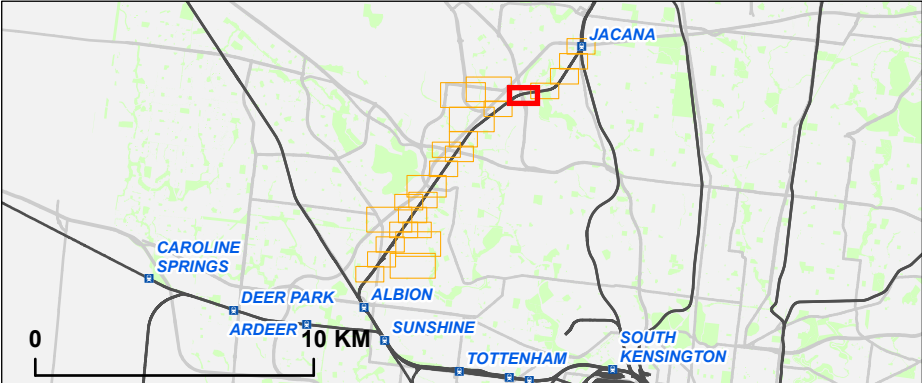
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- Rail
- ▬ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)
- ▨ Removed Native Vegetation
- Native Vegetation**
- 55 Plains Grassy Woodland

Map 21 of 25

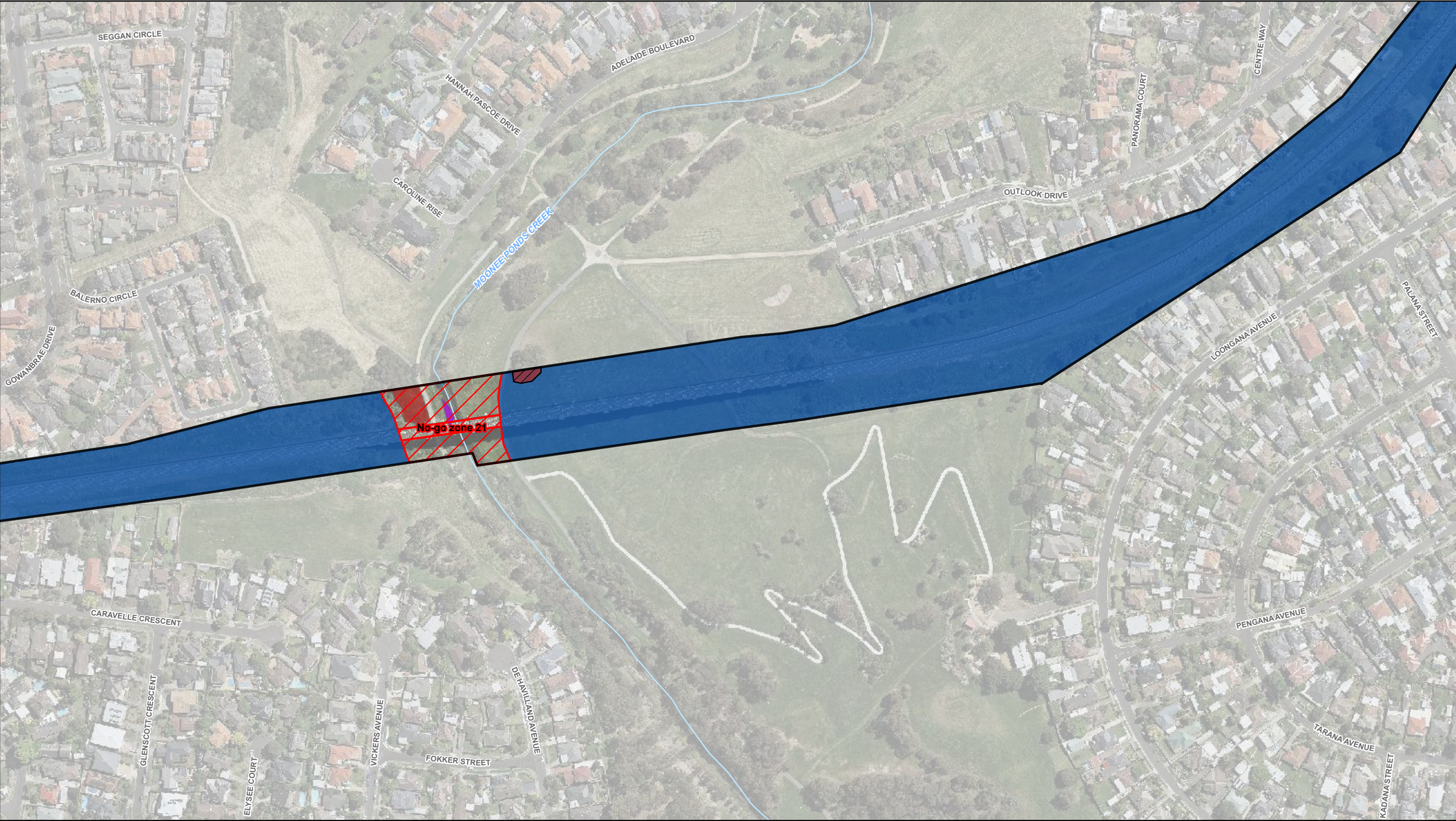
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Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

0 70 140
Metres
Coordinate System: GDA 1994 MGA Zone 55



Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

No-go Zones

No-go Zone

Removed Native Vegetation

Native Vegetation

55 Plains Grassy Woodland

641 Riparian Woodland

821 Tall Marsh

Map 22 of 25

Data Sources:

AJMJV 2022

VicTrack 2021

Vicmap 2021

Aerial photo:

DELWP Oct. 2021

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Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:

A.5

Drawn By:

J. Rivera

Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

A3

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70

140

Metres

Coordinate System: GDA 1994 MGA Zone 55

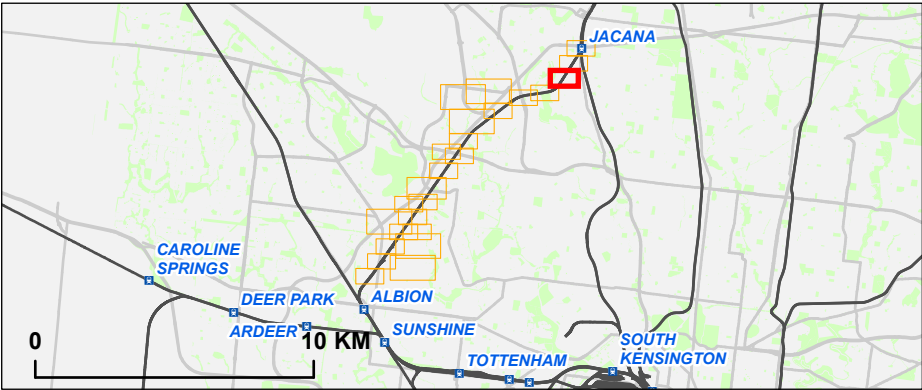
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Map 23 of 25

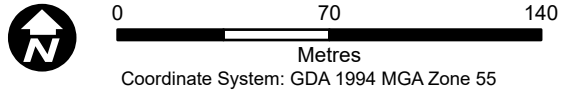
- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- ▭ Construction Footprint (Corridor Section)
- ▨ Removed Native Vegetation
- Native Vegetation**
- ▭ 55 Plains Grassy Woodland

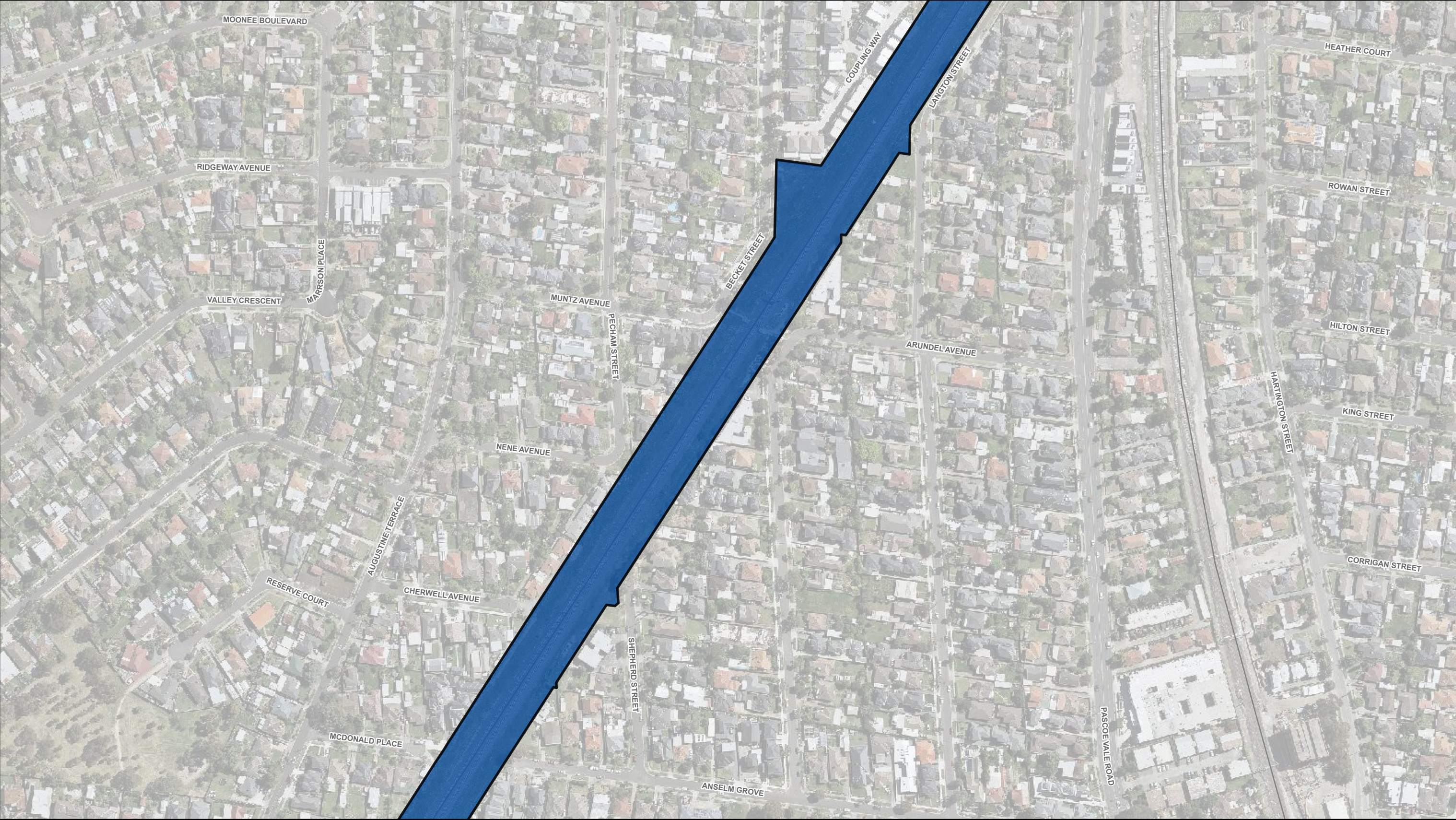
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Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
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J. Rivera	J. Sullivan	21/04/2022	A3

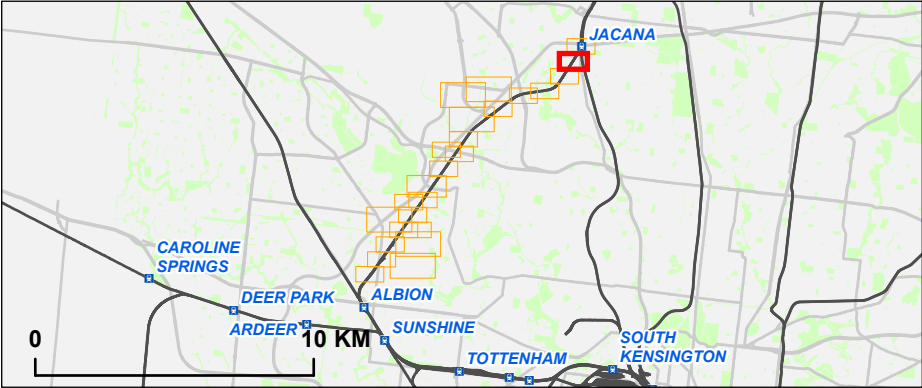




Map 24 of 25

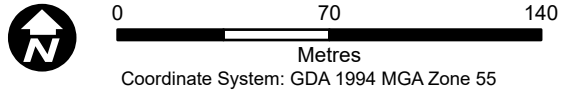
- Rail
- ▭ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)

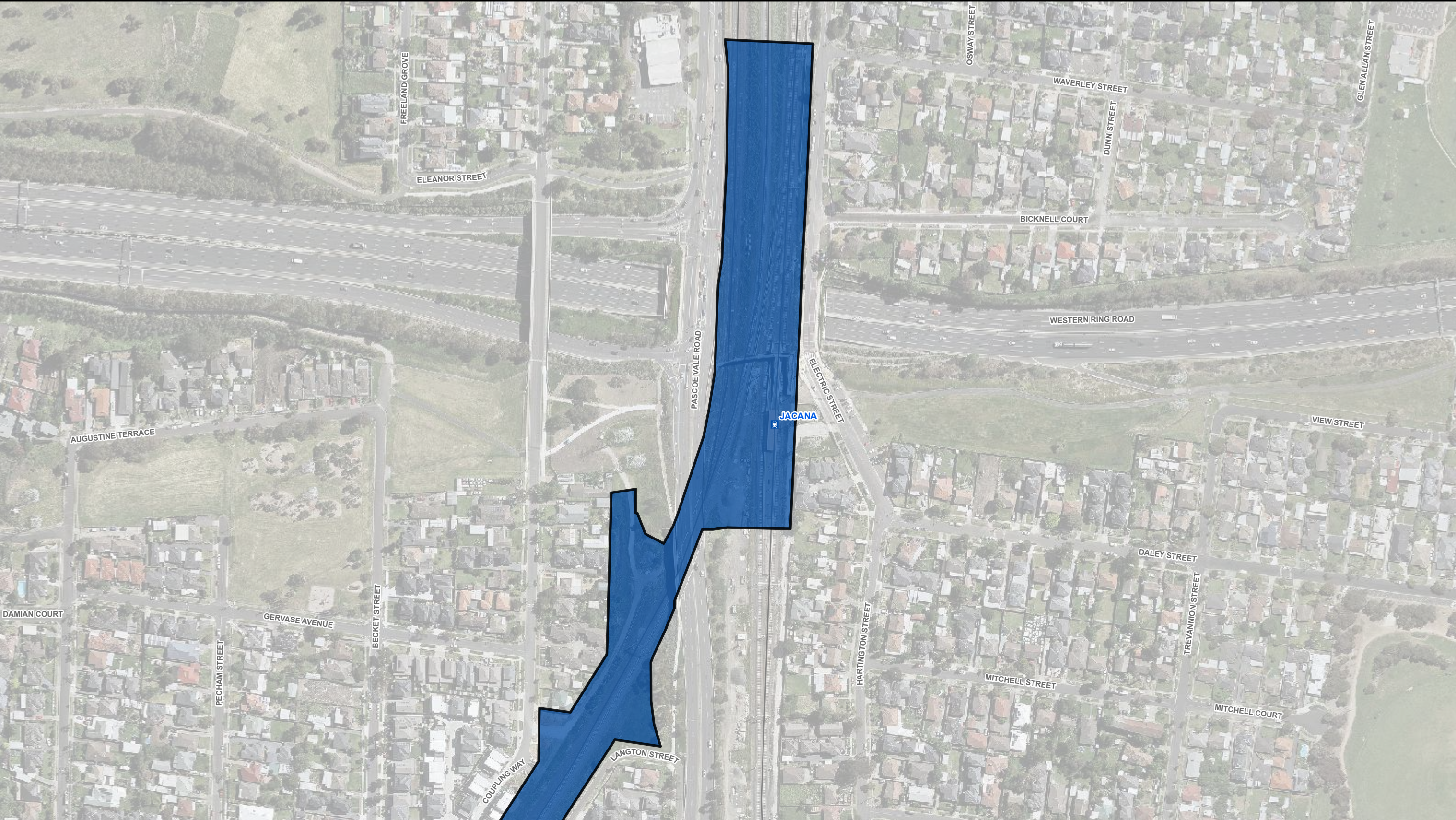
Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

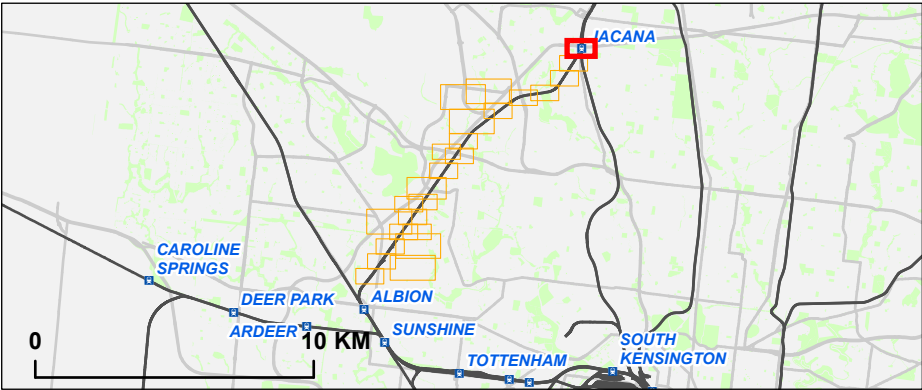




- Rail station
- Rail
- Project Land (Corridor Section)
- Construction Footprint (Corridor Section)

Map 25 of 25

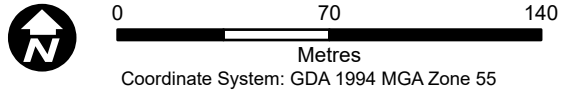
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Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
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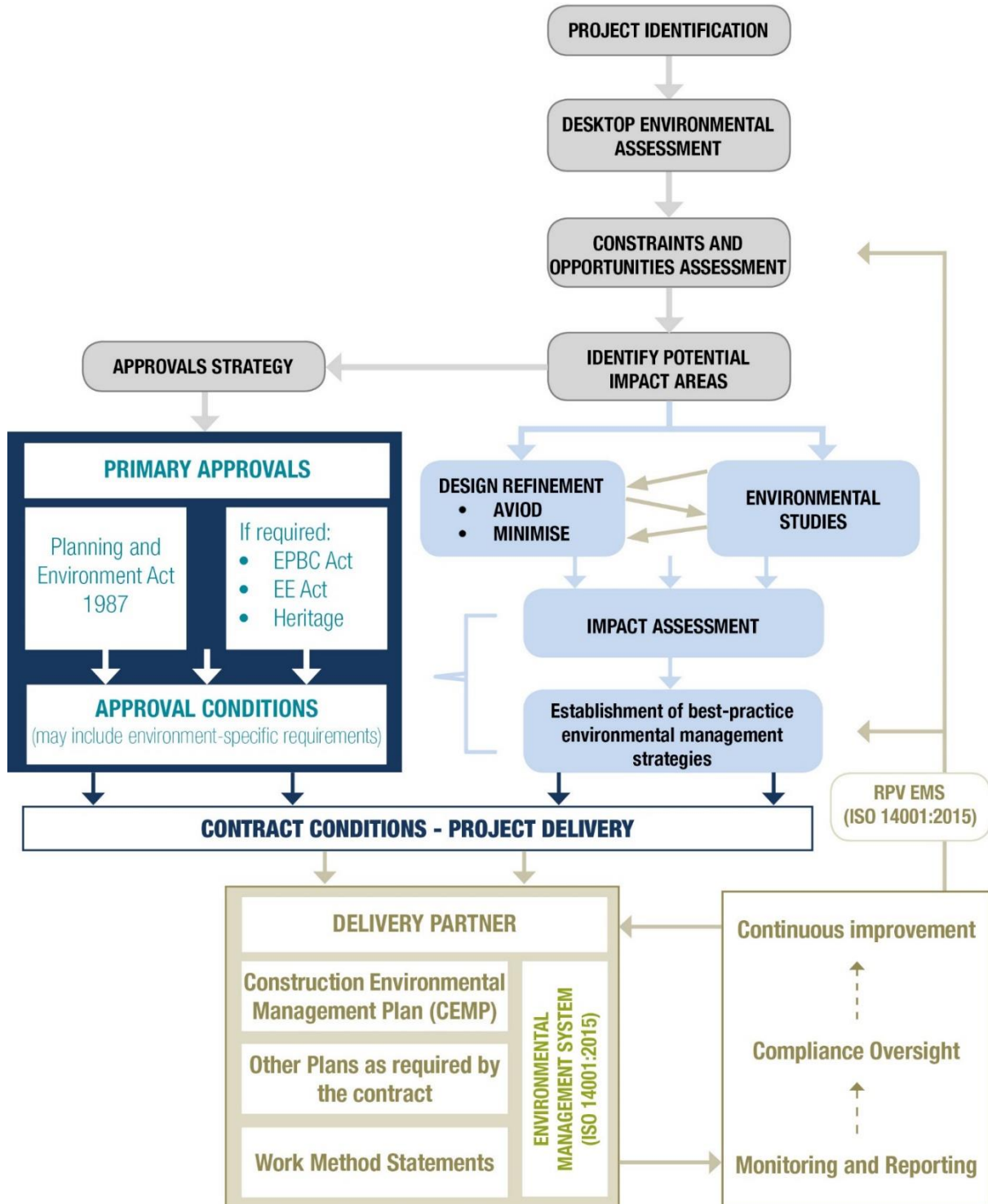


OFFICIAL: Sensitive

APPENDIX D RPV ENVIRONMENTAL MANAGEMENT GOVERNANCE WORKFLOW



Appendix D: RPV Environmental Management Governance Workflow



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APPENDIX E CORRIDOR SECTION THREATENED SPECIES MANAGEMENT PLAN (CSTSMP)



MELBOURNE AIRPORT RAIL

MAR CORRIDOR SECTION THREATENED SPECIES MANAGEMENT PLAN

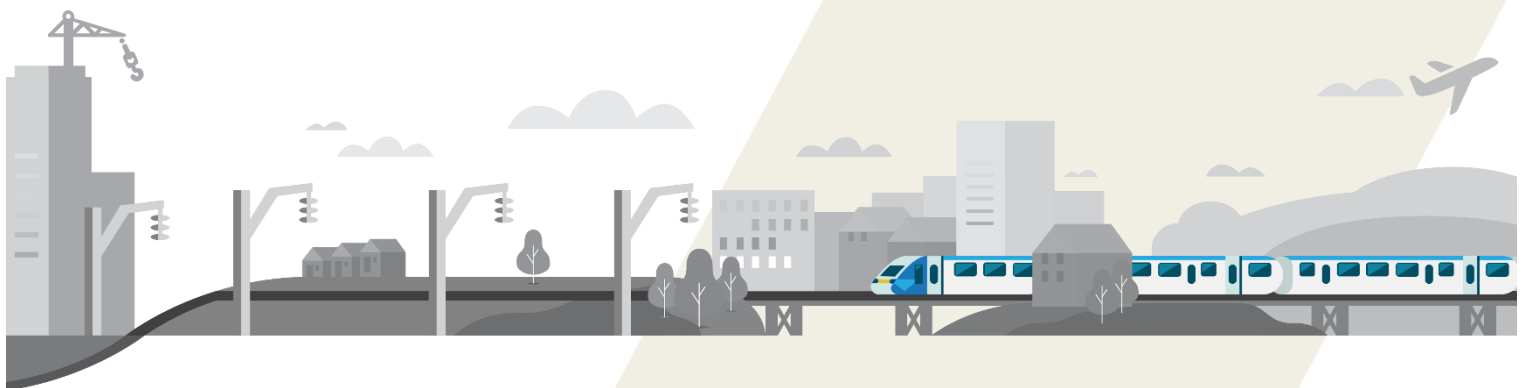
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222 Exhibition Street
Melbourne VIC 3000

PO Box 23061
Docklands VIC 8012
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Author Signature		Approver Signature	
Name	Rebecca Ffrost	Name	Ruth Macdonald

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This document should be read in full and no excerpts are to be taken as representative of the findings.

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Appendix A MNES Impacts Mapping

Table of Abbreviations

Term / Abbreviation	Description
AJM-JV	Aurecon Jacobs Mott Macdonald Joint Venture
ARTC	Australian Rail Track Corporation
CaLP Act	<i>Catchment and Land Protection Act 1994</i> (Vic)
CEMP	Construction Environmental Management Plan
CSTSMP	Corridor Section Threatened Species Management Plan
CSR	Combined Services Route
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
Delivery Partner	The contractor (including sub-contractors) to be appointed by the Project Owner to design and/ or construct the Project.
DELWP	Department of Environment, Land, Water and Planning
DTRS	Digital Train Radio System
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)
EMF	Environmental Management Framework
EMR	Environmental Management Requirements
EVC	Ecological Vegetation Class
EPA	Environmental Protection authority
FFG Act	<i>Flora and Fauna Guarantee Act 1998</i> (Vic)
ha	hectares
HV	High Voltage
MAR	Melbourne Airport Rail
MAR Project	Melbourne Airport Rail Project
MNES	Matter of National Environmental Significance
MTM	Metro Trains Melbourne
NTGVVP	Natural Temperate Grasslands of the Victorian Volcanic Plains
OHLE	Overhead Line Equipment
Project Owner	The body responsible for overseeing the delivery of the Project
P&E Act	<i>Planning and Environment Act 1987</i> (Vic)
RPV	Rail Projects Victoria
SSTSMP	Sunshine Section Threatened Species Management Plan
SUP	Shared Use Path
TSMP	Threatened Species Management Plan
VVP	Victorian Volcanic Plain

1. Introduction

Aurecon Jacobs Mott Macdonald Joint Venture (AJM-JV) has been engaged by Rail Projects Victoria (RPV) to prepare a referral to the Commonwealth Minister for the Environment to outline any potential impacts to Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) from the development and operation of the Corridor Section of the Melbourne Airport Rail (MAR) Project (MAR Project).

Ecological assessment of the MAR State Project Land determined that two sections of the larger MAR State Project Land either side of Barwon Avenue, Sunshine North (Chainage 14.670), present a different magnitude of potential impacts on MNES. Specifically:

- The Sunshine Section (defined as the Section of the larger MAR State Project Land that extends south-west from Barwon Avenue) is unlikely to result in a significant impact on any MNES based on the scope of construction works and implementation of No Go Zones and mitigation measures; while
- The Corridor Section (defined as the Section of the larger MAR State Project Land that extends north-east from Barwon Avenue) has been assessed as having a significant impact on Striped Legless Lizard and Spiny Rice-flower. Minor impacts (assessed as being below the significant impact threshold) are also proposed to Growling Grass Frog, Golden Sun Moth, Australian Grayling and Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).

As such, RPV is seeking assessment of the MAR Project Works on State Land through a separate referral for each geographic section (both separate to the referral for the Commonwealth land component at Melbourne Airport). A map of the larger MAR State Land Project showing both the Sunshine and Corridor Sections is included in Figure 1.1.

Various MNES have been identified as occurring within or adjacent to the MAR State Project Land in both State Land Sections of the MAR Project. The potential for impacts to MNES in each section have been assessed in separate EPBC Act referrals, and a Threatened Species Management Plan (TSMP) has been prepared for each section to manage the potential impacts identified.

This TSMP is specifically relevant to the Corridor Section Project Land and has been developed to ensure the protection of MNES and associated ecological values to be retained throughout the various phases of the MAR Project. This TSMP is referred to as the Corridor Section Threatened Species Management Plan (CSTSMP).

The area of land associated with the development of the Corridor Section is herein referred to as the 'Corridor Section Project Land'. No works are proposed beyond this area. Within the Corridor Section lies the construction footprint, which includes all areas of ground disturbance required to facilitate the construction, including all temporary and permanent works areas.

MNES that occur within the Corridor Section Project Land and are relevant to the CSTSMP include:

- Threatened ecological communities:
 - > Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)
- Threatened flora:
 - > Spiny Rice-flower (*Pimelea spinescens subsp. spinescens*)
- Threatened fauna
 - > Striped Legless Lizard (*Delma impar*)
 - > Golden Sun Moth (*Synemon plana*)
 - > Growling Grass Frog (*Litoria raniformis*)
 - > Australian Grayling (*Prototroctes maraena*).

Although the proposed Corridor Section Works have been carefully designed to avoid and minimise impacts to MNES as much as practicable, the Corridor Section Works are anticipated to have the following impacts on MNES in the Corridor Section Project Land:

- Removal of eight (8) individuals of Spiny Rice-flower (*Pimelea spinescens subsp. spinescens*)
- Removal of 1.144 ha of habitat for Striped Legless Lizard (*Delma impar*), a reduction from 1.147 ha impact as reported in the Corridor Section Referral (EPBC 2021/9081). As well as fragmentation resulting in the isolation of a 0.46 ha patch of Striped Legless Lizard habitat from the core remaining habitat area of 3.55 ha.
- Removal of 0.221 ha of Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)
- Permanent removal of 0.268 ha and temporary removal (with revegetation) of 0.932 ha of habitat for Growling Grass Frog (*Litoria raniformis*), as well as temporary loss of a non-breeding wetland at the M80 retention basin and localised reduction in habitat suitability in the vicinity of the Maribyrnong River due to noise and vibration during the construction of the Maribyrnong River Bridge
- Direct removal of 0.319 ha of habitat for Golden Sun Moth (*Synemon plana*)
- Localised disturbance to habitat for Australian Grayling (*Prototroctes maraena*) due to noise and vibration at the Maribyrnong River, limited to outside the critical migration period of the species.

As part of the Corridor Section Works, mitigation measures have been provided in this plan to manage any further potential impacts to MNES in the Corridor Section Project Land.

1.1 Purpose and objectives

The CSTSMP applies to planned works within the Corridor Section Project Land. The CSTSMP details the management measures to be implemented during construction to avoid, minimise and mitigate impacts to retained Matters of National Environment Significance (MNES) identified within and adjacent to the Corridor Section Project Land. The specific objectives of the CSTSMP are to:

- Avoid any additional direct impacts (i.e. physical removal or destruction) or indirect impacts (i.e. impacts not directly associated with physical removal or destruction such as shading, or exacerbating weed invasion), beyond those outlined above to NTGVVP, Spiny Rice-flower, Striped Legless Lizard, Growling Grass Frog, Golden Sun Moth and Australian Grayling within the Corridor Section Project Land
- Identify key personnel and organisations who are responsible for the implementation of the CSTSMP.

Mitigation measures detailed in this CSTSMP will be formalised through an Environmental Management Framework (EMF), prepared and approved in accordance with the relevant planning approval. The EMF will provide a transparent and integrated governance framework to manage the environmental aspects of the Project and will detail Environmental Management Requirements (EMR) that must be implemented by the Delivery Partner. The EMRs are a suite of performance-based environmental standards/outcomes such as the requirement to prepare and comply with a Construction Environmental Management Plan (CEMP). Compliance with the EMRs will be enforced by the Project Owner and monitored by way of inspections, reports and audits, with penalties applied for non-conformance.

1.2 Corridor Section Main Works

The Corridor Section main works (Corridor Section works) include:

- Construction of the new MAR tracks, comprising an approximately 8 km dual track railway and associated overhead line equipment (OHLE), combined services route (CSR) and track drainage works, including:
 - > A 2.3 km long elevated twin track viaduct structure between Sharps Road, Tullamarine and the Albion-Jacana rail corridor, crossing Steele Creek and the Western Ring Road including emergency and maintenance access points.

- > New at-grade MAR tracks within the existing Albion-Jacana rail corridor, located on the Western side of the existing Australian Rail Track Corporation (ARTC) tracks.
- > An elevated twin track viaduct structure across the Maribyrnong River valley, adjacent to the Western side of the existing state significant heritage bridge.
- > Slewing of ARTC tracks between Keilor Park Drive and the Calder Freeway.
- Signalling works along the Albion-Jacana rail corridor between Jacana Station and Barwon Avenue, Sunshine North and within the new MAR corridor North of the Western Ring Road.
- Construction of an intake supply substation at Terror Street or the Northeast area of Brimbank Park and two traction substations at Fullarton Road and within the McIntyre Sidings, Sunshine North.
- Construction of two new Digital Train Radio System (DTRS) facilities one North or South of Keilor Park Drive, Keilor East and a second at Airport Drive, Tullamarine.
- Diversion, relocation and replacement works associated with utilities and underground services, including the existing ARTC CSR, high voltage (HV) transmission lines and numerous miscellaneous assets
- Protection works associated with the Exxon Mobil jet fuel pipeline along the Albion-Jacana rail corridor.
- Modifications to existing structures, including structural modifications and strengthening works at Calder Freeway inbound and outbound bridges, Fullarton Road bridge, Western Ring Road on-ramp and off-ramp bridges, Keilor Park Drive and McIntyre Road bridges.
- Replacement of shared use path (SUP) connections at Calder Freeway / Fullarton Road, provision of a new SUP overpass at Cranbourne Avenue, and provision of a Strategic Cycling Corridor link between Western Ring Road and Airport Drive via Steele Creek.
- The provision of retention basins at several locations along the Albion-Jacana rail corridor
- Establishment of temporary construction laydown areas, site offices, worksites, storage, parking areas and access roads

1.3 Areas supporting MNES

This CSTSMP applies specifically to the following locations that support MNES:

- **Solomon Heights** (NTGVVP, Spiny Rice-flower, Striped Legless Lizard and Golden Sun Moth habitat)
- **River Valley Estate** (NTGVVP and Spiny Rice-flower)
- **M80 South Powerline Easement** (NTGVVP)
- **M80 North Zone** (NTGVVP, Striped Legless Lizard habitat)
- **Border Drive Reserve** (NTGVVP)
- Waterways:
 - > **Maribyrnong River** (Growling Grass Frog and Australian Grayling)
 - > **Moonee Ponds Creek** (Growling Grass Frog)
 - > **Steele Creek** (Growling Grass Frog).

Locations supporting MNES that are specifically relevant to this CSTSMP are shown in Appendix A.

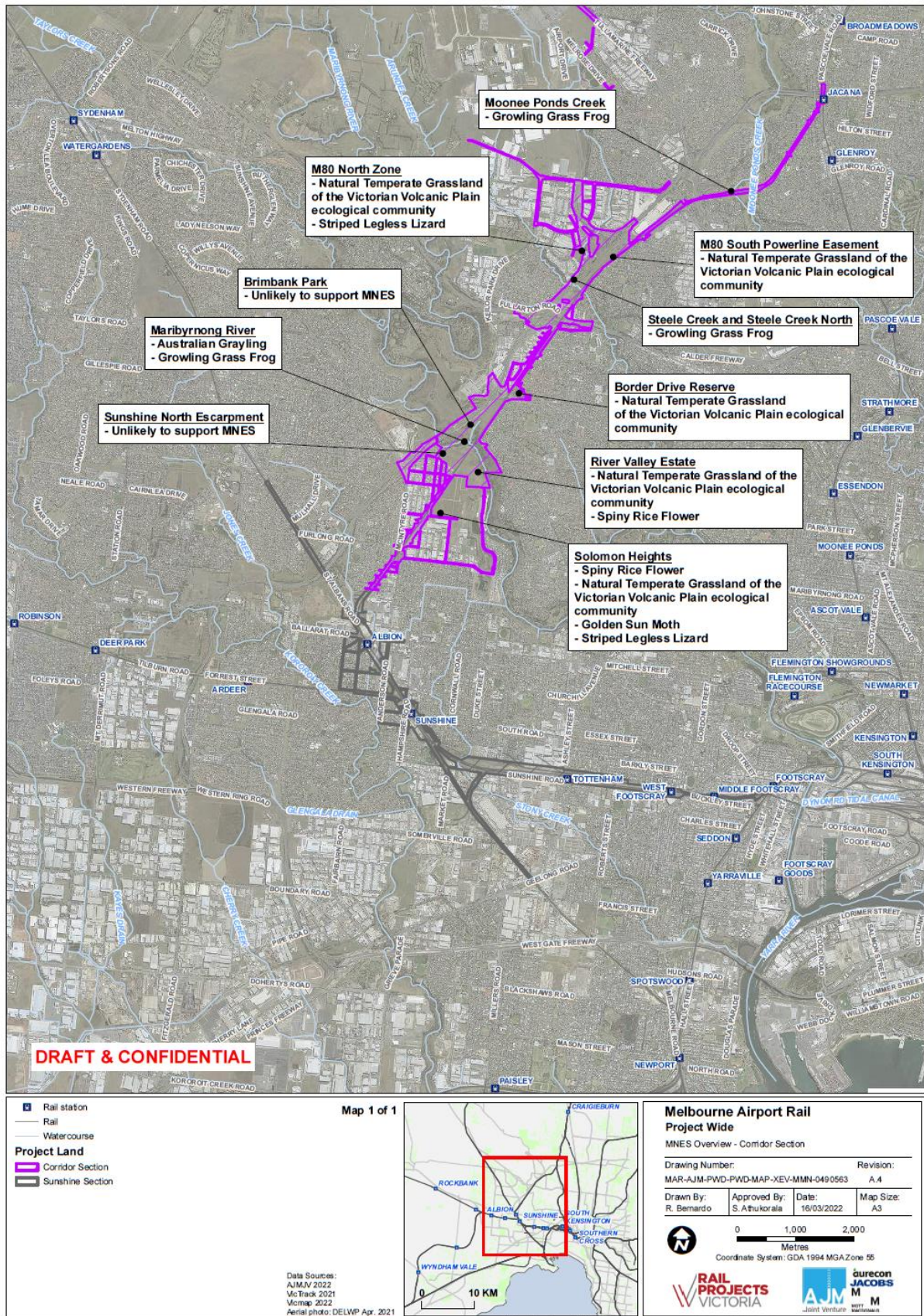


Figure 1.1 Corridor Section Project Land

2. Roles and Responsibilities

Table 2-1 outlines the key roles and responsibilities for RPV and Delivery Partners members in relation to the requirements of this CSTSMP.

Table 2.1 Outline of Roles and Responsibilities

ROLE	RESPONSIBILITY
RPV - Principal	
Rail Projects Victoria (RPV) Leadership Team and Land, Planning and Environment Director	<ul style="list-style-type: none"> Encourages leading practices in biodiversity. Approves CSTSMP and approach. Reports performance of the project against performance targets detailed in the CSTSMP on an annual basis and at key milestones.
Delivery Partners	
Delivery Partner Leadership Team	<ul style="list-style-type: none"> Principally accountable for meeting environment contractual requirements Supports and drives leading practices in biodiversity management Reports performance of the project against performance targets detailed in the CSTSMP on an annual basis and at key milestones
Delivery Partner	<ul style="list-style-type: none"> Principally responsible for meeting contractual requirements relating to biodiversity objectives Principally responsible for defining adequate controls in Construction Environmental Management Plan (CEMP) and associated management plans to ensure effective avoidance, minimisation, and mitigation sequencing for potential impacts to MNES Reports to RPV on progress against performance requirements Ensures processes defined in the CSTSMP, CEMP and associated management plans for avoidance of impacts to MNES and leveraging opportunities to enhance outcomes for MNES, are effectively integrated into project activities.
Project Ecologist	<ul style="list-style-type: none"> Is suitably experienced and qualified with specific experience working with MNES relevant to the Corridor Section Project Land Holds appropriate ethics approval and authorisation under the <i>Wildlife Act 1975</i> Responsible for on-ground implementation of this CSTSMP, particularly any implementation of salvage and relocation protocols where required Ensure effective implementation of fencing/no go zones such that the ecological values within the No Go Zones are protected
Site Environmental Officer	<ul style="list-style-type: none"> Is suitably experienced and qualified Responsible for on-ground implementation and monitoring of this CSTSMP and the CEMP
Wildlife Handler	<ul style="list-style-type: none"> Is suitably experienced and qualified Holds appropriate authorisation under the <i>Wildlife Act 1975</i> Is called upon as required by the Delivery Partner when clearing operations are planned or animals are identified on site that are injured or are required to be relocated.

3. Legal Framework

The following relevant legislation guided the preparation of the CSTSMP (Table 3-1).

Table 3.1 Relevant Commonwealth and State legislation.

Jurisdiction	Act	Relevance
Commonwealth	<i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	<p>The following MNES are listed under the EPBC Act and are subject to the CSTSMP:</p> <ul style="list-style-type: none"> Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) Spiny Rice Flower (<i>Pimelea spinescens</i> subsp. <i>spinescens</i>) Growing Grass Frog (<i>Litoria raniformis</i>) Striped Legless Lizard (<i>Delma impar</i>) Golden Sun Moth (<i>Synemon plana</i>) Australian Grayling (<i>Prototroctes maraena</i>) <p>The CSTSMP details measures that are part of the commitment of RPV and the Delivery Partner in meeting the legislative obligations of the EPBC Act.</p>
State	<i>Planning and Environment Act 1987 (P&E Act)</i>	As part of planning approval, an acceptable Environmental Management Framework (EMF) and Environmental Management Requirements (EMR) must be provided. Compliance with the EMF and EMR during delivery is a contractual requirement and will be assessed by an Independent Environmental Auditor appointed for the Project.
	<i>Flora and Fauna Guarantee Act 1988 (FFG Act)</i>	<p>The following processes have been listed as potentially threatening processes in accordance with Section 10 of the FFG Act:</p> <ul style="list-style-type: none"> Invasion of native vegetation by 'environmental weeds'
	<i>Catchment and Land Protection Act 1994 (CaLP Act)</i>	Preventing the spread and establishment of noxious weed and pest animal species is a requirement of the <i>Catchment and Land Protection Act 1994</i> (CaLP Act).
	<i>Wildlife Act 1975</i>	<p>It is an offence to take, destroy, acquire, capture and handle listed 'protected', 'notable' or 'endangered' wildlife in Victoria without an authorisation under the <i>Wildlife Act 1975</i>. Penalties for offences against listed species are significant and can include fines and / or imprisonment.</p> <p>Any person employed by the project to undertake surveys for or to handle fauna will need to have an authorisation to do so under the <i>Wildlife Act 1975</i>.</p>

3.1 Associated Documents

This CSTSMP provides a framework for the conservation management approach during construction and operation of the Corridor Section Project Land and should be read in conjunction with the CEMP and EMF.

4. Overview of MNES relevant to the Corridor Section

4.1 Natural Temperate Grassland of the Victorian Volcanic Plain

4.1.1 Ecological community description

NTGVVP is a critically endangered ecological community that is associated with the Victorian Volcanic Plain (VVP) bioregion. It is commonly associated with the Victorian Ecological Vegetation Class (EVC) of Plains Grassland (EVC 132).

NTGVVP is usually dominated by one or more of the following native tussock-forming grasses: Kangaroo Grass (*Themeda triandra*), wallaby grasses (*Austrodanthonia spp.*) or spear grasses (*Austrostipa spp.*), though some drainage lines may be dominated by large tussocks of Common Tussock Grass (*Poa labillardierei*). A variety of native herbs, including wildflowers, may be interspersed amongst the native grass tussocks (DSEWPC 2011). They usually flower in spring and may become dominant under some management regimes. In some circumstances, the native grasses may be sparse and the other native herbs are dominant, for instance after some fire regimes, and so these native herb fields are included as part of the national ecological community. Trees and large shrubs are naturally absent or sparse, and make up no more than 5% crown cover.

NTGVVP is listed as Critically Endangered under the EPBC Act.

4.1.2 Occurrence of NTGVVP in the Corridor Section Project Land

A total of 3.816 hectares of NTGVVP has been identified within the Corridor Section Project Land, including in the following locations:

- Solomon Heights and adjacent rail corridor (0.360 ha)
- River Valley Estate and adjacent rail corridor (2.401 ha)
- M80 South Powerline Easement (0.073 ha)
- M80 North Zone (0.290 ha)
- Border Drive Reserve (0.692 ha).

The extent of NTGVVP within the Corridor Section of the Project Land is shown in Appendix A. Methods and results of native vegetation and habitat surveys undertaken for this community during the impact assessment are provided in the Corridor Section MNES Report, provided in Appendix H of the MAR Corridor Section referral.

4.1.3 Existing conservation advice and recovery plans

The following key threats to NTGVVP are outlined in the published Conservation Advice for the threatened ecological community (DEWHA 2008):

- Habitat loss, disturbance and modification
- Invasive weeds
- Trampling, browsing, grazing, and fire

Priority actions for recovery and threat abatement at a local level include:

- Monitoring
- Protection of known remnants through the development of conservation agreements and covenants
- Weed control, particularly targeting Chilean Needle Grass and Serrated Tussock Grass

- Preventing trampling and excessive grazing pressure at known sites
- Developing and implementing appropriate fire management regimes.

The above guidance has been referred to in the formulation of mitigation measures associated with the CSTSMP.

4.2 Striped Legless Lizard

4.2.1 Species and habitat description

The Striped Legless Lizard (*Delma impar*) is a long, thin-bodied lizard, which like all members of the Pygopodidae family lacks forelimbs and has reduced or vestigial hind limbs (Cogger 2014). Striped Legless Lizards reach up to a maximum of 30 centimetres (cm) with the tail contributing to over half of this length. They can exhibit considerable variations in colour patterning, although can be distinguished by a series of stripes which run the length of the body. Striped Legless Lizards can often be confused with juvenile snakes but can be differentiated by the presence of ear openings and an undivided tongue (Cogger 2014).

Striped Legless Lizards were thought to exclusively inhabit native grasslands dominated by Kangaroo Grass and spear grasses in south-eastern Australia, but recent studies indicate the species also utilises introduced pasture grass and inhabits cleared woodland areas (Cogger 2014). A dense grassland structure is now considered to be the primary habitat requirement as opposed to a specific native species composition.

The Striped Legless Lizard is a grassland specialist, found only in areas of native grassland and nearby grassy woodland and exotic pasture (TSSC 2016a). The species' primary habitat is encompassed by four nationally threatened ecological communities including NTGVVP which occurs in the Corridor Section Project Land.

The Striped Legless Lizard is listed as Vulnerable under the EPBC Act, and endangered under the FFG Act.

4.2.2 Occurrence of Striped Legless Lizard in the Corridor Section Project Land

A total of 2.145 ha of Striped Legless Lizard habitat was mapped within the Corridor Section and is considered to occur in the following locations:

- Solomon Heights (including Munro Avenue in the South and the adjacent rail corridor) (0.712 ha) – habitat for Striped Legless Lizard was mapped in this area based on habitat suitability and presence of previous records.
- M80 North Zone (1.433 ha) – habitat for Striped Legless Lizard was mapped in this area based on recording of several individuals during targeted surveys.

The extent of habitat for Striped Legless Lizard in the Corridor Section of the Project Land is shown in Appendix A. Methods and results of targeted surveys undertaken for the species during the impact assessment are provided in the Corridor Section MNES Report (provided as Appendix H to the referral).

4.2.3 Existing conservation advice and recovery plans

The major threats to the Striped Legless Lizard and main cause for the species being eligible for listing as Vulnerable under the EPBC Act is the loss and decline of grassland habitat due to urban expansion, particularly on Melbourne's western fringe as well as inappropriate fire regimes and habitat modification from agricultural development across the species range (DSEWPaC 2011c).

The protection, management and improvement in understanding and monitoring of habitat critical to the survival of the Striped Legless Lizard are priority conservation actions in the Conservation Advice prepared by the Threatened Species Scientific Committee (2016a). Habitat critical to the survival of Striped Legless Lizard is likely to include sites that possess more than one of the following characteristics:

- Provides breeding habitat
- Provides foraging habitat

- Provides refuge from disturbance events
- Provides for long term protection from development
- Has connectivity value and contributes to the evolutionary potential of the species in the wild across its natural geographic range.

Key threatening processes thought to contribute to the decline of Striped Legless Lizard populations are identified in the National Recovery Plan for Striped Legless Lizards (Smith & Robertson 1999) and include:

- Loss, modification, degradation, and fragmentation of habitat
- Invasive species
 - > Spread of invasive grasses
 - > Feral cats and foxes adjacent to areas harbouring Striped Legless Lizard
- Fire

The above guidance has been referred to in the formulation of mitigation measures associated with the CSTSMP.

4.3 Golden Sun Moth

4.3.1 Species and habitat description

The Golden Sun Moth (*Synemon plana*) is a medium sized, diurnal (day flying) moth with clubbed antennae (DEWHA 2009a). The species is sexually dimorphic with the females having an enlarged abdomen and ovipositor that aids in egg laying. The species is also sexually dichromatic in wing colour. The forewings of females are brown and grey while the hind wings are yellow with black spots. Male Golden Sun Moth have dark brown forewings with grey scales and bronze-coloured hind wings. Females, which only fly irregularly, position themselves on the ground in a conspicuous location (usually inter-tussock spaces), flashing their golden hind wings (petticoats) to the males, who fly low over the grasses searching for them.

Golden Sun Moth prefer warm, dry conditions (above 20°C with little to no wind and cloud) and are usually observed flying during the warm part of the day (between 10:00 and 14:00) (DEWHA 2009a). Golden Sun Moth breeding season begins in mid-October and continues through to early January (DEWHA 2009a). The breeding season differs slightly from year to year depending on climate and location. During this time adult moths emerge continuously in cohorts and males are seen actively flying in search of females.

Potential habitat for Golden Sun Moth consists of areas which previously or currently support native grasslands or grassy woodlands (including derived grasslands) across the historical range of the species. Previous studies found that Golden Sun Moths display a preference for wallaby grasses *Rytidosperma* spp. (particularly *R. carphoides*, *R. auriculata*, *R. setacea*, *R. eriantha* and *R. racemosa*). However, more recent surveys have found Golden Sun Moth present in degraded grasslands and patches invaded with weedy species, including exotic Chilean Needle-grass (*Nassella neesiana*), native Red-leg grass (*Bothriochloa macra*), spear grasses (*Austrostipa* spp.) and Weeping Grass (*Microlaena stipoides*).

The Golden Sun Moth is listed as Vulnerable under the EPBC Act and the FFG Act.

4.3.2 Occurrence of Golden Sun Moth in the Corridor Section Project Land

A total of 0.657 ha of Golden Sun Moth habitat has been identified within the Corridor Section Project Boundary, all of which is at Solomon Heights (including Munro Avenue to the South). Habitat for Golden Sun Moth was mapped in this area based on the presence of habitat suitability and presence of previous records.

The extent of habitat for Golden Sun Moth in the Corridor Section of the Project Land is shown in Appendix A. Methods and results of targeted surveys undertaken for the species during the impact assessment are provided in the Corridor Section MNES Report provided in Appendix H of the MAR Corridor Section referral.

4.3.3 Existing conservation advice and recovery plans

The Action Statement for the Golden Sun Moth prepared under the FFG Act (DSE 2004) notes the following threatening processes to Golden Sun Moth in Victoria that are relevant to the Corridor Section Works:

- Habitat loss, degradation and fragmentation
- Weed invasion

While a National Recovery Plan currently does not exist for this species, management actions are recommended in the Conservation Advice published by the Commonwealth (DoE 2013). Those relevant to the Project include:

- Minimisation of disturbance in known populations
- Monitoring of known populations
- Control of invasions of weeds and pasture species

The above guidance has been referred to in the formulation of mitigation measures associated with this CSTSMP.

4.4 Growling Grass Frog

4.4.1 Species and habitat description

The Growling Grass Frog (*Litoria raniformis*) is a large frog, with females growing to at least 100 mm. Colouration varies from dull olive to bright emerald-green on the dorsum, with large irregular golden-bronze blotches. The groin and hind side of the thighs are usually bright bluish, while the lower sides and underside are off-white. The skin has numerous rounded warty projections on the back and sides (Cogger 2000). The Southern Bell Frog is active during both the day and night, and is highly mobile - it is known to move up to one kilometre in 24 hours (Robertson et al. 2002). Tadpoles have an aquatic period lasting 2 – 15 months, grow to 110 mm in total length and, in the later stages of development, have a characteristic green to yellowish dorsal colouration (Anstis 2002).

Habitat critical to the survival of the Growling Grass Frog differs throughout its range. In the more mesic areas including Tasmania, most of Victoria and the south-east of South Australia, the species is usually found among vegetation within or at the edges of permanent water such as slow flowing streams, swamps, lagoons and lakes. In disturbed areas it also commonly occurs in artificial waterbodies such as farm dams, irrigation channels, irrigated rice crops and disused quarries, particularly where natural habitat is no longer available (Hamer and Organ 2008). Favoured sites frequently have a large proportion of emergent, submerged and floating vegetation, and slow-flowing or still water (Hamer and Organ 2008). Because the Growling Grass Frog breeds in spring and summer, and populations in the southern part of the taxon's range often have a long larval phase, permanent waterbodies, or those in close proximity to permanent water, are favoured by the species. In these areas, frogs overwinter beneath thick vegetation, logs, rocks and other ground debris, sometimes at considerable distances from waterbodies.

The Growling Grass Frog is listed as Vulnerable under the EPBC Act and FFG Act.

4.4.2 Occurrence of Growling Grass Frog in the Corridor Section Project Land

The Growling Grass Frog is known to utilise the following waterways to varying degrees within the Corridor Section Project Land:

- The Maribyrnong River
- Steele Creek/Steele Creek North
- Moonee Ponds Creek.

The Maribyrnong River and Moonee Ponds Creek are important dispersal corridors for the species that incorporate pockets of suitable breeding habitat along their length. The utilisation of Steele Creek/Steele

Creek North by the species is considered to be more sporadic, with utilisation within the Corridor Section Project Land likely limited to dispersal.

The extent of habitat for Growling Grass Frog in the Corridor Section of the Project Land is shown in Appendix A. Methods and results of targeted surveys undertaken for the species during the impact assessment are provided in the Corridor Section MNES Report, provided in Appendix H of the MAR Corridor Section referral.

4.4.3 Existing conservation advice and recovery plans

Key threatening processes thought to contribute to the decline of Growling Grass Frog populations are identified as follows in the National Recovery Plan for Growling Grass Frog (Clemann & Gillespie 2012):

- Loss and degradation of habitat:
 - > Loss, modification, degradation and fragmentation of aquatic and adjacent terrestrial habitats are likely to have significant negative impact on the species. Most of its historic range has been subjected to land clearing for agriculture, urban and industrial development, changed hydrological regimes for irrigation and other purposes, increasing salinity and draining of wetlands.
- Barriers to movement
 - > Persistence of Growling Grass Frog in many areas is dependent upon the movement of adults between particular waterbodies, and between breeding and non-breeding habitats. Human-induced changes to landscapes have created barriers such as fences, roads and unsuitable habitat (e.g., industrial and urban estates) to frog movement and thus compromising the viability of populations.
- Disease
 - > Chytrid fungus is known to infect Growling Grass Frog with infected specimens recorded in South Australia and Werribee (Vic). Chytridiomycosis is listed as a threatening process under the EPBC Act.
- Predation
 - > The eggs and tadpoles of Growling Grass Frog may be vulnerable to fish predators, especially the introduced Eastern Gambusia (*Gambusia holbrooki*) (Pyke 2002).
- Biocides
 - > Exposure to a range of pollutants that enter waterbodies, such as toxic herbicides.

Management practices recommended in the National Recovery Plan for Growling Grass Frog include:

- Detailed surveys of known and potential habitat to determine current distribution
- Habitat retention and legal protection of sites where possible, especially on public land
- Strict adherence to hygiene planning and protocols, as detailed by Phillott *et al.* (2010)
- Investigation of the relationships between the Growling Grass Frog and associated habitat, and its response to environmental and artificial processes
- Demographic censusing to gather life history information and to monitor the success of management actions

The above guidance has been referred to in the formulation of mitigation measures associated with this CSTSMP.

4.5 Spiny Rice-flower

4.5.1 Species and habitat description

Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*) is a small spreading perennial shrub growing to 50 centimetres (cm) in height (DEWHA 2009b). Leaves are green and oval-shaped about 2-10 mm long and 1-3 mm wide and grow from spine-tipped stems. Clusters of between 6 and 12 small, unisexual (rarely bisexual), hairless pale yellow flowers form the inflorescences. Flowers are 1.5-3 mm long (males, slightly larger than females) (Carter & Walsh 2006).

Spiny Rice-flower is endemic to Victoria, with approximately 90% of the population occurring on the Victorian Volcanic Plain bioregion with the remaining population occurring in the western part of the Midlands and Riverina bioregions. It occurs on basalt soils and in areas that receive low levels of disturbance often associated with Kangaroo Grass (*Themeda triandra*) grasslands. Spiny Rice-flower is slow growing and may live as long as 100 years, with flowering occurring between April to August (DEWHA 2009b).

Spiny Rice-flower is listed as Critically Endangered under the EPBC Act and FFG Act..

4.5.2 Occurrence of Spiny Rice-flower in the Corridor Section Project Land

A total of 56 Spiny Rice-flower plants have been identified in the Corridor Section Project Land from the following locations:

- River Valley Estate (48 individuals recorded in this area during targeted surveys)
- Rail corridor adjacent to the River Valley Estate (6 individuals recorded in this area during targeted surveys).
- Solomon Heights (2 individuals recorded in this area during targeted surveys)

The locations of Spiny Rice-flower in the Corridor Section of the Project Land is shown in Appendix A. Methods and results of targeted surveys undertaken for the species during the impact assessment are provided in the Corridor Section MNES Report, provided in Appendix H of the MAR Corridor Section referral.

4.5.3 Existing conservation advice and recovery plans

Key threatening processes thought to contribute to the decline of Spiny Rice-flower populations are identified as follows in the National Recovery Plan for Spiny Rice-flower (Carter & Walsh 2006) and the existing Conservation Advice for the species (TSSC 2016b):

- Weed invasion – perennial introduced grasses
- Road and rail maintenance – Spiny Rice-flower populations at great risk from maintenance works near roadsides and rail reserves, and soil compaction by vehicle movement

Management priorities for Spiny Rice-flower include:

- Habitat loss and fragmentation
 - > Protect key populations from vegetation clearing and degradation through the establishment of formal reserves and conservation agreements
 - > Install signs advising the public of the presence of a nationally Critically Endangered species and the importance of protecting it
- Invasive plants
 - > Undertake appropriate and ongoing weed control at key sites
 - > Control the spread of weeds by reducing disturbance, e.g. reducing stock, vehicle or public access
- Stakeholder engagement

- > Establish an ongoing incentive program for actively involved community groups to help support and improve site-based conservation management
- > Provide information on the Spiny Rice-flower distribution, ecology and habitat to relevant land managers.

The above guidance has been referred to in the formulation of mitigation measures associated with this CSTSMP.

4.6 Australian Grayling

4.6.1 Species and habitat description

The Australian Grayling (*Prototroctes maraena*) is a small to medium-sized, slender, laterally compressed fish, with soft-rayed fins lacking any spines. The body is covered with small, thin, cycloid, easily dislodged scales (the head is scale-less); there is no lateral line. Colour is generally greyish-bronze, slightly darker on the dorsal surface, fading to silvery white below; each scale has a darker outline, and the operculum is silvery. The Australian Grayling reaches a maximum size of about 330 mm and 0.5 kilograms (kg), but is usually smaller, more commonly to 170–190 mm. The species is sexually dimorphic. During the breeding season, mature males develop numerous small nuptial tubercles on each scale and on rays of the pectoral, pelvic, dorsal and anal fins.

The Australian Grayling migrates within freshwater as adult fish, including annual movements downstream towards the top of the estuary to spawn before returning upstream, and between freshwater and the sea as juveniles (Koster et al. 2013) and therefore relies on uninhibited access between freshwater and the sea for its survival. The Australian Grayling spends most of its life in freshwater, inhabiting rivers and streams, usually in cool, clear waters with a gravel substrate and alternating pool and riffle zones (Berra 1982) but it can also occur in turbid water (Hall and Harrington 1989).

Australian Grayling is listed as Vulnerable under the EPBC Act and endangered under the FFG Act.

4.6.2 Occurrence of Australian Grayling in the Corridor Section Project Land

The Maribyrnong River is known to support Australian Grayling, with records of the species known from as recently as 2015 approximately 2.5km upstream from where the Maribyrnong River intersects the Corridor Section State Project Land. The species is unlikely to occur in Steele Creek and Moonee Ponds Creeks as the species has not been recorded in these catchments.

4.6.3 Existing conservation advice and recovery plans

Key threatening activities thought to contribute to the decline of Australian Grayling populations are identified as follows in the National Recovery Plan for Australian Grayling (Backhouse *et al.* 2008):

- Constructing barriers to fish movement/migration – barriers include culverts, weirs, dams, barrages
- Reduction in/alteration of river flows (especially winter flows), through abstraction of more water from the system, building new dams/weirs, retention in dams etc.
- Removal/degradation of riparian vegetation/habitat
- Removal of snags, woody debris, rocks from potential habitat.
- Events leading to increased siltation or sedimentation, such as works on riverbank and floodplain
- Pesticide and fertiliser run-off changing nutrient regimes leading to algae blooms, reduction in dissolved oxygen, increasing sedimentation rates etc.

Management practices required for conservation of Australian Grayling:

- Removal of artificial barriers or provision of fish passage (of a type suitable for negotiation by Australian Grayling) past barriers on streams

- Maintenance and restoration of river channel structure and instream habitat quality
- Maintenance or restoration of quality and width of riparian vegetation at levels necessary to maintain stream temperature and light regimes, maintain input of organic materials, and filter surface runoff under heavy rainfall conditions
- Management of catchment vegetation clearing and planting (e.g. of pine or eucalypt plantations) to avoid negative effects on catchment water yields and flow patterns, in catchments where Australian Grayling occur
- Manage water quality where Australian Grayling occurs to maintain waters free of significant levels of nutrient, sediment, pesticide and other pollutants, consistent with the ANZECC guidelines for water quality (ANZECC 2000)

The above guidance has been referred to in the formulation of mitigation measures associated with this CSTSMP.

5. Impacts to MNES from the Corridor Section Works

5.1 Potential Project Impacts

Potential impacts from Corridor Section Works have been considered for all MNES that occur within the Corridor Section Project Land. These considerations include impacts during both the construction phase and operation phase as follows.

- Construction Phase Impacts:
 - > Direct removal and/or destruction of MNES or associated habitats from construction activities, resulting in habitat loss and fragmentation
 - > Facilitating the spread of noxious weeds, pest animals and pathogens (including Chytrid Fungus) through the transport of propagules, that would result in disturbance or degradation to MNES
 - > Temporary barriers to dispersal of MNES created by construction activities such as fences. This is considered to be most relevant at the Maribyrnong River bridge, where substantial construction works will need to occur across both important terrestrial and aquatic habitats.
 - > Works near waterways causing sedimentation through the exacerbation of erosion or through surface runoff, which may result in impacts to MNES that use these waterways. This is particularly relevant at the Maribyrnong River, Steele Creek and Steele Creek North, where rail viaducts will be constructed over these waterways.
 - > Reduction in water quality due to the release of construction runoff at the Maribyrnong River, Steele Creek and Steele Creek North, which may result in impacts to MNES that use these waterways
 - > Increased noise and vibration that may result in reduced habitat suitability for MNES and potential disruptions to migration of Australian Grayling
 - > Dust impacts to MNES
 - > Potential injury or death to MNES (namely Striped Legless Lizard, Growling Grass Frog and Golden Sun Moth) during construction activities.
- Operation Phase Impacts
 - > Permanent and temporary barriers to dispersal of MNES associated with new infrastructure or clearance of vegetation that constituted a fauna dispersal corridor
 - > Ongoing absence of permanently removed vegetation causing a net reduction in available habitat, and dispersal potential for MNES
 - > Increase light and noise that may impact MNES
 - > Impacts to MNES (namely Striped Legless Lizard) associated with the shading of habitat due to the construction of the viaduct at the M80 North Zone.

Mitigation measures have been implemented as part of the Project to manage the above risks to MNES. This has included the designation of numerous No Go Zones as well as specific limitations to construction timing and methodologies to avoid and minimise impacts to MNES in the Corridor Section Project Land.

Details of the efforts taken to avoid and minimise impacts to MNES during the design phase of the Project are provided in the Corridor Section MNES Report (Appendix H of the MAR Corridor Section referral).

5.2 Residual Project Impacts

While significant efforts have been made in the design phase of the Project to avoid and minimise impacts to MNES in the Corridor Section Project Land, some residual impacts to MNES are planned for the Corridor Section Project Works. These are summarised in Table 5.1.

Mitigation measures presented in the following sections of the CSTSMP will be implemented to minimise any further impacts to MNES beyond those listed in Table 5.1.

Table 5.1 Summary of residual impacts to MNES within the Corridor Section Project Land

Ecological value	Summary of Residual Impacts
Matters of National Environmental Significance	
Threatened Ecological Communities	<ul style="list-style-type: none"> • NTGVVP: Direct removal of 0.211 ha
Threatened flora	<ul style="list-style-type: none"> • Spiny Rice-flower: Direct removal of eight (8) plants (considered to result in a significant impact to Spiny Rice-flower)
Threatened fauna	<ul style="list-style-type: none"> • Striped Legless Lizard: <ul style="list-style-type: none"> – Direct removal of 1.144 ha of habitat, and fragmentation resulting in the isolation of a 0.46 ha patch of Striped Legless Lizard habitat (considered to result in a significant impact to Striped Legless Lizard) – Exacerbation of fragmentation of Striped Legless Lizard Habitat at the M80 North Zone – Possible, localised reduction in habitat suitability due to noise and vibration associated with the construction of the M80 North Zone viaduct. – Potential injury or death of some Striped Legless Lizard individuals during the habitat clearance within the M80 North Zone. • Growling Grass Frog: <ul style="list-style-type: none"> – Permanent removal of 0.268 ha of Growling Grass Frog riparian habitat (including removal of 0.256 ha of riparian habitat at the Maribyrnong River associated with the construction of bridge pier 8 and shared user path widening, and 0.012 ha of riparian habitat (Stream Bank Shrubland) at Steele Creek North associated with the M80/Steele Creek viaduct pier bases, and a permanent access track beneath the viaduct. – Temporary removal of 0.932 ha of terrestrial riparian overwintering habitat (including 0.388 ha at the Maribyrnong River, 0.039 ha at the M80 North Zone retention basin and 0.465 ha at Steele Creek/Steele Creek North). Following works these areas will be revegetated. – Temporary loss of a wetland (the M80 retention basin) that does not support breeding from the Steele Creek/Steele Creek North Reach, known to be utilised for dispersal. This wetland will be isolated from the Steele Creek/Steele Creek North reach for the duration of the M80 North Zone Viaduct construction – estimated to be three years. – Localised reduction in habitat suitability in the vicinity of the Maribyrnong River due to noise and vibration during the construction the Maribyrnong River Bridge. • Golden Sun Moth: Direct removal of 0.319 ha of habitat <ul style="list-style-type: none"> • Australian Grayling: Localised reduction in habitat suitability in the vicinity of the Maribyrnong River (outside of the critical migration period) due to noise and vibration during construction

6. Management Measures – Planning Phase

6.1 Preparation of the Environmental Management Framework

An Environmental Management Framework (EMF) is to be prepared and approved in accordance with the relevant planning approval to ensure the Delivery Partner appropriately manages threats to the relevant MNES in the Corridor Section. The EMF will provide a transparent and integrated governance framework to manage the environmental aspects of the MAR Project and will detail Environmental Management Requirements (EMR) that must be implemented by the delivery partner such as measures to minimise impacts to the MNES before, during and following construction.

Table 6.1 Environmental Management Framework

Objective			
Action	Timing	Responsibility	Measurable Outcome
Prepare an Environmental Management Framework (EMF) with Environmental Management Requirements (EMRs) developed to protect and manage MNES and their habitat within and adjacent to the Corridor Section Project Land	During planning and design phases	RPV	An approved EMF

7. Management Measures – Detailed Design

These measures are to be carried out prior to the finalisation of the construction footprint and commencement of works.

Detailed design management measures must be enacted such that impacts to MNES as a result of Corridor Section Works are restricted to those outlined in Section 5.2.

Table 7.1 Detailed Design Management Measures

Objective			
Action	Timing	Responsibility	Measurable Outcome
Avoid any additional direct removal of any individuals or habitat for MNES beyond those identified in Section 5.2	Detailed design	Delivery Partner	No unapproved, additional impacts to MNES beyond those identified in Section 5.2
Minimise impacts to MNES by designation of No Go Zones for MNES within the Corridor Section Project Land	Planning/design	Delivery Partner	No further impacts to MNES beyond those identified in Section 5.2
Further reduce impacts to MNES by additional avoidance of key habitat areas where possible	Detailed design	Delivery Partner	Reduced impacts to MNES below those identified in Section 5.2

8. Management Measures – Pre-Construction

Management measures relating to preconstruction activities must be undertaken by the Delivery Partner as detailed in Table 8.1.

Table 8.1 General Pre-Construction Management Measures

Objective			
Action	Timing	Responsibility	Measurable Outcome
All approvals and permits to be obtained prior to construction commencing. Any conditions associated with those approvals and permits will be adhered to.	Prior to construction commencing.	Primary approvals ¹ – RPV Secondary approvals ² – Delivery Partner	Compliance with all approval and permit conditions.
A total of 16 No Go Zones (No Go Zones 7-21 and 23) have been identified for Corridor Section Project Land, many of them to protect MNES and associated habitats. No Go Zones are to be included on all site maps, including all Environmental Management Plans and related documentation (including the CEMP).	Prior to construction commencing.	Primary approvals – RPV Secondary approvals – Delivery Partner	All No Go Zones are clearly identified.

¹ Primary approvals are those upon which the overall approval for the Project is contingent.

² Secondary approvals are those upon which overall approval for the whole Project is not contingent. Approval permits or consents under relevant legislation can be sought after the primary approvals have been obtained, prior to, or during, construction.

9. Management Measures – Construction

With various MNES identified within and adjacent to the Corridor Section Project Land, specific measures will be implemented. Specific measures to avoid, minimise or mitigate impacts to MNES during construction are identified in Table 9-1.

Table 9.1 Construction phase Mitigation Measures

Action	Timing	Responsibility	Measurable Outcome
Adherence to Project Footprint			
The construction footprint (See EPBC Referral Appendix D) is to be adhered to through the construction process. Deviations outside the construction footprint will be subject to re-evaluation by a suitably qualified ecologist to ensure the findings of the impact assessment remain valid following the change.	Prior to commencing Works	Delivery Partner and Project Ecologist	No deviation of works beyond the project footprint
General Construction Measures			
The spread of noxious weeds and pest animals will be controlled in accordance with the CaLP Act. A dedicated Pest and Weed Management Plan (PWMP) under CEMP must be drafted and implemented with a focus on targeted control of woody weeds in favour of tussock-forming native species. The PWMP is to include provisions for monitoring and treatment of weeds until project's hand-over and/or successful revegetation with tussock-forming species is achieved	For the duration of Works	Delivery Partner	No spread of noxious weeds into any of the identified areas of habitat for MNES
Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the Corridor Section Project Land through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease will be provided within the CEMP).	For the duration of Works	Delivery Partner	Entry, exit and access points defined
Installation of rumble strips and/or washdown facilities as required to minimise transport of soil/mud/weeds/pathogens from plant and vehicles	For the duration of Works.	Delivery Partner	No spread of noxious weeds into any of the identified areas of habitat for MNES
Construction stockpiles, machinery, roads, and other infrastructure will be placed within the construction footprint.	For the duration of Work	Delivery Partner	All stockpiles and construction infrastructure to be located within the construction footprint.
Avoid placement of hazardous substances (including fuel) in the vicinity of mapped MNES and No Go Zones. Any dangerous/hazardous substances must be adequately stored/bunded in accordance with AS1940-2004. Plant and equipment, in particular hydraulic hoses, to be well-maintained and checked regularly for damage.	For the duration of Works.	Delivery Partner	No spills/leaks occur in the vicinity of MNES; No Go Zones
Deep pits, open trenches and construction areas will be covered overnight to ensure that species that enter site are dispatched without harm and injury. Where trenches are unable to be 'closed' for the night, open trenches will be checked each morning for fauna presence, and egress structures left in place for fauna to exit. If animals are within the trench, an ecologist/wildlife handler will be called to remove the animal. If it is a snake, a snake catcher will be called.	For the duration of Works.	Delivery Partner	No fauna remain trapped in trenches or construction areas
Exclusion Fencing around waterways			
Wherever the construction footprint comes within 200 m of a waterway, exclusion fencing must be set up between the construction footprint and that waterway such that frogs are excluded from the construction footprint. Exclusion fencing will be implemented to ensure there is no unintentional egress of	Prior to commencing Works	Delivery Partner	Exclusion fencing erected to restrict access to waterways within 200 metres of construction

Action	Timing	Responsibility	Measurable Outcome
personnel, machinery, and equipment onto these areas, therefore reducing the risk of weed invasion, impact or damage to threatened biodiversity values and habitat.			
Site personnel induction			
<p>All site personnel will be inducted. The induction will include details of MNES present in the Corridor Section Project Land. Following induction, site personnel will be able to identify MNES on site if encountered.</p> <p>The induction of all site personnel will include details of the importance of No Go Zones and will clearly outline activities which are prohibited from these areas.</p> <p>Ongoing communications and training after site induction (e.g. via toolbox presentations, crib posters) to reinforce awareness of environmental mitigation measures during construction</p>	Prior to commencing Works	Delivery Partner	All personnel inducted to site and aware of management procedures specific to MNES present.
No Go Zones			
<p>The No Go Zones identified in this plan will be avoided by construction works, with no admittance to the areas by construction personnel, vehicles or machinery. The ecological value to be protected by the No Go Zones will not be impacted.</p> <p>Foot access of personnel to No Go Zones for the purpose of guiding bores will be accompanied by a qualified ecologist.</p> <p>All No Go Zones will be included on all site maps, including all Environmental Management Plans and related documentation (including the CEMP).</p>	For the duration of Works	Delivery Partner	<p>No admittance into No Go Zones.</p> <p>No Go Zones marked clearly on all site maps.</p>
<p>No Go Zones must encompass a buffer around the perimeter of the identified area of threatened ecological communities, mapped threatened species habitat and threatened flora species. Perimeters and buffer distances are to be approved by an appropriately qualified ecologist.</p> <p>No Go Zones will be fenced with high-visibility safety bunting or temporary construction fencing (including erosion fencing if necessary). The area is to be signed as a 'No Go Zone'. Fencing will be erected in a way that still enables fauna to move through areas of habitat.</p> <p>The erection of the fencing surrounding No Go Zones will be supervised or reviewed by a qualified and experienced ecologist to ensure that the values supported within that No Go Zone are not impacted. The fencing will be maintained for the duration of the works.</p>	For the duration of Works	Delivery Partner	No Go Zones fenced prior to construction, and fencing maintained throughout construction.
Where a No Go Zone is to be established to protect EPBC Act listed NTGVVP, additional solid construction fencing (e.g. geofabric, shadecloth or similar solid fabric) will be erected to prevent dust impacts.	For the duration of Works	Delivery Partner	Solid fabric to be installed to protect areas of NTGVVP.
<p>Avoid conducting hot works (e.g. welding) during extreme hot/dry conditions to minimise fire risk.</p> <p>No re-fuelling to take place in close proximity to No Go Zones</p>	For the duration of Works.	Delivery Partner	No project related fire ignitions reported
Erosion and sediment controls			
Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 1834 and 1896) will be implemented for works in the vicinity of waterways and wetlands such that water quality of wetlands and watercourses that intersect the Corridor Section Project Land are maintained at pre-construction levels.	For the duration of Works	Delivery Partner	Erosion and sediment controls established prior to construction.
Fauna salvage and relocation			
A contingency plan must be in place for salvage and translocation of any Striped Legless Lizard, Tussock Skink and/or Growling Grass Frog in the event that any individuals are recorded during construction.	For the duration of Works.	Delivery Partner	In the event of a Striped Legless Lizard or Tussock Skink being identified in an area of works during construction, the Striped

Action	Timing	Responsibility	Measurable Outcome
Measures for salvage and translocation will be outlined in a Striped Legless Lizard and Tussock Skink Salvage and Translocation Plan, and a Growling Grass Frog Management Plan.			Legless Lizard and Tussock Skink Salvage and Translocation Plan must be implemented appropriately. In the event of a Growling Grass Frog being identified in an area of works during construction, the Growling Grass Frog Management Plan must be implemented appropriately.
Where woody habitat is identified for removal (including singular trees) an ecologist/ wildlife handler will be engaged to check for fauna occupancy. Where fauna are identified, fauna will be safely relocated to outside the construction footprint prior to the removal of habitat.	For the duration of Works	Delivery Partner and Project Ecologist	Fauna occupancy identified and relocated prior to habitat removal.
Where non-woody habitat is identified for removal, including grasslands, introduced tussock grasslands or any vegetation in the riparian zone, a wildlife handler will supervise habitat clearance. Any fauna disturbed in the process will be safely relocated to adjacent habitat outside the construction footprint.	For the duration of Works	Delivery Partner and Project Ecologist	A wildlife handler to supervise any habitat clearance.
Any interaction with wildlife through habitat clearing activities will be undertaken by a person holding a Section 28A <i>Wildlife Act 1975</i> authorisation.	For the duration of Works	Delivery Partner and Project Ecologist	Interaction with wildlife undertaken by a qualified handler.
Golden Sun Moth specific fencing and mitigation measures			
At Solomon Heights, where Golden Sun Moth habitat occurs adjacent to the project footprint, shade cloth fencing to a height of 1.8 m will be used to prevent Golden Sun Moth from entering the construction footprint for the duration of the flying season (late October – early January).	For the duration of Works	Delivery Partner	Solid fabric to be installed between the edge of the project footprint and adjoining Golden Sun Moth habitat at Solomon Heights.
Growling Grass Frog specific fencing and mitigation measures			
Chytrid Fungus standard hygiene controls for frog handling, footwear and vehicles will be included in the CEMP and must be implemented for all works in and around waterways (DSEWPac 2011b).	For the duration of Works	Delivery Partner	
Before construction, a protocol will be developed for frog salvage and re-location and included in the contractor CEMP and/or Growling Grass Frog Management Plan if required. Only a qualified wildlife handler/ecologist with the appropriate ethics approval and DELWP scientific permit will undertake the surveys and salvage protocol. A Section 28A <i>Wildlife Act 1975</i> authorisation is required to handle native fauna. The permit will also specify salvage and re-location controls that will need to be followed and included in the Growling Grass Frog Management Plan. As part of the Growling Grass Frog Management Plan, a Growling Grass Frog induction to all site personnel will be required.	Prior to commencing Works	Delivery Partner and Project Ecologist	Growling Grass Frog Management Plan and/or Growling Grass Frog mitigation measures identified in CEMP prior to construction.
Prior to construction activities commencing, an Ecologist will attend site during the day to undertake a Growling Grass Frog habitat suitability assessment where the construction footprint intersects the key waterways. Any changes in conditions will be noted, and these mitigation recommendations updated if required.	Prior to commencing Works	Delivery Partner and Project Ecologist	Pre-construction Growling Grass Frog habitat check undertaken
Immediately prior to construction activities being undertaken at the M80 North Zone, Growling Grass Frog survey will be undertaken at the M80 retention basin with the purpose of capturing and relocating any dispersing Growling Grass Frog	Prior to commencing Works and for	Delivery Partner and Project Ecologist	Survey undertaken to relocate any Growling Grass Frog outside the

Action	Timing	Responsibility	Measurable Outcome
individuals to outside the construction footprint, and the already set-up exclusion fencing that will prevent relocated Growling Grass Frog from re-entering the construction footprint. Surveys will be undertaken in accordance with the survey guidelines for the species (DEWHA 2009b). This measure is in addition to the below Growling Grass Frog salvage and relocation measures which will be enacted for the duration of the construction.	the duration of Works		construction footprint prior to construction.
Fencing suitable for the exclusion of Growling Grass Frog will be erected to exclude waterways from construction areas and access tracks within 200m of the waterway. During construction, daily checks of frog fencing will be undertaken by a suitably qualified environmental representative.	For the duration of Works.	Delivery Partner and Project Ecologist	Growling Grass Frog fencing erected prior to construction.
Open trenches will be closed at the end of each workday to prevent fauna from becoming stuck in trenches. Where trenches are unable to be 'closed' for the night, open trenches will be checked each morning for fauna presence, and egress structures left in place for fauna to exit. If animals are within the trench, an ecologist/wildlife handler will be called to remove the animal. If it is a snake, a snake catcher will be called.	For the duration of Works	Delivery Partner and Project Ecologist	Site trenches closed at the end of each day.
Construction activities, including the removable footbridge over the Maribyrnong River, must not encroach upon the low flow channel of any waterway, and further, must leave sufficient terrestrial space within the riparian zone so as to ensure that the Growling Grass Frog has the capacity to disperse overland along the riparian corridor.	For the duration of Works	Delivery Partner	Dispersal capability maintained.
Piling activities associated with pier 8 of the Maribyrnong River Bridge will be limited to bored piling to minimise noise and vibration to Growling Grass Frog at the Maribyrnong River.	For the duration of Works	Delivery Partner	Bored piling to be used for pier 8 adjacent to Maribyrnong River
Australian Grayling specific mitigation measures			
Piling activities associated with pier 8 of the Maribyrnong River Bridge will be restricted to December to March or July to August (outside the critical migration period of the Australian Grayling which is April to June and September to November) to ensure that the noise and vibration associated with piling does not interfere with the migration of the species.	For the duration of Works	Delivery Partner	Piling activities restricted to December to March or July to August (outside the critical migration period of the species).
The dispersal capability of the Australian Grayling will be maintained throughout the Corridor Section Works through ensuring that all permanent infrastructure and construction activities (including fences and the removable footbridge over the Maribyrnong River) remain clear of the low flow channel.	For the duration of Works	Delivery Partner	Permanent infrastructure and construction activities remain clear of the low flow channel.
Striped Legless Lizard specific mitigation measures			
To reduce the potential for noise and vibration impacts to Striped Legless Lizard at the M80 North Zone, piling activities between the M80 and Steele Creek North will be restricted to a 17 month period and namely will not extend across more than one Striped Legless Lizard active period of September to March.	For the duration of Works	Delivery Partner	Piling activities between M80 and Steele Creek restricted to one Striped Legless Lizard active period.
Pre-construction Striped Legless Lizard Survey will be implemented in areas where known Striped Legless Lizard habitat has been approved for removal at the M80 North Zone and Munro Avenue: <ul style="list-style-type: none"> Prior to the clearance of Striped Legless Lizard Habitat at the M80 North Zone and Munro Avenue, artificial shelter survey will be used to capture and relocate Striped Legless Lizards detected within the construction footprint to outside the construction footprint, and the already set-up exclusion fencing. The artificial shelter survey technique will be employed as per the survey guidelines of the species (DEWHA 2011a), and include weekly checks for at least three months within the peak detection period of the species, during the active season prior to construction. 	Prior to commencing works	Delivery Partner and Project Ecologist/ Zoologist	Pre-construction Striped Legless Lizard Survey implemented in all areas of Striped Legless Lizard habitat removal

Action	Timing	Responsibility	Measurable Outcome
<ul style="list-style-type: none"> Reptile-proof fencing will be installed around the Striped Legless Lizard habitat that is identified to be removed to ensure that relocated lizards do not re-enter the habitat area to be cleared. Fencing will be plastic sheeting both above and below ground. Trenching associated with burying fencing will be confined to areas of habitat that are to be removed as part of the Corridor Section Works. Trenching and installation of reptile-proof fencing is to be supervised by a suitably qualified ecologist to minimise the risk of harm to Striped Legless Lizard. <p>All appropriate permits will be in place prior to commencing the Striped Legless Lizard relocation.</p>			
Once construction commences, a qualified and experienced zoologist with the appropriate permits will be available on site to undertake any fauna salvage and release for individuals found during initial earthworks.	For the duration of works	Delivery Partner and Project Ecologist/ Zoologist	Any identified fauna are relocated prior to major works and habitat removal
NTGVVP/Spiny Rice-flower specific mitigation measures			
Where dust has the potential to impact areas immediately adjacent to the construction footprint that support NTGVVP and Spiny Rice-flower, installation and maintenance of temporary construction fencing (e.g. geofabric, shade cloth or similar solid fabric) will be undertaken to create a dust barrier between the construction footprint and areas of concern.	For the duration of Works	Delivery Partner	Installation and maintenance of temporary construction fencing that acts as a dust barrier
Dust monitoring will be implemented to determine if additional protocols need to be enacted.	For the duration of Works	Delivery Partner	Dust monitoring implemented
Avoid conducting hot works (e.g. welding) during extreme hot/dry conditions so as to minimise fire risk. No re-fuelling to take place in close proximity to No Go Zones	For the duration of Works	Delivery Partner	No project related fire ignitions reported

10. Management Measures – Post-Construction

Management measures to be implemented post-construction are detailed in Table 10-1.

Table 10-1 Post Construction Management Measures

Action	Timing	Responsibility	Measurable Outcome
Strategic Revegetation			
<p>Revegetation of areas of ground disturbance, that does not support permanent infrastructure, will be undertaken in a number of areas to minimise the impacts of the project to ecological values. These locations are discussed below:</p> <ul style="list-style-type: none"> • The Maribyrnong River Riparian Zone: All areas of the construction footprint, that does not support permanent infrastructure, within the riparian zone of the Maribyrnong River, including the construction footprint of associated access tracks and maintenance paths, will be revegetated with site-indigenous species such that the area supports EVC 56: Floodplain Riparian Woodland. • The M80 North Zone: All areas of the construction footprint, that does not support permanent infrastructure, within the M80 North Zone will be revegetated with site indigenous species such that the area supports the Plains Grassland EVC. The viaduct construction footprint is expected to result in an increase in shade below the structure, as such, only more shade-tolerant C3 grasses (such as Wallaby Grasses and Spear Grasses) should be used in the revegetation process rather than Kangaroo Grass, the lone site-indigenous C4 grass species. Further, monitoring will be required beneath the viaduct to determine the success of grassland revegetation. With the increase in shade (some areas receiving 3 additional hours of shade per day – mostly at the centre of the viaduct footprint) meaning that grassland vegetation may not take in some locations. Should grassland revegetation not take in those shadier locations, then more shade tolerant plantings will be utilised. • Steele Creek and Steele Creek North: All areas of the construction footprint, that does not support permanent infrastructure, within the riparian zone of the Steele Creek and Steele Creek North, including the area surrounding the M80 retention basin, will be revegetated. Revegetation will comprise site-indigenous flora species including species from EVC 851_61: Treed Stream Bank Shrubland, as well as indigenous floating and emergent aquatic species to provide habitat for Growling Grass Frog. 	Post-construction operating phase	Delivery Partner, ecologist	Revegetation of indigenous species along Maribyrnong River and Steele Creek in any disturbed areas.

11. Monitoring and Compliance

11.1 Monitoring and Review

To ensure the requirements of the CSTSMP have been implemented and reached the required performance targets associated with the monitoring and mitigation measures described above will be undertaken. Monitoring requirements are stipulated in Table 11-1.

Table 11-1: Monitoring requirements

Frequency	Monitoring Activity	Delegated Responsibility
Daily, for sites where construction is currently underway.	Inspection of Works Area to ensure that all mitigation measures within this plan are being adhered to and operating effectively.	Delivery Partner Project Manager or Site Environmental Officer
Weekly, at sites adjacent to parts of the Corridor Section that are known to support MNES.	Inspection of fencing and signage to ensure it is in good condition.	Delivery Partner Project Manager or Site Environmental Officer
Monthly, at sites adjacent to parts of the Corridor Section that are known to support MNES.	Ensure levels of weeds and evidence of pest animals have not increased within these areas.	Delivery Partner Ecologist

11.2 Non-Compliance

Where a 'non-compliance' is identified through monitoring or otherwise reported, it will be documented as per the process set out in the CEMP. The following steps will be undertaken where a non-compliance is identified:

- Where the non-compliance is identified and reported by someone other than the Project Manager or Site Environmental Officer, a site inspection of the affected area will be completed by the Project Manager or the Site Environmental Officer
- Further investigation will be completed to determine the possible causes for the non-compliance
- Relevant personnel, including if necessary, RPV, DELWP and/or DCCEEW representatives, will be informed
- An agreed corrective action will be determined and agreed with RPV
- The action will be implemented to rectify the problem.

Actions undertaken to rectify the problem may include the following:

- A new or revised procedure established and implemented
- Additional training provided to the relevant personnel
- Additional inspections implemented.

The actions required to correct the non-compliance and the successful implementation of these actions will be documented as per the process set out in the CEMP.

DELWP and DCCEEW will be consulted where a non-compliance results in significant changes to the implementation of this CSTSMP.

11.3 Data Management

To enable the continued protection and management of the various MNES within the Corridor Section Project Land, it is important that all future information gathered on the presence and extent of the populations of Striped Legless Lizard, Golden Sun Moth, Growling Grass Frog, Spiny Rice-flower and

Australian Grayling is shared with rail agencies and other government authorities. To enable this, the following steps will be completed:

- Provide current and accurate spatial data on the extent and location of threatened species habitat and individuals to rail agencies including Australian Rail Track Corporation (ARTC) and VicTrack
- Provide spatial information for rail agencies internal databases and the Victorian Biodiversity Atlas

12. References

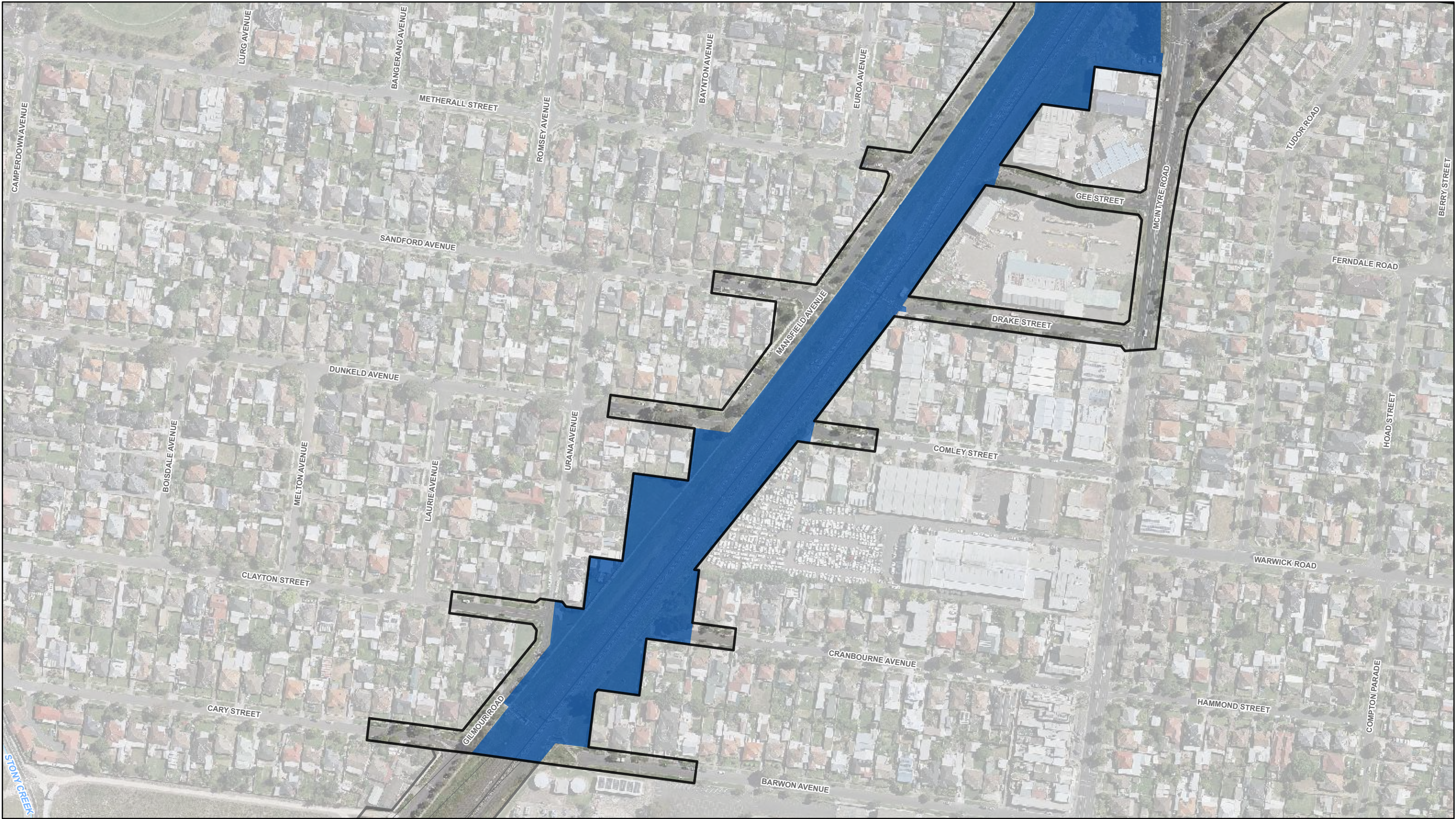
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APPENDIX A

MNES IMPACTS MAPPING

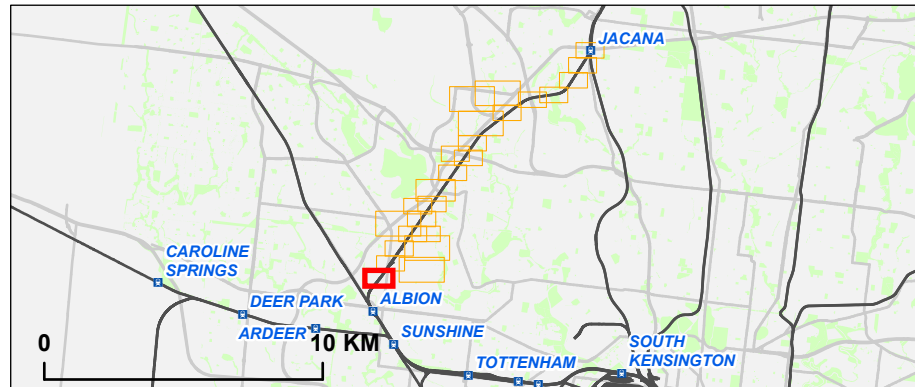




- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- ▭ Project Land (Sunshine Section)
- Construction Footprint (Corridor Section)

Map 1 of 25

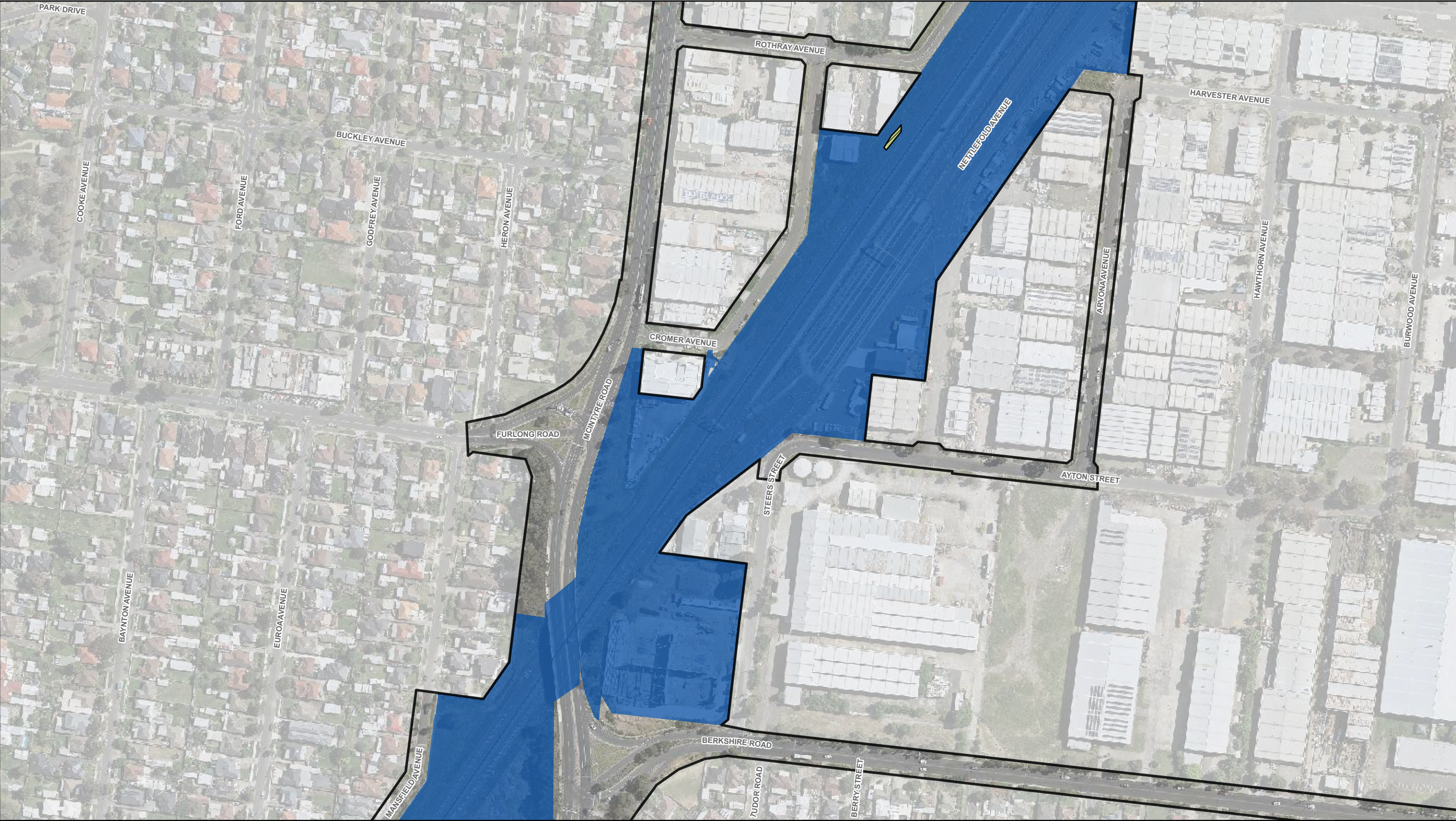
Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

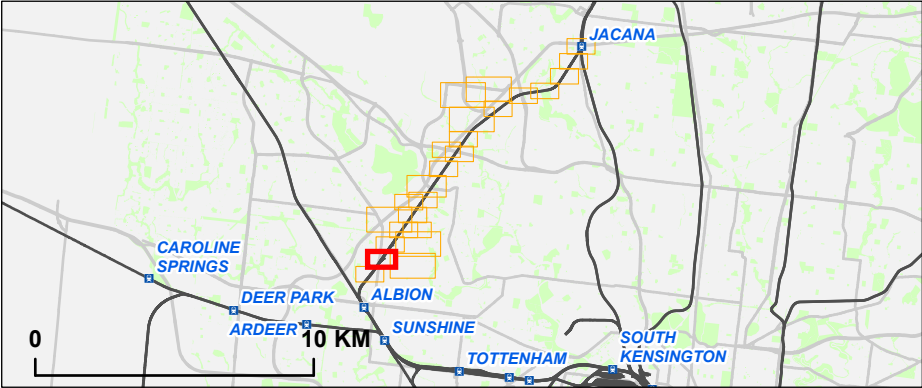
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Map 2 of 25

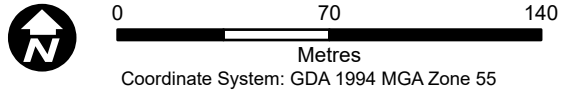
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- Construction Footprint (Corridor Section)
- ▨ Removed Native Vegetation
- Native Vegetation**
- 132 Plains Grassland

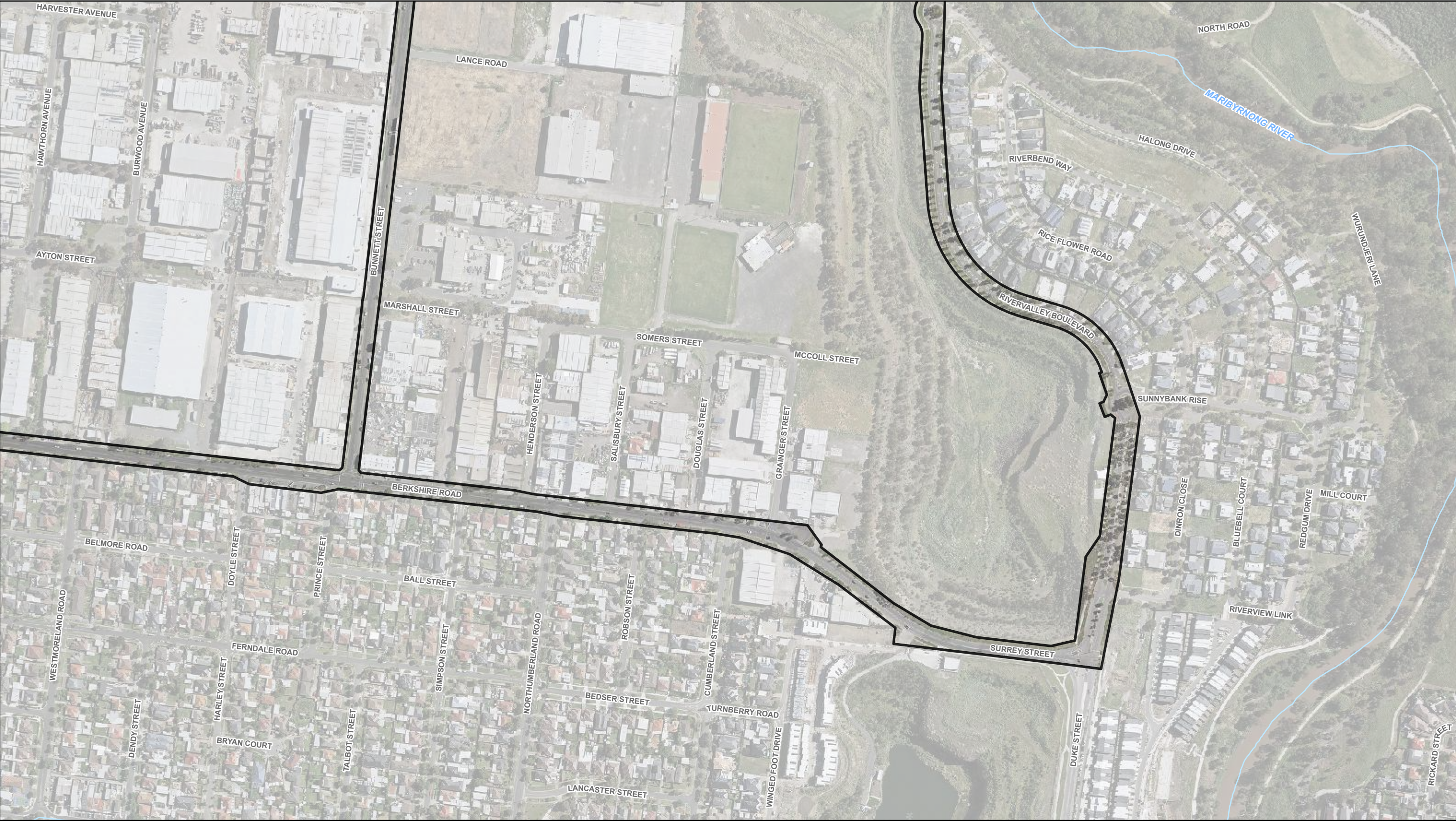
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Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

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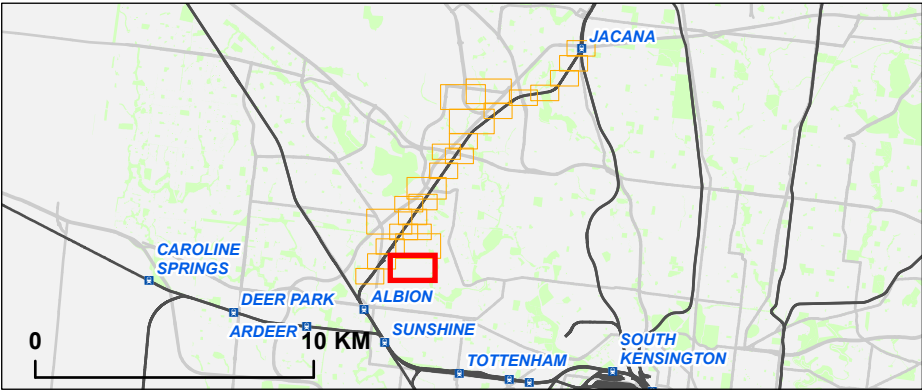




- Watercourse
- Project Land (Corridor Section)

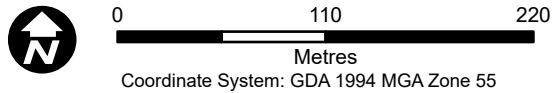
Map 3 of 25

Data Sources:
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Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3





- Rail

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Spiny Rice-flower to be removed
- Spiny Rice Flower

Removed Native Vegetation

Golden Sun Moth Habitat

Striped Legless Lizard Habitat

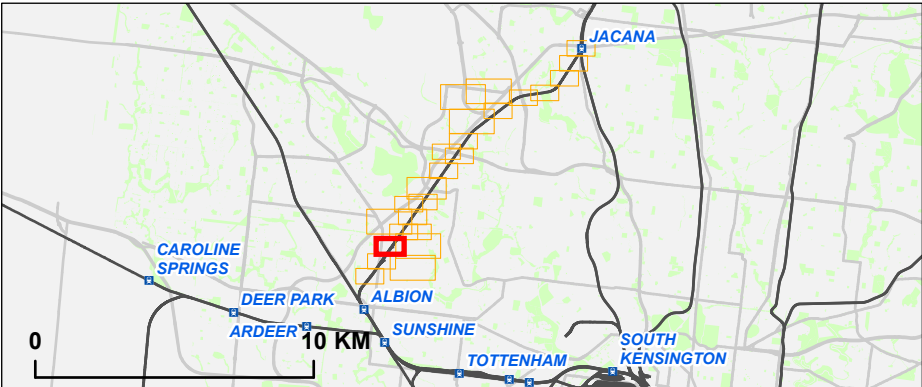
Native Vegetation

132 Plains Grassland

Natural Temperate Grassland of the Victorian Volcanic Plain

Map 5 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



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MNES Impacts Mapping - Corridor Section

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MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:

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J. Sullivan

Date:

21/04/2022

Map Size:

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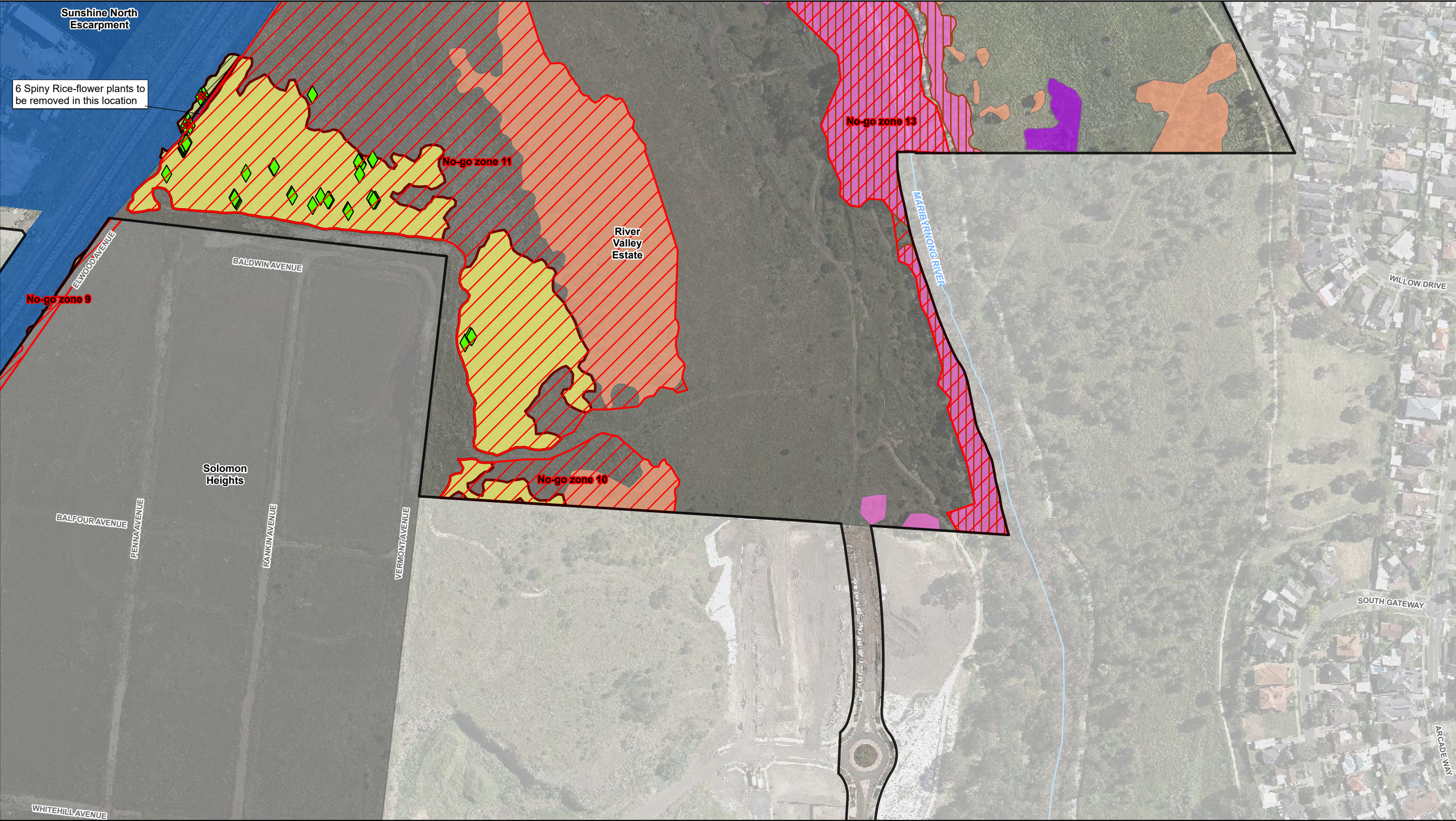
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Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

Spiny Rice-flower to be removed

Spiny Rice Flower

Removed Native Vegetation

Striped Legless Lizard Habitat

Growing Grass Frog Habitat

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

821 Tall Marsh

895 Escarpment Shrubland

Natural Temperate Grassland of the Victorian Volcanic Plain

Map 7 of 25

Data Sources:

AJMJV 2022

VicTrack 2021

Vicmap 2021

Aerial photo:

DELWP Oct. 2021

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Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:

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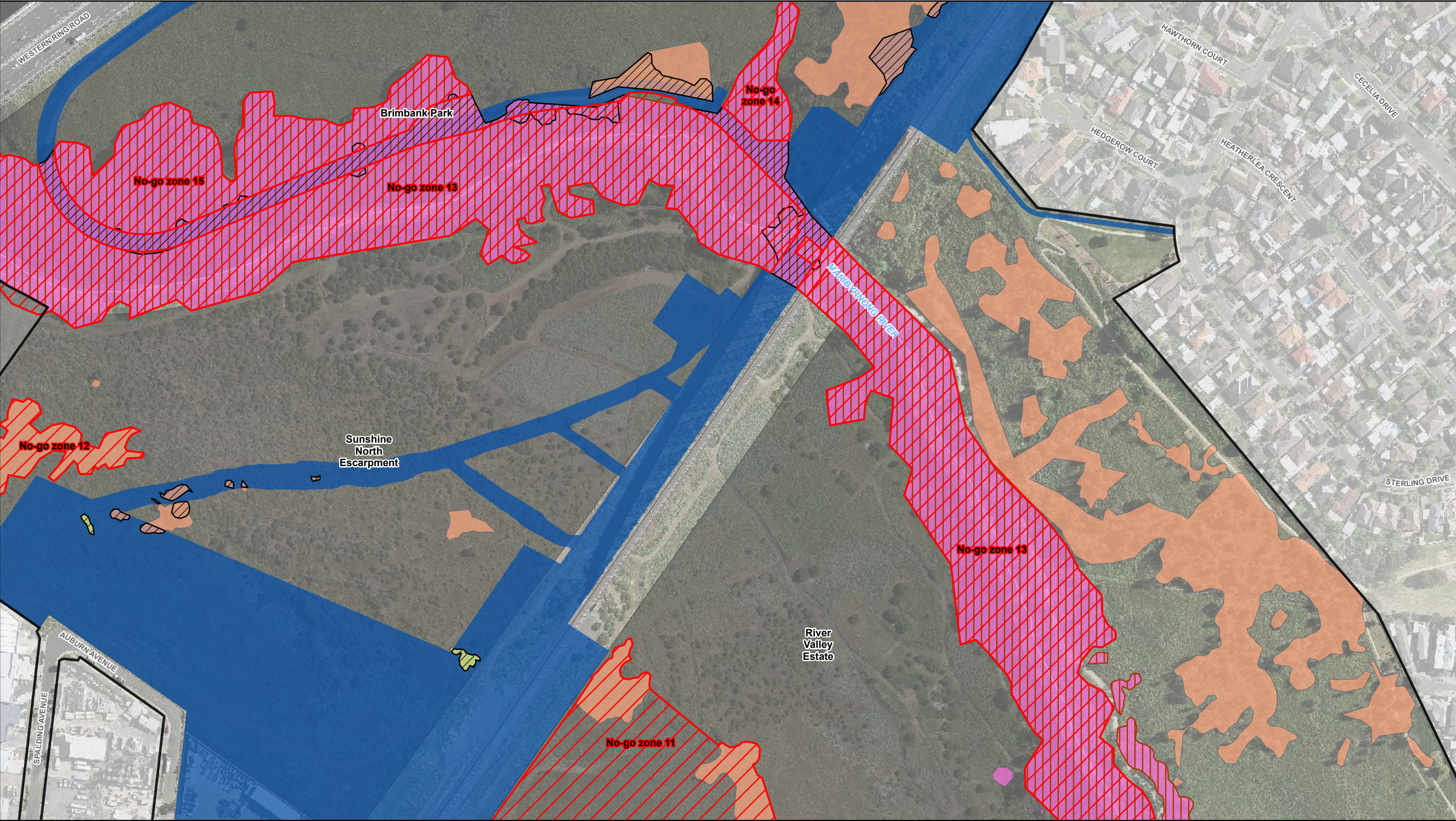
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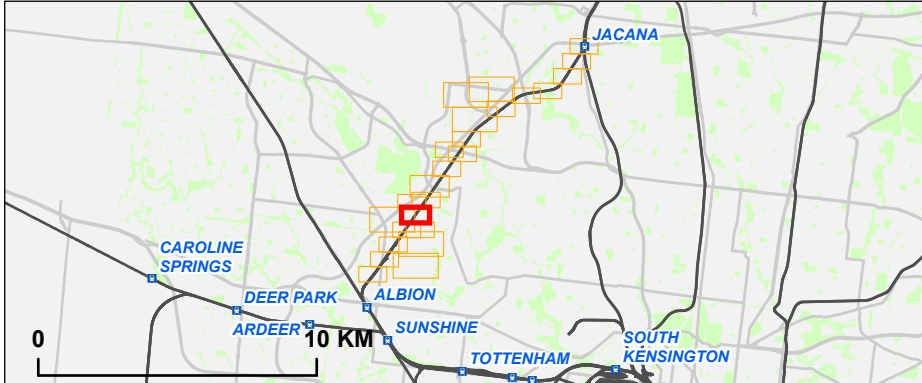
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- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- ▭ Construction Footprint (Corridor Section)
- ▭ Key Assessment Areas
- No-go Zones**
- ▭ No-go Zone
- ▨ Removed Native Vegetation
- ▨ Growing Grass Frog Habitat
- Native Vegetation**
- ▭ 132 Plains Grassland
- ▭ 56 Floodplain Riparian Woodland
- ▭ 895 Escarpment Shrubland

Map 8 of 25

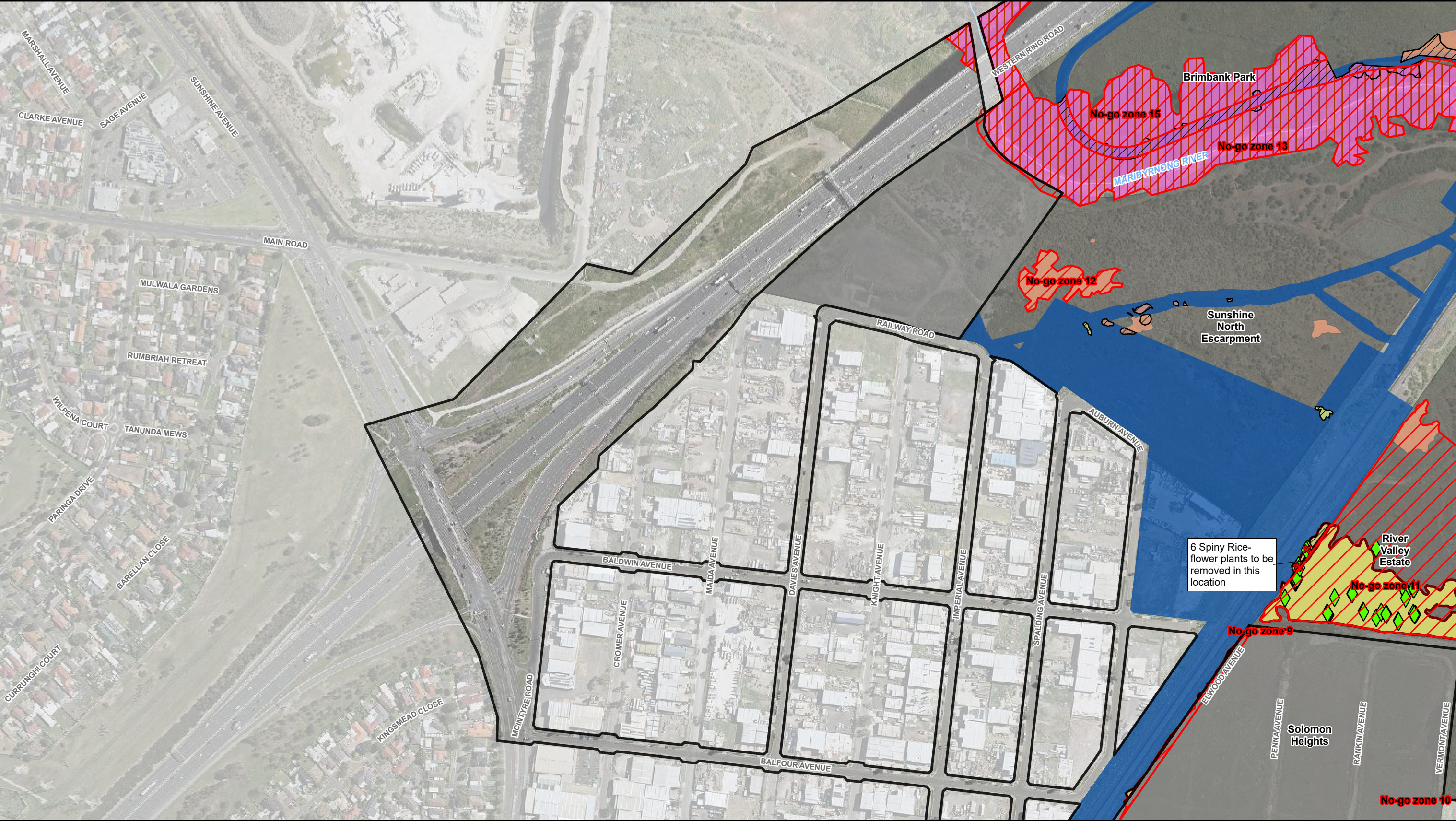
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Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

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Drawn By: J. Rivera	Approved By: J. Sullivan	Date: 21/04/2022	Map Size: A3

Coordinate System: GDA 1994 MGA Zone 55



Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Spiny Rice-flower to be removed

Spiny Rice Flower

Removed Native Vegetation

Golden Sun Moth Habitat

Striped Legless Lizard Habitat

Growing Grass Frog Habitat

Native Vegetation

132 Plains Grassland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Natural Temperate Grassland of the Victorian Volcanic Plain

Map 9 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

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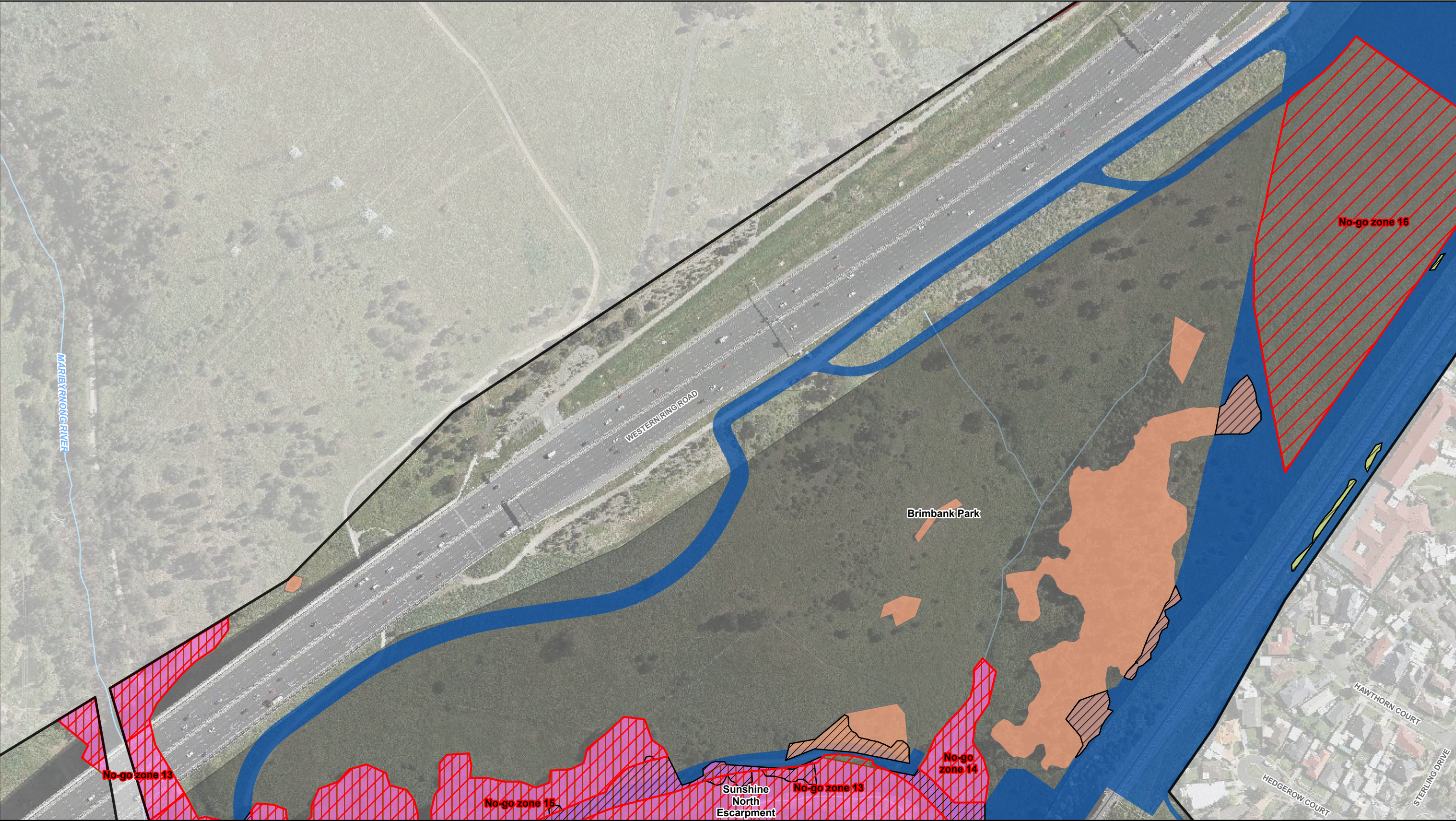
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Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Removed Native Vegetation

Growing Grass Frog Habitat

Native Vegetation

132 Plains Grassland

55 Plains Grassy Woodland

56 Floodplain Riparian Woodland

895 Escarpment Shrubland

Map 10 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

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Melbourne Airport Rail

Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:

MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:

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Drawn By:

J. Rivera

Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

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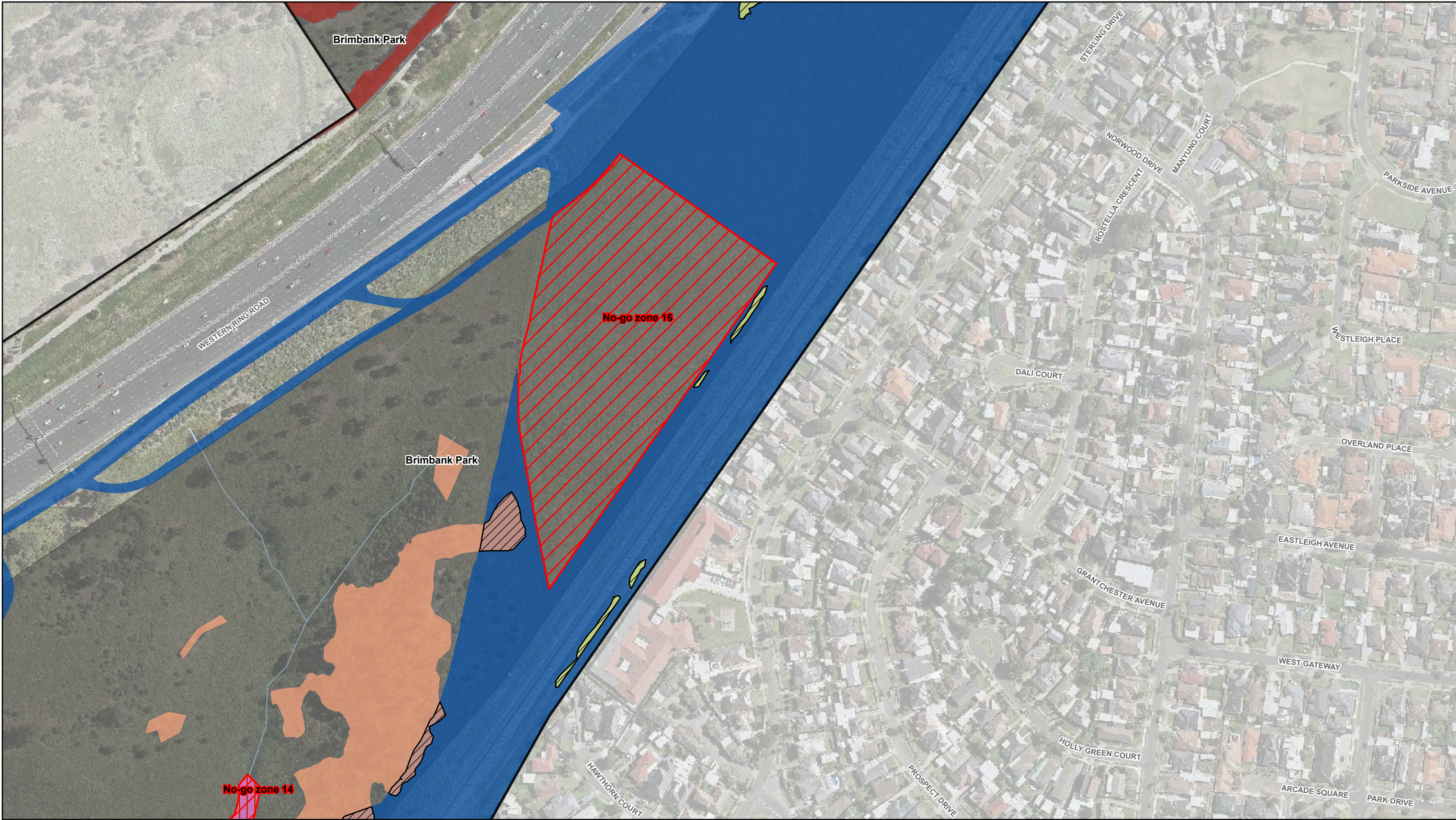
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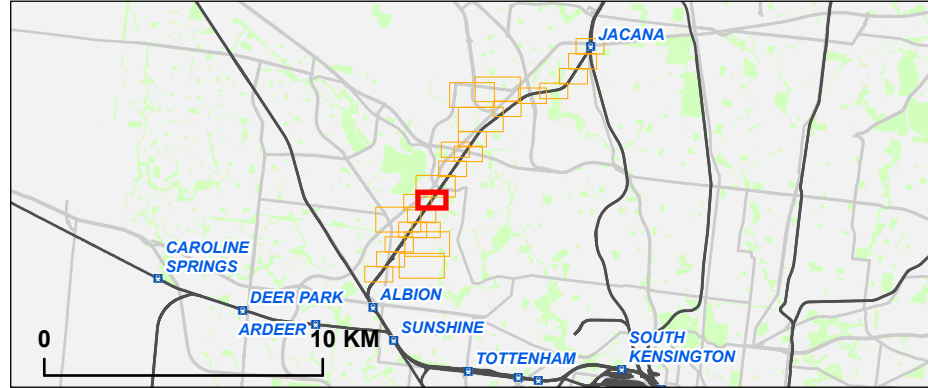






- Rail
- Watercourse
- ▬ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)
- Key Assessment Areas
- No-go Zones**
- ▬ No-go Zone

- ▨ Removed Native Vegetation
- ▨ Growing Grass Frog Habitat
- Native Vegetation**
- 132 Plains Grassland
- 55 Plains Grassy Woodland
- 56 Floodplain Riparian Woodland
- 895 Escarpment Shrubland

Map 11 of 25

Data Sources:
AJM JV 2022
VicTrack 2021
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Aerial photo:
DELWP Oct. 2021



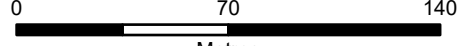



Melbourne Airport Rail

Project Wide

MNES Impacts Mapping - Corridor Section

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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3



Coordinate System: GDA 1994 MGA Zone 55



Rail

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Removed Native Vegetation

Native Vegetation

132 Plains Grassland

55 Plains Grassy Woodland

Natural Temperate Grassland of the Victorian Volcanic Plain

Map 12 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021

RAIL PROJECTS

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Melbourne Airport Rail

Project Wide

MNES Impacts Mapping - Corridor Section

Drawing Number:
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629

Revision:
A.5

Drawn By:
J. Rivera

Approved By:
J. Sullivan

Date:
21/04/2022

Map Size:
A3

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Metres

Coordinate System: GDA 1994 MGA Zone 55

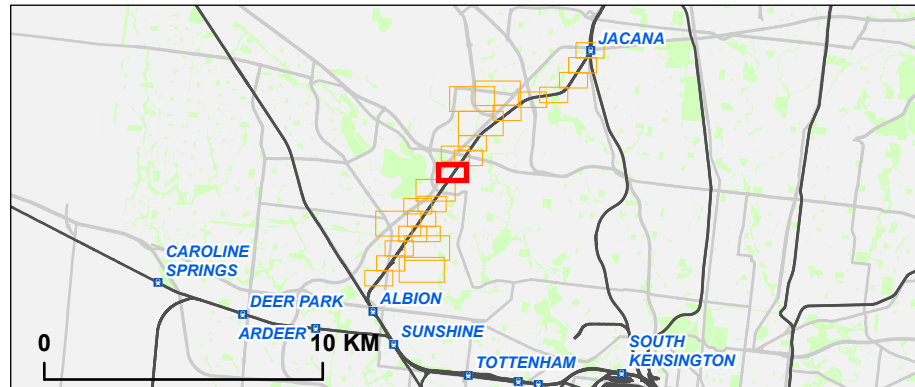
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- Rail
- ▬ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)

Map 13 of 25

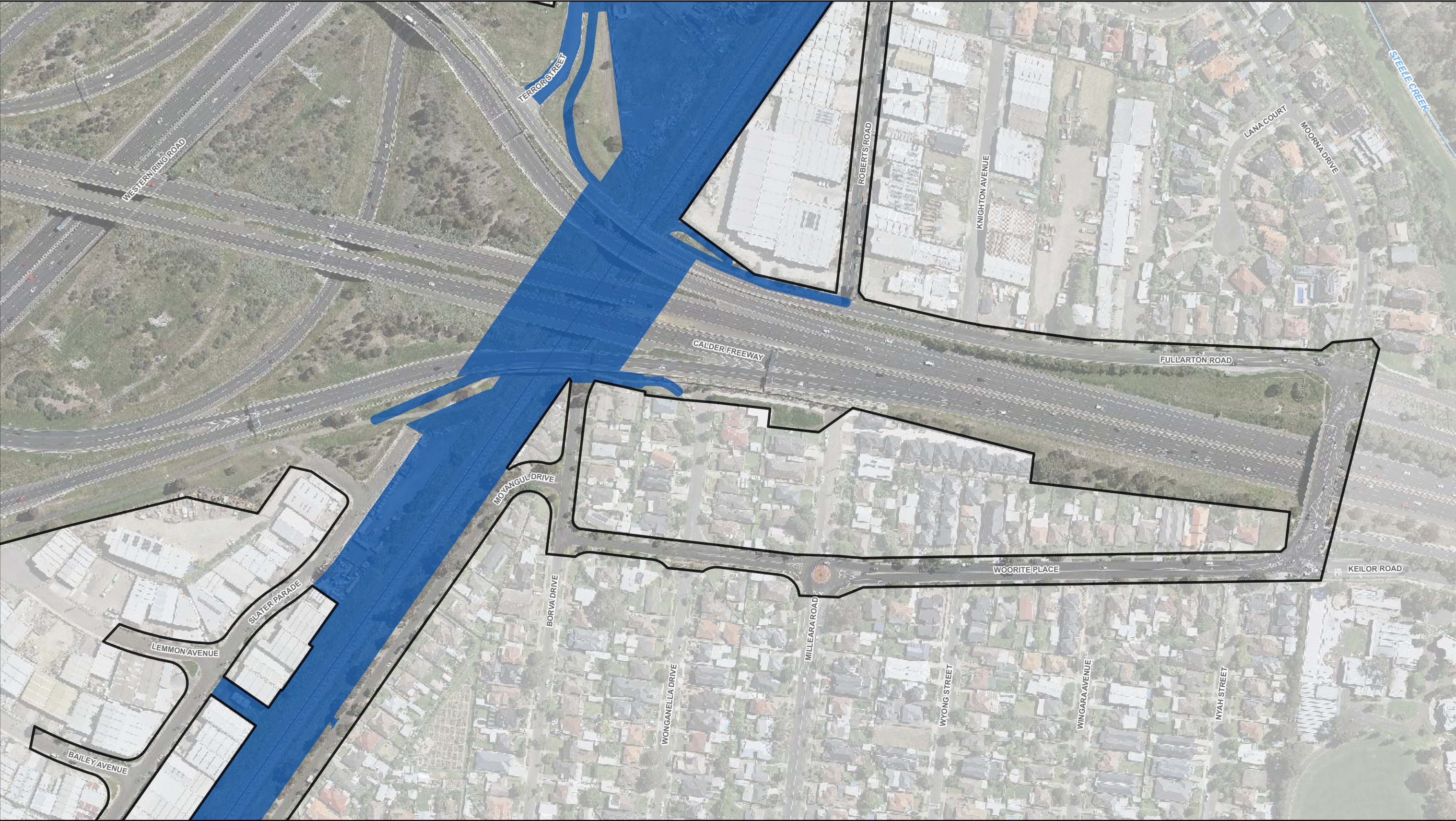
Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

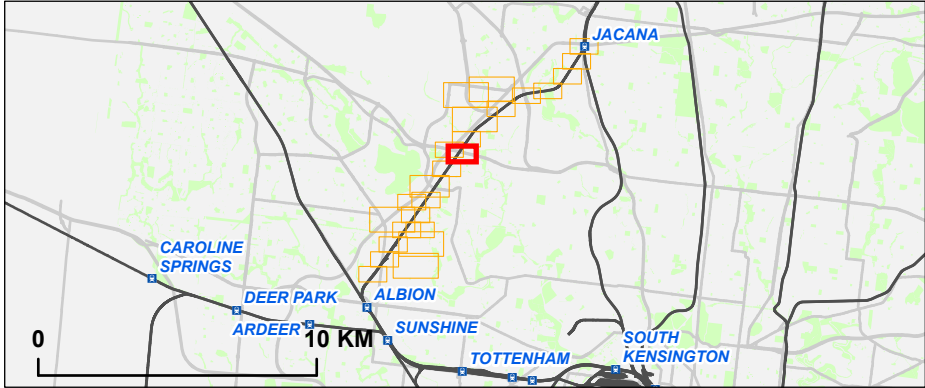
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Metres
Coordinate System: GDA 1994 MGA Zone 55



- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- ▭ Construction Footprint (Corridor Section)

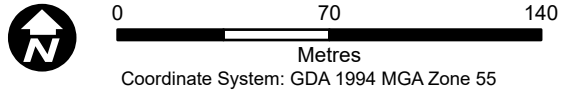
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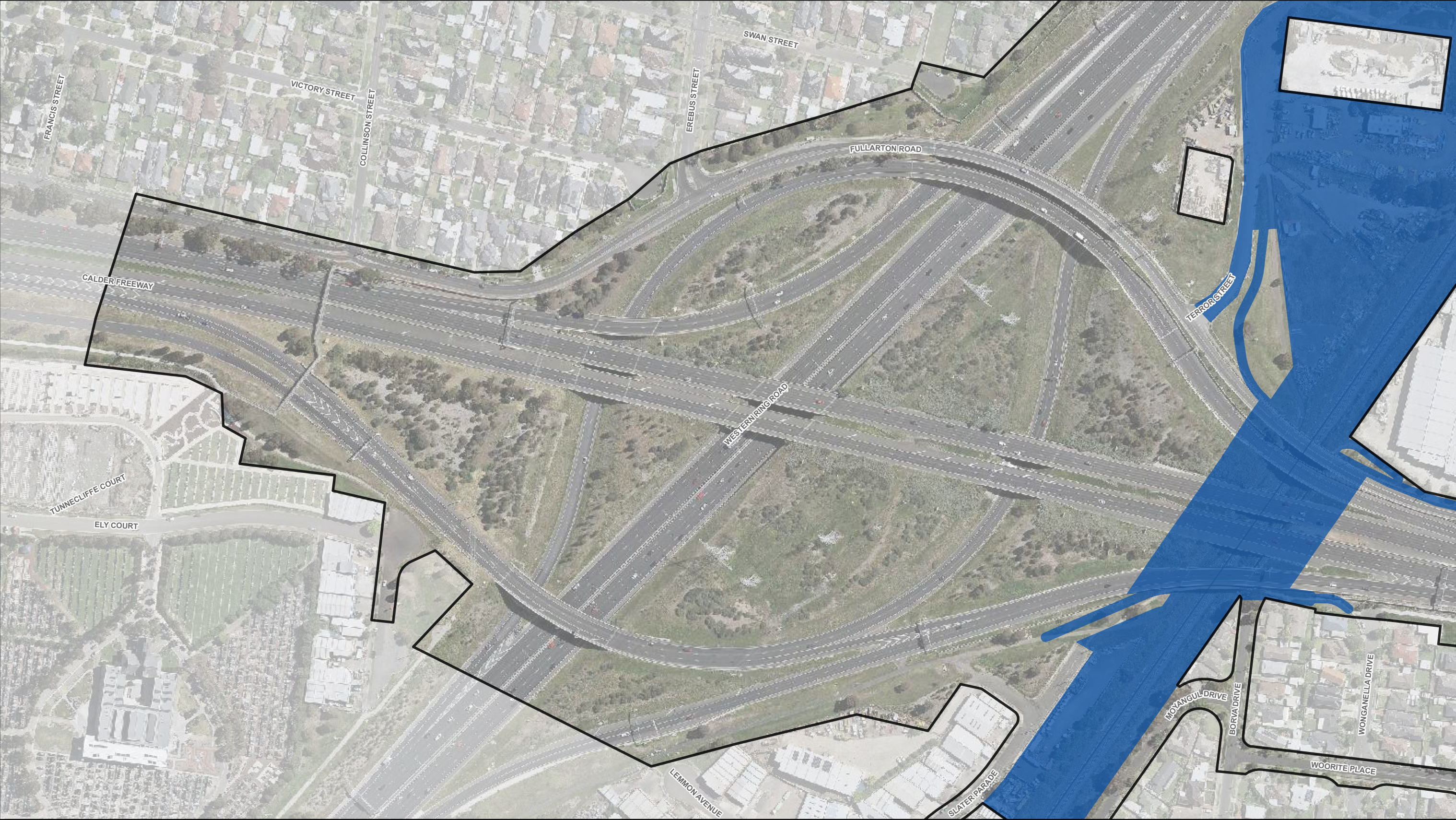
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VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

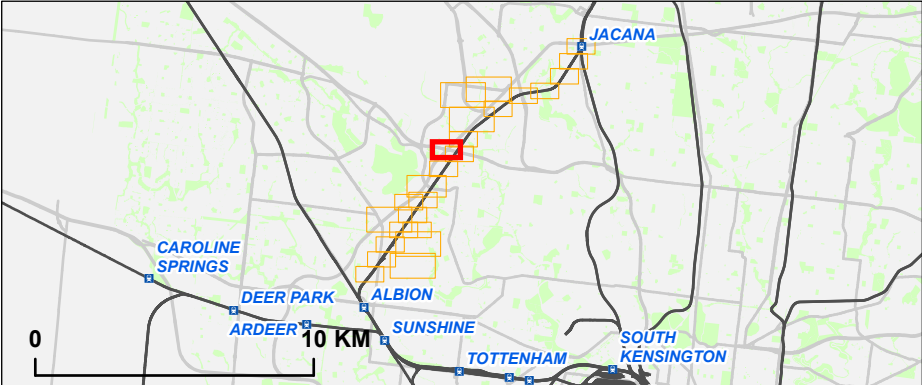




- Rail
- ▬ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)

Map 15 of 25

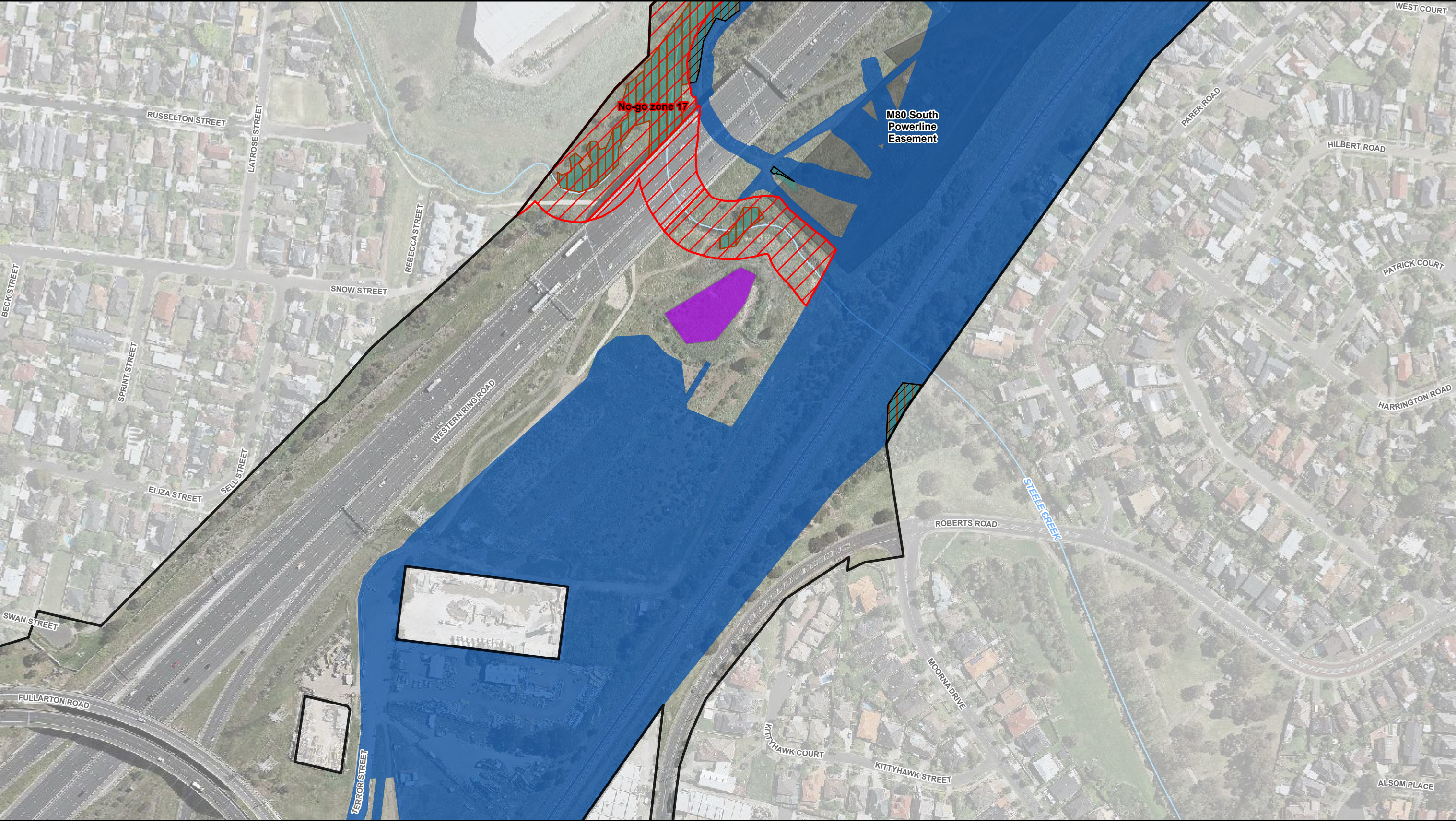
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VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

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Metres
Coordinate System: GDA 1994 MGA Zone 55



Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

Key Assessment Areas

No-go Zones

No-go Zone

Removed Native Vegetation

Growling Grass Frog Habitat

Native Vegetation

821 Tall Marsh

851 Stream Bank Shrubland

Map 16 of 25

Data Sources:

AJM JV 2022

VicTrack 2021

Vicmap 2021

Aerial photo:

DELWP Oct. 2021

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MNES Impacts Mapping - Corridor Section

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Revision:

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Drawn By:

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Approved By:

J. Sullivan

Date:

21/04/2022

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Coordinate System: GDA 1994 MGA Zone 55

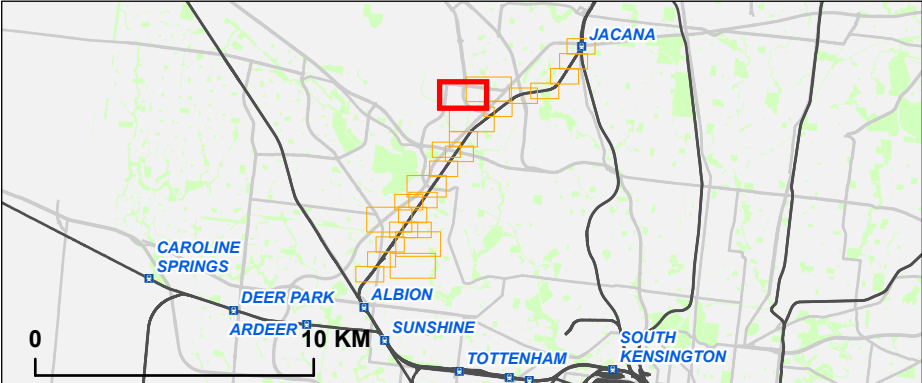
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- Watercourse
- Project Land (Corridor Section)
- Construction Footprint (Corridor Section)

Map 18 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
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Melbourne Airport Rail

Project Wide

MNES Impacts Mapping - Corridor Section

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Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

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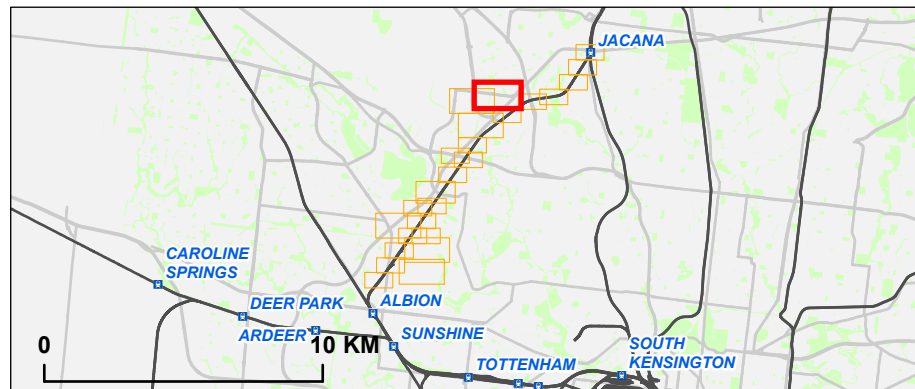
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- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- ▭ Construction Footprint (Corridor Section)

Map 19 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



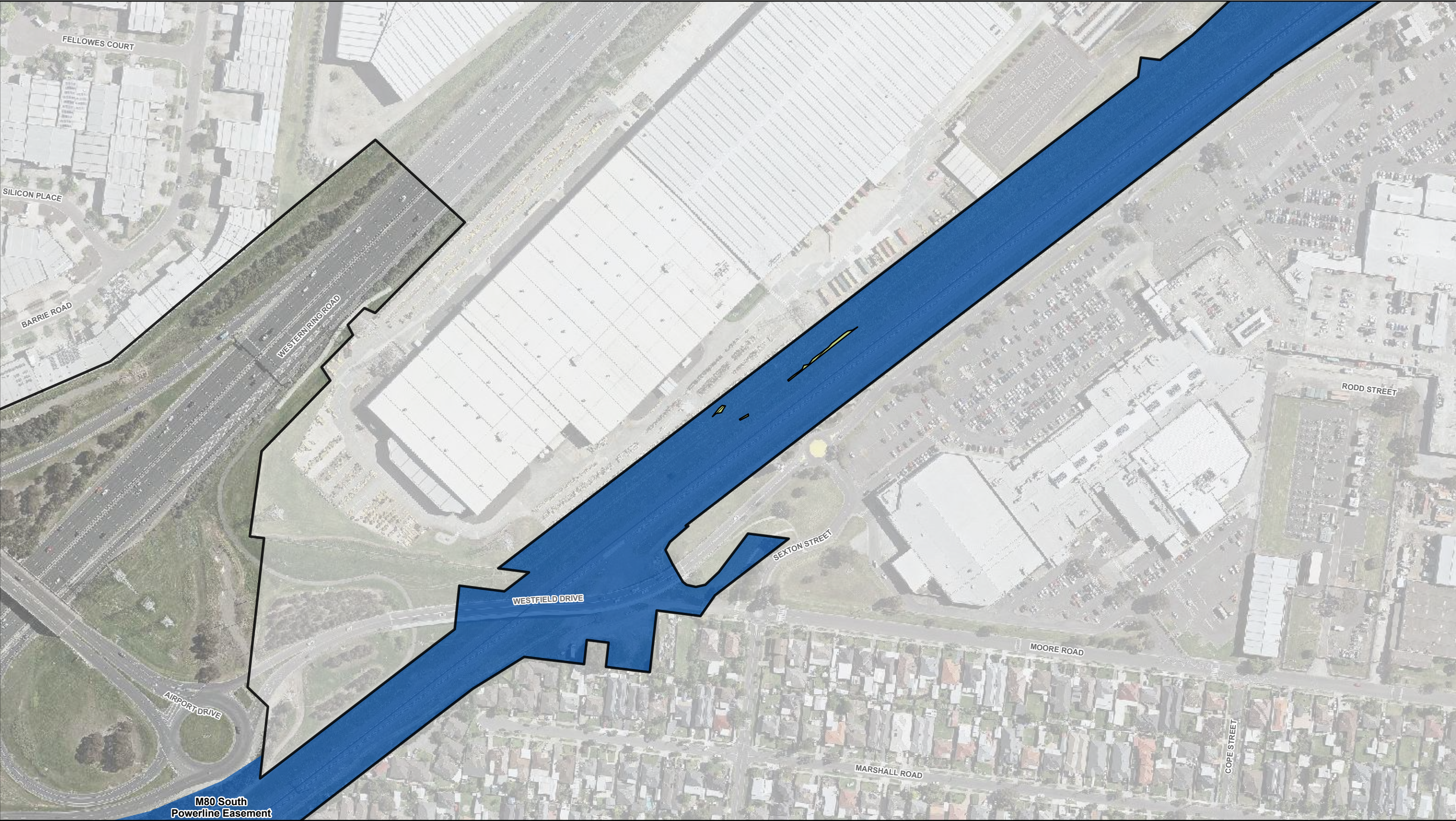
Melbourne Airport Rail Project Wide

MNES Impacts Mapping - Corridor Section

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Drawn By:	Approved By:	Date:	Map Size:
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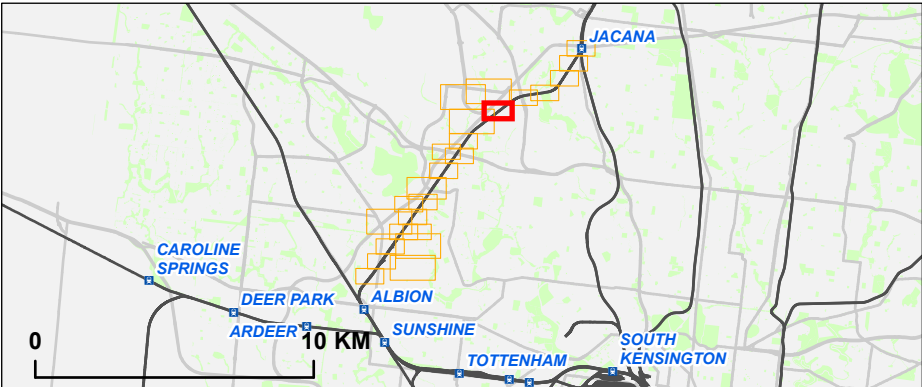
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Metres
Coordinate System: GDA 1994 MGA Zone 55



- Rail
- ▭ Project Land (Corridor Section)
- ▭ Construction Footprint (Corridor Section)
- ▭ Key Assessment Areas
- ▨ Removed Native Vegetation
- Native Vegetation**
- ▭ 132 Plains Grassland

Map 20 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
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J. Rivera	J. Sullivan	21/04/2022	A3

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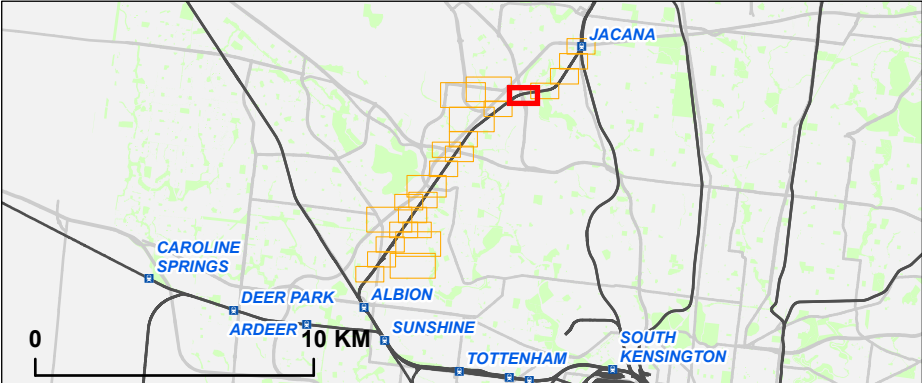
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- Rail
 - ▬ Project Land (Corridor Section)
 - Construction Footprint (Corridor Section)
 - ▨ Removed Native Vegetation
- Native Vegetation**
- 55 Plains Grassy Woodland

Map 21 of 25

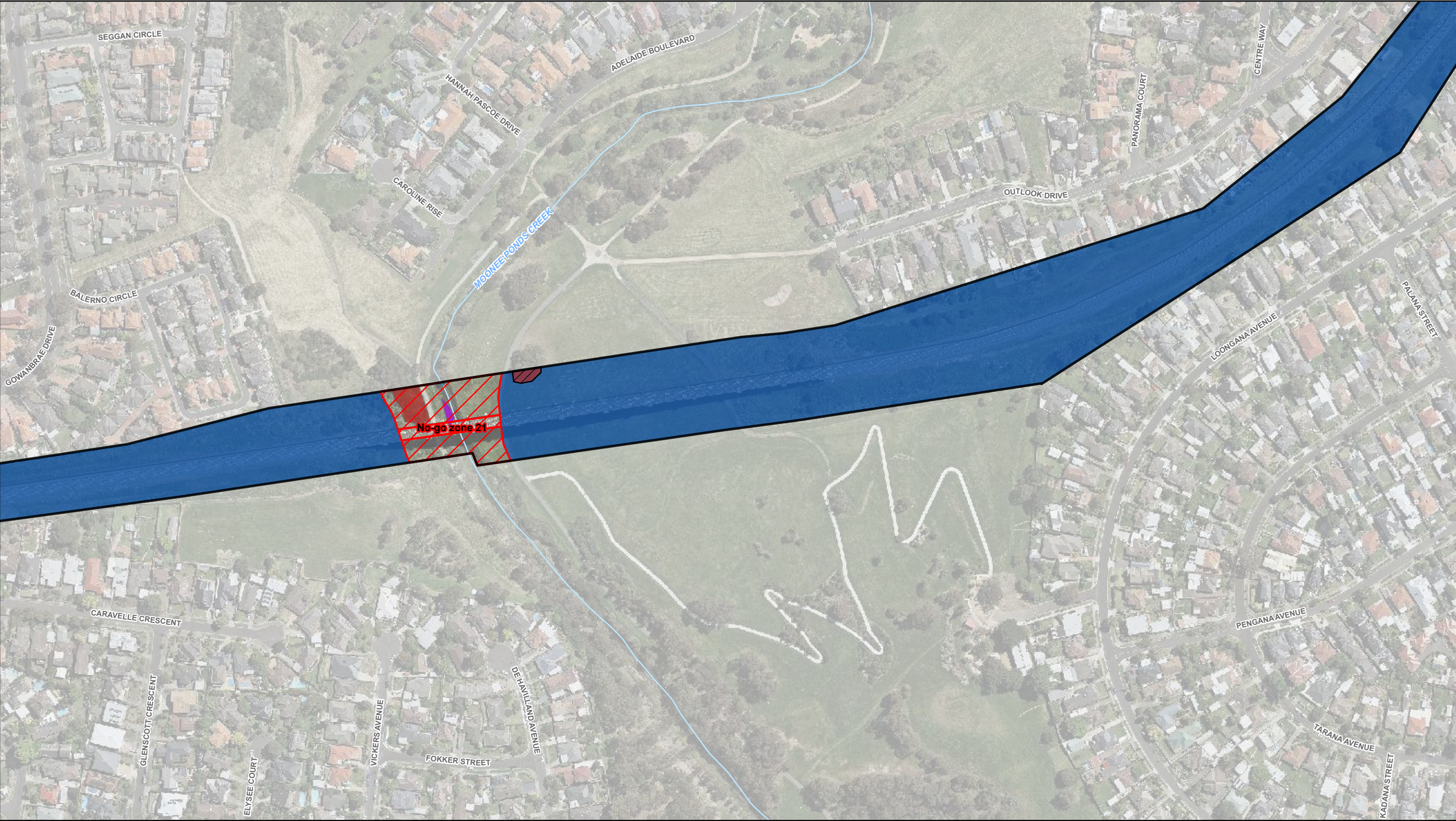
Data Sources:
AJM JV 2022
VicTrack 2021
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Aerial photo:
DELWP Oct. 2021



Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

Drawing Number:		Revision:	
MAR-AJM-PWD-PWD-MAP-XEV-MMN-0490629		A.5	
Drawn By:	Approved By:	Date:	Map Size:
J. Rivera	J. Sullivan	21/04/2022	A3

0 70 140
Metres
Coordinate System: GDA 1994 MGA Zone 55



Rail

Watercourse

Project Land (Corridor Section)

Construction Footprint (Corridor Section)

No-go Zones

No-go Zone

Removed Native Vegetation

Native Vegetation

55 Plains Grassy Woodland

641 Riparian Woodland

821 Tall Marsh

Map 22 of 25

Data Sources:

AJM JV 2022

VicTrack 2021

Vicmap 2021

Aerial photo:

DELWP Oct. 2021

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MNES Impacts Mapping - Corridor Section

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Approved By:

J. Sullivan

Date:

21/04/2022

Map Size:

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Coordinate System: GDA 1994 MGA Zone 55

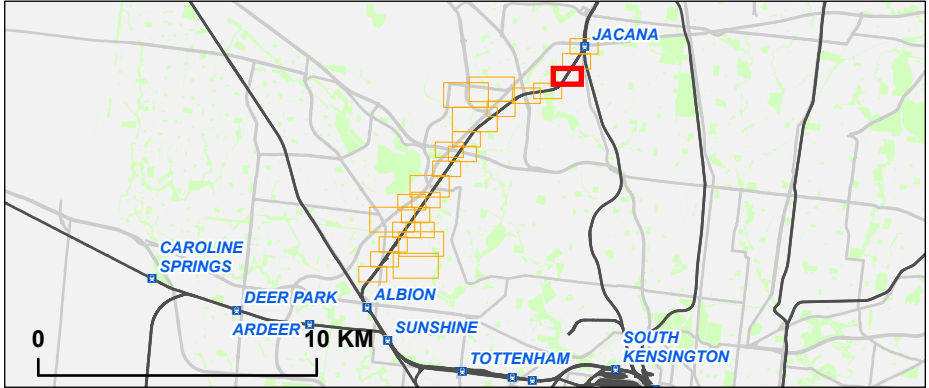
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Map 23 of 25

- Rail
- Watercourse
- ▭ Project Land (Corridor Section)
- ▭ Construction Footprint (Corridor Section)
- ▨ Removed Native Vegetation
- Native Vegetation**
- ▭ 55 Plains Grassy Woodland

Data Sources:
AJMJV 2022
VicTrack 2021
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DELWP Oct. 2021

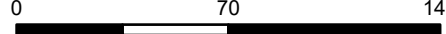





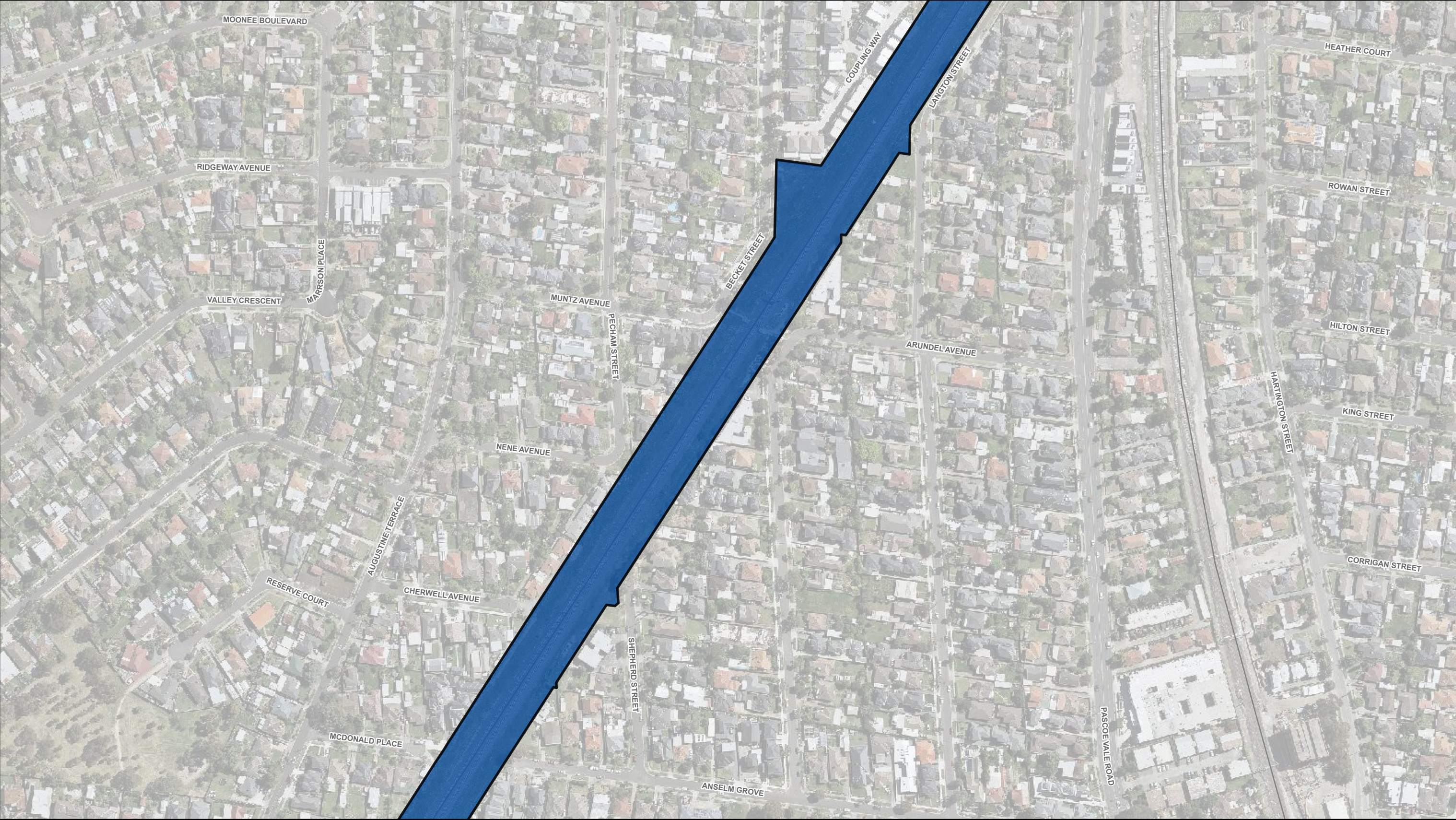
Melbourne Airport Rail
Project Wide

MNES Impacts Mapping - Corridor Section

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J. Rivera	J. Sullivan	21/04/2022	A3



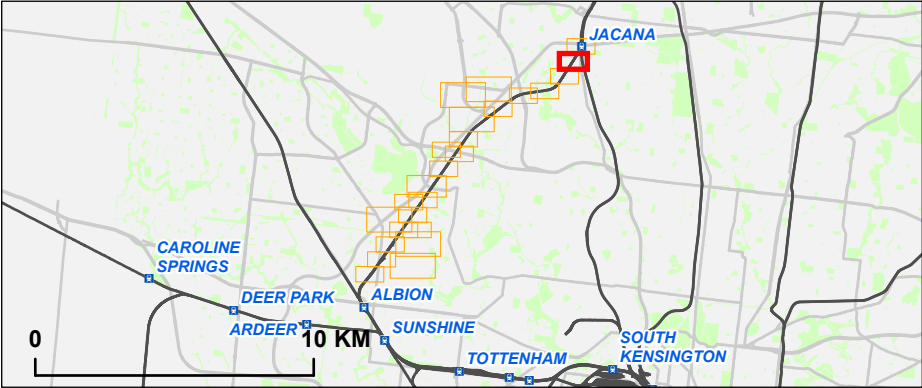
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Map 24 of 25

- Rail
- ▭ Project Land (Corridor Section)
- Construction Footprint (Corridor Section)

Data Sources:
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VicTrack 2021
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Aerial photo:
DELWP Oct. 2021

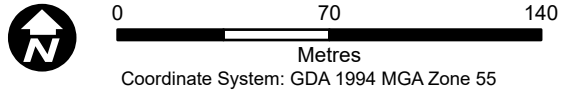






Melbourne Airport Rail
Project Wide
MNES Impacts Mapping - Corridor Section

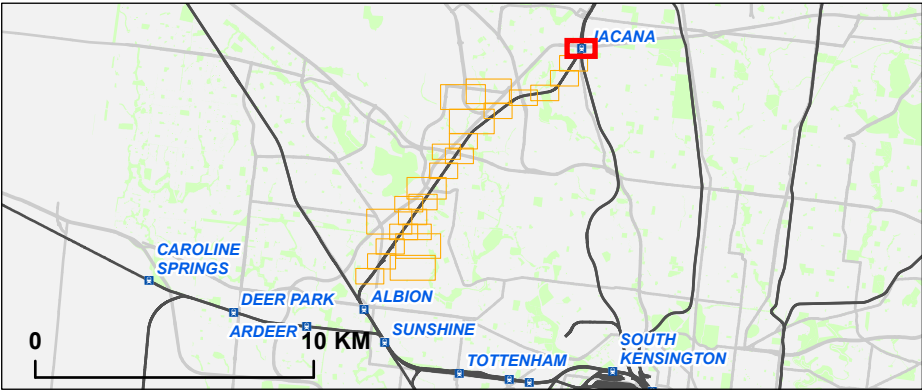
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J. Rivera	J. Sullivan	21/04/2022	A3





Map 25 of 25

Data Sources:
AJMJV 2022
VicTrack 2021
Vicmap 2021
Aerial photo:
DELWP Oct. 2021



- Rail station
- Rail
- Project Land (Corridor Section)
- Construction Footprint (Corridor Section)

Melbourne Airport Rail

Project Wide

MNES Impacts Mapping - Corridor Section

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222 Exhibition Street
Melbourne VIC 3000

PO Box 23061
Docklands VIC 8012
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APPENDIX F

MNES OFFSET STRATEGY



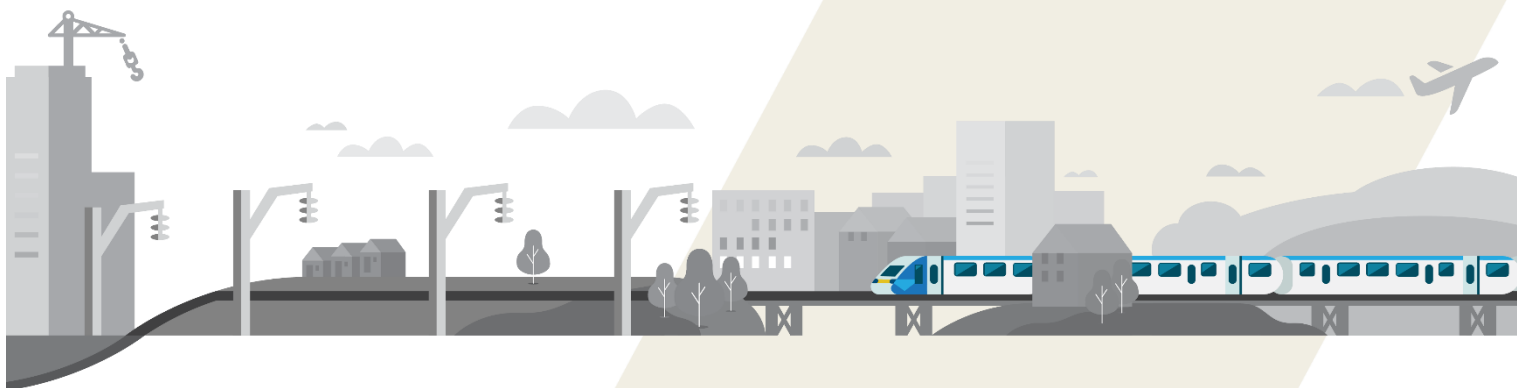
MELBOURNE AIRPORT RAIL

**MAR CORRIDOR SECTION (EPBC 2021/9081)
MNES OFFSET STRATEGY**
MAR-AJM-PWD-PWD-REP-XLP-NAP-0002738

12 September 2022
Revision C.1

Confidential
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Client		Rail Projects Victoria			Client Contact	James Plant
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Name	Rebecca Ffrost	Name	Ruth Macdonald

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This document should be read in full and no excerpts are to be taken as representative of the findings.

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Appendices

Appendix A	Striped Legless Lizard monitoring report at [REDACTED]
Appendix B	EPBC Offset Assessment Guide (EPBC Calculator) for Spiny Rice-flower
Appendix C	EPBC Offset Assessment Guide (EPBC Calculator) for Striped Legless Lizard

1. Executive Summary

The AJM Joint Venture (AJM-JV) on behalf of Rail Projects Victoria (RPV) has prepared Preliminary Documentation for the proposed Melbourne Airport Rail Project – Corridor Section (EPBC 2021/9081). On 24th November 2021, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) ('the Department') deemed that the Corridor Section Project works require approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) ('the Act') and on the 22nd December 2021 it was determined that the proposed action will be assessed by Preliminary Documentation.

The Corridor Section Project works have been determined to be a controlled action by the Department under the Act, as it is likely to have significant impact on listed threatened species and communities (section 18 and 18A of the Act).

Two threatened species, the Spiny Rice Flower (*Pimelea spinescens subsp. spinescens*) and the Striped Legless Lizard (*Delma impar*), have been assessed as being significantly impacted by the proposed action. Spiny Rice-flower is listed as Critically Endangered and Striped Legless Lizard is listed as Vulnerable under the EPBC Act. The proposed action results in a residual impact of eight (8) Spiny Rice-flower plants (from within a 0.150 ha area of habitat) and 1.144 ha of Striped Legless Lizard habitat to be removed from the Corridor Section Project Land.

Offsets have been proposed to account for the removal of the Spiny Rice-flower plants and Striped Legless Lizard habitat.

The offset proposed for Spiny Rice-flower is for the protection and management of 79 Spiny Rice-flower plants in a 0.5523 ha area of Grey Box Grassy Woodland located at [REDACTED], [REDACTED], Victoria (Figure 4.1), approximately 200 km north-west of the impact site. The offset site is located within the south east limit of a larger 31.25 ha offset parcel. At least 400 Spiny Rice-flower occur throughout the broader offset parcel.

The offset proposed for Striped Legless Lizard is for the protection and management of 5 hectares of grassland which supports a known population of Striped Legless Lizard at [REDACTED] approximately 100 km west of the impact site. The proposed offset is part of a broader 160 ha offset parcel which supports a known Striped Legless Lizard population and has first year monitoring data showing evidence of presence of the species.

Both proposed offset sites [REDACTED] are currently on the Victorian Native Vegetation Offset Register and are secured under existing agreements with the Secretary to Department of Environment Land Water and Planning (DELWP) under section 69 of the *Conservation, Forests and Lands Act 1987*. While secured as part of broader offset sites, both sites are currently unallocated. The proposed offset trades would result in the allocation of the offset credits at these sites.

Two separate and standalone offset management plans containing management actions have been prepared for each offset site to manage the values onsite for conservation.

2. Introduction

2.1 Background

The AJM Joint Venture (AJM-JV) on behalf of Rail Projects Victoria (RPV) has prepared Preliminary Documentation for the proposed Melbourne Airport Rail Project – Corridor Section (EPBC 2021/9081). On 24th November 2021, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) ('the Department') deemed that the Corridor Section Project works require approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) ('the Act') and on the 22nd December 2021 it was determined that the proposed action will be assessed by Preliminary Documentation.

The Corridor Section Project works have been determined to be a controlled action by the Department under the Act, as it is likely to have significant impact on listed threatened species and communities (section 18 and 18A of the Act).

2.2 Purpose

The purpose of the Melbourne Airport Rail Project – Corridor Section MNES Offset Strategy is to:

- Provide a description of the proposed Spiny Rice-flower and Striped Legless Lizard Offset Sites including the location, size, condition and environmental values
- Outline the details of surveys undertaken to confirm the presence of the Spiny Rice-flower and Striped Legless Lizard at the Offset Sites in accordance with the survey guidelines for the species
- Provide details of the quality of the offset sites and habitat characteristics for the protected matters
- Identify ongoing threats to the Spiny Rice-flower and Striped Legless Lizard at the Offset Sites
- Compare the environmental values at the Offset Sites to the Impact Sites
- Justify how the Offsets meets the EPBC Act Environmental Offsets policy.

2.3 Offset Policy

The EPBC Act is the Australian Government's principle piece of environmental legislation. It is designed to protect national environmental assets, known as matters of national environmental significance (MNES), and other protected matters. The EPBC Act Environmental Offsets Policy (the Policy) outlines the Australian Government's approach to the use of environmental offsets under the EPBC Act. Offsets are defined as measures that compensate for the residual adverse impacts of an action on the environment. The suitability of a proposed offset is considered as part of the decision as to whether or not to approve a proposed action under the EPBC Act. The Policy includes the Offsets assessment guide, which has been developed in order to give effect to the requirements of the Policy, utilising a balance sheet approach to measure impacts and offsets. The Policy has five key aims:

- 1) Ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of the offsets under the EPBC Act
- 2) Provide proponents, the community and other stakeholders with greater certainty and guidance on how offsets are determined and when they may be considered under the EPBC Act
- 3) Deliver improved environmental outcomes by consistently applying the policy
- 4) Outline the appropriate nature and scale of offsets and how they are determined
- 5) Provide guidance on acceptable delivery mechanisms for offsets.

The proposed Melbourne Airport Rail Project – Corridor Section has been identified to have significant impact on the Critically Endangered Spiny Rice-flower and Vulnerable Striped Legless Lizard. Two separate offset sites have been proposed to compensate for impacts to these values in the following locations:

- [REDACTED] and

- [REDACTED]

The Policy provides the overarching principles that are applied in determining the suitability of offsets.

3. Significant impacts to MNES

3.1 Spiny Rice-flower

The presence of Spiny Rice-flower in the Corridor Section Project Boundary has been confirmed through targeted surveys for the species that were completed for the project. A total of 56 individuals of Spiny Rice-flower have been recorded within the Corridor Section Project Boundary, in the following three locations:

- River Valley Estate (48 individuals)
- Rail corridor adjacent to River Valley Estate (6 individuals); and
- Within the Munro Avenue road reserve in the south of Solomon Heights (2 individuals).

3.1.1 Avoidance and Mitigation Measures

Potential direct and indirect impacts to Spiny Rice-flower from the Corridor Section Project works are considered in Section 3 of the Corridor Section Preliminary Documentation (EPBC 2021/9081) (AJM-JV 2022) and include:

- Removal of Spiny Rice-flower individuals
- Degradation of Spiny Rice-flower populations from weed spread, dust or disturbance.

To minimise impacts to Spiny Rice-flower, a Corridor Section Threatened Species Management Plan (CSTSMP) has been prepared which details mitigation measures to be implemented throughout the life of the project. Mitigation measures to be implemented to minimise impacts to Spiny Rice-flower are detailed in Section 4 of the Preliminary Documentation (AJM-JV 2022) and include:

- Implementation of No Go Zones to protect areas of Spiny Rice-flower
- Implementation of specific dust and weed controls to manage potential impacts during construction

3.1.2 Residual Impacts

A total of eight (8) Spiny Rice-flower plants are to be removed as a result of the proposed action. Residual direct impacts to Spiny Rice-flower will occur in the following locations within the Corridor Section Project Boundary:

- Removal of two plants within the Munro Avenue Road Reserve in the south of Solomon Heights, to allow access for the construction of the Maribyrnong River Bridge. These two Spiny Rice-flowers are associated with a 0.110 ha area of grassland habitat in this area which is to be removed as part of the project.
- Removal of six plants within the rail reserve adjacent to River Valley Estate, to allow for rail upgrades in this location. These six Spiny Rice-flowers are associated with a 0.040 ha area of grassland habitat in this area which is to be removed as part of the project.

The residual impact of removal of eight (8) Spiny Rice-flower plants (and removal of 0.150 ha of Spiny Rice-flower habitat) cannot be avoided, therefore an offset has been proposed.

3.2 Striped Legless Lizard

Striped Legless Lizard habitat occurs in a number of discrete locations within the Corridor Section Project Boundary. This has been confirmed through targeted (tile grid) surveys which have been completed for the project. In total, 2.145 ha of Striped Legless Lizard habitat has been recorded within the Corridor Section Project Boundary, in the following locations:

- Adjacent to Solomon Heights (including along Munro Avenue in the south and the adjacent rail corridor) (0.712 ha); and
- Within the M80 North Zone (1.433 ha).

3.2.1 Avoidance and Mitigation Measures

Potential direct and indirect impacts to Striped Legless Lizard from the Corridor Section Project works are considered in Section 3 of the Preliminary Documentation (AJM-JV 2022) and include:

- Removal of Striped Legless Lizard habitat
- Fragmentation of Striped Legless Lizard habitat
- Localised reduction in Striped Legless Lizard habitat suitability from noise and vibration
- Injury or death of Striped Legless Lizard individuals during construction.

To minimise impacts to Striped Legless Lizard, a Corridor Section Threatened Species Management Plan (CSTSMP) has been prepared which details mitigation measures to be implemented throughout the life of the project. Mitigation measures to be implemented to minimise impacts to Striped Legless Lizard are detailed in Section 4 of the Preliminary Documentation (AJM-JV 2022) and include:

- Implementation of No Go Zones to protect areas of Striped Legless Lizard habitat
- Strategic revegetation to re-connect areas of Striped Legless Lizard habitat that are temporarily fragmented during construction
- Limiting works in the main Striped Legless Lizard habitat area (M80 North Zone) to one active season to reduce potential impacts from noise and vibration
- Fauna salvage and translocation protocols for Striped Legless Lizard to reduce the possibility of injury or death of individuals

3.2.2 Residual Impacts

A total of 1.144 hectares of Striped Legless Lizard habitat is to be removed as a result of the proposed action. Residual direct impacts to Striped Legless Lizard will occur in the following locations within the Corridor Section Project Boundary:

- Removal of 0.375 ha of Striped Legless Lizard habitat at Munro Avenue in the South of Solomon Heights, to allow access for the construction of the Maribyrnong River Bridge; and
- Removal of 0.768 ha of Striped Legless Lizard habitat within the M80 North Zone, to allow for the construction of the M80 North Zone viaduct.

The residual impact of removal of 1.144 ha of Striped Legless Lizard cannot be avoided, therefore an offset has been proposed.

4. Offset Sites

This section describes the vegetation and habitat present within the proposed offset sites. Details provided are based on observations made during site visits undertaken by AJM-JV ecologists on 6th April 2022 ([REDACTED] site) and 22nd April 2022 ([REDACTED] site). Further details of the offset sites are provided in offset management plans which have been prepared for each site as follows:

- MAR Corridor Section (EPBC 2021/9081) **MNES Offset Management Plan, Spiny Rice-flower** – Doc No. MAR-AJM-PWD-PWD-REP-XLP-NAP-0002739; and
- MAR Corridor Section (EPBC 2021/9081) **MNES Offset Management Plan, Striped Legless Lizard** – Doc No. MAR-AJM-PWD-PWD-REP-XLP-NAP-0002826.

4.1 Spiny Rice-flower

4.1.1 Description of the offset site

4.1.1.1 Site Location

The offset site proposed for Spiny Rice-flower for EPBC 2021/9081 is a 0.5523 ha area of Grey Box Grassy Woodland located at [REDACTED], [REDACTED], Victoria (Figure 4.1). The offset site is located within the south east limit of a larger 31.25 ha offset parcel which is protected under an existing landowner agreement [REDACTED] (See Figure 4.1). The offset site proposed to offset impacts to Spiny Rice-flower is identified as [REDACTED] in the landowner agreement [REDACTED].

The broader offset parcel is located within the Northern Grampians Shire Local Government Area and the Goldfields Bioregion. It is located within a Rural Living Zone – Schedule 2 (RLZ2) and is affected by a Bushfire Management Overlay (BMO) [REDACTED].

The broader offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreement with the Secretary to DELWP under section 69 of the *Conservation, Forests and Lands Act 1987*. The broader offset parcel is known to support a large population of Spiny Rice-flower (approximately 400 Spiny Rice-flower plants, based on a count undertaken by the land manager in early March 2022).

The offset site [REDACTED] which is 0.5523 ha in area comprises 79 Spiny Rice-flower plants (based on a count undertaken by AJM-JV ecologists on the 6th April 2022). The offset site [REDACTED] for the MAR project therefore supports approximately 20% of the Spiny Rice-flower population within the broader offset parcel. The offset site [REDACTED] has not been allocated for the provision of any other offsets, either under the EPBC Offset Policy or for provision of native vegetation offsets in Victoria. Offset credits in HZ1I would be exhausted with the proposed trade for this offset.

The [REDACTED] adjoins the offset site to the east, separated only by the ARTC railway line (See Figure 4.1).

The offset site is located approximately 200 km north-west of the Spiny Rice-flower impact site in the Melbourne Airport Rail Corridor Section.

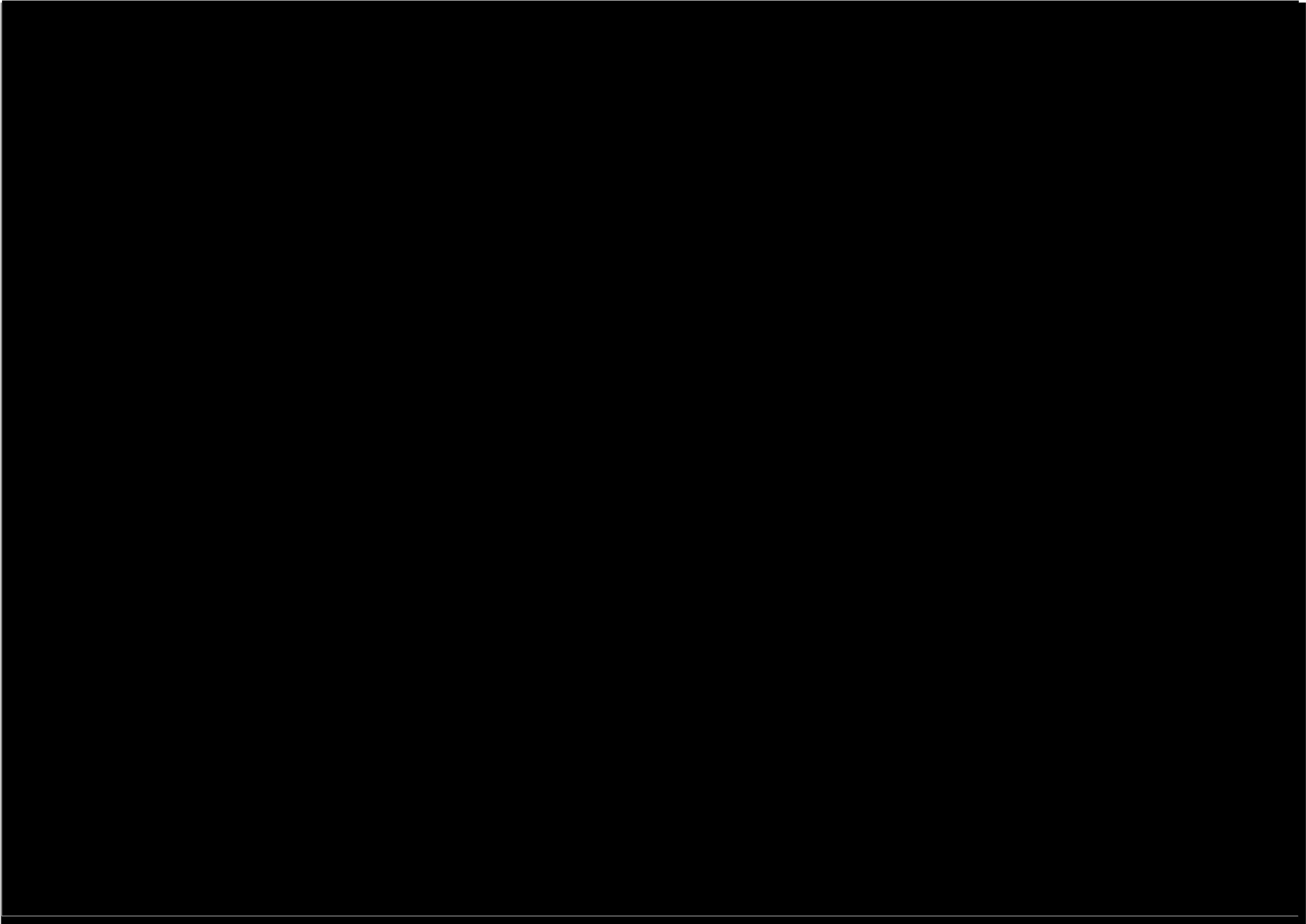


Figure 4.1 Map of Spiny Rice-flower offset site at [REDACTED], [REDACTED]

4.1.1.2 Site Context

The offset site forms part of a broader area of land that is protected and managed for the purpose of conservation, including for the protection of Spiny Rice-flower. This includes the broader offset parcel which is protected under a Section 69 Covenant, as well as land to the east within [REDACTED]. The protection and management of Spiny Rice-flower plants at the offset site is important to the management of the overall Spiny Rice-flower population that occurs in the area.

The broader offset parcel, which is currently privately held land, is located between [REDACTED] and the adjacent V/line train network railway. The [REDACTED] adjoins the offset site to the east, separated by the ARTC railway line. The ARTC railway corridor contains Spiny Rice-flower plants that form a large and important contiguous population with individuals in the offset site. To minimise impacts to this area, ARTC has installed security gates, signage and large concrete barriers to prevent vehicular access to this section of the rail corridor. This action has resulted in improved protection of Spiny Rice-flower within the rail corridor, reduced the possibility of disturbance and encouraged the growth of native understorey shrubs and trees in this area.

The Strategic Biodiversity Value (SBV) score of the proposed offset site is 0.848, as determined by the Victorian Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management (NVIM) offset tool (DELWP 2022).

4.1.1.3 Vegetation

The offset site comprises a mosaic of Shallow Sands Woodland (EVC 882) and Plains Sedgy Woodland (EVC 283) and is dominated by a canopy of Yellow Gum (*Eucalyptus leucoxylon*), Yellow Box (*Eucalyptus melliodora*) and Grey Box (*Eucalyptus microcarpa*). The canopy is contiguous throughout and is contiguous with adjoining habitats. The understorey is sparse throughout, with the ground layer comprising a very high cover of eucalypt leaf litter at the time of the recent site visit (April 2022). Large areas of space exist throughout the offset site suitable to allow for the recruitment and growth of Spiny Rice-flower.



Figure 4.2 Woodland at [REDACTED] Offset Site



Figure 4.3 Spiny Rice-flower recorded at [REDACTED] Offset Site

4.1.1.4 Significant environmental values

As noted above, the broader offset parcel is known to support an existing large population of Spiny Rice-flower, of at least 400 individuals. Several of the individuals observed during the recent site visit were considered to be mature specimens. The offset site [REDACTED] comprises 79 Spiny Rice-flower plants (based on a count undertaken by AJM on the 6th April 2022).

In addition to supporting Spiny Rice-flower, the broader offset parcel is also understood to support the following MNES:

- Habitat for Swift Parrot (*Lathamus discolor*), which is listed as Critically Endangered under the EPBC Act.
 - > Particularly, a 4.5 ha portion in the western half of the broader offset parcel (HZs 1F and 1G) has been previously allocated under the EPBC Offset Policy to account for impacts to Swift Parrot from another project.
- Large-headed Fireweed (*Senecio macrocarpus*), listed as Vulnerable under the EPBC Act.
- Ornate Pink-fingers (*Caladenia ornata*), listed as Vulnerable under the EPBC Act
- Clover Glycine (*Glycine latrobeana*), listed as Vulnerable under the EPBC Act
- Grey Box Grassy Woodland and Derived Native Grasslands of South-eastern Australia (ecological community), listed as Endangered under the EPBC Act

4.1.2 Details of surveys undertaken to provide evidence of Spiny Rice-flower

The existing land manager noted that a total of 433 Spiny Rice-flower plants were recorded across the broader offset parcel in 2016.

On 6th April 2022, two ecologists from AJM-JV undertook a site inspection of the Spiny Rice-flower offset site [REDACTED]. The length of the offset site was traversed in transects spaced less than 5 m apart, and all Spiny Rice-flower individuals were recorded and located using a device with built in GPS. A total of 79 Spiny Rice-flower individuals were recorded within the offset site [REDACTED] during the site inspection. While the inspection was undertaken within the published flowering time of the species (April to August), given the visit occurred in the beginning of the season, individuals on site were not flowering at the time of the site visit. As such, there is a chance that not all individuals were recorded. However, it is noted that given the survey effort, it is likely that >90% of individuals were recorded.

4.1.3 Quality of the offset site and habitat characteristics for Spiny Rice-flower

The offset site is considered to be of high quality as determined by a number of factors including:

- A high Strategic Biodiversity Value (SBV) as modelled by DELWP:
 - > The offset site has a modelled SBV of 0.848/1
- Presence of a large population of Spiny Rice-flower within the offset site that continues into the broader offset parcel
- Lack of high threats to Spiny Rice-flower

Weed cover at the offset site was observed to be very low (<5% cover) and consisted of scattered individuals of Spear Thistle.

4.1.4 Ongoing threats to Spiny Rice-flower

A summary of ongoing threats to Spiny Rice-flower at the offset site are listed below. A detailed account of these threats, as well as measures to manage them are provided in the Spiny Rice-flower Offset Management Plan (provided as Appendix F to the Preliminary Documentation).

Ongoing threats include:

- Degradation of habitat by the presence of high threat weed species. Weed cover varies throughout the year based on seasonal conditions, though was observed to be very low (<5% cover) during a site visit undertaken by AJM in April 2022. Weed cover is to be controlled by selective herbicide application and/or manual removal.
- Grazing/browsing by pest animals such as European Rabbits. Evidence of Rabbits was observed onsite, though numbers were not considered to be high. Monitoring of Rabbit numbers will be undertaken at the offset site with controls such as fencing to be implemented as required.

- Degradation of habitat by the increased/altered level of biomass present in the ground layer. Currently the site was observed to comprise a high cover of leaf litter, which competes with the availability for recruitment space for Spiny Rice-flower. Biomass will be monitored and controlled through ecological burning as required.
- Given the connectivity of habitat for Spiny Rice-flower and connectivity of land protected for conservation, potential edge effects to the Spiny Rice-flower in the offset site are considered to be low.

4.1.5 Comparison of environmental values at offset site and impact site

A comparison of the habitat values at the Impact Site and the Offset Site for Spiny Rice-flower is provided in Table 4.1. Based on the details provided in Table 4.1, the proposed offset site is considered to be appropriate to compensate for the impacts to Spiny Rice-flower from the project. Particularly, the extent and quality of habitat for Spiny Rice-flower at the offset site is much higher than that of the impact site.

Table 4.1 Comparison of Environmental Values between the Offset Site and the Impact Site for Spiny Rice-flower

Environmental Value	Spiny Rice-flower	
	Impact Site	Offset Site [REDACTED]
Site Size	<p>Eight (8) Spiny Rice-flower plants are to be removed for the Corridor Section Project Works out of 56 Spiny Rice-flower plants recorded in the Corridor Section Project Boundary.</p> <p>The area of impact to Spiny Rice-flower habitat has been determined as 0.150 ha, based on the area of grassland habitat being impacted where Spiny Rice-flower occurs.</p>	<p>The Offset site [REDACTED] supports 79 Spiny Rice-flower plants (based on a count undertaken by AJM-JV ecologists in 2022). The broader offset parcel (BB) is known to support at least 400 Spiny Rice-flower plants based on a count by the land manager in 2022.</p> <p>The 79 Spiny Rice-flower plants within the offset site greatly exceeds the number of plants to be removed at the impact site and has the potential to support a future value of approximately 100 Spiny Rice-flower plants. As the proposed offset site is currently managed under an existing security agreement and currently provides conservation benefit to Spiny Rice-flower, expected gains within the offset site have been inferred with a high level of confidence (80%).</p> <p>The area of the offset site supports 0.5523 ha of Spiny Rice-flower habitat.</p>
Landscape Context	<p>The eight (8) Spiny Rice-flower individuals to be removed for the proposed action are situated on the outer edge of a larger population, in otherwise degraded linear patches of grassland within road and rail reserves. Removal of these individuals will not result in fragmentation of the population.</p>	<p>The offset site [REDACTED] supports 79 Spiny Rice-flower plants within the south east edge of a broader population. The protection and management of this portion of the broader property will protect the viability of the species at the property by enhancing the size of the protected population, and allowing for further opportunity for recruitment.</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>
Habitat Suitability	<p>Habitat within the Corridor Section Project Boundary has been surveyed thoroughly for Spiny Rice-flower, with a total of 56 individuals being recorded. Of these, eight individuals are considered to be unavoidable to allow for the proposed action. Habitat present in the areas where the eight plants to be removed occur is limited to degraded remnants of native Plains Grassland.</p>	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>
Presence of Spiny Rice-flower	<p>Spiny Rice-flower has been recorded in the Corridor Section Project Boundary through targeted surveying in all potential habitat.</p>	<p>Spiny Rice-flower has been recorded in the offset site through recent (April 2022) targeted surveying.</p>
Threats present	<p>Within and adjacent to the Corridor Section Project Boundary, ongoing threats to Spiny Rice-flower include degradation of habitat by weed spread, browsing by pests, habitat clearance and</p>	<p>Limited threats were noted at the offset site. Ongoing threats included degradation of habitat by weed spread, browsing by pests (namely European Rabbits), and increased biomass. Management</p>

Environmental Value	Spiny Rice-flower	
	Impact Site	Offset Site
	damage/destruction of individuals from illegal dumping and other human disturbance.	actions have been identified to manage these ongoing threats.

4.2 Striped Legless Lizard

4.2.1 Description of the offset site

4.2.1.1 Site Location

The offset site proposed for Striped Legless Lizard for EPBC 2021/9081 is a 5 ha area of native grassland which supports a known population of Striped Legless Lizard at [REDACTED] (Figure 4.4). The site is located approximately 100km west of Melbourne within the Golden Plains Shire and is situated within the Victorian Volcanic Plain Bioregion.

The offset site is part of a broader 160 ha offset parcel which is protected under an existing landowner agreement [REDACTED]. The offset site proposed to offset impacts to Striped Legless Lizard is identified as a 5 ha portion of Zone 02A as identified in the landowner agreement [REDACTED].

The broad 160 ha offset parcel supports a known population of Striped Legless Lizard, evidenced by a recent monitoring report that recorded the species across the property.

The site is located within a Farming Zone (FZ) and is affected by an Environmental Significance Overlay - Schedule 2 (ESO2). Ferrers Creek and land immediately adjacent is subject to a Land Subject to Inundation Overlay (LSIO) and is also recognised as an Area of Aboriginal Cultural Heritage Sensitivity.

The broader offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreements with the Secretary to DELWP under section 69 of the *Conservation, Forests and Lands Act 1987*. The 5 ha offset site identified has not been allocated for the provision of any other offsets, either under the EPBC Offset Policy or for provision of native vegetation offsets in Victoria. Offset credits in this area would be exhausted with the proposed trade for this offset.

The offset site is located approximately 100 km west of the Striped Legless Lizard impact site in the Melbourne Airport Rail Corridor Section.

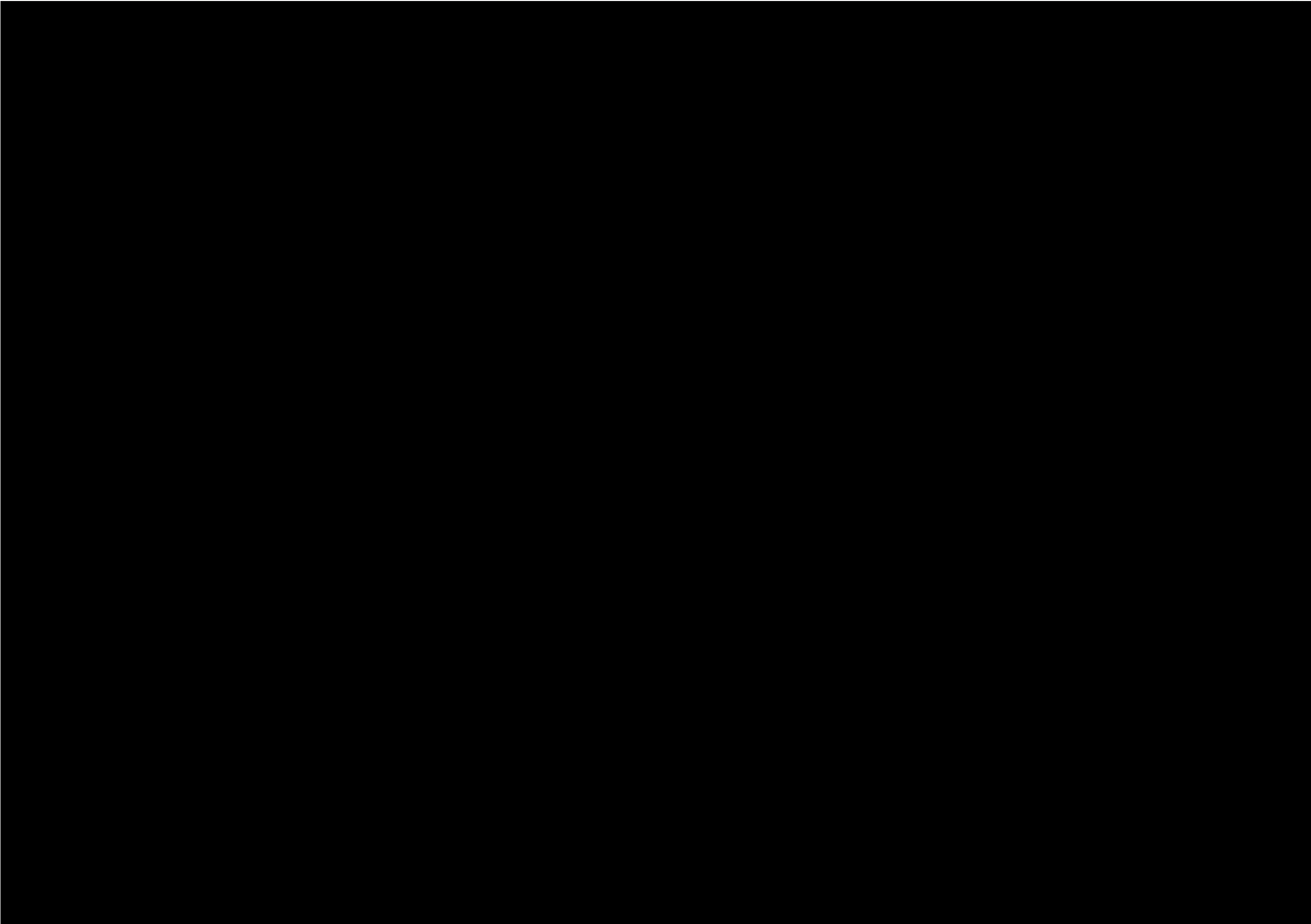


Figure 4.4 Map of Striped Legless Lizard offset site at [redacted] Victoria

4.2.1.2 Site Context

The offset site is located in an area of contiguous native vegetation, much of which forms known and potential suitable habitat for Striped Legless Lizard. The 160 ha broader offset parcel, which is privately owned, is located [REDACTED]. A further 190 ha of Striped Legless Lizard habitat occurs adjacent in separate ownership, making a total of 350 ha of native grassland habitat that supports Striped Legless Lizard in the area.

The Strategic Biodiversity Value (SBV) score of the proposed offset site is 0.728, as modelled by DELWPs NVIM offset tool (DELWP 2022). A high SBV is indicative of high biodiversity value, with the high scores for the proposed offset site rating the area very highly for general biodiversity.

4.2.1.3 Vegetation

The offset site comprises an extensive area of Plains Grassland (EVC 132) which is distinguished by a moderate to high cover of spear grass (*Austrostipa spp*), wallaby grass (*Rytidosperma spp*) and Kangaroo Grass (*Themeda triandra*), with scattered Common Tussock Grass (*Poa labillardierei*) and Rush (*Juncus spp.*) also present. Native grassland cover throughout the offset site (and broader parcel) meets the classification of the EPBC Act listed ecological community, Natural Temperate Grassland of the Victorian Volcanic Plain. Weed cover in the offset site was observed as being very low.



Figure 4.5 Native grassland, which provides habitat for Striped Legless Lizard at the [REDACTED] offset site



Figure 4.6 Exposed basalt rock and cracks in soil which provide habitat for Striped Legless Lizard at the [REDACTED] offset site

Extensive basalt rock, both surface rock and large embedded rock, was observed throughout the offset site during a recent site visit undertaken by AJM-JV ecologists in April 2022. The presence of rock, particularly embedded rock provides evidence for the lack of historic ground disturbance at the offset site.

The 5 ha offset site is representative of the broader offset parcel and supports habitat for Striped Legless Lizard evidenced by the presence of the following attributes:

- Extensive areas of embedded and surface rock
- Large and numerous cracks in the clay soils
- Tussock forming grasses, dominated by spear grass

- Intertussock space to allow for movement of fauna

4.2.1.4 Significant environmental values

As documented above, the broader offset parcel is known to support an existing population of Striped Legless Lizard. This is evidenced by monitoring surveys which have been undertaken as recently as 2020 (See 4.2.2 for details). Presence of Striped Legless Lizard habitat was confirmed during a site visit of the offset site and broader offset parcel undertaken by AJM-JV ecologists on the 22nd April 2022.

In addition to supporting Striped Legless Lizard, the broader offset parcel is also understood to support the following MNES:

- Natural Temperate Grassland of the Victorian Volcanic Plain, threatened ecological community, listed as Critically Endangered under the EPBC Act; and
- Golden Sun Moth (*Synemon plana*), listed as Vulnerable under the EPBC Act.

4.2.2 Details of surveys undertaken to provide evidence of Striped Legless Lizard

Striped Legless Lizard have been recorded within the broader [REDACTED] offset parcel through targeted (tile grid) surveying, which has most recently been undertaken at the site in spring/summer 2020 (Nature Advisory 2021).

Striped Legless Lizard were recorded during the 2020 survey in numerous tile grid locations throughout the broader 160 ha offset parcel, including within a tile grid which was situated within the 5 ha Striped Legless Lizard offset site. Methods used during the tile grid survey were consistent with the Commonwealth survey guidelines for the species (DSEWPC 2011). A copy of the monitoring report is provided in Appendix A.



Figure 4.7 Striped Legless Lizard recorded at [REDACTED] Offset property in 2020 monitoring (Nature Advisory 2021)

4.2.3 Quality of the offset site and habitat characteristics

The [REDACTED] offset site is considered to be of high quality as determined by a number of factors including:

- A high Strategic Biodiversity Value (SBV) as modelled by DELWP:
 - > The offset site has a high modelled SBV of 0.728
- Presence of a large population of Striped Legless Lizard within the offset site evidenced by recent reliable targeted survey/monitoring

- Lack of high threats to Striped Legless Lizard habitat

Weed cover at the offset site was observed to be very low (<5% cover), though scattered occurrences of Spear Thistle and Serrated Tussock were observed. Bathurst Burr was also observed nearby, along the edge of Ferrers Creek (outside the offset site).

4.2.4 Ongoing threats to Striped Legless Lizard

A summary of ongoing threats to Striped Legless Lizard habitat at the offset site are listed below. A detailed account of these threats, as well as measures to manage them are provided in the Striped Legless Lizard Offset Management Plan (provided as Appendix G to the Preliminary Documentation).

Ongoing threats include:

- Degradation of habitat by the presence of high threat weed species, namely Spear Thistle and Serrated Tussock. Currently these weeds are present as scattered individuals and are to be controlled by selective herbicide application and/or manual removal.
- Degradation of habitat by a potential increase of biomass in the ground layer. Biomass is currently managed through seasonal grazing by sheep which will be continued across the broader offset parcel.

4.2.5 Comparison of environmental values at offset site and impact site

A comparison of the habitat values at the Impact Site and the Offset Site for Striped Legless Lizard is provided in Table 4.2. Based on the details provided in Table 4.2, the proposed offset site is considered to be appropriate to compensate for the impacts to Striped Legless Lizard from the project. Particularly, the extent of habitat for Striped Legless Lizard at the offset site is much higher than that of the impact site. The quality of habitat is also considered to be higher at the offset site, namely as the site comprises native vegetation and classifies as a threatened ecological community.

Table 4.2 Comparison of Environmental Values between the Offset Site and the Impact Site for Striped Legless Lizard

Environmental Value	Striped Legless Lizard	
	Impact Site	Offset Site [REDACTED]
Site Size	1,144 ha of habitat for Striped Legless Lizard is to be removed for the Corridor Section Project Works out of 2,145 ha of Striped Legless Lizard habitat recorded in the Corridor Section Project Boundary. Additional Striped Legless Lizard habitat occurs outside but adjacent to the Corridor Section Project Boundary.	The offset site at [REDACTED] supports 5 hectares of Striped Legless Lizard habitat. The broader offset parcel is 160 ha in total and is known to support an existing population of Striped Legless Lizard.
Landscape Context	Striped Legless Lizard habitat to be removed for the proposed action is from two main locations, on the outer limit of Solomon Heights and within the M80 North Zone. Habitat on the edge of Solomon Heights is situated on the outer edge of a larger known area of habitat, in otherwise degraded linear patches of habitat within road and rail reserve. The area of habitat within the M80 North Zone while being a larger area of habitat, is also heavily disturbed, and largely comprised of noxious, high threat weeds, namely Serrated Tussock. All Striped Legless Lizard habitat to be removed for the proposed action is located in an area surrounded by urban and industrial use.	The offset site at [REDACTED] supports 5 ha of habitat for the Striped Legless Lizard, which forms part of a broader 160 ha of habitat in the same ownership. A further 190 ha of Striped Legless Lizard habitat occurs adjacent in separate ownership, making a total of 350 ha of native grassland habitat that supports Striped Legless Lizard in the area. The protection and management of the 5 ha portion of the broader offset parcel will protect the viability of the species at the property by enhancing the size of the protected population.
Habitat Suitability	Habitat for Striped Legless Lizard within the Corridor Section Project Boundary has been identified through targeted surveying, with a total of 2,145 ha of habitat being recorded. Of this, 1,144 ha is considered to be unavoidable to allow for the proposed action, particularly rail upgrades and access for construction of the Maribymong River	Habitat in the offset site (and broader offset parcel) comprises Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP), which is known to support an existing population of Striped Legless Lizard, as well as a population of Golden Sun Moth. Habitat in the offset site is dominated by native grasses including spear grass, wallaby grass and Kangaroo Grass.

Environmental Value	Striped Legless Lizard	
	Impact Site	Offset Site [REDACTED]
	Bridge adjacent to Solomon Heights, and the construction of the viaduct in the M80 North Zone. Striped Legless Lizard habitat to be removed consists of degraded remnants of Plains Grassland (adjacent to Solomon Heights) and heavily altered, weed dominated grassland (within the M80 North Zone).	
Presence of Striped Legless Lizard	Striped Legless Lizard have been recorded in the Corridor Section Project Boundary through targeted (tile grid) surveying in areas potential habitat. Striped Legless Lizard were recorded in the Corridor Section Project Boundary during the 2020-2021 spring/summer survey season.	Striped Legless Lizard have been recorded within the broader [REDACTED] offset parcel through targeted (tile grid) surveying, which has most recently been undertaken at the site in spring/summer 2020 (Nature Advisory 2021). Striped Legless Lizard were recorded in numerous grid locations throughout the broader 160 ha offset parcel, including within a tile grid situated within the area of the 5 ha Striped Legless Lizard offset site.
Threats Present	Within and adjacent to the Corridor Section Project Boundary, ongoing threats to Striped Legless Lizard include degradation of habitat by weed spread, predation by pests and pets, habitat clearance and damage/destruction of individuals from illegal dumping and other human disturbance.	Limited threats were noted at the offset site. Ongoing threats included degradation of habitat by weed spread, and increased biomass. Management actions have been identified to manage these ongoing threats.

5. Assessment against the *EPBC Act Environmental Offsets Policy*

5.1 Spiny Rice-flower

5.1.1 Offset Strategy

The broader offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreements with the Secretary to DELWP under section 69 of the *Conservation, Forests and Lands Act 1987*. A Memorandum of Understanding has been entered into by RPV and the Offset site landowner, and a bond secured for the cost of the offset site. The offset trade agreement includes the obligation for the landowner to provide permanent protection and management of the Offset Site.

In correspondence dated 6th June 2022, DAWE advised RPV that in regards to using the EPBC Act Offset Assessment Guide, impacts to Spiny Rice-flower should be considered based on *area of habitat* rather than the *number of individuals* removed. As such, the area of impact to Spiny Rice-flower habitat has been determined as 0.150 ha, based on the area of grassland habitat being impacted where Spiny Rice-flower occurs. This includes the following areas:

- 0.110 ha of grassland habitat being removed south of Munro Avenue (where two Spiny Rice-flowers are to be removed), and
- 0.040 ha of grassland habitat being removed west of River Valley Estate (where six Spiny Rice-flowers are to be removed).

Based on the EPBC Act Offset Assessment Guide (herein referred to as the EPBC offset calculator), the retention and management of the proposed 0.5523 ha of Spiny Rice-flower habitat at the offset site achieves an offset of 106% of the impact.

Consideration of the proposed offset for Spiny Rice-flower against the EPBC Act Environmental Offsets Policy and Principles is provided in Table 5.1 below.

Table 5.1 Consideration of the proposed offset location for Spiny Rice-flower against the EPBC Act Environmental Offsets Policy and Offset Principles

Offset Principles	Response
A suitable offset must:	
1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	The proposed Spiny Rice-flower offset at [REDACTED] will protect and improve a population of Spiny Rice-flower, adding to the maintained viability of this species. The protection and management of Spiny Rice-flower plants in the offset site is important to the management of the overall Spiny Rice-flower population that occurs across the broader offset parcel.
2. Be built around direct offsets but may include other compensatory measures	The proposed offset is a direct offset. Based on the EPBC Act Offset Assessment Guide (Offset Calculator) the proposed offset site mitigates 106% of the impact, which well exceeds the 90% direct offset requirement.
3. Be in proportion to the level of statutory protection that applied to the protected matter	The EPBC Act Offset Assessment Guide (Offset Calculator) has been used to determine the offset requirements to compensate for the proposed impacts to Spiny Rice-flower which considers the conservation status of the species. The offset site will exceed the requirement for direct offset
4. Be of a size and scale proportionate to the residual impacts on the protected matter	The residual impact from the Corridor Section Project works is the removal of eight (8) Spiny Rice-flower plants from a 0.150 ha area of habitat. The security and protection of 79 Spiny Rice-flower plants within a 0.5523 ha area of habitat at [REDACTED] is appropriate to account for the impact.
5. Effectively account for and manage the risks of the offset not succeeding	Given the population of Spiny Rice-flower and presence of Spiny Rice-flower habitat has been confirmed within the [REDACTED] offset

Offset Principles	Response
	<p>site in a recent site visit, and the threats to the species are low, it is considered likely that the offset will succeed.</p> <p>Management actions and monitoring will be undertaken at the offset site to maintain the viability of the population of Spiny Rice-flower and allow for the recruitment of the species.</p>
6. Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see Section 7.6)	While the offset site is part of a broader existing offset on the Victorian Native Vegetation Offset Register, the particular area subject to this offset occurs along the south east edge of the broader offset site and is currently unallocated.
7. Be efficient, effective, timely transparent, scientifically robust and reasonable	The offset site proposed at [REDACTED] is ready to be implemented as per the details in the Spiny Rice-flower Offset Management Plan. The offset site will require ongoing management and monitoring as detailed in the Offset Management Plan.
8. Have transparent governance arrangements including being able to be readily measures, monitored, audited and enforced	An Offset Management Plan for the [REDACTED] site has been prepared that will fulfil the management actions required to maintain and improve the Spiny Rice-flower population over time. The Offset Management Plan specifies that the management actions being proposed are reported to the Department.

5.1.2 Offset Analysis

The EPBC offset calculator was used to determine whether the offset site at [REDACTED] would provide sufficient gains to compensate for the residual impact to Spiny Rice-flower plants as a result of the project. A copy of the completed EPBC offset calculator for Spiny Rice-flower is provided in Appendix B utilising the *area of impact* attribute as advised by DAWE. A justification of the inputs into the calculator is provided below (Table 5.2). Based on the EPBC offset calculator, the retention and management of 0.5523 ha of Spiny Rice-flower habitat within the proposed [REDACTED] offset site achieves an offset of 106% of the impact.

Table 5.2 Offset assessment guide calculations for Spiny Rice-flower

Parameter	Value	Notes
Impact to Spiny Rice-flower		
Area of Impact	0.150 ha	<p>The area of impact to Spiny Rice-flower habitat has been determined as 0.150 ha, based on the area of grassland habitat being impacted where Spiny Rice-flower occurs. This includes</p> <ul style="list-style-type: none"> 0.110 ha of grassland habitat being removed south of Munro Avenue (where two Spiny Rice-flowers are to be removed), and 0.040 ha of grassland habitat being removed west of River Valley Estate (where six Spiny Rice-flowers are to be removed).
Quality	4 (out of 10)	<p>Quality of Spiny Rice-flower habitat at the impact site has taken the following attributes into consideration:</p> <ul style="list-style-type: none"> <u>Site condition</u>: The areas of grassland habitat that support Spiny Rice-flower to be removed were assigned quality scores (based on assessment as per the Victorian habitat hectare assessment method) of 35 out of 100. A site condition score of 3.5 out of 10 was therefore used as baseline to determine quality of Spiny Rice-flower habitat. <u>Site context</u>: Impact sites of Spiny Rice-flower habitat in the Corridor Section Project Boundary occur along existing road and rail corridors, where ongoing threats to habitat are high. Given the location, connectivity of habitats for the species at the impact sites is generally low. Site context score: 5. <u>Species stocking rate</u>: Few individuals of Spiny Rice-flower were recorded during targeted surveys at the impact sites. Species stocking rate score: 3. <p>An overall quality score of 4 out of 10 was therefore attributed to the impact site.</p>
Total quantum of impact	0.06	Adjusted hectares (area of impact/quality score)

Parameter	Value	Notes
Offset Calculations – [REDACTED] Offset Site		
Offset Area	0.5523 ha	The proposed offset is a 0.5523 ha of Spiny Rice-flower habitat. A 0.5523 ha portion of the existing offset parcel has been agreed with the landowner as a basis of the offset site for the project. The offset site is part of a much larger offset property owned by the Landowner. The 0.5523 ha area supports an existing population of Spiny Rice-flower (79 individuals) with further opportunity for recruitment.
Time until ecological benefit	5	The time until ecological benefit has been noted as five years. Improvements are likely to occur within this timeframe, especially given that the site is already secured, and considered as an advanced offset.
Time over which loss is averted	20	This reflects the time over which loss is averted. 20 years represents the maximum allowed in the calculator.
Start quality	7 (out of 10)	Quality of Spiny Rice-flower habitat at the offset site has taken the following attributes into consideration: <ul style="list-style-type: none"> • <u>Site condition</u>: The offset site supports an area of suitable habitat for Spiny Rice-flower, evidenced by the existing population (79 individuals recorded in recent site visit). The offset site supports grassy woodland vegetation with ample bare ground, and space for recruitment of further individuals. Native vegetation (habitat hectare) assessment was not undertaken at the offset site as part of the assessment. Site condition score: 7. • <u>Site context</u>: The proposed offset site is located in an area of contiguous native vegetation. Site context score: 7. • <u>Species stocking rate</u>: The offset site supports a large population of Spiny Rice-flower (79 individuals) with over 400 individuals known to occur at the broader offset property. The stocking rate is considered to be high. Species stocking rate score: 7 An overall quality score of 7 out of 10 was therefore attributed to the offset site.
Future quality without offset	6	Without the offset, it is predicted the quality of the habitat has the potential to decline due to the following: <ul style="list-style-type: none"> • Increased abundance and extent of high threat weeds • Increased browsing by pests (ie rabbits) • Uncontrolled biomass which could reduce opportunities for recruitment
Future quality with offset	8	Given the offset site is currently managed under an existing security agreement, it is predicted the quality of the habitat would gradually improve in the following areas: <ul style="list-style-type: none"> • Removal of woody weeds and cover to <1% • Management and monitoring of pest animals and biomass
Risk of loss (%) without offset	0%	Based on guidance by DCCEEW, the risk of loss in the offset calculator for Spiny Rice-flower at the [REDACTED] offset site has been updated to 0% with and without the offset.
Risk of loss (%) with offset	0%	Based on guidance by DCCEEW, the risk of loss in the offset calculator for Spiny Rice-flower at the [REDACTED] offset site has been updated to 0% with and without the offset.
Confidence in results (Risk of loss)	90%	The confidence in result in regard to risk of loss has been determined as 90%. There is high confidence that the risk of loss values are accurate as values follow recent advice provided from DCCEEW.
Confidence in results (Quality scores)	80%	Following further conversations with the landowner, the confidence in result in regard to quality has been determined as 80%. Quality of the offset site was measured taking into consideration site condition, site context and species stocking rate. The future quality of the offset site with and without the offset has been calculated based on expected changes in site condition. Based on the effectiveness of management actions undertaken to date, there is very high confidence that the implementation of management at the offset site will result in an increase in quality of the offset site (namely in site condition) from 7 to 8, whilst if the offset were not implemented the quality of the offset site (namely site condition) would decrease from 7 to 6. High confidence values also reflect the gains already achieved at the offset site since the broader offset parcel was secured. Given the offset site is already secured (before any impact occurs within the Project Boundary), this site is considered as an Advanced Offset (DAWE 2018).
% of impact offset	106%	Exceeds minimum of 90% direct offset

5.1.3 Management of Improvement of MNES

The following management actions will be implemented at the offset site to improve outcomes for Spiny Rice-flower:

- Elimination and control of high threat, woody, herbaceous weeds
- Monitoring for new and emerging weeds
- Control of pest species, particularly rabbits
- Maintenance of canopy condition and tree and shrub recruitment
- Undertaking supplementary planting

Further detail on these management measures is provided in the *MAR Corridor Section (EPBC 2021/9081) MNES Offset Management Plan – Spiny Rice-flower* (MAR-AJM-PWD-PWD-REP-XLP-NAP-0002739).

5.2 Striped Legless Lizard

5.2.1 Offset Strategy

The broader offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing Section 69 agreement. To ensure this process occurs a Memorandum of Understanding has been entered into by RPV and the Offset site landowner, and a bond secured for the cost of the offset site. The offset trade agreement includes the obligation for the landowner to provide permanent protection and management of the Offset Site.

Based on the EPBC offset calculator, the retention and management of 5 ha of Striped Legless Lizard habitat within the proposed offset site achieves an offset of 129.48% of the impact.

Consideration of the proposed offset for Striped Legless Lizard against the EPBC Act Environmental Offsets Policy and Principles is provided in Table 5.3 below.

Table 5.3 Consideration of the proposed offset location for Striped Legless Lizard against the EPBC Environmental Offsets Policy and Offset Principles

Offset Principles	Response
A suitable offset must:	
1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	The proposed Striped Legless Lizard offset at [REDACTED] will protect and improve the condition of known habitat for Striped Legless Lizard within an area of high biodiversity value, adding to the maintained viability of this species.
2. Be built around direct offsets but may include other compensatory measures	The proposed offset is a direct offset. Based on the EPBC Act Offset Assessment Guide (Offset Calculator) the proposed offset site mitigates 129.48% of the impact, which well exceeds the 90% direct offset requirement.
3. Be in proportion to the level of statutory protection that applied to the protected matter	The EPBC Act Offset Assessment Guide (Offset Calculator) has been used to determine the offset requirements to compensate for the proposed impacts to Striped Legless Lizard which considers the conservation status of the species. The offset site will exceed the requirement for direct offset.
4. Be of a size and scale proportionate to the residual impacts on the protected matter	The residual impact from the Corridor Section Project works is the removal of 1.144 hectares of habitat for Striped Legless Lizard. The security and protection of five (5) hectares of known habitat for Striped Legless Lizard at [REDACTED] is appropriate to account for the impact.
5. Effectively account for and manage the risks of the offset not succeeding	Given that the [REDACTED] offset site supports a known Striped Legless Lizard population and has first year monitoring data showing evidence of Striped Legless Lizard presence, it is considered likely that the offset will succeed.

Offset Principles	Response
	Management actions and monitoring will be undertaken at the offset site to maintain the viability of the Striped Legless Lizard population at the site.
6. Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see Section 7.6)	While the [REDACTED] offset site is part of a broader 160 hectare offset site on the Victorian Native Vegetation Offset Register, the particular area subject to this offset is currently unallocated.
7. Be efficient, effective, timely transparent, scientifically robust and reasonable	The offset site proposed at [REDACTED] is ready to be implemented as per the details in the Striped Legless Lizard Offset Management Plan. The offset site will require ongoing management and monitoring as detailed in the Offset Management Plan.
8. Have transparent governance arrangements including being able to be readily measures, monitored, audited and enforced	An Offset Management Plan for the [REDACTED] site has been prepared that will fulfil the management actions required to maintain and improve habitat for Striped Legless Lizard overtime. The Offset Management Plan specifies that the management actions being proposed are reported to the Department.

5.2.2 Offset Analysis

The EPBC offset calculator was used to determine whether the identified offset site at [REDACTED] would provide sufficient gains to compensate for the residual impact to Striped Legless Lizard habitat as a result of the project. A copy of the completed EPBC offset calculator for Striped Legless Lizard is provided in Appendix C. A justification of the inputs into the EPBC offset calculator is provided below (Table 5.4). Based on the EPBC offset calculator, the retention and management of 5 ha of Striped Legless Lizard habitat within the proposed offset sites achieves an offset of 129.48% of the impact.

Table 5.4 Offset assessment guide calculations for Striped Legless Lizard

Parameter	Value	Notes
Impact to Striped Legless Lizard		
Area of Impact	1.144 ha	A total of 1.144 ha of Striped Legless Lizard habitat is to be removed within the Corridor Section Project Boundary.
Quality	5 (out of 10)	<p>Quality of Striped Legless Lizard habitat at the impact site has taken the following attributes into consideration:</p> <ul style="list-style-type: none"> <u>Site condition</u>: While the vast majority of habitat for Striped Legless Lizard at the impact site comprised of introduced (non-native) vegetation, some small areas of native vegetation were recorded. The quality scores of patches of native vegetation within the impact site (based on assessment as per the Victorian habitat hectare assessment method) ranged from 11 to 35 out of 100. A site condition score of 3.5 out of 10 (upper end of the range) was therefore used as baseline to determine quality of Striped Legless Lizard habitat. Site condition score was then increased in recognition of the presence of suitable habitat features to support Striped Legless Lizard, namely the presence of cracking soils and cover of tussock forming grasses. Site condition score: 5. <u>Site context</u>: Impact sites of Striped Legless Lizard habitat in the Corridor Section Project Boundary occur in areas surrounded by urban and industrial use, where ongoing threats to habitat are high. Given the location, connectivity of habitats for the species at the impact sites is generally low. Site context score: 5. <u>Species stocking rate</u>: Multiple individuals of Striped Legless Lizard were recorded during surveys at the M80 North Zone (impact site). Species stocking rate score: 5. <p>An overall quality score of 5 out of 10 was therefore attributed to the impact site.</p>
Total quantum of impact	0.57	Adjusted hectares (area of impact/quality score)
Offset Calculations – [REDACTED] Offset Site		

Parameter	Value	Notes
Offset Area	5 ha	A 5 ha portion of the existing offset parcel has been agreed with the landowner as a basis of the offset site for the project. The offset site is part of a much larger offset property owned by the Landowner.
Time until ecological benefit	5	The time until ecological benefit has been noted as five years. Improvements are likely to occur within this timeframe, especially given that the site is already secured, and considered as an advanced offset.
Time over which loss is averted	20	This reflects the time over which loss is averted. 20 years represents the maximum allowed in the calculator.
Start quality	6 (out of 10)	<p>Quality of Striped Legless Lizard habitat at the offset site has taken the following attributes into consideration:</p> <ul style="list-style-type: none"> <u>Site condition</u>: The offset site forms an extensive area of suitable habitat for Striped Legless Lizard. Vegetation at the site is characterised as Plains Grassland and is dominated by several native tussock forming grass species. Important habitat features present at the site includes embedded and surface rock, cracking clay soils and vast inter-tussock space for the species dispersal. Native vegetation (habitat hectare) assessment was not undertaken at the offset site as part of the assessment. Site condition score: 6. <u>Site context</u>: The proposed offset site is located in an area of contiguous native vegetation. Site context score: 7. <u>Species stocking rate</u>: Monitoring at the offset site in 2020 showed numerous recordings of the species. Given the size of the offset parcel, the offset site is likely to support a larger stocking rate than the impact site. Species stocking rate score: 6 <p>An overall quality score of 6 out of 10 was therefore attributed to the offset site.</p>
Future quality without offset	5	<p>Without the offset, it is predicted the quality of the habitat has the potential to decline due to the following:</p> <ul style="list-style-type: none"> Increased abundance and extent of high threat weeds Increased biomass which would result in loss of inter-tussock space for Striped Legless Lizard movement and dispersal
Future quality with offset	7	<p>Given the offset site is currently managed under an existing security agreement, it is predicted the quality of the habitat would gradually improve in the following areas:</p> <ul style="list-style-type: none"> Removal of woody weeds and cover to <1% Management and monitoring of pest animals and biomass
Risk of loss (%) without offset	0%	Based on guidance by DCCEEW, the risk of loss in the offset calculator for Striped Legless Lizard at the [REDACTED] offset site has been updated to 0% with and without the offset.
Risk of loss (%) with offset	0%	Based on guidance by DCCEEW, the risk of loss in the offset calculator for Striped Legless Lizard at the [REDACTED] offset site has been updated to 0% with and without the offset.
Confidence in results (risk of loss)	90%	The confidence in result in regard to risk of loss has been determined as 90%. There is high confidence that the risk of loss values are accurate as values follow recent advice provided from DCCEEW.
Confidence in results (Quality scores)	75%	<p>The confidence in result in regards to quality has been determined as 75%. Quality of the offset site was measured taking into consideration site condition, site context and species stocking rate. The future quality of the offset site with and without the offset has been calculated based on expected changes in site condition. There is high confidence that the implementation of management at the offset site would result in an increase in quality of the offset site (namely in site condition) from 6 to 7, whilst if the offset were not implemented the quality of the offset site (namely site condition) would decrease from 6 to 5.</p> <p>High confidence values also reflect the gains already achieved at the offset site since the broader offset parcel was secured. Given the offset site is already secured (before any impact occurs within the Project Boundary), this site is considered as an Advanced Offset (DAWE 2018).</p>
% of impact offset	129.48%	Exceeds minimum of 90% direct offset

5.2.3 Management of Improvement of MNES

The following management actions will be implemented at the offset site to improve outcomes for the Striped Legless Lizard:

- Elimination and control of high threat woody weeds (<1%) with no mature plants present
- Monitoring for new and emerging weeds and eliminate to <1% cover
- Control of pest species, particularly rabbits and foxes
- Monitor and control grazing threats from introduced animals or overgrazing by native herbivores
- Monitor and control fire and flooding regimes
- Undertake periodic biomass management at agreed timing and frequency

Further detail on these management measures is provided in the *MAR Corridor Section (EPBC 2021/9081) MNES Offset Management Plan – Striped Legless Lizard* (MAR-AJM-PWD-PWD-REP-XLP-NAP-0002826).

6. Offset Establishment and Management

Table 6.1 Offset establishment and management for Spiny Rice-flower and Striped Legless Lizard

MNES	Offset Responsibilities	Site Security	Offset funding	Offset Management Plan
Spiny Rice-flower	The Spiny Rice-flower offset site at [REDACTED] will be managed as a third-party offset by the landowner, [REDACTED].	The offset site is a registered credit site with DELWP, and is secured under an existing Section 69 agreement. Environmental offset credits associated with the offset site will be allocated through a Third Party Offset Trade Agreement, following approval from DAWE.	The Offset will be funded by Rail Projects Victoria. Sufficient budget has been set aside to meet the price requested by the landowner. The price accounts for the loss of land use, security of the land for beneficial conservation outcomes and the completion of all management actions.	A Spiny Rice-flower Offset Management Plan has been prepared in close consultation with the landowner to ensure that it is practical and meets the objectives for improving habitat for Spiny Rice-flower within the offset site and the broader land holding.
Striped Legless Lizard	The Striped Legless Lizard offset site at [REDACTED] will be managed as a third-party offset by the landowner, [REDACTED].	The offset site is a registered credit site with DELWP, and is secured under an existing Section 69 agreement. Environmental offset credits associated with the offset site will be allocated through a Third Party Offset Trade Agreement, following approval from DAWE.	The Offset will be funded by Rail Projects Victoria. Sufficient budget has been set aside to meet the price requested by the landowner. The price accounts for the loss of land use, security of the land for beneficial conservation outcomes and the completion of all management actions.	A Striped Legless Lizard Offset Management Plan has been prepared in close consultation with the landowner to ensure that it is practical and meets the objectives for improving habitat for Striped Legless Lizard within the offset site and the broader land holding.

7. References

- AJM-JV (2022). *Corridor Section Preliminary Documentation (EPBC 2021/9081)*, Doc No. MAR-AJM-PWD-PWD-REP-XLP-NAP-0002722, Rev. A, prepared 20 April 2022
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- DELWP (2022). *Native Vegetation Information Management (NVIM) online tool*, <https://nvim.delwp.vic.gov.au/>, viewed 3rd May, 2022.
- DEWHA (2009a). *Significant impact guidelines for the critically endangered Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*)*. W. Department of the Environment, Heritage and the Arts, Commonwealth Government, ACT.
- DSEWPC (2011). *Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the vulnerable striped legless lizard, *Delma impar**. E. Department of Sustainability, Water, Planning and Communities, Commonwealth Government, ACT.
- Nature Advisory (2021). [REDACTED]
- TSSC (2016). *Conservation Advice for the Striped Legless Lizard (*Delma impar*)*. Threatened Species Scientific Committee. Environment Protection and Biodiversity Conservation Act 1999.

APPENDIX A
STRIPED LEGLESS LIZARD
MONITORING REPORT AT
[REDACTED] OFFSET SITE



APPENDIX B EPBC OFFSET ASSESSMENT GUIDE (EPBC CALCULATOR) FOR SPINY RICE-FLOWER



For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Spiny Rice-flower
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	6.8%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Threatened species habitat						
	Area of habitat	Yes	Spiny Rice-flower	Area	0.15	Hectares	MAR Corridor Section Project Preliminary Documentation
				Quality	4	Scale 0-10	
				Total quantum of impact	0.06	Adjusted hectares	
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species							
Birth rate e.g. Change in nest success	No						
Mortality rate e.g. Change in number of road kills per year	No						
Number of individuals e.g. Individual plants/animals	No						

Offset calculator																					
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
	Ecological Communities																				
	Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset									
								Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0										
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)									
	Threatened species habitat																				
	Area of habitat	Yes	FALSE	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	0.5523	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%		90%	0.00	0.00				
								Future area without offset (adjusted hectares)	0.6	Future area with offset (adjusted hectares)	0.6		0.00	80%	1.60	1.15					
						Time until ecological benefit	5	Start quality (scale of 0-10)	7	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	8	2.00	80%	1.60	1.15				
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
Number of features e.g. Nest hollows, habitat trees	No																				
Condition of habitat Change in habitat condition, but no change in extent	No																				
Threatened species																					
Birth rate e.g. Change in nest success	No																				
Mortality rate e.g. Change in number of road kills per year	No																				
Number of individuals e.g. Individual plants/animals	No																				

Summary								
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
						Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	0.06	0.06	106.00%	Yes	\$0.00	N/A	\$0.00
	Area of community	0				\$0.00		\$0.00
							\$0.00	\$0.00

APPENDIX C EPBC OFFSET ASSESSMENT GUIDE (EPBC CALCULATOR) FOR STRIPED LEGLESS LIZARD



For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Striped Legless Lizard
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Threatened species habitat						
	Area of habitat	Yes	Striped Legless Lizard Habitat	Area	1.147	Hectares <th rowspan="3">MAR COR Section MNES Report (App H to EPBC Referral)</th>	MAR COR Section MNES Report (App H to EPBC Referral)
				Quality	5	Scale 0-10	
				Total quantum of impact	0.57	Adjusted hectares	
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
	Threatened species						
	Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No						
Number of individuals e.g. Individual plants/animals	No						

Offset calculator																						
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
	Ecological Communities																					
	Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset										
									Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0										
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)										
	Threatened species habitat																					
	Area of habitat	Yes	0.57	Adjusted hectares	5	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	5	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%	0.00	90%	0.00	0.00	0.74	129.48%	Yes		
									Future area without offset (adjusted hectares)	5.0	Future area with offset (adjusted hectares)	5.0										
						Time until ecological benefit	5	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	7	2.00	75%	1.50	1.49					
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
Number of features e.g. Nest hollows, habitat trees	No																					
Condition of habitat Change in habitat condition, but no change in extent	No																					
Threatened species																						
Birth rate e.g. Change in nest success	No																					
Mortality rate e.g. Change in number of road kills per year	No																					
Number of individuals e.g. Individual plants/animals	No																					

Summary								
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
						Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	0.5735	0.74	129.48%	Yes	\$0.00	N/A	\$0.00
	Area of community	0				\$0.00		\$0.00
							\$0.00	\$0.00



AURECON | JACOBS | MOTT MACDONALD

222 Exhibition Street
Melbourne VIC 3000

PO Box 23061
Docklands VIC 8012
Australia

aurecon | **Jacobs** | **MOTT** **MACDONALD** ^M **M**

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APPENDIX G SPINY RICE-FLOWER OFFSET MANAGEMENT PLAN



MELBOURNE AIRPORT RAIL

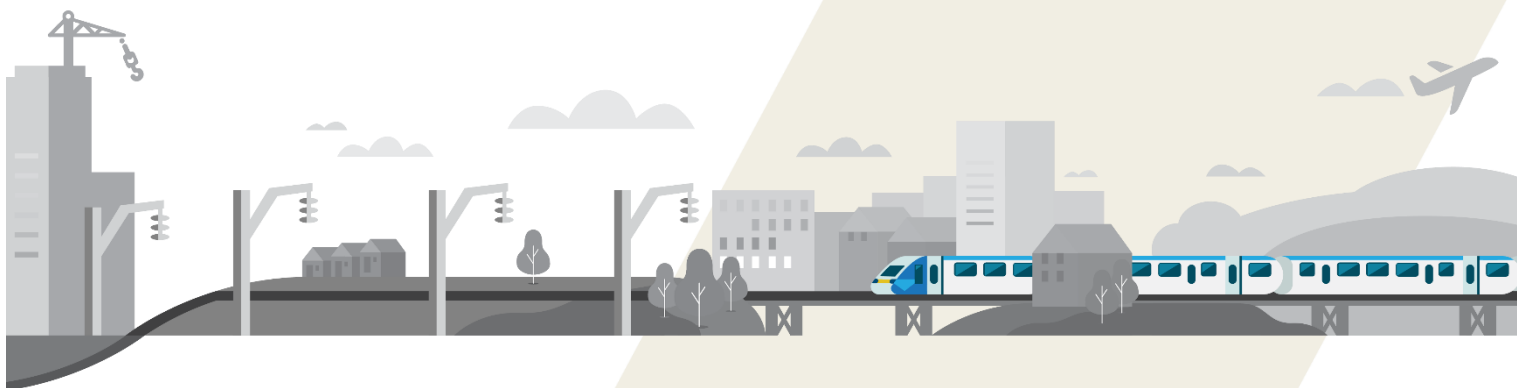
MAR CORRIDOR SECTION (EPBC 2021/9081) MNES OFFSET MANAGEMENT PLAN - SPINY RICE- FLOWER

MAR-AJM-PWD-PWD-REP-XLP-NAP-0002739

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222 Exhibition Street
Melbourne VIC 3000

PO Box 23061
Docklands VIC 8012
Australia

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Client		Rail Projects Victoria			Client Contact	James Plant
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Author Signature		Approver Signature	
Name	Rebecca Ffrost	Name	Ruth Macdonald

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This document should be read in full and no excerpts are to be taken as representative of the findings.

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Executive Summary

The AJM Joint Venture (AJM-JV) on behalf of Rail Projects Victoria (RPV) has prepared Preliminary Documentation for the proposed Melbourne Airport Rail Project – Corridor Section (EPBC 2021/9081).

On 24th November 2021, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) ('the Department') advised that the Corridor Section Project is a Controlled Action and that works require approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) ('the Act') as the action is likely to have significant impacts on listed threatened species and communities (section 18 and 18A of the Act). On the 22nd December 2021 the Department advised that the proposed action will be assessed by Preliminary Documentation.

Spiny Rice-flower (*Pimelea spinescens subsp. spinescens*), listed as Critically Endangered under the EPBC Act, has been assessed as being significantly impacted as a result of the proposed action. The project will result in the direct removal of eight (8) Spiny Rice-flower plants. This document forms the Offset Management Plan component of the Preliminary Documentation relevant to Spiny Rice-flower, and demonstrates how the environmental offsets proposed will compensate for the loss of Spiny Rice-flower individuals.

The offset proposed for Spiny Rice-flower is the protection and management of 79 Spiny Rice-flower plants in a 0.5523 ha area of Grey Box Grassy Woodland located at [REDACTED], Victoria, approximately 200 km north-west of the impact site. The offset site is located within the south east limit of a larger 31.25 ha offset parcel. At least 400 Spiny Rice-flower occur throughout the broader offset parcel.

The broader 31.25 ha offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreement with the Secretary of DELWP under section 69 of the *Conservation, Forests and Lands Act 1987*.

The existing Section 69 Agreement was executed by the Secretary of DELWP on 19 September 2017. The Section 69 Agreement restricts permitted land uses and obliges the landowner to protect and improve native vegetation and habitat in accordance with the agreed management plan in perpetuity. Since 2017 the landowner has demonstrated successful compliance with the on-title Section 69 Agreement and the successful delivery of MNES conservation and management. This offset for Spiny Rice-flower is as such being considered as an advanced offset, and is now in Year 5 of implementation.

The environmental outcome to be achieved by the offset site is no net loss in Spiny Rice-flower individuals within Victoria as a result of the Corridor Section of the MAR Project. This Offset Management Plan describes how the offset site will be secured, managed and monitored to meet the environmental outcome. Management actions to be completed at the offset site include reducing the presence and extent of pest plants and animals and prohibiting pedestrians from entering the site. This Offset Management Plan has been reviewed by the landholder and all required management actions and obligations have been agreed to.

Based on the EPBC Act Offset Assessment Guide (herein referred to as the EPBC Offset Calculator), the retention and management of 0.5523 ha of Spiny Rice-flower habitat at the proposed offset site achieves a direct offset of 106% of the impact.

1. Introduction

1.1 Context and Background

This EPBC Act Offset Management Plan (OMP) for [REDACTED] has been prepared to offset residual impacts of the Melbourne Airport Rail – Corridor Section (the Project) to Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*).

The removal of eight (8) Spiny Rice-flower from the Project constitutes a significant impact on a listed Matter of National Environmental Significance (MNES) under the Commonwealth EPBC Act (Referral number 2021/9081).

The Project Works span approximately 8 km from Albion and Jacana Station. Further information on the impact of the Project on MNES, proposed avoidance and mitigation measures, and overarching approach to offsets is provided in the Preliminary Documentation (AJM-JV 2022a).

In line with the request for additional information from the Department of Agriculture, Water and the Environment (DAWE), a separate Offset Strategy, as well as two Offset Management Plans, including one for Spiny Rice-flower (this plan) and one for Striped Legless Lizard, have been prepared for the MAR Project – Corridor Section.

The Offset Strategy (AJM-JV 2022b) details the following information relevant to Spiny Rice-flower:

- Description of the proposed Spiny Rice-flower offset site including the location, size, condition and environmental values
- Details of surveys undertaken to confirm the presence of Spiny Rice-flower at the proposed offset site
- Details of the quality of the offset site and habitat characteristics for Spiny Rice-flower
- Ongoing threats to the Spiny Rice-flower at the offset site
- Details of the environmental values at the offset site compared to the impact site
- Justification of how the offset meets the EPBC Act Environmental Offsets policy.

1.2 Purpose

The purpose of this Spiny Rice-flower Offset Management Plan is to:

- Identify the specific environmental outcomes to be achieved at the Spiny Rice-flower offset site
- Detail how the offset will be secured, managed and monitored to meet these environmental outcomes including:
 - > Management actions, performance targets, monitoring methodology and review criteria; and
 - > Responsibility and timing for implementation of the actions.

1.3 Proposed impacts to Spiny Rice-flower

Spiny Rice-flower, listed as Critically Endangered under the EPBC Act, has been assessed as being significantly impacted as a result of the proposed action. The project will result in the direct removal of eight (8) Spiny Rice-flower plants, which is above the threshold (>5 plants) for a significant impact as per the Spiny Rice-flower significant impact guidelines (DEWHA 2009). The area of impact to Spiny Rice-flower habitat has been determined as 0.150 ha, based on the area of grassland habitat being impacted where Spiny Rice-flower occurs.

1.4 Environmental Outcome to be achieved

The environmental outcome to be achieved for Spiny Rice-flower, through the security, protection and enhancement of the identified offset site, is no net loss in Spiny Rice-flower individuals within Victoria as a result of the Corridor Section of the MAR Project.

The environmental outcome is to be achieved by protecting and managing an area of freehold land at [REDACTED] that is known to support and contain individuals of Spiny Rice-flower. The proposed site at [REDACTED] is part of a broader 31.25 ha offset parcel which is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreement with the Secretary to DELWP under section 69 of the *Conservation, Forests and Lands Act 1987*, prohibiting any future clearing of Spiny Rice-flower individuals and habitat at the site.

Habitat for Spiny Rice-flower at the offset site will also be improved through completing the following management actions:

- Preventing illegal pedestrian access to the site (including 4WD and motorbike users)
- Controlling and minimising invasion of weeds including woody weeds
- Controlling pest animals that browse on or degrade Spiny Rice-flower individuals and habitat, particularly European rabbits

Based on the EPBC Act Offset Assessment Guide (herein referred to as the EPBC offset calculator), the retention and management of the proposed 0.5523 ha of Spiny Rice-flower habitat at the offset site achieves an offset of 106% of the impact.

1.5 Advanced offset

The existing landowner agreement for the broader 31.25 ha offset parcel was executed on 19 September 2017. The landowner has since demonstrated successful compliance with the on-title Section 69 Agreement and the successful delivery of MNES conservation and management. Management actions undertaken to date at the offset site have been documented in the Year 1 to Year 4 Annual Reports as required under the existing landowner agreement ([REDACTED]). Year 1 to 4 Annual Reports were submitted to DELWP at the completion of each year of management. Management actions undertaken to date, particularly erection and maintenance of fencing, and monitoring and controlling of weeds and pests, are considered to have assisted the local Spiny Rice-flower population in recent years. The Annual Reports provide evidence that the landowner has been managing the proposed offset site for the benefit of native vegetation (inclusive of Spiny Rice-flower) in advance of the MAR Corridor Section Project impacts. This offset is as such being treated as an advanced offset, and is now considered to be in Year 5 of implementation.

The benefit of the advanced offset approach is that the lag time between an approved impact and the achievement of the ecological benefit to MNES from the offset is reduced, thereby minimising the deficit in habitat that would otherwise occur and the associated long term risks to the MNES from such a deficit. Shorter lag times between the approved habitat loss and gain also improves certainty in the achievement of offset outcomes, as the offset management and monitoring have already been initiated.

2. Description of the Action

2.1 Summary of impacts to Spiny Rice-flower

Eight (8) Spiny Rice-flower plants will be removed from within the Corridor Section Project Boundary as a result of the proposed action. Removal of Spiny Rice-flower plants is proposed in the following locations:

- Two within the Munro Avenue Road Reserve in the south of Solomon Heights; and
- Six within the rail reserve adjacent to the River Valley Estate.

Removal of Spiny Rice-flower at Munro Avenue (along the southern boundary of Solomon Heights) is considered unavoidable as it forms part of the critical access route for the Maribyrnong River Bridge construction. Solomon Heights proper supports a large population of Spiny Rice-flower. The chosen access route along Munro Avenue has allowed avoidance of the numerous Spiny Rice-flower to the north. This has minimised the number of Spiny Rice-flower plants lost and restricted removal only to the edge of the population, eliminating any fragmentation to the population.

Removal of Spiny Rice-flower in the rail reserve adjacent to River Valley Estate is considered unavoidable as it also forms part of the critical access route for the Maribyrnong River Bridge construction. Restricting construction to the rail corridor has avoided the larger population of Spiny Rice-flower located in the adjacent private property and avoided fragmentation of that large population.

One of the key impact thresholds for a significant impact to Spiny Rice-flower is the loss of >5 individuals (DEWHA 2009). Given the Corridor Section will result in the removal of 8 individuals of Spiny Rice-flower, the Corridor Section Project works will result in a significant impact to the species. The area of impact to Spiny Rice-flower habitat has been determined as 0.150 ha, based on the area of grassland habitat being impacted where Spiny Rice-flower occurs.

3. Spiny Rice-flower Offset Site

3.1 Offset details

Table 3.1 below summarises the location, planning restrictions, and proposed security and management arrangement for the [REDACTED] Spiny Rice-flower offset site.

Table 3.1 Offset Site Security and Management

Item	Details
Landholder	[REDACTED]
Address/ Lot details	[REDACTED] [REDACTED]
Parcel Identifier	[REDACTED]
Local Government Area	Northern Grampians Shire
Catchment Management Authority	Glenelg Hopkins
Bioregion	Goldfields
Total Offset Parcel Area	31.25 ha
Offset site area (Zone 1I)	0.5523 ha
EPBC Individuals in Offset site	79 Spiny Rice-flower plants (in Zone 1I) (Appendix A)
Planning Zones and Overlays	Rural Living Zone (RLZ2) Bushfire Management Overlay (BMO) Heritage Inventory Site (No. [REDACTED])

3.2 Offset Location

The offset site proposed for Spiny Rice-flower for EPBC 2021/9081 is a 0.5523 ha area of Grey Box Grassy Woodland located at [REDACTED], [REDACTED], Victoria (Appendix A). The offset site is located within the south east limit of a larger 31.25 ha offset parcel which is protected under an existing landowner agreement [REDACTED]. The offset site proposed to offset impacts to Spiny Rice-flower is identified as [REDACTED] (See map in Appendix A) in the landowner agreement [REDACTED].

The broader offset parcel is located within the Northern Grampians Shire Local Government Area and the Goldfields Bioregion. It is located within a Rural Living Zone – Schedule 2 (RLZ2) and is affected by a Bushfire Management Overlay (BMO). [REDACTED]
[REDACTED]
[REDACTED]

The broader offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreement with the Secretary to DELWP under section 69 of the *Conservation, Forests and Lands Act 1987*. The broader offset parcel is known to support a large population of Spiny Rice-flower (approximately 400 Spiny Rice-flower plants, based on a count undertaken by the land manager in early March 2022). The existing Section 69 Agreement was executed on 19 Sept 2017 and has been under continual management since then with the goal of improving native vegetation. Although the existing Section 69 Agreement does not explicitly address management of Spiny Rice-flower, the broader goal of improving native vegetation would have benefited the local Spiny Rice-flower population.

The offset site [REDACTED] (Appendix A) which is 0.5523 ha in area comprises 79 Spiny Rice-flower plants (based on a count undertaken by AJM on the 6th April 2022). The offset site [REDACTED] (Appendix A) has not been allocated for the provision of any other offsets, either under the EPBC Offset Policy or for provision of native vegetation offsets in Victoria. Offset credits in [REDACTED] (Appendix A) would be exhausted with the proposed trade for this offset.

The offset site is located approximately 200 km north-west of the Spiny Rice-flower impact site in the Melbourne Airport Rail Corridor Section.

3.3 Site Context

The offset site forms part of a broader area of land that is protected and managed for the purpose of conservation, including for the protection of Spiny Rice-flower. This includes the broader offset parcel which is protected under a Section 69 Covenant, as well as land to the east within [REDACTED]. The protection and management of Spiny Rice-flower plants at the offset site is important to the management of the overall Spiny Rice-flower population that occurs in the area.

The broader offset parcel, which is currently privately held land, is located between [REDACTED] and the adjacent V/line train network railway. The [REDACTED] adjoins the offset site to the east, separated by the railway line. The ARTC railway corridor is currently contains Spiny Rice-flower plants that form a large and important contiguous population with individuals in the offset site. To minimise impacts to this area, ARTC has installed security gates, signage and large concrete barriers to prevent vehicular access to this section of the rail corridor. This action has resulted in improved protection of Spiny Rice-flower within the rail corridor, reduced the possibility of disturbance and encouraged the growth of native understorey shrubs and trees in this area.

The Strategic Biodiversity Value (SBV) score of the proposed offset site is 0.848, as modelled by the Victorian Department of Environment, Land, Water and Planning (DELWP). A high SBV is indicative of high biodiversity value, with the high scores for the proposed offset site rating the area very highly for general biodiversity (DELWP 2022).

3.4 Historic Land Use

[REDACTED]

3.5 Vegetation present

The offset site comprises a mosaic of Shallow Sands Woodland (EVC 882_61) and Plains Sedgy Woodland (EVC 283) and is dominated by a canopy of Yellow Gum (*Eucalyptus leucoxylon*), Yellow Box (*Eucalyptus melliodora*) and Grey Box (*Eucalyptus microcarpa*) (Figure 3.1). The canopy is contiguous throughout and the entire offset site is contiguous with adjoining habitats. The understorey is sparse throughout, with the ground layer comprising a very high cover of eucalypt leaf litter at the time of the recent site visit (April 2022). Large areas of space exist throughout the offset site suitable to allow for the recruitment and growth of Spiny Rice-flower. Other understorey species recorded included Cranberry Heath (*Astroloma humifusum*), Common Eutaxia (*Eutaxia microphylla* var. *microphylla*), Golden Wattle (*Acacia pycnantha*) and Fuzzy New Holland Daisy (*Vittadinia cuneata*).

Total herbaceous weed cover within the offset site at the time of execution of the Section 69 Agreement (in 2017) was estimated at 39%. More recently the landowner has estimated herbaceous weed cover to be 25% as documented in the most recent annual report submitted to DELWP. Weed cover varies throughout the year based on seasonal conditions. Weed cover at the offset site was observed to be very low (<5% cover) during a site visit undertaken by AJM in April 2022, with one high threat weed, Spear Thistle (*Cirsium vulgare*) recorded. Weeds are controlled within the offset site as part of this OMP.



Figure 3.1 Grey Box Grassy Woodland at the [REDACTED] Offset Site

3.6 Habitat Suitability for Spiny Rice-flower

The offset site at [REDACTED] is a suitable area for Spiny Rice-flower. Several canopy species often associated with Spiny Rice-flower, namely Yellow Gum (*Eucalyptus leucoxylon*) and Grey Box (*Eucalyptus microcarpa*), were recorded within the offset site and dominate the broader area (TSSC 2016). Additionally, as demonstrated within Figure 3.2, the offset site has a sparse ground layer with minimal competition from understorey species and provides suitable habitat structure for the natural recruitment and germination of future generations of Spiny Rice-flower.

During a recent site visit conducted in April 2022, 79 individuals of Spiny Rice-flower were recorded and mapped within [REDACTED] (Appendix A). As shown in Figure 3.3 and Figure 3.4, most Spiny Rice-flower plants recorded were in good condition, with some individuals in lower condition likely due to dry conditions in recent years. Given targeted surveys have confirmed the presence of Spiny Rice-flower and recorded a large population within [REDACTED] (Appendix A), the proposed area is considered to be a suitable offset site for the Corridor Section of the MAR Project.

The 0.5523 ha offset site supports suitable habitat for Spiny Rice-flower evidenced by the presence of the existing population.



Figure 3.2 Suitable area for recruitment of Spiny Rice-flower



Figure 3.3 Spiny Rice-flower recorded adjacent to fencing



Figure 3.4 Spiny Rice-flower recorded within the [REDACTED]

As mentioned in the Landowner Agreement ([REDACTED] for the [REDACTED], potential threats to Spiny Rice-flower at the [REDACTED] offset site are the invasion of noxious weeds and over-browsing by European rabbits. This Offset Management Plan has been prepared to address these potential threats and support the persistence of Spiny Rice-flower.

4. Offset Management

This section discusses the EPBC Offset Management obligations at [REDACTED]. These obligations are discussed in detail in Sections 4.1 to 4.12. In summary, the key focus of the management obligations and therefore key gains of the offset site (as outlined in [REDACTED]), include:

- The protection of the offset site (Zone 1I) through a section 69 agreement under the *Conservation, Forests and Lands Act 1970*
- Eliminate all woody weeds <1% cover and ensure that herbaceous weed cover does not increase beyond the current level
- Monitor for any new and emerging weeds and eliminate to <1% cover
- Control invasive species, in particular European rabbits (*Oryctolagus cuniculus*)
- Retain all standing trees (dead or alive) and all logs and fallen timber
- Exclude stock

The management actions listed above have been undertaken across the wider offset parcel since the property was registered under Section 69 of the *Conservation, Forests and Lands Act 1987* in 2017 and therefore are well established within the [REDACTED] site.

4.1 In Perpetuity Security

The offset site has been secured in-perpetuity via an agreement under Section 69 of the *Conservation, Forests and Lands Act 1987*, which was registered on the title on 19 September 2017. The offset site will be managed, protected and secured in-perpetuity for the purposes of biodiversity conservation.

4.2 Habitat Condition

Habitat values within the [REDACTED] offset site are in excellent condition and high-quality habitat is attributable to the long-term undisturbed nature of the area and current management of the Offset Site. Gains in vegetation quality and the number of individual Spiny Rice-flower through on-ground management actions are expected over the duration of the 10-year offset management plan.

4.3 Fencing

The [REDACTED] offset site is fitted with a secure and well-maintained fence surrounding the property boundary (2,288 m). Where fencing exists or is required within the offset site, fencing around the perimeter of the property is to be installed and maintained in accordance to the standards as detailed in the BushBroker Information Sheet 12 (Standards for Management – Fencing) as outlined in the landowner agreement ([REDACTED]).

Threats including stock are excluded from entering the site at all times and the risk of stock inadvertently entering the site from adjoining properties is low. The adjacent railway line on the east side of the offset site is also fenced with a temporary concrete barrier to block access from pedestrians and train maintenance vehicles. Monitoring for unauthorised access and surveys of the property to assess fence condition is a requirement of this Offset Site Management Plan.

4.4 Access and Signage

As mentioned above (Section 4.3) the offset site is protected by well-maintained fencing that surrounds the entire property boundary, therefore access by livestock and pedestrians is considered to be low. Signage identifying this as a private property is currently installed and maintained by the landowner on site. Any illegal activity or trespassing on the property will be reported to the Victorian Police Force and perpetrators will be prosecuted.

4.5 Weed Control

The control of woody and herbaceous weeds are mandatory management actions under section 69 of the *Conservation Forest and Lands Act 1987* and form part of this OMP.

Total cover of the herbaceous and grassy weeds at the offset site was noted as 39% at commencement of management (in 2017). Weed control within the offset site is to focus on the management of several high threat herbaceous weeds including:

- Cape Weed (*Arctotheca calendula*)
- Squirrel-tail Fescue (*Vulpia bromoides*)
- Spear Thistle (*Cirsium vulgare*)
- Perennial Rye-grass (*Lolium perenne*)
- Annual Veldt-grass (*Ehrharta longiflora*)
- Onion Grass (*Romulea rosea*)
- Musky Stork's-bill (*Erodium moschatum*)
- Mallow (*Malva sp.*)

These species are to be primarily controlled by GPS mapping and spot-spraying, taking extreme care to avoid off-target species and impacts associated with spray-drift. These weeds are to be monitored each year to ensure that biomass and projected cover is not increasing. Annual monitoring and elimination of new and emerging herbaceous weeds will also be required as part of this OMP.

Only one woody weed, Sugar Gum (*Eucalyptus cladocalyx*) was recorded within the offset site. The few Sugar Gums present will be retained for habitat value and any tree recruits will be prevented by the removal of seedlings and emerging plants. Any other woody species recorded on site must be eliminated (either cut & paint, spot spray or hand pull) and monitored appropriately.

Both herbaceous and woody weeds are to be managed in accordance with the BushBroker Information Sheet 8 (Standards for Management – Weeds) as outlined in the Landowner agreement () and include at minimum the following measures:

- Retain adult Sugar Gums whilst simultaneously monitoring and removing any tree recruits in the form of seedlings and emerging plants.
- Ensure all herbaceous weed cover does not increase beyond current levels
- Monitor for any new and emerging weeds and eliminate to <1% cover

The following Table 4.1 details herbaceous and woody weeds recorded within the offset site Habitat Zone 11 and the proposed control method and timing.

Table 4.1 Herbaceous and woody weeds recorded in the Offset Site, proposed control method and timing

Common Name	Scientific Name	Threat Status	Method	Timing
Cape Weed	<i>Arctotheca calendula</i>	High	Spot spray prior to flowering with appropriate herbicide	Spring
Squirrel-tail Fescue	<i>Vulpia bromoides</i>	High	Spot spray with an appropriate herbicide	Winter to Spring
Spear Thistle	<i>Cirsium vulgare</i>	High	Spot spray with an appropriate herbicide	Autumn and Spring
Perennial Rye-grass	<i>Lolium perenne</i>	High	Spot spray with an appropriate herbicide	Winter to Spring
Annual Veldt-grass	<i>Ehrharta longiflora</i>	High	Spot spray with an appropriate herbicide	Spring and Summer

Common Name	Scientific Name	Threat Status	Method	Timing
Onion Grass	<i>Romulea rosea</i>	High	Spot spray with an appropriate herbicide 6 weeks after emergence and prior to flowering	Autumn
Musky Stork's-bill	<i>Erodium moschatum</i>	High	Spot spray with an appropriate herbicide	Winter
Mallow	<i>Malva sp.</i>	High	Spot spray with an appropriate herbicide	Spring and Autumn
Sugar Gum	<i>Eucalyptus cladocalyx</i>	High	Recruits only: cut & paint, spot spray or hand pull	Ongoing

4.6 Pest Control

Control programs to reduce ecological pressures associated with browsing and degradation of habitat for Spiny Rice-flower by introduced fauna have been devised. Pest animals recorded within the offset site include rabbits, hares and foxes. Rabbits have been identified as a prominent feral species in the offset site and the surrounding area, with evidence of burrows and scat recorded during the site visit in April 2022.

The intent of the pest control program is to prevent the spread of, and as far as possible eradicate any established pest animal within the offset site. The successful control of pest animals will result in reduced browsing and material gains in the habitat condition on site, which will directly benefit the Spiny Rice-flower population and long-term population viability at the offset site.

To monitor and control pest animals, signs of pest animals will be recorded during weed monitoring surveys, and all other times when visiting the offset site. In particular, the locations of any active rabbit warren must be mapped using GPS and the locations supplied to the pest animal management contractor or landholder for treatment. Subsequent monitoring will then revisit the previously mapped warren to check for on-going use in addition to searching for new warrens throughout the area. Rabbits should be monitored and controlled throughout the year in accordance with the BushBroker Information Sheet 7 (Standards for Management – Rabbits).

An integrated approach to pest animal management as outlined in Table 4.2 below. A combination of these control techniques will achieve the best outcome to control pest populations in an effective, safe and humane way. Care must be taken to avoid off-targets impacts or inadvertent harm to native flora and fauna.

Any new or emerging pest animal threat identified during the monitoring program for Spiny Rice-flower is to be treated promptly by the landowner, with responsive control measures implemented within the offset site and wide property.

Table 4.2 Pest animals recorded in the Offset Site, proposed control method and timing

Common name	Method	Timing	Performance targets
Rabbits & hares	<ul style="list-style-type: none"> Fumigation and hand collapse of rabbit burrows Baiting When baiting, collect and dispose of carcasses to prevent poisoning native predators Control exotic plants or disperse logs if they are providing rabbit harbour but ensure that habitat components for indigenous fauna are not lost Monitor and control 	Annually and ongoing	Reduced rabbit and hare numbers or evidence of population decrease during monitoring of Spiny Rice-flower
Foxes	<ul style="list-style-type: none"> Monitor and control as necessary 	Ongoing	
New and emerging pest animals	<ul style="list-style-type: none"> Monitor and control as necessary Remove rubbish and disperse logs or rocks that may be used to harbour pest animals 	Ongoing	

4.7 Monitoring and Reporting

This OMP requires the landowner to submit a report annually for each of the ten years of this management plan to DELWP and DAWE. The monitoring report is to be submitted at least two months prior to the

anniversary date of the execution of the agreement to allow time for compliance to be assessed before the anniversary date. The monitoring report is to include details of the monitoring and management works conducted within the offset site.

4.7.1 Spiny Rice-flower population monitoring

The intent of this OMP is to conserve and maintain the existing Spiny Rice-flower population within the offset site at [REDACTED] and the wider property. Monitoring of the population is therefore a requirement of this OMP. The monitoring program, as set out below, is to be conducted in accordance with the EPBC survey guidelines for Spiny Rice-flower (DEWHA 2009).

Targeted survey monitoring for Spiny Rice-flower is to be conducted annually by a suitably qualified and experienced ecologist/botanist. Transect surveys within [REDACTED] are to be undertaken during the species flowering time (April and August) to determine the following:

- Number of individuals within [REDACTED]
- Recruitment of individuals
- Potential dieback
- Presence of threats
- Habitat condition.

All Spiny Rice-flower individuals within Habitat Zone 1I are to be mapped and recorded using GPS technology. The results of the monitoring will be used to assess the efficacy of other actions conducted on site, and will inform responsive, adaptive management actions if required (Section 4.9).

4.8 Annual Reporting

The annual monitoring report is to detail progress against the commitments set out in this OMP. Annual monitoring should therefore provide enough detail in the form of written components and supporting evidence that an assessor can easily determine the completion of/progress against the commitments for each management action.

Details of the monitoring reports are to include (but are not limited to):

- Details of management action, including ground works, undertaken within the reporting period
- Results of monitoring activities including fence condition, weeds, pest animals and overstorey/understorey condition
- Results of Spiny Rice-flower population monitoring including findings on population numbers, health and recruitment
- Site photographs
- Details of compliance or non-compliance with the schedule of management actions
- Details of compliance or non-compliance with performance targets
- Details of any incidents or new and emerging management issues, with recommendations for corrective action and plan review.

The results of the monitoring program are to be reported to DELWP and DAWE. Any major breaches of the management programs and or impacts on the target species (Spiny Rice-flower) is to be reported immediately by the landowner.

4.9 Adaptive Management

The monitoring program is required to identify any significant failings in the implementation or outcomes of the OMP, and any new or emerging threats that require an immediate and adaptive response. The development of an appropriate and responsive addition or variation of the OMP will be developed in

consultation with the landowner, DELWP and RPV. Any activities and approaches beyond the scope of the current Section 69 Agreement and Management Plan registered on title should be approved by DELWP prior to their implementation.

Examples of significant failings in the implementation or outcomes of the OMP would include stochastic events such as bushfire, habitat and/or water contamination due to chemical spills, significant population decline of Spiny Rice-flower, major fence failure, or events that are considered to be significant enough to warrant an adaptive management approach within the offset site.

In the event of a significant detrimental impact within the Offset area and/or failing of the OMP, the landowner will:

- Promptly notify RPV
- Develop a responsive management plan to address impacts
- Update the OMP and/or review the implementation period to address impacts

The intent of an adaptive management action provision in this OMP is to provide a mechanism for the landowner and RPV that facilitates considered and scientifically based variations to the management of the offset site. This flexible approach can be beneficial in that it enables a 'change of plan' if the Spiny Rice-flower population is not increasing, and/or habitat quality for the species is not improving on site. Variations of this nature however must be taken in consultation with ecologists, RPV, DAWE and where appropriate, other government Agencies with expertise in the management of threatened species or habitat.

4.10 Performance Targets

Table 4.3 outlines the 10-year performance targets for the actions identified within this OMP and the year that they will be achieved.

Table 4.3 10-year performance targets

Management Action	Responsibility	Timing	Performance Target	Year to be achieved
Security Agreement	Landowner	Once	Offset site secured in-perpetuity via an agreement under Section 69 of the <i>Conservation, Forests and Lands Act 1987</i> , which was registered on the title on 19 September 2017.	Achieved
Habitat Condition Monitoring	Landowner	Annually	Annual report submitted to DELWP detailing improvement or maintained habitat quality and condition	Annual monitoring report from Years 1-4 submitted to DELWP. Years 5 to 10 upcoming
Fencing	Landowner	Responsive	Fencing maintained and repaired promptly if required	Achieved in 2017 and ongoing
Access and Signage	Landowner	Responsive	Gates, fencing and or signage maintained within offset site	Achieved in 2017 and ongoing
Weed Control	Landowner	Annually	Control of herbaceous weeds to <25% cover and no woody weed recruitment within offset site	First year, and ongoing
Pest Control	Landowner	Annually	Control of feral animals, particularly rabbits	Commenced in 2017 and ongoing
Spiny Rice-flower monitoring Targeted Surveys	Landowner	Annually, within flowering period of Spiny Rice-flower (April to August)	Improvement to Spiny Rice-flower population	Years 1 to 10
Monitoring and Reporting	Landowner	Annually	Annual reports provided	Annual monitoring report from Years 1-4 submitted to DELWP. Years 5 to 10 upcoming

4.11 10-Year Management Plan

Table 4.4 provides a summary of the management action, responsible personnel and timing of each action to be implemented over the 10-year management period. Existing actions follow those detailed in the landowner agreement ().

Table 4.4 10-year management actions, responsibility and timing within the offset site

Management Action	Description	Responsibility	Timing of Action	Performance Target
Fencing	<ul style="list-style-type: none"> If grazing threats are identified, erect new fencing to exclude threats according to the standards detailed in Information Sheet 12 	Landowner	As soon as possible following identification of grazing threats	<ul style="list-style-type: none"> Erect fencing to DELWP fencing standards in BushBroker Information Sheet 12 Standards for Management – Fencing Exclusion of domestic stock and vehicles from offset area Exclusion of unauthorised access or unauthorised firewood collection
	<ul style="list-style-type: none"> Maintain fencing in good condition around entire boundary of all sites where fencing exists or is required 	Landowner	Ongoing	<ul style="list-style-type: none"> Maintain fencing to DELWP fencing standards in Bush Broker Information Sheet 12- Standards for Management – Fencing Exclusion of domestic stock from offset area Exclusion of vehicles from offset area Exclusion of unauthorised access or unauthorised firewood collection
Access and signage	<ul style="list-style-type: none"> Maintained of gates and signage as required to prohibit illegal access 	Landowner	Ongoing	<ul style="list-style-type: none"> No illegal access; no 4WD impacts within Offset area
Woody Weeds	<ul style="list-style-type: none"> Eliminate any Sugar Gum recruits and all other woody weed infestations within the offset area. Refer to Section 4.5 for control method and timing of actions. Monitor for any re-sprouting or seedlings and eradicate (either spot spray or hand pull) 	Landowner	Ongoing	<ul style="list-style-type: none"> No woody weeds present within offset area (< 1% cover) at the end of Year 10 Woody weeds not to interfere with shrub and canopy recruitment Weeds to be managed in accordance with BushBroker Information Sheet 8- Standards for Management- Weeds Minimise off-target damage (avoid all native plants)
	<ul style="list-style-type: none"> Monitor and eliminate all new & emerging woody weeds Woody weeds to be identified, cover estimated and mapped using GPS 	Landowner	Ongoing	<ul style="list-style-type: none"> <1% cover of all woody weeds at the end of Year 10 New outbreaks of woody weeds to be removed as soon as detected. Minimise off-target damage (avoid all native plants)
Herbaceous Weeds	<ul style="list-style-type: none"> Monitor and control all herbaceous weeds. Refer to Table 4.1 for list of herbaceous weeds, their control method and timing of actions 	Landowner	Refer to Table 4.1	<ul style="list-style-type: none"> No increase in cover beyond the cover listed for all herbaceous weeds. Herbaceous weeds not to interfere with shrub and canopy recruitment

Management Action	Description	Responsibility	Timing of Action	Performance Target
	<ul style="list-style-type: none"> Herbaceous weed cover (percentage cover) to be estimated throughout the offset site. All weed species present identified to species level. 			<ul style="list-style-type: none"> Minimise off-target damage (avoid all native plants) Weeds to be managed in accordance with BushBroker Information Sheet 8 - Standards for Management - Weeds
	<ul style="list-style-type: none"> Eliminate all new & emerging herbaceous weeds 	Landowner	Ongoing	<ul style="list-style-type: none"> <1% cover of all new and emerging herbaceous weeds at the end of Year 10
Pest Animals	<ul style="list-style-type: none"> Control rabbits, hares and foxes. Refer to Table 4.2 for a list of control methods and timing of actions 	Landowner	Refer to Table 4.2	<ul style="list-style-type: none"> No surface disturbance within the credit site No active rabbit warrens to be present. minimal surface harbour for rabbits and hares present (but excluding natural harbour such as logs and rocks) No surface harbour due to rubbish or artificial piles of logs or rocks. No active fox dens within the credit site. If present they are to be destroyed through fumigation and hand collapse.
	<ul style="list-style-type: none"> Monitor and control rabbits, hares and foxes including scats, diggings or signs of browsing or grazing. Locations of rabbit warrens to be mapped using GPS. 	Landowner	Ongoing	<ul style="list-style-type: none"> Control numbers of rabbits, hares and foxes Rabbits to be managed in accordance with BushBroker Information Sheet 7 - Standards for management - Rabbits
	<ul style="list-style-type: none"> Monitor and control all new and emerging pest animals 	Landowner	Ongoing	<ul style="list-style-type: none"> Control numbers of any new & emerging pest animals
Spiny Rice-flower population monitoring	<ul style="list-style-type: none"> Undertake annual targeted survey for Spiny Rice-flower within Z11 (offset site). Survey is to be undertaken along walked transects during the flowering period of Spiny Rice-flower (April to August) 	Landowner	April to August	<ul style="list-style-type: none"> Increase in number of Spiny Rice-flower population Recruitment of new Spiny Rice-flower individuals
Annual Reporting	<ul style="list-style-type: none"> Prepare and submit an annual report 	Landowner	Submit at least 2 months prior to agreement anniversary date	<ul style="list-style-type: none"> Annual report is signed, dated and submitted by the landowner at least 2 months prior to the anniversary date of the agreement Report provides enough detail in the form of written comments and supporting evidence that an assessor can easily determine the completion of/ progress against the OMP commitments

4.12 In Perpetuity Management

This OMP outlines the management actions and targets to be achieved at the offset site to improve the quality of potential habitat for Spiny Rice-flower over the 10-year time period. At the completion of the time period, the landowner is required to continue to undertake management actions to retain the population of Spiny Rice-flower, in addition to the quality and extent of habitat for the species at the offset site in perpetuity. Table 4.5 identifies the in-perpetuity performance targets for the offset site.

Table 4.5 Offset site performance targets to be maintained in perpetuity

Management Action	Responsibility	Performance Target
Security Agreement	Landowner	Section 69 agreement remains on Title
Habitat Condition	Landowner	Maintained at improved level
Fencing	Landowner	Maintained and upgraded if required
Access and Signage	Landowner	Illegal access prohibited
Weed Control	Landowner	Woody and herbaceous weeds controlled and eliminated
Pest Control	Landowner	Pest species managed and controlled
Monitoring and Reporting	Landowner	Landowner must submit annual reports to DELWP for years 1-10 and thereafter at the reasonable request of DELWP.
Spiny Rice-flower population monitoring	Landowner/RPV	Spiny Rice-flower population monitored annually in winter for years 1-10.

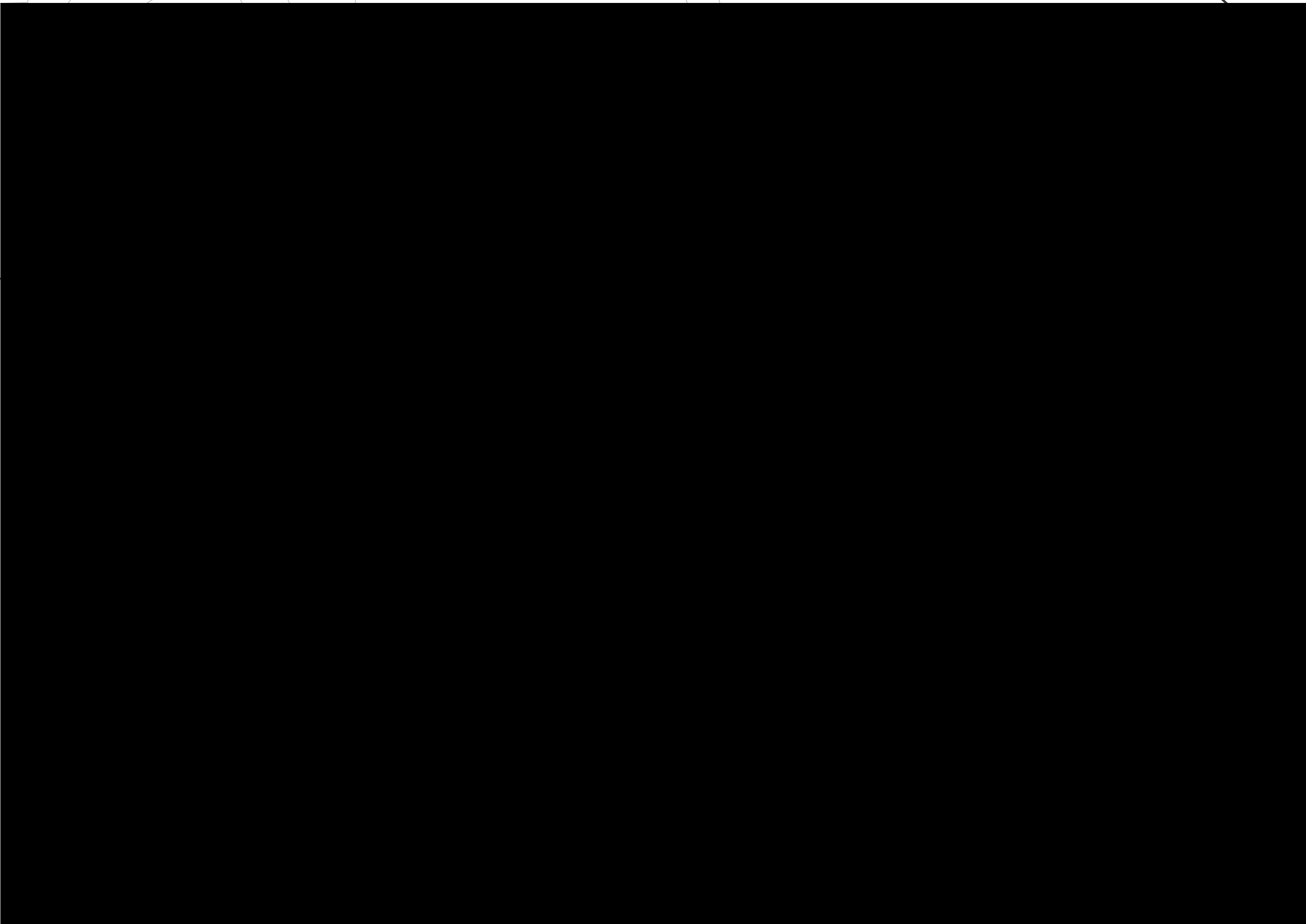
5. Information Sources

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APPENDIX A

MAP OF OFFSET SITE





10/10/2010

10/10/2010

10/10/2010

10/10/2010

10/10/2010

10/10/2010

10/10/2010

APPENDIX B OFFSET ASSESSMENT CALCULATIONS



For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Spiny Rice-flower
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	6.8%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Threatened species habitat						
	Area of habitat	Yes	Spiny Rice-flower	Area	0.15	Hectares	MAR Corridor Section Project Preliminary Documentation
				Quality	4	Scale 0-10	
				Total quantum of impact	0.06	Adjusted hectares	
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species							
Birth rate e.g. Change in nest success	No						
Mortality rate e.g. Change in number of road kills per year	No						
Number of individuals e.g. Individual plants/animals	No						

Offset calculator																					
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
	Ecological Communities																				
	Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset									
									Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0									
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)									
	Threatened species habitat																				
	Area of habitat	Yes	FALSE	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	0.5523	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%	0.00	90%	0.00	0.00	0.06	106.00%	Yes	
									Future area without offset (adjusted hectares)	0.6	Future area with offset (adjusted hectares)	0.6									
						Time until ecological benefit	5	Start quality (scale of 0-10)	7	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	8	2.00	80%	1.60	1.15				
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
Number of features e.g. Nest hollows, habitat trees	No																				
Condition of habitat Change in habitat condition, but no change in extent	No																				
Threatened species																					
Birth rate e.g. Change in nest success	No																				
Mortality rate e.g. Change in number of road kills per year	No																				
Number of individuals e.g. Individual plants/animals	No																				

Summary								
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
						Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	0.06	0.06	106.00%	Yes	\$0.00	N/A	\$0.00
	Area of community	0				\$0.00		\$0.00
							\$0.00	\$0.00



AURECON | JACOBS | MOTT MACDONALD

222 Exhibition Street
Melbourne VIC 3000

PO Box 23061
Docklands VIC 8012
Australia

aurecon | **Jacobs** | **MOTT** **MACDONALD** ^M **M**

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APPENDIX H STRIPED LEGLESS LIZARD OFFSET MANAGEMENT PLAN



MELBOURNE AIRPORT RAIL

MAR CORRIDOR SECTION (EPBC 2021/9081) MNES OFFSET MANAGEMENT PLAN – STRIPED LEGLESS LIZARD

MAR-AJM-PWD-PWD-REP-XLP-NAP-0002826

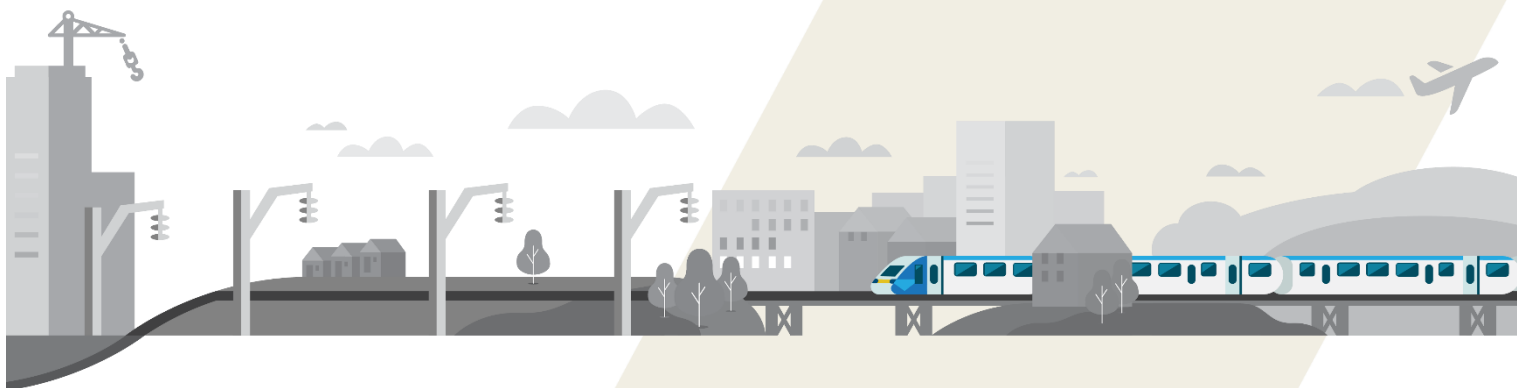
12 September 2022

Revision C.1

Confidential

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Author Signature		Approver Signature	
Name	Rebecca Ffrost	Name	Ruth Macdonald

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This document should be read in full and no excerpts are to be taken as representative of the findings.

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Appendix A Map of Offset Site

Appendix B Offset Assessment Calculations

Executive Summary

The AJM Joint Venture (AJM-JV) on behalf of Rail Projects Victoria (RPV) has prepared Preliminary Documentation for the proposed Melbourne Airport Rail Project – Corridor Section (EPBC 2021/9081).

On 24th November 2021, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) ('the Department') advised that the Corridor Section Project is a Controlled Action and that works require approval under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) ('the Act') as the action is likely to have significant impacts on listed threatened species and communities (section 18 and 18A of the Act). On the 22nd December 2021 the Department advised that the proposed action will be assessed by Preliminary Documentation.

Striped Legless Lizard (*Delma impar*), listed as Vulnerable under the EPBC Act, has been assessed as being significantly impacted as a result of the proposed action. The project will result in the direct removal of 1.144 ha of Striped Legless Lizard habitat. This document forms the Offset Management Plan component of the Preliminary Documentation relevant to Striped Legless Lizard, and demonstrates how the environmental offsets proposed will compensate for the loss of Striped Legless Lizard habitat.

The offset proposed for Striped Legless Lizard is the protection and management of 5 ha of suitable grassland habitat located at [REDACTED] Victoria, approximately 100 km west of the impact site. The proposed offset is part of a broader 160 ha offset parcel which supports a known population of Striped Legless Lizard and has baseline monitoring data showing evidence of presence of the species.

The broader 160 ha offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreement with the Secretary to DELWP under section 69 of the *Conservation, Forests and Lands Act 1987*.

The existing Section 69 Agreement was executed by the Secretary of DELWP in July 2020 and covers approximately 160 ha. It details a 10-year management plan that was prepared in consultation between the land manager and ecological consultants and was approved by DELWP. The Section 69 Agreement restricts permitted land uses and obliges the landowner to protect and improve native vegetation and habitat in accordance with the agreed management plan in perpetuity. The broader 160 ha included under the Section 69 Agreement was secured to deliver advanced offsets for impacts to multiple Matters of National Environmental Significance (MNES), including impacts to Striped Legless Lizard from the MAR Project Corridor Section. Given the existing landowner agreement for the broader 160 offset parcel was executed in July 2020, the offset for the MAR Project Corridor Section is considered to be an advanced offset, and is now in Year 2 of implementation.

This Offset Management Plan describes how the offset site will be secured, managed and monitored to meet the Environmental Outcome. Management and monitoring actions commenced in July 2020 as per the existing Section 69 Agreement. The time until the ecological benefit from the commencement of the offset – July 2020 – is 10 years. Striped Legless Lizard monitoring was undertaken in Year 1 to gather baseline monitoring data, and will occur again in Years 2, 5, 8 and 10 to monitor the population. Management actions to be completed at the offset site include reducing the presence and extent of pest plants and animals and prohibiting pedestrians from entering the site. This Offset Management Plan has been reviewed by the landholder and all required management actions and obligations have been agreed to. Any activities and approaches beyond the scope of the current Landowner Agreement and Management Plan registered on-title – e.g., adaptive/alternative management activities – needs to be approved by DELWP prior to their implementation.

Based on the EPBC Act Offset Assessment Guide (herein referred to as the EPBC Offset Calculator), the retention and management of 5 ha of Striped Legless Lizard habitat within the proposed offset site achieves a direct offset of 129.48% of the impact. The Environmental Outcome to be achieved by the offset site is no net loss in habitat for Striped Legless Lizard within Victoria as a result of the Corridor Section of the MAR Project.

1. Introduction

1.1 Context and Background

This EPBC Act Offset Management Plan (OMP) for [REDACTED] has been prepared to offset residual impacts of the Melbourne Airport Rail – Corridor Section (the Project) to Striped Legless Lizard (*Delma impar*).

The removal of 1.144 ha of Striped Legless Lizard habitat from the Project has been assessed as constituting a significant impact on a listed Matter of National Environmental Significance (MNES) under the Commonwealth EPBC Act (Referral number 2021/9081).

The Project Works span approximately 8 km from Albion and Jacana Station. Further information on the impact of the Project on MNES, proposed avoidance and mitigation measures, and overarching approach to offsets is provided in the Preliminary Documentation (AJM-JV 2022a).

In line with the request for additional information from the Department of Agriculture, Water and the Environment (DAWE), a separate Offset Strategy, as well as two Offset Management Plans, including one for Striped Legless Lizard (this plan) and one for Spiny Rice-flower, have been prepared for the MAR Project – Corridor Section.

The Offset Strategy (AJM-JV 2022b) details the following information relevant to Striped Legless Lizard:

- Description of the proposed Striped Legless Lizard offset site including the location, size, condition and environmental values
- Details of surveys undertaken to confirm the presence of Striped Legless Lizard at the proposed offset site
- Details of the quality of the offset site and habitat characteristics for Striped Legless Lizard
- Ongoing threats to Striped Legless Lizard habitat at the offset site
- Details of the environmental values at the offset site compared to the impact site
- Justification of how the offset meets the EPBC Act Environmental Offsets policy.

1.2 Purpose

The purpose of this Striped Legless Lizard Offset Management Plan is to:

- Identify the specific environmental outcomes to be achieved at the Striped Legless Lizard offset site
- Detail how the offset will be secured, managed and monitored to meet these environmental outcomes including:
 - > Management actions, performance targets, monitoring methodology and review criteria; and
 - > Responsibility and timing for implementation of the actions.

1.3 Proposed impacts to Striped Legless Lizard

Striped Legless Lizard, listed as Vulnerable under the EPBC Act, has been assessed as being significantly impacted as a result of the proposed action. Namely, the project will result in the direct removal of 1.144 ha of Striped Legless Lizard habitat.

1.4 Environmental Outcome to be achieved

The environmental outcome to be achieved for Striped Legless Lizard, through the security, protection and enhancement of the identified offset site, is no net loss in Striped Legless Lizard habitat within Victoria as a result of the Corridor Section of the MAR Project.

The environmental outcome is to be achieved by protecting and managing an area of freehold land at [REDACTED] that supports a known population of Striped Legless Lizard. The proposed offset site at

██████████ is part of a broader 160 ha offset parcel which is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreement with the Secretary to DELWP under section 69 of the *Conservation, Forests and Lands Act 1987*, prohibiting any future clearing of Striped Legless Lizard habitat at the site.

The broader 160 ha included under the Section 69 Agreement was secured to deliver advanced offsets for impacts to multiple Matters of National Environmental Significance (MNES), including impacts to Striped Legless Lizard from the MAR Project Corridor Section. All native grassland habitat across the broader 160 ha offset parcel is managed consistently and concurrently as one contiguous area of habitat for all MNES that it supports. This ensures that MNES present (including Natural Temperate Grassland of the Victorian Volcanic Plain community, Golden Sun Moth and Striped Legless Lizard) are not limited by the current 5 ha offset site boundary, and that fauna have access to adequate area for foraging and shelter (across the broader offset area), and are not at risk from unmanaged threats adjacent to the offset.

Habitat for Striped Legless Lizard at the offset site will also be improved through completing the following management actions:

- Controlling and minimising invasion of herbaceous and woody weeds
- Controlling pest animals, particularly European rabbits, and overgrazing by native and introduced herbivores that degrade Striped Legless Lizard habitat
- Undertaking periodic biomass management to maintain high quality Striped Legless Lizard habitat

Management at the offset site can be delivered efficiently and effectively by the land manager in conjunction with the conservation of the broader 160 ha offset parcel. Separate security and management would result in a patchwork of management approaches for the MNES on site, which would likely be unworkable for the land manager and significantly risk the successful conservation and management of these MNES.

Based on the EPBC Act Offset Assessment Guide (herein referred to as the EPBC offset calculator) the security, protection, and enhancement of the identified offset site containing 5 ha of Striped Legless Lizard habitat within the proposed offset site at ██████████ achieves a direct offset of 129.48%.

1.5 Advanced offset

The existing landowner agreement for the broader 160 ha offset parcel was executed in July 2020. The landowner has since demonstrated successful compliance with the on-title Section 69 Agreement and the successful delivery of MNES conservation and management. Management actions undertaken to date at the offset site have been documented in the Year 1 Annual Report as required under the existing landowner agreement (V_CFL-3697_01). The Year 1 Annual Report was submitted to DELWP in 2021. Management actions undertaken to date, particularly erection and maintenance of fencing, and monitoring and controlling of weeds and pests, are considered to have benefited the local Striped Legless Lizard population. The Annual Report provides evidence that the landowner has been managing the proposed offset site for the benefit of native vegetation and habitat (inclusive of Striped Legless Lizard) in advance of the MAR Corridor Section Project impacts. This offset is as such being treated as an advanced offset, and is now considered to be in Year 2 of implementation.

The benefit of the advanced offset approach is that the lag time between an approved impact and the achievement of the ecological benefit to MNES from the offset is reduced, thereby minimising the deficit in habitat that would otherwise occur and the associated long term risks to the MNES from such a deficit. Shorter lag times between the approved habitat loss and gain also improves certainty in the achievement of offset outcomes, as the offset management and monitoring have already been initiated.

2. Description of the Action

2.1 Summary of impacts to Striped Legless Lizard

A total of 1.144 ha of Striped Legless Lizard habitat will be removed from within the Corridor Section Project Boundary as a result of the proposed action. Removal of Striped Legless Lizard habitat is proposed in the following locations:

- 0.375 ha of Striped Legless Lizard habitat within the Munro Avenue Road Reserve in the south of Solomon Heights; and
- 0.768 ha of Striped Legless Lizard habitat within the M80 North Zone.

Removal of Striped Legless Lizard habitat at Munro Avenue (along the southern boundary of Solomon Heights) is considered unavoidable as it forms part of the critical access route for the Maribyrnong River Bridge construction. Solomon Heights proper supports a large area of habitat for Striped Legless Lizard. The chosen access route along Munro Avenue has allowed avoidance of the larger areas of continuous habitat for Striped Legless Lizard to the north. This has minimised the area of Striped Legless Lizard habitat lost and restricted removal only to the edge of the habitat area, eliminating any fragmentation to the population.

Removal of Striped Legless Lizard habitat at the M80 North Zone is considered unavoidable as it forms the location of the M80 North Zone Viaduct. Impacts in this location have been minimised to the greatest extent possible, including restricting impacts to a 55 m wide corridor which is the minimum width required for construction of the viaduct.

The proposed removal of Striped Legless Lizard habitat outlined above is considered to meet the criteria for a significant impact in regards to a reduction in the area of occupancy of the species (DSEWPC 2011a).

In addition to direct removal of habitat, the Corridor Section Project works will have the following impacts on the species:

- Temporary fragmentation of Striped Legless Lizard habitat at the M80 North Zone resulting in the isolation of a 0.46 ha patch of habitat from the core remaining habitat area of 3.55 ha. It is noted that fragmentation in this area will be temporary as it will be limited to the construction phase of the Project. Following construction, the area under the rail viaduct in this area will be subject to strategic revegetation with tussock forming grasses which will effectively re-connect existing areas of Striped Legless Lizard habitat through this area.
- Potential localised reduction in habitat suitability due to noise and vibration associated with the construction of the M80 North Zone Viaduct.
- Potential injury or death of some Striped Legless Lizard individuals which may occur during the habitat clearance within the M80 North Zone.

The proposed impacts to Striped Legless Lizard from the Corridor Section Project works are considered to result in a significant impact to the species.

3. Striped Legless Lizard Offset Site

3.1 Offset details

Table 3.1 below summarises the location, planning restrictions, and proposed security and management arrangement for the [REDACTED] Striped Legless Lizard Offset site.

Table 3.1 Offset Site Security and Management

Item	Details
Landholder	[REDACTED]
Address/ Lot details	[REDACTED]
Parcel Identifier	[REDACTED]
Local Government Area	Golden Plains Shire
Catchment Management Authority	Corangamite
Bioregion	Victorian Volcanic Plain
Total Offset Parcel Area	160 ha (confirmed Striped Legless Lizard population (Nature Advisory 2021))
Offset site area	5 ha
Planning Zones and Overlays	Farming Zone (FZ) Environmental Significance Overlay (ESO2) Land Subject to Inundation Overlay (LSIO) Aboriginal Cultural Heritage Sensitivity

3.2 Offset Location

The offset site proposed for Striped Legless Lizard for EPBC 2021/9081 is a 5 ha area of native grassland which supports a known population of Striped Legless Lizard at [REDACTED] (Appendix A). The site is located approximately 100km west of Melbourne within the Golden Plains Shire and is situated within the Victorian Volcanic Plain Bioregion.

The offset site is part of a broader 160 ha offset parcel which is protected under an existing landowner agreement [REDACTED]. The offset site proposed to offset impacts to Striped Legless Lizard is identified as a 5 ha portion of Zone 02A as identified in the landowner agreement [REDACTED].

The broad 160 ha offset parcel supports a known population of Striped Legless Lizard, evidenced by a recent monitoring report that recorded the species across the offset parcel.

The site is located within a Farming Zone (FZ) and is affected by an Environmental Significance Overlay - Schedule 2 (ESO2). Ferrers Creek (which dissects the broader offset parcel) and land immediately adjacent is subject to a Land Subject to Inundation Overlay (LSIO) and is also recognised as an Area of Aboriginal Cultural Heritage Sensitivity.

The broader offset parcel is currently registered on the Victorian Native Vegetation Offset Register and is secured under an existing agreements with the Secretary to the Department of Environment, Land, Water and Planning (DELWP) under section 69 of the *Conservation, Forests and Lands Act 1987*. The 5 ha offset site identified has not been allocated for the provision of any other offsets, either under the EPBC Offset Policy or for provision of native vegetation offsets in Victoria. Offset credits in this area would be exhausted with the proposed trade for this offset.

The offset site is located approximately 100 km west of the Striped Legless Lizard impact site.

3.3 Site Context

The offset site is located in an area of contiguous native vegetation, much of which forms known and potential suitable habitat for Striped Legless Lizard. The 160 ha broader offset parcel, which is privately

owned, is located [REDACTED], [REDACTED]. A further 190 ha of Striped Legless Lizard habitat occurs adjacent in separate ownership, making a total of 350 ha of native grassland habitat that supports Striped Legless Lizard in the area.

The Strategic Biodiversity Value (SBV) score of the proposed offset site is 0.728, as modelled by DELWPs NVIM offset tool (DELWP 2022). A high SBV is indicative of high biodiversity value, with the high scores for the proposed offset site rating the area very highly for general biodiversity.

3.4 Historic Land Use

The offset site is characterised by high-quality native grassland with embedded and exposed basalt rocks still evident across the land surface. The site presents little evidence of disturbance and although the site contains area of cultural heritage sensitivity, particularly around Ferrers Creek, the site is not considered to have historical significance.

3.5 Vegetation present

The offset site comprises an extensive area of Plains Grassland (EVC 132) which is distinguished by a moderate to high cover of spear grass (*Austrostipa spp*), wallaby grass (*Rytidosperma spp*) and Kangaroo Grass (*Themeda triandra*), with scattered Common Tussock Grass (*Poa labillardierei*) and Rush (*Juncus spp.*) also present (Figure 3.1). Native grassland cover throughout the offset site (and broader parcel) meets the classification of the EPBC Act listed ecological community, Natural Temperate Grassland of the Victorian Volcanic Plain.

Weed cover in the offset site was observed as being very low (<2% cover across the site) however several high threat weeds including Serrated Tussock (*Nassella trichotoma*) and Spear Thistle (*Cirsium vulgare*) were observed. These weeds, among others listed in the landowner agreement ([REDACTED]) are to be controlled within the offsite area as part of this OMP. Bathurst Burr (*Xanthium spinosum*) was observed nearby along the edge of Ferrers Creek (outside this offset site).



Figure 3.1 Native grassland providing suitable habitat for Striped Legless Lizard at the [REDACTED] offset site

3.6 Habitat Suitability for Striped Legless Lizard

Striped Legless Lizards inhabit and are largely restricted to tussock forming grasslands (TSSC 2016). The species is known to occur within areas dominated by native flora such as spear grass (*Austrostipa spp*) and Kangaroo Grass (*Themeda triandra*), though has also been recorded in sites comprised of exotic species including Toowoomba Canary-grass (*Phalaris aquatica*) and Serrated Tussock (*Nassella trichotoma*) (Smith and Robertson 1999). Striped Legless Lizards utilise grassland cover, rocky rises and soil cracks as habitat and overwintering refuge (Smith and Robertson 1999).

The offset site at [REDACTED] is a suitable area for Striped Legless Lizard. As shown in Figure 3.2, the offset site is largely undisturbed with exposed basalt boulders, rocks and large soil cracks evident on the land surface. These notable habitat features provide suitable shelter and habitat for the species in addition to providing protection from predators.



Figure 3.2 Exposed basalt rocks and evidence of soil cracks providing suitable habitat for Striped Legless Lizard at the offset site

The site is considered to be of high quality given the presence of a large population of Striped Legless Lizard within the offset site evidenced by recent reliable targeted surveys and monitoring (Nature Advisory 2021). A total of 13 individuals of Striped Legless Lizard were recorded during tile grid surveys, three of which were recorded within the allocated site for this offset (Nature Advisory 2021). All individuals of Striped Legless Lizards recorded during field surveys appeared to be in good condition as detailed in Figure 3.3.



Figure 3.3 Striped Legless Lizard individual recorded at [REDACTED] offset site during targeted surveys and tile checks in 2020 monitoring (Nature Advisory 2021)

As mentioned in the Landowner Agreement ([REDACTED]) for the [REDACTED] property, potential threats to Striped Legless Lizard at the offset site include the invasion of noxious weeds and over browsing by European rabbits. This Offset Management Plan has been prepared to address these potential threats and support the persistence of Striped Legless Lizard at the site.

4. Offset Management

This section discusses the EPBC Offset Management obligations at [REDACTED]. These obligations are discussed in detail in Sections 4.1 to 4.14. In summary, the key focus of the management obligations and therefore key gains of the offset site (as outlined in [REDACTED]), include:

- The protection of the offset site through a section 69 agreement under the *Conservation, Forests and Lands Act 1970*
- Undertake periodic biomass management at agreed timing and frequency
- Eliminate all woody weeds <1% cover
- Ensure that herbaceous weed cover does not increase beyond current levels
- Monitor for any new and emerging weeds and eliminate to <1% cover
- Control invasive species, in particular European rabbits (*Oryctolagus cuniculus*)
- Control all high threats

The management actions listed above have been undertaken across the wider offset parcel since the property was registered under Section 69 of the *Conservation, Forests and Lands Act 1987* in 2020 and therefore are well established within the [REDACTED] site.

4.1 In Perpetuity Security

The offset site has been secured in-perpetuity via an agreement under Section 69 of the *Conservation, Forests and Lands Act 1987*, which was registered on the title on 17 July 2020. The offset site will be managed, protected and secured in-perpetuity for the purposes of biodiversity conservation.

4.2 Habitat Condition

Habitat values within the [REDACTED] offset site are in excellent condition and high-quality habitat is attributable to the long-term undisturbed nature of the area and current management of the Offset Site. Gains in vegetation quality and habitat for Striped Legless Lizard through on-ground management actions are expected over the duration of the 10-year offset management plan.

4.3 Fencing

The [REDACTED] offset site is fitted with secure and well-maintained fencing that surrounds the property boundary and separates zones internally for strategic grazing purposes. The intention of fencing at the offset site is to protect the site from threats including stock and unauthorised access. All fencing around and within the site is to be maintained in good condition according to *Fencing Management Standard* detailed in *DELWP Management standards for native vegetation offset sites September 2019* as outlined in the landowner agreement ([REDACTED]).

4.4 Access and Signage

As mentioned in Section 4.3 the offset site is protected by well-maintained fencing that surrounds the entire property boundary, therefore access by disallowed livestock and pedestrians is considered to be low. Signage identifying this as a private property is currently installed and maintained by the landowner on site. Any illegal activity or trespassing on the property will be reported to the Victorian Police Force and perpetrators will be prosecuted.

4.5 Biomass management

To promote floristic diversity in native grassland vegetation and to uphold suitable habitat for Striped Legless Lizard, biomass management will be undertaken within the offset site. Biomass management will be

implemented to maintain the inter-tussock space for germination and recruitment of native flora whilst preserving habitat for Striped Legless Lizard. As detailed within the landowner agreement, livestock (specifically sheep) are permitted into all zones of the offset site for strategic grazing. The site is currently seasonally grazed at 1 sheep per acre to reduce impacts associated with high intensity grazing.

The method and timing of biomass management will be seasonally dependent and will largely respond to the growth and extent of introduced and native grasses yearly. To assist landowner decisions on the most appropriate grazing regime relevant to the vegetation quality, species composition and seasonal conditions each year, a spring vegetation assessment will be undertaken by a qualified botanist or ecologist in each management year. The survey will aim to identify flora species present within the offset site and the composition of these species at the time of assessment, including the extent of native vs non-native and perennial vs annual grasses and herbs.

Table 4.1 outlines the biomass management methods and timing within the [REDACTED] offset site.

Table 4.1 Biomass management methodology, timing and performance targets within the [REDACTED] offset site

Biomass management	Method	Timing and Performance Targets
Strategic Grazing Regime	<p>A grazing and rest regime will be implemented using a maximum stocking rate of 12 Dry Sheep Equivalent (DSE) per hectare across the credit site.</p> <p>Grazing pressure will be reduced to 0-5 DSE/ha during dry or low growth periods, late Spring and Summer, to minimise impacts to native grass and forb species and allow for their natural recruitment</p> <p>Rotational grazing to be implemented to conserve and enhance native grassland and wetland vegetation and MNES habitat. Close monitoring to be undertaken to determine the grazing pressure required relevant to vegetation, habitat and seasonal conditions</p>	<p>The timing of grazing will depend largely on vegetation, habitat and seasonal conditions. In each management year, the landholder will:</p> <ul style="list-style-type: none"> • Aim to maintain at least 70% vegetation cover; • Maintain at least 20% bare ground or inter tussock space by mid to late Spring each year to allow for recruitment of native herbs and grasses. • Allow native grasses sufficient recovery time after grazing (i.e. until native grass species have at least three tillers); • Reduce the grazing pressure from mid to late Spring (0-5 DSE/ha depending on seasonal conditions) to minimise impacts to native forb species; • Maintain a minimal stocking rate over summer (0-5 DSE/ha depending on seasonal conditions) to support the natural recruitment of native grass species; • Where possible, aim for a 3-month exclusion period in either Spring or Summer if seasonal and vegetative conditions allow (e.g. if annual introduced grasses and herbaceous weeds are not out-competing native flora) and; • Reduce or remove grazing from the offset site at any other time as required (e.g. during dry, low growth periods or extreme wet conditions when the site may be at risk of pugging), to avoid impacts to native grassland, wetland vegetation and habitat.
Ecological Burning	<p>Ecological burning will be used to reduce both native and non-native biomass as required and where targeted, the cover of introduced grasses</p> <p>Prior to each ecological burn, the landholder will:</p> <ul style="list-style-type: none"> • Obtain a burn permit from Golden Plains council if within the fire danger period • Notify CFA and council of burn days • Prepare a burn plan with a consultant or CFA • Ensure appropriate containment equipment and protocols are in place • Any fire breaks to be slashed and wetted (no foam or mineral earth breaks) <p>Each ecological burn will involve burning in either a non-targeted mosaic pattern to a maximum of 20% of the credit site, or over one or multiple targeted areas (each <1ha to a maximum of 20%</p>	<p>A minimum of two ecological burns will be implemented in Autumn across the credit site during management years 3-8. A Spring burn may only be implemented following advice from a qualified botanist or ecologist.</p> <p>The ultimate timing, size and frequency of ecological burning will be at the discretion of the landowner depending on vegetation and seasonal conditions, the outcomes of other management activities and the availability of suitable personnel and equipment.</p>

Biomass management	Method	Timing and Performance Targets
	<p>of the credit site) with a high cover of introduced grasses or dense swards of native grass (eg. Kangaroo Grass) that are limiting inter-tussock spaces.</p> <p>The reintroduction of grazing will be delayed after a burn to allow sufficient recovery of native perennial grass (i.e. plants have a minimum of three tillers). Close monitoring will be undertaken to review the outcomes of each ecological burn and plant recovery. Ecological burning must be undertaken in accordance the Golden Plains Shire and CFA planning requirements.</p>	
Spring Vegetation Assessment	A rapid spring assessment by a qualified botanist/ecologist will be undertake each year to assist with biomass management decisions through reviewing vegetation and habitat condition, the composition of flora species present, including the cover of introduced grasses and herbaceous weeds, and the outcomes of strategic grazing and ecological burning undertaken.	Early to mid-Spring in each management year

4.6 Weed Control

The control of woody and herbaceous weeds are mandatory management actions under section 69 of the *Conservation Forest and Lands Act 1987* and form part of this OMP. Weed control within the offset site is to focus on the management of several high threat herbaceous weeds identified in Table 4.2 below.

Table 4.2 Herbaceous weeds recorded in the Offset Site, proposed control method and timing

Common Name	Scientific Name	Method of control	Timing
Brown-top Bent	<i>Agrostis capillaris</i>	Strategic grazing and ecological burning. If required, spot with appropriate herbicide prior to flowering, chip or hand pull.	All year
Capeweed	<i>Arctotheca calendula</i>	Spot spray if required with appropriate herbicide prior to flowering, chip or hand pull.	Spring
Brome	<i>Bromus spp.</i>	Strategic grazing and ecological burning. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Winter and Spring
Spear Thistle	<i>Cirsium vulgare</i>	Spot spray with appropriate herbicide prior to flowering, chip or hand pull. For significant infestations, control a feasible area each year (<70ha).	Spring and Summer
Couch	<i>Cynodon dactylon</i>	Strategic grazing and ecological burning. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	All year
Big Heron's-bill	<i>Erodium botrys</i>	Strategic grazing. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Spring
Ox-tongue	<i>Helmintheca echinoides</i>	Spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Spring
Yorkshire Fog-grass	<i>Holcus lanatus</i>	Strategic grazing and ecological burning. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	All year
Barley-grass	<i>Hordeum spp.</i>	Strategic grazing and ecological burning. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Winter and Spring
Cat's Ear	<i>Hypochaeris radicata</i>	Strategic grazing. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Spring
Spiny Rush	<i>Juncus acutus subsp. acutus</i>	Cut and paste, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Spring
Hare's tail grass	<i>Lagurus ovatus</i>	Strategic grazing and ecological burning. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Winter and Spring

Common Name	Scientific Name	Method of control	Timing
Ryegrass	<i>Lolium spp.</i>	Strategic grazing and ecological burning. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Winter and Spring
Serrated Tussock	<i>Nassella trichotoma</i>	Spot spray with appropriate herbicide prior to flowering, chop or hand pull.	Spring and Summer
Toowoomba Canary-grass	<i>Phalaris aquatica</i>	Strategic grazing and ecological burning. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	All year
Onion Grass	<i>Romulea rosea</i>	Strategic grazing. If required in concentrated areas, spot spray with appropriate herbicide prior to flowering, chip or dig out corms.	Winter and Spring
Dock	<i>Rumex spp.</i>	Strategic grazing. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Spring and Summer
Sow-Thistle	<i>Sonchus spp.</i>	Strategic grazing. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	All year
Rat-tail Grass	<i>Sporobolus africanus</i>	Strategic grazing and ecological burning. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Spring
Variegated Thistle	<i>Silybum marianum</i>	Spot spray with appropriate herbicide prior to flowering, chop or hand pull.	Spring
Clover	<i>Trifolium spp.</i>	Strategic grazing.	Spring and Summer
Squirrel-tail Fescue	<i>Xanthium spinosum</i>	Strategic grazing and ecological burning. If required, spot spray with appropriate herbicide prior to flowering, chip or hand pull.	Spring

Total cover of the herbaceous and grassy weeds listed above at the offset site was noted as 25% at commencement of management.

These species are to be primarily controlled by strategic grazing, ecological burns and spot spraying taking extreme care to avoid off-target species and impacts associated with spray-drift. These weeds are to be monitored each year to ensure that biomass and projected cover is not increasing. Annual monitoring and elimination of new and emerging herbaceous weeds will also be required as part of this OMP.

No woody weeds were recorded within the offset site. Monitoring for woody weeds, with rapid control actions will also be required as part of this OMP.

Weeds are to be managed in accordance with DELWP's *Management Standards for native vegetation offset sites (September 2019 – Weed Management Standard)* as outlined in the Landowner agreement () and include at minimum the following measures:

- Eliminate all woody weeds <1% cover with no mature plants present
- Ensure all herbaceous weed cover does not increase beyond current levels
- Monitor for any new and emerging weeds and eliminate to <1% cover.

4.7 Pest Control

Control programs to reduce ecological pressures associated with degradation and fragmentation of habitat for Striped Legless Lizard by introduced fauna have been devised. Pest animals recorded within the offset site include rabbits and foxes. Rabbits have been observed and identified as a prominent feral species within the offset site given a number of warrens and dens have been recorded along the banks of Ferrers Creek.

The intent of the pest control program is to prevent the spread of, and as far as possible eradicate any established pest animal within the offset site. The successful control of pest animals will result in reduced degradation and material gains in the habitat condition on site, which will directly benefit Striped Legless Lizard habitat and long-term population viability at the offset site.

To monitor and control pest animals, signs of pest animals will be recorded during weed monitoring surveys, and all other times when visiting the offset site throughout the year. In particular, the locations of any active rabbit warren or fox den must be recorded, and the locations supplied to the pest animal management

contractor or landholder for treatment. Subsequent monitoring will then revisit the previously mapped warren or den to check for on-going use in addition to searching for new warrens and dens throughout the area. Rabbits and foxes should be monitored and controlled throughout the year in accordance with the DELWP's *Management standards for native vegetation offset sites (September 2019)*.

An integrated approach to pest animal management as outlined in Table 4.3 below. A combination of these control techniques will achieve the best outcome to control pest populations in an effective, safe and humane way. Care must be taken to avoid off-targets impacts or inadvertent harm to native flora and fauna.

Any new or emerging pest animal threat identified during the monitoring program for Striped Legless Lizard is to be treated promptly by the landowner, with responsive control measures implemented within the offset site and broader offset parcel.

Table 4.3 Pest animals recorded in the Offset Site, proposed control method and timing

Common name	Method	Timing	Performance targets
Rabbits	<ul style="list-style-type: none"> Fumigation and hand collapse of rabbit burrows Control exotic plants or disperse logs if they are providing rabbit harbour but ensure that habitat components for indigenous fauna are not lost Remove or disperse surface harbour Monitor and control 	Annually and ongoing	Reduced rabbit numbers or evidence of population decrease during monitoring of Striped Legless Lizard
	<ul style="list-style-type: none"> Baiting and Shooting (optional method) When baiting, collect and dispose of carcasses to prevent poisoning native predators 	September to January if required	
Foxes	<ul style="list-style-type: none"> Fox dens where present are to be destroyed through fumigation and hand collapse Monitor and control as necessary 	Ongoing	Reduced fox numbers or evidence of population decrease during monitoring of Striped Legless Lizard
	<ul style="list-style-type: none"> Shooting (optional method) Remove or disperse surface harbour 	September to January if required	
New and emerging pest animals	<ul style="list-style-type: none"> Monitor and control as necessary Remove rubbish and disperse logs or rocks that may be used to harbour pest animals 	Ongoing	Control any new / emerging pests

4.8 High threats

The Striped Legless Lizard is highly vulnerable to disturbance and several key threatening processes. To protect and maintain ecological values recorded within the [REDACTED] offset site, the following threats are to be controlled:

- Grazing threats from introduced animals
- Overgrazing by native animals including kangaroos, wallabies and possums
- High threat weeds
- Inappropriate fire or flood regimes
- Inappropriate drainage
- Threats to condition from vehicles including motorbikes
- Illegal firewood collection and tree or log harvesting
- Additional threats as identified or that may appear during the 10-year active management period of this OMP.

The threats listed above threaten soil structure, natural water flow, vegetation condition and recruitment. To mitigate these high threats the following control methods have been proposed (Table 4.4).

Table 4.4 High threat control methods and timing

Threat	Method for monitoring and control actions	Timing
Uncontrolled livestock access	Internal and external fences will be stock-proof to prevent access by neighbouring stock and support a rotational grazing regime.	Completed in Year 1. Monitoring of fence condition will be ongoing.
Potential for spray drift from nearby cropland	Signage along the boundary fence will alert neighbouring properties and the public to the presence of the offset site and prohibited activities. Monitor for spray drift. If a threat arises, it will be addressed with the relevant landowners.	Erection of signage was completed in Year 1. Monitoring will be ongoing.
Unauthorised vehicle or pedestrian access	All access gates to the credit site will remain locked and signs will be erected along the external boundary fence to alert the public to the presence of the credit site, its purpose and prohibited activities.	Access gates are locked. Erection of signage was completed in Year 1.
Impact by management vehicles	The site is accessible to vehicles when their threat to native vegetation and habitat is low (i.e. when dry) to implement management actions. Close monitoring will be undertaken by the land manager and an ecologist during the annual rapid Spring assessment, or Vegetation Quality Assessments, to ensure vehicles do not impact native vegetation and habitat condition and extent.	Ongoing monitoring by land manager. Annual monitoring by ecologist during rapid Spring assessment.
Litter	Litter collection to be undertaken as required. Signage along the boundary fence will alert the public to the presence of the credit site, its purpose and prohibited activities, including no littering.	Erection of signage was completed in Year 1. Litter collection will be undertaken as required.
New / emerging threats	Monitoring for new high threats and developing an integrated program of management and control actions for each new threat that is identified.	As required

4.9 Monitoring and Reporting

This OMP requires the landowner to submit a report annually for each year of the ten years of this management plan to DELWP and DAWE. The monitoring report is to be submitted at least two months prior to the anniversary date of the execution of the agreement to allow time for compliance to be assessed before the anniversary date. The monitoring report is to include details of the monitoring and management works conducted within the offset site.

4.9.1 Striped Legless Lizard population monitoring

The intent of this OMP is to conserve and maintain the existing Striped Legless Lizard population within the offset site at [REDACTED]. Monitoring of the population is therefore a requirement of this OMP. The monitoring program, as set out below, is to be conducted in accordance with the EPBC survey guidelines for Australia's threatened reptiles (DSEWPC 2011b).

Monitoring will determine if the distribution and population of Striped Legless Lizard persists within the offset site and ensure that the management activities and habitat are suitable for a viable Striped Legless Lizard population in the future. Targeted survey monitoring for Striped Legless Lizard is to be conducted by a suitably qualified and experienced ecologist/zoologist during the appropriate survey period (tile grids laid by June, monitoring from September to December) in each monitoring year.

Baseline Striped Legless Lizard monitoring has already been completed for the broader offset parcel as detailed in Section 4.9.1.1. Further monitoring will be undertaken in Years 2, 5, 8 and 10 to monitor the population.

Striped Legless Lizard population monitoring reports will be prepared after each monitoring year and submitted by the approval holder to DELWP and DAWE.

Additional monitoring of Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) and Striped Legless Lizard habitat will also be undertaken as part of this OMP. Vegetation quality assessments (VQA) will be undertaken by a suitably qualified botanist/ecologist in Years 2, 5, 8 and 10 and will include:

- A record of flora species present;

- Review vegetative covers of native and non-native vegetation, including native grasses and herbs, woody and herbaceous weeds, and high threat herbaceous weeds;
- Undertake a Vegetation Quality (Habitat Hectare) Assessment;
- Reassessment of the vegetation and habitat against the condition thresholds for NTGVVP and Striped Legless Lizard habitat;
- Vegetation quality assessment reports to be prepared after each assessment in Years 2, 5, 8 and 10; and,
- If required, review future management actions to ensure improvement and the 10-year and in perpetuity targets are being met.

The approval holder will submit the vegetation quality assessment reports to DELWP and the Department upon completion.

4.9.1.1 Baseline Striped Legless Lizard monitoring results

Baseline monitoring conducted over the 2020/21 survey season confirmed the presence of a Striped Legless Lizard population at the [REDACTED] offset site (Nature Advisory 2021). A total of 13 Striped Legless Lizard individuals were observed and recorded under five tile grids deployed across the study area and indicates that the species is likely persist throughout the widespread native grassland habitat of the larger offset parcel (Nature Advisory 2021). The baseline monitoring survey confirmed that the site is a suitable offset site for the Corridor Section of the MAR Project given the area provides habitat to support a Striped Legless Lizard population and the future conservation of the species.

4.10 Annual Reporting

The annual monitoring report are to detail progress against the commitments set out in this OMP. Annual monitoring should therefore provide enough detail in the form of written components and supporting evidence that an assessor can easily determine the completion of/progress against the commitments for each management action.

Details of the monitoring reports are to include (but are not limited to):

- Results of monitoring conducted on site fencing, weed control programs and pest/feral animal control actions
- Details of management actions undertaken and completed within the offset site during the reporting period
- Site photographs
- Details of compliance or non-compliance with the schedule of management actions
- Details of compliance or non-compliance with performance targets
- Details of any incidents or new and emerging management issues, with recommendations for corrective action and plan review.

The results of the monitoring programs are to be reported to DELWP and DAWE. Any major breaches of the management programs and or impacts on the target species (Striped Legless Lizard) is to be reported immediately by the landowner.

Results of Striped Legless Lizard population monitoring is to be reported on Years 2, 5, 8 and 10. Striped Legless Lizard population monitoring reports will be prepared after each monitoring year and submitted by the approval holder to DELWP and DAWE.

4.11 Adaptive Management

The monitoring program is required to identify any significant failings in the implementation or outcomes of the OMP, and any new or emerging threats that require an immediate and adaptive response. The development of an appropriate and responsive addition or variation of the OMP will be developed in

consultation with the landowner, DELWP and RPV. Any activities and approaches beyond the scope of the current Section 69 Agreement and Management Plan registered on title should be approved by DELWP prior to their implementation.

Examples of significant failings in the implementation or outcomes of the OMP would include stochastic events such as bushfire, habitat and/or water contamination due to chemical spills, significant population decline of Striped Legless Lizard, major fence failure and/or stock impacts within habitat, or events that are considered to be significant enough to warrant an adaptive management approach within the offset site.

In the event of a significant detrimental impact within the Offset area and/or failing of the OMP, the landowner will:

- Promptly notify RPV
- Develop a responsive management plan to address impacts
- Update the OMP and/or review the implementation period to address impacts

The intent of an adaptive management action provision in this OMP is to provide a mechanism for the landowner and RPV that facilitates considered and scientifically based variations to the management of the offset site. This flexible approach can be beneficial in that it enables a 'change of plan' if the Striped Legless Lizard population is not increasing, and/or habitat quality for the species is not improving on site. Variations of this nature however must be taken in consultation with ecologists, RPV, DAWE and where appropriate, other government Agencies with expertise in the management of threatened species or habitat.

4.12 Performance Targets

Table 4.5 outlines the 10-year performance targets for the actions identified within this OMP and the year that they will be achieved.

Table 4.5 10-year performance targets

Management Action	Responsibility	Timing	Performance Target	Year to be Achieved
Security Agreement	Landowner	Once	Offset site secured in-perpetuity via an agreement under Section 69 of the <i>Conservation, Forests and Lands Act 1987</i> , which was registered on the title on 17 July 2020	Achieved
Habitat Condition Monitoring	Landowner	Annual	Annual report provided to RPV detailing improvement or maintained habitat quality and condition.	Years 1 to 10
Fencing	Landowner	Responsive	Fencing maintained and repaired promptly if required	Achieved in 2020-2021 and ongoing
Access and Signage	Landowner	Responsive	Gates, fencing and or signage maintained within offset site	Achieved in 2020-2021 and ongoing
Weed Control	Landowner	Annual	Control all introduced grasses and herbaceous weeds to <25% cover and no woody weeds present.	First year, and ongoing
Pest Control	Landowner	Annual	Control of feral animals, particularly rabbits	Commenced 2020, ongoing
Biomass Control	Landowner	Annual	Controlled grazing regime/ ecological burn to conserve native grassland	Strategic grazing – Commenced 2020, seasonal, ongoing Ecological burns in Years 3-8

Management Action	Responsibility	Timing	Performance Target	Year to be Achieved
Striped Legless Lizard Targeted Surveys	Landowner	Years 2 (completed), 5, 8 and 10	Improvement to Striped Legless Lizard population/habitat	Baseline completed (2020), Years 2, 5, 8, 10 upcoming
Monitoring and Reporting	Landowner	Annual	Annual reports provided	Year 1 report submitted July 2021. Years 2-10 upcoming

4.13 10-Year Management Plan

Table 4.6 provides a summary of the management action, responsible personnel and timing of each action to be implemented over the 10-year management period. Existing actions follow those detailed in the landowner agreement ().

Table 4.6 10-year management actions, responsibility and timing within the Offset Site

Management Action	Description	Responsibility	Timing of Action	Performance Target
Fencing	<ul style="list-style-type: none"> Maintain perimeter fencing in good condition around the entire boundary of all sites 	Landowner	Ongoing	<ul style="list-style-type: none"> Uphold and maintain fencing as per the DELWP Fencing Standards in <i>Management Standards for native vegetation offset sites, September 2019</i>
	<ul style="list-style-type: none"> Conduct yearly monitoring to ensure all fencing meets the required standard 			
Access and Signage	<ul style="list-style-type: none"> Maintain signage along the external boundary of the credit site alert neighbours, roadside managers and the public to the presence of the offset site, its purpose and prohibited activities 	Landowner	Ongoing	<ul style="list-style-type: none"> A minimum of four signs along the external boundary at all times
Woody Weeds	<ul style="list-style-type: none"> Monitor for any re-sprouting or seedlings and eradicate (either spot spray or hand pull) 	Landowner	Ongoing	<ul style="list-style-type: none"> Achieve <1% cover of all listed woody weeds, with no mature plants present at the end of Year 10 Minimise off-target damage and avoid impact to native plants
	<ul style="list-style-type: none"> Monitor for and eliminate all new & emerging woody weeds 			
Herbaceous weeds	<ul style="list-style-type: none"> Monitor for and control all herbaceous weeds. Refer to Table 4.2 for list of herbaceous weeds, their control method and timing of actions 	Landowner	Table 4.2 & Ongoing	<ul style="list-style-type: none"> No increase in cover beyond the cover listed for all herbaceous weeds Minimise off target damage and avoid impact to native plants
	<ul style="list-style-type: none"> Monitor for and eliminate all new & emerging herbaceous weeds 			<ul style="list-style-type: none"> Achieve <1% cover of all new and emerging herbaceous weeds at the end of Year 10
Pest animals	<ul style="list-style-type: none"> Monitor for and control rabbits and foxes. Refer to Table 4.3 for a list of control methods and timing of actions 	Landowner	Table 4.3 & Ongoing	<ul style="list-style-type: none"> No surface disturbance within the Offset site No active rabbit warrens to be present No active fox dens to be present No rubbish Minimal artificial piles of logs and rocks

Management Action	Description	Responsibility	Timing of Action	Performance Target
	<ul style="list-style-type: none"> Monitor for and control rabbits and foxes 			<ul style="list-style-type: none"> Control numbers of rabbits and foxes
	<ul style="list-style-type: none"> Monitor for and control all new and emerging pest animals 			<ul style="list-style-type: none"> Control numbers of any new & emerging pest animals
High threats	<ul style="list-style-type: none"> Control all high threats to native vegetation condition improvement. 	Landowner	Ongoing	<ul style="list-style-type: none"> No increase in, and where possible a reduction of presence, activity and impact of identified threat(s) from levels recorded at commencement date
	<ul style="list-style-type: none"> Monitor for new high threats and for each new threat identified – develop an integrated program of management and control actions to be implemented 			<ul style="list-style-type: none"> Develop an integrated program of management and control actions for DELWP for approval within 3 months of identification of threat Implement program upon DELWP approval
Biomass management	<ul style="list-style-type: none"> Implement strategic grazing regime. Refer to Table 4.1 for method and timing. 	Landowner	Table 4.1	<ul style="list-style-type: none"> Controlled grazing regime is implemented for the purposes of native grassland conservation
	<ul style="list-style-type: none"> Undertake ecological burn (optional year). Refer to Table 4.1 for method and timing. 			<ul style="list-style-type: none"> A minimum of 2 ecological burns undertaken in the credit site in Years 3-8
	<ul style="list-style-type: none"> Undertake rapid spring assessment. Refer to Table 4.1 for method and timing. 			<ul style="list-style-type: none"> Rapid spring assessment completed and assist landowner biomass management decisions
Striped Legless Lizard population monitoring	<ul style="list-style-type: none"> Undertake monitoring of Striped Legless Lizard to assess distribution and population trends 	Suitably qualified ecologist / zoologist	Baseline completed (2020), Years 2, 5, 8, 10 upcoming	<ul style="list-style-type: none"> Maintain and increase Striped Legless Lizard population and distribution within offset site
	<ul style="list-style-type: none"> Undertake vegetation quality assessment 			<ul style="list-style-type: none"> Maintain and increase habitat hectares score
	<ul style="list-style-type: none"> Prepare and submit monitoring reports 			<ul style="list-style-type: none"> Reporting is submitted
Annual reporting	<ul style="list-style-type: none"> Prepare and submit an annual report 	Landowner	Annual	<ul style="list-style-type: none"> Annual report is signed, dated and submitted by the landowner at least 2 months prior to the anniversary date of the agreement Report provides enough detail in the form of written comments and supporting evidence that an assessor can easily determine the competition of/progress against the OMP commitments

4.14 In Perpetuity Management

This OMP outlines the management actions and targets to be achieved at the offset site to improve the quality of potential habitat for Striped Legless Lizard habitat over the 10-year time period. At the completion of the time period, the landowner is required to continue to undertake management actions to retain the Striped Legless population, in addition to the quality and extent of habitat for the species at the offset site in perpetuity. Table 4.7 identifies the in-perpetuity performance targets for the offset site.

Table 4.7 Offset site performance targets to be maintained in perpetuity

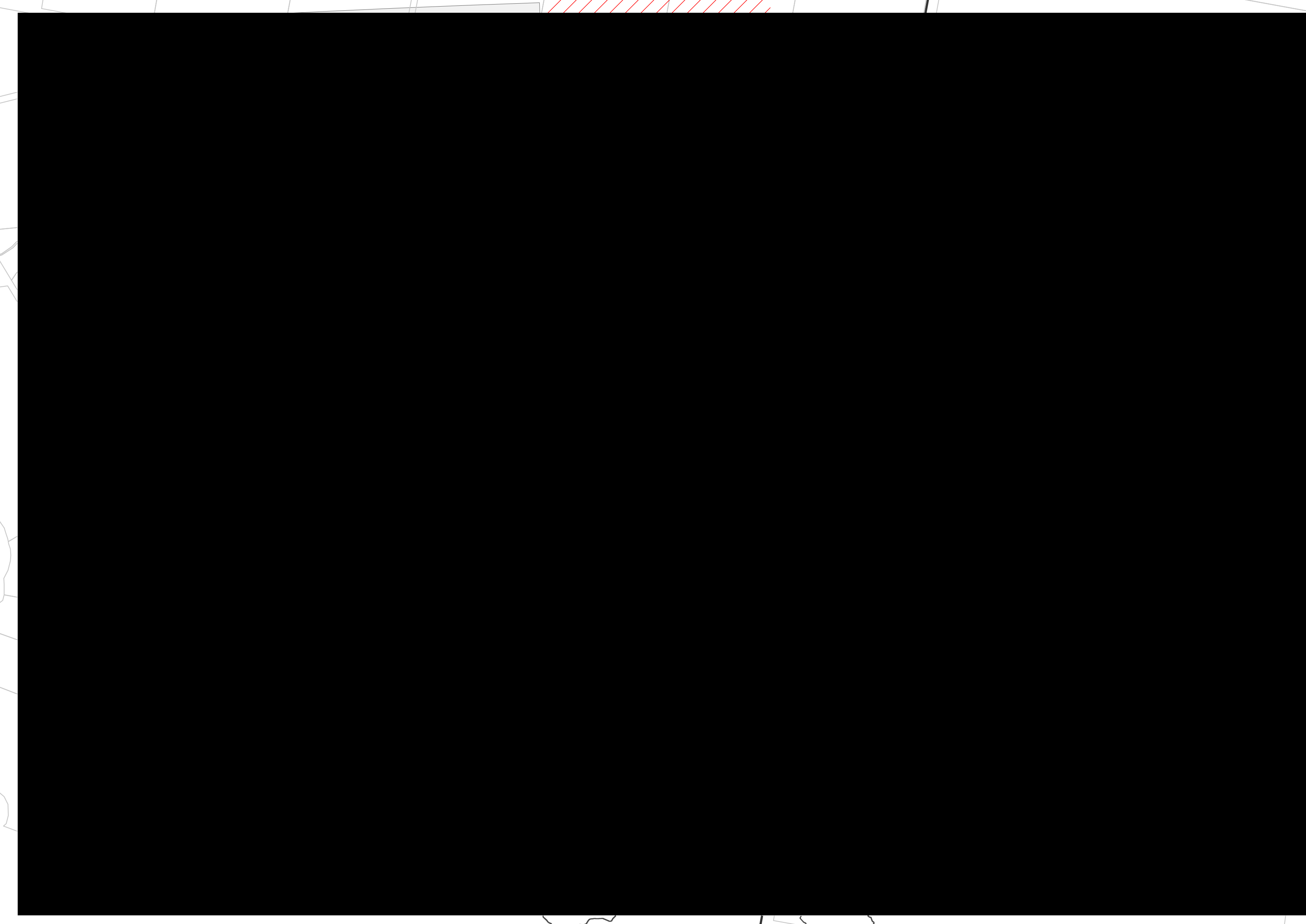
Management Action	Responsibility	Performance Target
Security Agreement	Landowner	Section 69 agreement remains on Title
Habitat Condition	Landowner	Maintained at improved level
Fencing	Landowner	Maintained and upgraded if required
Access and Signage	Landowner	Illegal access prohibited
Weed Control	Landowner	Woody and herbaceous weeds controlled and eliminated
Pest Control	Landowner	Pest species managed and controlled
Monitoring and Reporting	Landowner	Landowner must submit annual reports for years 1-10 and thereafter at the reasonable request of DELWP
Striped Legless Lizard population monitoring	Suitably qualified ecologist / zoologist	Reporting submitted following monitoring surveys in Years 2, 5, 8, 10.

5. Information Sources

- AJM-JV (2022a) *Corridor Section Preliminary Documentation (EPBC 2021/9081)*. Doc No. MAR-AJM-PWD-PWD-REP-XLP-NAP-0002722, Rev A, prepared 20 April 2022
- AJM-JV (2022b) *MAR Corridor Section (EPBC 2021/9081) MNES Offset Strategy*. Doc No. MAR-AJM-PWD-PWD-REP-XLP-NAP-0002738, Rev. A, prepared 20 April 2022
- DELWP (2022). *NatureKit*. Retrieved 2022, <http://maps.biodiversity.vic.gov.au/viewer/?viewer=NatureKit> Department of Environment, Land, Water and Planning, Government of Victoria.
- DSEWPC (2011a). *Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the vulnerable striped legless lizard, Delma impar*. E. Department of Sustainability, Water, Planning and Communities, Commonwealth Government, ACT.
- DSEWPC (2011b) Survey Guidelines for Australia's threatened reptiles, Guidelines for detecting reptiles listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*, Department of Sustainability, Environment, Water, Population and Communities, Commonwealth Government, ACT
- Nature Advisory (2021) [REDACTED]
- Smith, W.J.S. & P. Robertson (1999). National Recovery Plan for the Striped Legless Lizard (*Delma impar*): 1999-2003. Unpublished report to Environment Australia, Canberra.
- TSSC (2016). Conservation Advice for the Striped Legless Lizard (*Delma impar*). Threatened Species Scientific Committee. Environment Protection and Biodiversity Conservation Act 1999

APPENDIX A MAP OF OFFSET SITE





APPENDIX B OFFSET ASSESSMENT CALCULATIONS



For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Striped Legless Lizard
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Threatened species habitat						
	Area of habitat	Yes	Striped Legless Lizard Habitat	Area	1.147	Hectares	MAR COR Section MNES Report (App H to EPBC Referral)
				Quality	5	Scale 0-10	
				Total quantum of impact	0.57	Adjusted hectares	
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
	Threatened species						
	Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No						
Number of individuals e.g. Individual plants/animals	No						

Offset calculator																						
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
	Ecological Communities																					
	Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset										
									Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0										
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)										
	Threatened species habitat																					
	Area of habitat	Yes	0.57	Adjusted hectares	5	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	5	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%	0.00	90%	0.00	0.00	0.74	129.48%	Yes		
									Future area without offset (adjusted hectares)	5.0	Future area with offset (adjusted hectares)	5.0										
						Time until ecological benefit	5	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	7	2.00	75%	1.50	1.49					
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
Number of features e.g. Nest hollows, habitat trees	No																					
Condition of habitat Change in habitat condition, but no change in extent	No																					
Threatened species																						
Birth rate e.g. Change in nest success	No																					
Mortality rate e.g. Change in number of road kills per year	No																					
Number of individuals e.g. Individual plants/animals	No																					

Summary								
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
						Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	0.5735	0.74	129.48%	Yes	\$0.00	N/A	\$0.00
	Area of community	0				\$0.00		\$0.00
							\$0.00	\$0.00



AURECON | JACOBS | MOTT MACDONALD

222 Exhibition Street
Melbourne VIC 3000

PO Box 23061
Docklands VIC 8012
Australia

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AURECON | JACOBS | MOTT MACDONALD

222 Exhibition Street
Melbourne VIC 3000

PO Box 23061
Docklands VIC 8012
Australia

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