PRACTICAL ECOLOGY
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Targeted Spiny Rice-Flower and Striped Legless Lizard Surveys at 31 Fuller Road, Ravenhall




February 2022

Prepared for Fuller Road West Pty Ltd

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1. Executive summary

Practical Ecology Pty Ltd was commissioned by Fuller Road West Pty Ltd to undertake targeted surveys for Spiny Rice-flower *Pimelea spinescens* and Striped Legless Lizard *Delma impar* at 31 Fuller Road, Ravenhall. This aimed to meet the requirements of a request from Melton City Council dated 15 December 2020, and to identify if a recommendation for a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EBPC Act) is warranted in relation to proposed development of the Study Area into an industrial estate.

Moderate suitable habitat for the SRF was detected in the south-east section of the Study Area and formed the focus of targeted transect surveys for this species. Similar for the SLL, moderate quality habitat was identified within the south-east area of the Study Site, within SLL tile grids number three to six were subsequently located.

No SRF were detected during the transect surveys completed within the moderate quality habitat identified within the Study Area. No SLL were detected across the seven tile grids established within the Study Area, and during the six surveys that were completed from October to December 2021. The Tussock Skink, *Pseudemoia pagenstecheri* – listed as threatened under the *Flora and Fauna Guarantee Act 1988* – was however recorded at four of the seven tile grids.

Based on the extent and quality of habitat and connectivity to extant populations, the potential for the site to support a population of SRF or SLL is deemed to be low. A significant impact on either of these species is not expected, though a referral under the EPBC Act, is recommended for SLL as a precautionary approach for legal certainty purposes due to the immediate SLL records and lack of soil disturbance to the west of the Study Area.

No management actions and design elements are recommended to conserve and enhance habitat on the site for SRF and SLL due to the current proposed plans to remove all vegetation resident on site. It is recommended that a suitably qualified zoologist is to be present for the removal of rocks and rock walls and for immediate inspection of the ground post excavation.

2. Introduction

Practical Ecology Pty Ltd was commissioned by Fuller Road West Pty Ltd in February 2021 to undertake targeted surveys for Spiny Rice-flower (SRF) *Pimelea spinescens* subsp. *spinescens* and Striped Legless Lizard (SLL) *Delma impar* at 31 Fuller Road, Ravenhall.

These surveys were commissioned to meet a request for more information from the Environmental Services department at Melton City Council. As communicated via e-mail from Cam Luong (Development Planner at Melton City Council) on 15 December 2020 which stated that:

> *Environment and Sustainability note that the Ecologist report* [Savona 2020] *recommends, targeted surveys for Spiny Rice Flower (Pimelea spinescens subsp. spinescens) and Striped Legless Lizard (Delma impar). Both are protected under the EPBC Act as Matters of National Environmental Significance (MNES). Environment and Sustainability request the following information before reviewing the application any further:*
>
> - *As recommended in the ecologist report, targeted surveys for Spiny Rice Flower (Pimelea spinescens subsp. spinescens) and Striped Legless Lizard (Delma impar) must be undertaken.*

The surveys completed also aimed to inform a decision on whether a referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is recommended in relation to these species. Under the *EPBC Act*, an action must be referred to the Australian Government Department of Environment (DOE), if it '*has, will have or is likely to have a significant impact'* on a listed threatened species. The surveys also aimed to identify if other approvals would be required in relation to the species, such a permit to remove threatened species under the *Flora and Fauna Guarantee Act 1988* (FFG Act).

2.1 Study Area

The Study Area – 31 Fuller Road in Ravenhall – is 20.80 hectares in size. It is an irregularly shaped block, bound by established industrial buildings and associated access roads (Fuller Road, Vanessa Drive and Westwood Drive) to the north and east. To the immediate south vacant land occurs through which a drainage line occurs; a compound with several shipping containers is present to the south-east corner of the site. Further south is the Ararat Rail Line. To the west of the site are vacant and occupied industrial allotments with frontage to Katherine Drive. Map 1 below shows the extent of the Study Area and surrounding features.

The Study Area is zoned Industrial 3 Zone (IN3Z). The south-west corner is covered by Design and Development Overlay – Schedule 1 (DDO1). This overlay provides for the establishment of the connection of the Western Freeway to the Western Ring Road. There are no other overlays that cover the site.

2.2 Project Scope

The scope of works covered by this report include:

- *A desktop analysis to review existing information/ database searches to establish species detection/ presence rates in the surrounding locality*
- *Detailed habitat assessments to determine suitable habitat for SRF and SLL and to guide the location of targeted surveys*
- *An on-site targeted survey capable of detecting the presence of SLL and SRF and undertaken in areas deemed more likely to support these species based on available habitat*
- *A discussion of survey findings, with reference to State and Commonwealth legislative approvals*
- *The provision of relevant guidance on best practice ways of ameliorating potential impacts to SFR and/or SLL and their habitat within the Study Area in relation to its proposed future development as an industrial estate.*

Map 1. Study Area

31 Fuller Road, Ravenhall

Legend

- Study Area
- Parcels
- Contours (10m)
- Constructed watercourse
- Natural watercourse
- Railways

Details

Mapping by: Ali Nia
Date: 3/02/2022
Version: 1
Aerial photography from Nearmap (Dec 2021)).

N

0 50 100 m

Scale 1:2,500 (Page size A3)

Disclaimer

Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

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3. Species Descriptions

3.1 Spiny Rice-Flower

3.1.1 Appearance and Biology

Spiny Rice-flower is a perennial, long-lived subshrub with glabrous, spinescent stems to 30 centimetres long. The leaves are opposite, narrowly elliptic and densely crowded. The species predominately occurs in grasslands with basalt-derived soil (Figure 1). Individual plants are able to persist following fire, grazing or other surface disturbance due to the species large tap root that can be in excess of one metre long. The white flowers are unisexual (sometimes hermaphroditic) emerging primarily between April and August (DAWE 2021).

Figure 1. Spiny Rice-flower. Image; Debbie Reynolds

3.1.2 Distribution and Habitat

Spiny Rice-flower is endemic to Victoria, with the distribution primarily on the Victorian Volcanic Plain, extending from the west of Melbourne to near Horsham. Outlying populations can be found as far as Echuca. Spiny Rice-flower occurs primarily in grasslands and occasionally in shrubland and woodland with basalt derived soils (VicFlora 2020; DSE 2008).

3.1.3 Historical Records and Status in the Study Area

A recent search of the Victorian Biodiversity Atlas (VBA) (DELWP 2022) revealed the Spiny Rice-flower was recorded along the southern boundary of the subject site in 2005. Other nearby records include a population directly north-west of the subject site, with 2013 the most recent record. Multiple records of Spiny Rice-flower are listed within the Ravenhall Nature Conservation Reserve, directly south of the subject site, with 2013 the most recent record (Map 2).

3.2 Striped Legless Lizard

3.2.1 Appearance and Biology

Striped Legless Lizard is a pale-grey lizard up to thirty centimetres in length, with a maximum snout-vent length (SVL) of about twelve centimetres (refer to Figure 2). The species has a long this body and the tail, when unbroken, is about twice the length of the body. They have a series of distinctive dark and light brown or black longitudinal stripes commencing at the neck and breaking into oblique bars or rows of spots on the tail (Cogger 2000; Wilson & Knowles 1988). Each stripe has individual black-centred scales. The head is generally darker than the body and black with juveniles. The underside of the species is whitish and they have a blunt snout. The sexes are similar externally. However, males may be distinguished by the presence of a small rounded 'spur' under each hind limb flap.

Figure 2. Striped Legless Lizard- Long Paddock, Cressy, Victoria (Practical Ecology 2021)

Distribution and Habitat

Striped Legless Lizard has a patchy distribution in grasslands across south-eastern Australia, including south-eastern New South Wales (NSW), the Australian Capital Territory (ACT), much of Victoria and south-eastern South Australia (Robert and Smith 2010). The species has declined across much of its former range in Victoria, with remaining populations occurring in the south-west of the state, upper Goulburn are, and the outer western and northern suburbs of Melbourne (DAWE 2020).

Striped Legless Lizard is restricted to temperate grassland habitats, sheltering in grass tussocks, down soil cracks and spider burrows, and under rocks and woody debris (Robert and Smith 2010). Although the Striped Legless Lizard has been reported to occupy relatively undisturbed native grasslands dominated by tussock-forming grasses such as Kangaroo grass *Themeda* spp. and Spear-grasses *Austrostipa* spp. (Dorrough & Ash 1999), the species is able to occupy and has been observed in grasslands dominated by exotic species. In Melbourne's north and west, Striped Legless Lizard is known to occupy historically disturbed areas dominated by grasses Serrated Tussock Nassella trichotoma and Chilean Needle Grass Nassella neesiana in addition to areas dominated by native grasses (O'Shea 1996; Corrigan *et al*; Rauhala 1996).

Striped Legless Lizard is a relatively sedentary species. Home ranges have been conservatively estimated at 10 m^2 based on recaptures using tiles in Victoria (Robertson and Smith 2010), though a larger area between 25 m^2 (5 m x 5 m) and 100 m^2 (10 m x 10 m) appears to be a reasonable generalisation based on pitfall and tile recapture data from surveys undertaken in the Australian Capital Territory (DAWE, 2014). The greatest distance that an individual SLL has been observed to travel was 80 m (Eco Logical 2013). However, (O'Shea, 2005) estimated that the average distance moved by individuals was 4.05 m.

3.2.2 Historical Records and Status in the Study Area

There is one previous record of Striped Legless Lizard within the Study Area on south-east boundary, recorded in 2003 (DELWP 2022). The closest previous record (from 2007) is approximately 200 metres from the southern boundary of the Study Area. Several records are present from both 2007 and 2012 directly south-west of the Study Area. Targeted surveys conducted in 2016 by Biosis Pty Ltd recorded seventeen Striped Legless Lizard observations within the Ravenhall Nature Conservation Reserve, directly south of the Study Area.

4. Survey Methods

Targeted surveys for Spiny Rice-flower and Striped Legless Lizard were conducted in accordance with the relevant survey guidelines and under the appropriate seasonal conditions. Further detail is provided below.

4.1 Spiny Rice-flower

4.1.1 Habitat Assessment

The entire Study Area was initially traversed on 15th June 2021 to categorise the suitability of habitat for Spiny Rice-flower. The Study Area was then separated into two categories: areas of 'moderate' and 'low' habitat suitability (Map 3). Areas of moderate habitat suitability were defined as those with at least 10% indigenous vegetation cover and low soil disturbance. Areas of low habitat suitability had extensive soil disturbance and almost no indigenous vegetation. No areas of highly suitable habitat were identified, as all areas were relatively disturbed with high cover of environmental weeds.

4.1.2 Targeted Surveys

Targeted surveys for Spiny Rice-flower were subsequently conducted on 3rd August 2021 in all areas of moderate habitat suitability as previously identified. Two botanists (Daniel Miller and Emma Wilkin) walked transects 2 m apart on foot, with each running parallel to the southern boundary. Both botanists had previously performed multiple targeted surveys for Spiny Rice-flower and have detected them in multiple environments including grasslands and urban parkland.

The area adjacent to the previous record of the species was also searched for additional time.

4.2 Striped Legless Lizard

4.2.1 Habitat Assessment

A habitat assessment was undertaken on 15th June 2021 to identify locations across the Study Area containing potential habitat for SLL. This information was subsequently used to inform the positioning of the tile grids throughout the site. Habitat attributes (Robertson and Smith 2010; Turner 2007) assessed included:

- Presence of tussock forming grasses both native Kangaroo grass *Themeda triandra* or Spear Grass Stipa spp. and exotic Chilean Needle Grass *Nassella neesiana* or Serrated Tussock *Nassella trichotoma*
- Presence of dense and continuous tussocks
- Presence of soil cracks and/or arthropod burrows
- Presence of rocks, rock walls and crevices

Based on the presence of the habitat attributes listed above, the location of each grid for the placement of roof tiles (see below) was given a habitat quality score – 'Low', 'Moderate' or 'High'. A Low habitat quality score was given where few to none of the habitat attributes were present. Moderate habitat quality score was given where multiple or all habitat attributes were present though at varying qualities. High habitat quality score was given where all Striped Legless Lizard habitat attributes were present and at a high quality. Map 4 shows the location of tile grids established within the Subject Area.

4.2.2 Targeted Surveys

Targeted surveys for Striped Legless Lizard (SLL) were undertaken in accordance with the *Survey guidelines for Australia's threatened reptiles. EPBC Act survey guidelines 6.6* (DSEWPaC, 2011b). As such, seven tile grids (350 tiles) were deployed in June 2021, four months prior to the initial survey/checks undertaken in October to December 2021.

Each grid consisted of 50 upturned concrete roof tiles arranged in five rows of ten, with approximately five metre spacing between each tile. Each tile in a grid was sequentially numbered, commencing with tile no. 0.0. Tile grids were strategically placed based on the location of suitable habitat.

Six SLL surveys – based on checks of each roof tile deployed on site – were completed between October and December 2021 when ambient temperatures exceeded 12°C, but were below 28°C, in line with the *Survey guidelines for Australia's threatened reptiles* (DAWE, 2011). Prior to checking each tile grid, the ambient temperature, humidity and wind speed were recorded at the first tile for each grid using a hand-held weather meter (Kestrel, k3500). Soil temperature was recorded by placing the Kestrel under the first tile checked at every grid and retrieving once all tiles within the grid had been checked.

Tile surveys were led by two experienced zoologists/ecologist familiar with the appearance and ecology of Striped Legless Lizard. Surveys involved individually checking each tile, six times, at intervals of at least a week apart. Surveys were undertaken on the 6th, 15th and 26th October and the 9th, 17th of November and the 10th of December.

The presence/absence of SLL were recorded for each tile, in each grid on every survey occasion. All non-target vertebrate fauna observed under tiles were recorded, noting the species, number of individuals and relative tile number.

4.2.3 Weather Conditions

Temperature, wind and humidity were noted at the commencement of each tile grid and soil temperature at the end of each grid. The range of conditions recorded for each of the seven grids are listed below (Table 1).

Table 1. Weather **conditions** during Striped Legless Lizard surveys.

Date	Time (start)	Wind	Temperature	Humidity	Soil Temperature
06/10/2021	12:30pm	1-3 km/hr	14-24°C	36-69%	19-28°C
15/10/2021	10:00am	1-6 km/hr	15-25°C	60-7-%	17-30°C
26/10/2021	10:00am	0.8-6km/hr	14-16°C	55-80%	20-26°C
09/11/2021	11:15am	1-3km/hr	20-25°C	35-45%	28-38°C
17/11/2021	11:00am	0-2km/hr	16-20°C	45-55%	20-35°C
10/12/2021	12:30pm	2.5-8km/hr	18-22°C	35-60%	25-35°C

4.3 Taxonomy and Permits

Taxonomy is consistent with the DELWP's Victorian Biodiversity Atlas (DELWP 2020). Terrestrial fauna surveys for this current study were conducted under the Wildlife and Small Institutions Animal Ethics Committee approval, dated 17/11/2019.

4.4 Mapping

Determination of habitat boundaries and grid placement for SLL was informed by a combination of ground-truthing with aerial/satellite imagery and marked on field maps created for the project. Survey maps were then digitised and produced using ArcView ArcGIS.

4.5 Limitations

All surveys were conducted in accordance with the relevant survey guidelines under the EPBC Act and best practice measures and under appropriate weather conditions.

With regard to the SLL surveys, increased rainfall was experienced in October to November resulting in Tile Grid 3 and 4 being submerged in water for extended periods of time. The

potential for detectability of SLL may therefore be somewhat reduced as 50 tiles within Grid 3 and 4 were therefore uninhabitable for 3 survey periods (site visits), potentially reducing the survey effort. There were no other significant limitations relating to the survey effort, implementation and results of the targeted surveys.

Note that surveys aimed to determine the presence or absence of SRF and SLL within the Study Site based on current site conditions. They aimed to meet the request from Melton City Council dated 15 December 2020, and to identify if a recommendation for a referral under the EPBC Act is warranted. As outlined in Savona (2020) the Study Area was subject to ". . . *earthworks to level it, remove debris that had accumulated over time, and to reduce biomass to minimise the risk of a wildfire affecting surrounding infrastructure (Sean Doyle (Pelligra Group), Pers. Comm., 5 August 2020)"* in mid-2020. The results of this study are based on the current conditions on site as observed in mid-late 2021 with inferences made regarding the potential for the site to support SRF and SLL based on the current conditions within the Study Area.

4.6 Database entry, validation and submission

Records of all fauna and flora taxa observations throughout the survey within the Study Area will be submitted to DELWP, as a contribution to the VBA database for future reference.

5. Results

5.1 Spiny Rice-flower

Targeted surveys for SRF were undertaken during the peak flowering time throughout all areas of deemed moderate habitat suitability.

No Spiny Rice-flower were however detected during targeted surveys.

5.2 Spiny Rice-flower Habitat Assessment

Along the southern boundary, there was a small, relatively undisturbed band of grassland vegetation dominated by Wallaby Grasses *Rytidosperma* spp., with scattered occurrence of Spear Grasses *Austrostipa* spp., Small Poranthera *Poranthera microphylla,* Common Woodruff *Asperula conferta,* Grassland Wood-sorrel *Oxalis perennans*, Berry Saltbush *Atriplex semibacatta*, and Windmill Grass *Chloris truncata*, as well as numerous exotic species. These areas were considered 'moderate' suitability habitat for Spiny Rice-flower, with all other areas considered 'low' suitability due to evidence of significant soil disturbance and a general lack of indigenous vegetation (Map 3).

All areas of moderate habitat suitability were thoroughly inspected during targeted surveys and no SRF were detected. The remainder of the Study Area was highly unlikely to support any individuals. There is a low possibility that the Study Area would currently support a population of SRF particularly given the results of targeted surveys in more suitable areas of the site.

5.3 Striped Legless Lizard Survey

A total of seven grids (350 tiles) were surveyed targeted SLL and were completed in suitably warm and calm conditions as documented in Table 1.

No Striped Legless Lizards observed sheltering under tiles or among other habitat attributes within the Study Area that were incidentally assessed.

Five other reptile species were however recorded during the survey. Lizard species detected included Tussock Skink *Pseudemoia pagenstecheri*, Weasel Skink *Saproscincus mustelinus,* Eastern Blue-tongue *Tiliqua scincoides* and a small black skink that was unable to be captured and accurately identified (Table 2). Other species observed included the Tiger Snake *Notechis scutatus,* Spotted Marsh Frog *Limnodynastes tasmaniensis* and House Mouse *Mus musculus.*

Other incidental fauna species recorded during the course of targeted surveys for SLL were also noted are presented in APPENDIX 2.

Table 2. Survey Results for each Tile Grid

Species	Number of detections at each tile grid (TG)						
	TG1	TG2	TG3	TG4	TG5	TG6	TG7
Reptiles							
Tussock Skink *Pseudemoia pagenstecheri*	1	2				1	2
Weasel Skink *Saproscincus mustelinus*					3	1	2
Common Blue-tongue *Tiliqua scincoides*			1		2	1	
Scincidae spp. (Unidentified black skink)	1		2		1	2	
Tiger Snake *Notechis scutatus*		1	2		2		
Amphibians							
Spotted Marsh Frog *Limnodynastes tasmaniensis*		6	16	7	1	1	3
Mammals							
House Mouse *Mus musculus*		1					1

As shown in Table 2, six Tussock Skink individuals were recorded under tiles within Tile Grids1, 2, 6, and 7 (refer to Figure 3). Tussock Skink shares similar habitat requirements to the SLL and is Endangered under the FFG Act.

Figure 3. Tussock Skink from Tile Grid 7 in the north of the Study Area (Practical Ecology 9 October 2021)

5.4 Striped Legless Lizard Habitat Assessment

The Study Area was assessed against the criteria for Striped Legless Lizard habitat including the mapping and habitat quality scoring of different vegetation types (Map 4).

A general description of each habitat quality score is provided below in Table 3.

Table 3. Habitat quality categories

Habitat Quality Score	Habitat Description	Tile Grid No.
Low	Little to no tussock forming grasses present and/or bare earth. Few or no rocks, rock crevices or arthropod burrows	1 & 2
Moderate	Moderately dense tussock forming grasses of both exotic and native species. Presence of either rocks, rock walls, crevices, soil cracks and arthropod burrows	3, 4, 5, 6 & 7
High	Dense native tussock forming grasses etc. Kangaroo Grass and Stipa spp. Rocks, rock walls and crevices present. Soil cracks and arthropod burrows present.	No high habitat was present throughout the Study Area

Tile Grids 3-7 were determined to have a 'Moderate' habitat quality score based on the presence of dense tussock forming grasses, rocks and crevices. Minor differences between Grids 3-7 were found for the 'Moderate' score. These areas predominately consisted of exotic grasses such as Chilean Needle Grass *Nassella neesiana*, though scattered patches of Wallaby Grasses *Rytidosperma* spp. and Spear Grasses *Austrostipa* spp were present among Tile Grids 3-7. Rocks were scattered throughout Study Area, providing refuge for reptile species in Tile Grids 4, 6 and 7 and providing permanent habitat with the presence of rock rumble/walls in Tile Grids 3 and 5. Soil cracks and crevices were present at each of the 7 Tile Grids, providing temporary refuge and permanent habitat when in close proximity to grass tussocks.

A 'Low' habitat quality score was determined for Tile Grids 1 and 2 based on the lack of tussock forming grasses both exotic and native and the presence of bare earth with few soil cracks and crevices. This not to say there is no potential for SLL to occupy such areas, though the probability is quite low.

Figures 4 through 7 provide examples of the habitat present within the Study Area in relation to the Tile Grids that were established on site.

Figure 4. Scattered rocks throughout the Study Area

Figure 5. Soil cracks in between grass forming tussocks

Figure 6. Dense tussock forming grasses

Figure 7. Scattered Wallaby Grass *Rytidosperma* spp

6. Discussion

The results of surveys and implications for legislative requirements and site management are discussed below. Best practice for future development of the site in relation to management of Spiny Rice Flower and Striped Legless habitat and other fauna is also discussed.

6.1 Spiny Rice-flower

No Spiny Rice-flower were detected during targeted surveys. Spiny Rice-flower is associated with basalt soils often dominated by Kangaroo Grass *Themeda triandra* grasslands. While there is one record of the species on the southern boundary of the Study Area on the boundary of the rail corridor (Map 3) from 2005, this specimen was not detected on site and if still present, potentially occurs within the rail corridor.

Sections of the Study Area were deemed to have either low or moderate habitat quality, with the areas of moderate quality subject to targeted surveys using transects.

An assessment of potential impacts to SFR from the proposed development of the site, and in light of the findings of the targeted surveys, has been made against the EPBC Act *Significant Impact Guidelines for the Critically Endangered Spiny Rice-flower* (DEAWA 2009) in Table 4 below. The risk of a significant impact as defined under the EPBC Act (refer to Table 4 below) is deemed to be very low; consequently, a referral under the EPBC Act in relation to the current presence of SRF is not recommended.

Table 4. Spiny Rice Flower Significant Impact Thresholds Analysis

EPBC Act Policy Statement 3.11 – Significant Impact Guidelines for the Critically Endangered Spiny Rice-flower			
Ecological element affected	**Impact threshold**	**Comment**	**Comment in relation to study area**
Contiguous habitat area: 'Contiguous habitat' is a similar and connected area that supports a population of Spiny Rice-flower.	Any fragmentation of a population	Connectivity is particularly important for maintaining and supporting gene flow given the limited dispersal ability of this subspecies. "Fragmentation" may include, but is not limited to: incomplete clearing leaving isolated smaller patches and/or the introduction of a physical barrier to plant dispersal (e.g. solid fences, transport corridors, walking tracks, easements)	**No significant impact expected in relation to fragmentation of population.** Study Area is relatively isolated and no Spiny Rice-flower were detected. Fragmentation of a population is not expected to occur. Some moderate suitability habitat although most of Study Area highly disturbed
Population viability (medium to long-term): A 'population' of Spiny Rice-flower refers to a collection of individual plants occurring close together but separated geographically from other such collections. Land use and management practices may limit the geographic extent of populations.	Loss of >5 individuals.	Given that recruitment (through germination of seeds) appears to be very limited, the loss of even small numbers of plants from a current population could have a significant impact on the persistence and recovery of the subspecies.	**No significant impact expected in relation to the loss of >5 individuals.** No Spiny Rice-flower detected
Extent of occurrence: Populations at or near the edge of the range	Any loss of individuals from any population which occurs on the edge of the Spiny Rice-flower's current known distribution.	The range of the Spiny Rice-flower has been greatly reduced, and populations at the edges of the current distribution may be particularly important.	**No significant impact expected based on loss of individuals on edge of known distribution.** The Study Area is within central area of range and Spiny Rice-flower not detected

While the SRF is listed under the FFG Act, as the site is private land there are no implications under this Act in relation to any potential, even very low level, impacts to this species. This is also the case for other native flora species at this site that are exempt from protected flora controls under the FFG Act given the site is private land.

6.2 Striped Legless Lizard

Low to moderately suitable habitat for SLL at the southern end of the Study Area was surveyed for the presence of this species. As outlined above, no SLL were detected over the six rounds of survey despite the method of survey implemented is known to have a 55% probability of detecting the species during a single survey (DSE, 2013). However, as noted above, three tile grids deemed of moderately habitat quality were submerged under water during three survey visits, reducing the detection probability of the species for three out of six surveys. This survey outcome indicates that no SLL population occupied the Study Area at the time of the survey where the tile grids were checked.

While this is the case, there remains suitable habitat present along the eastern and southern boundaries of the Study Area in particular. Based on the detection of Tussock Skink on site – a species that occupies very similar habitat to SLL – and the numerous recent records within the area, it is still possible that this cryptic and often difficult to detect species, may still utilise the habitat that is present within the Study Area. This takes into account the numerous recent records of the species directly south of the Study Area from 2012 and throughout the Ravenhall Nature Conservation Reserve from 2016 recorded by Abzeco Pty Ltd. While direct connectivity to these areas from the Study Area is reduced due to the presence of a trainline and the Western Freeway, there remains continuity of habitat alongside and surrounding this infrastructure, along with a number of records for the species along these from the last 10-15 years. This combined with the potential for individual SLL to disperse over time, even over small distances incrementally, makes it difficult to make definitive judgement that individuals would not occur within the Study Area, particularly at its southern end in more suitable habitat.

An assessment of potential impacts to SLL from the proposed development of the site, and in light of the above, has been made against the *Matters of National Environmental Significance Significant impact guidelines 1.1* (DAWE 2013) in Table 5 below. The risk of a significant impact as defined under the EPBC Act (refer to Table 5 below) is deemed to be unlikely; though a referral under the EPBC Act in relation to the current presence of SLL is recommended as a precautionary approach for legal certainty purposes due to the immediate SLL records and lack of soil disturbance to the west of the Study Area.

Table 5. Striped Legless Lizard Significant Impact Analysis

Significant Impact Guidelines 1.1 – Significant Impact Criteria for a Vulnerable Species (Striped Legless Lizard)		
Significant Impact Criteria	**Risk to Species**	**Likelihood of a significant impact**
Lead to a long-term decrease in the size of an important population of a species	While no SLL were detected during targeted surveys, there remains potential for the habitat within the Study Area, particularly at its southern end, to provide habitat for this species given the presence of at least some continuity of habitat to other areas in the local landscape, including areas where previous records for this species from the preceding 10-15 years. The proposed development of the site into an industrial estate, which is proposed to include the removal of all available habitat for this species, could have short-term impacts on the localised population that could be utilising the habitat in the Study Area. Given the habitat present is on the edge a larger area across Ravenhall with known records of this species, the risk of a long-term decrease in the overall size of the population across this landscape from the development proposal is expected to be low.	It is unlikely that the development proposal and removal of potential habitat at the southern end of the Study Area will lead to a long-term decrease in the size of an important population of this species.
Reduce the area of occupancy of an important population	As highlighted above, no SLL were detected during targeted surveys, however there remains potential for the habitat within the Study Area to support this species given continuity with habitat with known records.	As habitat for the SLL occurs at the southern end of the Study Area, and the population across the Ravenhall area is deemed an important population of this species, it is possible that the removal of habitat could reduce the overall area of occupancy of the species.
Fragment an existing important population into two or more populations	The Study Area is located at the edge of a larger area across Ravenhall with known records of this species, it reduces the risk that an important population would be split into two or more populations. The habitat for this species is located on the southern edge of the Study Area. To the north the quality of the habitat across the Study Site is largely reduced, and further beyond this an already established industrial estate occurs.	It is unlikely that the development proposal and removal of potential habitat at the southern end of the Study Area will fragment an existing important population into two or more populations
Adversely affect habitat critical to the	No SLL were detected during targeted surveys. While there is some potential that the habitat within the Study	It is unlikely that the development proposal and

survival of a species	Area could support this species, this moderate quality habitat is not likely critical to the survival of the species overall.	removal of potential habitat at the southern end of the Study Area will adversely affect habitat critical to the survival of SLL as a species.
Disrupt the breeding cycle of an important population	No SLL were found within the Study Area during targeted surveys. A key to ameliorating impacts to SLL and any potential breeding patterns will be on ensuring that early works associated with construction, which will need to include salvage and translocation, are not undertaken during the species' breeding season in summer.	Provided construction is not undertaken during the species breeding season, it is unlikely to disrupt the breeding cycle of the local population of SLL.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Though appropriate habitat for the species will be removed during the development, the removal of this habitat from the southern end of the Study Area is not likely to result in an overall decline of SLL.	It is unlikely that the development proposal and removal of potential habitat at the southern end of the Study Area will result in a decline in the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed development is unlikely to result in any additional invasive species becoming established in the Study Area.	It is unlikely that the development proposal will result in invasive species that will impact on SLL.
Introduce disease that may cause the species to decline, or	Disease is not listed as a threat to this species. The proposed development would be unlikely to introduce a disease that may cause this species to decline.	It is highly unlikely that diseases will be introduced by the proposed development that will impact this species
Interfere substantially with the recovery of the species.	The National Recovery Plan for the Striped Legless Lizard (Delma impar) 1999-2003 largely focusses on populations or clusters of populations maintained in reserves or appropriately managed sites across the known distribution of the species.	It is unlikely that the development proposal will substantially interfere with the recovery of the species as there are no recorded SLL populations or clusters within the Study Area.

Based on these determinations and considerations, there is at least some risk that the development proposal could have a significant impact to SLL based on the criteria in Table 5 above in relation to a reduction in the area of occupancy of the species.

In terms of determining if this risk is enough justification to warrant the need for a referral under the EBPC Act, the document, *Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the vulnerable striped legless lizard, Delma impar* (DSEWPaC 2011a) provides further guidance. This document includes referral guidelines based on the risk of significant impact to the species, and aims to assist in determining whether a referral is recommended. Key items in relation to the current development proposal and the potential presence of SLL within the Study Area are as follows:

- There is a high risk of a significant impact and a referral is recommended where:
    - An important population is not detected but removal or modification of 0.5 hectares or more of known habitat, or habitat that has a moderate or high potential to support the species.
- There is uncertainty, and a referral is recommended, or contact with the department where:
    - There is to be long-term modification of habitat with a buffer of known or potential habitat

The referral guidelines also recommendation to referral to the Commonwealth where legal certainty in cases even where there is deemed a low risk of a significant impact.

Based on the potential for the Study Site to still support SLL despite a lack of detection during surveys, there remains at least some risk of a significant impact on this species from the proposed development. Preparing a referral will therefore provide legal certainty in relation to this project and the potential presence of SLL and associated impacts. This approach will also provide assurance to the Commonwealth that the species has been considered and that appropriate measures will be undertaken to ameliorate impacts during construction in particular.

Amelioration of impacts will need to include the recommendation that a suitably qualified zoologist be present for the removal of rocks and rock walls as well as immediate inspection of the ground post excavation of vegetation to ensure the safe removal of SLL and another other reptile and amphibian populations present on site.

6.3 Site Development

The Study Area is proposed for industrial development with no habitat areas identified for retention. Therefore, no recommendations are provided in regards to retention and enhancement of the current vegetation and habitat or the design of the proposed development. If habitat areas were proposed to be retained, the section of the Study Area encompassing grid 3-6 would be recommended to be retained. This is based on the moderate habitat present, the several reptile species observed within this area including Tussock Skink, and most importantly its potential to provide habitat for SLL.

6.3.1 Fauna salvage

As noted above, a suitably qualified zoologist is to be present for the removal of all rock piles/walls and piles of debris present onsite, to allow for the opportunity for reptile and amphibian species to be safely removed and relocated to nearby habitat, south of the Study Area. A qualified zoologist should also be present to inspect the ground/soil immediately post removal of the vegetation irrespective of the method of removal.

7. REFERENCE

Cogger, G.G. (2000). Reptiles and Amphibians – 6th edition. Sydney, NSW: Reed New Holland.

Corrigan, A., L.S. Nelson, D. Shorthouse & W.J.S. Smith (1996. Survey of section 107 Symonston for two vulnerable lizard species and salvage of the Striped Legless Lizard (*Delma impar*) population during the summer of 1995-96. *Internal Report* 96/4. Wildlife Research Unit.

DAWE (2021). Spiny Rice-flower. Received from: https://www.awe.gov.au/environment/biodiversity/threatened/species/30-plants-by-2020/spiny-rice-flower.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2009). Significant impact guidelines for the critically endangered spiny rice-flower (Pimelea spinescens subsp. spinescens).

DELWP (2022) NatureKit. Department of Environment, Land, Water and Planning, Government of Victoria. Accessed via: http://maps.biodiversity.vic.gov.au/viewer/?viewer=NatureKit

DELWP (2022). Victorian Biodiversity Atlas (VBA). Received from: https://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

Dorrough, J. & J.E. Ash (1999). Using past and present habitat to predict the current distribution and abundance of a rare cryptic lizard, *Delma impar* (Pygopodidae). *Australia Journal of Ecology.* 24:614-624.

DSE (2008). Action Statement – Spiny Rice-flower, *Pimelea spinescens.* Received from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0019/32680/Spiny_Rice-flower_Pimelea_spinescens-spinescens.pdf

Department of Sustainability and Environment (DSE) (2013). Evaluating the effectivness of salvage and tranlocation of Striped Legless Lizard.

DSEWPaC (2011a). Environment Protection and Biodiversity Conservation Act 1999 Referral Guidelines for the vulnerable Striped Legless Lizard, Dela impar. Department of Sustainability, Environment, Water, Populations and Communities, Canberra.

DSEWPaC (2011b). Survey Guidelines for Australia's threatened reptiles. Department of Sustainability, Environment, Water, Populations and Communities, Canberra.

Flora of Victoria (2020). *Pimelea spinescens.* Royal Botanic Gardens of Australia. Received from: https://vicflora.rbg.vic.gov.au/flora/taxon/abc330c6-b92d-44e0-89e5-9b86e3f39061

Marchant, S. & P.J.Higgins, eds. (1990). The Handbook of Australian, New Zealand and Antarctic Birds, Volume 1 Part a – Rattites to Petrels. Melbourne, Victoria: Oxford University Press.

O'Shea, M. (1996). *An Ecological Study of the Population of Striped Legless Lizards Delma impar within the Australian Territory.* Canberra: ACT Parks & Conservation Service.

Rauhala, M.A. (1996). *1995 survey and monitoring program for the Striped Legless Lizard* Delma impar. Internal Report96/1. ACT: Wildlife Research Unit, ACT Parks and Conservation Service.

Robertson, P. & Smith, W. (2010). National Recovery Plan for the Striped Legless Lizard, Delma impar. Department of Sustainability and Environment, Melbourne.

Turner, G. (2007). Observations of diurnal activity in the Striped Legless Lizard, *Delma impar*. T*he Victorian Naturalist* 124; 167-169.

Williams, K.D. & Kukolic, K. (1991). Fauna of the ACT's native grasslands. In: The *ACT'S native grasslands*. (Ed R. Falconer). Pp. 11-19. Conservation Council of the South-east Region and Canberra, Canberra.

APPENDIX 1. Maps

See Maps over page.

Map 1. Study Area

31 Fuller Road, Ravenhall

Legend

- Study Area
- Parcels
- Contours (10m)
- Constructed watercourse
- Natural watercourse
- Railways

Details

Mapping by: Ali Nia
Date: 3/02/2022
Version: 1
Aerial photography from Nearmap (Dec 2021)).

N

0 50 100 m

Scale 1:2,500 (Page size A3)

Disclaimer

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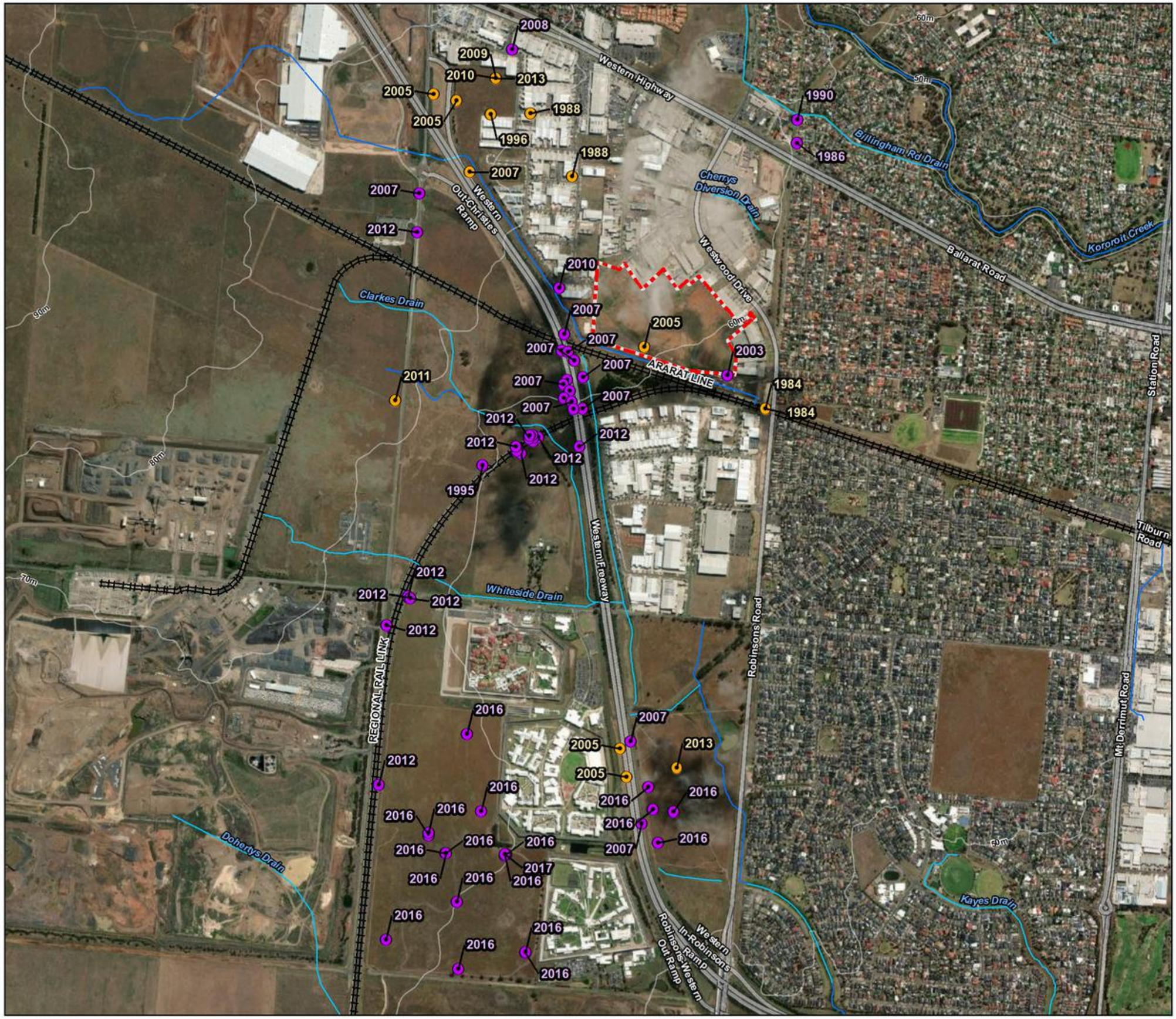

Map 2. Local SRF and SLL Records

31 Fuller Road, Ravenhall

Legend

- Study Area
- Contours (10m)
- Constructed watercourse
- Natural watercourse
- Railways

VBA Records

- Striped Legless Lizard
- Spiny Rice-flower

Details

Mapping by: Ali Nia
Date: 3/02/2022
Version: 1
Aerial photography from Nearmap (Sep 2020)).

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0 250 500 m

Scale 1:15,500 (Page size A3)

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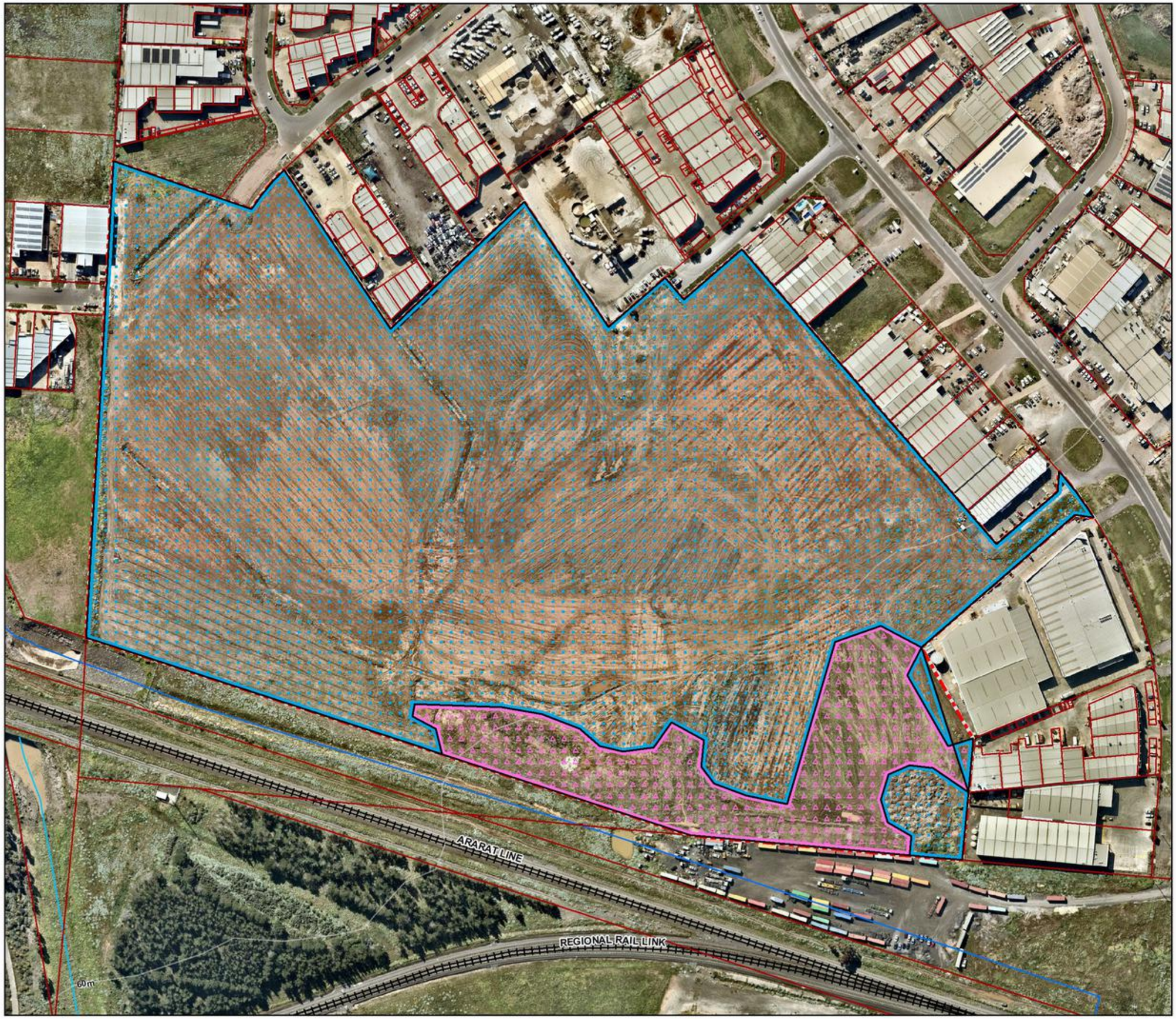
Map 3. Spiny Rice-flower Habitat Suitability

31 Fuller Road, Ravenhall



Legend

- Study Area
- Parcels
- Contours (10m)
- Constructed watercourse
- Natural watercourse
- Railways

Habitat Suitability

- Low
- Moderate

Details

Mapping by: Ali Nia
Date: 31/01/2022
Version: 1
Aerial photography from Nearmap (Sep 2020)).

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0 50 100 m

Scale 1:2,500 (Page size A3)

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Map 4. Tile Grid Locations

31 Fuller Road, Ravenhall

Legend

- Study Area
- Parcels
- Contours (10m)
- Constructed watercourse
- Natural watercourse
- Railways
- Tile Grids

Habitat Quality

- Low
- Moderate

Details

Mapping by: Ali Nia
Date: 31/01/2022
Version: 1
Aerial photography from Nearmap (Sep 2020)).

N

0 50 100 m

Scale 1:2,500 (Page size A3)

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APPENDIX 2. Incidental Fauna Records

EPBC Act 1999 conservation status

EX: Extinct, CR: Critically endangered, EN: Endangered,
VU: Vulnerable and CD: Conservation dependant.

FFG Act 1998 (2020 status)

Cd: Conservation dependant,
Cr: Critically endangered, En: Endangered, Ex: Extinct,
Th: Threatened, Vu: Vulnerable

En(ExV): Endangered (extinct in Vic)

International Treaty

B: Bonn Convention; C: CAMBA;
J: JAMBA; R: ROKAMBA.

Family	Origin	Scientific Name	Common Name	EPBC	FFG	TREATY
INVERTEBRATES						
Nymphalidae		Heteronympha merope	Common Brown Butterfly			
AMPHIBIANS						
Myobatrachidae		Limnodynastes tasmaniensis	Spotted Marsh Frog (race unknown)			
REPTILES						
Scincidae		Pseudemoia pagenstecheri	Tussock Skink		En	
Elapidae		Notechis scutatus	Tiger Snake			
Scincidae		Tiliqua scincoides	Common Blue-tongued Lizard			
Scincidae		Saproscincus mustelinus	Weasel Skink			
BIRDS						
Sturnidae	*	Sturnus vulgaris	Common Starling			
Columbidae	*	Spilopelia chinensis	Spotted Dove			
Motacillidae		Anthus australis	Australian Pipit			
Corvidae		Corvus coronoides	Australian Raven			
Columbidae	*	Columba livia	Domestic Pigeon			
Cacatuidae		Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo			
Pelecanidae		Pelecanus conspicillatus	Australian Pelican			
Sylviidae		Cisticola exilis	Golden-headed Cisticola			
Falconidae		Falco cenchroides	Nankeen Kestrel			
MAMMALS						
Murinae	*	Mus musculus	House Mouse			