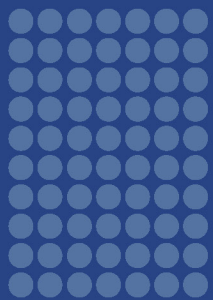
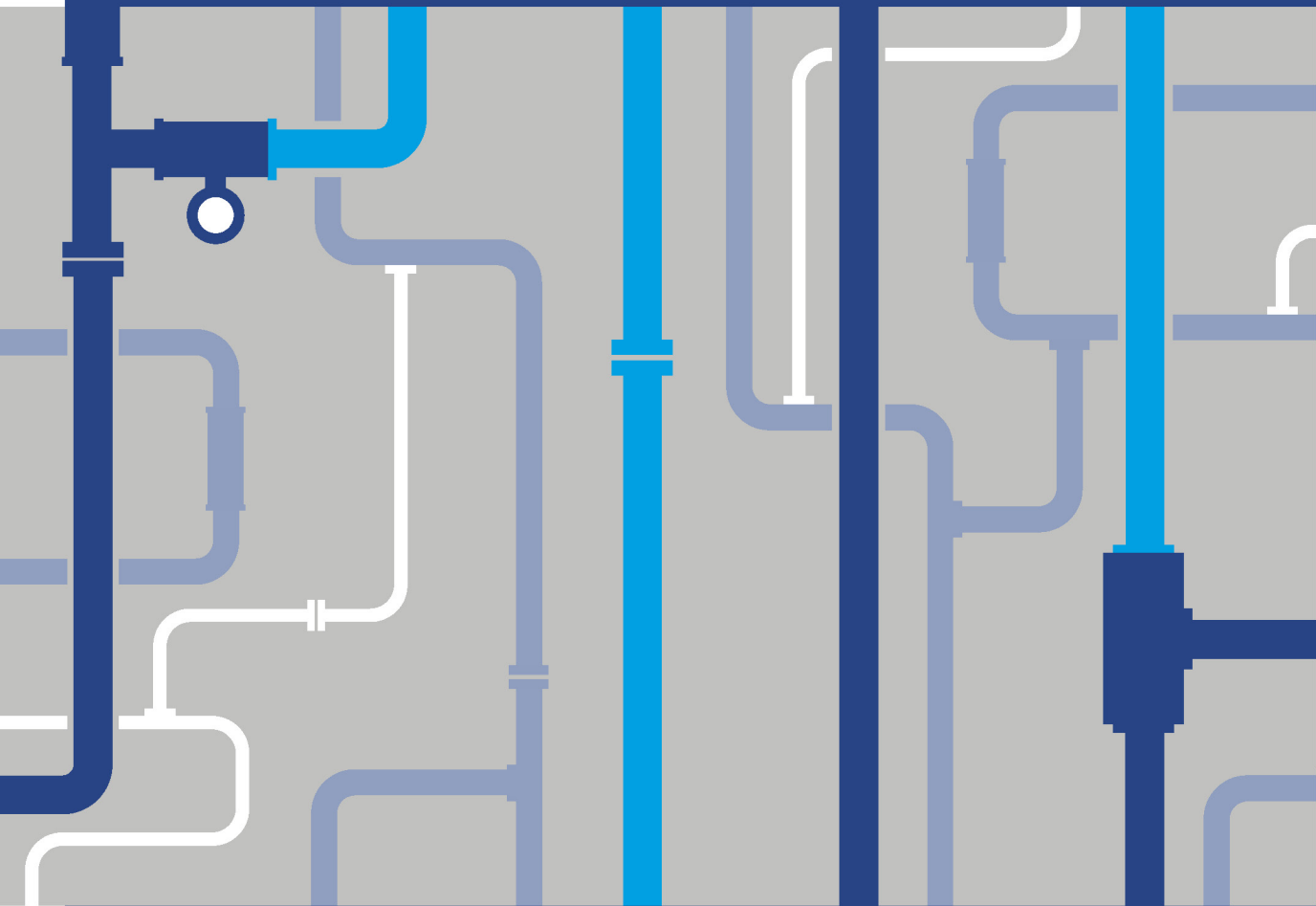




chapter 18

# matters of national environmental significance.



Environment Effects Statement | May 2021

western outer  
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## 18.1 Introduction

This chapter provides the findings of the assessment of potential impacts associated with the construction and operation of the Western Outer Ring Main (WORM) gas pipeline project (the Project) on Matters of National Environmental Significance (MNES). Further detail on impacts to MNES is provided in Technical report A *Biodiversity and habitats*.

The Project was referred to the Commonwealth under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (referral 2019/8569) on 21 October 2019. On 21 February 2020, a delegate for the Commonwealth Minister for the Environment determined the Project to be a 'controlled action' and that further assessment is required before the Project can proceed. The relevant controlling provision for the Project is:

- Potential impacts on listed threatened species and communities (Section 18 and Section 18A of the EPBC Act).

Through the Bilateral Assessment Agreement, which is between the Commonwealth and the State of Victoria, the Environment Effects Statement (EES) process is accredited to assess impacts on MNES under the EPBC Act. After considering the Minister for Planning's assessment under the *Environment Effects Act 1978* (EE Act), the Commonwealth Minister or delegate will decide whether the Project is approved.

The EES scoping requirements set out the following evaluation objective for the Project with regards to MNES:

- Avoid and minimise potential adverse effects on native vegetation, listed threatened and migratory species and ecological communities, and habitat for these species, as well as restore and offset residual environmental effects consistent with state and Commonwealth policies.

## 18.2 Key regulatory approvals

The legislation relevant to the principal approvals required for the Project is:

- Commonwealth approval under the EPBC Act. For the component of the Project that is located outside of the MSA (see Section 18.3.2), the Project requires assessment and approval under the EPBC Act, under the assessment bilateral agreement with Victoria made under Section 45 of the EPBC Act. This MNES Chapter provides a summary of these issues
- Pipeline Licence approval is required under the *Pipelines Act 2005* (Vic) (Pipelines Act) for the Project. The Pipeline Licence application is exhibited with the EES documentation
- Cultural Heritage Management Plan (CHMP) under the *Aboriginal Heritage Act 2006* (Vic) (AH Act). Two CHMPs are currently in progress for the Project.

For further details on the applicable approvals (both principal and secondary approvals) for the Project, see Chapter 5 *Evaluation and Assessment Framework*.

## 18.3 Matters of National Environmental Significance

### 18.3.1 MNES relevant to the Project

The EPBC Act provides the framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, referred to as MNES. Under the EPBC Act there are nine MNES. The matters of relevance to the Project are described in Table 18-1.

#### What is a 'controlled action'?

If the Commonwealth Minister for the Environment decides that significant impacts are likely on MNES, then the action requires approval under the EPBC Act. The action is known as a 'controlled action'.

The Project has been determined to be a 'controlled action' (referral decision 2019/8569) with the potential to have a *significant impact* (as discussed in Section 18.4.3) on listed threatened species and ecological communities. This chapter presents the findings of the investigations and assessment completed for these potential impacts.

Table 18-1 MNES and relevance to the Project

MNES	Relevance to the Project	Comments
World heritage properties	No	There are no world heritage places that would be impacted by the Project.
National heritage places	No	There are no national heritage places that would be impacted by the Project.
Wetlands of international importance (Ramsar)	No	The nearest Ramsar site to the Project is the Port Phillip Bay (western shoreline) and Bellarine Peninsula, which is approximately 20 kilometres downstream of the Project. Given the distance, it is not expected that the Project would have a direct or indirect impact on this Ramsar site.  Sediment and erosion control measures would be implemented during construction to avoid and minimise the likelihood of downstream water quality impacts.
Nationally threatened species and ecological communities	Yes	Multiple ecological communities and species could potentially be impacted by the Project. A discussion of the communities and species found to be most at risk, and any potential impacts from the Project, is provided within this chapter.
Migratory species	No	With the exception of Latham's Snipe ( <i>Gallinago hardwickii</i> ), White-throated Needletail ( <i>Hirundapus caudacutus</i> ) and Fork-tailed Swift ( <i>Apus pacificus</i> ), migratory species are unlikely to make significant use of, or have important habitat within the construction corridor. <ul style="list-style-type: none"> <li>Latham's Snipe: the construction corridor does not include any areas of habitat currently recognised as internationally important for this species, nor areas that are considered likely to support at least 18 individuals (trigger under the guidelines (DoEE, 2017a) to consider location significant habitat)</li> <li>White-throated Needletail and Fork-tailed Swift: these species potentially make use of the aerial space over the entire construction corridor; however, this area is not expected to constitute important habitat and the Project is unlikely to pose a significant risk to these species.</li> </ul>

MNES	Relevance to the Project	Comments
Commonwealth marine areas	No	There are no Commonwealth marine areas that would be impacted by the Project.
The Great Barrier Reef Marine Park	No	The Great Barrier Reef Marine Park would not be impacted by the Project.
Nuclear actions (including uranium mining)	No	The Project is not a nuclear action.
A water resource, in relation to coal seam gas development and large coal mining development	No	The Project is not a coal seam gas or coal mining development.

The nationally threatened species and ecological communities identified in the Department of Agriculture, Water and the Environment's (DAWE) referral decision as potentially impacted by the Project are:

- Considered likely to be significantly impacted:
  - Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains
  - Natural Temperate Grassland of the Victorian Volcanic Plain
  - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
  - Grassy Eucalypt Woodland of the Victorian Volcanic Plain
  - Matted Flax-lily (*Dianella amoena*)
  - Golden Sun Moth (*Synemon plana*)
  - Spiny Rice-flower (*Pimelea spinescens subsp. Spinescens*)
  - Growling Grass Frog (*Litoria raniformis*)
- Considered to have a real chance or possibility of being significantly impacted:
  - Adamson's Blown-grass (*Lachnagrostis adamsonii*)
  - Small Golden Moths (*Diuris basaltica*)
  - Maroon Leek-orchid (*Prasophyllum frenchii*)
  - Button Wrinklewort (*Rutidosia leptorhynchoides*)
  - Hoary Sunray (*Leucochrysum albicans subsp. tricolor*)
  - Australasian Bittern (*Botaurus poiciloptilus*)
  - Grassland Earless Dragon (*Tympanocryptis pinguicolla*)
  - Large-headed Fireweed (*Senecio macrocarpus*)
  - Clover Glycine (*Glycine latrobeana*)
  - Swamp Everlasting (*Xerochrysum palustre*)
  - River Swamp Wallaby-grass (*Amphibromus fluitans*)
  - Painted Honeyeater (*Grantiella picta*)

- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Australian Grayling (*Prototroctes maraena*)
- Pink-tailed Worm-lizard (*Aprasia parapulchella*)
- Striped Legless Lizard (*Delma impar*).

See Section 18.4 for the methodology used to identify the communities and species that required further survey and assessment.

### 18.3.2 Melbourne Strategic Assessment

The Melbourne Strategic Assessment (MSA) is an environmental assessment process implemented by the Commonwealth and Victorian Governments to conserve biodiversity in Melbourne's growth corridors. The Victorian Government has established a specific flora and fauna assessment process for projects inside the MSA area, with the MSA defining the reporting and offset requirements for these projects.

The Department of Agriculture, Water and the Environment (DAWE) has advised that part of the construction corridor (KP 0–KP 3.15, KP 28.16–KP 28.57, and KP 32.07–KP 51.04) (97 hectares) falls within the MSA area. For the area within the MSA, APA can rely on the approval decision made for this area under Part 10 of the EPBC Act in September 2013. No further approvals are required under the EPBC Act for urban development in these areas, provided development follows the Urban Growth Boundary Program Report and the conditions of the approvals. These conditions include complying with the *Biodiversity Conservation Strategy for Melbourne's growth corridors*<sup>1</sup> which outlines Conservation Areas that require protection, and to meet Habitat Compensation Obligations to offset any loss of certain listed threatened species habitat and/or native vegetation.

Figure 18-1 and Figure 18-2 displays the MSA, and the sections of the Project within its boundaries. Assessment of MNES under the EPBC Act for this Project is relevant to the area outside the MSA area only (KP 3.15–KP 28.16 and KP 28.57–KP 32.07), being 88 hectares.

## 18.4 Method of assessment

### 18.4.1 Overview

In assessing the potential impacts of the Project on listed threatened species and ecological communities, the following key tasks were undertaken:

- Desktop assessment to determine the likelihood of MNES in relation to the Project. The Protected Matters Search Tool (PMST) was used to determine potential MNES within a five kilometre buffer of the Project. For aquatic species, separate PMST searches were completed using a five kilometre buffer from each waterway crossing on Deep Creek, Jacksons Creek and Merri Creek

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<sup>1</sup> Department of Environment and Primary Industries (2013). Biodiversity Conservation Strategy for Melbourne's growth corridors. Published by the Victorian Government.

- A likelihood of occurrence assessment for each of the threatened flora, fauna or migratory species and each threatened community identified in the desktop assessment as having the potential to occur within five kilometres of the Project, or is assumed or known to occur from current records
- Rapid field assessment to determine the presence/absence of native vegetation and habitat. These were conducted on foot, by vehicle or from adjacent road reserves
- Targeted surveys for individual species where the outcome of the desktop review and rapid field assessment indicated a medium or higher likelihood of occurrence (see Section 18.3.2)
- Assessment of the potential impacts during construction and operation of the Project on listed threatened species and ecological communities was undertaken considering the *Matters of National Environmental Significance: Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999*<sup>2</sup> (Significant Impact Guidelines). Environmental management measures (EMMs) were identified in response to the impact assessment and residual impacts were considered. Refer to Chapter 19 *Environmental management framework* for the full list of environmental management measures.

## 18.4.2 Targeted surveys

Following the findings of the desktop assessment and rapid field assessment, targeted surveys were conducted for listed species which were determined to have a medium or higher likelihood of occurrence, and where the outcome of such surveys might contribute to the determination of a species' presence within the construction corridor. Even if mentioned in the DAWE referral decision, surveys were not undertaken for species with a low or negligible likelihood of occurrence, or for migratory species.

Excluded from targeted surveys were three flora species listed as threatened under the EPBC Act and referenced in the DAWE referral decision (Hoary Sunray, Maroon Leek-orchid, and Swamp Everlasting). These species were reconsidered at a desktop level and were found to have an extremely low likelihood of occurrence (with a high degree of confidence) within the construction corridor. As such, they were not considered further.

Some EPBC threatened or migratory fauna species (wide-ranging, highly mobile and so on) did not require targeted surveys as it would not add any certainty to the species presence or assist in any assessment of impact. In these cases, if a survey was undertaken, but no individuals recorded, it would not necessarily mean that these species would not still visit the habitat within the construction corridor (Biosis, 2020). For these reasons, two threatened species (Grey-headed Flying-fox and Swift Parrot), and two migratory species (Latham's Snipe and White-throated Needletail) did not require targeted surveys.

Targeted surveys were conducted for five threatened ecological communities, nine threatened flora, and four threatened fauna.

All communities, flora and fauna species surveyed are identified in Table 18-2.

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<sup>2</sup> Department of Environment (2013). *Matters of National Environmental Significance: Significant impact guidelines 1.1., Environment Protection and Biodiversity Conservation Act 1999*. Department of Environment, Australian Government.

Note: Table 18-2 lists parcels that were surveyed for each individual species (including parcels outside of the construction corridor). The corridor comprises 137 parcels.

Table 18-2 Surveys undertaken for listed threatened species and communities

Species/community	Survey details	Date	Present (or likely to be present)
Threatened ecological community			
Grassy Eucalypt Woodland of the Victorian Volcanic Plain (critically endangered)	EVC 55_61 Plains Grassy Woodland sites within the Victorian Volcanic Plain were assessed for diagnostic criteria and condition thresholds meeting this community	Sep 2019 to Feb 2020 (Biosis <sup>3</sup> ) Apr to Jul 2020 (GHD <sup>4</sup> )	Yes – recorded during survey
Natural Temperate Grassland of the Victorian Volcanic Plain (critically endangered)	Areas of native grassland identified as EVC 132 Plains Grassland were assessed for diagnostic criteria and condition thresholds meeting this community	Sep 2019 to Feb 2020 (Biosis) Apr to Jul 2020 (GHD)	Yes – recorded during survey
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (critically endangered)	Surveys undertaken in one area that contained EVC 125 Plains Grassy Wetland	Sep 2019 to Feb 2020 (Biosis) Apr to Jul 2020 (GHD)	No – not recorded during survey
Grey Box Grassy Woodlands and Derived Native Grasslands or South-Eastern Australia (endangered)	This community is most closely aligned with EVC 235 Plains Woodland/Herb-rich Gilgai Wetland Mosaic or EVC 803 Plains Woodland in the Central Victorian Uplands and Victorian Volcanic Plain bioregions  One small patch of Plains Woodland was compared against condition thresholds but did not meet the minimum patch size requirement of 0.5 ha	Sep 2019 to Feb 2020 (Biosis) Apr to Jul 2020 (GHD)	No – not recorded during survey
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (critically endangered)	Species that may be co-dominant throughout this community's range do not occur in the Melbourne region including in the construction corridor	Sep 2019 to Feb 2020 (Biosis) Apr to Jul 2020 (GHD)	No – not recorded during survey

<sup>3</sup> Biosis (2020). Western Outer Ring Main (WORM): Biodiversity assessment. Report for APA. Project no. 31496. Biosis Pty Ltd, Port Melbourne.

<sup>4</sup> GHD (2021). Western Outer Ring Main (WORM): EES Technical report A *Biodiversity and habitats*. GHD Pty Ltd, Melbourne.



Species/community	Survey details	Date	Present (or likely to be present)
<b>Flora</b>			
Spiny Rice-flower ( <i>Pimelea spinescens</i> subsp. <i>Spinescens</i> ) (critically endangered)	Surveys of 57 land parcels west of Deep Creek in areas of uncultivated grassland, with transects of 5 metres apart and 2.5 metres apart	July 2019 (Biosis) Sept 2019 to Feb 2020 (Biosis) Apr, May, Jul 2020 (GHD) Nov and Dec 2020 (GHD)	No – not recorded during survey
Large-headed Fireweed ( <i>Senecio macrocarpus</i> ) (vulnerable)	Surveys of 88 parcels (identified with potential habitat) with transects of 5 metres apart	Oct 2019 (Biosis) Apr, May, Jul, Nov 2020 (GHD)	No – not recorded during survey
Small Golden Moths ( <i>Diuris basaltica</i> ) (endangered)	Surveys of 88 parcels (identified with potential habitat) with transects of 5 metres apart.	Oct 2019 (Biosis) Apr, May, Jul, Nov 2020 (GHD)	No – not recorded during survey
River Swamp Wallaby-grass ( <i>Amphibromus fluitans</i> ) (vulnerable)	Surveys of 147 parcels (identified with potential habitat) with transects of 5 metres apart	Nov 2019 to Feb 2020 (Biosis) Apr, May, Nov, Dec 2020 (GHD)	No – not recorded during survey
Curly Sedge ( <i>Carex tasmanica</i> ) (vulnerable)	Surveys of 147 parcels (identified with potential habitat) with transects of 5 metres apart	Nov 2019 to Feb 2020 (Biosis) Apr, May, Nov, Dec 2020 (GHD)	No – not recorded during survey
Matted Flax-lily ( <i>Dianella amoena</i> ) (endangered)	Surveys of 147 parcels (identified with potential habitat) with transects of 5 metres apart	Nov 2019 to Feb 2020 (Biosis) Apr, May, Nov, Dec 2020 (GHD)	Yes – one plant recorded during survey
Clover Glycine ( <i>Glycine latrobeana</i> ) (vulnerable)	Surveys of 147 parcels (identified with potential habitat) with transects of 5 metres apart	Nov 2019 to Feb 2020 (Biosis) Apr, May, Nov, Dec 2020 (GHD)	No – not recorded during survey
Adamson's Blown-grass ( <i>Lachnagrostis adamsonii</i> ) (endangered)	Surveys of 147 parcels (identified with potential habitat) with transects of 5 metres apart	Nov 2019 to Feb 2020 (Biosis) Apr, May, Nov, Dec 2020 (GHD)	No – not recorded during survey
Button Wrinklewort ( <i>Rutidosia leptorhynchoides</i> ) (endangered)	Surveys of 147 parcels (identified with potential habitat) with transects of 5 metres apart	Nov 2019 to Feb 2020 (Biosis) Apr, May, Nov, Dec 2020 (GHD)	No – not recorded during survey
Basalt Peppergrass ( <i>Lepidium hyssopifolium</i> s.s.) (endangered)	Surveys of 147 parcels (identified with potential habitat) with transects of 5 metres apart	Nov 2019 to Feb 2020 (Biosis) Apr, May, Nov, Dec 2020 (GHD)	No – not recorded during survey

Species/community	Survey details	Date	Present (or likely to be present)
Fauna			
Striped Legless Lizard ( <i>Delma impar</i> ) (vulnerable)	20 tile arrays of 50 tiles each, over 10 parcels. Each array checked 10-15 times	Sept to Dec 2019 (Biosis)	Yes – recorded during survey
Golden Sun Moth ( <i>Synemon plana</i> ) (critically endangered)	Surveys of 111 land parcels identified as containing suitable habitat for Golden Sun Moth. Each land parcel surveyed up to four times, at approximately weekly intervals during the flight season	Nov to Dec 2019 (Biosis), Nov 2020 to Jan 2021 (GHD)	Yes – recorded during survey
Growling Grass Frog ( <i>Litoria raniformis</i> ) (vulnerable)	Habitat assessment at 31 waterbodies: 3 waterways, 28 dams Nocturnal surveys at 19 waterbodies. Two nocturnal surveys	Diurnal habitat survey: Dec 2019 and Feb 2020 (Biosis), Nov and Dec 2020 (GHD) Nocturnal survey: Dec 2019 to Feb 2020 (Biosis), Dec 2020 (GHD)	Yes – assumed present at two creeks
Australian Grayling ( <i>Prototroctes maraena</i> ) (vulnerable)	Electrofishing at three sites on each waterway (Deep Creek, Jacksons Creek and Merri Creek) during daylight hours Double-wing 4 mm mesh fyke nets deployed overnight (12 hour soak time)	July 2020 (GHD)	No – however they may still migrate through the construction corridor during spawning periods

### 18.4.3 Assessment of impacts

In order to determine whether a project is likely to have a *significant impact* on a MNES, the nature and magnitude of potential impacts must be considered. As outlined in the Significant Impact Guidelines, the following variables influence the nature and magnitude of an impact:

- The sensitivity of the environment which will be impacted
- The timing, duration and frequency of the action and its impacts
- All on-site and off-site impacts
- All direct and indirect impacts
- The total impact which can be attributed to the action over the entire geographic area affected, and over time
- Existing levels of impact from other sources
- The degree of confidence with which the impacts of the action are known and understood.

#### What is a significant impact?

Under the EPBC Act, a significant impact is an impact which is “important, notable or of consequence, having regard to its context or intensity”.

There are different significant impact criteria depending on the MNES and EPBC status. The Project is then assessed against each criterion considering whether there is a real or possible chance of impact. If the answer is “yes”, the Project is considered to have a significant impact on that MNES.

Considering the variables listed, the Significant Impact Guidelines specify assessment criteria depending on the MNES (for example, community versus species), and EPBC status (for example, endangered versus vulnerable).

For some species there are additional guidelines that provide quantitative information that supports the assessment of impacts (for example, the *Significant impact guidelines for the critically endangered golden sun moth (Synemon plana)* (DEWHA, 2009)<sup>5</sup>). Each criterion asks if the “action”, in this case the Project, has a real chance or possibility of meeting the criterion. If the answer is yes, the project is considered to have a significant impact on that MNES.

Many MNES do not have a clear threshold for significant impact, with DAWE ultimately determining if the Project triggers a significant residual impact. As such, the language used to describe significance of impact often includes terms like 'may be considered' to meet a criterion, as this allows for the possibility of DAWE making a different determination. However, though this language is not definitive, where significant impacts have been assumed, appropriate management measures and offsets have been determined regardless of the uncertainty. This provides for a conservative approach to impacts.

The above approach has been used for the purposes of assessing the impacts on MNES due to the Project, with the findings presented in Appendix S to Appendix Z of Technical report A *Biodiversity and habitats*. This assessment was completed for the two threatened ecological communities and the one EPBC-listed flora species recorded during the targeted surveys. It was also completed for each EPBC-listed fauna species that was nominated within DAWE's referral decision.

Only the four fauna species recorded during targeted surveys are considered further in this chapter, as they are known or assumed to occur within the construction corridor. Other fauna species are not expected to be impacted as they are considered unlikely to occur, or even if they are present, any impacts would be negligible. The criteria used for assessment on each of the MNES warranting further investigation for the Project is identified in sections 18.5, 18.6 and 18.7.

Management and mitigation measures were developed in response to the assessment of impacts on MNES, and residual impacts identified. In determining these residual impacts, the known effectiveness of the management and mitigation measures was considered, with measures that are well established and understood providing a higher level of certainty that they will work to reduce the impact.

An assessment of the impacts on each species and community considering the significant impact criteria is provided in the sections below.

Note: avoidance and minimisation of impacts to these MNES has been undertaken wherever possible during the Project route selection<sup>6</sup>, design phase and refinement of the preferred alignment. For further information on measures to avoid or minimise impact on these matters, see Chapter 7 *Biodiversity*, and Technical report A *Biodiversity and habitats*.

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<sup>5</sup> Department of the Environment, Water, Heritage and the Arts (2009). Significant impact guidelines for the critically endangered golden sun moth (*Synemon plana*). Department of the Environment, Water, Heritage and the Arts, 2009.

<sup>6</sup> See route selection report on WORM webpage: <https://www.apa.com.au/globalassets/about-apa/our-projects/western-outer-ring-main-project/western-outer-ring-main-project-route-options-report.pdf>

## 18.5 Threatened ecological communities

Based on the PMST, five EPBC listed ecological communities were predicted to occur or have potential to occur in the construction corridor (or within 5 km). Two of these Critically Endangered communities, Grassy Eucalypt Woodland of the Victorian Volcanic Plain and Natural Temperate Grassland of the Victorian Volcanic Plain, were confirmed to be present and were mapped within the construction corridor during field surveys in 2019. The distribution of these two communities within the construction corridor is provided in Figure 18-1 and Figure 18-2.

Figure 18-1 MNES within the construction corridor (KP 0–KP 20)

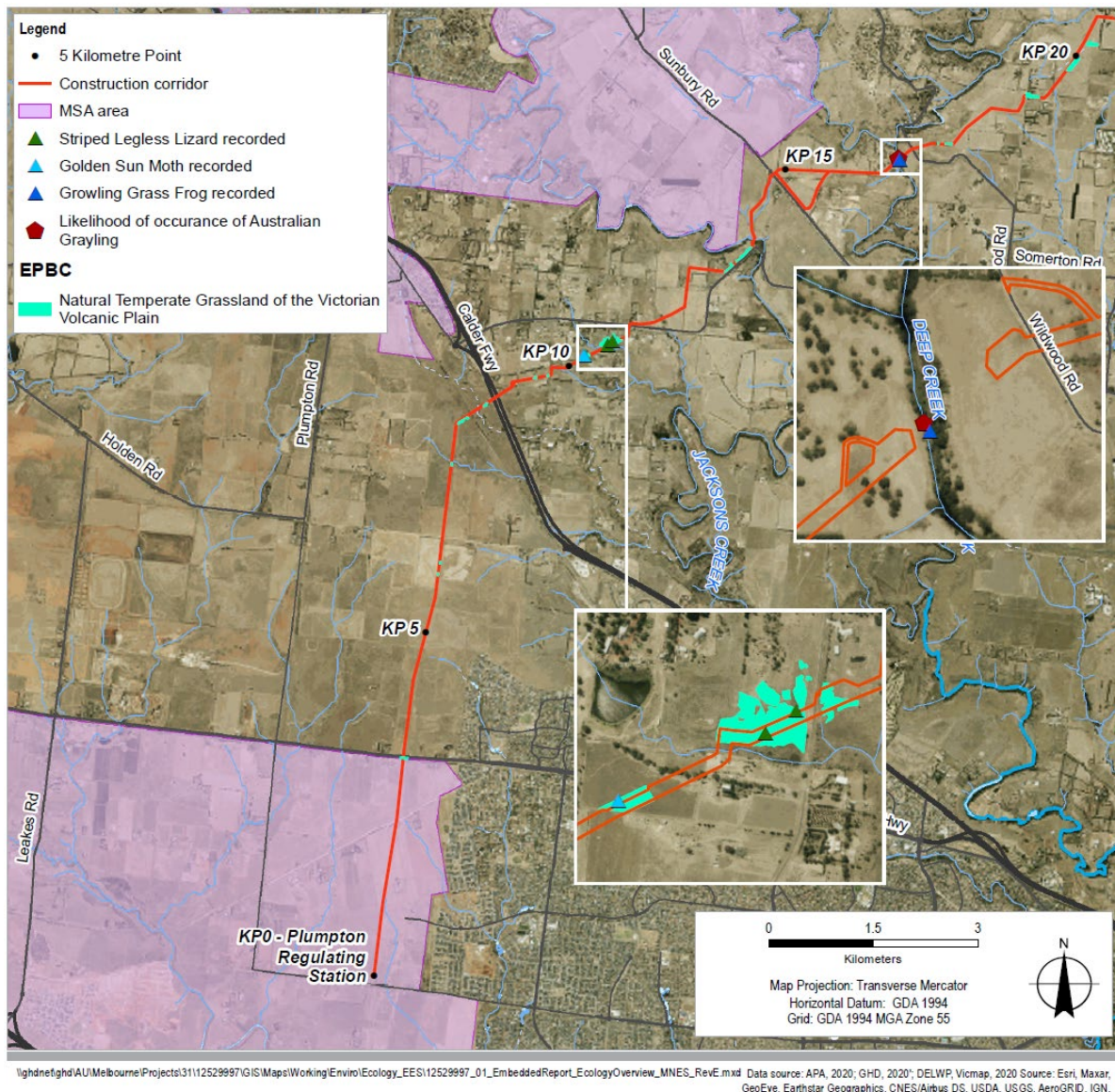
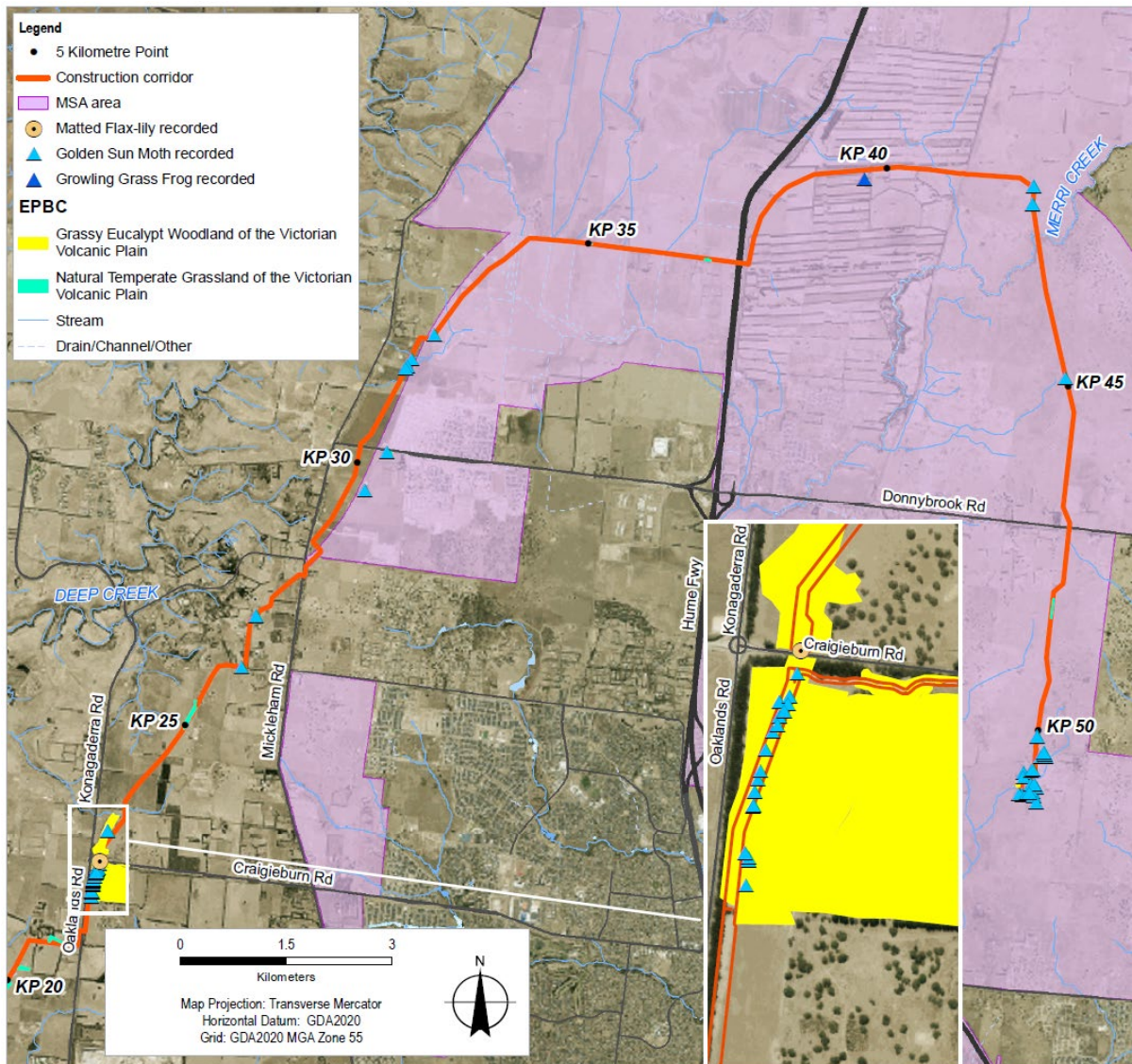




Figure 18-2 MNES within the construction corridor (KP 20–KP 51)



lightnet\ghd\AU\Melbourne\Projects\31112529997\GIS\Maps\Working\Enviro\Ecology\_EES\12529997\_02\_EmbeddedReport\EcologyOverview\_MNES\_RevF.mxd

Data source: APA, 2020; GHD, 2020; DELWP, Vicmap, 2020 Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

The EPBC listed Critically Endangered communities Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains and the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, along with the Endangered community Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia, were identified in the PMST as being within five kilometres of the construction corridor. However, none of these communities were identified during the extensive field surveys of the construction corridor.

Both direct impacts and impacts on the extent/size of patches have been considered for threatened ecological communities. In situations where larger patches have been dissected by the alignment and the remaining non-impacted parts of the patch no longer meet the area criteria to qualify as the listed community (and so consequently lose their protection under the EPBC Act), then the whole patch has been considered lost. There are 17 fragmented patches that meet this criterion, resulting in an additional 0.32 ha of indirect loss of threatened ecological communities.

Table 18-3 Summary of EPBC communities and impacts for outside the MSA area

Communities	Amount found	Amount to be impacted (direct and indirect)
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	2.25 ha	2.25 ha + 0.04 ha
Natural Temperate Grassland of the Victorian Volcanic Plain	3.53 ha	3.53 ha + 0.28 ha

### 18.5.1 Grassy Eucalypt Woodland of the Victorian Volcanic Plain

In total, 2.31 hectares of Grassy Eucalypt Woodland of the Victorian Volcanic Plain was mapped within the construction corridor, with 2.25 hectares of that occurring outside of the MSA area (see Figure 18-2). For the area outside the MSA, the Project would require the total removal of 2.25 hectares of this community, and would indirectly impact 0.04 hectares of fragmented patches.

Grassy Eucalypt Woodland of the Victorian Volcanic Plain is endemic to western Victoria and is limited to the Victorian Volcanic Plain bioregion. It is a listed Critically Endangered community under the EPBC Act.

This community has the potential to occur in areas of woodland including Plains Grassy Woodland (EVC 55) and Stony Knoll Shrubland (EVC 649), or where scattered River Red-gum trees are present or likely to have been formerly present (Threatened Species Scientific Committee, 2009). This community’s area of extent is currently unknown, but is estimated to occupy between 18,000 and 60,500 hectares, with only 3 per cent formally reserved in 2007 (Threatened Species Scientific Committee, 2009). The majority of this community occurs on private property. With ongoing clearing and decline of this community throughout much of its range, its area of occupation has almost undoubtedly declined.

The community’s remnant distribution is geographically restricted, and exists in very small patches. Within the construction corridor, Grassy Eucalypt Woodland of the Victorian Volcanic Plain is confined to a single patch that spans two properties separated by a bitumen road (see Figure 18-2). At one property the community is in good condition, while at the other it is of poorer quality. A number of large trees also occur within the patch, with the patch in overall good condition, suggesting its position within the larger area of the community, and the current land use is beneficial. The larger area of the community is estimated from aerial imagery as around 50 hectares in extent.

An assessment of the potential impacts on this ecological community was undertaken considering the criteria defined in the Significant Impact Guidelines as identified in Table 18-4. Appendix S of Technical report A *Biodiversity and habitats* provides further information on this assessment.

Table 18-4 Significant impact criteria and assessment for Grassy Eucalypt Woodland of the Victorian Volcanic Plain

Significant impact criteria	Assessment of the Project
Reduce the extent of an ecological community	<p>The distribution of Grassy Eucalypt Woodland of the Victorian Volcanic Plain is considered to be geographically restricted, based on the fragmentation of remnants into very small patch sizes. These patches are subject to ongoing threats such as ongoing clearing as a result of urbanisation, weed invasion leading to a worsening in condition, and lack of appropriate management of the community throughout much of its range. As such, the extent of the community has almost undoubtedly and measurably declined. In this context, the proposed removal would not reduce the geographic area of extent of the community, but will reduce its area of occupancy.</p> <p><b>Conclusion:</b> Unlikely to reduce the overall geographic extent of community but likely to significantly impact the community through a reduction in the area of occupancy.</p>
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	<p>The community is confined to a single patch that that spans two properties separated by a bitumen road. The patch was assessed as in good condition at one property, and in poorer quality at the other. The Project would result in further fragmentation of this community. Four areas of the community within the construction corridor will be reduced to an area smaller than 0.05 ha and as a consequence, will no longer meet the patch size threshold for the community. The fragmented distribution of the community and its generally small patch size increase the vulnerability of this community to threatening processes.</p> <p><b>Conclusion:</b> Likely to be a significant impact.</p>
Adversely affect habitat critical to the survival of an ecological community	<p>There is no current list of sites critical for the survival of the ecological community and no critical habitat described for this community.</p> <p>However, clearing for urban development in the Hume, Melton and Whittlesea urban growth zones has been identified by the Threatened Species Scientific Committee (2009)<sup>7</sup> as a serious threat and likely to lead to further loss of this community.</p> <p><b>Conclusion:</b> Likely to adversely affect habitat critical to the survival of an ecological community.</p>
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	<p>Construction of the Project involves removal of topsoil within a 30 m wide corridor and construction techniques include open trenching (2 m deep and 1 m wide).</p> <p><b>Conclusion:</b> These works are likely to modify or destroy abiotic (non-living) factors.</p>

<sup>7</sup> Threatened Species Scientific Committee (2009). Commonwealth Listing Advice on Grassy Eucalypt Woodland of the Victorian Volcanic Plain. Department of the Environment, Water, Heritage and the Arts.

Significant impact criteria	Assessment of the Project
<p>Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning, or flora or fauna harvesting</p>	<p>The current land use regime and location of the patch is beneficial to the community's health. Reduction in patch size through fragmentation of this community is likely to lead to a loss of floristic diversity and structural intactness, in particular large old trees that are keystone functional components of the vegetation and are hollow bearing, leaving it vulnerable to threatening processes.</p> <p><b>Conclusion:</b> Likely to cause a substantial change in the species composition of an occurrence of an ecological community.</p>
<p>Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Assisting invasive species that are harmful to the listed ecological Community, to become established</li> <li>• causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community</li> </ul>	<p>There is little potential for introduction of new weeds and spread of established weeds during construction of the Project since the surrounding vegetation is already heavily invaded by weeds.</p> <p>However, as the community was assessed as being in good condition, it may be vulnerable if disturbed. EMM B2 and EMM B13 include measures to manage potential weed invasion, contaminated soil and erosion. Measures will be incorporated into a CEMP to protect surrounding areas of this community. Consequently, weed management during construction and operation would be more substantial than occurs at present.</p> <p><b>Conclusion:</b> Unlikely to cause a substantial reduction in the quality or integrity of an occurrence of an ecological community.</p>
<p>Interfere with the recovery of an ecological community</p>	<p>There is no recovery plan for this community. The patch within the construction corridor is of good quality and would make a substantial contribution to the recovery of the broader community. Any loss of the community would contribute to cumulative losses within the remaining community's extent.</p> <p>To date, establishment of a Grassy Woodland Reserve, planned under the MSA program, is underway but has not been implemented by DELWP. The reserve is planned to protect 1,200 ha of this ecological community and restore its former biodiversity value.</p> <p>Delays in acquiring land for the Grassy Eucalypt Woodland Reserve and continuing threats of degradation are considered to pose significant risks to this community. Therefore, removal of the community is likely to further exacerbate recovery efforts.</p> <p><b>Conclusion:</b> Likely to interfere with the recovery of an ecological community.</p>

Overall, the assessment found that according to the relevant significance criteria the Project is likely to have a significant impact on the Grassy Eucalypt Woodland of the Victorian Volcanic Plain. This is due to the clearing of 2.25 hectares (and the indirect impact on 0.04 hectares of fragmented patches) which has the potential to result in a further fragmentation of the community, and cause substantial change to the species composition, increasing its vulnerability to threatening processes. Combined with the clearing being associated with urban development in zones that include critical habitat for the community, the removal and modification of soils, and the loss of large trees due to vegetation clearance, the Project would also contribute to cumulative losses of this community across the Victorian Volcanic Plain Bioregion. No operational impacts are expected for this community.



## Management measures

Avoidance and minimisation of impacts on EPBC ecological communities and State significant native vegetation was a key consideration in selecting the proposed alignment for the Project. However, given the size and linear nature of the Project, some impacts on native vegetation are unavoidable.

Measures to avoid and minimise impacts on Grassy Eucalypt Woodland of the Victorian Volcanic Plain include:

- Realignment at five locations to avoid 10 large trees and 2.8 hectare of the community, with other areas of narrowing and alignment changes as noted in Technical report A *Biodiversity and habitats*
- Clearly marking out the construction area boundary including installing and maintaining temporary fencing (star pickets and bunting) adjacent to sensitive environmental values (EMM B1/B18)
- Weed management including topsoil management (EMM B2 and B8)
- Training for on-site contractors (EMM B3)
- Site rehabilitation once works are complete (EMM B7).

## Residual impacts

Despite management measures to avoid, minimise and manage impacts during construction, the residual impact on Grassy Eucalypt Woodland of the Victorian Volcanic Plain due to the Project may still be considered significant under the Significant Impact Guidelines. The community represents some of the highest quality vegetation in the Project area, and further disturbance and fragmentation due to the Project are likely to lead to a loss of floristic diversity, a loss of structural intactness and through this fragmentation, loss of EPBC Act conservation status. In addition, impacts are still expected to large trees that are important functional components of the community and cannot be replaced through reinstatement.

These significant residual impacts will be addressed through offsetting in accordance with the *EPBC Act Environmental Offsets Policy* (DSEWPC, 2012) and the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017). An Ecological Offsets Strategy (refer EES Attachment II) has been prepared for the Project, addressing both State and Commonwealth requirements. This offset strategy also outlines the approach to preparing Offset Management Plans which in turn describe how the offsets will be secured, managed and monitored, including management actions, responsibility, timing, performance measures and the specific environmental outcomes to be achieved.

Calculated offsets for this community have been provided in Section 18.9.

### 18.5.2 Natural Temperate Grassland of the Victorian Volcanic Plain

In total, 4.26 hectares of Natural Temperate Grassland of the Victorian Volcanic Plain was mapped within the construction corridor, with 3.53 hectares occurring outside the MSA area (see Figure 18-1 and Figure 18-2). The Project would require the total removal of the 3.53 hectares outside the MSA area, and would indirectly impact 0.28 hectares of fragmented patches.

The Natural Temperate Grassland of the Victorian Volcanic Plain has a disjunct distribution from Melbourne to the South Australian border on the Victorian Volcanic Plain. It is a listed Critically Endangered community under the EPBC Act. This community has the potential to occur in areas of grassland and may correlate with areas of Plains Grassland (EVC 132) and Creekline Tussock Grassland (EVC 654). Better quality remnants of the community were previously found in the outer western and northern suburbs of Melbourne, however, the community was estimated to have declined by at least 98 per cent, with 5,240 hectares remaining in 2004 (Threatened Species Scientific Committee, 2008). Sixteen years later, this percentage is likely to be substantially higher owing to ongoing clearing, weed invasion and a lack of ecological management throughout the communities' range.

In general, the community is of poor quality, with its species composition lacking in diversity across the construction corridor. It is mainly comprised of the more resilient species (for example, Wallaby and Spear grasses), with other species that previously characterised the community, such as native daisies, peas and kangaroo grass, appearing to be absent. The community is considered highly fragmented across both the construction corridor and across its entire range, with little to no continuity.

There are no published thresholds for determining a significant impact based on extent of removal of this community. However, the patch size threshold for the community is small (0.05 hectares) and even small areas are considered worthy of protection (Threatened Species Scientific Committee, 2008). Furthermore, areas that have been disturbed and are regenerating are also considered important for the recovery of the ecological community.

An assessment of the potential impacts on this ecological community was undertaken, considering the criteria defined in the Significant Impact Guidelines as identified in Table 18-5. Appendix S of Technical report A *Biodiversity and habitats* provides further information on this assessment.

Table 18-5 Significant impact criteria and assessment for Natural Temperate Grassland of the Victorian Volcanic Plain

Significant impact criteria	Assessment of the Project
Reduce the extent of an ecological community	<p>Based on the 2004 area of occupancy data (5,240 ha), the removal of 4.26 ha of the community would constitute an impact of at least 0.13% of the listed community.</p> <p>Given the ongoing decline in extent and condition of Natural Temperate Grassland of the Victorian Volcanic Plain and its already fragmented distribution, the proposed removal is unlikely to reduce the geographical extent of the community, however, it is likely to significantly reduce its area of occupancy.</p> <p><b>Conclusion:</b> Unlikely to reduce the overall geographic extent of an ecological community but likely to significantly impact an ecological community through a reduction in the area of occupancy.</p>

Significant impact criteria	Assessment of the Project
<p>Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines</p>	<p>Removal of existing patches, or portions of patches, is likely to cause further fragmentation of this already fragmented community, and could contribute to a decline in the overall area of occupancy of the community. The Project is also creating additional breaks within the patches along the construction corridor (see Figure 18-1 and 18-2).</p> <p>The patch size threshold for this community is small (0.05 ha) and even small areas are considered worthy of protection (Threatened Species Scientific Committee, 2008).<sup>8</sup></p> <p>Fifteen patches would be reduced to an area smaller than 0.05 ha and as a consequence, would no longer meet the patch size threshold for the community.</p> <p><b>Conclusion:</b> Likely to fragment or increase fragmentation of an ecological community leading to a significant impact.</p>
<p>Adversely affect habitat critical to the survival of an ecological community</p>	<p>A number of sites have been nominated as key remnants of the listed community, including road and rail reserves, cemeteries and some reserves within the Greater Melbourne area. However, none of these remnants are proposed to be impacted.</p> <p><b>Conclusion:</b> Unlikely to adversely affect habitat critical to the survival of an ecological community.</p>
<p>Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns</p>	<p>Construction of the Project involves removal of topsoil within a 30 m wide corridor and construction techniques include open trenching (2 m deep and 1 m wide).</p> <p><b>Conclusion:</b> These works are likely to modify or destroy abiotic (non-living) factors.</p>
<p>Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting</p>	<p>The community is already lacking in floristic diversity, with many small forbs and key species lost, and only the more resilient species remaining.</p> <p>Consequently, there is little opportunity for a further substantial change in the species composition of adjacent examples of the ecological community.</p> <p><b>Conclusion:</b> Unlikely to cause a substantial change in the species composition of an occurrence of an ecological community.</p>
<p>Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Assisting invasive species harmful to the listed ecological community to become established</li> <li>• Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community</li> </ul>	<p>Though there is limited potential for introduction of new weeds, declared noxious weeds and weeds of national significance are abundant throughout the construction corridor and have the ability to rapidly establish on fertile basalt soils.</p> <p>Removal of vegetation within the construction easement is likely to render adjacent patches of this community somewhat more vulnerable to weed invasion through a reduction in patch size, increase in edge effects and susceptibility of fertile basalt soils to weed establishment.</p> <p>EMM B2 and B13 have been developed to manage weeds, contaminated soil and erosion, and measures would be incorporated into a CEMP to protect adjacent patches of this community where they occur. It should be noted that weed management during construction will be far more substantial than present occurring.</p> <p><b>Conclusion:</b> Unlikely to cause a substantial reduction in the quality or integrity of an occurrence of an ecological community.</p>

<sup>8</sup> Threatened Species Scientific Committee (2008). Commonwealth Listing Advice on *Natural Temperate Grassland of the Victorian Volcanic Plain*. Department of the Environment, Water, Heritage and the Arts.

Significant impact criteria	Assessment of the Project
Interfere with the recovery of an ecological community	<p>There is no recovery plan for this community. Though the community is of poor quality, any loss would contribute to cumulative losses within the remaining community's extent.</p> <p>To date, establishment of a Western Grassland Reserve planned under the MSA program has not been implemented by DELWP. The reserve is planned to protect 15,000 ha of grassland, including the largest and highest quality example of Natural Temperate Grassland remaining in Victoria.</p> <p>Delays in acquiring land for the Western Grassland Reserve and continuing threats of degradation are considered to pose significant risks to this community. Therefore, removal of the community is likely to further exacerbate recovery efforts.</p> <p><b>Conclusion:</b> Likely to interfere with the recovery of an ecological community.</p>

While the loss of 3.53 hectares (and the indirect impact on 0.28 hectares of fragmented patches) of Natural Temperate Grassland of the Victorian Volcanic Plain would not significantly reduce its geographic extent, it would reduce its area of occupancy.

According to Significant Impact Guidelines, the Project is likely to have a significant impact on this community based on three criteria:

- The further fragmentation of the community's already fragmented distribution
- Works would modify soils
- Works would interfere with the recovery of this community.

No operational impacts are expected for this community.

### Management measures

To avoid impacts to the community, horizontal boring would be undertaken at five locations, avoiding 0.98 hectares of native grassland, with other areas of narrowing and alignment changes as noted in Technical report A *Biodiversity and habitats*. The management measures listed in Section 18.5.1 would also be implemented to minimise impacts to this community.

### Residual impact

Despite the nominated measures, the residual impacts on Natural Temperate Grassland of the Victorian Volcanic Plain due to the Project are considered significant according to the Significant Impact Guidelines.

Offsets as per the Project's Ecological Offsets Strategy (refer EES Attachment II) mentioned in Section 18.5.1 would be provided in accordance with the *EPBC Act Environmental Offsets Policy* (DSEWPC, 2012) and *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017) to address the significant residual impact. Note: the offsetting of impacts does not change the significance of the impact, the significance of the impact can only be reduced through avoidance and mitigation or management measures, before the assessment of the residual impact.

Calculated offsets for this community have been provided in Section 18.9.

## 18.6 Threatened flora

A total of 19 species of EPBC Act-listed threatened flora were identified in the desktop assessment as having potential to occur in the construction corridor or within five kilometres. Of these species, 10 were considered to have a medium or higher likelihood of occurring within the construction corridor or within five kilometres and were selected for targeted surveys (as identified in Table 18-2).

Targeted surveys were conducted for these 10 species according to flowering time. Additional surveys were conducted in 2020 where access had not been available to parcels during the earlier survey period to assess habitat suitability and confirm likelihood of absence.

As a result of targeted surveys, only one EPBC Act-listed species, Matted Flax-lily, was confirmed to be present as a single individual plant (Biosis, 2020). No suitable habitat was identified during field surveys in or near to the construction corridor for any of the remaining EPBC Act threatened flora.

Table 18-6 Summary of EPBC flora and impacts for outside the MSA area

Species	Amount found	Amount to be impacted/removed
Matted Flax-lily	One	None

### 18.6.1 Matted Flax-lily

A single Matted Flax-lily individual was identified within the fenceline along an uncultivated area of roadside (218268306, KP 23) adjacent to a paddock of Plains Grassy Woodland in 1PS733045 (KP 23 – KP 24). The plant is one small tuft, believed to consist of only one ramet (no additional tufts attached or nearby). The Project would not impact this individual.

Matted Flax-lily is a small, perennial, tufted lily endemic to south-east Australia, occurring in grassland and grassy woodland habitats (refer Figure 18-3). Matted Flax-lily occurs in Victoria and Tasmania. South of the Dividing Range it is largely confined to drier grassy woodland and grassland communities but multiple populations are known from the northern and western suburbs of Melbourne, typically within remnant vegetation alongside road or rail corridors, conservation reserves and in translocation sites (Carter, 2010; VicFlora, 2016).

The Matted Flax-lily recorded is on public land outside the MSA area, as shown in Figure 18-2.

An assessment of the potential impacts on Matted Flax-lily was undertaken considering the criteria defined in the Significant Impact Guidelines as identified in Table 18-7. Appendix T of Technical report A *Biodiversity and habitats* provides further information on this assessment.

Figure 18-3 Matted Flax-lily.  
Source: GHD





Table 18-7 Significant impact criteria and assessment for Matted Flax-lily

Significant impact criteria	Assessment of the Project
Lead to a long-term decrease in the size of a population	<p>The single Matted Flax-lily plant identified is located within an area of the Project that is planned to be bored via horizontal directional drilling (HDD) and this plant would not be removed for the Project.</p> <p>The Project would not result in a long-term decrease in the size of the population.</p> <p><b>Conclusion:</b> Unlikely to lead to a long-term decrease in the size of a population.</p>
Reduce the area of occupancy of the species	<p>The Project would not require the removal of the one plant identified in the construction corridor.</p> <p><b>Conclusion:</b> Unlikely to reduce the area of occupancy of the species.</p>
Fragment an existing population into two or more populations	<p>The population would not be fragmented into two or more populations – only a single plant occurs at one location and this would be retained through HDD through this area.</p> <p><b>Conclusion:</b> Unlikely to fragment an existing population into two or more populations.</p>
Adversely affect habitat critical to the survival of a species	<p>Currently there is no habitat identified as critical to the survival of Matted Flax-lily, however, the species would be expected to occur in grassland and grassy woodland communities of sufficient quality. No plants were recorded in these habitats in spite of detailed targeted surveys conducted during the flowering period and since only a single plant exists, dispersal to these areas is unlikely.</p> <p><b>Conclusion:</b> Unlikely to adversely affect habitat critical to the survival of a species.</p>
Disrupt the breeding cycle of a population	<p>A single plant is not considered a viable population. The Project is unlikely to promote any decline in the population.</p> <p><b>Conclusion:</b> Unlikely to disrupt the breeding cycle of a population</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>Habitat for the single Matted Flax-lily is planned for removal in nearby grassy woodland vegetation during construction of the Project. Since only one plant occurs, it is highly unlikely that vegetation removal will be the sole cause of any species' decline.</p> <p><b>Conclusion:</b> Unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	<p>Matted Flax-lily individual would be retained and little if any change to current conditions is expected at the site where the plant occurs.</p> <p><b>Conclusion:</b> Unlikely. The Project is unlikely to result in invasive species that are harmful to the Matted Flax-lily becoming established in the endangered or critically endangered species' habitat.</p>
Introduce disease that may cause the species to decline	<p>No diseases known to affect Matted Flax-lily would likely be activated or exacerbated by construction of the Project.</p> <p><b>Conclusion:</b> Unlikely to introduce disease that may cause the species to decline.</p>
Interfere with the recovery of the species	<p>Construction of the Project would not interfere with implementation of any known recovery effort in the broader area or the national recovery plan.</p> <p><b>Conclusion:</b> Unlikely to interfere with the recovery of the species.</p>

The single Matted Flax-lily plant identified is located in an area of the Project that is planned to be bored via horizontal directional drilling (HDD) and this plant would not be removed for the Project. The Project is unlikely to have a significant impact on this species given:

- The one plant identified would not be impacted
- No important habitat has been identified as critical to the survival of Matted Flax-lily
- No diseases known to affect Matted Flax-lily would likely be activated or exacerbated by construction of the Project.

No other Matted Flax-lily plants were identified anywhere in the construction corridor during seasonal targeted surveys.

## Management measures

The section of the construction corridor where the Matted Flax-lily occurs would be bored and this construction methodology would avoid impacts on the plant. Additionally, the area around the plant would be clearly identified as a no-go zone and temporary fencing (star pickets and bunting) would be installed alongside the plant to prevent impacts (EMM B1). All Project personnel would be required to attend an induction outlining environmental management requirements (EMM B3 and EMM B18).

## Residual impact

The residual impact on Matted Flax-lily due to the construction and operation of the Project is considered unlikely to be significant according to the Significant Impact Guidelines.

## 18.7 Threatened fauna

A total of 28 species of EPBC Act-listed threatened fauna (including terrestrial and aquatic) were identified in the desktop assessment as having potential to occur in the construction corridor (or within five kilometres).

Based on desktop investigations and a rapid field assessment, only three EPBC Act-listed terrestrial and one fish species were considered to have a medium or higher likelihood of occurring within the construction corridor and were nominated for targeted surveys. The remaining EPBC Act fauna species have not been discussed below, as they are not expected to be impacted by the Project; they either have a low likelihood of occurrence, or even if they are present any impacts have been assessed as negligible.

A total of three threatened species were recorded during targeted surveys: Striped Legless Lizard, Golden Sun Moth, and Growling Grass Frog (refer Figure 18-1 and Figure 18-2). The fish species, Australian Grayling, was not detected. However, due to Deep Creek containing suitable habitat, and its connectivity to Maribyrnong River (where the species is known to occur), there is considered to be potential for the species to migrate through the construction corridor. As such, the Australian Grayling was considered as having a medium likelihood of occurrence in Deep Creek.

Table 18-8 Summary of EPBC fauna and impacts for outside the MSA area

Species	Amount found (individuals and habitat)	Amount of habitat to be impacted/ removed (known or assumed)
Striped Legless Lizard	6 individuals, 39.34 ha	39.34 ha
Golden Sun Moth	66 individuals, 19.93 ha	19.93 ha
Growling Grass Frog	1 individual at Deep Creek, assumed present in Jacksons Creek	0.03 ha
Australian Grayling	None (only assumed)	None

### 18.7.1 Striped Legless Lizard

This species occurs within natural temperate grasslands, grassy woodlands and some exotic grasslands (especially those dominated by tussock forming grass species). Figure 18-4 provides a photograph of the Striped Legless Lizard. While much of the construction corridor has been subject to agricultural practices, areas that still support native grassland, or non-native grassland that is grazed without a recent history of cropping, have the potential to support this species.

During targeted surveys, six unique individuals of Striped Legless Lizard were recorded from two locations within one land parcel (at approximately KP 10.7), outside the MSA area (see Figure 18-1).

Based on results of the targeted surveys, and following Striped Legless Lizard referral guidelines (Commonwealth of Australia, 2011) all patches of native and non-native vegetation within this one land parcel are confirmed habitat. Additionally, the native and non-native vegetation in the adjacent land parcel that is contiguous with (west of) the native vegetation identified in the one land parcel is also considered confirmed habitat. The adjacent land parcel has had a habitat assessment undertaken, however, suitable habitat was not identified.

Following consultation with DELWP, a conservative approach has been adopted, where the species is presumed present in all areas containing suitable habitat for the species. This includes areas where targeted surveys have and have not been undertaken. The total area of confirmed or presumed Striped Legless Lizard habitat within the construction corridor is 39.33 hectares, and all of this habitat is proposed to be removed.

Figure 18-4 Striped Legless Lizard. Source: GHD



An assessment of the potential impacts on the Striped Legless Lizard was undertaken considering the criteria defined in the Significant Impact Guidelines as identified in Table 18-9. Appendix W of Technical report A *Biodiversity and habitats* provides further information on this assessment.



Table 18-9 Significant impact criteria and assessment for the Striped Legless Lizard

Significant impact criteria	Assessment of the Project
Lead to a long-term decrease in the size of an important population of a species	<p>The population within the construction corridor may be considered an important population (Threatened Species Scientific Committee, 2016)<sup>9</sup>, however, works are not expected to lead to a long-term decrease in the size of this population.</p> <p>As a vast area of similarly suitable habitat surrounds the construction corridor, there is sufficient habitat available for individuals to reside during construction. The habitat within the Project Area would be made unsuitable prior to construction to encourage individuals away from the construction corridor, but would be rehabilitated post-construction to encourage individuals back.</p> <p>Six individuals were identified from two grids, which suggests that populations are not large. While not all areas of habitat were surveyed the majority of unsurveyed habitat is marginal and considered to have a lower likelihood of supporting the species.</p> <p><b>Conclusion:</b> Unlikely. Residual impacts of the works are not expected to result in a long-term population change.</p>
Reduce the area of occupancy of an important population	<p>The population within the construction corridor may be considered an important population, and work may be considered to lead to a reduction in its area of occupancy. Proposed impacts are expected to be limited to 0.67 ha of known habitat, and 38.66 ha of assumed habitat (a total of 39.34 ha). The ability for this species to recolonise areas following ground disturbance is not well understood and it must be assumed that the area of occupancy may be reduced as a result of works within the Project Area.</p> <p><b>Conclusion:</b> Possible. The residual area of occupancy for this species may be reduced. It is possible that over time the species may recolonise the construction corridor but the species' ability to do this is not well understood and habitat within the construction corridor must be assumed to be lost.</p>
Fragment an existing important population into two or more populations	<p>The construction corridor would be typically 30 m wide. This species may be capable of crossing the construction corridor following rehabilitation, though its ability to do this is not well understood.</p> <p>In many places along the construction corridor, the route follows the edge of parcel boundaries where land use might change or already disturbed areas such as driveways and roads which already present barriers to the species.</p> <p>The only confirmed habitat within the construction corridor is bordered by a waterway which does not constitute habitat for the species. In this location the important population present is not expected to be fragmented.</p> <p>Given the sedentary nature of the species if they are unable to cross the construction corridor following rehabilitation this could result in the fragmentation of a population if present within areas of assumed habitat.</p> <p><b>Conclusion:</b> Possible. If the species is not able to cross areas of ground disturbance, then fragmentation may occur if any important populations exist within areas of assumed habitat.</p>

<sup>9</sup> Threatened Species Scientific Committee (2016). Conservation Advice *Delma impar* Striped Legless Lizard, Department of the Environment and Energy, Canberra.

Significant impact criteria	Assessment of the Project
Adversely affect habitat critical to the survival of a species	<p>While all habitat is likely to provide critical habitat in that it is necessary for foraging, breeding or dispersal, there is a vast area of similarly suitable habitat surrounding the construction corridor that is sufficient for individuals to reside in during construction.</p> <p><b>Conclusion:</b> Unlikely. Habitat of similar quality is prevalent across parcels that have been considered habitat. Suitable habitat is present across the extent of the parcel known to support the species within where it can reside during construction.</p>
Disrupt the breeding cycle of an important population	<p>Works within the construction corridor are expected to be temporary and localised. The breeding cycle if disrupted is expected to be limited to a small number of individuals within the construction corridor rather than the population or species as a whole.</p> <p><b>Conclusion:</b> Unlikely. Disruption to breeding cycle expected to be temporary and localised, and would not change breeding dynamics.</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>Vast area of similar suitable habitat is available. Proposed impacts are expected to be limited to 0.67 ha of known habitat. It is acknowledged that a total of 39.34 ha of habitat is considered suitable though largely marginal for this species within the construction corridor.</p> <p>Disturbance of grassland is expected to decrease the availability of habitat for Striped Legless Lizards. However, this is expected to be temporary and is not expected to result in species' decline.</p> <p><b>Conclusion:</b> Unlikely. Habitat is not expected to be modified, destroyed, removed, isolated or decreased to the extent that would constitute an impact on the species as a whole.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Invasive species that could be detrimental to this species are already present. These include fauna (cats, foxes, rats, mice) and flora (Chilean Needle Grass, Serrated Tussock, numerous other non-native grassland species).</p> <p>Appropriate weed, disease and pathogen management would be implemented to prevent any further invasive flora or fauna being introduced as a result of the Project.</p> <p><b>Conclusion:</b> Unlikely. Invasive species already present and the Project is not expected to introduce new species.</p>
Introduce disease that may cause the species to decline	<p>The Project is not expected to result in the introduction of disease that may cause the species to decline. Appropriate weed, disease and pathogen management would be implemented.</p> <p><b>Conclusion:</b> Unlikely. The Project is not expected to result in the introduction of disease.</p>
Interfere substantially with the recovery of the species	<p>The proposed Project proposes to impact only a small amount of known habitat (0.67 ha) when considering the context of the grassland habitats available within the immediate area. It is acknowledged that a total of 39.34 ha of habitat is considered suitable though largely marginal for this species within the construction corridor.</p> <p>Disturbance of grassland is expected to decrease the availability of habitat for Striped Legless Lizard locally and possibly temporarily. This is not expected to interfere in any way with the recovery of the species as a whole.</p> <p><b>Conclusion:</b> Unlikely. Impacts are not expected to interfere in any way with the recovery of the species as a whole.</p>

The population within the construction corridor may be considered an important population (Threatened Species Scientific Committee, 2016). The Striped Legless Lizard is confined to the grassy and grassy woodland habitats. Disturbance of these habitats within the construction corridor is expected to be temporary with habitats reinstated following works. However, given the species' susceptibility to ground disturbance, it is possible that individuals may not readily return to pre-construction use or any use of the construction corridor. It is not known how effectively Striped Legless Lizards can use such areas as part of their foraging territory, but in the absence of cracking soils and rocks (which are not expected to be reinstated), impacts on these areas may reduce the area of occupancy of the species.

It is feasible to consider that the species is capable of crossing the construction corridor following rehabilitation during operation, though the species' ability to do this is not well understood. Given the apparently sedentary or localised nature of the species, inability to cross the construction corridor following rehabilitation could result in the fragmentation of a population if present within areas of assumed habitat. Fragmentation of a population is not expected within the area of confirmed habitat as the Construction corridor abuts a waterway that does not constitute habitat.

Land management along the alignment is largely managed at a parcel scale, consequently habitats within parcels tend to be fairly homogenous with regard to species composition, vegetation structure and land use. As such, any habitat removal is expected to result in impacts on individuals within the construction corridor rather than at a population scale. Most habitat loss that would occur as a result of the Project is small and localised, and for fauna is expected to result in the loss or displacement of individuals rather than populations or species.

## Management measures

To avoid known habitat, the width of the Construction corridor was reduced by 0.2 hectares in one specific parcel (a reduction of almost 30% of known habitat). Overall reduction in impacts of 1.24 hectares of known or assumed habitat outside of the MSA. Other areas of narrowing and alignment changes area noted in Technical report A *Biodiversity and habitats*.

Other measures to prevent mortality of individuals of the population would be outlined in a Striped Legless Lizard Management Plan. The plan would include measures such as actively searching areas of habitat for individuals (rock rolling and lifting of debris) prior to slashing, slashing areas of suitable habitat within the construction corridor to make them less suitable (slashing to occur no lower than 50 mm to minimise risks to individuals), tying the area (digging up the soil), relocating any individuals found and installing lizard-proof fences to prevent recolonisation during construction (EMM B20). Visual inspection of trenches would also occur at the start of each work day to remove individuals prior to work commencing (EMM B9).

Subsequent rehabilitation of habitat and removal of fauna fences will then allow Striped Legless Lizards to recolonise the disturbed habitat and resume their pre-construction habitat use. Appropriate weed, disease and pathogen management would be implemented to prevent any further invasive flora or fauna being introduced (EMM B2).

## Residual impact

The proposed removal of 39.34 hectares (comprising 0.67 hectares of known habitat and 38.66 hectares of assumed habitat) during construction is considered to trigger a significant residual impact on the Striped Legless Lizard according to the Significant Impact Guidelines. It may result in a reduction in the area of occupancy of the species if they don't recolonise cleared areas, and fragmentation of a population if present within areas of assumed habitat only.

A significant residual impact on this species triggers offset requirements under the EPBC Act. Calculated offsets for this species have been provided in Section 18.9.

## 18.7.2 Golden Sun Moth

This species occurs within natural temperate grasslands, grassy woodlands and some exotic grasslands (especially those dominated by tussock forming grass species). A photograph of the Golden Sun Moth is in Figure 18-5. While much of the construction corridor has been subject to agricultural practices, areas that still support native grassland, and non-native grassland that is grazed without a recent history of cropping, have the potential to support this species.

A total of 90 Golden Sun Moths were recorded in areas within and outside of the MSA area from approximately KP 10 through to KP 51 (see Figure 18-1 and Figure 18-2). Of the 14 parcels surveyed and found to contain Golden Sun Moths, five parcels were outside the MSA area, two parcels had contiguous suitable habitat both within and outside the MSA area, and a total of 66 moths were recorded. Where this species has been found within a parcel that overlaps the MSA area, the portion of the parcel outside the MSA has been considered to support the species regardless of whether the actual location of the record was inside or outside the MSA area. The current estimate of confirmed Golden Sun Moth habitat within construction corridor, but outside the MSA area, is approximately 19.93 hectares (comprising 11.85 hectares of known habitat and 8.08 hectares of assumed habitat).

An assessment of the potential impacts on the Golden Sun Moth was undertaken considering the criteria defined in the Significant Impact Guidelines in Table 18-10. Appendix U and V of Technical report A *Biodiversity and habitats* provides further information on this assessment.

Table 18-10 Significant impact criteria and assessment for the Golden Sun Moth

Significant impact criteria	Assessment of the Project
Lead to a long-term decrease in the size of a population	<p>Even though apparent population size is known to vary from year to year based on conditions, the numbers of individuals detected suggest that population sizes within the construction corridor are small. Any disturbance of habitat for the Project is expected to be temporary, with habitats reinstated following works. However, the ability for Golden Sun Moth to recolonise areas of ground disturbance is not well understood and the areas are considered lost.</p> <p>Impacts are expected to be restricted to a linear construction corridor that bisects areas of Golden Sun Moth habitat, which would allow the species to still cross the construction corridor during and following construction and maintain population flow.</p> <p><b>Conclusion:</b> Unlikely. A long-term decrease in the size of the population is not expected as a result of the habitat disturbance.</p>
Reduce the area of occupancy of the species	<p>The Project occurs in a landscape of nearly contiguous suitable habitat, where almost every land parcel intercepted by the Project is considered suitable habitat.</p> <p><b>Conclusion:</b> Possible. At a landscape scale, the area of occupancy for this species will not change. However, at a habitat-area scale, the residual area of occupancy for this species may be reduced. It is possible that over time the species may recolonise the construction corridor but the species' ability to do this is not well understood and habitat within the construction corridor must be assumed to be lost.</p>

Significant impact criteria	Assessment of the Project
Fragment an existing population into two or more populations	<p>The construction corridor would be typically 30 m. However, Golden Sun Moth are capable of flying across this distance, so populations are unlikely to be fragmented during the construction period. With habitat rehabilitation, any localised fragmentation would be temporary.</p> <p><b>Conclusion:</b> Unlikely. This species is capable of crossing the area of disturbance during construction.</p>
Adversely affect habitat critical to the survival of a species	<p>The Project occurs in a landscape of nearly contiguous suitable habitat, where almost every land parcel is considered suitable habitat. Impact on habitat or assumed habitat is minimal when considered at the scale at which habitat occurs in this area.</p> <p>Adverse impacts on habitat or assumed habitat for this species are not expected to be at the scale that would impact the survival of the species as a whole.</p> <p><b>Conclusion:</b> Unlikely. Habitat within the construction corridor is not expected to be critical to the survival of the species. Residual impacts are expected to be temporary with habitats reinstated following works and supporting the potential for recolonisation.</p>
Disrupt the breeding cycle of a population	<p>Impacts on adults are expected to be minimal given the apparently small population sizes in the areas where they were detected (a total of 66 individuals were recorded from 7 parcels). Pupal and larval life stages are likely to be disturbed or killed during earth works. Larvae in adjacent habitat will not be impacted.</p> <p><b>Conclusion:</b> Unlikely. Any disruption to the breeding cycle of this species is expected to be temporary and highly localised, and not change the breeding dynamics of a population.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>The Project occurs in a landscape of nearly contiguous suitable habitat, where almost every land parcel that the Project intercepts is considered suitable habitat. Disturbance of habitat within the construction corridor would be reinstated following works. However, the quality of the habitat following ground disturbance may be such that it is no longer considered habitat.</p> <p><b>Conclusion:</b> Unlikely. Modifications, destruction and removal of habitat are expected to be highly localised and are not expected to result in impacts at a species level.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	<p>Invasive species that could be detrimental to this species are already present. These include fauna (cats, foxes, rats, mice) and flora (numerous non-native grassland species).</p> <p>Appropriate weed, disease and pathogen management would be implemented to prevent any further invasive flora or fauna being introduced as a result of the Project.</p> <p><b>Conclusion:</b> Unlikely. Invasive species already present and the Project is not expected to introduce new species.</p>
Introduce disease that may cause the species to decline	<p>The proposed Project is not expected to result in the introduction of disease that may cause the species to decline. Appropriate weed, disease and pathogen management would be implemented.</p> <p><b>Conclusion:</b> Unlikely. The Project is not expected to result in the introduction of disease.</p>
Interfere with the recovery of the species	<p>Proposed impacts are expected to be highly localised and subject to appropriate reinstatement. Proposed impacts would also occur only in a narrow strip that long term, would not create a barrier to movement and has the potential to be recolonised, though the degree to which this is feasible is not well known.</p> <p><b>Conclusion:</b> Unlikely. Impacts are expected to be highly localised and impact individuals rather than whole populations and are not expected to interfere with the recovery of the species.</p>



The Project would require removal of a total of 19.93 hectares of potential habitat for this species outside the MSA area. This includes both habitat that is known to support this species (11.85 hectares) or assumed to support this species (8.08 hectares). This loss of vegetation and subsequent loss of habitat for this species is unavoidable and this impact triggers the threshold of a 'significant impact' (under the additional guidelines provided for the Golden Sun Moth) as the Project occurs in a landscape of contiguous habitat (that is, greater than 10 hectares) where the impact threshold for a significant impact is "habitat loss, degradation or fragmentation greater than 0.5 hectares". The amount of habitat removal for the Project meets this criterion for a significant impact.

Most habitat loss that is likely to, or that may, occur as a result of this Project is small and localised. For fauna it is expected to result in the loss or displacement of individuals rather than populations or species.

The Project is limited to linear corridor (typically 30 metres in most places). As such, impacts as a result of noise, vibration and lighting are expected to be minimal as they are expected to be highly localised.

No operational impacts are expected for this species.

### Management measures

To avoid known and assumed habitat on some parcels, some areas were removed from the Project, and narrowing of the Construction corridor was also undertaken. An overall reduction of impact of 4.08 hectares was achieved on these parcels.

The Project would also avoid as far as practicable the removal of native vegetation and fauna habitat and impacts on habitat connectivity by establishing no-go zones and clear works areas to protect vegetation and fauna habitat to be retained (EMM B1).

Areas considered known or potential Golden Sun Moth habitat would be rehabilitated and reinstated (EMM B7) with consideration to native vegetation, habitat features, and topsoil management (EMM B8).

Topsoil management is particularly important for Golden Sun Moths as it can minimise larval death. Measures include minimising time between soil removal and replacement, and reinstating with soil sourced from sites potentially harbouring Golden Sun Moth larvae. A Golden Sun Moth Management Plan would be prepared detailing the location and method for mitigation (EMM B19). It is possible, however, that the species would not recolonise the impacted area following ground disturbance.

EMM B14 requires speed limits to minimise noise and dust, which should also assist in preventing harm to active moths. EMM B8 contains specific dust management requirements during the flying season (November to January) to minimise impacts on flying adult moths. EMM B3 requires contractor awareness inductions, so all on site staff are aware of responsibilities toward threatened species.

Figure 18-5 Golden Sun Moth.  
Source: GHD



Measures would be implemented to minimise light spillage during construction to protect threatened native fauna habitat to the extent practicable (EMM B5). Noise and vibration would be managed in accordance with the requirements outlined in EMM NV1 and NV2 (EMM B6).

## Residual impacts

Residual impacts on this species are expected to be highly localised, and suitable habitat for populations to persist are available immediately adjacent to all known or assumed habitat patches within the construction corridor. However, construction of the Project would involve the removal of 19.93 hectares of habitat (comprising 11.85 hectares of known habitat and 8.08 hectares of assumed habitat), in a landscape of contiguous habitat. It is also unknown if the species would recolonise impacted areas following ground disturbance, which would mean that the residual area of occupancy for this species would be reduced. The significant impact threshold of greater than 0.5 hectares is met, so the residual impact on the Golden Sun Moth due to the Project is considered significant. A significant residual impact under the Significant Impact Guidelines on this species triggers offset requirements under the EPBC Act. Calculated offsets for this species are provided in Section 18.9.

### 18.7.3 Growling Grass Frog

The Growling Grass Frog is a member of the Bell Frog species complex (*Anura: Hylidae*) and is distributed across a large portion of south-east Australia. A photograph of the Growling Grass Frog is in Figure 18-6. In Victoria it was previously widespread and common, absent only from the driest and highest parts of the state. In the last few decades, the species suffered widespread population declines and has now disappeared from most of its former range.

The species is found mostly among non-shaded emergent vegetation including rushes, reeds and sedges, and in or at the edge of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams. Growling Grass Frogs may use permanent or semi-permanent waterbodies. Typical habitats include lowland grasslands, open vegetated wetlands, flooded paddocks and drains. Floodplains tend to provide suitable habitat for this species, as they are predominantly wet and contain a range of waterbody types.

A total of 12 waterbodies (outside of the MSA area) identified as potential Growling Grass Frog habitat were dry during initial inspection and were not subject to targeted survey in 2019/20 (Biosis, 2020). A total of eight waterbodies were found to contain water and had at least some habitat attributes known to be positively associated with occupancy by Growling Grass Frog at the time of assessment and underwent a targeted survey (Biosis 2020).

Rainfall was higher leading up to the 2020/21 breeding season for the species and subsequent habitat assessments found that 10 of the 12 dry waterbodies contained water during November and December 2020 in habitat assessments by GHD. The remaining two waterbodies were not able to be accessed (permission not granted) but were assumed to also contain water. Subsequently, those waterbodies that were expected to be directly impacted were subject to nocturnal survey in the 2020/21 season.

Growling Grass Frogs were recorded within Deep Creek, and also within an offline waterbody within the MSA area near KP 40. Growling Grass Frogs have been previously recorded from the three major streams (Jacksons, Deep and Merri creeks) crossed by the construction corridor. Consequently, presence of Growling Grass Frog at Jacksons and Merri Creeks is assumed.

The species was only identified at one site outside of the MSA area at Deep Creek. It is assumed to be present at one other location outside of the MSA area, which is Jacksons Creek. There is very little emergent or bank aquatic vegetation at Jacksons Creek, with one side of the bank being very steep and therefore unlikely to provide favourable habitat. Habitat suitable for the species does not extend beyond the banks of either Deep or Jacksons Creek, with the vegetation beyond the banks comprising of grazed pasture grasses.

Growling Grass Frogs were also recorded within the MSA in a farm dam supporting a high cover of aquatic vegetation near KP 39. Figure 18-1 and 18-2 show the locations where Growling Grass Frogs were recorded inside and outside the MSA.

An assessment of the potential impacts on the Growling Grass Frog was undertaken considering the criteria defined in the Significant Impact Guidelines as identified in Table 18-11. Appendix W of Technical report A *Biodiversity and habitats* provides further information on this assessment.

Table 18-11 Significant impact criteria and assessment for the Growling Grass Frog

Significant impact criteria	Assessment of the Project
Lead to a long-term decrease in the size of an important population of a species	<p>All viable populations of the Growling Grass Frog are considered important populations, however, works are not expected to lead to a long-term decrease in the size of a population of the species.</p> <p>HDD would be used for the Project at Deep Creek, avoiding disturbance to the creek habitat.</p> <p>Works within Jacksons Creek where the waterway crossing is proposed to be open cut would be undertaken outside of the species active period (November to March) to minimise impacts on individuals and connectivity.</p> <p><b>Conclusion:</b> Unlikely. Residual impacts of the works are not expected to result in a long-term population change.</p>
Reduce the area of occupancy of an important population	<p>A small reduction in available habitat at Jacksons Creek (0.03 ha) is expected. Foraging, breeding and sheltering habitat may occur at this location though habitat quality is low, and works are expected to result in temporary removal of habitat where areas of impact will be rehabilitated following construction.</p> <p><b>Conclusion:</b> Unlikely. The area of occupancy for this species is not expected to change.</p>
Fragment an existing important population into two or more populations	<p>Works in and near Growling Grass Frog habitat predominantly comprises installation of underground infrastructure. Following works, these areas would be rehabilitated and there would be no permanent barrier to movement.</p> <p>Works within Jacksons Creek would be outside the species' active period (November to March) to minimise impacts on individuals and population connectivity.</p> <p><b>Conclusion:</b> Unlikely. The Project is not expected to result in fragmentation of a population.</p>
Adversely affect habitat critical to the survival of a species	<p>Small amounts of temporary degradation to potential habitat may occur within the construction corridor at Deep Creek and Jacksons Creek. Habitat degradation is not expected to result in impacts on habitat critical to the species such as those which support recruitment, survival, or dispersal.</p> <p><b>Conclusion:</b> Unlikely. Adverse impacts on habitat are expected to be temporary and residual impacts on critical habitat are not expected subject to appropriate reinstatement.</p>



Significant impact criteria	Assessment of the Project
Disrupt the breeding cycle of an important population	<p>Works within the construction corridor are expected to be temporary and localised. The breeding cycle if disrupted is expected to be limited to a small number of individuals within the construction corridor rather than the population or species as a whole.</p> <p><b>Conclusion:</b> Unlikely. Works will be scheduled outside of the breeding season at locations where presence is known or assumed and that is holding water during this period.</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>Proposed impacts are limited to small areas at two discrete locations: Deep Creek, with a crossing to be HDD with impacts avoided, and Jacksons Creek, with an open cut crossing.</p> <p>At both of these locations there is sufficient habitat available immediately adjacent to the construction corridor for individuals to reside during construction.</p> <p>Works are expected to result in small amounts of temporary habitat removal or degradation, however, this is not expected to result in species' decline.</p> <p><b>Conclusion:</b> Unlikely. Habitat is not expected to be modified, destroyed, removed, isolated or decreased to the extent that would constitute an impact on the species as a whole.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Invasive species that could be detrimental to this species are already present. These include fauna (cats, foxes, rats, carp, Gambusia) and flora (numerous non-native wetland species).</p> <p>Appropriate weed, disease and pathogen management would be implemented to prevent any further invasive flora or fauna being introduced by the Project.</p> <p><b>Conclusion:</b> Unlikely. Invasive species already present and the Project is not expected to introduce new species.</p>
Introduce disease that may cause the species to decline	<p>Indirect impacts from the proposed works may include the introduction or spread of Amphibian Chytrid Fungus.</p> <p>This fungus is likely to be present across the Project Area already. Transmission of the disease from vehicles is unlikely with the correct implementation of hygiene protocols for Chytrid Fungus. If the handling of frogs is required during construction (that is, during salvage), a suitably qualified and experienced ecologist would be engaged and would use hygiene protocols.</p> <p><b>Conclusion:</b> Unlikely. Chytrid is likely already present in the construction corridor. Mitigation would manage the risk of introduction (in case of it not already being present, or of other pathogens etc.) or further spreading of chytrid.</p>
Interfere substantially with the recovery of the species	<p>Impacts are expected to be temporary with works installed underground and no long term barrier to connectivity or movement is expected.</p> <p>Impacts to individuals would be minimised through measures outlined with a salvage and relocation plan and timing of works limited to outside of the peak movement period.</p> <p><b>Conclusion:</b> Unlikely. Impacts are expected to be largely temporary or not impacting critical habitat and are not expected to result in the recovery of the species.</p>

Though any population present within the construction corridor may be considered an important population, works are temporary and the construction corridor would be rehabilitated following construction. Direct impacts on individuals would be avoided or minimised through measures outlined in the following sections, with a salvage and relocation plan and timing of works limited to outside of the peak active period. The area of impact at Jacksons Creek is restricted to 0.03 hectares, and given the duration of works, the impacts are not expected to result in the loss of dispersal or overwintering opportunities.

The Project would result in increased noise for a period of time while works are being undertaken. Construction noise at night could result in temporary silencing of the frogs, or could result in frogs not being heard. If the construction period lasts longer than the frogs' breeding/calling season, there is a risk of losing an entire breeding cohort from that location. However, construction is expected to avoid the breeding period at these locations and therefore noise is not expected to disrupt the species' ability to hear, or be heard, when calling.

Blasting is also proposed at 13 locations along the Project, five of which are outside the MSA. There is no Growling Grass Frog habitat in the vicinity of the Project (within 100 metres) at any of these sites. And while vibration impacts are also possible from high impact ground disturbance (such as HDD and pile driving), it is considered less likely than noise to disturb Growling Grass Frogs. Vibrations tend to be localised and relatively minor in effect, and for any Growling Grass Frogs at or near these locations, it is expected the noise, rather than vibrations, would disturb them.

Any noise and vibration disturbance is expected to be minor, localised and short term (Growling Grass Frogs would most likely return to the habitat when the noise disturbance subsides). It is also most likely to affect individuals rather than populations or species, and is not expected to have a long-lasting effect on the population of Growling Grass Frogs.

Project construction at night would require adequate lighting, which may disturb the Growling Grass Frog. However, in some situations, this lighting may help keep the frogs away from the immediate construction area.

No operational impacts are expected for this species.

Figure 18-6 Growling Grass Frog. Source: GHD



## Management measures

HDD would be used for the Project at Deep Creek, avoiding disturbance to this creek habitat. Works may occur at any time at Deep Creek but the construction program is not expected to begin until after January, which is outside of the peak calling period, despite frogs potentially still being active until March. With works limited to two to four weeks at waterway crossings the whole cohort is not expected to be impacted. Though the Merri Creek crossing is within the MSA area, relevant management measures would also be implemented at that location.

The Jacksons Creek crossing is expected to use open trench construction methodology. Works at Jacksons Creek are to be scheduled during daylight hours between March and May. This period avoids the entire active season (November to March), so the risk of construction noise disrupting the species calling season is not expected to occur. It is also within the low flow period (January to May), and the period that has the least amount of flow variability, minimising the risk of erosion and sedimentation to habitat. Risks of high flow events will be managed through EMM SW7 and SW9, including flood management and response plans. Impacts are not expected to disrupt breeding (EMM B21).

Aside from HDD and avoidance, other measures to protect Growling Grass Frogs and their habitat include reducing the work's corridor to 20 metres width within Jacksons Creek, and limiting those works to be outside the species' active period (November to March) (EMM B21). This would minimise impacts on individuals and connectivity. Habitat would also be made unsuitable prior to construction to discourage the species from using the construction corridor, and checks would be undertaken for individuals immediately prior to construction. Trenches would be checked at the start of each day to move them to adjacent suitable habitat (EMM B9). Handling and hygiene protocols would be developed and implemented for any removal of individuals, with installation of fauna-proof fencing suitable to prevent frog movement also following any removal of individuals. A salvage and relocation plan outlining the above measures would also be prepared (EMM B21).

Measures would be implemented to minimise light spillage during construction to protect threatened native fauna habitat to the extent practicable (EMM B5). Noise and vibration would be managed in accordance with the requirements outlined within EMM NV1 and NV2 (EMM B6).

## Residual impact

Taking mitigation measures into account, any residual impacts on this species are expected to be highly localised and the species is expected to be able to readily recolonise disturbed areas following reinstatement and resume pre-construction habitat use. The proposed removal of 0.03 hectares of habitat for this species is not considered a significant impact under the Significant Impact Guidelines.

### 18.7.4 Australian Grayling

Australian Grayling are the largest native salmoniform fish in Australia and the last surviving member of the family *Prototroctidae* (refer Figure 18-7). The species occur in coastal rivers and streams in south-eastern Australia from the Shoalhaven River in New South Wales through to the Hopkins River in Victoria. Usually they prefer cool, clear waters with a gravel substrate and alternating pool and riffle habitats, but they can also occur in turbid water. They may form large schools, especially before spawning periods. Adults prefer moderate to fast-flowing water, usually below altitudes of 200 metres, although in Victoria they have also been recorded above 1,000 metres.

Due to connectivity with waterways where this species is known to exist, the likelihood of occurrence was considered in the three major waterways in the construction corridor (that is, Jacksons Creek, Merri Creek and Deep Creek). A lack of suitable habitat, the presence of barriers to migration and no historical records or sightings during targeted surveys resulted in a low likelihood of occurrence in Jacksons Creek and Merri Creek.

No individuals were recorded in Deep Creek during targeted surveys. However, Deep Creek does contain suitable habitat for the species, and is also connected to the Maribyrnong River, where the species is known to occur. Given Australian Grayling are a migratory species, and are known to migrate many kilometres, this suggests that there is a potential for individuals to migrate through the construction corridor. Taking this into account, the likelihood of occurrence in Deep Creek for the species is considered to be medium. Figure 18-1 displays the location at Deep Creek where there is a potential to encounter Australian Grayling. However, the lack of records within five kilometres of the construction corridor, and no detection during the targeted surveys suggests there are no resident individuals that may be impacted by the construction works.

An assessment of the potential impacts on the Australian Grayling was undertaken considering the criteria defined in the Significant Impact Guidelines as identified in Table 18-12. Appendix X of Technical report A *Biodiversity and habitats* provides further information on this assessment.

Table 18-12 Significant impact criteria and assessment for the Australian Grayling

Significant impact criteria	Assessment of the Project
Lead to a long-term decrease in the size of an important population of a species	<p>There are no records of this species within 5 km of the construction corridor. However, connectivity of Merri Creek to the Yarra River, and Jacksons Creek and Deep Creek to Maribyrnong River (where the species is known to occur) suggests there is potential for them to migrate into the construction corridor.</p> <p>Habitat assessments and targeted surveys determined the likelihood of the species being present in Jacksons and Merri Creek is low. In Deep Creek the likelihood is medium.</p> <p><b>Conclusion:</b> Unlikely. Project impacts are not expected to lead to a long-term decrease in the size of a population as HDD is proposed at Deep Creek</p>
Reduce the area of occupancy of an important population	<p>There have been no records of the species within 5 km of the construction corridor and the targeted surveys did not detect the species.</p> <p>It is not considered the species regularly inhabits the Deep Creek construction corridor and the Project is not expected to reduce the area of occupancy of an important population of this species.</p> <p><b>Conclusion:</b> Unlikely. The area of occupancy for this species is not expected to change.</p>
Fragment an existing important population into two or more populations	<p>The species is not considered to regularly inhabit Deep Creek in the vicinity of the construction corridor. While this species may migrate through the construction corridor, HDD is proposed at Deep Creek. The Project is not expected to result in the fragmentation of a population.</p> <p><b>Conclusion:</b> Unlikely. HDD reduces the chance of a barrier and fragmentation of a population of this species is not expected.</p>
Adversely affect habitat critical to the survival of a species	<p>The construction corridor does not represent habitat critical to the survival of the species, and the species is not considered to regularly inhabit the area of Deep Creek where it meets the Project. HDD also limits impacts.</p> <p><b>Conclusion:</b> Unlikely. Habitat within the construction corridor is not considered critical to the species' survival.</p>
Disrupt the breeding cycle of an important population	<p>Given that HDD is proposed at Deep Creek, no disruptions to the breeding cycle are expected.</p> <p><b>Conclusion:</b> Unlikely. Impacts to the breeding cycle of a population are not expected as barriers to migration are not anticipated.</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>The species is not considered to regularly inhabit Deep Creek in the vicinity of the construction corridor.</p> <p>Measures would be undertaken to prevent adverse effects to habitat including:</p> <ul style="list-style-type: none"> <li>• Controls for erosion, sedimentation and other contaminants</li> <li>• Limiting the removal of riparian and other vegetation</li> <li>• Rehabilitation following construction.</li> </ul> <p><b>Conclusion:</b> Unlikely. The Project is not expected to directly or indirectly modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>

Significant impact criteria	Assessment of the Project
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>The invasive species that pose a threat include Common Carp (<i>Cyprinus carpio</i>), Goldfish (<i>Carrasius auratus</i>), Redfin (<i>Perca fluviatilis</i>), Eastern Gambusia (<i>Gambusia holbrooki</i>) and Oriental Weatherloach (<i>Misgurnis anguillicaudatus</i>).</p> <p>These species are already present. No additional invasive aquatic species are expected to be introduced due to the Project.</p> <p>Appropriate weed, disease and pathogen management would be implemented to prevent any further invasive flora or fauna being introduced by the Project.</p> <p><b>Conclusion:</b> Unlikely. Invasive aquatic species are already present and the Project is not expected to introduce new species.</p>
Introduce disease that may cause the species to decline	<p>The Project is not expected to result in the introduction of disease that may cause the species to decline. Appropriate weed, disease and pathogen management would be implemented.</p> <p><b>Conclusion:</b> Unlikely. The Project is not expected to result in the introduction of disease.</p>
Interfere substantially with the recovery of the species	<p>The Recovery Plan<sup>10</sup> for this species lists the following threatening processes:</p> <ul style="list-style-type: none"> <li>• Barriers to movement</li> <li>• River regulation</li> <li>• Poor water quality</li> <li>• Siltation</li> <li>• Introduced species</li> <li>• Climate change</li> <li>• Disease</li> <li>• Fishing.</li> </ul> <p>It is unlikely the Project will interfere with the majority of these processes. Management measures would be employed for siltation and water quality including:</p> <ul style="list-style-type: none"> <li>• Controls for erosion, sedimentation and other contaminants</li> <li>• Limiting the removal of riparian and other vegetation</li> <li>• Rehabilitation following construction.</li> </ul> <p><b>Conclusion:</b> Unlikely. The Project is not expected to interfere with species recovery.</p>

Any Australia Grayling population that migrates through the construction corridor may be considered an important population. However, as HDD is planned for Deep Creek there will be no impacts due to the creation of barriers to migration. No operational impacts are expected for this species.

<sup>10</sup> Backhouse, G, Jackson, J, & O'Connor, J (2008). National Recovery Plan for the Australian Grayling *Prototroctes maraena*, Melbourne.



## Management measures

Management measures to control impacts to water quality during construction including limiting the removal of riparian and other vegetation, and rehabilitation of the sites following construction would also assist in minimising impacts (EMM SW4, EMM SW8 and EMM B7). Technical report B *Surface water* includes a number of management measures which would assist in avoiding and minimising impacts to the creek habitat.

## Residual impact

Due to the Project using the HDD construction technique at Deep Creek, the impact on the Australian Grayling due to the Project is not considered significant under the Significant Impact Guidelines.

*Figure 18-7 Australian Grayling. Source: GHD*



## 18.8 Migratory species

With the exception of Latham's Snipe, White-throated Needletail and Fork-tailed Swift, migratory species are unlikely to make significant use of, or have important habitat within the construction corridor.

For Latham's Snipe, the construction corridor does not include any areas of habitat currently recognised as internationally important for this species, nor areas considered likely to support at least 18 individuals (the trigger under guidelines (DoEE, 2017a) to consider locations as significant habitat).

The White-throated Needletail and Fork-tailed Swift may potentially use the aerial space over the entire construction corridor, however, this is not expected to constitute important habitat and the Project is unlikely to pose a significant risk to these species.

The impact on migratory species (Latham's Snipe, White-throated Needletail and Fork-tailed Swift) due to the Project is not considered significant under the Significant Impact Guidelines.

## 18.9 Conclusion

This chapter has identified and assessed the potential impacts to MNES. According to the Significant Impact Guidelines, the Project is considered to have the potential to meet some criteria for a significant impact on one ecological community (Grassy Eucalypt Woodland of the Victorian Volcanic Plain) and is considered to meet some criteria for the other community (Natural Temperate Grassland of the Victorian Volcanic Plain). Two fauna species (Striped Legless Lizard and Golden Sun Moth) are also considered to meet some criteria for a significant impact. The Project is not likely to have a significant impact on other EPBC-listed flora or fauna species including Matted Flax-lily, Growling Grass Frog and Australian Grayling. Note: refer to Section 18.4.3 for explanation of language used to describe significance of impact.

The Project may be considered to significantly impact the Grassy Eucalypt Woodland of the Victorian Volcanic Plain and is considered to trigger a significant impact on the Natural Temperate Grassland of the Victorian Volcanic Plain. Impacts on the two ecological communities have been reduced as far as possible through the selection of the proposed Project alignment, with further refinement possible. Where impacts could not be avoided, they will be minimised wherever feasible through detailed design, construction management and rehabilitation.

Despite the management measures for these two communities, a significant residual impact may still occur for some criteria for the Grassy Eucalypt Woodland community, and the Natural Temperate Grassland community is also still considered to meet some criteria for significant residual impacts. These residual impacts would be offset in accordance with the requirements of the *EPBC Act Environmental Offsets Policy* (DSEWPC, 2012) and the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017).

An Ecological Offsets Strategy has been prepared for the Project (refer EES Attachment II), addressing both State and Commonwealth requirements. This offset strategy also outlines the approach to preparing Offset Management Plans which in turn describe how the offsets will be secured, managed and monitored, including management actions, responsibility, timing, performance measures and the specific environmental outcomes to be achieved. The offsets calculated as required are presented in Table 18-13.

The Project is considered to trigger a significant impact according to the Significant Impact Guidelines on the Striped Legless Lizard and the Golden Sun Moth.

The Striped Legless Lizard is confined to grassy and grassy woodland habitats. Disturbance of these habitats within the construction corridor is expected to be temporary with habitats reinstated following works. Impacts are also expected to be restricted to the narrow construction corridor bisecting areas of habitat, which would allow the species to readily recolonise the area following reinstatement. However, given the species' susceptibility to ground disturbance, it is possible that individuals may not readily return to pre-construction use or any use of the construction corridor. A Striped Legless Lizard Management Plan would be prepared to manage impacts to the species.

Proposed impacts on 39.34 hectares of Striped Legless Lizard habitat are expected, comprising 0.67 hectares of known habitat and 38.66 hectares of assumed habitat. This habitat removal is considered to trigger a significant residual impact, with the calculated offsets to address the impact presented in Table 18-13.

While the Project has the potential to have a significant impact on the Golden Sun Moth due to the removal of potential habitat for this species, most habitat loss that is likely to, or that may, occur as a result of the Project, is highly localised. This is likely to result in the loss or displacement of individuals rather than populations of this species. Impacts would be reduced by reinstating construction areas once works are complete and revegetating areas with appropriate native grasses that provide habitat and food sources for Golden Sun Moth. A Golden Sun Moth Management Plan would be prepared detailing the location and methods for mitigation.

It is unknown however if the species would recolonise the impacted area following ground disturbance. Proposed impacts on 19.93 hectares of Golden Sun Moth habitat are expected, comprising 11.85 hectares of known habitat and 8.08 hectares of assumed habitat, in a landscape of contiguous habitat. If the impacted area is not recolonised, it would mean that the residual area of occupancy for this species would be reduced. As the significant impact threshold of greater than 0.5 hectares is met, the residual impact to this species is considered significant. The offsets required for this species are presented in Table 18-13.

A summary of total predicted loss of EPBC species relevant for this MNES assessment (residual impacts), and the required offsets for the significant residual impacts, is provided in Table 18-13. For further discussion of the offsets required for the Project, see Technical report *A Biodiversity and habitats*, and the Ecological Offsets Strategy that has been prepared for the Project (refer EES Attachment II). Note: the offsetting of impacts does not change the significance of the impact, the significance of the impact can only be reduced through avoidance and mitigation or management measures prior to the assessment of residual impacts.

Table 18-13 Total loss of EPBC habitat and required offsets

EPBC value	MNES assessment - total loss of habitat/ individuals (residual impact)	Offsets required
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	2.25 ha + 0.04 ha of fragmented patches	Approx.* 10.5 ha
Natural Temperate Grassland of the Victorian Volcanic Plain	3.53 ha + 0.28 ha of fragmented patches	Approx. 13 ha
Matted Flax-lily	None	None
Striped Legless Lizard	39.34 ha (comprising 0.67 ha of known habitat and 38.66 ha of assumed habitat) (including area where 6 individuals were found)	Approx. 125 ha
Golden Sun Moth	19.93 ha (comprising 11.85 ha of known habitat and 8.08 ha of assumed habitat) (including area where 66 individuals were found)	Approx. 113.5 ha
Growling Grass Frog	0.03 ha	None
Australian Grayling	None	None

\* The offsets calculated for the Project need to be approved. Until such time as they are approved, they are given as approximate figures.