A2I | Albury to Illabo

Squirrel Glider and Sloane's Froglet Fauna Connectivity Strategy

FINAL REPORT

Prepared for Martinus

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- NSW DCCEEW RD: Renee Sheperd, Leigh Maloney, Andrew Fisher

Biosis staff involved in this project were:

- Matt Looby (project director, quality assurance).
- Dimity Webster (lead ecologist, author, project manager, targeted Squirrel Glider Surveys, initial field assessment).
- Shannon Braun, Thomas Perret, Cassandra Kalafatakis, Erin Parker, Joel Nicholson (targeted Squirrel Glider surveys).
- Erin Parker, Trevor Coombes, James Sheperd, Bret Stewart (Camera trap analysis).
- Olivia Williams (GIS mapping).

Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work. We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.

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Definitions

BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
CoA	Conditions of Approval
Completion of works	Completion of works refers to the completion of all construction activities, including site remediation and removal of all construction materials and facilities. Completion of works will occur progressively on a site-by-site basis. Sites relevant to this FCS include Billy Hughes Bridge site and Uranquinty Creek Yard site.
CIZ	Construction Impact Zone
CSSI	Critical State Significant Infrastructure
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
LGA	Local Government Area
NSW DCCEEW	New South Wales Department of Climate Change, Energy, the Environment and Water
FCS	Fauna Connectivity Strategy
NSW	New South Wales
OMAMP	Operational Monitoring and Adaptive Mitigation Program
PCT	Plant Community Type
RD	Regional Delivery Division, formerly Biodiversity Conservation Science Directorate (BCS)
TARP	Trigger Action Response Plan
TEC	Threatened Ecological Community
UMM	Updated Mitigation Measures

Executive summary

Project background

Biosis Pty Ltd was engaged by Martinus to develop a Fauna Connectivity Strategy (FCS) for the threatened species Squirrel Glider and Sloane's Froglet in support of the Albury to Illabo section of the Inland Rail Project. This strategy addresses Conditions of Approval (CoA) under the Critical State Significant Infrastructure (CSSI) designation for the Albury to Illabo rail upgrade (SSI-10055), with a focus on two priority sites: Billy Hughes Bridge in Albury and Uranquinty Creek Yard in Uranquinty, New South Wales (NSW). The CoA relevant to this FCS are outlined within Section 1.2, and summarised below.

CoA	Condition	Scope addressed within this strategy
D13	*An **Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program** must be implemented for a period of ten (10) years to evaluate the effectiveness of fauna connectivity measures, unless otherwise agreed with the Planning Secretary. The Program must be prepared by a suitably qualified and experienced ecologist(s) with experience in fauna connectivity and include regular seasonal ongoing monitoring for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek. The Program must include:* *(a) existing fauna movements identified in accordance with Condition E29;* *(b) monitoring methodology to evaluating the effectiveness of new and existing fauna connectivity measures and performance indicators;* *(c) visual inspections of fauna connectivity structures following a severe weather event and/or record of fauna mortality and rectification of any damaged structures;* *(d) a process to identify adaptive mitigation measures following monitoring results obtained in accordance with Condition D13(b) and the timeframe for implementation.* *The results of the monitoring must be provided in an annual report and submitted to the Planning Secretary, to DCCEEW, and the relevant Council(s).* ***Note:** This condition is not meant to duplicate the monitoring requirements of the Sloane's Froglet Management Plan required in accordance with **Condition E26**.*	An Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek Yard is provided in Appendix 6. The OMAMP has been prepared and quality checked by Biosis' Principal Ecologist and General Manager (Business and Technical development) Matt Looby and Senior Ecologist (Major project lead) Dimity Webster, whom are suitably qualified to prepare the OMAMP, Curriculum vitae are provided within Appendix 1.
E29	*Before construction at Billy Hughes Bridge and Uranquinty Creek Yard, a suitably qualified expert, in consultation with NSW DCCEEW, must determine and provide evidence of existing fauna movement corridors,*	An initial targeted survey plan for Squirrel Glider was formulated through consultation with the NSW DCCEEW's RD, to collect baseline data on the presence of Squirrel Glider to inform the FSC.

CoA	Condition	Scope addressed within this strategy
	pathways, and connectivity for the Squirrel Glider, including analysis of existing studies or baseline monitoring	Consultation is outlined within Section 2.2. The survey was undertaken by qualified Biosis ecologists and commenced on 14 May 2025 and was completed on 19 June 2025. The survey identified fauna movement corridors, pathways, and connectivity for the Squirrel Glider. Prior to the commencement of survey, and analysis was undertaken of existing studies through an initial site visit and habitat feature mapping. The results of this assessment are provided within Section 3.4.
E30	*Fauna connectivity design in accordance with Guidelines*	This FCS has been prepared in accordance with the Fauna Design Guidelines for the ARTC Inland Rail Program (ARTC 2022).
E31	*The Proponent must prepare and implement a Fauna Connectivity Strategy for the Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek Yard before commencing work that could impact these species. The strategy must detail existing corridors, justify connectivity measures, align with guidelines, demonstrate effectiveness, include mapping and maintenance plans, and incorporate the Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program.*	This strategy document includes an FCS for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek Yard. This is detailed within Sections 4 and 5. Martinus is responsible for the development and implementation (including monitoring) of the FCS prior to construction, and during construction. Inland Rail and ARTC are responsible for implementation of the FCS post-construction during operation of the project and the OMAMP.
E32	*A qualified expert in the targeted species must prepare the Fauna Connectivity Strategy in consultation with RD, DPI Fisheries, and with approval from the Planning Secretary*	Biosis' Principal Ecologist and General Manager (Business and technical development) Matt Looby, Senior Ecologist (Major project lead) Dimity Webster, and Senior Zoologist (Technical lead zoology) Bret Stewart are suitably qualified to prepare and quality check the FCS, Curriculum vitae are provided within Appendix 1. Consultation is outlined within Section 2.2. This assessment includes a FCS for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek Yard, this is detailed within sections 4 and 5. This assessment will be sent to relevant agencies for review and comment in accordance with CoA E32.

CoA	Condition	Scope addressed within this strategy
The following specific mitigation measures from the Updated Mitigation Measures (UMM) document may apply to the scope of work outlined in this FCS		
BD2	*During detailed design, provision of one glider pole on each side of the rail corridor will be further investigated to enhance habitat connection between patches of remnant vegetation for squirrel glider at the Billy Hughes bridge enhancement study area*	Glider pole recommendations have been provided within Section 4.1.
BD 3	*A project connectivity strategy will be prepared and implemented with reference to the Fauna Design Guidelines for the Inland Rail Project (2022) to consider further enhancements, including beyond the proposal study area*	This FCS has been completed in accordance with the Fauna Design Guidelines for the ARTC Inland Rail Program (ARTC 2022).
BD11	*Mitigation measures will be implemented to address impacts on habitat connectivity for squirrel gliders. This would include the addition of connectivity structures (i.e., glider poles, canopy bridges) and vegetation rehabilitation. The final locations of connectivity structures and enhancement measures will be developed as part of post approval Flora and Fauna Management Plan. Potential indicative locations for implementation of glider poles include Sandy Creek, Eight Mile Creek/Billy Hughes Bridge, Oddies Creek and Murray River Bridge. Canopy bridges may also be used as an alternative measure particularly where gaps in vegetation are larger such as Reedy Creek. Final locations for fauna connectivity measures will account for the height of remaining trees, gap between trees and the gliding angle of squirrel gliders to enable successful corridor movements*	The UMM have been assessed and included where relevant within this FCS (including Sections 3.4 and 4.1) and OMAMP within Appendix 1. The final locations of connectivity structures and enhancement measures will be developed as part of post approval Flora and Fauna Management Plan. Development of the Flora and Fauna Management Plan is not part of the scope of this FCS.

Methods

This strategy was informed by a comprehensive methodology including background research, stakeholder consultation, field investigations and reference to published standards and guidelines. Background research was undertaken to infirm the FCS, including the Fauna Design Guidelines for the ARTC Inland Rail Program (ARTC 2022).

Stakeholder consultation was undertaken to inform the FCS and is summarised below.

Topic	Detail	Consultation date
Survey plan	An initial targeted survey plan for Squirrel Glider was formulated and submitted to NSW DCCEEW's RD for review. A meeting with RD, Biosis and Martinus was undertaken to discuss the preliminary expectations of RD regarding the survey effort and needs for Squirrel Glider to inform the FCS.	28 May 2025
	The draft survey plan was reviewed by RD. The draft survey plan was updated to address and incorporate the provided advice. The survey plan was implemented commencing 2 June 2025.	17 April 2025
	Consultation was undertaken with Albury City Council (ACC) regarding the Strategic Plan for Squirrel Glider Connectivity. The Council noted the study area was outside the area of research included as part of the Strategic Plan for Squirrel Glider Connectivity, however, the railway and Hume Freeway were identified as likely barriers to movement of Squirrel Glider.	24 – 28 April 2025
	The updated survey plan was reviewed by RD, with a second round of advice provided. Provided advice was assessed against the interim survey results, with transferrable advice included as part of the FCS.	6 June 2025
Interim results memo	An interim results memo was provided to RD 15 July 2025 to provide an update of the survey undertaken for Squirrel Glider and discuss the baseline survey objectives. A meeting was held 1 August 2025 with RD to display results and receive final approval of the Baseline Survey Plan.	15 July 2025 – 1 August 2025
FCS	Further information has been provided representatives of NSW DCCEEW RD regarding the approach used for improving local connectivity through the Burrumbuttock Squirrel Glider Local Area Management Plan (LAMP). This approach will be assessed incorporated into the FCS where relevant.	• Initial consultation 24 -30 April 2025 • Follow up consultation 30 June 2025
	Consultation with NSW DCCEEW species experts was undertaken to ascertain if existing habitat mapping held by NSW DCCEEW is present within the study area, to seek advice regarding the Sloane's Froglet Local Area Management Plan and to confirm if NSW DCCEEW are aware of any extant populations of Sloane's Froglet in the Uranquinty area that may not be visible of the NSW BioNet as sensitive data.	• 3 July 2025 to11 July 2025
	The draft FCS will be submitted to RD for review.	12 December 2025

Results

Targeted species surveys (including stag watching, spotlighting, and camera trapping) were conducted from May to June 2025. These identified habitat features, movement corridors, and potential barriers to connectivity at both priority sites. The key findings of these surveys include:

- Squirrel Glider:
  - Detected in suitable habitat at the Billy Hughes Bridge study area and Uranquinty Creek Yard study area.
  - Barriers to movement include major roads, existing railway infrastructure, and fragmented vegetation.
- Sloane's Froglet:
  - Not detected during targeted surveys (undertaken by NGH July and August 2024 (NGH 2024), however, consultation with RD determined the surveys were not completed to the appropriate level required, and as such presence was assumed to inform this FCS.
  - Key threats to Sloane's Froglet include habitat fragmentation and degradation caused by land clearing, altered water availability and flow patterns, water pollution, development, overgrazing, and potential infection from the Chytrid fungus.

Sloane's Froglet was incidentally identified during pre-clearance surveys in December 2025 (Habitat Innovation & Management 2025a), appropriate protocols were undertaken, and followed up with appropriate mitigation measures.

At Billy Hughes Bridge study area, vegetation connectivity for the Squirrel Glider is considered low to moderate due to fragmentation caused by roads, rail lines, and cleared areas, with gaps between habitat patches ranging from 5 to 70 metres. However, some connectivity exists via Eight Mile Creek. The floristic structure is of moderate quality, featuring a mix of native Eucalypts and Wattle species, and 19 out of 21 hollow-bearing trees were found to be suitable for Squirrel Gliders based on hollow size.

At Uranquinty Creek Yard study area**,** vegetation connectivity is moderate along Sandy Creek but is disrupted by the Olympic Highway and railway. Canopy gaps range from 20 to 50 metres, and connectivity declines further toward the urban area. The floristic structure is low to moderate, with scattered River Red Gums and limited Wattle presence. Only 12 hollow-bearing trees were identified as supporting suitable hollows for Squirrel Gliders within the Uranquinty Creek Yard site.

Hollow-bearing trees are displayed within Figure 4.

A desktop assessment was undertaken for the remaining sites located between Albury and Illabo to inform mitigation measure BD 11 (refer to Table 1), the connectivity features identified are summarised in this FCS within Table 10 and displayed within Figure 4. An assessment of floristic structure, and presence/absence of hollow-bearing trees was not included as part of this assessment as field surveys for these additional sites was beyond the scope of the CoAs and this FCS.

This assessment determined, additional to the Billy Hughes Bridge and Uranquinty Creek Yard sites, further assessment of connectivity actions should be considered at the Albury Murray River Bridge and Junee Harefield Yard. Through consultation with RD, it was determined that both the Murray River Bridge and Junee Harefield sites are not suitable for installation of glider poles and/or rope bridges. In light of this advice, no further actions are proposed at the Murray River Bridge or Junee Harefield sites.

Martinus in consultation with IRPL and ARTC is responsible for final determination of preferred connectivity actions to be undertaken as part of this FCS in accordance with the CoA.

Connectivity strategy

The following connectivity enhancement actions have been investigated for Squirrel Glider:

- Canopy bridges and glider poles.
- Revegetation.
- Nest boxes.

In order to undertake the proposed works within the study area as part of the project, Martinus, on behalf of ARTC, has obtained temporary lease of land adjacent to the rail corridor. It is important to note that the connectivity actions below are subject to approval with existing land holders / land managers. Proposed connectivity actions, and on-going monitoring/maintenance activities will require approval through landholder agreements with ARTC. Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy. Landholder agreements must ensure a contractual obligation, or similar, is included ensuring connectivity actions such as revegetation are not impacted through non-compatible land uses (such as clearing).

Connectivity enhancement actions are summarised below.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
Billy Hughes Bridge				
Glider poles and canopy bridges	Option 1 • Two 21-metre-high glider poles at Eight Mile Creek on either side of the rail corridor in accordance with height recommendations outlined in section 4.1 – Canopy bridge, at least 9.1 metres above the existing rail track (in accordance with the ARTC Fauna Design Guidelines for Inland Rail) is optional.	• Decrease the impact of the railway as a barrier to movement for Squirrel Glider.	• Glider poles should be installed during the final stages of construction following the completion of construction activities within the CIZ that are not compatible with the presence of a glider pole (e.g. Bulk earthworks, access establishment) to avoid damage of the infrastructure and ensure required works within the CIZ can be completed.	• Martinus in consultation and agreement with ARTC are responsible for determination of final pole and canopy bridge locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for installation of poles and canopy bridges.
	Option 2 • Two minimum 18-metre-high glider poles at the tributary of Eight Mile Creek on either side of the rail corridor in accordance with height recommendations outlined in section 4.1. • Canopy bridge, at least 9.1 metres above the existing rail track (in accordance with the ARTC Fauna Design Guidelines for Inland Rail) is optional.	• Decrease the impact of the railway as a barrier to movement for Squirrel Glider.	• Glider poles should be installed during the final stages of construction following the completion of construction activities within the CIZ that are not compatible with the presence of a glider pole (e.g. Bulk earthworks, access establishment) to avoid damage of the infrastructure and ensure required works within the CIZ can be completed.	

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
	Option 3 • Two 21-metre-high glider poles on either side of Wagga Road in accordance with height recommendations outlined in section 4.1. – Canopy bridge to existing vegetation recommended. – Canopy bridge, at least 10 metres (to ensure sufficient clearance for highway use) above the existing road formation across Wagga Road is optional.	• Decrease the impact of Wagga Road and Bily Hughes Bridge as a barrier to movement for Squirrel Glider.	• Glider poles should be installed during the final stages of construction following the completion of construction activities within the CIZ that are not compatible with the presence of a glider pole (e.g. Bulk earthworks, access establishment) to avoid damage of the infrastructure and ensure required works within the CIZ can be completed.	

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
Revegetation	• Removal of exotic vegetation. • Rehabilitation of areas containing exotic vegetation through native plantings, and revegetation of derived native grassland areas outside the CIZ, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Increase connectivity and provide natural habitat for Squirrel Glider.	• During the construction phase.	• Martinus in consultation and agreement with ARTC are responsible for determination of final revegetation locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
	• Revegetation connecting Eight Mile Creek to planted vegetation within the CIZ, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Increase connectivity and provide natural habitat for Squirrel Glider.	• Post completion of all works.	• Martinus in consultation and agreement with ARTC are responsible for determination of final revegetation locations. • Inland Rail and ARTC are responsible for revegetation activities post construction.
	• Revegetation between existing woodland and proposed glider poles at Wagga Road, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Ensure natural connectivity between glider pole and existing habitat is achieved in the long term to support natural movement.	• During the construction phase.	• Martinus in consultation and agreement with ARTC are responsible for determination of final revegetation locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
Floristic enhancement	• Understorey plantings of Silver Wattle in areas of existing woodland habitat, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Enhance food availability and resources for Squirrel Glider.	• During the construction phase.	• Martinus and Inland Rail in consultation and agreement with ARTC are responsible for determination of final revegetation locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase.
Nest boxes	• Installation of at least 10 Squirrel Glider nest boxes, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Enhance den sites and reduce hollow competition by providing nest boxes suitable for Squirrel Glider.	• Nest boxes should be installed during the final stages of construction to avoid disturbance in woodland areas adjacent to the CIZ during construction.	• Martinus in consultation and agreement with ARTC are responsible for determination of final nest box locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for installation of nest boxes during the construction phase.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
Uranquinty Creek				
Glider poles and canopy bridges	• Three 21-metre-high glider poles connecting Sandy Creek over the Olympic Highway and railway in accordance with height recommendations outlined in section 4.1. – Canopy bridge, at least 9.1 metres above the existing rail track (in accordance with the ARTC Fauna Design Guidelines for Inland Rail) and at least 10 metres (to ensure sufficient clearance for highway use) above the existing road formation between poles is optional. – Canopy bridge to existing vegetation recommended.	• Decrease the impact of the railway and Olympic Highway as a barrier to movement for Squirrel Glider.	• Glider poles should be installed during the final stages of construction following the completion of construction activities within the CIZ that are not compatible with the presence of a glider pole (e.g. Bulk earthworks, access establishment) to avoid damage of the infrastructure and ensure required works within the CIZ can be completed.	• Martinus in consultation and agreement with ARTC are responsible for determination of final pole and canopy bridge locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for installation of poles and canopy bridges.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
Revegetation	• Revegetation of Sandy Creek, and the road reserve of the Olympic Highway dissecting Sandy Creek, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Increase connectivity and provide natural habitat for Squirrel Glider.	• During the construction phase.	• Martinus in consultation and agreement with ARTC are responsible for determination of final revegetation locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase.
Floristic enhancement	• Understorey plantings of Silver Wattle in all areas of existing woodland habitat, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Enhance food availability and resources for Squirrel Glider.	• During the construction phase.	• Martinus in consultation and agreement with ARTC are responsible for determination of final revegetation locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
Nest boxes	• Installation of at least 10 Squirrel Glider nest boxes, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Enhance den sites and reduce hollow competition by providing nest boxes suitable for Squirrel Glider.	• Nest boxes should be installed during the final stages of construction to avoid disturbance in woodland areas adjacent to the CIZ during construction.	• Martinus in consultation and agreement with ARTC are responsible for determination of final nest box locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for installation of nest boxes during the construction phase.

Sloane's Froglet is not considered likely to occur within the Uranquinty Creek Yard study area, and as such, wetland construction is not considered an action that would increase breeding habitat for this species.

The following methods of connectivity improvement for Sloane's Froglet have been investigated:

- Site remediation post-construction to re-instate existing conditions and current habitat opportunities.
- Enhancement of the existing farm dam.
- Wetland construction (habitat creation) within the Billy Hughes Study area.

During construction, the mitigation measures outlined in the project BDAR (WSP August 2022) should be followed to ensure current level of potential habitat present for Sloane's Froglet will be maintained.

Wetland construction cannot be undertaken within the rail corridor to ensure the integrity of the railway and ensure rail access. As part of the project, Martinus on behalf of ARTC has obtained temporary lease of land surrounding the rail to undertake construction activities. Through consultation with RD, it is noted that large expansive wetlands are not required, wetland construction can be undertaken as small shallow pools, as such, wetland construction is referred to as habitat creation.

Within the Billy Hughes Bridge study area two connectivity strategies were investigated, habitat creation and enhancement of the existing farm dam.

The ongoing management actions outlined to ensure adequate habitat is maintained for Sloane's Froglet would not be viable for the existing landholders and could not occur within the temporary lease held by Martinus.

Potential locations for habitat creation were assessed on the land adjacent to the rail corridor; however, these were deemed unsuitable due to the requirement for ongoing management. An integral part of ensuring constructed wetlands for Sloane's Froglet continue to provide breeding habitat includes ongoing management of water, aquatic vegetation (shading levels) and sediment levels. Martinus has obtained a temporary lease only for these lands and cannot ensure ongoing management of any habitat creation.

Consultation has commenced with RD, and representatives from Martinus, Inland Rail and ARTC regarding creation of Sloane's Froglet habitat to meet the CoA. Inland Rail on behalf of ARTC is pursuing consultation with TfNSW and ACC regarding the potential creation of Sloane's Froglet habitat on land outside of the project area.

Consultation outcomes will be included in an amendment to this FCS and the OMAMP and these amendments are to be prepared by a suitably qualified expert. Inland Rail and ARTC are responsible for ensuring consultation outcomes are included in an amendment to this FCS and the OMAMP and these amendments are to be prepared by a suitably qualified expert.

Construction monitoring

In accordance with advice received from DCCEEW RD ongoing monitoring of Squirrel Glider movement should commence from track possession. This monitoring should continue seasonally to provide statistically population data as a reference point for comparison against results of the operational monitoring following implementation of the FCS. A summary of construction monitoring is outlined below. Construction monitoring will commence following the implementation of connectivity measures / actions outlined in the finalised FCS document.

Action	Monitoring	Number	Location in study area	Study area	Timing and duration	Responsible person	Responsible party
Construction							
General monitoring	Baited camera trap	• Placement of 6 baited traps for 2 weeks in summer, autumn, winter, spring.	• Replication of the pre-established locations outlined in the baseline survey plan (Section 2.3 of the FCS)	• Billy Hughes Bridge • Uranquinty Creek Yard	• From the implementation of connectivity measures outlined in this FCS until completion of construction	• Qualified expert in the target species.	• Martinus is responsible for monitoring until the completion of construction and as per the Landscape Management Plan. • ARTC is responsible for all monitoring following initiation of operational activities
General monitoring	Stag watching and spotlighting	• 2 nights every season (summer, autumn, winter, spring)	• Replication of the pre-established transects outlined in the baseline survey plan (Section 2.3 of the FCS)	• Billy Hughes Bridge • Uranquinty Creek Yard	• From the implementation of connectivity measures outlines in this FCS until completion of construction	• Qualified expert in the target species or community monitoring led by a suitably qualified individual experienced with Squirrel Glider identification	• Martinus is responsible for monitoring until the completion of construction and as per the Landscape Management Plan. • ARTC is responsible for all monitoring following initiation of operational activities

1 Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by Martinus to prepare a Fauna Connectivity Strategy (FCS) for the threatened species Squirrel Glider and Sloane's Froglet for the Albury to Illabo section (Figure 1) of the Albury to Parkes Critical State Significant Infrastructure (CSSI) approval (SSI-10055) dated 8 October 2024 rail upgrade (the project). The FCS is focused on two key sites identified as part of the Conditions of Approval (refer to Section 1.2, CoA D13, E29 and E31), these are the Billy Hughes Bridge site in Albury, and the Uranquinty Creek Yard site in Uranquinty, New South Wales (NSW) (Figure 2).

The project involves enhancements that would provide the necessary vertical and horizontal clearance along the existing 'Main South Line' corridor to support the safe running of double-stacked freight trains up to 1,800 metres long and 6.5 metres high.

Within the Albury to Illabo section, the project will include enhancements to:

- Rail tracks
- Footbridges and road bridges
- Overhead structures
- Signal structures
- Level crossings.

1.2 Conditions of approval

The scope of works requires a qualified ecologist to prepare a number of plans in accordance with CSSI approval dated 8 October 2024. Specific requirements of the CoA (SSI-10055) and Updated Mitigation measures (UMM) that are applicable to fauna connectivity on the project have been addressed through field investigations and reporting and are subject to consultation with the New South Wales (NSW) Department of Climate Change, Environment and Water (DCCEEW) Regional Delivery Division (RD) (formerly Biodiversity Conservation Science Directorate [BCS]).

The CoA relevant to this assessment, and where/how the CoA has been addressed within this FCS is outlined within Table 1.

Martinus and Inland Rail are responsible for the design and implementation of connectivity strategies in consultation and agreement with ARTC (and subject to the requirements of the applicable Landscape Management Plan).

Table 1 Conditions of approval relevant to this assessment

CoA	Condition	Scope addressed within this strategy
D13	*An **Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program** must be implemented for a period of ten (10) years to evaluate the effectiveness of fauna connectivity measures, unless otherwise agreed with the Planning Secretary. The Program must be*	An Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek Yard is provided in Appendix 6.

CoA	Condition	Scope addressed within this strategy
	prepared by a suitably qualified and experienced ecologist(s) with experience in fauna connectivity and include regular seasonal ongoing monitoring for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek. The Program must include: *(a) existing fauna movements identified in accordance with Condition E29;* *(b) monitoring methodology to evaluating the effectiveness of new and existing fauna connectivity measures and performance indicators;* *(c) visual inspections of fauna connectivity structures following a severe weather event and/or record of fauna mortality and rectification of any damaged structures;* *(d) a process to identify adaptive mitigation measures following monitoring results obtained in accordance with Condition D13(b) and the timeframe for implementation.* *The results of the monitoring must be provided in an annual report and submitted to the Planning Secretary, to DCCEEW, and the relevant Council(s).* ***Note:** This condition is not meant to duplicate the monitoring requirements of the Sloane's Froglet Management Plan required in accordance with **Condition E26**.*	
E29	*Before construction at Billy Hughes Bridge and Uranquinty Creek Yard, a suitably qualified expert, in consultation with NSW DCCEEW, must determine and provide evidence of existing fauna movement corridors, pathways, and connectivity for the Squirrel Glider, including analysis of existing studies or baseline monitoring*	An initial targeted survey plan for Squirrel Glider was formulated through consultation with the NSW DCCEEW's RD, to collect baseline data on the presence of Squirrel Glider to inform the FSC. Consultation is outlined within Section 2.2. The survey was undertaken by qualified Biosis ecologists and commenced on 14 May 2025 and was completed on 19 June 2025. The survey identified fauna movement corridors, pathways, and connectivity for the Squirrel Glider. Prior to the commencement of survey, and analysis was undertaken of existing studies through an initial site visit and habitat feature mapping. The results of this assessment are provided within Section 3.4.
E30	*Fauna connectivity design in accordance with Guidelines*	This FCS has been prepared in accordance with the Fauna Design Guidelines for the ARTC Inland Rail Program (ARTC 2022).

CoA	Condition	Scope addressed within this strategy
E31	*The Proponent must prepare and implement a Fauna Connectivity Strategy for the Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek Yard before commencing work that could impact these species. The strategy must detail existing corridors, justify connectivity measures, align with guidelines, demonstrate effectiveness, include mapping and maintenance plans, and incorporate the Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program.*	This strategy document includes an FCS for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek Yard. This is detailed within Sections 4 and 5. Martinus is responsible for the development and implementation (including monitoring) of the FCS, prior to construction, and during construction. Inland Rail and ARTC are responsible for implementation of the FCS post construction during operation of the project, and the OMAMP.
E32	*A qualified expert in the targeted species must prepare the Fauna Connectivity Strategy in consultation with RD, DPI Fisheries, and with approval from the Planning Secretary*	Biosis' Principal Ecologist and General Manager (Business and technical development) Matt Looby, Senior Ecologist (Major project lead) Dimity Webster, and Senior Zoologist (Technical lead zoology) Bret Stewart are suitably qualified to prepare, and quality check the FCS, Curriculum vitae are provided within Appendix 1. NSW government agency and local government experts were also consulted during FCS preparation. Consultation is outlined within Section 2.2. This assessment includes a FCS for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek Yard, this is detailed within sections 4 and 5. This assessment will be sent to relevant agencies for review and comment in accordance with CoA E32.
The following specific mitigation measures from the Updated Mitigation Measures (UMM) document may apply to the scope of work outlined in this FCS		
BD2	*During detailed design, provision of one glider pole on each side of the rail corridor will be further investigated to enhance habitat connection between patches of remnant vegetation for squirrel glider at the Billy Hughes bridge enhancement study area*	Glider pole recommendations have been provided within Section 4.1.
BD 3	*A project connectivity strategy will be prepared and implemented with reference to the Fauna Design Guidelines for the Inland Rail Project (2022) to consider further enhancements, including beyond the proposal study area*	This FCS has been completed in accordance with the Fauna Design Guidelines for the ARTC Inland Rail Program (ARTC 2022).

CoA	Condition	Scope addressed within this strategy
BD11	*Mitigation measures will be implemented to address impacts on habitat connectivity for squirrel gliders. This would include the addition of connectivity structures (i.e., glider poles, canopy bridges) and vegetation rehabilitation. The final locations of connectivity structures and enhancement measures will be developed as part of post approval Flora and Fauna Management Plan. Potential indicative locations for implementation of glider poles include Sandy Creek, Eight Mile Creek/Billy Hughes Bridge, Oddies Creek and Murray River Bridge. Canopy bridges may also be used as an alternative measure particularly where gaps in vegetation are larger such as Reedy Creek. Final locations for fauna connectivity measures will account for the height of remaining trees, gap between trees and the gliding angle of squirrel gliders to enable successful corridor movements*	The UMM have been assessed and included where relevant within this FCS (including Sections 3.4 and 4.1) and OMAMP within Appendix 4. The final locations of connectivity structures and enhancement measures will be developed as part of post approval Flora and Fauna Management Plan. Development of the Flora and Fauna Management Plan is not part of the scope of this FCS.

1.3 Scope of assessment

The primary aim of the FCS is to demonstrate how the project will maintain or enhance habitat connectivity values throughout the landscape prior to activities that would impact assumed habitat connectivity for Squirrel Glider and Sloane's Froglet, during the construction and post construction phases of the Project. This FCS aims to address CoA outlined within Table 1. The objectives of this FCS are to:

- Describe the current habitat connectivity values present within the land comprising the Project area and surrounds, and how these link to relevant local and regional connectivity data and outcomes (such as the Regional Natural Environment Strategy 2020-2032).
- Outline an Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek Yard.
- Provide evidence of existing fauna movement corridors, pathways, and connectivity for the Squirrel Glider, including analysis of existing studies or baseline monitoring.
- Detail existing corridors, justify connectivity measures, align with guidelines, demonstrate effectiveness, include mapping and maintenance plans.
- Detail consultation undertaken and proposed to be undertaken with relevant stakeholders and agencies.
- Reference to the Fauna Design Guidelines for the Inland Rail Project (ARTC 2022).
- Outline an Operational monitoring and adaptive mitigation measure program.

Figure 1 Study area overview

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Figure 2 Location of the study area

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2 Methods

2.1 Background research

The following background research and sources have been assessed to inform this FCS:

- The NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) BioNet Atlas of NSW Wildlife for BC Act listed threatened entities.
- The Commonwealth Department of Climate Change, Energy, the Environment and water (Cth DCCEEW) Protected Matter Search Tool for EPBC Act matters of national environmental significance.
- The project EIS and BDAR (WSP August 2022).
- Existing vegetation mapping including the *NSW State Vegetation Type Map* (C2.0M2.0), vegetation mapped within the project BDAR, and vegetation spatial data provided by Martinus.
- The *Sloane's Froglet Stormwater Wetland Design Guidelines* (Spire, 2017).
- The *Fauna Sensitive Road Design Manual Volume 2* (Queensland Government, 2010).
- The *Fauna Sensitive Road Design Guidelines* (VicRoads 2021).
- *Fauna Design Guidelines for the Inland Rail Project* (2022).
- *Squirrel Glider Habitat Management Guide Murray Local Land Services* (Korodaj, Winsemius, & Tack 2017).
- The Regional Natural Environment Strategy 2020 -2032 (2C1C & Biosis 2020).

2.2 Albury Conservation Company Squirrel Glider Monitoring Report (DM Ecological 2019).Consultation

Consultation has been undertaken with relevant stakeholders and agencies, a summary of the consultation undertaken is provided below within Table 2.

Table 2 Consultation summary

Topic	Detail	Consultation date
Survey plan	An initial targeted survey plan for Squirrel Glider was formulated and submitted to NSW DCCEEW's RD for review. A meeting with RD, Biosis and Martinus was undertaken to discuss the preliminary expectations of RD regarding the survey effort and needs for Squirrel Glider to inform the FCS.	28 May 2025
	The draft survey plan was reviewed by RD. The draft survey plan was updated to address and incorporate the provided advice. The survey plan was implemented commencing 2 June 2025.	17 April 2025
	Consultation was undertaken with Albury City Council (ACC) regarding the Strategic Plan for Squirrel Glider Connectivity. The Council noted the study area was outside the area of research included as part of the Strategic Plan	24 – 28 April 2025

Topic	Detail	Consultation date
	for Squirrel Glider Connectivity, however, the railway and Hume Freeway were identified as likely barriers to movement of Squirrel Glider.	
	The updated survey plan was reviewed by RD, with a second round of advice provided. Provided advice was assessed against the interim survey results, with transferrable advice included as part of the FCS.	• 6 June 2025
Interim results memo	An interim results memo was provided to RD 15 July 2025 to provide an update of the survey undertaken for Squirrel Glider and discuss the baseline survey objectives. A meeting was held 1 August 2025 with RD to display results and receive final approval of the Baseline Survey Plan.	• 15 July 2025 – 1 August 2025
FCS	Further information has been provided representatives of NSW DCCEEW RD regarding the approach used for improving local connectivity through the Burrumbuttock Squirrel Glider Local Area Management Plan (LAMP). This approach will be assessed incorporated into the FCS where relevant.	• Initial consultation 24 -30 April 2025 • Follow up consultation 30 June 2025
	Consultation with NSW DCCEEW species experts was undertaken to ascertain if existing habitat mapping held by NSW DCCEEW is present within the study area, to seek advice regarding the Sloane's Froglet Local Area Management Plan and to confirm if NSW DCCEEW are aware of any extant populations of Sloane's Froglet in the Uranquinty area that may not be visible of the NSW BioNet as sensitive data.	• 3 July 2025 to11 July 2025
	The Draft FCS will be submitted to RD for review.	12 December 2025

2.3 Field investigation

In accordance with the survey plan, subject to consultation with RD, the following survey effort was undertaken:

- Initial daytime survey on 14 May 2025.
- Camera trap surveys targeted gliders between 14 May 2025 – 16 June 2025 (Albury), 14 May 2025 - 18June 2025 (Uranquinty).
- Glider stag watch and spotlighting surveys round 1: 2 – 5 June 2025.
- Glider stag watch and spotlighting surveys round 2: 10 – 13 June 2025.
- Glider stag watch and spotlighting surveys round 3: 16 – 19 June 2025.
- Weather conditions for the survey period are outlined below in Table 3.

Table 3 Weather conditions

Study area	Dates	Rain (mm)	Minimum temperature (°C)
Initial assessment Billy Hughes Bridge	14/05/2025	0.0*	7.0*
Initial assessment Uranquinty Creek Yard	14/05/2025	0.0*	6.6*
Round 1 glider survey Billy Hughes Bridge	2/06/2025	0.0	5.0
	3/06/2025	0.0	1.0
Round 1 glider survey Uranquinty Creek Yard	4/06/2025	0.0	-0.2
	5/06/2025	0.0	0.7
Round 2 glider survey Billy Hughes Bridge	10/06/2025	0.2*	2.0
	11/06/2025	0.0*	5.5*
Round 2 glider survey Uranquinty Creek Yard	12/06/2026	0.0*	5.7*
	13/06/2025	0.0*	5.9*
Round 2 glider survey Billy Hughes Bridge	16/06/2025	3.0*	5.1*
	17/06/2025	1.4*	3.2*
Round 2 glider survey Uranquinty Creek Yard	18/06/2025	0.0*	0.0*
	19/06/2025	0.0*	-0.8*

**climate data obtained from Bureau of Meteorology Albury Airport (072146) and Kapooka (Defence) (074272)* (Bureau of Meteorology 2025).

2.3.1 Initial survey

An initial field investigation was undertaken by Senior Ecologist Dimity Webster prior to targeted Squirrel Glider surveys at Billy Hughes Bridge and Uranquinty Creek Yard. This survey covered the entire study area. In accordance with the survey plan, this assessment included:

- Verification of vegetation mapping, or stratification of vegetation mapping where no previous mapping was present. This information will be utilised to determine appropriate plant species for rehabilitation.
- Determination of potential and existing fauna movement corridors, pathways and connectivity at Billy Hughes Bridge and Uranquinty Creek Yard.
- Mapping of fauna habitat and ecological values and areas requiring management (e.g. hollow / habitat trees, dense understorey and/or sub-canopy tree patches, waterways, areas for mitigation measures during construction) at Billy Hughes Bridge and Uranquinty Creek Yard.
- Initial on ground truthing to assess the areas of mapped movement corridors, pathways and connectivity for the Squirrel Glider. This was achieved through assessing height of trees, density of vegetation to move through, distance between patches of suitable vegetation (e.g. gliding distances).
- Assessment of locations for suitable revegetation activities within the scope of the study area.
- Finalisation of suitable locations to place camera traps, spotlighting transects and stag watching locations for the targeted surveys described below. Following this assessment, camera traps were deployed (see details provided below).

2.3.2 Camera trapping

Camera traps were placed in areas of suitable habitat for Squirrel Glider by Biosis Senior Ecologist Dimity Webster and Martinus Environmental Coordinator Rachel Don-Wauchope. Generally, traps were placed on or across from larger trees containing hollows with the potential to support Squirrel Glider. Traps were placed throughout the study area to support the baseline survey objectives. Six camera traps were placed at each study area (Figure 3).

Within the Billy Hughes Bridge survey area, two traps were placed north of the Construction Impact Zone (CIZ) along Eight Mile Creek, two placed south of the CIZ in a tributary of Eight Mile Creek, and two placed east of the CIZ in isolated scattered trees.

The placement of traps was designed to capture presence of Squirrel Glider north and south of the study area in Eight Mile Creek and its tributary to determine if natural movement is occurring across barriers such as the Hume Highway and the existing rail line. Two camera traps were placed in isolated trees that 'link' these two locations to determine if movement is occurring through this fragmented landscape to inform the FCS.

Camera traps at the Uranquinty Creek study area were placed north and south of the CIZ along Sandy Creek to determine the presence/absence of Squirrel Glider, and if present, to determine if the species was effectively moving past barriers, including the Olympic Highway. Camera traps were not placed in urban areas of Uranquinty adjacent to the CIZ due to the proximity to houses and walking paths/areas used by members of the public.

One camera trap was placed between Morgan Street and the Olympic Highway (location 1) in planted native vegetation 14 May – 5 June 2025 and was relocated to the southernmost survey point along Sandy Creek (location 2) following access approval (5 June – 19 June 2025).

Traps were mounted arboreally on trees, around 1.5 to 2 metres above ground level, facing tree mounted bait stations. Bait stations were made up of a oats, peanut butter and honey mixture, with honey water sprayed around the bait (Photo 1 and Photo 2). Camera traps were set to medium - high sensitivity, with three photos captured every five seconds for detected motion.

Camera traps were placed at both study areas on 14 May 2025. Batteries and SD cards were replaced on 2 and 3 June 2025 at Billy Hughes Bridge, and 4 and 5 June 2025 at Uranquinty by Zoologists Shannon Braun and Thomas Perret. Old baits were removed and replaced with fresh honey water sprayed over bait stations. Camera traps were retrieved on 16 June 2025 at Billy Hughes Bridge, and 18 June at Uranquinty Creek. The camera traps at Billy Hughes Bridge were set up for a total of 40 nights, and Uranquinty Creek for a total of 42 nights.

Photo 1 Example camera and bait in woodland

Photo 2 Example of camera and bait in scattered tree

2.3.3 Glider surveys round 1 to 3

Three rounds of targeted stag watching and spotlighting were conducted at each study area. Stag watching has been used as a colloquial term for observing hollow-bearing trees at dusk, the trees assessed were not 'stags' and were living trees. Each of the three rounds consisted of two nights stag watching, and two nights spotlighting at each study area, amounting to a total of 6 nights stag watching and spotlighting at each study area.

A total of seven trees were subject to stag watching at each study area. Prior to the commencement of spotlighting, a suitable hollow-bearing tree was selected. Suitable hollow-bearing trees are those with a hollow size that could support Squirrel Glider. One to two ecologists observed the hollow-bearing tree for a least 30 minutes from dusk, or until it was suitably dark. The hollow-bearing tree was then spotlighted to observe presence of any fauna recently exited from hollows. A minimum of three hours stag watching was completed in total for each study area.

Spotlighting was completed on foot, with two ecologists walking about 10 metres apart. Around 1 kilometre of transect broken across two transects was surveyed at the Uranquinty Creek study area. Around 2 kilometres of transect broken across four transects was surveyed at the Billy Hughes Bridge study area. LEDLensor head torches were utilised with the beam focused to a direct point allowing eyeshine to be observed clearly from up to 100 metres. All fauna species observed were recorded. At least two hours of spotlighting was completed each night, amounting to a minimum total of 12 spotlighting hours at each study area.

2.3.4 Species identification

All camera trap images identified as containing potential occurrence of Squirrel Glider were assessed by experienced and qualified personnel Dimity Webster and Bret Stewart. Key diagnostic features were utilised to achieve positive identification of Squirrel Glider, including but not limited to size of the individual captured and key morphological features including tail shape and face triangulation (Baker & Gynther 2023) and (Van Dyck, Gynther, & Baker 2013). Image sequences of individuals were assessed allowing for multiple features and angles to be observed (Table 4).

Bait stations used were 12 centimetres in length, and 6 centimetres in width. This allowed for an accurate size assessment of individuals using bait stations as a scale, including on angled images, where diagnostic features, such as tail shape or length were not visible. Kreft's Glider *Petaurus notatus* was not identified within any camera trap images, all camera trap images of glider's were positively identified as Squirrel Glider.

Head to body length of Kreft's Glider is 11.5 to19.4 centimetres, compared to the larger 18 to24 centimetres of Squirrel Glider (Baker & Gynther 2023) (Van Dyck, Gynther, & Baker 2013).

Spotlighting was undertaken by experienced personnel that have extensive experience surveying for Squirrel Glider, and similar species such as Kreft's Glider and/or have undergone in-house training for identification of the target species in the field. Key diagnostic features utilised to identify glider species during spotlighting included individual size, tail and head morphology and behaviour. Individuals identified during spotlighting were observed for several minutes, with breaks between light shone on an individual. This period of observation allowed for confirmation of species. Only one potential sighting of a Kreft's Glider occurred at the Billy Hughes Bridge site, in a planted White Cypress Pine, around 3 metres tall. The individual identified appeared small, however, further analysis of the diameter of the tree trunk where the species was observed, and branch length confirmed the individual was too large to be a Kreft's Glider. All other spotlighted individuals were positively identified as Squirrel Glider.

Table 4 Example of Squirrel Glider identification process of camera trap images, Billy Hughes Bridge and Uranquinty Creek Yard

Diagnostic feature description	Image(s)
Example of image series. Photo 3 (image 1 of 2) does not show diagnostic tail features, however, Photo 4 (Images 2 of 2), show the same individual, captured 3 seconds apart with a diagnostic fluffy tail, and large body size allowing for positive identification of Squirrel Glider.	 **Photo 3 Squirrel Glider image 1 of 2 series example**

Diagnostic feature description	Image(s)
	 **Photo 4 Squirrel Glider image 2 of 2 series example**

Diagnostic feature description	Image(s)
Example of image series allowing multiple identification points. Photo 5 shows the initial image captured of a Squirrel Glider, with minimal diagnostic features present however, the remaining 23 images were captured of the same individual over a period of 2 minutes and 22 seconds showcased identifiable features. The individual did not leave the image frame, and was photographed at multiple angles, allowing identification through body length, head shape and tail shape.	 **Photo 5 Squirrel Glider image 1 of 24 series example**

Diagnostic feature description	Image(s)
	 **Photo 6 Squirrel Glider image 18 of 24 series example**

Diagnostic feature description	Image(s)
	 **Photo 7 Squirrel Glider image 23 of 24 series example**

Diagnostic feature description	Image(s)
Example of bait trap size utilised to confirm positive identification of Squirrel Glider, showing large body length. Photo 8 shows an example of this process, where the length of the bait trap was utilised to confirm identification, outlying the body length of the individual to be approximately 24 centimetres, which is above the size range for a Kreft's Glider and confirms identification of Squirrel Glider.	 **Photo 8 Squirrel Glider image bait trap length analysis**

2.3.5 Survey personnel

Targeted surveys and camera trap analysis were undertaken by experienced Ecologists and Zoologists outlined in Table 5.

Table 5 Survey personnel position and experience

Name/Title	Role/Experience
Bret Stewart **Bsc** **Senior Zoologist – Technical Lead Zoology**	**Camera trap setting review/camera trap data and image analysis** Bret has over 17 years' experience undertaking targeted fauna surveys and species identification. Bret has extensive experience in camera trap survey, and image analysis, including Squirrel Glider, Sugar Glider and Kreft's Glider.
Dimity Webster BSc Senior Ecologist – Major Projects	**Initial survey/ camera trap placement/targeted survey/camera trap data analysis**. Dimity has over 9 years' experience undertaking targeted fauna surveys and habitat assessment. Dimity has an academic background in targeted surveys in the Albury region, and over 6 years' experience undertaking targeted survey in Albury for threatened fauna, including Squirrel Glider.
Shannon Braun BConB, Hons Zoologist	**Targeted survey/camera trap placement.** Shannon has over 10 years' experience undertaking a wide variety of fauna survey techniques throughout Victoria and NSW, including pitfall trapping, Elliot trapping, infrared camera trapping, harp trapping, cage trapping, roof tile surveys, call playback, active searching, transects, track plots, netting and fish traps, light traps for invertebrates, hair sampling, mark re-capture and spatially explicit capture re-capture to estimate population density. Shannon has over 2 years' experience undertaking targeted survey within the Albury region, with experience surveying for Squirrel Glider.
Joel Nicholson BEnvS, Hons Senior Consultant – Field Coordinator	**Targeted survey/ Camera trap retrieval.** Joel has over 5 years' experience undertaking targeted fauna surveys and habitat assessment. Joel's experience includes translocation of small mammals and invertebrates, and targeted survey of microbats, birds, mammals, frogs and reptiles. He is also experienced in managing long and short-term fauna monitoring programs. Joel has over 5 years' experience undertaking targeted survey for Squirrel Glider.
Cassandra Kalafatakis BSc, Hons Ecologist	**Targeted survey/ Camera trap retrieval.** Cassandra has over 1 years' experience undertaking targeted fauna surveys, including within the Albury region for threatened fauna species. Cassandra has a background in natural resource management, conservation and habitat assessment.
Erin Parker BBioCon Ecologist	**Targeted survey/ Camera trap data analysis.** Erin has over 2 years' experience undertaking targeted fauna surveys for threatened species in NSW. Erin has a background in ecological conservation. Erin has over 2 years' experience undertaking analysis of camera trap data, including identifying Squirrel Glider.
Thomas Perret BSc Zoologist	**Targeted survey/camera trap placement.** Thomas has over one years' experience undertaking targeted fauna surveys and habitat assessment. Thomas has a broad range of zoological survey experience including Grassland Earless Dragon, vessel-based survey in the Bass Straight for seabirds and targeted survey throughout Victoria and NSW for threatened fauna.

Figure 3 Baseline targeted survey effort

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3 Results

3.1 Background research

3.1.1 Squirrel Glider

Squirrel Glider population density assessment Albury

Squirrel Glider has been recorded within the study area of the Billy Huges Bridge, in both 2020 and 2024. Surveys within Albury (NSW DCCEEW 2025a), and records from the NSW BioNet Atlas (NSW DCCEEW 2025a) alongside local survey efforts (DM Ecological 2019) show the core population area for this species is centred within Thurgoona and Wirlinga. Records are also located both east and west of the Hume Freeway along Eight Mile Creek.

Presence of Squirrel Glider was strongly linked to the availability of hollows (Michael, Niedra, & McWhinney 2021).

Squirrel Glider population density assessment Uranquinty

A threatened population of Squirrel Glider under the BC Act occurs within the Wagga Wagga LGA. The Uranquinty Creek Yard study area falls within the Wagga Wagga LGA. An assessment of records under the BioNet Atlas (NSW DCCEEW 2025a) indicates the core population occurs in the township of Wagga Wagga with outlying records in Forest Hill, Ladysmith, Rowan, Moorong and Uranquinty.

Squirrel Glider was not detected during the targeted survey undertaken as part of the project BDAR (WSP August 2022); however, presence was assumed. Two BioNet records are present north of the Uranquinty Creek Yard study area in connected vegetation along Sandy Creek. Research into the occurrence of this species indicates it may be more widespread within the NSW South West Slopes and Wagga Wagga LGA than previously thought (Claridge, A & van der Ree, R 2004). Records from the NSW BioNet Atlas (NSW DCCEEW 2025a) indicate a potential for continuous population presence between Wagga Wagga and Uranquinty.

Limited research has been undertaken on Squirrel Glider in the outlying edges of the Wagg Wagga LGA; however, an assessment of records indicates this species is likely to occur at low density within the Uranquinty Creek Yard study area.

Barriers to movement and connectivity

Stewart, D & van der REE, R (2009) note that '*the Hume Freeway could be draining animals from the central portion of the region of interest and therefore enabling more pathways to the Hume Freeway could cause even more of the study area to be drained of individuals*' (Stewart, S & van der Ree, R 2009). Fragmentation of habitat and populations remains a key risk to the species causing declines (Claridge, A & van der Ree, R 2004).

Consultation was undertaken with Albury City Council regarding the Strategic Plan for Squirrel Glider Connectivity 24 April 2025 with a response received 28 April 2025. Albury City Council noted the study area was outside the area research as part of the Strategic Plan for Squirrel Glider Connectivity, however, the railway and Hume Freeway were identified as likely barriers to movement of Squirrel Glider.

Key barries to movement for Squirrel Glider within both the Billy Hughes Bridge and Uranquinty Creek Yard study areas are likely to be the existing rail corridor, the Wagga Road on and off ramps to the Hume Highway, the Olympic Highway and fragmented habitat with patches more than 50 metres apart restricting gliding.

3.1.2 Sloanes Froglet

Sloanes Froglet population density analysis Albury

Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. A stronghold population of Sloane's Froglet occurs within the Albury LGA (TSSC 2019).

Research on Sloane's Froglet has identified its use of wetland complexes forming metapopulations, where this species is known to have life cycles and habitat requirements that depend on the linking of complementary habitats at multiple spatial scales (Alexandra Ruth Knight 2015).

An analysis of BioNet records indicates the core population in Albury occurs east of the Hume Highway, north of the Murray River, west of Lake Hume and south of Table Top (NSW DCCEEW 2025a). This area roughly aligns with the Sloane's Froglet Local Area Management Plan (Albury City Council 2025). The study area at Billy Hughes Bridge does not fall within this area, however, it is directly adjacent to where the LAMP area occurs east of the Hume Highway. Targeted surveys for Sloane's Froglet were not undertaken as part of the project BDAR and presence was assumed (WSP 2022). Targeted surveys were commissioned on behalf of Martinus and undertaken by NGH in July and August 2024. Sloane's Froglet was not detected at the Billy Hughes Bridge area (NGH 2024). however, consultation with RD determined that the presence of the species should be assumed to inform this FCS.

A metapopulation is known to occur directly east of the Billy Hughes Bridge study area in wetland habitat. This wetland population occurs along the tributary of Eight Mile Creek that bisects the southern end of the Billy Hughes Bridge study area. A small pond is located in the south-west of the study area, directly south of Wagga Road, a record of Sloane's Froglet is present in this habitat from 2012.

Sloane's Froglet was incidentally identified during pre-clearance surveys in December 2025 (Habitat Innovation & Management 2025a), appropriate protocols were undertaken, and followed up with appropriate mitigation measures.

Sloanes Froglet population density assessment Uranquinty

Sloanes Froglet has not been recorded in the last 20 years north of Albury, the species is considered unlikely to occur within Uranquinty. However, as targeted surveys for Sloane's Froglet were not undertaken as part of the project BDAR, presence was assumed in all areas of habitat with the potential to support this species (WSP 2022).

Targeted surveys were commissioned on behalf of Martinus and undertaken by NGH in July and August 2024. Sloane's Froglet was not detected at the Uranquinty Creek Yard study areas (NGH 2024). however, consultation with RD determined the surveys were not completed to the appropriate level required, and as such presence was assumed to inform this FCS.

Consultation undertaken was undertaken with an NSW DCCEEW species expert 11 July 2025 via telephone to confirm NSW DCCEEW is not aware of any extant populations in the Uranquinty area.

Barriers to movement and connectivity

Key threats to the Sloane's Froglet include fragmentation and degradation of habitat and water quality through clearing, changes in water availability, flow and flooding regimes, loss of habitat due to development, habitat degradation from overgrazing, and potential susceptibility to the Chytrid fungus (Knight 2013 & 2014; OEH 2017).

Sloane's Froglet historical distribution includes north-central Victoria through central-western NSW to the Queensland border. Although historically infrequently recorded throughout its range, the species is considered to have undergone a population contraction in recent years. A number of factors have been attributed to this decline, which include habitat modification and reduction via agricultural and residential development (OEH 2017), predation by introduced fish (Knight 2014) and possibly the amphibian disease chytridiomycosis caused by the pathogen *Batrachochytrium dendrobatidis* (chytrid fungus) (OEH 2017).

3.2 Local area management plan approach

Further information has been provided NSW DCCEEW RD species experts regarding the approach used for improving local connectivity through the Burrumbuttock Squirrel Glider Local Area Management Plan (LAMP). Through this consultation Biosis has been provided a copy of the LAMP Manual: Securing threatened species using the Local Area Management Program approach for NSW (Cameron 2025).

Key aspects of this LAMP manual relevant to this FCS include:

- Population analysis and working towards the goal of a robust population to ensure future viability.
- Habitat mapping, baseline targeted survey and ongoing monitoring.
- Development of management actions, working with landholders and engaging the community.

These key aspects have been assessed and incorporated into this FCS.

The Burrumbuttock (Wirriminna) LAMP is centralised on the Burrumbuttock LGA (Bull 2024), with habitat management actions constructed from the Squirrel Glider Habitat Management Guide (Korodaj, Winsemius, & Tack 2017).

Consultation undertaken with a NSW DCCEEW species expert has determined the Local Area Management Plan for Sloane's Froglet is designed as a process to guide developers and is not intended for use to inform Land Area Management.

3.3 Vegetation

An in-field assessment of vegetation was undertaken by Biosis at the Billy Hughes Bridge and Uranquinty Creek Yard study areas. A desktop assessment was undertaken for all other sections of the CIZ as part of the Albury to Illabo section. The desktop assessment relied on mapped vegetation and floristic detail from the project BDAR (WSP August 2022) and State Vegetation mapping for NSW (NSW DCCEEW 2025b).

3.3.1 Billy Hughes Bridge

The site investigation, alongside the project BDAR and spatial data provided by Martinus found the following Plant Community Type (PCT) was present:

- PCT 277 Blakley's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.

The structure, floristic composition and condition of the vegetation communities present within the Billy Hughes Bridge study area are described in Table 6 and displayed within Figure 4.11.

All other areas were identified as exotic vegetation, dominated by exotic perennial grasses and annual exotic species including Fleabane *Conyza bonariensis*, Paspalum *Paspalum dilatatum*, Wild Oats *Avena fatua*, Catsear *Hypochaeris radicata* and Lamb's Tongue *Plantago lanceolata*.

Table 6 PCT 277 Blakley's Red Gum – Yellow Box grassy tall woodland Billy Hughes Bridge

PCT 277 Blakley's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.	
Description	This PCT occurs throughout the study area as remnant and planted woodland. Remnant woodland generally occurs as tall woodland to 20 metres dominated by Blakely's Red-gum *Eucalyptus blakelyi* and Yellow Box *Eucalyptus melliodora*. Blakely's Red-gum and Yellow Box varied in their dominance, some areas also contain low densities of Apple Box *Eucalyptus bridgesiana,* Red Box *Eucalyptus polyanthemos* and White Box *Eucalyptus albens.* Shrubs are generally absent in remnant areas. Planted occurrences of this PCT occur where Blakley's Red-gum, Yellow Box were planted with a low density of remnant trees. Planted Mugga Ironbark *Eucalyptus sideroxylon* and Argyle Apple *Eucalyptus cinerea* are the dominant species. Planted shrub species are also present at low density including Silver Wattle *Acacia dealbata,* Sticky hopbush *Dodonaea viscosa* subsp. *Angustissima,* Kangaroo Thorn *Acacia paradoxa,* White Cypress Pine *Callitris glaucophylla,* Varnish Wattle *Acacia verniciflua,* and Honey myrtle *Melaleuca* sp. The ground cover varied, with dense Phalaris *Phalaris aquatica* along Eight Mile Creek, covering in some areas over 90% of the ground, with some exotic annuals breaking through including Ryegrass *Lolium rigidum.* The planted and terrestrial areas were generally dominated by bare ground, and native ground cover including native Red Grass *Bothriochloa macra* and Rough Speargrass *Austrostipa scabra*. South of Wagga Road, the remnant woodland was dominated by dense exotic tussock forming African Lovegrass *Eragrostis curvula* grass with native sedges in damp/wet areas, including Tall Sedge *Carex appressa.*
Condition	Moderate and planted.
Threatened Ecological Community	The assessment undertaken as part of the project BDAR (WSP August 2022) determined all areas of this PCT are associated with and forms part of the BC Act listed *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*. Due to the fragmented nature, and dominance of exotic species in the ground layer, the project BDAR (WSP August 2022) determined all areas of this PCT within the study area of the FCS did not meet the condition thresholds for listing of *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* under the EPBC Act.

Photo 9 PCT 277 Eight Mile Creek 15 May 2025

Photo 10 PCT 277 South of Wagga Road 15 May 2025

Photo 11 PCT 277 Planted north of Wagga Road 15 May 2025

Photo 12 PCT 277 Planted south of Wagga Road 15 May 2025

Photo 13 PCT 277 Tributary of Eight Mile Creek 15 May 2025

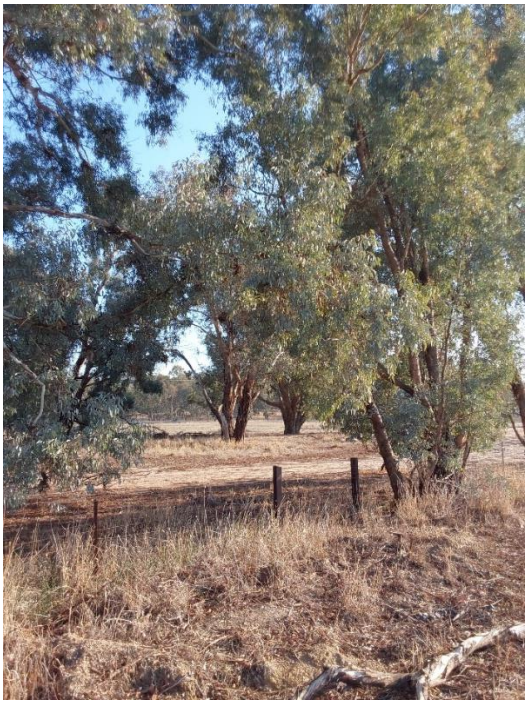

Photo 14 PCT 277 Isolated Yellow Box with sparse native ground layer

3.3.2 Uranquinty Creek Yard

The site investigation, alongside the project BDAR and spatial data provided by Martinus found the following PCTs are present:

- PCT 277 Blakley's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.
- PCT 5 River Red Gum herbaceous – grassy very tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion.

The structure, floristic composition and condition of the vegetation communities present within the Uranquinty Creek Yard study area are described in Table 7 and Table 8, and displayed within Figure 4.5.

All other areas were identified as exotic vegetation, dominated by exotic perennial grasses and annual exotic species including Paspalum *Paspalum dilatatum*, Wild Oats *Avena fatua* and Phalaris *Phalaris aquatica.*

Planted native vegetation occurred in one patch, containing Mugga Ironbark *Eucalyptus sideroxylon*, Sugar Gum *Eucalyptus cladocalyx*, Lemon Scented Gum *Corymbia citriodora* and Yellow Gum *Eucalyptus leucoxylon*.

Table 7 PCT 5 River Red Gum herbaceous – grassy tall open forest wetland

PCT 5 River Red Gum herbaceous – grassy very tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion.	
Description	This PCT occurs along Sandy Creek within the study area as very tall open forest dominated by River Red-gum *Eucalyptus camaldulensis* with trees averaging approximately 25 m high and a canopy cover of approximately 40 – 80%. The shrub layer is sparse or absent, with one patch of Silver Wattle *Acacia dealbata* south of the Olympic Highway along Sandy Creek. The ground cover was generally dominated by Phalaris *Phalaris aquatica*, often forming over 80% of the ground cover. Dense leaf litter and patches of bare ground are also present. Phalaris is more established/denser south of the Olympic Highway along Sandy Creek. Some native species are present at low density including Red Grass *Bothriochloa macra* and Common Wheat Grass *Anthosachne scabra*. Occurs on silty-sandy loam-clay soils along Sandy Creek and raised landform elements adjacent to the creek bed.
Condition	Moderate.
Threatened Ecological Community	Not associated with any TECs under the EPBC Act or BC Act.

Photo 15 PCT 5 north of the Olympic Highway along Sandy Creek

Photo 16 PCT 5 south of the Olympic Highway along Sandy Creek

Table 8 PCT 277 Blakley's Red Gum – Yellow Box grassy tall woodland Uranquinty Creek Yard

PCT 277 Blakley's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.	
Description	This PCT occurs throughout the study area as remnant woodland in small, isolated stands. Remnant woodland generally occurs as tall woodland to 20 metres dominated by Blakely's Red-gum *Eucalyptus blakelyi* and Yellow Box *Eucalyptus melliodora*. The isolated patch occurs between the existing rail line and Olympic Highway. The ground stratum is dominated my exotic annual species including Paspalum *Paspalum dilatatum* and Wild Oats *Avena fatua.* Some native species are present at low density including Red Grass *Bothriochloa macra* and Common Wheat Grass *Anthosachne scabra*.
Condition	Moderate
Threatened Ecological Community	The assessment undertaken as part of the project BDAR (WSP August 2022) determined all areas of this PCT is associated with and forms part of the BC Act listed *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*. Due to the fragmented nature, and dominance of exotic species in the ground layer, the project BDAR (WSP August 2022) determined all areas of this PCT within the study area of the FCS did not meet the condition thresholds for listing of *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* under the EPBC Act.

Photo 17 PCT 277 behind exotic vegetation

3.4 Squirrel Glider habitat and connectivity

A detailed assessment was undertaken to determine the key habitat features required to support Squirrel Glider these include:

- Connected vegetation with patches less than 50 metres apart.
- Floristic structure containing varying foraging resources, namely, *Eucalyptus* spp. and *Acacia* spp.
- Abundance and location of hollow-bearing trees for den sites and breeding for a robust population.

Squirrel Gliders move through the landscape by climbing and gliding between vegetation, occasionally they will cross between vegetation patches at ground level where patches are too wide to glide. Taller trees allow for further gliding distances of up to 50 metres, with the average gliding distance being 20 to 40 metres. Gaps greater than 40 and 70 metres are considered a barrier to the movement for this species. Gliders can move up to 2 kilometres a night (Korodaj, Winsemius, & Tack 2017).

Squirrel Glider forage on nectar, sap and invertebrates, with a preference shown in the South West Slopes for *Eucalyptus* spp. and *Acacia* spp. Their diet varies throughout the year based on season, as such, woodland and forest habitat with a varies floristic structure containing a mixture of *Eucalyptus* spp. and *Acacia* spp. is a key component to supporting viable populations of this species (Korodaj, Winsemius, & Tack 2017) (Crane, Lindenmayer, & Cunningham, R 2012).

Squirrel Gliders are a nocturnal species, sheltering in 'dens' during the day within the hollows of Eucalyptus trees. Multiple den sites are utilised within their territory, on average around five to seven den trees are utilised within an individual's home range (Crane, Lindenmeyer, & Cunningham 2010). Squirrel Glider located in inland habitat fragments have a home range of around 3 to 4 hectares (NSW Scientific Committee 2008). Den sites are generally used within 300 metres of foraging locations (Korodaj, Winsemius, & Tack 2017), with den sites 'swapped out' approximately every three to five days (Crane, Lindenmeyer, & Cunningham 2010). Squirrel Gliders are a social species, sharing den sites, a single den can contain up to 10 individuals depending on the size (Korodaj, Winsemius, & Tack 2017). Larger old growth, and stag trees are preferred for den sites, especially trees with multiple suitable hollows (Crane, Lindenmeyer, & Cunningham 2010). Squirrel Gliders prefer den trees located in areas of floristic structure, with a regenerating canopy and a present shrub layer (Crane, Lindenmeyer, & Cunningham 2010).

The habitat assessment undertaken as part of the baseline survey identified habitat features that could support Squirrel Glider, these are described in detail below within Table 9 and displayed in the Figure 4 map series.

Table 9 Squirrel Glider habitat features Billy Hughes Bridge and Uranquinty Creek Yard study areas

Habitat component	Detail
Billy Hughes Bridge	
Vegetation connectivity	Vegetation connectivity for Squirrel Glider within the Billy Hughes Bridge study area is low - moderate. Barriers to movement occur in the form of Wagga Road, the existing rail line, cleared areas, barbed wire fences and farm tracks. The vegetation present is bisected into numerous patches. With some areas of native vegetation containing grassland patches. Numerous gaps occur between the disconnected patches of vegetation, ranging from 5 - 70 metres. The vegetation within Eight Mile Creek and the tributary in the south links the study area to the broader landscape.
Floristic structure	The floristic structure present is considered moderate quality, with a range of Eucalypt species present, alongside some planted Wattle species.
Hollow-bearing trees	A total of 21 hollow-bearing trees were identified within the study area, of these 21 trees, 19 were identified as containing hollows likely to be suitable for Squirrel Glider. Refer to Figure 4.11.
Movement pathways	Squirrel Glider were recorded east and west of Eight Mile Creek and its tributary on either side of the railway through both spotlighting and camera trap images. Direct evidence in the form of gliding over the rail corridor was not observed during the spotlighting survey. The presence of individuals on both east and west sides of the existing railway infers some form of population movement across this barrier is present. An individual Squirrel Glider was recorded in isolated vegetation, at camera trap 3. This indicates some form of movement, is occurring in low frequency through fragmented areas. Squirrel Glider were recorded both north and south of Wagga Road, however, these records were primarily associated with Eight Mile Creek and its tributary. Movement across this barrier may occur, however no evidence was observed during the spotlighting of individuals near the road reserve. The highest density of records was observed along Eight Mile Creek, indicating this section of habitat is the key movement corridor for Squirrel Glider within the Billy Hughes Bridge study area. Refer to Figure 4.11 for recorded presence of Squirrel Glider.
Uranquinty Creek Yard	
Vegetation connectivity	Vegetation connectivity within the Sandy Creek area is considered moderate, with minimal patches and continuous vegetation linking the study area within the broader landscape. However, the existing rail and Olympic Highway bisects this vegetation. Planted native vegetation and some fragmented vegetation in the road reserve of the Olympic Highway occurs. Gaps in canopy range from around 20-50 metres. Where the CIZ extends

Habitat component	Detail
	north-west into the Uranquinty township connectivity is low due to urban development, the rail line and roads. The key area of habitat for this species is along Sandy Creek.
Floristic structure	The floristic structure present is considered low-moderate. Established River Red Gum are present, with a low density of other Eucalyptus. Only one stand of Silver Wattle was observed, containing around 10-15 plants, no other foraging trees or shrubs were identified during the site assessment.
Hollow-bearing trees	Within the study area, only 12 hollow-bearing trees suitable for Squirrel Glider were recorded. Refer to Figure 4.5
Movement pathways	Squirrel Glider were recorded both north and south of the railway and Olympic Highway, however, this large gap with multiple barriers to movement is considered unlikely to be crossed regularly. No evidence of crossings were observed during the spotlighting survey. Refer to Figure 4.5 for recorded presence of Squirrel Glider.

3.4.1 Other connectivity sites

A desktop assessment was undertaken for the remaining sites located between Albury and Illabo to inform mitigation measure BD 11 (refer to Table 1), the connectivity features identified are summarised below within Table 10 and displayed within the Figure 4 map series. Table 10.1 *Mitigation measures for detailed design/pre-construction* of the project BDAR states '*A regional connectivity strategy will be prepared and implemented with reference to the Fauna Design Guidelines for the Inland Rail Project (2021) to consider further enhancements, including beyond the proposal site*'. An assessment of floristic structure, and presence/absence of hollow-bearing trees was not included as part of this assessment. The desktop assessment included assessment of mapped native vegetation (NSW SVTM), aerial imagery, and Google Street View imagery. Mapped native vegetation SVTM is displayed within the Figure 4 map series for all sites, excluding Billy Hughes Bridge and Uranquinty Creek Yard where ground-truthed surveys were undertaken.

All areas of mapped native vegetation (SVTM) containing woodland/forest were assumed to represent potential Squirrel Glider habitat. Many of the sites investigated, and summarised below within Table 10 did not contain mapped native vegetation (SVTM), and occurred in urban, peri-urban or fragmented and cleared landscapes and as such, are considered unlikely to contain potential Squirrel Glider habitat.

This assessment determined, additional to the Billy Hughes Bridge and Uranquinty Creek Yard sites, further assessment of connectivity actions, in accordance with BD11, should be considered at the Albury Murray River Bridge and Junee Harefield Yard.

Through consultation with RD it was determined that both the Murray River Bridge and Junee Harefield sites are not suitable for installation of glider poles and/or rope bridges. In light of this advice, no further actions are proposed at the Murray River Bridge or Junee Harefield sites.

Martinus is responsible for final determination of preferred connectivity actions, in consultation with ARTC, to be undertaken as part of this FCS in accordance with the CoA.

Table 10 Desktop assessment of Squirrel Glider habitat to inform mitigation measure BD11

Site	Habitat detail
Albury Table Top Yard	No woodland vegetation present. No habitat present that would support Squirrel Glider.
Albury Station Yard	Located in an urban environment, some vegetation present however the site is largely cleared due to infrastructure, the existing rail and roads. Minimal habitat present that would support Squirrel Glider.
Albury Murray River Bridge	Oddies Creek and Murray River occur in and adjacent to this site, with the rail forming a barrier to movement for this species. Squirrel Glider is likely to occur on either side of the railway. **This site is considered suitable for further assessment of connectivity actions, refer to 3.4.2.**
Culcairn Station Yard	Located in an urban environment, some vegetation present however the site is largely cleared due to infrastructure, the existing rail and roads. Minimal habitat present that would support Squirrel Glider.
The Rock Yard	Located in an urban environment, some vegetation present however the site is largely cleared due to infrastructure, the existing rail and roads. Some potential woodland habitat is located to the west between the railway and Olympic Highway, however minimal vegetation is located north, south or east of the site. Minimal habitat present that would support Squirrel Glider.
Henty Yard	Located in an urban environment, some vegetation present however the site is largely cleared due to infrastructure, the existing rail and roads. Minimal habitat present that would support Squirrel Glider.
Yerong Creek Yard	Located in an urban/rural living environment, some vegetation present however the site is largely cleared due to infrastructure, the existing rail and roads. Minimal habitat present that would support Squirrel Glider, with agricultural cropping, urban development and roads surrounding the site on all sides.
Junee IS2 Dual Track	Located in a rural landscape, some vegetation present however the site is largely cleared due to agricultural cropping/grazing and roads. Minimal habitat present that would support Squirrel Glider.
Junee Harefield Yard	Minimal habitat present within the CIZ that would support Squirrel Glider; however Reedy Creek is bisected by the existing rail. Reedy Creek is vegetated on both sides and has the potential to support Squirrel Glider. The site is continuously connected to the Murrumbidgee River and occurs within the potential distribution of the Wagga Wagga Squirrel Glider population. **This site is considered suitable for further assessment of connectivity actions, refer to Section 3.4.2.**
Junee Kemp Street Bridge	Located in an urban environment, some vegetation present however the site is largely cleared due to infrastructure, the existing rail and roads. The site is connected to a local park with some native vegetation, however minimal

Site	Habitat detail
	vegetation is present to the north, east and south. Minimal habitat present that would support Squirrel Glider.
Junee Station Yard	Located in an urban environment, some planted vegetation present however the site is largely cleared due to infrastructure, the existing rail and roads. Minimal vegetation is present to the north, east, west and south. No habitat present that would support Squirrel Glider.
Junee Olympic Highway Under Bridge	Located in an urban/rural environment, some vegetation present however the site is largely cleared due to infrastructure, urban development, the existing rail and roads. The site is connected to a small patch of isolated woodland, however minimal to no native vegetation is present to the north, east and south. Minimal habitat present that would support Squirrel Glider.
Wagga Wagga Pearson Street Bridge	Located in an urban/industrial environment, some planted vegetation present however the site is largely cleared due to infrastructure, the existing rail and roads. Minimal vegetation is present to the north, east, west and south. Minimal to no habitat present that would support Squirrel Glider.
Wagga Wagga Station Yard	Located in an urban/industrial environment, some planted vegetation present however the site is largely cleared due to infrastructure, the existing rail and roads. Minimal vegetation is present to the north, east, west and south. Minimal to no habitat present that would support Squirrel Glider.
Wagga Wagga Bomen Yard	Located in a semi-rural/industrial area. Isolated patches of woodland vegetation occur in the adjacent vicinity, with some woodland visible parallel with the existing rail and road. There is a low potential for Squirrel Glider to occur given the sites location in Wagga Wagga, however the habitat present is linear and highly fragmented. Given the fragmented nature of the potential habitat in the adjacent landscape this site is not considered logical for further assessment of connectivity actions in the scope of this assessment.

3.4.2 Consultation

Through consultation with RD it was determined that both the Murray River Bridge and Junee Harefield sites are not suitable for installation of glider poles and/or rope bridges. The following comments were provided by RD:

- CPHR does not support the construction of glider poles or rope bridges for squirrel gliders at the Murray River Bridge site. The site has minimal connectivity to native vegetation due to a lack of suitable receiving habitat and absence of other bridge or glider poles at the Hume Freeway, which runs parallel to the site. This option was previously excluded during the pre-approval phase (see discussion on Issue 11 in DOC24/159895, dated 14 March 2024).
- No further surveys or mitigation for Squirrel Gliders is required for the Harefield site. Any crossing structure installed at Harefield would need to cover a long distance and be constructed within a large drainage line, with little benefit as there is limited connectivity to native vegetation. Creating a connection to direct squirrel gliders to the south-east will result in fauna being stranded in cleared paddocks.

In light of this advice, no further actions are proposed at the Murray River Bridge or Junee Harefield sites.

Figure 4 Squirrel Glider habitat

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3.5 Sloane's Froglet habitat and connectivity

Sloane's Froglet has niche breeding and habitat requirements (A Knight 2015), these include:

- Natural and manmade depressions as small as 1 metre squared, through to large wetlands more than 200 hectares. Occur in dams, shallow depressions, gilgai, roadside table drains, oxbows and irrigation drains.
- Shallow water depth averaging around 1 to31 centimetres in depth, with a preference for less than 8 centimetres depth.
- Wetland inundation length, with waterbodies becoming inundated July/August for breeding, and water presence remaining for a minimum of 3 months to ensure successful survival of tadpoles – frogs.
- Waterbodies containing low to no flowing water.
- Vegetated edges of waterbodies, with submerged and emergent vegetation. A maximum height of 42 centimetres for emergent vegetation is required for calling males. Both exotic and native plants have been recorded in use by female froglets for egg laying and calling males.
- Less than 5 percent canopy shading, with direct sunlight likely required to ensure egg and tadpole development.
- Wetlands with slope of less than 4 percent are preferred. Steep banks are less likely to be used as they are generally associated with deeper water.

Within the Albury LGA, particularly within the Local Area Management Plan for Sloane's Froglet, all areas of waterbodies are considered breeding or transitional habitat for this species. In dryer period the species is likely to retreat to permanent water sources, including Eight Mile Creek and its tributaries (A Knight 2015).

Targeted surveys for Sloane's Froglet were not undertaken as part of the project BDAR, as such presence was assumed in all areas of potential habitat (WSP 2022). Biosis was not engaged to undertake targeted surveys for Sloane's Froglet. Targeted surveys were undertaken by NGH on behalf of Martinus. Sloane's Froglet was not identified within the Billy Hughes Bridge (however, consultation with RD determined that the presence of the species should be assumed to inform this FCS.), or Uranquinty Creek Yard study areas. Within the Billy Hughes Bridge study area, there is potential habitat for Sloane's Froglet (Figure 5.1) in the form of:

- Eight Mile Creek: Transitional and non-breeding refuge habitat:
  - Deep channel densely shaded and seasonally fast flowing water.
- Tributary of Eight Mile Creek: Transitional and non-breeding refuge habitat:
  - Shallow, slow flowing to still water with vegetated banks, however densely shaded.
- Potential gilgai identified within the project BDAR, farm dam and drainage line connected to the farm dam: Potential low quality breeding habitat.
  - Still flowing water, non-shaded, potential to meet breeding requires of this species.
- Natural wetland pocket south of Wagga Road: Transitional and non-breeding refuge habitat.
  - Shallow, slow flowing to still water with vegetated banks, however densely shaded with tall *Carex appressa*.

Sloane's Froglet was incidentally identified during pre-clearance surveys in December 2025 (Habitat Innovation & Management 2025a), appropriate protocols were undertaken, and followed up with appropriate mitigation measures. The habitat area is located adjacent to the proposed access track in a vegetated

drainage depression that is located to the north and adjacent to Wagga Road, flowing in a south-westerly direction. The drainage depression is being fed from runoff from Wagga Road and the nearby landscape and was well vegetated with moist soil at the time of the discovery. The drainage depression is not a mapped watercourse and it is unknown if it is part on a natural drainage system. The discovery of the froglet within this area requires it to be managed as Sloane's Froglet habitat (Habitat Innovation & Management 2025b).

Consultation with NSW DCCEEW was undertaken confirming no extant populations of Sloane's Froglet (refer to Section 2.2) occur within the Uranquinty area, however, the following habitat was mapped during the BDAR (WSP 2022) as assumed presence (refer to Figure 5.1):

- Sandy Creek: Transitional and non-breeding refuge habitat:
  - Shallow, slow flowing to still water with steep vegetated banks, however densely shaded.
- Table drains and unnamed watercourses near Yarragundry Street:
  - Still flowing water, non-shaded, potential to meet breeding requires of this species, however no known population is present.

3.5.1 Movement pathways

Sloane's Froglet moves across the landscape during wet periods during its winter-spring active phase. Movement primarily occurs through connected habitat, including table drains, flooded grasslands, drainage lines, watercourses, gilgai and wetlands (CSU 2025). Key potential movement pathways within the Billy Hughes Bridge study area include Eight Mile Creek and its tributary. Movement outside of these areas has the potential to occur between areas of identified potential habitat during wet periods or local flood events. The key aquatic corridor within the Uranquinty Creek yard study area is Sandy Creek, and table drains within the road reserve.

Targeted surveys undertaken by NGH did not identify presence of Sloane's Froglet at either the Billy Hughes Bridge study area, or Uranquinty Creek Yard study area. However, consultation with RD determined that the presence of the species should be assumed to inform this FCS. Sloane's Froglet was incidentally identified during pre-clearance surveys in November 2025 (Habitat Innovation & Management 2025a), appropriate protocols were undertaken, and followed up with appropriate mitigation measures.

Figure 5 Sloane's Froglet habitat Billy Hughes Bridge and Uranquinty Creek Yard

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4 Squirrel Glider Connectivity Strategy

The following connectivity enhancement actions have been investigated for Squirrel Glider:

- Canopy bridges and glider poles.
- Revegetation.
- Nest boxes.

In order to undertake the proposed construction works within the study area as part of the project, Martinus on behalf of ARTC has obtained temporary lease of land adjacent to the rail corridor. It is important to note that the connectivity actions below are subject to approval with existing land holders / land managers. Proposed connectivity actions, and on-going monitoring/maintenance activities, will require approval through landholder agreements with ARTC. Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD prior to the finalisation of this strategy..

Martinus in consultation with ARTC is responsible for final determination of preferred connectivity actions to be undertaken as part of this FCS. Following this determination, Martinus on behalf of ARTC will engage landholders to propose connectivity actions and undertake landholder agreements on behalf of ARTC. In the event that landholders do not approve of revegetation activities, consultation should be undertaken with RD NSW DCCEEW to receive further direction regarding the approach to achieve the connectivity goals outlined within the CoA. Landholder agreements must ensure a contractual obligation or similar is included ensuring connectivity actions such as revegetation are not impacted through non-compatible land uses (such as clearing).

Connectivity enhancement actions are summarised within Table 11 below.

Table 11 Summary of connectivity actions for Squirrel Glider

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
Billy Hughes Bridge				
Glider poles and canopy bridges	Option 1 • Two 21-metre-high glider poles at Eight Mile Creek on either side of the rail corridor in accordance with height recommendations outlined in section 4.1. – Canopy bridge, at least 9.1 metres above the existing rail track (in accordance with the ARTC Fauna Design Guidelines for Inland Rail) is optional.	• Decrease the impact of the railway as a barrier to movement for Squirrel Glider.	• Glider poles should be installed during the final stages of construction following the completion of construction activities within the CIZ that are not compatible with the presence of a glider pole (e.g. Bulk earthworks, access establishment), to avoid damage of the infrastructure and ensure required works within the CIZ can be completed.	• Martinus in consultation and agreement with Inland Rail and ARTC are responsible for determination of final pole and canopy bridge locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for installation of poles and canopy bridges.
	Option 2 • Two minimum 18-metre-high glider poles at the tributary of Eight Mile Creek on either side of the rail corridor in accordance with height recommendations outlined in section 4.1. – Canopy bridge, at least 9.1 metres above the existing rail track (in accordance with the ARTC Fauna Design Guidelines for Inland Rail) is optional.	• Decrease the impact of the railway as a barrier to movement for Squirrel Glider.	• Glider poles should be installed during the final stages of construction following the completion of construction activities within the CIZ that are not compatible with the presence of a glider pole (e.g. Bulk earthworks, access establishment), to avoid damage of the infrastructure and ensure required works within the CIZ can be completed.	
	Option 3 • Two 21-metre-high glider poles on either side of Wagga Road in	• Decrease the impact of Wagga Road and Bily Hughes Bridge as a	• Glider poles should be installed during the final stages of construction	

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
	accordance with height recommendations outlined in section 4.1. – Canopy bridge to existing vegetation recommended. – Canopy bridge, at least 10 metres (to ensure sufficient clearance for highway use) above the existing road formation across Wagga Road optional.	barrier to movement for Squirrel Glider.	following the completion of construction activities within the CIZ that are not compatible with the presence of a glider pole (e.g. Bulk earthworks, access establishment), to avoid damage of the infrastructure and ensure required works within the CIZ can be completed.	
Revegetation	• Soil preparation and initial weed management • Removal of exotic vegetation. • Rehabilitation of areas containing exotic vegetation through native plantings, and revegetation of derived native grassland areas outside the CIZ, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Increase connectivity and provide natural habitat for Squirrel Glider.	• During the construction phase.	• Martinus in consultation and agreement with Inland Rail and ARTC are responsible for determination of final revegetation locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase and as per the Landscape Management Plan including soil preparation and initial weed management.
	• Soil preparation and initial weed management • Revegetation connecting Eight Mile Creek to planted vegetation within the	• Increase connectivity and provide natural habitat for Squirrel Glider.	• Post completion of all works.	• Martinus in consultation and agreement with Inland Rail and ARTC are responsible for determination of final revegetation locations.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
	CIZ, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.			• Inland Rail and ARTC are responsible for any revegetation activities required post construction completion including soil preparation and initial weed management as per the Landscape Management Plan.
	• Soil preparation and initial weed management • Revegetation between existing woodland and proposed glider poles at Wagga Road, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Ensure natural connectivity between glider pole and existing habitat is achieved in the long term to support natural movement.	• During the construction phase.	• Martinus in consultation and agreement with Inland Rail and ARTC are responsible for determination of final revegetation locations. • Martinus are responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus are responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase and as per the Landscape Management Plan including soil preparation and initial weed management.
Floristic enhancement	• Soil preparation and initial weed management	• Enhance food availability and resources for Squirrel Glider.	• During the construction phase.	• Martinus in consultation and agreement with Inland Rail and ARTC are responsible for determination of final revegetation locations.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
	• Understorey plantings of Silver Wattle in areas of existing woodland habitat, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.			• Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase and as per the Landscape Management Plan including soil preparation and initial weed management.
Nest boxes	• Installation of at least 10 Squirrel Glider nest boxes, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Enhance den sites and reduce hollow competition by providing nest boxes suitable for Squirrel Glider.	• Nest boxes should be installed during the final stages of construction to avoid disturbance in woodland areas adjacent to the CIZ during construction.	• Martinus in consultation and agreement with Inland Rail and ARTC are responsible for determination of final nest box locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for installation of nest boxes during the construction phase.
Uranquinty Creek				
Glider poles and canopy bridges	• Three 21-metre-high glider poles connecting Sandy Creek over the Olympic Highway and railway in accordance with height recommendations outlined in section 4.1.	• Decrease the impact of the railway and Olympic Highway as a barrier to movement for Squirrel Glider.	• Glider poles should be installed during the final stages of construction following the completion of construction activities within the CIZ that are not compatible with the	• Martinus in consultation and agreement with Inland Rail and ARTC are responsible for determination of final pole and canopy bridge locations.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
	– Canopy bridge, at least 9.1 metres above the existing rail track (in accordance with the ARTC Fauna Design Guidelines for Inland Rail) and at least 10 metres (to ensure sufficient clearance for highway use) above the existing road formation between poles is optional. – Canopy bridge to existing vegetation recommended.		presence of a glider pole (e.g. Bulk earthworks, access establishment), to avoid damage of the infrastructure and ensure required works within the CIZ can be completed.	• Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for installation of poles and canopy bridges.
Revegetation	• Soil preparation and initial weed management. • Revegetation of Sandy Creek, and the road reserve of the Olympic Highway dissecting Sandy Creek, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Increase connectivity and provide natural habitat for Squirrel Glider.	• During the construction phase.	• Martinus in consultation and agreement with ARTC are responsible for determination of final revegetation locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase and as per the Landscape Management Plan including soil preparation and initial weed management.
Floristic enhancement	• Soil preparation and initial weed management. • Understorey plantings of Silver Wattle in all areas of existing woodland	• Enhance food availability and resources for Squirrel Glider.	• During the construction phase.	• Martinus in consultation and agreement with Inland Rail and ARTC are responsible for determination of final revegetation locations.

Connectivity action	Recommendation	Connectivity benefit	Timing	Responsibility
	habitat, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.			• Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for revegetation activities, including actions outlined in the TARP (Appendix 5) during the construction phase and as per the Landscape Management Plan including soil preparation and initial weed management.
Nest boxes	• Installation of at least 10 Squirrel Glider nest boxes, subject to approval by landholders. • Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy.	• Enhance den sites and reduce hollow competition by providing nest boxes suitable for Squirrel Glider.	• Nest boxes should be installed during the final stages of construction to avoid disturbance in woodland areas adjacent to the CIZ during construction.	• Martinus in consultation and agreement with Inland Rail and ARTC are responsible for determination of final nest box locations. • Martinus is responsible for landholder negotiations and finalisation of landholder agreements on behalf of and in consultation with ARTC. • Martinus is responsible for installation of nest boxes during the construction phase.

4.1 Crossing structures

Martinus, in consultation and agreement with Inland Rail and ARTC, is responsible for final determination of preferred glider poles and canopy bridge locations to be undertaken as part of this FCS. The recommendations below provide options for Martinus, in consultation and agreement with Inland Rail and ARTC, to consider in order to meet the CoA. Following this determination, Martinus on behalf of ARTC will engage landholders to propose connectivity actions and undertake landholder agreements on behalf of ARTC. Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy, to achieve the connectivity goals outlined within the CoA. Landholder agreements must ensure a contractual obligation or similar is included ensuring connectivity actions are not impacted through non-compatible land use activities (such as clearing).

Two key forms of crossing structure have been considered; these are glider poles and canopy bridges. Canopy bridges allow for direct connection of canopy habitat. Glider poles are used as a high point allowing gliders to cross into adjacent patches over smaller distances. Both glider poles and canopy bridges have been found as effective crossing structures for Squirrel Glider, reducing road kills and increasing connectivity (Sloanes, K et al. 2013).

Albury City Council has installed 3, 17-metre-high glider poles in the Albury LGA to support movement over roads. Two of the three poles were recorded in use by Squirrel Glider after one night, the remaining pole was utilised within one month confirming the effectiveness of this method within the LGA (Wraith & Lincoln 2023).

This height was determined as part of the Squirrel Glider Connectivity and Structure Report for Thurgoona and Wirlinga, by the Albury Conservation Company for Albury City Council. Pole height recommendations were provided following an analysis of 19 studies, assessing glide angle and height loss over distance. The literature review found an average glide angle of 28.5 -30^{o}. The assessment determined, at a 29^{o} glide angle the average Squirrel Glider loses 1 metre of height for every 1.85 metres travelled (DM Ecological 2021).

In accordance with the ARTC Fauna Design Guidelines for Inland Rail (ARTC 2022), canopy bridges should be at least 9.1 metres above the railway to account for a double stacked train of 7.1 metres. Canopy bridges above roads should be at least 5 metres to allow clearance for trucks. Research demonstrates that as a component of successful use by Squirrel Glider, rope bridges should be at least 6 metres in height (BL&A 2015). However, this FCS recommends a clearance of 10 metres to ensure sufficient highway access from Wagga Road, and sufficient highway use leading from Uranquinty, where, both Albury and Uranquinty are placed in a rural setting, with regular transportation of large farm machinery. A 10-metre recommendation for rope bridges, if installed, will ensure the current road use would not be impacted.

The following locations are recommended for installation of glider poles and or canopy bridges, these locations are displayed within the Figure 6 map series:

- Uranquinty Creek Yard (Figure 6.2):
  - Crossing structure over the Olympic Highway and railway to connect vegetation along Sandy Creek north and south. Three glider poles at least 21 metres in height, or a canopy bridge at least 10 metres above the road (to ensure sufficient highway use), and at least 9.1 metres above the rail track (in accordance with the ARTC Fauna Design Guidelines for Inland Rail).
- Billy Hughes Bridge (Figure 6.3):

- Option1: Crossing structure over the railway, at Eight Mile Creek, to connect vegetation east and west. Two glider poles at least 21 metres in height, and or a canopy bridge at least 9.1 metres above the rail track (in accordance with the ARTC Fauna Design Guidelines for Inland Rail).
- Option 2: Crossing structure over the railway at the tributary of Eight Mile Creek, to connect vegetation east and west. Two glider poles at least 18 metres in height, and or a canopy bridge at least 9.1 metres above the rail track (in accordance with the ARTC Fauna Design Guidelines for Inland Rail).
- Option 3: Crossing structure over Wagga Road to connect vegetation north and south. Two glider poles at least 20 metres in height, or a canopy bridge at least 10 metres above the road (to ensure sufficient highway access).

Canopy bridges are constructed from two wooden poles with cable lines securing them in adjacent vegetation. A canopy bridge is secured between the two poles. Glider poles are wooden poles, with landing and launching structures (wooden planks or poles).

The following design aspects should be considered:

- Glider poles and/or canopy bridge poles should be placed a safe distance from the road and rail:
  - Canopy bridges should be at least 10 metres above the road (to ensure sufficient highway access and use), and at least 9.1 metres above the rail tracks (in accordance with the ARTC Fauna Design Guidelines for Inland Rail).
- Placement should avoid conflict with service infrastructure including powerlines.
- Poles should be a minimum of 21 metres to ensure glide trajectory avoids collision with trains, and 20 metres to avoid collision with traffic.
- Rope ladder design should be utilised over rope tunnels.
- Predator shields should be placed on the top of glider poles and canopy bridge support poles; these are a metal disk on the top of glider poles and canopy bridges to reduce risk from predatory avian species.
- An appropriate, well-defined access road is required from a public roadway or the rail corridor to allow accessibility of poles by an elevated work platform for inspections and maintenance and to install and maintain cameras or other monitoring equipment.
- A gravel hard stand beneath each pole will enable access during wetter months of the year.
- The cross-arm assemblies should always be nontreated hardwood, and treated poles used to maximise lifespan and reduce the need for replacement.
- The cross-arm/launching pad of glider poles at least 2 metres in length, pointing towards the opposite side of the railway to shorten glide length.
- The glider poles must be rough-sawn and not smoothly sanded, to make it easier for gliders to climb.
- All wood used should be hardwood, treated wood can be used for the glider pole but not the cross-arms/launching pad.
- Glider poles should include an open-ended length of 100-millimetre diameter PCV pipe installed horizontally on the cross-arm/launching pad to provide additional protection from predators.
- Glider poles should be installed during the final stages of construction following the completion of construction activities within the CIZ that are not compatible with the presence of a glider pole (e.g. Bulk earthworks, access establishment), to avoid damage of the infrastructure and ensure required works within the CIZ can be completed.

4.1.1 Billy Hughes Bridge

Three potential glider pole locations have been detailed below and include:

- Eight Mile Creek: Private land, adjacent to the rail corridor.
- Tributary of Eight Mile Creek, Albury City Council (west of rail corridor) and Transport for NSW land (east of rail corridor).
- Wagga Road, road reserve, managed by Albury City Council.

The CoA for the project implies a minimum of at least one glider pole pair should be installed. The CoA do not state all three options below must be implemented. Final determination of pole locations would be finalised by Martinus, in consultation and agreement with Inland Rail and ARTC, and through land holder agreements. All three options provided below would meet the CoA providing connectivity enhancement for the Billy Hughes Bridge study area.

The glide distance between canopy edges over the existing rail at Eight Mile Creek is around 25 to 30 metres, based on the above equation, a gliding Squirrel Glider would lose 16.22 metres in height across 30 metres. A 21-metre pole on either side of the rail corridor is recommended here to ensure a 5-metre clearance corridor for any oncoming trains (ARTC 2022) (Figure 6.3). Access for pole installation, monitoring and maintenance will be required. Access may be required within the rail corridor, where an existing access track outside the rail corridor is not present to the proposed location.

The glide distance between canopy edges over the existing railway at the tributary of Eight Mile Creek in the south of the Billy Hughes Bridge study area is around 17 to 25 metres, based on the above equation, a gliding Squirrel Glider would lose 13.51 metres in height across 25 metres. A minimum 18-metre pole on either side of the rail corridor is recommended here to ensure a 5-metre clearance corridor for any oncoming trains (ARTC 2022) (Figure 6.3). Access for pole installation, monitoring and maintenance will be required. Access may be required within the rail corridor, where an existing access track outside the rail corridor on the eastern side is not present to the proposed location. A small existing track is present on the western side and may provide access outside the rail corridor.

An alternative location for consideration is across Wagga Road. This location poses a greater difficulty, where the current canopy gap across Wagga Road is 70 metres. To ensure a 5-metre collision clearance (assuming the maximum average height of a truck is 4 metres) across the road for a 70-metre gap a gliding pole would need to be around 43 metre high, this is considered unreasonable. The ARTC Fauna Design Guidelines for Inland Rail specify a maximum distance between 20 metre poles should not be more than 37 metres (ARTC 2022). As such, if this location is pursued by Martinus, in consultation and agreement with Inland Rail and ARTC, revegetation or installation of additional poles should be undertaken to decrease this gap, with glider poles placed as close to the road edge as possible, reducing the gliding distance to 30 metres or less, enabling the installation of a 20-metre pole on either side of Wagga Road (Figure 6.3). Although this option is not directly related to the rail corridor, it improves connectivity within the study area. Alongside this, placement of glider poles within the road reserve allows for access for pole installation, monitoring and maintenance.

As revegetation activities are likely to take several years to allow natural movement of Squirrel Glider to the suggested pole locations on Wagga Road, a canopy bridge from the glider poles to the existing canopy is recommended (Figure 6.3).

4.1.2 Uranquinty Creek Yard

One key area for installation of glider poles and/or canopy bridges has been identified connecting Sandy Creek across the Olympic Highway and existing rail corridor. Pole locations are placed within Crown land

(north of the rail corridor), and the road reserve of the Olympic Highway managed by Transport for NSW. An existing access track is present north of the rail corridor on Crown land. Placement of glider poles within the road reserve south of the Olympic Highway allows for access for pole installation, monitoring and maintenance.

The existing gaps between vegetation across the railway and Olympic Highway within the Uranquinty Creek study area are around 20-30 metres. A series of 3, 21-metre-high glider poles are recommended in conjunction with revegetation (Figure 6.2).

As revegetation activities are likely to take several years to allow natural movement of Squirrel Glider to the suggested pole locations adjacent to the Olympic Highway, a canopy bridge from the glider poles to the existing canopy is recommended (Figure 6.2).

4.2 Revegetation and floristic enhancement

Revegetation is a crucial component of restoring and improving connectivity for Squirrel Glider, ensuring natural habitat, food resource and eventually den sites (Korodaj, Winsemius, & Tack 2017). Revegetation for Squirrel Glider within the study area will assist in increasing resources and connectivity (Korodaj, Winsemius, & Tack 2017)in an area with an identified population. Revegetation increases movement, and gene flow of metapopulations, assisting to secure a robust population at a landscape scale (Cameron 2025).

Martinus, in consultation and agreement with Inland Rail and ARTC, is responsible for final determination of preferred revegetation locations, and extent of revegetation to be undertaken as part of this FCS. Following this determination, Martinus on behalf of ARTC will engage landholders to propose revegetation and undertake landholder agreements on behalf of ARTC. Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy, to achieve the connectivity goals outlined within the CoA. Landholder agreements must ensure a contractual obligation or similar is included ensuring connectivity actions such as revegetation are not impacted through non-compatible land use activities (such as clearing).

This investigation identified areas where revegetation should be considered to connect fragmented vegetation. Within the Billy Hughes Bridge study area revegetation should consist of species identified in the adjacent vegetation, consistent with PCT 277 and PCT 5. It is important to note that Martinus on behalf of ARTC has obtained temporary lease of the land surrounding the rail corridor, any revegetation activities would require landholder endorsement and a land holder agreement.

Revegetation is recommended to be considered in areas where exotic vegetation, or derived grassland is located adjacent to the CIZ. Revegetation locations have been recommended for Martinus, in consultation and agreement with Inland Rail and ARTC, to consider for connecting and enhancing existing vegetation. A section of revegetation is recommended following completion of construction within the CIZ at Billy Hughes Bridge to enhance a connectivity pathway inferred to be in use by Squirrel Glider through camera trap records (Figure 6.3). Revegetation, as noted above is an important consideration for connectivity of Squirrel Glider habitat.

This FCS recommends, in order to achieve the connectivity goals outlined within the CoA and UMM BD11, some form of revegetation is undertaken within the Billy Hughes Bridge and Uranquinty Creek Yard study areas. The CoA and BD11 do not impose a minimum requirement for revegetation activities. The Final FCS will be updated to reflect final revegetation and/or floristic enhancement activity locations.

Potential revegetation and floristic enhancement locations proposed include private land, Council land and land managed by Transport for NSW and Council within the road reserve of Wagga Road, the Hume Highway and Olympic Highway.

The existing vegetation supporting Squirrel Glider at both Billy Hughes Bridge and Uranquinty Creek largely consists of established Eucalypts.

Silver Wattle is the only wattle species listed under the NSW BioNet Vegetation Information System (VIS) for both PCT 277 identified at Billy Hughes Bridge, and PCT 5 identified at the Uranquinty Creek Yard site. However, additional wattle species indigenous to the region, and known to occur in other PCTs in the local area such as PCT 278 Riparian Blakley's Red Gum Woodland and PCT 266 White Box Woodlands, have been included.

Floristic enhancement is recommended to provide secondary food sources for Squirrel Glider in the form of Silver Wattle *Acacia dealbata*, Green Wattle *Acacia deanei,* Western Silver Wattle *Acacia decora* and Hickory Wattle *Acacia implexa* midstorey plantings (Figure 6.2 and Figure 6.3).

Martinus is responsible for revegetation and floristic enhancement related activities during the construction phase and in accordance with the Landscape Management Plan. Martinus will consult with ARTC during the development of the Landscape Management Plan and handover period following completion of works, to provide detail surrounding establishment of revegetation activities. ARTC is responsible for all for revegetation and floristic enhancement related activities following completion of construction. All revegetation and floristic enhancement should, as a best practice, ensure a success rate of 80 percent establishment (self-sufficient for water and nutrients). Revegetation and floristic enhancement should include the following steps:

- Soil preparation and weed management.
- Tubestock planting.

4.2.1 Soil preparation

Site preparation is required to develop adequate soil moisture through the soil profile of the site, which is essential for the survival transplanted tube stock. For heavy clay soils or highly compacted areas, deep ripping may be appropriate to enable easier planting and increase water availability at planting time. Ripping should not be conducted near existing trees, shrubs and native grasses and should proceed with caution in cracking clays, sandy or loamy soils, or riparian areas (NSW Biodiversity Conservation Trust 2019, Greening Australia 2017). It is important to ensure ripping is conducted across the contour (to slow water movement downslope) and do not exceed than 20 to 50 centimetres in depth (DEC 2005). Soil preparation (i.e. ripping) should be conducted early in order to minimise soil disturbance, reduce compaction, allow time for weeds to emerge and be controlled and to increase soil moisture as much as possible (Greening Australia 2017).

It is best practice to minimise soil disturbance as much as possible. In more resilient sites that have some native understorey, minimal disturbance will reduce the impacts to the site's existing resilience levels and minimise weed growth that disturbance often triggers. However, some disturbance in resilient sites may be warranted if soil is compacted to a degree that will prevent seedlings establishing, or if the objective of the disturbance is to trigger natural regeneration from seed stored in the site's seedbank (i.e., via the use of fire or crash grazing). In good quality sites, it is advised to use the minimal amount of disturbance possible, followed by adequate maintenance to address any unwanted consequences for the site (OEH 2011).

When it comes time to plant into the site, further small-scale soil preparation with a hand-held mattock may be warranted to remove any weeds that may have emerged since the last weed treatment, and to loosen the

soil to allow the planted tube stock a suitable bed into which they can establish roots. If using hand tools, holes for tube stock should approximate the depth of the plant container but should measure at least twice its width(DEC 2005).

4.2.2 Weed management

All plants are actively competing for resources (space, water, nutrients and light). Techniques to improve survival of tube stock include:

- Removing weeds that will compete with revegetation early, and undertaking multiple rounds of weed control to achieve the best results (Greening Australia 2017).
  - Where possible perform weed control in the 6 months leading up to planting (DEC 2005).
- Weeds should be controlled in an area one metre in diameter around new plants for a period of at least 2 years to help ensure plants are able to establish and be vigorous enough to outcompete weeds(Greening Australia 2017).

There are a wide range of weed control techniques that can be used, from hand pulling, chipping, blanket boom spraying, spot spraying, scalping, mulching, digging prior to planting, weed matting and even crash grazing (OEH 2011, NSW Biodiversity Conservation Trust 2019). The method(s) used will be determined by the site condition and the objectives for the site. Like soil preparation, use the lowest disturbance methods that are able to achieve the weed management goals (NSW Biodiversity Conservation Trust 2019).

For highly strategic revegetation sites, weed mats have provided considerable success in planting projects, especially when planting within tree guards in combination with weed mats. The technique protects the seedlings from browsing, helps to retain critical soil moisture , reduces weed competition and protects the plant from the extremes of weather (DEC 2005).

Prior to planting the following should be considered:

- Application of a broad-spectrum herbicide to kill competitive weed species and to prevent further seed set.
- Conduct an additional herbicide application just before planting takes place (if using a residual herbicide ensure sufficient time and/or rain had occurred prior to planting into the site).
- Follow up with an application of herbicide in autumn (for the region's winter rainfall season) to kill weeds that emerge after the initial spray.
- Herbicide application between 6 and 10 weeks after the autumn spray to control the more opportunistic weeds that have emerged.

Greening Australia (2017) indicate that although it may not always be possible (or appropriate) to meet the above weed control standards leading up to planting, the nearer the site preparation comes to meeting these weed control standards, where applicable, the more successful the revegetation results will be in terms of survival and growth rates.

4.2.3 Tube stock

Two methods are used for revegetation; these are tube stock manual planting and direct seeding. Direct seeding generally involves large volumes of locally or strategically sourced seed, mixed and sown by a mechanical seeding machine, towed either by a tractor or four-wheel drive vehicle (OEH 2011). This method is not recommended for this FCS, as canopy species, such as Eucalypts can be slow to germinate with varied

densities of canopy species germinating. Planting of tube stock ensures a minimum density of canopy and shrub species for connectivity and food availability to support Squirrel Glider.

Provided site preparation and maintenance programs are adequate, tube stock has a greater likelihood of success than the direct seeding technique (NSW Biodiversity Conservation Trust 2019).

The most resilient and successful seedlings are 10-20 centimetres tall, have established root systems but are not root-bound, and have been adequately hardened off in a greenhouse prior to being delivered for planting. This hardening off involves nutrient restriction and exposure to cold temperatures (for at least one month), which increases the plant's resilience to being planted into frosty, dry or hot conditions. This process also toughens the leaves, making them less palatable to browsing animals (Greening Australia 2017). The day prior to planting, it is important to ensure the tube stock get a thorough watering (or soak them in a tray) to maximise the pot moisture and minimise the transplanting shock that the plant will experience (DEC 2005).

Tube stock should be planted carefully into the soil as to ensure the crown of the roots ball is below the surface of the soil. If this is not achieved, it is likely that the plant will dry out and not survive. In some cases it is recommended to bury tube stock well into the soil, burying the lower leaves and stem (NSW Biodiversity Conservation Trust 2019) and in riparian areas burying up to as much as 1/3 the depth of the stem (OEH 2011).

If site access and resources allow, best results are achieved when plants are watered in immediately after being planted. This helps to remove the air pockets around the roots of the plant, which reduces water stress that may otherwise be experienced. However, in instances where watering in is not a feasible option, planting crews need to ensure plants are buried deep enough and that the surrounding soil is gently pressed down, to try to bed in the plants and minimise any air pockets that are a result of the planting process (DEC 2005, OEH 2011).

All planted tube stock should be protected with a tree guard to reduce predation by herbivores.

Recommended revegetation locations are displayed within Figure 6.2 and Figure 6.3 with species and plating distances outlined below in Table 12. Figure 6.2 and Figure 6.3 will be updated with final proposed revegetation locations following finalisation of landholder agreements. Revegetation should be undertaken in a grid, mosaic or line formation.

Table 12 Recommended species for revegetation and floristic enhancement

Structural component	Species	Planting distance
Billy Hughes Bridge		
Canopy	• PCT 277: – Blakley's Red Gum – Yellow Box	• One tubestock every 8-10 metres.
Midstory	• Silver Wattle • Green Wattle • Western Silver Wattle • Hickory Wattle	• One tubestock every 5-8 metres.
Uranquinty Creek Yard		
Canopy	• PCT 277: – Blakley's Red Gum	• One tubestock every 8-10 metres.

Structural component	Species	Planting distance
	– Yellow Box • PCT 5: – River Red Gum	
Midstorey	• Silver Wattle • Green Wattle • Western Silver Wattle • Hickory Wattle	• One tubestock every 5-8 metres.

4.3 Nest boxes

Hollow-bearing trees are a crucial resource for Squirrel Glider. A hollow-bearing tree assessment was undertaken at both the Billy Hughes Creek and Uranquinty Creek Yard study area, with hollows identified that would support Squirrel Glider. These hollows were also observed to likely be in use by Common Brushtail Possum and Common Ring-tailed Possum, as well as birds. An abundance of Common Brushtail Possum was observed at the Uranquinty Creek Yard study area.

Natural hollows can take over 100 years to form, as such, nest boxes are recommended to supplement den and breeding sites for Squirrel Glider. Installation of nest boxes, specific to the preferred dimensions of Squirrel Glider will reduce hollow competition and improve habitat suitability for this species within the study area.

It is important to note that Martinus, on behalf of ARTC, has obtained temporary lease of the land surrounding the rail corridor, any installation of nest boxes would require a land holder agreement. Nest boxes require ongoing management, installation of nest boxes may not be viable on private land due to limitations imposed by the temporary lease held by Martinus on behalf of ARTC.

Nest box locations have been placed within Council owned land, and land managed by Transport for NSW and Council within the road reserve of Wagga Road, the Hume Highway and Olympic Highway.

Martinus, in consultation and agreement with Inland Rail and ARTC, are responsible for final determination of preferred nest box locations to be undertaken as part of this FCS. Following this determination, Martinus on behalf of ARTC will engage landholders to propose nest box installation and ongoing management and undertake landholder agreements on behalf of ARTC. Finalisation of agreements may be obtained following approval of this FCS. In the event that landholders do not approve of nest boxes, consultation should be undertaken with RD NSW DCCEEW to determine if next boxes are required to achieve the connectivity goals outlined within the CoA.

Nest boxes for Squirrel Glider have an entrance hollow diameter of 4 centimetres, include a number of small 5-millimetre drainage holes, have a width of 14-17 centimetres, a depth of 15-20 centimetres and a height of 40-50 centimetres. The top of the nest box should be capable of opening as a 'lid' for maintenance and monitoring.

Habitat Modular Nest Boxes (Habitat Innovation & Management 2026) are recommended over traditional wooden nestboxes. Habitat Modular Nest boxes are thermally stable and designed to mimic natural tree hollows and are more durable than traditional wooden nest boxes. Habitat Modular Nest Boxes can be ordered through https://www.habitatinnovation.com.au/buy-a-nest-box.

Nest boxes should be placed at a minimum of 4 metres from the ground, on the leeward side of a tree away from prevailing weather. Nest boxes should be firmly secured to the tree. It is recommended that a minimum of 10 nest boxes at each site are installed, as outlined in section 3.4, Squirrel Glider have a home range of around 3- 4 hectares, utilising multiple den sites. The addition of 10 nest boxes, with specifications that meet the preferences for Squirrel Glider would support the existing population at Billy Hughes Bridge and reduce hollow competition from Common Brushtail Possum at Uranquinty Creek Yard.

4.4 Monitoring and adaptive management

Monitoring of connectivity activities is required to ensure effectiveness of management activities including:

- Monitoring effectiveness of crossing structures.
- Ensuring establishment and success of revegetation and floristic enhancement.
- Nest box monitoring to confirm use and ensure nest box health.

An adaptive mitigation approach is required to be implemented in accordance with the CoA. This approach involves implementation of mitigation measure that can be adapted if required to ensure effectiveness of connectivity strategies. Adaptive mitigation includes implementation of a Trigger Action Response Plan (TARP) for connectivity actions (Appendix 4).

Monitoring and adaptive management actions are outlined within Appendix 6.

It is important to note that Martinus, on behalf of ARTC, has obtained temporary lease of the land surrounding the rail corridor, any monitoring activities would require endorsement by the landholder through a landholder agreement. Martinus is responsible on behalf of ARTC for finalising landholder agreements prior to the commencement of connectivity actions outlined in this FCS. Finalisation of agreements may be obtained following approval of this FCS. In the event that landowner agreements cannot be obtained alternative connectivity options will be considered and the strategy will be updated to reflect these changes in consultation with ARTC and RD, prior to the finalisation of this strategy. Construction monitoring is required by Martinus once FCS actions / measures are implemented during the construction phase. These actions are summarised below in Table 13 and outlined within Section 4.4.1.

Martinus, on behalf of ARTC is responsible for installation of poles and canopy bridges. Martinus, on behalf of ARTC, is responsible for revegetation activities during the construction phase including soil preparation and initial weed management. Establishment (self-sufficient for water and nutrients) of revegetation and floristic enhancement may not be achievable within the construction period. Martinus will consult with ARTC during the handover period following completion of construction, to provide detail surrounding establishment of revegetation activities.

Martinus is responsible for all monitoring to be undertaken during construction. Martinus will consult with ARTC during the handover period following completion of construction, to provide detail surrounding any existing monitoring activities in place.

Table 13 Squirrel Glider monitoring summary

Action	Monitoring	Number	Location in study area	Study area	Timing and duration	Responsible person	Responsible party
Construction							
General monitoring	Baited camera trap	• Placement of 6 baited traps for 2 weeks in summer, autumn, winter, spring.	• Replication of the pre-established locations outlined in the baseline survey plan (Section 2.3 of the FCS)	• Billy Hughes Bridge • Uranquinty Creek Yard	• From the implementation of connectivity measures outlined in this FCS until completion of construction	• Qualified expert in the target species.	• Martinus is responsible for monitoring until the completion of construction and as per the Landscape Management Plan. • ARTC is responsible for all monitoring following initiation of operational activities.
General monitoring	Stag watching and spotlighting	• 2 nights every season (summer, autumn, winter, spring)	• Replication of the pre-established transects outlined in the baseline survey plan (Section 2.3 of the FCS)	• Billy Hughes Bridge • Uranquinty Creek Yard	• From the implementation of connectivity measures outlines in this FCS until completion of construction	• Qualified expert in the target species or community monitoring led by a suitably qualified individual experienced with Squirrel Glider identification	• Martinus is responsible for monitoring until the completion of construction and as per the Landscape Management Plan. • ARTC is responsible for all monitoring following initiation of operational activities.

4.4.1 Construction Monitoring

In accordance with advice received from New South Wales (NSW) Department of Climate Change, Energy, the Environment and Water (DCCEEW) Regional Delivery Division (RD) ongoing monitoring of Squirrel Glider movement should commence from track possession. This monitoring should continue seasonally to provide statistically population data as a reference point for comparison against results of the operational monitoring following implementation of the FCS. Construction monitoring will commence following the implementation of connectivity measures / actions outlined in the finalised FCS document.

The following monitoring should be undertaken by a qualified expert in the target species during the construction phase once the FCS measures are implemented:

- Placement of 6 baited camera traps in the same locations outlined within the baseline survey plan (Biosis 2025), for 2 weeks in summer, autumn, winter, spring until completion of construction.
- Targeted stag watching, and spotlighting should be undertaken for 2 nights every season (summer, autumn, winter, spring) following the same locations and procedure outlined within the baseline survey plan until completion of construction.

4.4.2 Adaptation of connectivity strategies

The final locations of connectivity actions may require a flexible approach and adaptation during the installation process to allow for site-based conditions. Exact locations of glider poles and canopy bridges will require micro-siting during installation; this would be overseen by a qualified expert in the target species to ensure final locations can be accessed by Squirrel Glider in accordance with the CoA.

Exact boundaries of revegetation, and locations of floristic enhancement may require micro-siting during planting.

Nest box locations may need to be shifted to ensure suitable placement.

Figure 6 Squirrel Glider connectivity activities

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5 Sloanes Froglet Connectivity Strategy

The following methods of connectivity improvement for Sloane's Froglet have been investigated:

- Site remediation to maintain current habitat.
- Enhancement of the existing farm dam.
- Wetland construction (habitat creation) within the Billy Hughes Study area.

Wetland construction cannot be undertaken within the rail corridor to ensure the integrity of the railway and ensure rail access. As part of the project, Martinus, on behalf of ARTC, has obtained temporary lease of land surrounding the rail to undertake construction activities. Through consultation with RD it is noted that large expansive wetlands are not required, wetland construction can be undertaken as small shallow pools, as such, wetland construction is referred to as habitat creation.

Within the Billy Hughes Bridge study area two connectivity strategies were investigated, habitat creation and enhancement of the existing farm dam.

Sloane's Froglet enhancement should be completed in accordance with the Sloane's Froglet Stormwater Wetland Design Guidelines (ACC & OEH 2017). Through consultation with RD, it has been advised that the Sloane's Froglet Stormwater Wetland Design Guidelines are currently undergoing a review and update. Actions to be undertaken as part of this FCS should follow the latest version of the Sloane's Froglet Stormwater Wetland Design Guidelines.

5.1 Site remediation

During construction the mitigation measures outlined in the outlined in the project BDAR (WSP August 2022) should be followed including:

- Temporary frog exclusion fencing will be avoided where possible around construction compounds/laydown areas occur adjacent to potential Sloane's Froglet breeding habitat as it breaks connectivity for dispersal.
- Instream works at Sandy Creek (Uranquinty Yard clearances) and Jeralgambeth Creek (Junee to Illabo clearances) will be undertaken in dry conditions, as far as practicable. Where works cannot be conducted in the dry, appropriate erosion and sediment control would be installed (i.e. a silt curtain or sediment boom around the work area and attached to the same side of the bank to maintain fish passage).
- Appropriate species-specific erosion and sediment control's appropriate for Sloane's Froglet will be installed and maintained.

Following completion of construction, as outlined in the project BDAR (WSP August 2022), aquatic habitat will be returned to pre-works condition (or better) in accordance with the rehabilitation strategy.

This will ensure that the current level of potential habitat (Uranquinty Creek Yard) and identified habitat (Billy Hughes Bridge) present, both native and exotic as described in the BDAR for Sloane's Froglet will be maintained.

5.1.1 Existing habitat enhancement

An existing farm dam is present within the study area. Enhancement of the existing farm dam is unlikely to be considered viable, as this area of the study area is subject to livestock grazing. Extensive works, including fencing off the existing farm dam, with a hardened stock access point created to ensure water access is available for livestock would be required. Enhancement of the existing habitat would be required to be completed in accordance within the Sloane's Froglet Stormwater Wetland Design Guidelines (ACC & OEH 2017). The ongoing management actions outlined to ensure adequate habitat is maintained for Sloane's Froglet would not be viable for the existing landholder and could not occur within the temporary lease held by Martinus.

5.1.2 Wetland construction (habitat creation) and connectivity

Sloane's Froglet is considered unlikely to occur within the Uranquinty Creek Yard study area, and as such, habitat creation is not considered an action that would increase breeding habitat for this species.

Albury City Councilengaged Spiire to work with DPE to produce the Sloane's Froglet Stormwater Wetland Design Guidelines. These guidelines are essential for maintaining meta-populations of Sloane's Froglet in a developing landscape within the Albury LGA.

An assessment of the Billy Hughes study area has determined no areas within the rail corridor would be viable for the habitat creation in accordance with the Sloane's Froglet Stormwater Wetland Design Guidelines.

Potential locations for habitat creation were assessed in the land adjacent to the rail corridor; however, these were deemed unsuitable due to the requirement for ongoing management. An integral part of ensuring habitat creation for Sloane's Froglet continue to provide breeding habitat include ongoing management of water and sediment levels. Martinus has obtained a temporary lease only for these lands and cannot ensure ongoing management of any habitat creation.

Consultation has commenced with RD, and representatives from Martinus, Inland Rail and ARTC regarding creation of Sloane's Froglet habitat to meet the CoA. Inland Rail is pursuing consultation with TfNSW and ACC regarding the potential creation of Sloane's Froglet habitat on land outside of the project area.

Consultation outcomes will be included in an amendment to this FCS and the OMAMP and these amendments are to be prepared by a suitably qualified expert

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Appendices

Appendix 1 Curriculum vitae project leads

"P:\41900s\41964\Data\Project specific CVs\Combined 2025.pdf"

Curriculum vitae

Matt Looby

General Manager Business and Technical Development

Qualifications

- Masters of Natural Resource Management, University of Melbourne
- Bachelor of Applied Science, University of Melbourne
- Diploma of Natural Resource Management
- Advanced Certificate of Natural Resource Management

Other qualifications, training & affiliations

- Vegetation Quality Assessment Accreditation
- General Construction Induction (white card)
- Four Wheel Drive, Driver Training and Recovery
- Rail Industry Worker (RIW) training
- Australasian Inter-Service Incident Management Systems (AIIMS) training
- Preparing & Assessing a Bushfire Management Statement, Planning Institute Australia
- Ecological Consultants Association of Victoria

Professional experience

Matt has 25 years of diverse experience in natural resource management, ecological survey and environmental planning in Victoria and NSW. He has worked across the private and public sectors, and started his career with a strong grounding in land and fire management in the Victorian Alps. Matt has been with industry leader Biosis since 2013.

Matt has led many ecological survey and impact assessment projects, including complex surveys programs in rural and remote locations. Matt has extensive experience working across most environments in Victoria and NSW with specialist skills in alpine regions, the semi-arid inland and floodplain environments. During his time with the Victorian government, he worked in biodiversity protection and regulation giving him a wide breadth of knowledge and experience with environmental approvals across a range of industries. Matt also has extensive experience in renewable and alternative energy environmental approvals having led impact assessments for many large-scale wind, solar and battery energy projects in south-eastern Australia.

Matt brings a highly organised and analytical approach to his work priding himself on professionalism, innovation and a talent for problem solving. His strong grasp of ecology, practical land management and environmental approvals provides a rare skill-set that can be applied to ecological assessments, land and water use planning projects.

Key project experience

Project Director

Wilan Wind Farm, NSW

NSW South West Renewable Energy Zone biodiversity impact assessments and technical reporting for project Environmental Impact Statement (EIS).

Project Manager / Lead Ecologist

Winton and Glenrowan Solar Farms, Vic

Ecological impact assessment and planning permit preparation for large-scale solar facilities in north-east Victoria. Post-approvals management plan preparation and implementation.

Project Director

Warburton Mountain Bike Destination, Vic

Warburton Mountain Bike Destination project EES biodiversity technical studies and expert witness for 180 km trail network. Ongoing post-approvals compliance and project construction environmental management advisor.

Project Director

Nimmie-Caira (Gayini) Water Modification Project, NSW

Long-term detailed ecological studies and environmental reporting for water delivery across 85,000 hectare landholding on the Murrumbidgee River. Preparation and coordination of specialist studies for a Review of Environmental Factors (REF) for infrastructure modifications.

Project Manager / Lead Ecologist

Kosciuszko National Park Scorecards monitoring, NSW

Project establishment and data collection for long-term environmental monitoring plots through remote alpine regions in the Kosciuszko National Park

Project Director

Silverton Wind Farm, NSW

Post-approvals management plan preparation and implementation for an operational windfarm site near Broken Hill in NSW.

Project Manager / Lead Ecologist

Limondale, Hay and Hillston Solar Farm, NSW

NSW South West Renewable Energy Zone biodiversity impact assessments and technical reporting for project Environmental Impact Statement (EIS) for three large-scale solar farms.

Project Director

Omeo Mountain Bike Trail Complex, Vic

Omeo MTB Complex masterplan and environmental approvals for 120 km trail network. Ongoing post-approvals compliance and project construction environmental management advisor.

Project Manager / Lead Ecologist

Toorale Environmental Water Delivery Project, NSW

Preparation of ecological values assessment for the project business case and ongoing monitoring of post-works environmental recovery along the Warrego and Darling Rivers in NSW to support improved water flows and habitat restoration.

Project Manager / Lead Ecologist

Eagle Chairlift replacement, Falls Creek, Vic

Ecological impact assessment and planning permit preparation for lift replacement in sensitive alpine environment. Environmental supervision of project works and compliance monitoring and reporting.

Curriculum vitae

Bret Stewart

Senior Zoologist, Technical Lead - Zoology

Qualifications

- Bachelor of Science, Evolution and Ecology, University of California Davis
- NSW BAM Assessor BAAS22033

Other qualifications and training

- Provide First Aid (HLTAID003 and -002)
- General Construction Induction (white card)
- Four Wheel Drive, Driver Training and Recovery
- Apply Risk Management Processes – RIIRIS301D
- Communicate information – RIICOM301D
- Contribute to Workplace Incident Response – BSBWHS416
- WaterNSW Declared Catchment Induction

Professional experience

Bret's core interest is herpetology, which led to early involvement in herpetofauna surveys with university researchers while he was a junior high school student in the United States. Bret worked as a research assistant at University of California Davis which led to field studies in the Top End of Australia. Bret went on to work for the University of Canberra as a field biologist conducting research on river turtles in the Northern Territory. He has led field teams and completed field work for academic studies in landscape ecology, nesting ecology, and animal behavior. Bret co-authored research that was published in the journal Animal Behavior and featured in the BBC series Life in Cold Blood, for which Bret was a production assistant.

Bret began work as an ecological consultant in 2008, undertaking impact assessment, targeted surveys and fauna management in Western Australia, the Northern Territory, Queensland, and most recently in New South Wales. Bret's consulting work in NSW includes impact assessment and in-depth ecological studies, which has included detailed assessments of threatened fauna species post-bushfire and development of overarching management plans for large biodiversity offset areas. Bret is able to apply a sound understanding of local legislation, impact assessment, and flora and fauna management within NSW, together with a diverse background in ecological survey and research.

Bret has over 17 years' experience finding, capturing, and handling fauna, including 13 years' experience spotlighting and trapping Squirrel Glider. Bret has 8 years' experience identifying Squirrel Glider from camera trap imagery. Additional to his experience above, Bret has led and worked on wildlife connectivity projects, his recent experience includes leading the preparation of a Wildlife Connectivity Strategy for a confidential major road upgrade in NSW.

Key project experience

Senior Ecologist/Project Manager

Baseline flora and fauna monitoring of Ngambaa Nature Reserve for NSW National Parks and Wildlife Service

Baseline flora and fauna monitoring within a planned 3,000 ha feral predator-free area. Project tasks included pitfall and box trapping, bird census, spotlighting, active searches for fauna, and vegetation plot surveys prior to the construction of predator-proof fencing, as well as production of a baseline survey report to NPWS.

Senior Ecologist/Project Manager

Confidential TfNSW Wildlife Connectivity Strategy

Project manager, lead zoologist, technical advice, preparation and delivery of a Wildlife Connectivity Strategy for a major road upgrade.

Senior Ecologist/Project Manager

Tweed Coast Road haul road BDAR for Gales Kingscliff Pty Ltd

BAM plots, targeted survey for Wallum Froglet, Green-thighed Frog, Common Planigale, Koala, Mitchell's Rainforest Snail

Senior Ecologist/Project Manager

1881 Tullimbar BDAR for Dahua Group Pty Ltd

BAM plots, fauna habitat surveys, BDAR and vegetation management plan report production.

Senior Ecologist/Project Manager

Biodiversity Offsets acquisition for Whitehaven Coal Ltd

Bundaleer Offset Biodiversity Stewardship Site Assessment Report. For Whitehaven Coal Ltd

Senior Ecologist/Project Manager

Biodiversity Offsets Flora and Fauna Monitoring for Whitehaven Coal Ltd

Quarterly weed monitoring,

Senior Ecologist/Project Manager

Flora and Fauna Targeted Surveys for TfNSW Picton Road Upgrade Program

Surveys for Koala, Greater Glider, New Holland Mouse, Eastern Bristlebird, Eastern Ground Parrot, Broad-headed Snake, Giant Dragonfly, and other threatened species

Senior Ecologist

Fauna Monitoring for Wollongong Coal Ltd

Annual monitoring of Giant Burrowing Frog and Littlejohn's Tree Frog,

Key publications

Doody, J.S., **Stewart, B**., Camacho C., and Christian, K. (2012) Good vibrations? Sibling embryos expedite hatching in a turtle. Animal Behaviour 83:3.
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Curriculum vitae

Dimity Webster

Senior Ecologist – Major Projects (NSW)

Qualifications

- Bachelor of Science (Zoology) (Ecology & Conservation), James Cook University
- NSW BAM Assessor BAAS23038

Other qualifications and training

- Provide First Aid (HTLAID011)
- General Construction Induction (white card)
- Conservation Skills Centre Certificate
- Rail Industry Worker Card
- Assessing the Rail Corridor TLISS00103 (TLIF2080 & TLIF0020)
- RMS Workers on Foot
- Writing Clear Science – How to be an Efficient Writer
- River Academy:
  - Introduction to Scientific Communication
  - River Restoration, Form & Function.
- Nationally Recognised 4WD Operation Course
- Nationally recognised Basic Wildfire Awareness (VIC)
- Introduction to Australian Wildlife (WIRES)
- Ethical leadership (University of Technology Sydney UTS) Nationally Recognised Operate a Side by Side (NSW DPI Tocal Collage)
- Fire Ecology (Open Learn)
- Stewardship landholder training unit (BCT)
- UrbanShift City Academy:
  - Green and Thriving Neighbourhoods
  - Nature Based Solutions

Professional experience

Dimity is a 2015 graduate from James Cook University, Townsville, QLD, where she completed a Bachelor of Science with a double major Zoology, Ecology & Conservation. With over 9 years' professional experience in the environmental industry Dimity has worked in an extensive array of environments, industry and ecological assessments across QLD, NSW and VIC. Dimity joined Biosis in April 2023.

Throughout her career, Dimity has gained strong experience working on connectivity and conservation strategies including the Project Energy Connect Nest Box Installation Plan, Albury City Natural Areas Management Strategy, Axedale Solar Habitat Management Plan and Albury Revegetation Plan alongside revegetation for numerous projects. Dimity is a BAM Accredited Assessor with over 5 years' experience applying the BAM.

Dimity has over 12 years' experience undertaking spotlighting, and camera trap surveys for arboreal mammals, where additional to her professional career, she undertook targeted surveys from 2013 – 2015 during her studies at JCU in Townsville as part of research projects in northern QLD. Dimity has over 8 years' experience undertaking targeted surveys for Squirrel Glider.

Dimity has led large- and small-scale ecological assessments in the NSW Riverina and Western NSW. Dimity's project experience includes mountain bike trails, fire trail upgrades, Local Government Area natural area management plans, revegetation, landscape and connectivity plans, State Significant Developments, wind and solar farms, mining (excluding coal), rail upgrades, special activation precincts, residential subdivisions, site assessment, water infrastructure, forestry surveys, and both minor and major road infrastructure upgrades.

Key project experience

Senior Ecologist

Conservation/ Albury Natural Areas Management Strategy

Project tasks included habitat identification for threatened species, including Squirrel Glider, extensive weed and vegetation mapping throughout the Albury LGA, stratification of management strategies including revegetation and nest box management.

Senior Ecologist

Conservation/ Albury Revegetation Plan

Project tasks included update and finalisation of the Albury revegetation Plan for the Albury Local Government Area to assess previous revegetation efforts, and co-ordinate and plan future revegetation and maintenance requirements.

Senior Ecologist/Project Manager

Regional Growth / Thurgoona – Wirlinga Precinct Structure Plan

Project tasks included project management, stakeholder and department engagement, co-ordination and leading of field assessments in accordance with the BAM including vegetation integrity and targeted fauna assessment. Lead author for the preparation of a constraints hierarchy and detailed biodiversity assessment.

Senior Ecologist

Rail/ Narrabri to North Star BDAR

Project tasks included amending the project BDAR to address department comments during the Response to Submissions Phase and consultation with the NSW DCCEEW

Senior Ecologist/ Project Manager

Conservation and Compliance/ Axedale Solar Farm

Project manager and lead author on the preparation of a habitat management plan to meet compliance actions associated with the project including habitat restoration and enhancement.

Senior Ecologist/Project Manager

Water Infrastructure / Werai Regulator Upgrades

Project manager and technical lead on the preparation of a Part 5 Biodiversity Assessment for terrestrial and aquatic ecology in a Ramsar wetland.

Key publications

Webster, C. Massaro, M. Michael, **D. Bambrick**, D. Riley, J. Nimmo, D (2018). Native reptiles alter their foraging in the presence of the olfactory cues of invasive mammalian predators. Royal Society of Open Science 5180136180136http://doi.org/10.1098/rsos.180136

Appendix 2 Baseline Survey Plan

"P:\41900s\41964\Report\01. Survey plan\41964.Survey.Plan.A2I.FIN01.20250429.pdf"

Albury to Illabo

Fauna connectivity: Survey plan

FINAL REPORT

Prepared for Martinus Rail Pty Ltd

29 April 2025

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Document control

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Final version 01	Matt Looby	29/04/2025

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Biosis gratefully acknowledges the contributions of the following people and organisations in preparing this report:

- Martinus: Simon Fisher, Chris Standing, Anirudh Khatri
- Australian Commonwealth Department of Climate Change, Energy, the Environment and Water for access to the Protected Matters Search Tool of the Australian Government.
- NSW Department of Climate Change, Energy, the Environment and Water for access to the BioNet Atlas of NSW Wildlife.
- RD CPHR: Renee Shepherd, Andrew Fisher, Leigh Maloney. Matt Cameron
- Albury City Council: Matt Lincoln

Biosis staff involved in this project were:

- Matt Looby (project director, quality assurance, technical lead)
- Dimity Webster (project manager, lead author)

Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work.

We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.

Contents

Figures

Definitions

BC Act	*Biodiversity Conservation Act 2016*
CSSI	Critical State Significant Infrastructure
Cth DCCEEW	Australian Commonwealth Department of Climate Change, Energy, the Environment and Water
FCS	Fauna Connectivity Strategy
LAMP	Land Area Management Plan
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
RD	Regional Delivery Division (formerly Biodiversity Conservation Science Directorate (BCS)

1 Introduction

1.1 Project background

Biosis understands that Matinus Rail Pty Ltd is proposing to upgrade roughly 185 kilometres of rail between Albury and Illabo as part of the Inland Rail Project. These works will include enhancements to:

- Rail tracks
- Footbridges and road bridges
- Overhead structures
- Signal structures
- Level crossings.

In particular the scope of works requires a qualified ecologist to prepare a number of plans in accordance with Critical State Significant Infrastructure (CSSI) approval dated 8 October 2024. Specific requirements of the CoA and UMM that are applicable to fauna connectivity on the project are proposed to be addressed through field investigations and reporting but will be subject to consultation with the New South Wales (NSW) Department of Climate Change, Environment and Water (DCCEEW) Regional Delivery Division (RD) (formerly Biodiversity Conservation Science Directorate [BCS]).

The following conditions are to be addressed as part of this scope of work:

D13 *-Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek* – Biosis' scope will involve preparation of the plan/program (excluding implementation).

E29 - *Before construction at Billy Hughes Bridge and Uranquinty Creek, a suitably qualified expert, in consultation with NSW DCCEEW, must determine and provide evidence of existing fauna movement corridors, pathways, and connectivity for the Squirrel Glider, including analysis of existing studies or baseline monitoring* – Biosis' scope will include background review of approvals technical studies, consultation with RD and fauna habitat field studies at these two specific locations.

E30 – *Fauna connectivity design in accordance with Guidelines* – Biosis' scope will involve desktop advice on design and options, and consultation with RD at the specific locations.

E31 - *The Proponent must prepare and implement a Fauna Connectivity Strategy for the Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek before commencing work that could impact these species. The strategy must detail existing corridors, justify connectivity measures, align with guidelines, demonstrate effectiveness, include mapping and maintenance plans, and incorporate the Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program.* - Biosis's scope will include preparation (but not implementation) of a Fauna Connectivity Strategy for the Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek.

E32 - *A qualified expert in the targeted species must prepare the Fauna Connectivity Strategy in consultation with RD, DPI Fisheries, and with approval from the Planning Secretary* – Biosis' scope will involve discussions with RD and responding to their review of the plan.

We also understand the following specific mitigation measures from the Updated Mitigation Measures document may apply to the scope of work:

BD2 - *During detailed design, provision of one glider pole on each side of the rail corridor will be further investigated to enhance habitat connection between patches of remnant vegetation for squirrel glider at the Billy Hughes bridge enhancement study area.*

BD 3 - *A project connectivity strategy will be prepared and implemented with reference to the Fauna Design Guidelines for the Inland Rail Project (2022) to consider further enhancements, including beyond the proposal study area.*

BD11 - *Mitigation measures will be implemented to address impacts on habitat connectivity for squirrel gliders. This would include the addition of connectivity structures (i.e., glider poles, canopy bridges) and vegetation rehabilitation. The final locations of connectivity structures and enhancement measures will be developed as part of post approval Flora and Fauna Management Plan. Potential indicative locations for implementation of glider poles include Sandy Creek, Eight Mile Creek/Billy Hughes Bridge, Oddies Creek and Murray River Bridge. Canopy bridges may also be used as an alternative measure particularly where gaps in vegetation are larger such as Reedy Creek. Final locations for fauna connectivity measures will account for the height of remaining trees, gap between trees and the gliding angle of squirrel gliders to enable successful corridor movements.*

In summary, the Fauna Connectivity Strategy will be prepared as outlined below:

- Review of current relevant documentation.
- Review of existing biodiversity and ecological data to identify critical habitat and corridors.
- Undertake ecological field surveys at Uranquinty Creek and Billy Hughes Bridge to address the requirements of BD 11. This will include targeted surveys for Squirrel Glider at these locations only. Additional study areas requiring survey after consultation with RD, and subject to the nature of project impacts on surrounding habitat, would be subject to a revised scope and proposal.
- Map critical movement corridors for terrestrial and aquatic species at the two specific study areas.
- Consultation with relevant authorities (especially RD).
- Develop a Fauna Connectivity Strategy plan (FCS) and Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program.

1.2 Scope of assessment

Targeted surveys in accordance with relevant NSW guidelines for both Squirrel Glider and Sloane's Froglet are required to inform the preparation of an Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek study areas.

This report outlines Biosis' proposed survey plan for Squirrel Glider at both the Billy Hughes Bridge and Uranquinty Creek study areas. Sloane's Froglet surveys have previously been completed by a separate service provider and are not part of Biosis' scope.

1.3 Location of the study areas

The two study areas occur between Albury and Wagga Wagga (Figure 1). The Billy Hughes Bridge study area is located in Albury, NSW. Billy Hughes Bridge refers to the bridge that crosses above the railway as part of Wagga Road. The Billy Hughes Bridge study area is located west of the Hume Freeway, directly below Wagga Road and south of Davey Road (Figure 2). The Uranquinty Creek study area is located in Uranquinty, NSW. Sandy Creek runs north-south through the study area. The study area runs parallel to the Olympic Highway leading into the township of Uranquinty (Figure 2).

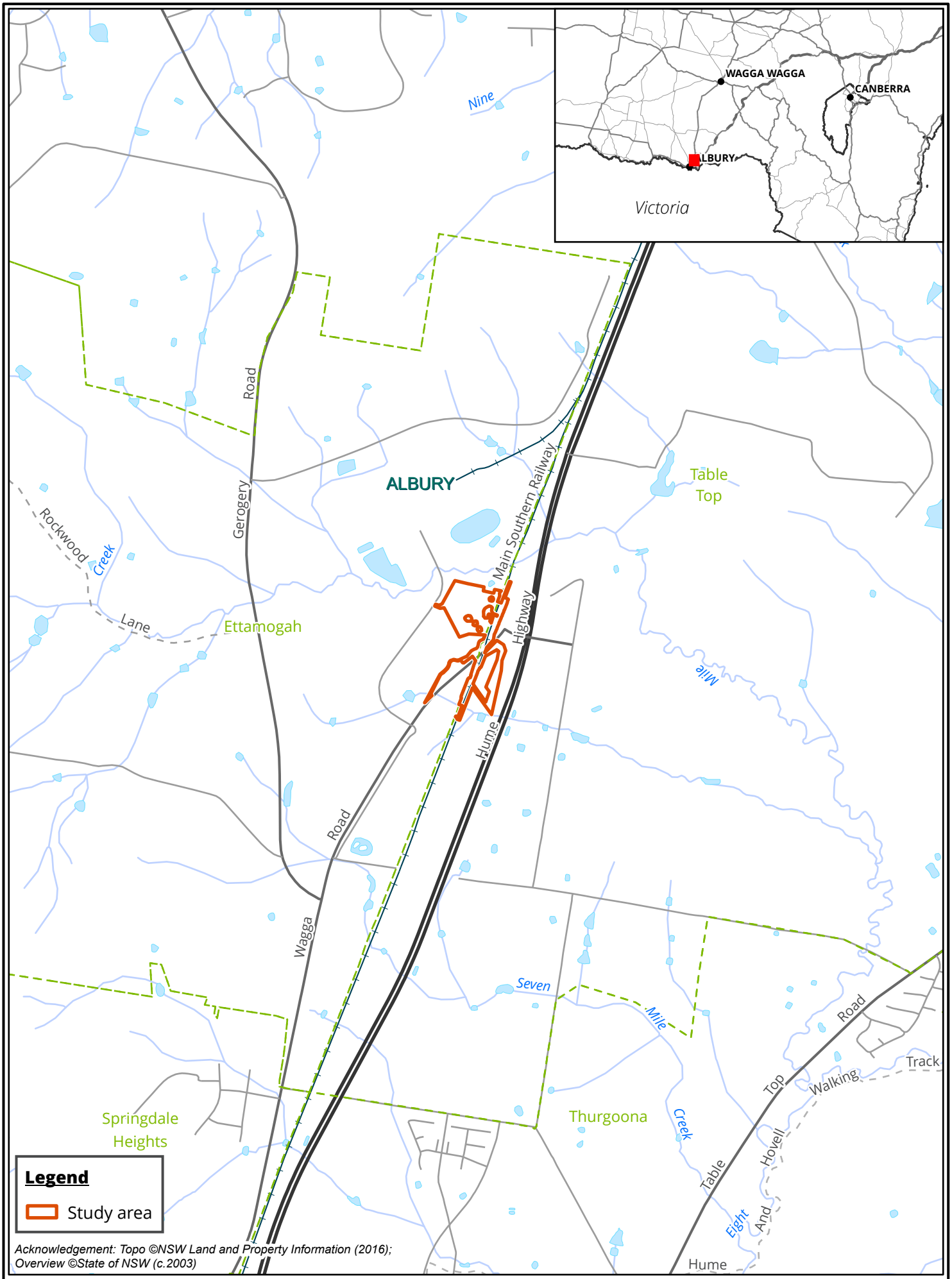

Figure 1.1 Location of the study area

Matter: 41964, Date: 26 March 2025,
Prepared for: DW, Prepared by: OW, Last edited by: owilliams
Location: P:\41900s\41964\Mapping\
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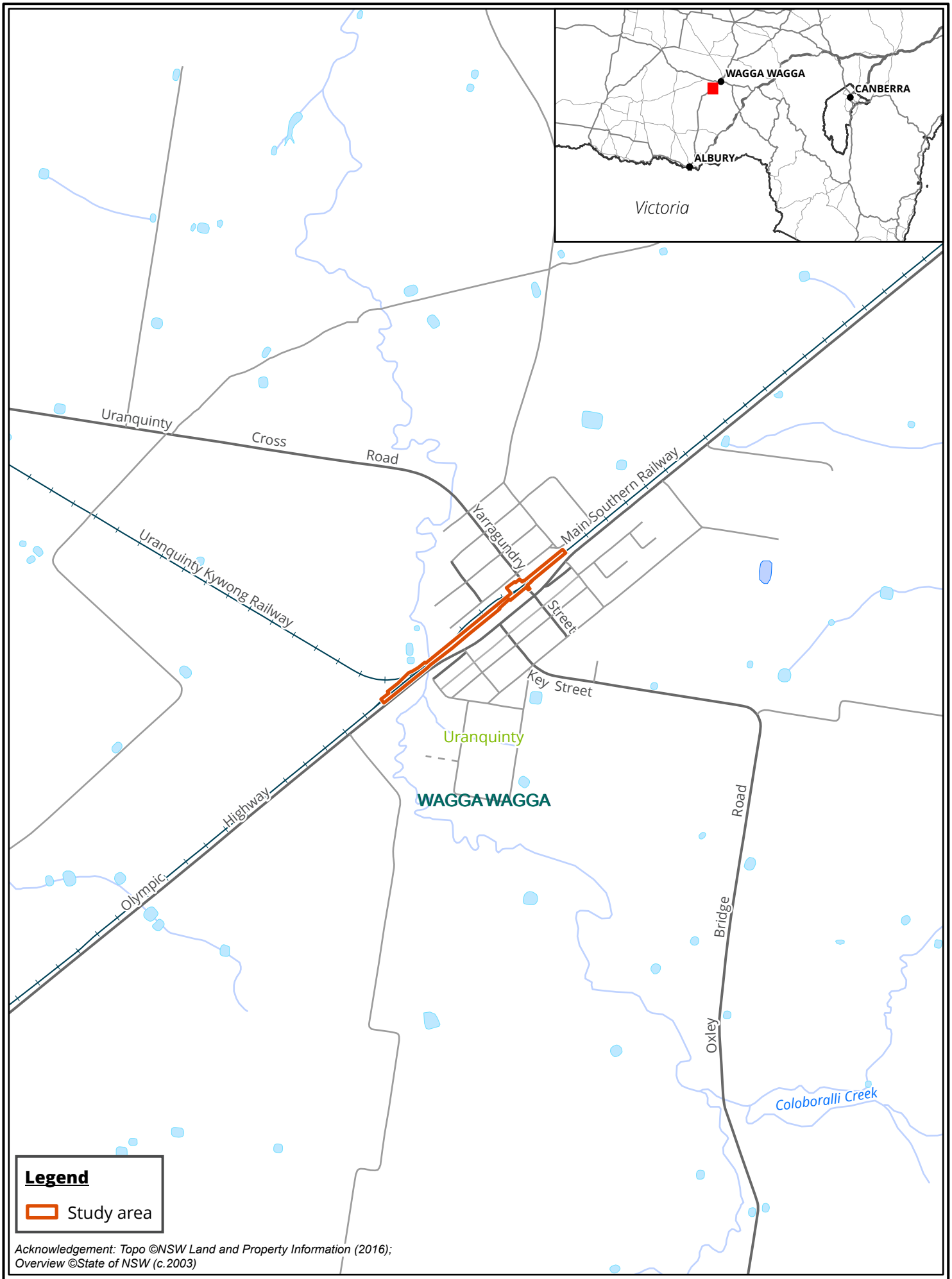
Layout: 00-FJ-C04_G

Scale 1:25,000@ A4, GDA2020 MGA Zone 55



Acknowledgement: Topo ©NSW Land and Property Information (2016); Overview ©State of NSW (c.2003)

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Figure 1.2 Location of the study area

Matter: 41964, Date: 26 March 2025,
Prepared for: DW, Prepared by: OW, Last edited by: owilliams
Location: P:\41900s\41964\Mapping\
41964_Albury_Ilabo_Fauna_Connectivity
Layout: 00-FJ-Quality_C

0 250 500 750 1,000
Metres
Scale 1:25,000@ A4, GDA2020 MGA Zone 55

N

Legend

- Study area
- Lot

Figure 2.1 Study area detail

0 50 100 150 200

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

N

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Matter: 41964, Date: 26 March 2025,
Prepared for: DW, Prepared by: OW, Last edited by: owilliams
Location: P:\41900s\41964\Mapping\
41964_Albury_Ilabo_Fauna_Connectivity,
Layout: 41964_F2_StudyArea

Figure 2.2 Study area detail

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Matter: 41964, Date: 26 March 2025,
Prepared for: DW, Prepared by: OW, Last edited by: owilliams
Location: P:\41900s\41964\Mapping\
41964_Albury_Ilabo_Fauna_Connectivity,
Layout: 41964_F2_StudyArea

2 Proposed methods

2.1 Approach

Our proposed approach is described below, and proposed survey locations and methods are displayed within Figure 3.

2.1.1 Background research

Following consultation with RD (Appendix 1), local studies from the Thurgoona/Wirlinga area in Albury were reviewed to estimate population density in surrounding connected habitat and to inform the method and survey effort. The following resources, recommended by RD were reviewed:

- Squirrel Glider Monitoring Program – Thurgoona/Wirlinga (NSW) (DM Ecological 2019).
- Population Viability Analysis for Squirrel Gliders in the Thurgoona and Albury Ranges of NSW (Stewart, S & van der Ree, R 2009).
- The conservation of arboreal marsupials in the Albury-Wodonga region of south-eastern Australia (Michael, D, Niedra, S, & McWhinney, D 2020).
- NSW BioNet Atlas (NSW DCCEEW 2025).

Squirrel Glider has been recorded within the study area of the Davey Huges Bridge, in both 2020 and 2024. Surveys within Albury (NSW DCCEEW 2025), and records from the NSW BioNet Atlas alongside local survey efforts (DM Ecological 2019) show the core population area for this species is centralised within Thurgoona and Wirlinga. However, there are isolated records north, east, south and west of the study area. Records are also located both east and west of the Hume Freeway along Eight Mile Creek.

Local surveys within Albury focusing on the Thurgoona Wirlinga area indicated a decline in species detection from 2018 to 2019 (DM Ecological 2019) (Michael, D, Niedra, S, & McWhinney, D 2020), with less individuals recorded outside the core population area. Presence of Squirrel Glider was strongly linked to the availability of hollows (Michael, D, Niedra, S, & McWhinney, D 2020).

Population viability assessment over 100 years has been assessed by other authors (Stewart, S & van der Ree, R 2009). This research found the core population area is likely to persists within the next 100 years, however a slow decline was determined likely to occur due to isolated populations going extinct from lack of connectivity. Connectivity within the landscape was found to improve population survivability and distribution over the next 100 years. However, noting, '*that the Hume Freeway could be draining animals from the central portion of the region of interest and therefore enabling more pathways to the Hume Freeway could cause even more of the study area to be drained of individuals*' (Stewart, S & van der Ree, R 2009). We assume this draining of animals refers to road kill events as animal attempt to cross the freeway.

Consultation was sought from Matt Lincoln of Albury City Council regarding the Strategic Plan for Squirrel Glider Connectivity 24 April 2025 with a response received 28 April 2025 (refer to Appendix 1). Matt Lincoln noted the study area was outside the area research as part of the Strategic Plan for Squirrel Glider Connectivity, however, the railway and Hume Freeway were identified as likely barriers to movement of Squirrel Glider.

Further information has been requested from Matt Cameron of NSW DCCEEW RD regarding the approach used for improving local connectivity through the Burrumbuttock Squirrel Glider Local Area Management Plan (LAMP). This information will be assessed once received and incorporated into the FCS.

2.1.2 Initial consultation and field investigation

Initial consultation was undertaken on 28 March 2025 with the NSW DCCEEW RD. The draft Survey Plan was submitted for review, with comments received 16 April 2025. The results of the consultation have been included within this final survey plan. Additional advice was also provided in the RD response, regarding steps to be considered as part of the fauna connectivity strategy. Additional advice was received from Matt Lincoln of Albury City Council regarding the Albury City's Strategic Plan for Squirrel Glider Connectivity. Refer to Appendix 1

Biosis proposes to undertake an initial field investigation prior to targeted Squirrel Glider surveys at Billy Hughes Bridge and Uranquinty Creek. This will include areas north, south, east and west of the study area. The survey effort is displayed within Figure 3 and will involve the following tasks:

- Verify vegetation mapping of the study area (Billy Hughes Bridge and Uranquinty Creek) to help determine appropriate plant species for rehabilitation.
- Determine existing fauna movement corridors, pathways and connectivity at Billy Hughes Bridge and Uranquinty Creek.
- Map areas of fauna habitat and ecological values and areas requiring management (e.g., hollow / habitat trees, dense understorey and/or sub-canopy tree patches, threatened species presence, waterways, areas for mitigation measures during construction) at Billy Hughes Bridge and Uranquinty Creek.
- Initial on ground truthing and surveys will take place to assess the areas of mapped movement corridors, pathways and connectivity for the Squirrel Glider at Billy Hughes Bridge and Uranquinty Creek. This will be achieved through assessing height of trees, density of vegetation to move through, distance between patches of suitable vegetation (e.g., gliding distances) and to confirm the movement corridors.
- Assessment of locations for suitable glider poles on either side of the tracks at Billy Hughes Bridge and Uranquinty Creek will be initially mapped with distances and heights required being informed by the vegetation present on site and the results of survey effort. These will be refined post targeted surveys.
- Assessment of locations for suitable revegetation activities within the scope of the survey area.
- Determination of suitable locations to place camera traps, spotlighting transects and stag watching locations for the targeted surveys described below.

2.1.3 Targeted Squirrel Glider survey effort

Biosis proposes to undertake camera trapping, stag watching and spotlighting for Squirrel Glider at the works locations. All surveys will be completed in accordance with *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities working draft* (DEC 2004).

All personnel undertaking camera trap placement, data analysis and spotlighting surveys will be experienced in survey and identification for Squirrel Gliders.

Where appropriate, ongoing monitoring and survey effort will be proposed as part of the FCS and Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program as recommended by RD.

Camera trapping

Biosis proposes to place 6 baited camera traps per site (Figure 3). As part of the Uranquinty Creek study area, camera traps are proposed to be placed upstream and downstream of Sandy Creek. As part of the Billy Hughes Bridge study area, 2 camera traps are proposed to be placed along Eight Mile Creek, 2 along the unnamed watercourse and 2 within the study area.

Camera traps are proposed to be placed in areas that will assist in determining movement or lack of movement of these species within the study areas.

The following survey methods will be undertaken:

- Camera traps will placed on an auxiliary branch/ limb facing a target area on the main trunk or another branch/ limb with significant surface area. A baited canister will be installed on the tree trunk with small holes and capped at either end, to limit bait theft by other species. The bait and attractant will be replaced/refreshed after 2 weeks. The baited canister will be a standardised size so that measurements of gliders captured on camera can be reviewed and compared to differentiate species.
- Camera traps will left in place for a minimum of 4 weeks. Following collection, all camera trap images will be analysed by a qualified zoologist to identify all species captured. If species differentiation between Squirrel Glider and similar species cannot be reliably confirmed via a captured photo, a precautionary approach should be adopted, and it should be assumed that the species is Squirrel Glider.

Stag watching and spotlighting

As part of the initial field investigation, all hollow bearing trees suitable to support this species will be identified and marked with a GPS. Prior to the commencement of spotlighting, stag watching of suitable hollows will be completed. Stag watching will be completed for 30 minutes at dusk, starting after sunset. Stag watching will take place at one stag per night for two nights prior to commencement of the spotlighting transect(s) each night.

Spotlighting transects will be completed via walked transects covering all areas of suitable habitat adjacent to, and within (excluding the rail corridor), both study areas. Spotlighting cannot be completed within the rail corridor, where white and red lights use is not permissible. Spotlighting will be completed for two hours, with two ecologists (each with a spotlight) over two nights (i.e. eight survey hours per site). Survey transects will cover at least 1 kilometre in length for each study area (Figure 3).

All survey effort will be subject to achieving safe land access arrangements.

2.1.4 Permits and licences

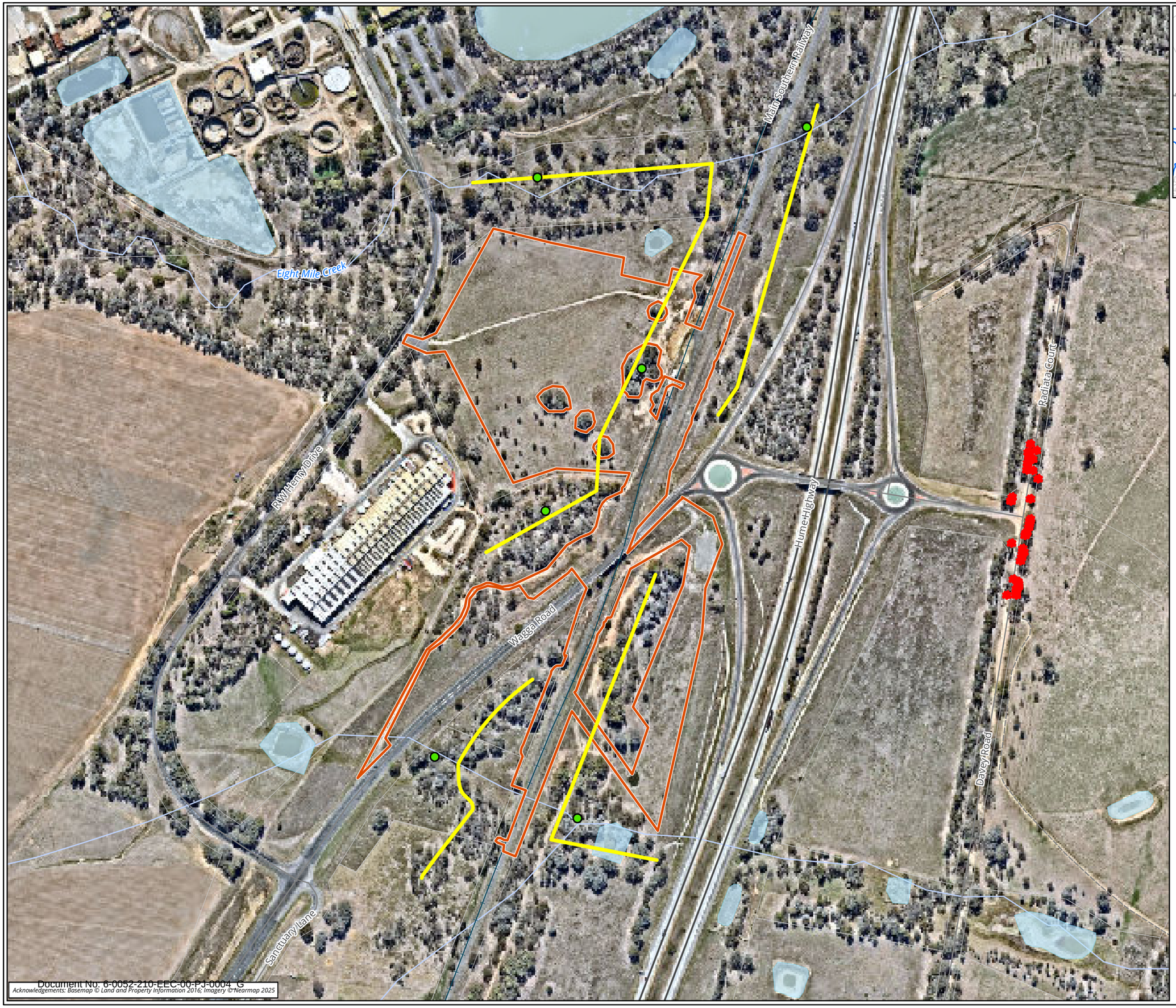
The surveys will be conducted under the terms of Biosis' Scientific Licence issued by the NSW DCCEEW under the *Biodiversity Conservation Act 2016* (BC Act) (SL100758, expiry date 30 June 2026). Fauna survey will be conducted under Animal Research Authority 17/892 from the NSW Secretary's Animal Care and Ethics Committee (expiry date 31 January 2026).

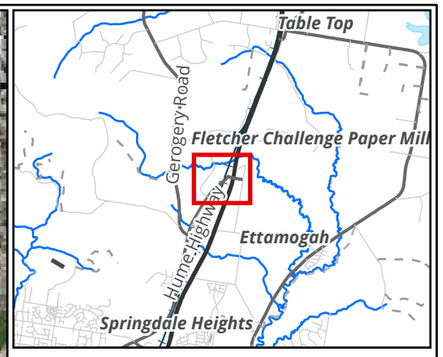
Survey timing

Survey timing will be subject to confirmation with Martinus regarding their construction program. Squirrel Glider have no documented seasonal limitations for surveys under the Threatened Biodiversity Data Collection (TBDC).

Survey effort for this species, as advised by RD is recommended to be complete during Spring and Summer, however, the survey method is constrained by development timeframes and as such, the survey effort will be completed during Autumn and Winter 2025.

The spotlighting survey effort is recommended to be repeated 3 times over 3 weeks to allow for the provision of meaningful data within the proposed survey locations. This will ensure, alongside the placement of cameras a high detectability rate, despite the survey effort completion during Autumn and Winter.





Legend

- Study area
- Lot
- Hollow-bearing tree
- Proposed camera trap placement
- Proposed spotlighting transects

Figure 3.1 Survey plan

0 50 100 150 200

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

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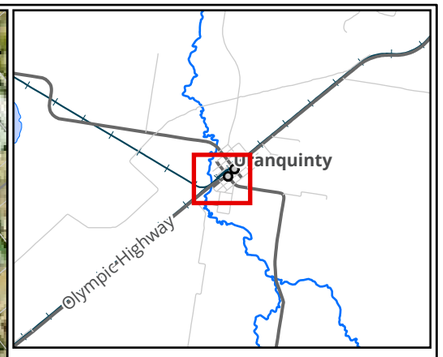
Matter: 41964, Date: 24 April 2025,
Prepared for: DW, Prepared by: OW, Last edited by: owilliams
Location: P:\41900s\41964\Mapping\
41964_Albury_Ilabo_Fauna_Connectivity,
Layout: 41964_F3_SurveyPlan



Legend

- Study area
- Lot
- Proposed camera trap placement
- Proposed spotlighting transects

Figure 3.2 Survey plan

0 50 100 150 200

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

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Location: P:\41900s\41964\Mapping\
41964_Albury_Ilabo_Fauna_Connectivity,
Layout: 41964_F3_SurveyPlan

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DM Ecological 2019. *Squirrel Glider Monitoring Program Thurgoona / Wirlinga (NSW) Autumn 2019 Report*, Albury Conservation Company.

Michael, D, Niedra, S, & McWhinney, D 2020. *The conservation of arboreal marsupials in the Albury-Wodonga region of south-eastern Australia*, Ecological Society of Australia.

NSW DCCEEW 2025. *BioNet the website for the Atlas of NSW Wildlife*, *BioNet, New South Wales Department of Climate Change, Energy, the Environment and Water*, https://atlas.bionet.nsw.gov.au/.

Stewart, S & van der Ree, R 2009. *Population Viability Analysis for Squirrel Gliders in the Thurgoona and Albury Ranges Region of New South Wales*, Australian Research Centre for Urban Ecology, Albury Conservation Company.

Appendix 3 Fauna results

Appendix 3.1. Fauna recorded at the Billy Hughes Bridge study area

Table 14 Fauna recorded at Billy Hughes Bridge

Scientific Name	Common Name	EPBC Act status	NSW status
Birds			
Artamus cyanopterus cyanopterus	Dusky Woodswallow		vu
Colluricincla harmonica	Grey Shrike-thrush		
Dacelo novaeguineae	Laughing Kookaburra		
Hieraaetus morphnoides	Little Eagle		vu
Anthochaera carunculata	Red Wattlebird		
Ninox novaeseelandiae	Southern Boobook		
Mammals			
Trichosurus vulpecula	Common Brushtail Possum		
Pseudocheirus peregrinus	Common Ringtail Possum		
Macropus giganteus	Eastern Grey Kangaroo		
Vulpes vulpes	Fox		
Pteropus poliocephalus	Grey-headed Flying-fox	VU	VU
Rattus sp.	Rat		
Petaurus norfolcensis	Squirrel Glider		VU
Wallabia bicolor	Swamp Wallaby		
Antechinus flavipes	Yellow-footed Antechinus		

Appendix 3.2. Fauna recorded at the Uranquinty Creek study area

Table 15 Fauna recorded at Billy Hughes Bridge

Scientific Name	Common Name	EPBC Act status	NSW status
Birds			
Gymnorhina tibicen	Australian Magpie		
Artamus cyanopterus cyanopterus	Dusky Woodswallow		VU
Colluricincla harmonica	Grey Shrike-thrush		
Dacelo novaeguineae	Laughing Kookaburra		
Grallina cyanoleuca	Magpie-lark		
Cracticus nigrogularis	Pied Butcherbird		
Anthochaera carunculata	Red Wattlebird		
Ninox novaeseelandiae	Southern Boobook		
Podargus strigoides	Tawny Frogmouth		
Mammals			
Trichosurus vulpecula	Common Brushtail Possum		
Petaurus norfolcensis	Squirrel Glider		VU
Petaurus breviceps\norfolcensis	Sugar\Squirrel Glider		
Wallabia bicolor	Swamp Wallaby		

Appendix 4 Local nurseries and glider poles resources

The NSW Biodiversity Conservation Trust (2019) suggest land managers develop relationships with local nurseries that specialise in native plant seed collection and propagation. It is important to ascertain where seed has been sourced for revegetation seedlings. Ideally land managers should be involved in that provenance and seed-sourcing process, through the provision of locally sourced seeds (from AlburyCity land where appropriate) to their growing nurseries. Specialist seed collectors are available to help with seed collection, but in many cases, nurseries will provide the seed collecting services (DEC 2005). AlburyCity currently uses a small list of local nurseys that use local collected seed for propagation, primarily these are:

- Our Native Garden – Wodonga
  www.ournativegarden.com.au
  PH: 0418 579 331
- Jayfields Nursery – Pulletop/Howlong
  www.jayfieldsnursery.com
  PH: 02 6036 7235
- Sandy Creek Trees Nursery – Alans Flat
  www.sandycreektrees.com.au
  PH: 02 6027 1497
- Park Lane – Wangaratta
  www.parklanenursery.com.au
  PH: 0357216955
- Ecological Enhancement Services – Albury (small scale work)
  Ecological Enhancement Services – Environmental planning and sales (ecoenhancement.com.au)
- Native Seed Supply and Direct Seeding: Murray Local Land Services
  https://www.lls.nsw.gov.au/regions/murray
  1300 795 299

GPE High Voltage design and construct glider poles and fauna crossings. These structures include large poles and can include rope ladder bridges to provide safe aerial passage for fauna to commute over barriers to movement.

- GPE Albury Office, https://www.gpe.com.au/electrical-services/high-voltage/fauna-crossings
  (02) 6049 3900

Appendix 5 Squirrel Glider construction TARP

Trigger	Action	Response	Timeframe	Responsibility
Tubestock watering TARP - Construction				
< 5 mm rainfall received within 24 hours of planting	• Manual watering of plants	• Fill all air gaps and ensure saturation of soil once tubestock is planted • Detail actions undertaken in annual monitoring report.	• 0 days – 1 day	• Martinus
< 5 mm rainfall received within last 48 hours	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 1 days – 1 week	• Martinus
< 5 mm rainfall received in last 3 days	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 1 week – 2 weeks	• Martinus
< 5mm rainfall received in last 7 days	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 2 weeks – 3 months	• Martinus
< 10 mm rainfall received in last 4 weeks	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 3 months – 1 year	• Martinus until completion of construction. • ARTC is responsible for ensuring establishment of vegetation if not achieved during the construction phase. ARTC is responsible for revegetation activities following initiation of operational activities. Refer to the OMAMP Appendix 6
< 100 mm rainfall received in last 3 months	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 1 year – 5 years (or until established [until established (self-sufficient for water and nutrients]) OR until construction is complete and responsibility of establishment is handed over to ARTC. Refer to the OMAMP Appendix 6.	

Appendix 6 Operational Monitoring and Adaptive Mitigation Program

"P:\41900s\41964\Report\03. FCS\10.FIN1.1\41964.Operational Monitoring and Adaptive Mitigation Program.FIN01.20260326.pdf"

Albury to Illabo

Squirrel Glider and Sloane's Froglet Fauna Operational Monitoring and Adaptive Mitigation Program

FINAL REPORT

Prepared for Martinus

26 March 2026

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- Matt Looby (project director, quality assurance)
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Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work. We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.

Contents

Tables

Definitions

CoA	Conditions of Approval
CSSI	Critical State Significant Infrastructure
NSW DCCEEW	New South Wales Department of Climate Change, Energy, the Environment and Water
FCS	Fauna Connectivity Strategy
NSW	New South Wales
OMAMP	Operational Monitoring and Adaptive Mitigation Program
RD	Regional Delivery Division
Severe weather event	A severe weather event is defined as: • 50 millimetres or greater rainfall event over a period of 24 hours or less • Winds in excess of 100 kilometres per hour. • Unplanned fire within the area
TARP	Trigger Action Response Plan

1 Introduction

1.1 Project background and scope of assessment

Biosis Pty Ltd was commissioned by Martinus to prepare a Fauna Connectivity Strategy (FCS) for Squirrel Glider and Sloane's Froglet for the Albury to Illabo section of the Albury to Parkes Critical State Significant Infrastructure (CSSI) approval (SSI-10055) dated 8 October 2024 rail upgrade (the project). The FCS is focused on two key sites identified as part of the Conditions of Approval (CoA D13, E29 and E31) (refer to section 1.2 of the FCS, these are the Billy Hughes Bridge site in Albury, and the Uranquinty Creek Yard site in Uranquinty, New South Wales (NSW).

As part of the CoA an 'Operational Fauna Connectivity Monitoring and Adaptive Mitigation Program for Squirrel Glider and Sloane's Froglet at Billy Hughes Bridge and Uranquinty Creek'.

Monitoring and maintenance activities have not been outlined for Sloane's Froglet, pending provision of further direction from RD regarding an approach to achieve the connectivity goals outlined within the CoA as part of the FCS. Consultation outcomes would be included and addressed within this OMAMP in collaboration with Inland Rail and ARTC.

It is important to outline that ARTC is subject to monitoring and maintenance within the scope of the temporary lease held over surrounding land adjacent to the rail corridor. Monitoring and maintenance actions outlined below are subject to endorsement by landholders and land managers through a landholder agreement as part of the FCS. Martinus, on behalf of ARTC, as part of the FCS, will engage landholders to outline monitoring and maintenance requirements, including detail of monitoring and maintenance responsibility, as part of the landholder agreements on behalf of ARTC. This OMAMP will be updated to include finalised details of landholder agreements as part of the Final FCS.

1.2 Objectives

The key objective of this document is to outline monitoring and reporting requirements associated with ensuring the effectiveness of connectivity actions outlined in the overarching FCS.

Additional to the above, the following connectivity objectives are outlined:

- Monitoring of connectivity structures to ensure their long-term effectiveness in accordance with the CoA.
- Maintenance of connectivity structures to ensure their effectiveness for the life of the project in accordance with the CoA.
- Reporting and analysis of gathered data to inform this OMAMP and the adaptive mitigation process.

2 Monitoring and maintenance

2.1 Squirrel Glider

Monitoring and maintenance are an essential component to ensuring the effectiveness of connectivity activities. All monitoring and maintenance outlined in this OMAMP is to occur following the completion of construction. The following monitoring actions are recommended:

- Annual photo point monitoring for 5 years, or until established (i.e. self-sufficient for water and nutrients):
  - Recommended photo point locations are outlined within Figure 6 of the FCS. These locations are recommendations and can be modified by a suitably qualified expert if required. The placement of the recommended locations would allow for accurate photographic representation of the overall success of the revegetation and floristic enhancement.
  - Photo point locations should numbered/labelled and established with a star picket, with an identification tag of the photo point number attached to the star picket.
  - Photo point should be taken from around 1.2 metres in height.
  - Four photos should be taken, facing north, east, south and west.
  - Photos should be taken at the same time each year with a preference for spring (September – November).
- Annual nest box monitoring to check on nest box condition and record signs of use / occupation (e.g. chew mark, scat or pellets below nest box, presence of nesting material inside nest boxes or presence of Squirrel Glider/fauna).
- Seasonal monitoring for Squirrel Glider use of crossing structures.
- Seasonal monitoring to record ongoing population data for Squirrel Glider within the study areas.
- Annual monitoring report is required in accordance with CoA, to summarise outcomes and progress of connectivity activities undertaken following completion of actions outlined in the FCS, and results of Squirrel Glider monitoring.

The following management actions are recommended:

- Watering of planted flora species until established (self-sufficient for water and nutrients).
- Nest box management, including assessing for presence of ants, wasps, introduced bird species or European Honeybees and ensuring nest box health (i.e. the nest box is functioning as intended and has not been damaged).
- Weed and grazing management for rabbits and macropods in revegetation zones until established (self-sufficient for water and nutrients).

These recommendations are outlined below and summarised within Table 1.

Table 1 Squirrel Glider monitoring summary

Action	Monitoring	Number and Location in study area	Study area	Timing and duration	Responsible person	Responsible party
Operation						
Crossing structures	Non-baited camera trap	• Placement of 1 non-baited camera trap on 1 launch point on each pole (glider pole or rope bridge pole) • Camera trap batteries and SD cards should be replaced every 2 months or, the camera trap should have a solar connection and photo transmission capabilities	• Billy Hughes Bridge • Uranquinty Creek Yard	• From the completion of construction for 12 months	• Suitably qualified ecologist	• Inland Rail in consultation and agreement with ARTC
Crossing structures	Non-baited camera trap	• Placement of 1 non-baited camera trap on 1 launch point on each pole (glider pole or rope bridge pole) • Camera trap batteries and SD cards should be replaced every 2 months or, the camera trap should have a solar connection and photo transmission capabilities	• Billy Hughes Bridge • Uranquinty Creek Yard	• After the initial 12-month period, bi-annual trap placement for 4 weeks in Autumn, and 4 weeks in Spring for 4 years or, the camera trap should have a solar connection and photo transmission capabilities. • Monitoring for the first 5 years following installation, if Squirrel Glider is confirmed in use of structure, monitoring past 5 years is not required. Refer to Section 3.1	• Suitably qualified expert	• Inland Rail in consultation and agreement with ARTC
Crossing structures and nest boxes	Following severe weather event	• In accordance with CoA D13 (c) a visual inspection of fauna connectivity structures following a severe weather event and/or record of fauna mortality is required.	• All installed glider poles, canopy bridges and nest boxes	• Following a severe weather event.	• Suitably qualified expert, or experienced ARTC personnel	• Inland Rail in consultation and agreement with ARTC

Action	Monitoring	Number and Location in study area	Study area	Timing and duration	Responsible person	Responsible party
Revegetation and floristic enhancement	Photo point	• Establishment of at least two photo points at Uranquinty Creek Yard and at least three photos points at Billy Hughes Bridge centralised in revegetation areas (refer to Figure 6 of the FCS). • Establishment of at least two photo points at Uranquinty Creek Yard and at least 3 photos points at Billy Hughes Bridge centralised in floristic enhancement areas (refer to Figure 6 of the FCS).	• Billy Hughes Bridge • Uranquinty Creek Yard	• 1 series of photographs taken facing north, east, south and west annually until establishment of vegetation (self-sufficient for nutrients and water)	• Suitably qualified expert, or ARTC personnel	• Inland Rail in consultation and agreement with ARTC
Nest boxes	Monitoring for signs of use	• All nest boxes	• Billy Hughes Bridge • Uranquinty Creek Yard	• Bi-annually in Autumn and Spring for the first 5 years from installation	• Suitably qualified expert or community monitoring led by a suitably qualified individual capable of positive Squirrel Glider identification	• Inland Rail in consultation and agreement with ARTC

Action	Monitoring	Number and Location in study area	Study area	Timing and duration	Responsible person	Responsible party
General monitoring	Stag watching and spotlighting	• 2 nights • Replication of the pre-established transects outlined in the baseline survey plan (Section 2.3 of the FCS)	• Billy Hughes Bridge • Uranquinty Creek Yard	• Autumn and spring for 5 years from the onset of revegetation activities	• Inland Rail in consultation and agreement with ARTC	• Inland Rail in consultation and agreement with ARTC

Table 2 Squirrel Glider maintenance summary

Action	Monitoring	Number and Location in study area	Study area	Timing and duration	Task to be undertaken by?	Responsible party
Operation						
Crossing structure maintenance inspection	Inspection of crossing structures	• All crossing structures and associated features	• Billy Hughes Bridge • Uranquinty Creek Yard	• Annual inspection for 5 years from the completion of construction. • Following completion of initial 5-year monitoring, an inspection will be completed every 5 years for the life of the project. • In accordance with CoA D13 an inspection is required following severe weather events.	• Suitably qualified or experienced individual.	• Inland Rail in consultation and agreement with ARTC
Revegetation and floristic enhancement establishment	Watering of planted tube stock and tree guard inspection	• All planted tube stock within the revegetation and floristic enhancement areas	• Billy Hughes Bridge • Uranquinty Creek Yard	• In accordance with the timeframes outlined within the TARP (Appendix 1)	• Suitably qualified or experienced individual.	• Inland Rail in consultation and agreement with ARTC
Nest box maintenance inspection	Inspection of nest boxes	• All nest boxes	• Billy Hughes Bridge • Uranquinty Creek Yard	• Annual inspection for 5 years following from the completion of construction. • Following completion of initial 5-year monitoring, an inspection will be completed every 5 years for the life of the project. • In accordance with CoA D13 an inspection is required following severe weather events.	• Suitably qualified expert or community monitoring led by a suitably experienced individual.	• Inland Rail in consultation and agreement with ARTC

2.1.1 Operational monitoring

Operational monitoring will commence with the commencement of operations following completion of construction. Operational monitoring should include consideration of community involvement, such as community monitoring events led by a suitably qualified expert or experienced individuals. Inland rail in consultation and agreement with ARTC is responsible for engaging a suitably qualified expert or experienced individuals to undertake operational monitoring. Consultation should be undertaken with existing community groups such as the Albury Conservation Company, that lead community biodiversity survey events.

Crossing structures

Following the implementation of crossing structures monitoring is required to ensure effectiveness of placement and provide statistical data to monitor use.

The following monitoring is recommended and should be undertaken by a suitably qualified expert, for the Billy Hughes Bridge and Uranquinty Creek Yard study areas:

- A non-baited camera trap should be placed on one 'launch pad' for each pole installed from the completion of construction is recommended:
  - Camera traps should be left in place for 12 months following completion of construction.
  - Camera trap batteries and SD cards should be replaced every two months, or the camera trap should have a solar connection and photo transmission capabilities (such as the Swift Enduro 4G Camera Trap) to avoid the requirement of SD card and battery changes.
- After a 12-month period, biannual monitoring should occur, with a non-baited camera trap placed on one 'launch pad' for each pole installed, for four weeks in Autumn and four weeks in Spring for four years to align with the establishment of revegetation plantings. Alternatively, a solar connected camera and photo transmissible capable camera trap could be installed to allow for permanent placement and remote download of data:
  - This monitoring will occur for at least five years following completion of construction.
  - Data will be reviewed and analysed progressively as it is collected bi-annually to determine if adaptive mitigation measures are required.
  - After the five-year period, all data will be analysed to confirm the effectiveness of the connectivity structure and this OMAMP will be updated to determine if no further monitoring is required.
  - In the event Squirrel Glider has not been recorded utilising the structure, a suitably qualified expert must undertake an assessment to determine if further monitoring is required, or if additional connectivity actions are required to improve the effectiveness of the installed features and encourage use by Squirrel Glider.

Revegetation and floristic enhancement

It is recommended that vegetation monitoring is undertaken annually from planting through to establishment of planted species, generally five years or when planted individuals are self-sufficient for water and nutrients.

All revegetation and floristic enhancement should, as a best practice ensure a success rate of 80 percent establishment (self-sufficient for water and nutrients).

A photo point will be established within each revegetation zone and restoration area, with an image taken facing north, east, south and west from the photo point. Each photo point should be marked with a star

picket to ensure accuracy of location photos. Photo point establishment and monitoring can be undertaken by a suitably qualified expert or ARTC personnel.

Photo point monitoring is a simple and effective method to visually monitor change over time. Photo points will provide a visual representation of revegetation success that can be displayed in a table or similar as part of the annual monitoring report.

The revegetation and floristic enhancement proposed is not considered to require statistical analysis (such as the Biodiversity Assessment Method Vegetation Integrity Plots) of vegetation integrity to monitor change over time, where revegetation proposed is focused on planting of shrub and canopy species relevant to connectivity and foraging of Squirrel Glider.

Monitoring is not required following establishment (self-sufficient for water and nutrients) of revegetation activities.

Nest boxes

Monitoring for signs of nest box use, alongside presence of Squirrel Glider should be completed. Squirrel Gliders are known to be discouraged from nest box use if regular disturbance through monitoring occurs, as such, monitoring should occur twice yearly in Autumn and Spring for the first five years from installation. A success rate of 80 percent use should be achieved as a best practice.

A non-invasive nest box inspection camera should be used over physical listing of the nest box lid. Any signs of use should be recorded, including chew mark, scat or pellets below nest box, presence of nesting material inside nest boxes. Any fauna present within the nest box should be identified and recorded.

Nest box monitoring can be undertaken by a suitably qualified expert or through community monitoring led by a suitably qualified individual experienced in Squirrel Glider identification

A visual inspection of fauna connectivity structures following a severe weather event and/or record of fauna mortality must occur in accordance with CoA D13.

General monitoring

In accordance with advice received from RD ongoing monitoring of Squirrel Glider movement should be undertaken following implementation of connectivity actions. This monitoring should continue seasonally to provide statistically population data as a reference point for comparison against results of the operational monitoring following implementation of the FCS.

The following monitoring during the operational phase is recommended for the Billy Hughes Bridge and Uranquinty Creek Yard study areas:

- Targeted stag watching, and spotlighting should be undertaken for two nights in Autumn and Spring following the same locations and procedure outlined within the baseline survey plan (Biosis 2025) for five years or until revegetation plantings are established (self-sufficient for water and nutrients).
- This survey effort can be undertaken by a by a suitably qualified expert or community monitoring led by a suitably qualified individual capable of positive Squirrel Glider identification.

2.1.2 Maintenance

Crossing structures

Glider poles and/or rope bridges have the potential to require maintenance. Regular monitoring is required to ensure the integrity and effectiveness of the structures for the life of the project to ensure obligations under the CoA are maintained.

An inspection will be completed annually for the first five years from installation. Following this, an inspection must be completed at least every five years the life of the project. In accordance with CoA D13, an inspection must be undertaken following severe weather events.

The inspection can be undertaken by a suitably qualified or experienced individual to ensure:

- The pole is in good condition and not showing any signs of decay.
- Launching points are in good condition and not showing any signs of decay.
- Rope bridges are in good condition and not showing any signs of decay
- Launching points, and the predator disk and rope bridges are firmly secured.

The inspection would be completed with the use of an elevated work platform scissor lift or similar.

A trigger action response plan (TARP) is recommended, with an example template outlined in Appendix 1.

Revegetation and floristic enhancement

A TARP is recommended ensuring establishment (self-sufficient for water and nutrients) of flora species, generally for the first five years. A TARP template based on water management and planting success has been provided within Appendix 1.

Maintenance is not required following establishment (self-sufficient for water and nutrients) of revegetation activities.

Nest boxes

A TARP is recommended for ensuring nest boxes are maintained and functional. Without management, nest boxes are known to fail, with common issues including dislodgement from trees, invasion by ants, Indian Myna or European Honeybee, general wear and damage from storms (Leck J & Knight A 2022).

Nest box failure rates are high without adequate management and monitoring (Lindenmayer et al. 2017). A TARP is recommended for the life of the project to ensure the installed artificial structures are capable of providing habitat as intended. A template TARP for nest box management is provided within Appendix 1.

Nest box maintenance inspections will be completed annually for the first five years from installation. Following this, an inspection must be completed at least every five years the life of the project. In accordance with CoA D13, an inspection must be undertaken following severe weather events.

2.1.3 Reporting

Reporting is required to record and detail actions undertaken, outline success of actions and provide recommendations or additional actions if required. Reporting should be undertaken by a suitably qualified expert or environmental specialist. The following reports are recommended:

- Interim results memo – Construction:
  - A memo should be prepared every three months and include:
    - Results of the previous two months of camera trap survey.
    - Results of the previous two rounds of stag watching and spotlighting.
    - Analysis of Squirrel Glider Presence against baseline survey results.
- Annual operational monitoring and maintenance report (year 1 [commencing from completion of construction] to year 10 in accordance with CoA D13) including:
  - Detail of all connectivity actions undertaken.
  - Results of all monitoring undertaken, including analysis of Squirrel Glider presence against baseline survey results.
  - Results of all maintenance undertaken.
  - Assessment of effectiveness of actions, with recommendations provided to ensure adaptive management approach is undertaken.

In accordance with CoA D13 the results of the monitoring must be provided in an annual report and submitted to the Planning Secretary, to the NSW DCCEEW, and the relevant Council(s).

2.2 Sloane's Froglet

Consultation has commenced with RD, and representatives from Martinus, Inland Rail and ARTC regarding creation of Sloane's Froglet habitat. Inland Rail is pursuing consultation with TfNSW and ACC regarding the potential creation of Sloane's Froglet habitat on land outside of the project area.

Consultation outcomes will be included in an amendment to the FCS, with monitoring and maintenance requirements to be outlined within this OMAMP, where relevant, to be prepared by a suitably qualified expert.

3 Adaptive mitigation

To maintain relevance and effectiveness, this OMAMP will require review and amendment throughout the implementation of mitigation measures, and until the completion of monitoring. This OMAMP will be reviewed and updated as required in consultation with ARTC and Inland Rail, annually or after any key outcomes or findings.

Regular monitoring and maintenance of connectivity structures is an essential component of successful implementation of this OMAMP and is required to inform the adaptive mitigation management process to provide flexibility in the management of these measures. The adaptive mitigation approach will allow for data produced from monitoring, maintenance and reporting to be analysed by a suitably qualified expert against the projects objectives and recommend corrective measures if required.

A summary of the mitigation measures outlined as relevant to this assessment are located within Table 1 of the FCS. The following additional mitigation measures will be implemented:

- Micro-siting of pole locations for glider poles and canopy bridges should be undertaken to ensure safety of road users and compliance for rail safety.
- Ongoing consultation should be undertaken with RD throughout the construction and operational monitoring and maintenance periods.

3.1 Data analysis and adaptation of monitoring and maintenance

This plan includes monitoring and maintenance that will produce data to be analysed and incorporated into interim result memos and an annual operational monitoring and maintenance report.

The suitably qualified expert will ensure adequate data management.

All data must be supplied to ARTC following completion of data collection activities.

The results of targeted survey, and monitoring data for Squirrel Glider must be analysed by a suitably qualified expert against the objectives of this plan to inform ongoing monitoring requirements. An adaptive approach is required to ensure this plan remains effective and relevant to the conditions of the study area, as such, a suitably qualified expert must review all actions outlined in this plan against analysed data and make recommendations if required for any changes considered required in consultation with Inland Rail, ARTC and RD.

Monitoring for Squirrel Glider use of glider poles and/or canopy bridges will occur for the first 5 years following installation. Following this period, a suitably qualified expert must review all data confirming Squirrel Glider has been recorded utilising the installed structures. In the event Squirrel Glider has not been recorded utilising the structure, a suitably qualified expert must undertake an assessment to determine if further monitoring is required, or if additional connectivity actions are required to improve the effectiveness of the installed features and encourage use by Squirrel Glider.

Monitoring for Squirrel Glider use of next boxes should occur twice yearly in Autumn and Spring for the first five years from installation. Ongoing maintenance is required for nest boxes to ensure their long-term effectiveness in providing den sites for Squirrel Glider. In the event Squirrel Glider has not been recorded utilising a nest box, a suitably qualified expert must undertake an assessment to determine if further monitoring is required, or if additional connectivity actions are required to improve the effectiveness of the

installed features and encourage use by Squirrel Glider. A success rate of 80% use should be achieved. Nest box 'use' by a Squirrel Glider is use as a den site, or for breeding.

Monitoring and maintenance of revegetation activities is required to ensure an 80% success rate is achieved as a best practice. The monitoring data will determine when 80% of the revegetation has reached establishment (self-sufficient for water and nutrients).

3.2 Consultation and reporting

Ongoing consultation with ARTC, Inland Rail and RD is required throughout the implementation of this plan. Adaptation of this plan should include consultation with Inland Rail and ARTC. If Inland Rail in consultation and agreement with ARTC determine adaption of the plan is required, consultation with RD will occur at the direction of ARTC.

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Appendices

Appendix 1 Squirrel Glider TARP operation

Trigger	Action	Response	Timeframe	Responsibility
Crossing structure TARP				
Glider pole or rope bridge pole is showing signs of decay	Immediate actions taken to remove faulty structure	• Undertake assessment to determine why decay has happened. • Replace the existing structure. • Detail actions undertaken in annual monitoring report.	• Faulty pole to be removed as soon as possible to ensure safety of railway and road users, and to ensure injury does not occur to Squirrel Glider. • Pole replacement to be commissioned and installed as soon as reasonably capable.	• Inland Rail in consultation and agreement with ARTC
Launching platform showing signs of decay	Immediate actions taken to remove decayed wood.	• Undertake assessment to determine why decay has happened. • Replace the existing platform. • Detail actions undertaken in annual monitoring report.	• Faulty platform to be removed as soon as possible to ensure safety of railway and road users, and to ensure injury does not occur to Squirrel Glider. • Platform replacement to be commissioned and installed as soon as reasonably capable.	• Inland Rail in consultation and agreement with ARTC
Rope bridge showing signs of decay	Immediate actions taken to remove decaying rope.	• Undertake assessment to determine why decay has happened. • Replace the existing rope bridge. • Detail actions undertaken in annual monitoring report.	• Faulty rope bridge to be removed as soon as possible to ensure safety of railway and road users, and to ensure injury does not occur to Squirrel Glider. • Rope bridge replacement to be commissioned and installed as	• Inland Rail in consultation and agreement with ARTC

Trigger	Action	Response	Timeframe	Responsibility
			soon as reasonably capable.	
Predator disk, launching platforms or rope bridge not firmly secured	Re-secure immediately if possible.	• Undertake assessment to determine why the attachment has become loose and modify how the attachment is secured if required to ensure fault does not occur regularly. • Detail actions undertaken in annual monitoring report.	• During maintenance inspection, or as soon as possible to ensure safety of railway and road users, and to ensure injury does not occur to Squirrel Glider.	• Inland Rail in consultation and agreement with ARTC
Dead Squirrel Glider, or gliding species found	• Immediate investigation to be undertaken by a suitably qualified expert • Photographs to be taken and GPS location of deceased individual	• Engage suitably qualified expert to undertake investigation to determine if animal death has occurred from installation of crossing structure. • Consultation with RD should occur to notify of the occurrence and investigation. • If gliding pole or canopy bridge is determined to be the likely cause of death, the structure must be removed.	• Engagement to find suitably qualified expert should commence within 1 day of finding of dead individual. • Consultation should occur within RD within 1 week of finding of dead individual and be on-going throughout the investigation process. • Investigation should be completed within 8 weeks of engagement of suitably qualified expert.	• Inland Rail in consultation and agreement with ARTC
Tubestock watering TARP – Establishment (self-sufficient for water and nutrients)				
< 100 mm rainfall received in last 3 months	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• From the initiation of operational activities – 5 years (or until established [until established (self-sufficient for	• Inland Rail in consultation and agreement with ARTC is responsible for ensuring establishment of vegetation if not

Trigger	Action	Response	Timeframe	Responsibility
			water and nutrients]) to achieve an established success rate of 80%	achieved during the construction phase. • Inland Rail in consultation and agreement with ARTC is responsible for revegetation activities following initiation of operational activities.
Tubestock plant survival TARP				
Dead plant identified and success rate is less than 80%	Replace and re-initiate watering TARP	• Record species and location. • Detail actions undertaken in annual monitoring report.	• With each manual watering event and/or monitoring events for first 5 years.	• Inland Rail in consultation and agreement with ARTC
Tubestock watering TARP – Replacement of dead plants				
< 5 mm rainfall received within 24 hours of planting	• Manual watering of plants	• Fill all air gaps and ensure saturation of soil once tubestock is planted • Detail actions undertaken in annual monitoring report.	• 0 days – 1 day	• Inland Rail in consultation and agreement with ARTC for any tubestock re-planted as part of this TARP post construction.
< 5 mm rainfall received within last 48 hours	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 1 days – 1 week	• Inland Rail in consultation and agreement with ARTC for any tubestock re-planted as part of this TARP post construction.
< 5 mm rainfall received in last 3 days	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 1 week – 2 weeks	• Inland Rail in consultation and agreement with ARTC for any tubestock re-planted as part of this TARP post construction.

Trigger	Action	Response	Timeframe	Responsibility
< 5mm rainfall received in last 7 days	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 2 weeks – 3 months	• Inland Rail in consultation and agreement with ARTC for any tubestock re-planted as part of this TARP post construction.
< 10 mm rainfall received in last 4 weeks	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 3 months – 1 year	• Inland Rail in consultation and agreement with ARTC for any tubestock re-planted as part of this TARP post construction.
< 100 mm rainfall received in last 3 months	• Manual watering of plants	• No response required • Detail actions undertaken in annual monitoring report.	• 1 year – 5 years (or until established [until established (self-sufficient for water and nutrients])	• Inland Rail in consultation and agreement with ARTC for any tubestock re-planted as part of this TARP post construction.
Tubestock plant guard TARP				
Damaged plant guard	• Remove and replace guard	• Detail actions undertaken in annual monitoring report.	• With each manual watering event and/or monitoring events for first 12 months.	• Inland Rail in consultation and agreement with ARTC
Nest box TARP				
Damaged or fallen nest box	• Photograph • Remove and replace or remove, fix and re-install	• Record nest box and management actions and detail actions undertaken in annual monitoring report.	• Replace nest box as soon as possible subject.	• Inland Rail in consultation and agreement with ARTC
Nest box with European Honeybee, Indian Myna, wasps or ants present	• Remove ants or bees. If bees are present remove all comb built, any remaining wax may attract bees • Re-install or replace	• Record nest box and management actions and detail actions undertaken in annual monitoring report.	• Undertake restorative actions or replace nest box as soon as possible subject.	• Inland Rail in consultation and agreement with ARTC

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