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EGH2 GREEN HYDROGEN PROJECT

ATTACHMENT B: OFFSET STRATEGY

DRAFT FOR PUBLIC EXHIBITION

PREPARED FOR EDIFY ENERGY

DOCUMENT TRACKING

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Acronyms and terms

Acronym	Term
BTF	Black-throated Finch southern subspecies (*Poephila cincta cincta*). Listed as Endangered under the EPBC Act
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
EMP	Environmental Management Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Cth)*
LEIP	Lansdown Eco-Industrial Precinct
MNES	Matters of National Environmental Significance
OMP	Offset Management Plan
RFI	Request for Further Information to inform an assessment on Preliminary Documentation under Part 8 of the EPBC Act
TEC	Threatened Ecological Community

Term	Description
Avoidance Footprint	The areas that have been avoided due to environmental value and/or sensitivity, including a 50 m buffer. No development activities under the Proposed Action will be undertaken in these areas.
Disturbance Footprint	The areas where development activities under the Proposed Action may be undertaken. These areas may be directly and/or indirectly impacted by the Proposed Action.
Impact assessment report	The report that assesses potential impacts of the Proposed Action on MNES. A key part of the Preliminary Documentation package
Preliminary documentation	The package of information to address the RFI and meet the requirements of Part 8 of the EPBC Act
Project Area	The area that encompasses the Disturbance Footprint and the Avoidance Footprint. This area covers 107.28 ha.

1 Introduction

Edify Energy Pty Ltd (the Proponent) is proposing to construct and operate the Edify Green Hydrogen (EGH2) project at the Lansdown Eco-Industrial Precinct, 46 km south of Townsville, near Woodstock in North Queensland.

The EGH2 project was deemed a Controlled Action under the Commonwealth *Environment Protection and Biodiversity Conservation Act* (1999) (EPBC Act) (EPBC referral 2023/09604). The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) subsequently issued a Request for Further Information (RFI) to inform an assessment on Preliminary Documentation under Part 8 of the EPBC Act.

The RFI identified the potential for the EGH2 project to lead to residual adverse impacts to the Black-throated Finch – southern subspecies (*Poephila cincta cincta*) (BTF). Edify Energy are committed to delivering a suitable offset to compensate for these potential impacts.

This document comprises the offset strategy for the EGH2 project. It sets out:

- The context and need for offsets to compensate for potential residual adverse impacts to BTF
- The offset commitments that Edify Energy will deliver for BTF
- The provisional offset target for BTF
- The implementation and assurance approach for delivery of the offsets
- An evaluation of the adequacy of the strategy against the EPBC offset policy (Commonwealth of Australia, 2012a)

The offset strategy forms part of the Preliminary Documentation package and is one of the attachments to the Impact Assessment Report (Open Lines, 2024) (as set out in Figure 1).

No other MNES will be subject to residual adverse impacts and offsets for other matters are not necessary.

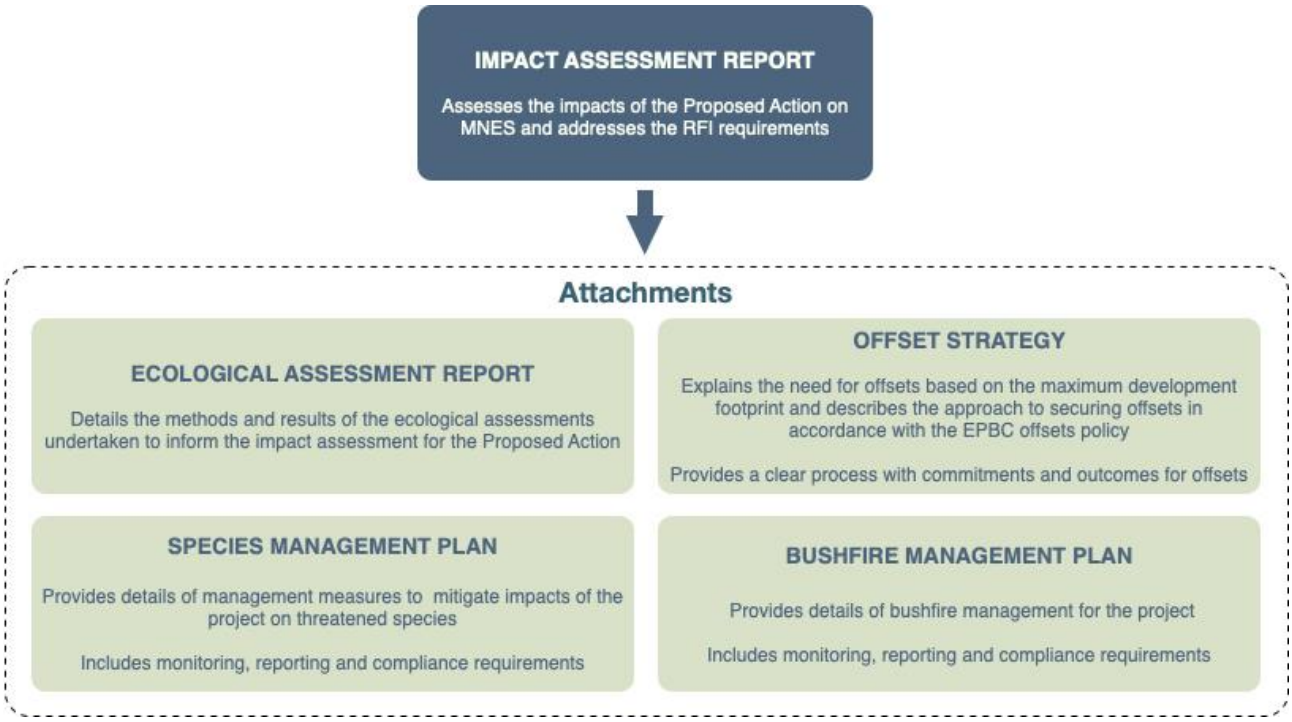

Figure 1: Overview of the Preliminary Documentation package

2 Context and need for offsets

Offsetting impacts to MNES is the final step in the mitigation hierarchy. It is intended to compensate for any residual adverse impacts that remain after impacts have been avoided, minimised and mitigated (Commonwealth of Australia, 2012a). This section sets out the:

- Context for offsetting under the EPBC Act
- Need for offsets for BTF

2.1 CONTEXT FOR OFFSETTING UNDER THE EPBC ACT

The EPBC Act environmental offsets policy (Commonwealth of Australia, 2012a) outlines the Commonwealth Government's approach to the use of biodiversity offsets under the Act. The policy establishes ten principles for offsetting which are set out in Table 1.

The EPBC offsets policy is accompanied by the EPBC offset assessment guide. The guide was developed in order to give effect to the requirements of the policy for site-by-site projects, using a balance sheet approach to estimate impacts and offsets for threatened species and ecological communities. The guide is an Excel spreadsheet with embedded formula and is an impact and offset calculator.

Table 1: Principles of the EPBC Act Environmental Offsets Policy (Commonwealth of Australia, 2012a)

Offset principles
Suitable offsets must: 1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action 2. Be built around direct offsets but may include other compensatory measures 3. Be in proportion to the level of statutory protection that applies to the protected matter 4. Be of a size and scale proportionate to the residual impacts on the protected matter 5. Effectively account for and manage the risks of the offset not succeeding 6. Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see section 7.6 [of the offset policy]) 7. Be efficient, effective, timely, transparent, scientifically robust and reasonable 8. Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced **In assessing the suitability of an offset, government decision-making will be:** 9. Informed by scientifically robust information and incorporate the precautionary principle in the absence of scientific certainty 10. Conducted in a consistent and transparent manner

2.2 NEED FOR OFFSETS FOR BTF

The Impact Assessment Report (Open Lines, 2024) provides a detailed description of:

- Edify Energy's approach to designing the project
- The occurrence of BTF within and adjacent to the project area, and
- An analysis of the potential impacts to BTF

This section provides a brief summary of that work and sets out the need for offsets for the species. The Impact Assessment Report (Open Lines, 2024) should be read in conjunction with this strategy in order to understand the full details.

2.2.1 DESIGNING THE DISTUBRANCE FOOTPRINT

Edify Energy are seeking approval for a 96.67 ha disturbance footprint that has been designed to avoid key MNES habitat values within the Project Area and reduce the potential for environmental impacts, while still allowing for an appropriate development outcome.

The EGH2 project is proposed to be undertaken in stages. The first stage of the Project will involve the construction and operation of a 17.6 MW green hydrogen production facility, with the electrolyser expected to have a hydrogen generating capacity of 333 kg/hr. After the initial stage (approximately year 5), the facility will be expanded to increase the hydrogen production capacity, leading to an estimated 1GW of hydrogen production in the final stage of the project with significant export volumes from the Port of Townsville.

The first stage of the Project will occupy only a portion of the disturbance footprint. Due to the staging and nature of the project occurring over time, detailed layout design for the subsequent stages is yet to occur. To accommodate this, the disturbance footprint of 96.67 ha represents the maximum impact area required to complete all stages of the project. The detailed design for the subsequent stages is likely to occur after Part 9 approval (but prior to commencing the action). This design process may determine that the entire disturbance footprint is not required. In this case, Edify Energy will seek to prioritise further avoidance of areas of higher environmental values for MNES and may lead to a reduction in impacts to BTF habitat.

Refer to Section 5.1 of the Impact Assessment Report (Open Lines, 2024) for further details.

2.2.2 OCCURRENCE OF BTF WITHIN AND ADJACENT TO THE PROJECT AREA

BTF was not recorded within or surrounding the Project Area during the targeted surveys for the project, and there is no evidence (nests) that the species uses the site. However, there are several historic records within 10 km, including one 2017 record immediately adjacent to the northern boundary of the Project Area (Terra Solutions, 2023). Two individuals of the species were also recorded in 2023 as part of the surveys to inform the LEIP Enabling Infrastructure Project (EPBC 2022/09383). The individuals were recorded approximately 3 km north of the EGH2 Project Area along the railway corridor(CDM Smith, 2023). Additionally, the Project Area is located in the Townsville Plains subregion, a recognised core area for BTF (Terra Solutions, 2023).

Due to the largely degraded nature of the environment on site, the Project Area is considered low value to the BTF and only provides potential marginal habitat for the species. This includes (see Figure 2):

- 40.78 ha of potential marginal foraging habitat in the non-remnant grassland during both the wet and dry seasons. 39.52 ha of this occurs within the disturbance footprint
- 5.88 ha of potential marginal breeding habitat in the woodland and riparian woodland areas. 1.24 ha of this occurs within the disturbance footprint

Refer to Sections 6.1.2 and 6.1.3 of the Impact Assessment Report (Open Lines, 2024) for further details.

As explained in the Impact Assessment Report (Open Lines, 2024), there are minor differences in the vegetation and habitat extents presented in Terra Solutions, 2023, compared to those presented in the Open Lines, 2024. This was due to minor mapping errors in Terra Solutions, 2023, where some spatial polygons overlapped. This error was corrected during spatial processing for the PD. Therefore the extents presented in the Impact Assessment Report and this Offset Strategy are accurate and reflect the most recent on-ground ecological data.

2.2.3 RESIDUAL ADVERSE IMPACTS TO BTF

The Proposed Action will lead to residual impacts to 39.52 ha of potential marginal foraging habitat and 1.24 ha of potential marginal breeding habitat for BTF.

Despite the low value of the site for BTF, Edify Energy are proposing to provide offsets for these impacts due to the:

- Occurrence of the Project Area within the important Townsville region
- Presence of several records within the vicinity of the Project Area, and
- Requirements of the RFI which indicate that an offset is needed

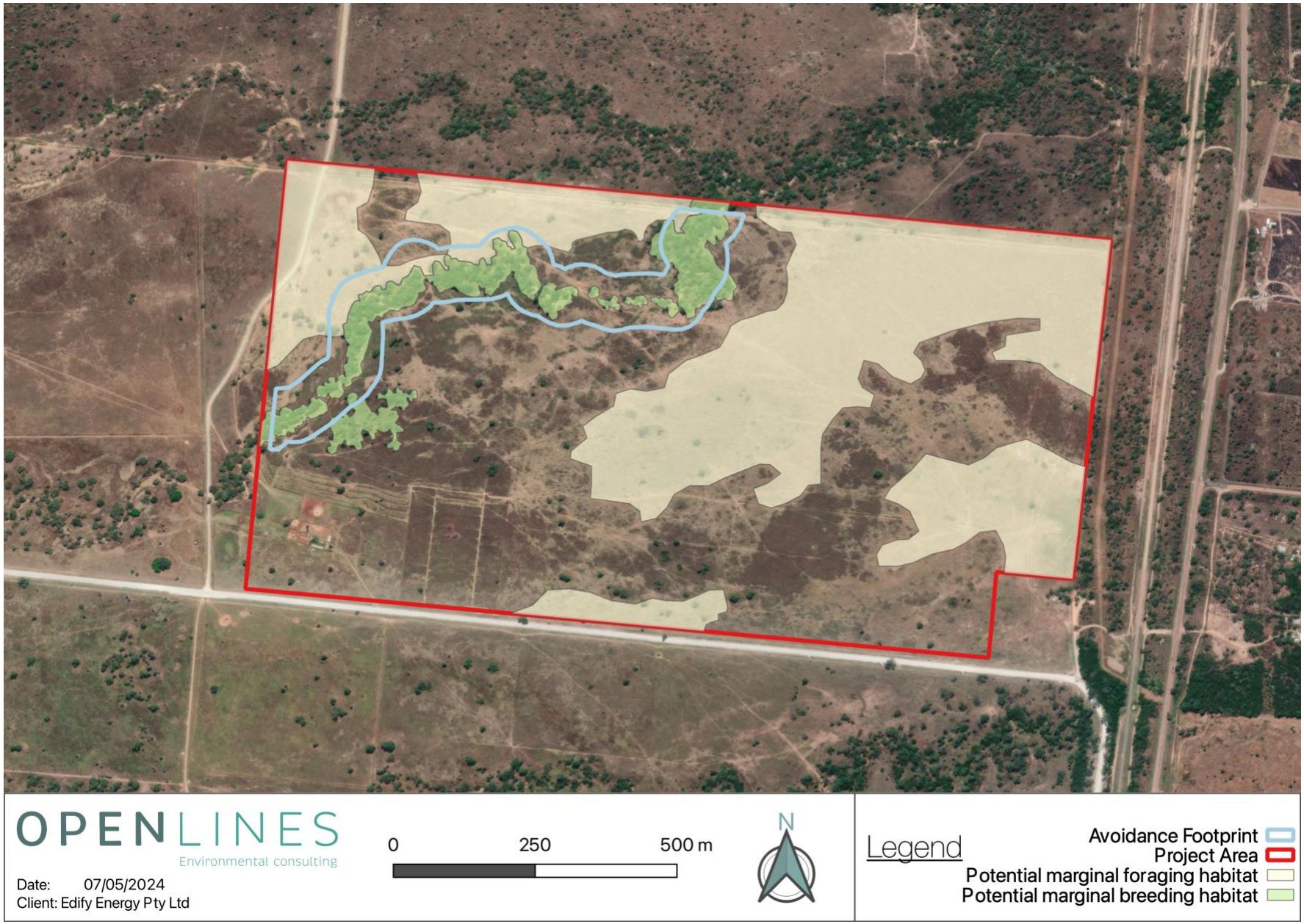

Figure 2: BTF habitat within the Project Area

3 Offset commitments for BTF

This section sets out the offset commitments that Edify Energy will deliver for BTF (see Table 2). The commitments are designed to:

- Ensure a positive outcome for BTF within the Townsville region
- Ensure the offset meets the requirements of the EPBC offsets policy and EPBC offset assessment guide
- Provide for a provisional offset target that is based on the maximum impact of the disturbance footprint
- Incentivise further avoidance during the detailed design phase of the project by allowing the offset target to be reduced if impacts are reduced, and
- Ensure an appropriate offset site is identified and secured prior to development commencing

Table 2: Offset commitments for BTF

No.	Commitment
1	The offset that will be delivered will provide for the long-term management and in-perpetuity protection of a suitable area of land within the Greater Townsville important areas for BTF (as mapped in the BTF significant impact guidelines (DEWHA, 2009))
2	The offset that will be delivered will meet the requirements of the EPBC offsets policy and EPBC offset assessment guide
3	Edify Energy will endeavour to reduce the residual adverse impacts on potential BTF habitat as part of detailed design of the Green Hydrogen Facility. The necessary offset target and site will be defined following this design stage. This process will facilitate appropriate implementation of the conservation hierarchy of avoid first, then mitigate and then offset. A provisional offset target is provided in Section 4 of this Strategy
4	Edify Energy will consult with DCCEEW on the size, location, values and suitability of the proposed offset site prior to formalising any arrangements to secure and manage the land. This will include provision of an updated EPBC offset assessment guide and final offset target to ensure the proposed offset is suitable to compensate for any residual adverse impacts to BTF
5	Once a suitable offset site is identified, Edify Energy will develop and implement an Offset Management Plan in accordance with the framework set out in Appendix A. The Offset Management Plan will be provided to DCCEEW as part of the final Preliminary Documentation package to be submitted for approval
6	Development of the Green Hydrogen facility will not commence until DCCEEW are satisfied that the appropriate offset site has been identified and the necessary administrative and legal processes have commenced to secure the site in perpetuity

4 Provisional offset target

A provisional offset target for BTF was determined through application of the EPBC offset assessment guide. This process:

- Used the maximum impact areas to BTF habitat due to the disturbance footprint
- Applied the methodology for determining habitat quality as set out in Appendix B which was based on the *Queensland Government Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy* (State of Queensland, 2020)
- Was based on a number of assumptions about the potential offset site

As outlined above in the offset commitments, the EPBC offset assessment guide is proposed to be reapplied once the detailed design phase is completed and the final residual impacts to BTF are known. This process will include analysis of the actual offset site to be delivered, and will involve finalisation of the inputs for the offset side of the calculator.

The inputs for the impact side of the calculator will not change except for impact area (if revised at the detailed design phase).

This section sets out the:

- Inputs used in the offset assessment guide to determine the provisional target
- Results of the process including the provisional target

4.1.1 INPUTS USED IN THE OFFSET ASSESSMENT GUIDE

The offset assessment guide requires a number of inputs on both the impact side and the offset side.

Table 3 provides the method and justification for the inputs used to generate the provisional offset target.

Consistent with the Queensland *Guide to determining terrestrial habitat quality* (State of Queensland, 2020), different habitat types within the Project Area were separated into Assessment Units. Separate offset assessment guides were then prepared for each Assessment Unit, and the sum of the offset quantum for each Assessment Unit was taken as the total provisional offset target (see Section 4.1.2).

The Assessment Units are shown on Figure 3 and include:

- Assessment Unit 1 (AU1): Non-remnant grassland. This Assessment Unit is 39.52 ha in size and covers approximately 36.8 per cent of the Project Area
- Assessment Unit 2 (AU2): Riparian woodland. This Assessment Unit is 0.43 ha in size and covers approximately 0.4 per cent of the Project Area
- Assessment Unit 3 (AU3): *Eucalyptus crebra* and *Corymbia dallachiana* woodland. This Assessment Unit is 0.81 ha in size and covers approximately 0.78 per cent of the Project Area

Table 3: Method and justification for the inputs used to generate the provisional offset target

Inputs to the offset assessment guide	Approach
IMPACT CALCULATOR	
Impact area (ha)	The impact area was calculated for each Assessment Unit using the habitat mapping for BTF. The impact areas based on the disturbance footprint are: • AU1 = 39.52 ha • AU2 = 0.43 ha • AU3 = 0.81 ha • TOTAL = 40.76 ha

Inputs to the offset assessment guide	Approach
Impact quality (0-10)	The impact quality score for each Assessment Unit is a measure of how well the area supports BTF and contributes to its ongoing viability. As described in the offset guide (Commonwealth of Australia, 2012b), there are three components that contribute to the calculation of habitat quality: site condition, site context, and species stocking rates. Impact quality is determined as per the detailed approach set out in Appendix B. The impact quality scores are: • AU1 = 4 • AU2 = 4 • AU3 = 4
OFFSET CALCULATOR	
Risk related time horizon (max 20 years)	The risk related time horizon for the offset "is the foreseeable timeframe (in years) over which changes in the level of risk to a proposed offset site can be considered and quantified" (Commonwealth of Australia, 2012b). The value was set at its maximum level of 20 years given that the offset site will be protected in perpetuity.
Time until ecological benefit	Time until ecological benefit "is the estimated time (in years) that it will take for the habitat quality improvement of the proposed offset to be realised" (Commonwealth of Australia, 2012b). Using a precautionary approach for the preliminary application of the calculator, a timeframe of 10 years was applied. This provides ample opportunity for habitat improvements associated with revegetation or management activities such as grazing, fire and weed management. This parameter will be revised when the development footprint is finalised and the offset site is chosen.
Risk of loss of offset site:	
Risk of loss (%) without offset*	The risk of loss for the potential offset site was set at 0% as the probability of this outcome is considered to be remote. This is based on the typical existing land-use (grazing) and the low likelihood that these areas would be cleared in the next 20 years, since they are protected under national environment law. An EPBC referral would be required to impact BTF habitat at the site The potential offsets would likely continue to be used for agricultural purposes if not protected under a legal mechanism.
Risk of loss (%) with offset*	The risk of loss for a site secured as an offset is set at 0% because the probability of this outcome is considered to be remote. The offset site will be protected in perpetuity and active management will ensure the habitat does not deteriorate. The risk is not considered zero as there is some probability that threats such as the invasion of new high threat weeds or the influence of climate change could have negative impacts.
Confidence in result (%)*	The risk of loss assumptions are provided with confidence (set at 90%). This assessment is based on firsthand observations by Terra Solutions associated with the management of other BTF habitat in the Townsville region.
Quality of offset site:	
Start quality (scale of 0-10)	The start quality score for the offset site has been predicted based on the approach set out in Appendix B and previous experience with offsets in the Townsville region. A predicted start quality score for the offset of 6 was applied. This will be refined when the offset strategy is finalised.
Future quality without offset (scale of 0-10)	The quality of potential offset sites can deteriorate quickly when managed in a manner with little or no consideration for the biodiversity values. Activities such as the application of fertiliser, high stocking rates, or seeding areas with exotic pasture can degrade BTF habitat. The future quality score without offsets was therefore set at one point less than the start quality (score of 5).

Inputs to the offset assessment guide	Approach
Future quality with offset (scale of 0-10)	Management of offset sites has the potential to lead to a range of improvements such as reduced weeds, restoration of some vegetation types and structure, and increased recruitment of sensitive species. As a result, the future quality scores with offsets are set at one point greater than the start quality (score of 7).
Confidence in result (%)*	The offset quality assumptions are provided with confidence (set at 90%). This assessment is based on firsthand observations by Terra Solutions associated with the management of other BTF habitat in the Townsville region and the assessment of risks associated with inadvertent losses of habitat.

*** Note about risk and confidence percentages**

The guide includes a number of parameters which require an assessment of risk or confidence calculated as a percentage. While the offset calculator provides a sliding scale allowing any integer percentage to be selected in the calculator, the assessment for this project includes only four options:

- 0% is selected for where the probability of an event is considered remote
- 10% is selected for where the probability of an event is considered low
- 50% is selected when the probability of an event is considered uncertain (i.e. could go either way)
- 90% is selected when the probability of an event is considered with confidence

These selections are made based on a lack of evidence to confidently select other options. For example, selecting 85% suggests an ability to identify changes at intervals of 5%. Even the selection of 80% suggests the ability to identify changes at intervals of 10%. In the absence of any real data on these risks the selection of these percentages is considered subjective and as such the confidence intervals noted above are used. The overall impact of selecting different levels of confidence on the calculated offset for BTF is considered minor as the calculator does not appear very sensitive to changes in the order of 10% to 20% in these values.

4.1.2 RESULTS

Initial application of the offset assessment guide provides a provisional offset target of 102 ha.

Table 4 provides the results for each Assessment Unit. As discussed, this figure is based on the maximum extent of development and a range of assumptions about the offset site. The target may change following:

- Detailed design of the development footprint if additional avoidance outcomes for BTF are achieved, and
- Selection of the actual offset site

Table 4: Results of the offsets assessment guide for each Assessment Unit

Assessment Unit	Offset target (ha)
AU1	98.9
AU2	1.1
AU3	2.0
Total	**102.0**

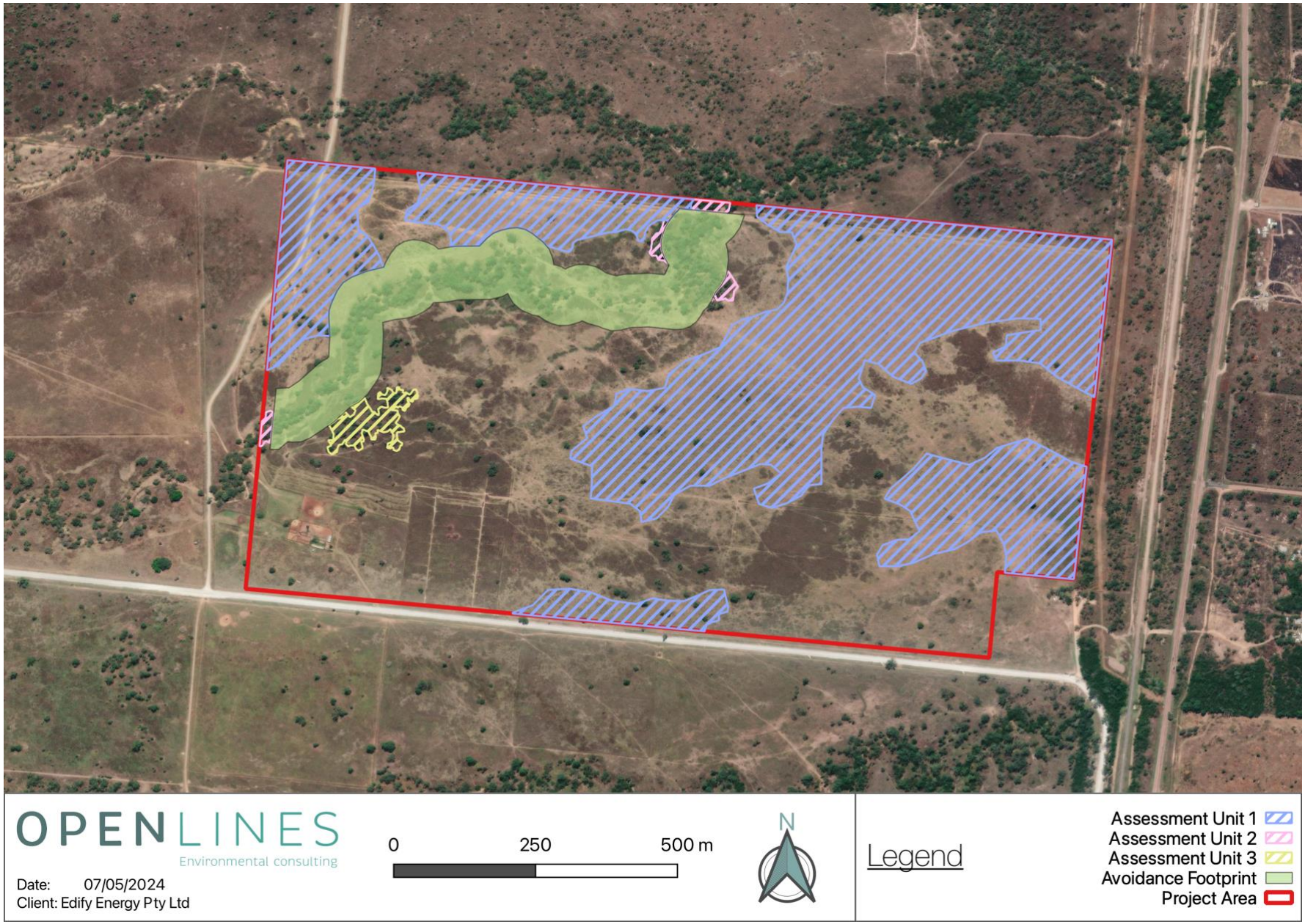

Figure 3: Assessment Units for use in the EPBC offset assessment guide

5 Implementation and assurance

5.1 IMPLEMENTATION

As outlined in the commitments, Edify Energy is proposing to finalise selection and implementation of the offset site after the detailed design is completed.

Implementation of the offset will involve the following steps:

- Completion of the detailed design to determine the final impacts to BTF habitat
- Identification of a suitable offset site that has the appropriate characteristics in terms of:
  - Location within the Greater Townsville region
  - Habitat values for BTF
  - Scale (this will be guided initially by the provisional offset target)
- Re-running the EPBC offset assessment guide using the method and approach set out in Section 4 and Appendix B to determine the final offset target. This process will take into account the:
  - Final impacts to BTF habitat, and
  - Specific characteristics of the offset site (e.g. start quality)
- Agreement with the owner of the offset site to secure the offset
- Preparation of an Offset Management Plan (OMP) in accordance with the framework set out in Appendix A which draws on the requirements of the RFI. The OMP will be prepared prior to approval as part of the final Preliminary Documentation package and will:
  - Set out the management requirements for the offset site
  - Outline the process for setting milestones, monitoring and reporting
  - Provide a risk assessment framework and set out triggers for adaptive management
- Finalisation of the formal processes to secure the offset
- Ongoing engagement with DCCEEW in accordance with the commitments set out in Table 2 to ensure that the proposed offset is suitable to compensate for any residual adverse impacts to BTF

5.2 ASSURANCE

Edify Energy is confident that an appropriate offset site is available in the Greater Townsville region. Analysis and early conversations with potential landholders as part of preparing the Preliminary Documentation package supports this. Townsville City Council is currently securing offsets as part of the LEIP Enabling Infrastructure Project (EPBC 2022/09383) which also aims to provide offsets for current and future proponents of the LEIP, including Edify Energy. Based on discussion with Townsville City Council, these offsets would be sufficient to address the impacts to BTF associated with the EGH2 project. However, given the current timeframes for which Edify Energy is seeking approval of the EGH2 project, these offsets may not be secured as efficiently. Therefore, Edify Energy has sought their own offsets in consultation with Townsville City Council (as described below).

Edify Energy has been consulting with Townsville City Council to identify available council owned land that may provide suitable offsets. A number of potentially suitable sites are available and could be secured through an offset agreement with Townsville City Council. Attachment A to this document provides evidence of initial engagement between Edify Energy and Townsville City Council in relation to 'Council Intent to Provide Authorisation to Make Land Available for Biodiversity Offsets'.

Importantly, and consistent with Commitment 6, Edify Energy will not commence development of the Green Hydrogen facility until DCCEEW are satisfied that the appropriate offset site has been identified and the necessary administrative and legal processes have commenced to secure the site in perpetuity. This provides assurance that the offset will be delivered prior to any impacts to BTF habitat occurring.

In addition, the OMP will be prepared prior to approval of the final Preliminary Documentation package and will provide a framework and process for ongoing assurance in relation to the offset site. This will include:

- A framework to measure the success of the offset site. This includes:
  - A set of offset completion criteria
  - Five yearly interim milestones
- Processes for monitoring, including the nature, timing and frequency of monitoring to understand progress against the interim milestones
- Processes and timing for reporting
- Details of adaptive management processes for the offset site

6 Evaluation against the EPBC offset policy

As discussed in Section 2.1 the EPBC Act environmental offsets policy outlines the Commonwealth Government's approach to the use of biodiversity offsets under the Act. An evaluation of the Offset Strategy for the Proposed Action against these Principles is provided below in Table 5.

Table 5: Evaluation of the Offset Strategy against the principles of the EPBC offset policy

#	EPBC offset principles	How the offset strategy meets each principle
Suitable offsets must:		
1	Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	The Offset Strategy will deliver an overall conservation outcome that improves or maintains the viability of BTF. This is based on: • The focus on direct offsets (as per Principle 2) which provides the most tangible conservation gains for MNES • Selection of an offset site within the Greater Townsville region which is both the location of the development and a core area for BTF • Delivery of an appropriate offset area that will be determined through application of the EPBC offset assessment guide This meets Principle 1.
2	Be built around direct offsets but may include other compensatory measures	The proposed offset will be entirely based on direct offsets. This meets Principle 2.
3	Be in proportion to the level of statutory protection that applies to the protected matter	The proposed offset will be proportional to the conservation status of BTF. The final offset quantum will be determined using the EPBC offset assessment guide which incorporates conservation status. This meets Principle 3.
4	Be of a size and scale proportionate to the residual impacts on the protected matter	The proposed offset will be proportionate in size and scale to residual impacts to BTF. The final offset quantum will be determined using the EPBC offset assessment guide which incorporates the scale of impacts to the protected matter. This meets Principle 4.
5	Effectively account for and manage the risks of the offset not succeeding	The Offset Strategy includes a Commitment to develop and implement an Offset Management Plan for the offset site (Commitment 5) prior to project approval. As set out in Appendix A, the OMP will incorporate: • Clear objectives and milestones to deliver for BTF • Management measures to maintain and improve the condition of BTF habitat on the offset site • Monitoring and reporting processes to track success of the offset site • Adaptive management processes that can be applied if corrective actions are required These processes will account for and manage the risks of the offset not succeeding. This meets principle 5.

#	EPBC offset principles	How the offset strategy meets each principle
6	Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see section 7.6)	The proposed offset site will be selected where there is not an existing level of protection. This meets Principle 6.
7	Be efficient, effective, timely, transparent, scientifically robust and reasonable	The Offset Strategy is designed to be: • Efficient and effective and provide for the sound allocation of resources by Edify Energy to secure and manage the offset site • Timely and will be implemented prior to the commencement of development • Based on scientifically robust and transparent information. This includes detailed ecological information about the Project Area and will include detailed information about the offset site to be included in the OMP. Ongoing information about the offset site will be available through the reporting processes set out in the OMP • Reasonable by providing an offset in accordance with the EPBC offset assessment guide This meets Principle 7.

8	Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	The Offset Strategy includes a Commitment to develop and implement an OMP for the offset site (Commitment 5) prior to project approval. As set out in Appendix A, the OMP will provide:
		• A framework to measure the success of the offset site. This includes:
		  o A set of offset completion criteria
		  o Five yearly interim milestones
		• Processes for monitoring, including the nature, timing and frequency of monitoring to understand progress against the interim milestones
		• Processes and timing for reporting
		• Details of adaptive management processes for the offset site
		This meets Principle 8.

In assessing the suitability of an offset, government decision-making will be:		
9	Informed by scientifically robust information and incorporate the precautionary principle in the absence of scientific certainty	This principle is largely a matter for DCCEEW as it relates to government decision-making. However, preparation of the documents for the Preliminary Documentation (including the Impact Assessment Report (Open Lines, 2024) and Offset Strategy (this document)) is based on scientifically robust information and processes, and considers the precautionary principle where appropriate.
10	Conducted in a consistent and transparent manner	This principle is largely a matter for DCCEEW as it relates to government decision-making.

References

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Commonwealth of Australia (2012a) 'Environment Protection and Environmental Offsets Policy', (October).

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State of Queensland (2020) 'Guide to determining terrestrial habitat quality: Methods for assessing habitat quality under the Queensland Environmental Offsets Policy Version 1.3'.

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Appendix A: Offset management plan framework

The Offset Strategy includes a commitment (5) that Edify Energy will develop and implement an Offset Management Plan (OMP) once a suitable offset site is identified. The OMP will be prepared prior to project approval and will form part of the final Preliminary Documentation package for approval. This appendix provides the framework for the OMP. It sets out the:

- Purpose of the OMP
- Structure and requirements of the OMP

PURPOSE OF THE OMP

The purpose of the OMP is to describe the offset site and establish the framework for management to ensure positive outcomes for BTF.

STRUCTURE AND REQUIREMENTS OF THE OMP

Section	Requirements
Introduction	This section will set out the context of the OMP including the development to which it relates.
Overview of the impact	This section will provide a detailed description of the residual impacts associated with the Proposed Action which require offsetting after the detailed design phase is complete. It will include: • The area of habitat in hectares to be impacted • The quality of this habitat according to method and approach set out in Section 4 and Appendix B of the Offset Strategy

Overview of the offset site	**Description of the site**
	This section will provide a description of the offset site. It will include:
	• The location of the site including:
	  o The physical address of the offset site
	  o The coordinates of the boundary points in decimal degrees
	  o A map which clearly defines the site's boundaries
	• Size of the site in hectares
	• A description of the values of the site for BTF including the condition of habitat on the site
	• Current and future tenure
	• Environmental values present on the site
	• Surrounding land use
	Shapefiles with the appropriate attributes will also be provided.
	Data used to inform site selection
	This section will outline the baseline data and supporting evidence which documents the presence of the BTF on the offset site. The documentation will be in accordance with relevant survey guidelines, and based on a scientifically robust and repeatable methodology.
	Process to secure the site
	This section will provide detail of the timing and mechanisms to legally secure the offset site.
	Habitat quality assessment
	This section will assess the habitat quality of the offset site using the *Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy* and be consistent with the approach in Appendix B to the Offset Strategy.

Section	Requirements
	Context of the offset site This section will describe how the offset site will provide connectivity for the species with other areas of habitat and biodiversity corridors or if it will contribute to a larger strategic offset for the species.
Justification of the offset site	This section will demonstrate how the offset compensates for residual impacts to BTF in accordance with the principles of the EPBC offsets policy and all requirements of the EPBC offsets assessment guide. It will also provide evidence of how the OMP is consistent with the listing advice and recovery plan for BTF, and any relevant threat abatement plans.
Offset management	This section will describe a framework to define success of the offset site and set out management measures for BTF. **Outcomes** The OMP will define: • Specific and measurable outcomes which detail the nature of the gain for BTF • A set of specific offset completion criteria to demonstrate the improvement in habitat quality over a 20 year period. • Five yearly interim milestones to monitor progress towards the offset completion criteria **Management measures** The OMP will set out management measures to meet the outcomes. This will include timeframes for implementation. Management measures will be designed to align with objectives of the *Draft National Recovery Plan for the Southern Black-throated Finch* (DCCEEW, 2023) and principles of the EPBC offset policy (Commonwealth of Australia, 2012a). Management measures will focus on maintaining and improving the habitat values for the species (e.g. through maintaining native grasslands, water availability, and minimising disturbances). Techniques like regular mosaic burning, weed control, and supplemental watering during dry periods have shown promise. Success depends on selecting the appropriate techniques for the offset site. Key factors in the success or failure of previous management efforts at other offset sites include the adequacy of site-specific planning, sufficient resources, and adaptive strategies to address challenges like invasive species and seasonal variability.
Assurance	This section will set out the assurance processes for successful implementation of the offset site. **Risk assessment** The OMP will provide a risk analysis and risk management and mitigation strategy. This will address all risks to the successful implementation of the OMP and timely achievement of the offset completion criteria. **Monitoring** The OMP will set out a monitoring framework that describes the nature, timing and frequency of monitoring to understand progress against the interim milestones. This framework will be designed and implemented in consultation with appropriate experts. **Reporting** The OMP will set out the requirements around reporting. **Adaptive management** The OMP will identify triggers for adaptive management, and provide details of potential corrective actions if monitoring indicates that an interim milestone has not been achieved. This will include an approach to monitoring the effectiveness of corrective actions.

Appendix B: Habitat quality assessment method

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EGH2 GREEN HYDROGEN PROJECT

APPENDIX B: HABITAT QUALITY ASSESSMENT METHOD

PREPARED FOR EDIFY ENERGY

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1 Introduction

This document is an appendix to the Offset Strategy for the Edify Green Hydrogen Project (EPBC referral 2023/09604) (the Proposed Action).

Offsets are required for residual adverse impacts to Black-throated Finch (*Poephila cincta cincta*) (BTF) within the Project Area. Refer to the Impact Assessment Report for a description of the Proposed Action and Project Area.

The Offset Strategy provides the need and context for offsets associated with the Proposed Action (See Section 2.2 of the Offset Strategy), and provides a provisional offset target based on the maximum extent of development within the Project Area (See Section 4 of the Offset Strategy). The provisional offset target was calculated using the EPBC Act offsets assessment guide (Commonwealth of Australia, 2012a).

Habitat quality scores are one of the parameters used in the EPBC Act offsets assessment guide to determine the quantum of offsets required to offset residual adverse impacts to threatened species or ecological communities (Commonwealth of Australia, 2012a). The habitat quality score is a measure of how well a site supports a particular threatened species and contributes to its ongoing viability.

This appendix provides the method for calculating a habitat quality score for areas of BTF habitat subject to residual adverse impacts within the Project Area. This document sets out the:

- Habitat quality score assessment method
- Results of the habitat quality assessment method

2 Habitat quality score assessment method

The following text box provides the relevant requirements from the Request for Information (RFI):

> *… the offset proposal must include, but not be limited to the following:*
>
> *B1.1 Details of the residual impacts to protected matters as a result of the proposed action. This must include the methodology, with justification and supporting evidence, used to inform the inputs of the Offsets Assessment Guide in relation to the impact site for each relevant protected matter, including:*
>
> - *Total area of habitat (in hectares); and*
> - *Habitat quality (e.g. using the Queensland Government Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy [2020])*
>
> *A methodology that is suitable for the species in question must be used to assess habitat quality, noting that the same scoring mechanism must be used at both the impact site and the offset site.*

2.1 OVERVIEW OF THE METHOD

The method used to quantify the habitat quality score of the impact site was based on guidance in the following documents:

- *Guide to determining terrestrial habitat quality - Methods for assessing habitat quality under the Queensland Environmental Offsets Policy* (State of Queensland, 2020)
- *How to use the offsets assessment guide* (Commonwealth of Australia, 2012b)

The *Guide to determining terrestrial habitat quality* (State of Queensland, 2020) sets out a method for assessing a site using a number of Assessment Units (see Section 2.3 of this Appendix). The process set out in this Appendix involves identifying Assessment Units within the Project Area (as per (State of Queensland, 2020)) and assigning each unit with a habitat quality score between 0 and 10, where a score of 10 indicates a fully intact area of habitat.

As discussed, a habitat quality score is a measure of how well a site supports a particular threatened species and contributes to its ongoing viability. The *EPBC Act Offsets Assessment Guide* (Commonwealth of Australia, 2012a) identifies three components that contribute to the calculation of habitat quality: site condition, site context and species stocking rates. As such, the habitat quality assessment method provided individual scores for:

- Site condition - scored out of 4
- Site context - scored out of 3
- Species stocking rate - scored out of 3

It is noted that the weighting of condition, context and species stocking rate may vary based on the ecological context of the species in question. For BTF, a higher weighting was applied to site condition due to the specific nature of some BTF habitat requirements. Each component was scored using a number of indicators and scoring metrics which are identified in the following sections. Figure 1 provides an overview of the method used to score habitat quality for BTF.

This chapter sets out:

- Data used to inform the habitat quality assessment method
- Identification of Assessment Units
- Site condition scoring method
- Site context scoring method
- Species stocking rate scoring method
- The method to determine the final habitat quality score

Refer to Chapter 3 for the overall habitat score results (Section 3.1) and the detailed results against each indicator (Section 3.2).

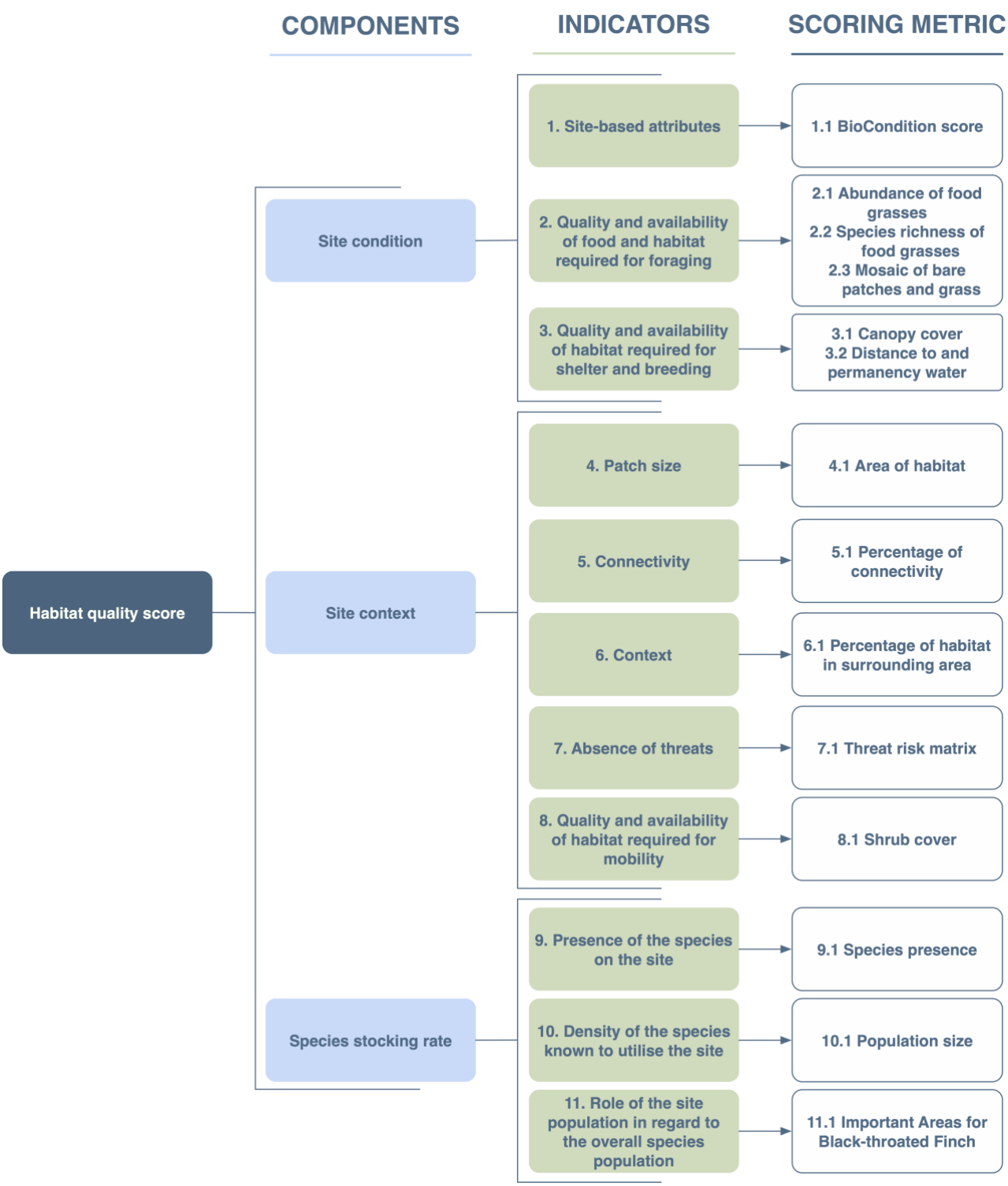

Figure 1: Overview of the habitat quality assessment method

2.2 DATA USED TO INFORM THE HABITAT QUALITY ASSESSMENT METHOD

A number of quantitative and qualitative sources were used to inform the habitat quality assessment method. These included:

- Commonwealth documents, including:
    - *Significant impact guidelines for the endangered Black-throated Finch (southern) (Poephila cincta cincta)* (DEWHA, 2009b)
    - *Draft National Recovery Plan for the Southern Black-throated Finch (Poephila cincta cincta)* (DCCEEW, 2023)
    - *Background document - Significant impact guidelines for the endangered Black-throated Finch (southern) (Poephila cincta cincta)* (DEWHA, 2009a)
- Species Profiles and Threats Database (DCCEEW, 2024)
- *Habitat management guidelines for the Black-throated Finch (Poephila cincta cincta) in the Brigalow Belt North Bioregion* (NRA, 2011)
- Scientific literature on BTF (including (Rechetelo, 2015; Mula Laguna *et al.*, 2019))
- Field surveys for the proposed action within the Project Area (Terra Solutions, 2023)
- Expert input from Terra Solutions based on their experience of the Project Area and more generally with BTF in the region

2.3 IDENTIFICATION OF ASSESSMENT UNITS

The *Guide to determining terrestrial habitat quality* (State of Queensland, 2020) outlines a process for identifying Assessment Units. An Assessment Unit is defined as an area, or a group of areas, that are at least 1 ha in size that are comprised of only one Regional Ecosystem (RE) type, and within a reasonably consistent condition (State of Queensland, 2020). A habitat quality score is applied to each Assessment Unit.

Based on this definition, three Assessment Units have been identified for BTF habitat within the Development Footprint (see Figure 2):

- Assessment Unit 1 (AU1): Non-remnant grassland. This Assessment Unit is 39.52 ha in size and covers approximately 36.8 per cent of the Project Area
- Assessment Unit 2 (AU2): Riparian woodland. This Assessment Unit is 0.43 ha in size and covers approximately 0.4 per cent of the Project Area*
- Assessment Unit 3 (AU3): *Eucalyptus crebra* and *Corymbia dallachiana* woodland. This Assessment Unit is 0.81 ha in size and covers approximately 0.78 per cent of the Project Area*

*It is noted that AU2 and AU3 are less than 1 ha in size. However, given that these areas are distinct from areas of habitat within AU1 in both condition and habitat type for BTF, it is considered appropriate to assess these areas of habitat independently

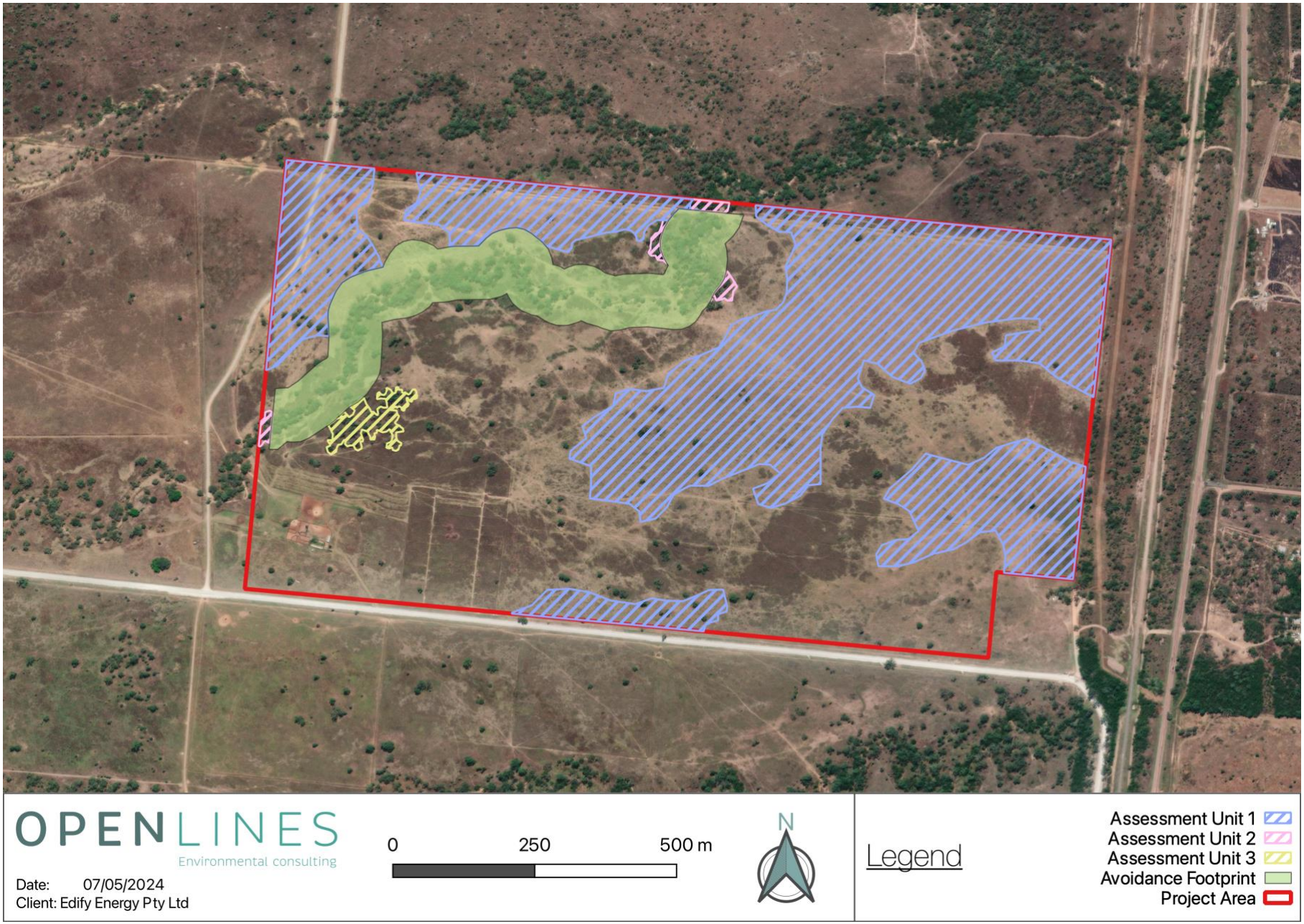

Figure 2: Assessment Units used in the habitat quality assessment method

2.4 SITE CONDITION SCORING METHOD

Site condition is defined as the condition of the site in the context of the ecological requirements of a species or ecological community. It takes into account the condition and structure of vegetation, the number of habitat features for the species, and the diversity of habitat present (Commonwealth of Australia, 2012b).

The method for quantifying site condition was informed by indicators drawn from the *Guide to determining terrestrial habitat quality* (State of Queensland, 2020). These included:

- Site-based attributes
- Species habitat attributes, including:
    - Quality and availability of food and habitat required for foraging
    - Quality and availability of habitat required for shelter and breeding

The method used to score each of these indicators, and the method used to calculate the overall score, is provided below.

2.4.1 SITE-BASED ATTRIBUTES

The *Guide to determining terrestrial habitat quality* (State of Queensland, 2020) recommends that site-based attributes are used in assessing the habitat quality of a site. Site-based attributes are generally assessed in accordance with the BioCondition Assessment Manual (Queensland Herbarium, 2015). BioCondition is used to quantify the overall condition of vegetation on a site when compared to an undisturbed (or benchmark) site (State of Queensland, 2020).

The method for assessing site-based attributes for BTF involved:

1. Estimating BioCondition scores
2. Comparing the estimated BioCondition scores against benchmark scores and calculating a site-based attribute score out of 10

ESTIMATING BIOCONDITION SCORES

A BioCondition score is based on the method set out in the *Guide to determining terrestrial habitat quality* (State of Queensland, 2020) and the BioCondition Assessment Manual (Queensland Herbarium, 2015). Scores reflect the condition of vegetation against a set of attributes and determining scores requires vegetation plots to be undertaken in each Assessment Unit.

The vegetation surveys for the project (Terra Solutions, 2023) did not incorporate BioCondition plots as they were not required to identify and map habitat for the relevant threatened species. A BioCondition score therefore cannot currently be determined in accordance with the established method. As a result, a BioCondition score for each Assessment Unit has been estimated based on the results of the on-ground surveys for the project.

Estimated BioCondition score

BioCondition scores were estimated based on the method provided in the BioCondition Assessment Manual (Queensland Herbarium, 2015). This approach involves scoring:

- Grassland ecosystems between 0 and 30
- Woodland ecosystems between 0 and 80

The estimated BioCondition score for each Assessment Unit was informed by the results of field surveys for the project (Terra Solutions, 2023). These estimates:

- Considered the attributes set out in the BioCondition Assessment Manual (Queensland Herbarium, 2015)
- Were based on a precautionary approach to ensure a higher score was given where there was any doubt about condition

COMPARING THE SITE-BASED ATTRIBUTE SCORES AGAINST THE BENCHMARKS

The estimated BioCondition scores were compared against the benchmark scores for the ecosystem type in each Assessment Unit (Queensland Herbarium, 2015) (see

Table 1) to determine a site based attribute score out of 10 based on the following formula:

$$Site\ based\ attribute\ score = \frac{BioCondition\ score}{Benchmark\ score} \times 10$$

Table 1: Benchmark score used for each Assessment Unit and justification

Assessment Unit	Benchmark score	Justification
AU1	30	AU1 includes areas of non-remnant grassland (Terra Solutions, 2023). The maximum BioCondition score for grassland ecosystems (excluding landscape scale attributes) is 30 (Queensland Herbarium, 2015).
AU2	80	AU2 includes areas of Riparian woodland, best described as a narrow and depauperate representation of RE 11.3.25b (Terra Solutions, 2023). The maximum BioCondition score for RE 11.3.25b (excluding landscape scale attributes) is 80 (Queensland Herbarium, 2015).
AU3	80	AU3 is a small patch of woodland representing a degraded version of RE 11.3.30 (Terra Solutions, 2023). The maximum BioCondition score for RE 11.3.30 (excluding landscape scale attributes) is 80 (Queensland Herbarium, 2015).

2.4.2 QUALITY AND AVAILABILITY OF FOOD AND HABITAT REQUIRED FOR FORAGING

The *Guide to determining terrestrial habitat quality* (State of Queensland, 2020) identifies quality and availability of food and foraging resources as a species habitat attribute used to determine the quality of habitat. This attribute contributes to the capacity of an area to support a species during all parts of its lifecycle.

The scoring of this attribute is comprised of three scoring metrics. The scoring metrics are species specific and inform the quality and availability of food and habitat for foraging within each Assessment Unit. The scoring metrics used were informed by the *Significant impact guidelines for the endangered Black-throated finch (southern) (Poephila cincta cincta)* (DEWHA, 2009b), *Draft National Recovery Plan for the Southern Black-throated Finch* (DCCEEW, 2023), and scientific literature. Table 2 provides the scoring metrics used to score the quality and availability of food and habitat required for foraging.

Table 2: Scoring metrics used to score the quality and availability of food and habitat required for foraging

Scoring metric	Rationale
Abundance of preferred food grass	BTF predominantly feeds on the seeds of grasses and forbs. They generally forage on the ground for fallen seeds. There is evidence that the species feeds from a variety of grass species, including both native and non-native species (DCCEEW, 2023). The early wet season (October to December) triggers a significant food shortage for BTF as remaining seeds germinate or rot. This period results in a resource bottle neck which continues until grasses commence seed production again. This is a vulnerable time for the species. Early flowering perennials which produce seed quickly after the first rains are vital during this period (NRA, 2011).
Species richness of food grasses	There is evidence that the species feeds from a variety of grass species, including both native and non-native species. BTF appears to prefer areas which support a high diversity of native gasses (DCCEEW, 2023).
Mosaic of bare patches and grass	Given that BTF predominantly forages on the ground for fallen seeds (DCCEEW, 2023), a mosaic of ground cover and bare patches is optimal to facilitate access to the seed bank. A balance between ground cover and bare ground is important. If the groundcover is too dense, access to resources will be impaired. While areas characterised by minimal groundcover with a lot of bare ground may result in insufficient food resources (Rechetelo, 2015).

The method for scoring the quality and availability of food and habitat required for foraging included:

1. Scoring each Assessment Unit against the scoring metrics
2. Converting each scoring metric score into a value between 0 and 10
3. Calculating an overall score for quality and availability of food and habitat required for foraging

SCORING EACH ASSESSMENT UNIT AGAINST THE SCORING METRICS

A maximum score (benchmark) for each scoring metric was used to infer the optimal attributes of a site. Table 3 provides the minimum and maximum score used for each scoring metric, and a justification.

Table 3: Minimum and maximum scores (benchmarks) for each scoring metric of the quality and availability of food and habitat required for foraging

Scoring metric	Minimum score	Maximum score (benchmark)	Justification
Abundance of preferred food grass	Groundcover comprises: • 0% early flowering perennial species • 0% other food species	Groundcover comprises: • 25% early flowering perennial species • 75% other food species	The *Habitat Management Guidelines for the Black-throated Finch (Poephila cincta cincta) in the Brigalow Belt North Bioregion* include the following performance indicator (NRA, 2011): *"Early flowering perennial grasses, such as Cockatoo Grass, occur in >25% of 20 randomly-spaced 0.5 m by 0.5 m plots in areas used by BTFs during the early wet season and wet season (November to February). This functional group of grasses is to be dominated by native species."*
Species richness of food grasses	No food species present	6 or more food species, 4 of which are native species	The *Habitat Management Guidelines for the Black-throated Finch (Poephila cincta cincta) in the Brigalow Belt North Bioregion* include the following performance indicator (NRA, 2011): *"At least six different grass species occur in 20 randomly-spaced 0.5 m by 0.5 m plots in areas used by BTFs. At least four should be native."*
Mosaic of bare patches and grass	100% ground cover OR 0% ground cover	40% ground cover	Rechetelo, (2015) found that within observed habitat for BTF, average ground cover was approximately 40%.

CONVERTING EACH SCORING METRIC INTO A VALUE BETWEEN 0 AND 10

To provide a consistent scoring system, the score for each scoring metric was converted into a score between 0 and 10, where 10 represents the maximum score. The method for this process is provided below.

Abundance of preferred food grass

This scoring metric was divided into two equal elements, one being the percentage of early flowering perennials (0 to 25 per cent), the other being the presence of other BTF food species (0 to 75 per cent).

Each element was converted into a score between 1 and 5 using the following calculation:

$$Species\ abundance\ score = \frac{Percentage\ of\ food\ species\ present}{Maximum\ score} \times 5$$

The result was two scores between 1 and 5. The sum of these scores provided the overall score for the scoring metric out of 10.

Species richness of food grasses

The scoring for this scoring metric was divided into two equal elements, one being the number of food species present (0 to 6), the other being the number of native species present (0 to 4). The scoring for these elements was as follows:

- If the Assessment Unit had six or more food species presented, it received the maximum score of 5. If there was less than six food species presence, a score between 1 and 5 was generated using the formula below with a maximum score of 6
- If the Assessment Unit had four or more native food species presented, it received the maximum score of 5. If there was less than four native food species presence, a score between 1 and 5 was generated using the formula below with a maximum score of 4

$$Species\ richness\ score = \frac{Number\ of\ species\ present}{Maximum\ score} \times 5$$

The result was two scores between 1 and 5. The sum of these scores provided the overall score for the scoring metric out of 10.

Mosaic of bare patches and grass

This scoring metric was informed by the percentage of ground cover recorded for each Assessment Unit. If the Assessment Unit had less than 40 per cent ground cover, the score was compared to a range of 0 to 40, where 0 is the minimum and 40 is the maximum. If the Assessment Unit had more than 40 per cent ground cover, the score was compared to a range of 40 – 100, where 40 is the best score (while still being the minimum), and 100 is the worst score.

If the ground cover was less than 40 per cent, it was converted into a score between 1 and 10 using the following calculation:

$$Ground\ cover\ score = \frac{Percentage\ ground\ cover}{40} \times 10$$

If the ground cover was greater than 40 per cent, it was converted into a score between 1 and 10 using the following calculation:

$$Ground\ cover\ score = \frac{100 - Percentage\ ground\ cover}{100 - 40} \times 10$$

CALCULATE AN OVERALL SCORE FOR QUALITY AND AVAILABILITY OF FOOD AND HABITAT REQUIRED FOR FORAGING

The overall score for quality and availability of food and habitat required for foraging was calculated by converting the sum of the three scoring metric scores into a score between 0 and 10. The maximum sum of scores for the three scoring metrics was 30.

The following calculation was used to convert the score into a score between 1 and 10:

$$Quality\ and\ availability\ of\ food\ and\ habitat\ required\ for\ foraging = \frac{sum\ of\ scoring\ metrics\ scores}{30} \times 10$$

2.4.3 QUALITY AND AVAILABILITY OF HABITAT REQUIRED FOR SHELTER AND BREEDING

The *Guide to determining terrestrial habitat quality* (State of Queensland, 2020) identifies quality and availability of habitat required for shelter and breeding as a species habitat attribute used to determine the quality of habitat. This indicator contributes to the capacity of an area to support a species during parts or all of its lifecycle.

The scoring of this indicator is comprised of two scoring metrics which were informed by the *Significant impact guidelines for the endangered Black-throated finch (southern) (Poephila cincta cincta)* (DEWHA, 2009b), *Draft National Recovery Plan for the Southern Black-throated Finch* (DCCEEW, 2023) and scientific literature. Table 4 provides the scoring metrics used to score the quality and availability of habitat required for shelter and breeding.

Table 4: Scoring metrics used to score the quality and availability habitat required for shelter and breeding

Scoring metric	Rationale
Canopy cover	BTF requires access to trees which provide suitable habitat for nesting (DEWHA, 2009b). Nesting habitat for BTF predominantly comprises open woodlands and woodlands dominated by *Eucalyptus platyphylla, E. drepanophylla, Corymbia clarksoniana, C. dallachiana, C. erythtrophloia and Casuarina cunninghamiana* (Mula Laguna *et al.*, 2019). Canopy cover is used as a scoring metric to indicate the presence of nest trees and the suitability of vegetation type for nesting.
Distance to and permanency of water	Access to reliable water sources is a key habitat attribute for BTF. The species drinks regularly throughout the day (DCCEEW, 2023). Permanent water sources are a critical resource for BTF, providing refuge during the dry season and in drought. Seasonal water sources are also an important resource to BTF in providing greater access to areas of habitat during the wet season (DEWHA, 2009b). According to the Significant Impact Guidelines, impacts to BTF can be minimised by (DEWHA, 2009b): • Retaining remnant woodland within one km of water sources (nesting habitat) • Maintaining all foraging habitat within 400 m of known nesting habitat, and within three km of water sources

The method for scoring the quality and availability of habitat required for shelter and breeding included:

1. Scoring each Assessment Unit against the scoring metrics
2. Converting each scoring metric score into a value between 0 and 10
3. Calculating an overall score for quality and availability of habitat required for shelter and breeding

SCORING EACH ASSESSMENT UNIT AGAINST THE SCORING METRICS

A maximum score for each scoring metric was used to infer the optimal attributes of a site. Table 5 provides the minimum and maximum score used for each scoring metric, and a justification.

Table 5: Minimum and maximum scores for each scoring metric for quality and availability of habitat required for shelter and breeding

Scoring metric	Minimum score	Maximum score	Justification
Canopy cover	0% OR 100%	Between 10% and 30%	Nesting habitat for BTF predominantly comprises open woodlands and woodlands (Mula Laguna *et al.*, 2019). Woodlands are defined as comprising 10 to 30 per cent canopy cover (Specht, 1970).
Distance to and permanency of water	>1 km	< 400 m from permanent water source	According to the Significant Impact Guidelines, impacts to BTF can be minimised by retaining remnant woodland within one km of water sources (nesting habitat) (DEWHA, 2009b). The *Habitat Management Guidelines for the Black-throated Finch (Poephila cincta cincta) in the Brigalow Belt North Bioregion* include the following performance indicator (NRA, 2011): *"Water sources are located within 200 m of and not more than 400 m from foraging habitat and near woody vegetation."*

CONVERTING EACH SCORING METRIC SCORE INTO A VALUE BETWEEN 0 AND 10

To provide a consistent scoring system, the score for each scoring metric was converted into a value between 0 and 10, where 10 represents the maximum score. The method for each scoring metric is provided below.

Canopy cover

This scoring metric was informed by the percentage of canopy cover recorded for each Assessment Unit. The scoring was as follows:

- If the canopy cover for an Assessment Unit was between 10 and 30 per cent, it received a score of 10
- If the Assessment Unit had less than 10 per cent canopy cover, the score was compared to a range of 0 to 10, where 0 is the minimum and 10 is the maximum (see below)
- If the Assessment Unit had more than 30 per cent canopy cover, the score was compared to a range of 30 – 100, where 30 is the best score (while still being the minimum), and 100 is the worst score (see below)

If canopy cover was less than 10 per cent, it was converted into a score between 1 and 10 using the following calculation:

$$Canopy\ cover\ score = \frac{Percentage\ canopy\ cover}{10} \times 10$$

If canopy cover was greater than 30 per cent, it was converted into a score between 1 and 10 using the following calculation:

$$Canopy\ cover\ score = \frac{100 - Percentage\ canopy\ cover}{100 - 30} \times 10$$

Distance to and permanency of water

The scoring for this scoring metric was applied using the matrix set out in Table 6.

Table 6: Matrix used for the distance to and permanency of water scoring metric

		Distance from water		
		< 400 m	**400 m to 1 km**	**> 1 km**
Permanency of water	**Permanent**	10	7.5	0
	Ephemeral	5	2.5	0

CALCULATING AN OVERALL SCORE FOR QUALITY AND AVAILABILITY OF HABITAT REQUIRED FOR SHELTER AND BREEDING

The overall score for quality and availability of habitat required for shelter and breeding was calculated by converting the sum of the two scoring metric scores into a score between 0 and 10. The maximum sum of scores for the scoring metrics was 20.

The following calculation was used to generate a score between 1 and 10:

$$Quality\ and\ availability\ of\ habitat\ required\ for\ shelter\ and\ breeding\ = \frac{sum\ of\ scoring\ metric\ scores}{20} \times 10$$

2.4.4 CALCULATION OF THE FINAL SCORE FOR SITE CONDITION

As discussed in Section 2.1, the overall site condition score for each Assessment Unit was scored out of 4. The overall score for site condition was calculated by converting the sum of the three indicator scores (See Sections 2.4.1, 2.4.2, and 2.4.3) into a percentage of the maximum possible score (30), and taking that percentage to provide a score out of four.

The following calculation was used to convert the indicator scores into an overall score between 1 and 4:

$$ite\ condition\ score = \frac{sum\ of\ component\ scores}{30} \times 4$$

2.5 SITE CONTEXT SCORING METHOD

Site context measures the relative important of a site for a species in relation to the broader landscape. This considers the connectivity of the site with other areas of habitat, movement patterns of the species, and the role of the site in relation to the overall population (Commonwealth of Australia, 2012b).

A number of indicators were used to inform the site context score for each Assessment Unit. These included:

- Patch size
- Connectivity
- Context
- Absence of threats
- Quality and availability of habitat required for mobility

The method used to score each of these indicators, and the method used to calculate the overall score, is provided below.

2.5.1 PATCH SIZE

The method for scoring the patch size of an Assessment Unit involved:

1. Calculating the patch size of habitat within and adjacent to the Project Area
2. Comparing the patch size against a benchmark
3. Converting the score into a value between 0 and 10

CALCULATING THE PATCH SIZE OF HABITAT WITHIN AND ADJACENT TO THE PROJECT AREA

Patch size was calculated as the area of the Assessment Unit and any remnant or regrowth vegetation which is contiguous with the Assessment Unit as set out in the *BioCondition Assessment Manual* (Queensland Herbarium, 2015).

State vegetation mapping was used to inform patch size outside of the Project Area (Queensland Government, 2023).

COMPARING THE PATCH SIZE AGAINST A BENCHMARK

There are well established relationships between the size of a patch of native vegetation and the size and persistence of populations, with large patches generally supporting more persistent populations than smaller patches (Margules and Pressey, 2000). In the context of BTF, the minimum area of habitat required to sustain a viable breeding colony is not known. It has been suggested that areas of habitat that are 40 to 50 ha in size, within 500 m of a nesting colony of BTF, may be necessary for viability (DEWHA, 2009a).

Therefore, a benchmark score of 50 ha has been used as the optimal size of a patch.

CONVERTING THE SCORE INTO A VALUE BETWEEN 0 AND 10

To provide a consistent scoring system, the patch size for each Assessment Unit was converted into a score between 0 and 10, where 10 represents the maximum score. Note that if the total habitat exceeds the benchmark (>50 ha), then the Assessment Unit receives the maximum score (10).

The patch size was converted into a score between 1 and 10 using the following calculation:

$$Patch\ size\ score = \frac{Patch\ size}{50} \times 10$$

2.5.2 CONNECTIVITY

Connectivity of each Assessment Unit was scored using the method set out in the *BioCondition Assessment Manual* (Queensland Herbarium, 2015). This involves calculating the proportion of the Assessment Unit perimeter that is connected with remnant or regrowth vegetation. The scoring of this metric was informed by survey results for the Project Area, and state vegetation mapping outside the Project Area (Queensland Government, 2023b).

The criteria and scoring method are outlined below in Table 7.

Table 7: Scoring method for connectivity (taken from (Queensland Herbarium, 2015)***)**

Criteria	Score
The assessment unit is not connected using any of the below descriptions.	0
The assessment unit: • Is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR • Is connected with adjacent remnant vegetation along <10% of its perimeter AND • Is connected with adjacent regrowth native vegetation > 25% of its perimeter	4
The assessment unit: • Is connected with adjacent remnant vegetation along 50% to 75% of its perimeter.	8
The assessment unit: • Is connected with adjacent remnant vegetation along >75% of its perimeter OR • Includes > 500 ha remnant vegetation	10

*Note that the scoring method has been adapted to provide a score between 0 and 10.

2.5.3 CONTEXT

The context of each Assessment Unit was scored using the method set out in the *BioCondition Assessment Manual* (Queensland Herbarium, 2015). This involves calculating the proportion of native vegetation within a 1km radius. The scoring of this metric was informed by state vegetation mapping (Queensland Government, 2023b).

The criteria and scoring method are outlined below in Table 8.

Table 8: Scoring method for context (taken from (Queensland Herbarium, 2015)***)**

Criteria	Score
• <10% remnant vegetation AND <30% native non-remnant vegetation (regrowth)	0
• ≥10% to 30% remnant vegetation AND <30% regrowth OR • <10% remnant vegetation AND ≥30% regrowth	4
• ≥30% to 75% remnant vegetation OR • ≥10% to 30% remnant vegetation AND ≥30% regrowth	8
• >75% remnant vegetation	10

*Note that the scoring method has been adapted to provide a score between 0 and 10.

2.5.4 THREATS

The method for scoring the absence of threats within an Assessment Unit involved:

1. Assessing the absence of threats using a threat matrix
2. Converting the score into a value between 0 and 10

ASSESSING THE ABSENCE OF THREATS USING A THREAT MATRIX

The absence of threats is used to indicate the magnitude of all known or potential threats that may impact on the species within an area (State of Queensland, 2020).

Threats to the BTF as identified in the *Significant impact Guidelines for the Endangered Black-throated Finch* (DEWHA, 2009b) include:

- Habitat loss, fragmentation and degradation*
- Grazing
- Fire
- Resource bottleneck*
- Drought
- Weed invasion

* Note that habitat loss, fragmentation and degradation, and resource bottleneck were excluded from consideration in this indicator. These threats have been considered within other indicators of site condition and site context.

The *Guide to determining terrestrial habitat quality* (State of Queensland, 2020) provides a threat matrix to assess threat factors. This is based on defining the:

- Scope of the threat – "*The proportion of the species' habitat or local population within the matter area that can reasonably be expected to be affected by the threat within ten years given the continuation of current circumstances and trends*"
- Severity of the threat – *"Within the scope, the level of damage from the threat to the species' habitat/local population that can reasonably be expected given the continuation of current circumstances and trends"*

Table 9 provides the threat matrix used to score the absence of threats within each Assessment Unit. For definitions of the score units, refer to the *Guide to determining terrestrial habitat quality* (State of Queensland, 2020).

Table 9: Threat matrix used to assess the absence of threats (taken from (State of Queensland, 2020)**)**

		Severity				
		Very high (1)	**High (2)**	**Medium (3)**	**Low (4)**	**Very low (5)**
Scope	**Very high (1)**	1	2	3	4	5
	High (2)	2	4	6	8	10
	Medium (3)	3	6	9	12	15
	Low (4)	4	8	12	16	20
	Very low (5)	5	10	15	20	25

For each Assessment Unit, the absence of threats was scored against the threat matrix with advice from experts at Terra Solutions, and the results of field surveys on site (Terra Solutions, 2023).

CONVERTING THE SCORE INTO A VALUE BETWEEN 0 AND 10

To provide a consistent scoring system, the threat matrix score for each threat within each Assessment Unit was converted into a score between 0 and 10, where 10 represents the maximum score.

The threat matrix scores were converted into a score between 1 and 10 using the following calculation:

$$Absence\ of\ threat\ score = \frac{Threat\ matrix\ score}{25} \times 10$$

This resulted in three threat scores (grazing, drought and bushfire) between 0 and 10 for each Assessment Unit. The overall absence of threat score for each Assessment Unit was calculated by taking the average of these scores.

2.5.5 QUALITY AND AVAILABILITY OF HABITAT REQUIRED FOR MOBILITY

The *Guide to determining terrestrial habitat quality* (State of Queensland, 2020) recommends assessing the quality and availability of habitat required for mobility as an indicator of habitat quality.

There is limited understanding of specific habitat requirements, and potential barriers to mobility for BTF. However, the species is known to occupy open woodlands and open forests (DCCEEW, 2023). Further, the species has not been observed foraging in areas with dense woody vegetation and appears to avoid habitats with high shrub cover (Rechetelo, 2015). Therefore, the density of shrub cover has been used as a scoring metric for quality and availability of habitat required for mobility.

The method for scoring the density of shrub cover involved:

1. Estimating shrub cover within each Assessment Unit
2. Comparing shrub cover within each Assessment Unit against a benchmark
3. Converting the score into a value between 0 and 10

ESTIMATING SHRUB COVER WITHIN THE PROJECT AREA

For each Assessment Unit, an estimate of the percentage of shrub cover was informed by the results of field surveys. Each Assessment Unit was given an average shrub cover score between 0 and 100 per cent.

COMPARING SHRUB COVER IN THE PROJECT AREA AGAINST A BENCHMARK

The *Habitat Management Guidelines for the Black-throated Finch (Poephila cincta cincta) in the Brigalow Belt North Bioregion* include the following performance indicator (NRA, 2011): *"Tree canopy remains open (crowns do not overlap) and shrub stratum remains sparse (crowns well separated)".*

Sparse is defined to comprise 10 to 30 per cent density (Specht, 1970). Therefore, shrub cover of less than 30 per cent was used as a benchmark.

CONVERTING THE SCORE INTO A VALUE BETWEEN 0 AND 10

The scoring for this scoring metric was as follows:

- If the percentage of shrub cover in an Assessment Unit is less than 30 %, the Assessment Unit receives a score of 10
- If the percentage of shrub cover in an Assessment Unit is greater than 30 %, a score between 1 and 10 was generated using the following formula

$$Shrub\ cover\ score = \frac{100 - Percentage\ of\ shrub\ cover}{30 - 100} \times 10$$

2.5.6 CALCULATION OF THE FINAL SCORE FOR SITE CONTEXT

As discussed in Section 2.1 the overall context score for each Assessment Unit was scored out of 3. The overall score for site context was calculated by converting the sum of the four indicator scores (See Sections 2.5.1, 2.5.2, 2.5.4 and 2.5.5) into a percentage of the maximum possible score (40), and taking that percentage to provide a score out of 3.

The following calculation was used to convert the indicator scores into an overall score between 1 and 3:

$$Site\ context\ score = \frac{sum\ of\ indicator\ scores}{40} \times 3$$

2.6 SPECIES STOCKING RATE SCORING METHOD

Species stocking rate refers to the density or usage of a species on the site. This principle considers the importance of the site for the species irrespective of condition or context and draws on survey information as well as considering the role of the site population for the overall population (Commonwealth of Australia, 2012b).

The *How to use the offsets assessment guide* (Commonwealth of Australia, 2012b) defines species stocking rate to include the:

- Presence of the species on the site
- Density of the species known to utilise the site
- Role of the site population in regard to the overall species population

The method used to score each of these indicators, and the method used to calculate the overall score, is provided below.

2.6.1 PRESENCE OF THE SPECIES ON THE SITE

The presence of the species on the site was informed by site surveys (Terra Solutions, 2023) and WildNet records. Table 10 provides the scoring criteria for this indicator.

Table 10: Scoring criteria used for presence of the species on the site

Score	Criteria
0	Species not recorded on the site or on the adjacent site
5	Confirmed presence on adjacent site
10	Confirmed presence on site

2.6.2 DENSITY OF THE SPECIES KNOWN TO UTILISE THE SITE

The method for scoring the density of the species known to utilise the site involved:

1. Determining the density of individuals in each Assessment Unit
2. Comparing the density of individuals on site to a benchmark
3. Converting the score into a value between 0 and 10

DETERMINING THE DENSITY OF INDIVIDUALS ON THE SITE

Density of individuals was informed by field survey records (Terra Solutions, 2023) and WildNet records. Where appropriate, the number of individuals noted in a species record was used in the density score.

COMPARING THE DENSITY OF INDIVIDUALS ON SITE TO A BENCHMARK

BTF occurs mostly in pairs, or in small flocks of up to 20 birds. It is noted that larger flocks of up to 160 birds have been recorded (DCCEEW, 2024). It has been assumed that a flock of 20 or above can be considered as a larger flock of BTF.

Therefore, a flock of 20 individuals was used as the benchmark.

CONVERTING THE SCORE INTO A VALUE BETWEEN 0 AND 10

To provide a consistent scoring system, the total population size for each Assessment Unit was converted into a score between 0 and 10, where 10 represents the maximum score. Note that if the total population size exceeds the benchmark (>20), then the Assessment Unit receives the maximum score (10).

The total population sizes were converted into a score between 1 and 10 using the following calculation:

$$Density\ score = \frac{Total\ population\ size}{20} \times 10$$

2.6.3 ROLE OF THE SITE POPULATION IN REGARD TO THE OVERALL SPECIES POPULATION

The role of the site population in regard to the overall species population was informed by species records (from field surveys and WildNet records), and the Important Areas for BTF as defined by the *Significant impact guidelines for the endangered Black-throated finch (southern) (Poephila cincta cincta)* (DEWHA, 2009b). Table 10 provides the scoring criteria for this indicator.

Table 11: Scoring criteria used for the role of the site population in regard to the overall species population

Score	Criteria
0	Species not recorded on the site
5	Site **is not** within an Important Area (DEWHA, 2009a), and species presence has been confirmed on site
10	Site **is** within an Important Area (DEWHA, 2009a), and species presence has been confirmed on site

2.6.4 CALCULATION OF THE FINAL SPECIES STOCKING RATE SCORE

As discussed in Section 2.1 the overall species stocking rate score for each Assessment Unit was scored out of 3. The overall score for species stocking rate was calculated by converting the sum of the three indicator scores (See 2.6.1, 2.6.2 and 2.6.3) into a percentage of the maximum possible score (30), and taking that percentage to provide a score out of 3.

The following calculation was used to convert the indicator scores into an overall score between 1 and 3:

$$Species\ stocking\ rate = \frac{sum\ of\ indicator\ scores}{30} \times 3$$

2.7 METHOD TO DETERMINE THE FINAL HABITAT QUALITY SCORE

The final habitat quality score was calculated as the sum of the three component scores as follows:

$$Habitat\ quality\ score = Site\ condition\ score + Site\ context\ score + Species\ stocking\ rate\ score$$

The result was a final habitat quality score between 0 and 10. The score was rounded to the nearest whole integer for input into the EPBC Act Offsets Assessment Guide.

3 Results of the habitat quality assessment method

This chapter provides the:

- Overall habitat quality scores for each Assessment Unit
- Detailed results against each indicator

3.1 OVERALL HABITAT QUALITY SCORES

The overall habitat quality scores are provided in Table 12.

Table 12: Overall habitat quality scores for each Assessment Unit

Component	Maximum score	Score for AU1	Score for AU2	Score for AU3
Site condition	4	1.7	2.0	2.0
Site context	3	1.7	1.8	1.1
Species stocking rate	3	0.5	0.5	0.5
Overall Score	**10**	**3.9**	**4.3**	**3.6**
Rounded score*	**10**	**4**	**4**	**4**

* The EPBC offset assessment guide (the calculator) can only be used with whole integers. As a result the scores for each Assessment Unit are rounded.

3.2 DETAILED RESULTS AGAINST EACH INDICATOR

This section provides the results of the habitat quality assessment method. This includes the scores for:

- Site condition (Table 13)
- Site context (Table 14)
- Species stocking rate (Table 15)

Table 13: Detailed results for site condition

Indicator number	Indicator/scoring metric		Raw score			Final Score		
			AU1	AU2	AU3	AU2	AU1	AU3
1. Site-based attributes								
1.1	Estimated BioCondition score		10	30	30	3.3	3.8	3.8
2. Quality and availability of food and habitat required for foraging								
2.1	Abundance of preferred food grass	Percentage of early perennial groundcover	0	0	0	0	0	0
		Percentage of foraging habitat	55	10	0	3.7	0.7	0
		Total score for scoring metric 2.1				**3.7**	**0.7**	**0**
2.2	Species richness of food grasses	Number of foraging species present	>6	0	0	5	0	0
		Number of native foraging species present	0	0	0	0	0	0
		Total score for scoring metric 2.2				**5**	**0**	**0**
2.3	Mosaic of bare patches and grass		50	30	70	8.3	7.5	5.0
Total score for quality and availability of food and habitat required for foraging						**5.7**	**2.7**	**1.7**
3. Quality and availability of habitat required for shelter and breeding								
3.1	Percentage of canopy cover		0	30	30	0	10	10
3.2	Distance to and permanency of water	Distance to water (m)	700	960	50	7.5	7.5	5
		Permanency of water	Permanent	Permanent	Ephemeral			
Total score for quality and availability of habitat required for shelter and breeding						**3.8**	**8.8**	**7.5**
Total score for site condition						**1.7**	**2.0**	**2.0**

Table 14: Detailed results for site context

Indicator number	Indicator		Raw score			Final score		
			AU1	AU2	AU3	AU1	AU2	AU3
4	Patch size (ha)		77.7	64.5	0.9	10	10	0.2
5	Connectivity	Connectivity with Remnant veg (%)	8.0	52.5	0	0	8	0
		Connectivity with Regrowth veg (%)	0	0	0			
6	Context	Percentage of Remnant veg in 1 km (%)	20.5	20.5	20.5	4	4	4
		Percentage of Regrowth veg in 1 km (%)	0	0	0			
7	Absence of threats	Grazing	16	6	6	6.4	2.4	2.4
		Fire	16	16	16	6.4	6.4	6.4
		Weed invasion	8	8	4	3.2	3.2	1.6
		Drought	9	9	9	3.6	3.6	3.6
		Total score for indicator 7				**4.9**	**3.9**	**3.5**
8	Quality and availability of habitat required for mobility	Percentage of shrub cover	0	70	10	10	4.3	10
Total score for site context						**1.7**	**1.8**	**1.1**

Table 15: Detailed results for species stocking rate

Indicator number	Indicator	Raw score			Final score		
		AU1	AU2	AU3	AU1	AU2	AU3
9	Presence of the species on the site	Recorded adjacent to site	Recorded adjacent to site	Recorded adjacent to site	5	5	5
10	Density of the species known to utilise the site	0	0	0	0	0	0
11	Role of the site population in regard to the overall species population	Species not present	Species not present	Species not present	0	0	0
Total score for species stocking rate					**0.5**	**0.5**	**0.5**

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