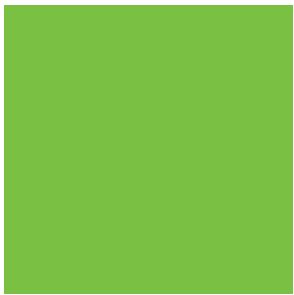
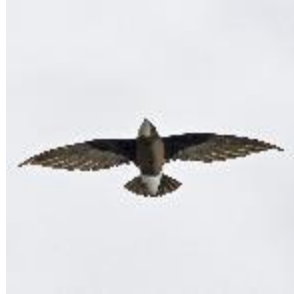




Appendix P Matters of National Environmental Significance Management Plan



Townsville City Council

Matters of National Environmental Significance Management Plan

1 September 2023

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Acronyms and Abbreviations

Acronym	Definition
BMP	Bushfire Management Plan
CEMP	Construction Environmental Management Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EMM	EMM Consulting
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
GRP	Glass Reinforced Polymer
Ha	Hectares
LEIP	Lansdown Eco-Industrial Precinct
MP	Management Plan
MNES	Matters of National Environmental Significance
NC Act	Nature Conservation Act 1992
OMP	Offset Management Plan
QLD	Queensland
RE	Regional Ecosystem
SPRAT	Species Profile and Threats Database
TCC	Townsville City Council
WMPPM	Weed and Pest Management Plan
WoNS	Weeds of National Significance

Section 1 Introduction

1.1 Background

Townsville City Council (TCC) is delivering the Lansdown Eco-Industrial Precinct (LEIP) Project, Northern Australia's first environmentally sustainable advanced manufacturing, technology, and processing hub. The LEIP will realise the objectives of the Townsville City Deal (a tri-partisan agreement spanning 15 years and all levels of government) to activate industry and export growth for Townsville and its regional partners as the Industry Powerhouse of the North.

The LEIP is located on approximately 2,200 hectares (ha) of freehold land owned by TCC.

Five initial proponents have been conditionally allocated land in the precinct following tender processes conducted by TCC. These proponents are:

- Queensland Pacific Metals;
- Edify Energy;
- Origin Energy Future Fuels Pty Ltd;
- Solquartz Pty Ltd; and
- North Queensland Gas Pipeline.

A tract of Sport & Recreation zoned land directly adjacent the LEIP was leased to DriveIT NQ in 2016 for the creation of a multi-use motorsport facility. Construction commenced in 2021 with the main track recently completed.

On 25 March 2022, TCC formally endorsed the infrastructure masterplan for the LEIP. Under the masterplan, over the next 15 – 20 years the LEIP will be developed in the following stages:

- Stage 0 Enabling Infrastructure (2022-2025) – essential early enabling infrastructure works (as shown on Figure 1-1) to service the LEIP that primarily involves road access at the northern and southern section of the LEIP and a raw water network (including external pipeline, storage dam, internal pump station and internal pipeline) to service the initial proponents;
- Stage 1 (2022 – 2025) – Initial proponents obtain all various approvals and commence construction of their facilities;
- Stage 2 (2026-2030) – Initial proponents move into full and expanded operations. Expansion to the south, with provision of necessary infrastructure to service other proponents; and
- Stages 3 & 4 (2031-2041) – Final expansion and infill of infrastructure to service those areas remaining. Proponents' operations continue to grow. Enhancement of infrastructure as the LEIP continues to be further developed.

Stage 0 (Enabling Infrastructure) is the action that is the subject of the EPBC referral (2022/09383) and this Preliminary Documentation. Therefore, only the water infrastructure network and access roads shown in Figure 1-1 are considered under this Preliminary Documentation. Further information on the Project's enabling infrastructure is detailed in Section 1.3.

Development of the various land parcels within the LEIP (i.e., Stages 1 to 4) will be undertaken by the various proponents, with separate EPBC Act processes where applicable. Other future infrastructure to support future proponents would also be subject to separate EPBC Act processes.

While future projects within the LEIP project boundary will be subject to future EPBC Act processes, an overarching constraints analysis assessment was undertaken as part of the Master Planning process which included identifying environmentally sensitive areas (refer to the TCC LEIP Master Plan 2022). As a result of this assessment, mapped regional ecosystems (up to 308 ha), which have the potential to provide suitable habitat for EPBC listed species, have been classified as moderate to highly constrained areas. Therefore, of the total LEIP Project area of 2,056.5 ha, it is considered that only 1,627.6 ha is developable land.

Future projects will need to carry out detailed assessment before development can proceed. The mapped regional ecosystems and environmentally sensitive areas require ground truthing to understand the condition and suitability of habitat for EPBC listed species. Two proponents (Drive-it NQ and QPM) have carried site specific environmental investigations, including EPBC referrals/self-assessment, for sections of the developable land within the precinct, therefore a total of 1,459.8 ha of land remains, of which 1,161.6 ha is considered developable.

Calibre Professional Group Pty Ltd (Calibre) has been assisting the TCC with the engineering design works for the LEIP Enabling Infrastructure and CDM Smith Australia Pty Ltd (CDM Smith) has been engaged to provide environmental and approvals support. EMM Consulting Pty Ltd (EMM) has provided a third-party review of the draft preliminary documentation.

1.2 Purpose

The EPBC Act referral (EPBC 2022/09383) for the Project was deemed a controlled action, assessment by preliminary documentation on 23 December 2022. This Matters of National Environmental Significance (MNES) Management Plan (MP) is to demonstrate how impacts on the 'listed threatened species and communities' and their habitat, will be avoided, mitigated, and managed. The applicable 'listed threatened species and communities' are known to or are likely to occur within the Project. An additional list of fauna species were noted by DCCEEW in the RFI on 20 January 2023 which were also considered during the preliminary documentation stage. Species included in this MNES MP are:

- Black-throated finch (southern) (*Poephila cincta cincta*);
- Bare-rumped sheathtail bat (*Saccolaimus saccolaimus nudicluniatu*);
- Squatter pigeon (southern) (*Geophaps scripta scripta*);
- White-throated needletail (*Hirundapus caudacutus*);
- Australian painted snipe (*Rostratula australis*);
- Fork-tailed swift (*Apus pacificus*);
- Glossy ibis (*Plegadis falcinellus*);
- Black-faced monarch (*Monarcha melanopsis*);
- Barn swallow (*Hirundo rustica*); and
- Oriental cuckoo (*Cuculus optatus*).

As per the significant impacts assessment for the Koala (*Phascolarctos cinerus*) in the Preliminary Documentation, we do not believe the Koala to be likely to occur within the Project area.

1.3 Project Description

The LEIP has been formed to foster Australia's first environmentally sustainable, advanced manufacturing, technology, and processing hub which will result in significant economic benefit to the local, regional and State economy. The LEIP is located approximately 38 km south of Townsville, adjacent and west of Flinders Highway. The enabling infrastructure is contained within the LEIP site and numerous existing road reserves including Flinders Highway, Woodstock Giru Road, Major Creek Road, Jones Road, Woodstock Avenue, Old Flinders Highway, No Name Road, Unnamed Road, Ghost Gum Road and Bidwilli Road. The LEIP location and its components are provided in Figure 1-1, refer to Appendix C of the Preliminary Documentation for a copy of detailed design plans. To facilitate the development of the LEIP, enabling infrastructure is required and a summary of project components is outlined in Table 1-1.

Table 1-1 Summary of project components forming LEIP enabling infrastructure

Project Component	Description Summary
Water Infrastructure	
External Pipeline	<ul style="list-style-type: none"> ▪ Extends from Ross River Dam Pipeline, connecting existing water supply network to LEIP; ▪ Connection occurs adjacent to three intersection junctions at Majors Creek; ▪ Total length of 16.25 km, within a 20 m construction corridor; ▪ 4.5 m from the nearest property boundary; ▪ Constructed using DN900 glass reinforced polymer (GRP) pipe; and ▪ Pipeline protection, erosion control and scour prevention materials used.
Internal Pipeline	<ul style="list-style-type: none"> ▪ Installed within the No Name Road existing and new road reserve from Ghost Gum Rd to Manton Quarry Rd; ▪ 3.8 km Ductile Iron Cement Lined (DICT) pipeline; and ▪ Various diameters including DN250 to DN500 to suit water demand of each individual proponent.
Storage Dam	<ul style="list-style-type: none"> ▪ Proposed immediately south of Bidwilli Road at the termination of the external pipeline; ▪ Occupies an area of approximately 26 ha; ▪ Storage capacity of approximately 437 ML; and ▪ Access via Bidwilli Road.
Internal Pump Station	<ul style="list-style-type: none"> ▪ New pump station immediately east of the storage dam; ▪ Connects storage dam and internal pipeline; and ▪ Access via Bidwilli Road.
Site Laydown Area	<ul style="list-style-type: none"> ▪ Approximately 1.7 ha in area, north east of Flinders Highway and Woodstock Giru Road intersection.
Access Roads	
Jones Road to Flinders Highway Upgrade	<ul style="list-style-type: none"> ▪ Modifications to existing roads and intersections required; and ▪ All roads are existing sealed roads within road reserves.
Jones Road Intersection Upgrade	<ul style="list-style-type: none"> ▪ Existing road; ▪ Connection to No Name Road (north) via an upgraded intersection; and ▪ Upgraded to 10 m wide pavement within the 30 m wide road reserve for approximately 900 m in length to connect to Old Flinders Highway.
Closure of Existing Level Crossings	<ul style="list-style-type: none"> ▪ Two existing level crossings will be closed; and ▪ No change to land tenure, road reserves or road infrastructure.
No Name Road (north) Upgrade	<ul style="list-style-type: none"> ▪ Extends 1.7 km from northern LEIP boundary to Jones Road; ▪ New road, new 10 m wide pavement within an existing 20 m road reserve; ▪ Designed to accommodate heavy vehicles; ▪ Road reserve will be expanded to 30 m in width with a 10 m wide land resumption on the western side of the road corridor; and ▪ Forecast for 2,340 vehicles per day, with 35% heavy vehicle usage.
No Name Road (south) Upgrade	<ul style="list-style-type: none"> ▪ New, 10 m wide road pavement within a new 30 m road reserve; ▪ Designed to accommodate heavy vehicles; ▪ Extends approximately 2.2 km from Bidwilli Road to Manton Quarry Road; and ▪ Design is not yet complete but will adopt the same cross section as No Name Road (north)
Bidwilli Road	<ul style="list-style-type: none"> ▪ Minor modifications required to connect to No Name Road (south) and provide access to internal pump station and storage dam; ▪ Raw water pipeline to be installed within Bidwilli Road reserve on the southern side; and ▪ Northern side of the road reserve will allow for a 4.25 m service corridor for future resources.

Project Component	Description Summary
Unnamed Road	<ul style="list-style-type: none"> ▪ East-West road north of Manton Quarry Road. ▪ Existing road reserve is 20 m wide; ▪ Design is not yet complete, however will adopt the same cross section and details to No Name Road (north and south); ▪ New, 10 m wide road pavement designed to accommodate heavy vehicles; and ▪ New 10 m wide easement will be added to the northern boundary of Unnamed Road for drainage and future services.
Flinders Highway Upgrade	<ul style="list-style-type: none"> ▪ Shoulder widening required. The shoulder widening works are contained within the existing Flinders Highway road reserve
Creation of Easements	<ul style="list-style-type: none"> ▪ 45 m wide easement on western side of No Name Road (south); ▪ A 10m wide easement on the northern side of Unnamed Road; and ▪ A 20m wide easement within the southern side of the existing Ghost Gum road reserve.

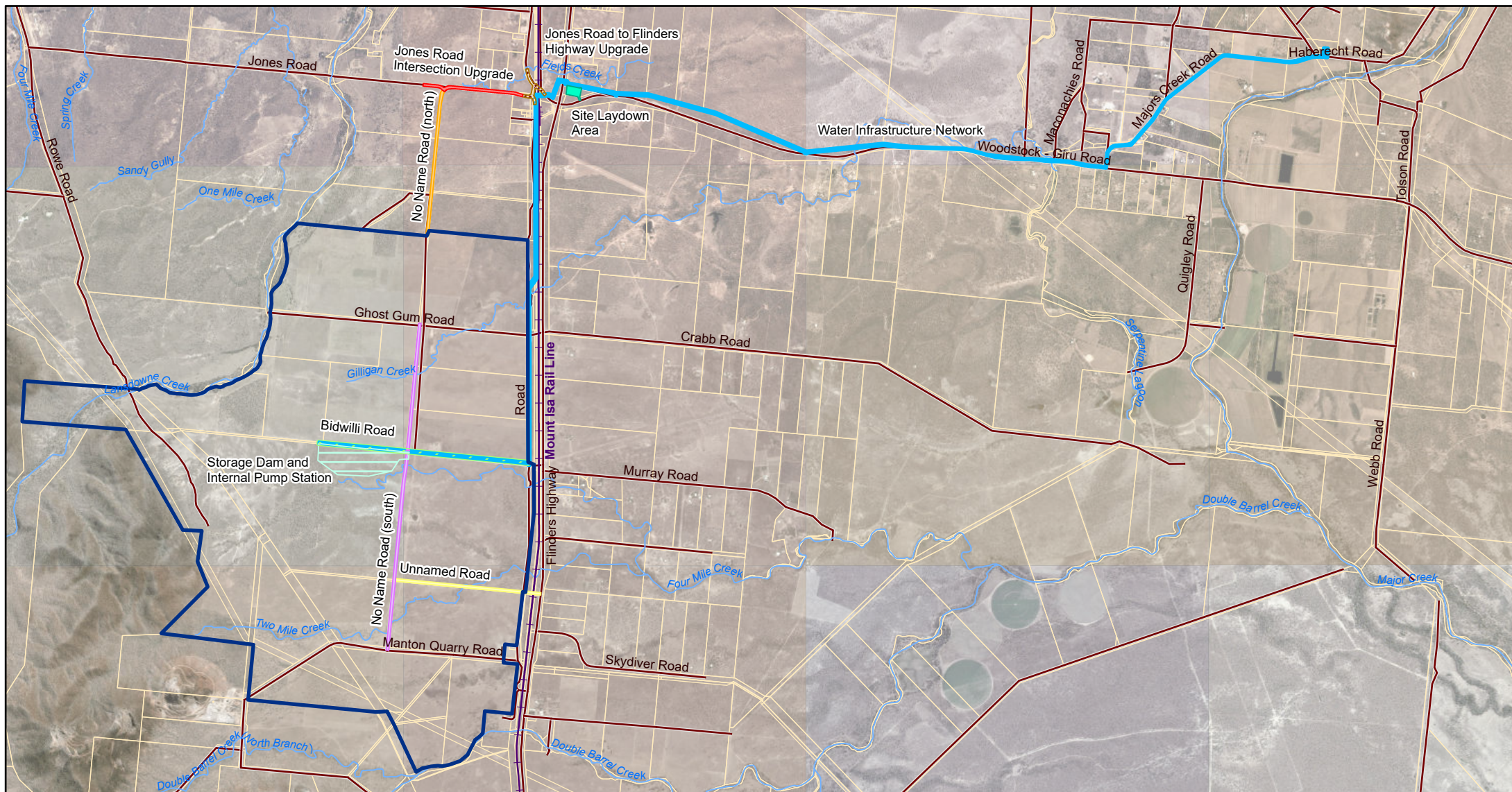
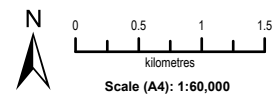


Figure 1-1 Project Location and Project Components

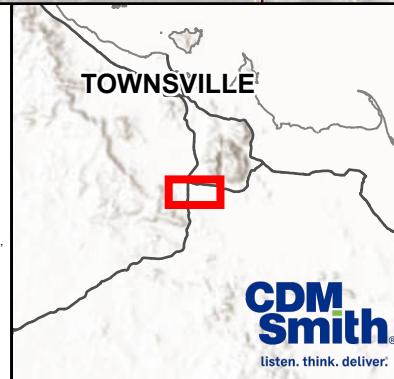
LEGEND

- | | | |
|--|---------------------------------------|-----------------|
| LEIP Precinct Boundary | Bidwilli Road | Rail Network |
| Jones Road Intersection Upgrade | Unnamed Road | Existing Roads |
| Jones Road to Flinders Highway Upgrade | Water Infrastructure Network | Watercourse |
| No Name Road (north) | Storage Dam and Internal Pump Station | Cadastre (DCDB) |
| No Name Road (south) | Site Laydown Area | |



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 Project: Figure1_PublicExhibition.aprx
 Client: 1001483 TCC - LEIP Prelim Documentation
 Projection: GDA 1994 MGA Zone 55

Esri, Geoscience Australia, NASA, NGA, USGS, Esri, USGS
 Imagery: Queensland Satellite Data QSat 2017.
 DISCLAIMER
 CDM Smith has endeavoured to ensure accuracy and completeness of the data. CDM Smith assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.



1.4 Proponent

The proponent details are outlined in Table 1-2.

Table 1-2 Proponent Details

	Proponent Details
Organisation name (as registered for ABN/CAN)	Townsville City Council
ABN	44741992072
Business address	103 Walker Street, Townsville, QLD 4810
Postal address	PO Box 1268, Townsville, QLD 4810
Primary contact	Danny Lynch
Job title	Program Director – Major Projects, Infrastructure and Operations

1.5 Relationships to Other Plans

The MNES MP is one of several plans that outline management measures and controls for the Project, including the:

- Construction Environmental Management Plan (CEMP);
- Weed and Pest Management Plan (WPMP); and
- Bushfire Management Plan (BMP).

1.6 Management Review and Document Control

1.6.1 Review

The MNES MP will be reviewed regularly by TCC or their delegate annually, including by the Project Manager and by any construction or operations manager. The reviews may be run in conjunction with wider Project team meetings and will consider the following:

1.6.2 Document Updates and Control

Relevant parties will be notified of any changes (key roles identified in Section 3) and then disseminated to the broader team. This can be through management meetings, special communications or toolbox talks.

Section 2 Legislative Requirements

2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation that provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the EPBC Act as matters of national environmental significance (MNES).

- Protected matters under the EPBC Act are:
- World heritage properties;
- National heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Nationally threatened species and ecological communities;
- Migratory species protected under international agreements;
- Commonwealth marine areas;
- Great Barrier Reef Marine Park;
- Nuclear actions; and
- A water resource in relation to coal seam gas and large coal mining development.

Proponents may refer projects to the Australian Government Minister for the Environment (the Minister) for a determination on whether their project is a controlled action or not a controlled action. If the action described in the referral is deemed to be a controlled action, then it is likely to have the potential for a significant impact on MNES and an assessment process must be undertaken in accordance with the decision from the Minister.

Where significant impacts to MNES are deemed likely to occur and are unavoidable, a project proponent may be required to compensate by providing environmental offsets in accordance with the EPBC Act Environmental Offsets Policy (DSEWPC, 2012a).

The EPBC referral was submitted to DCCEEW on 23 November 2022. On 22 December 2022, a delegate of the Minister for the Environment determined the Project a controlled action under the EPBC Act and will be assessed by Preliminary Documentation (EPBC 2022/09383). The controlling provisions were determined to be listed threatened species and communities (sections 18 and 18A).

2.1.1 Matters of National Environmental Significance: Significant Impact Guidelines 1.1 – EPBC Act

The Significant Impact Guidelines 1.1 are provided under the EPBC Act and are required where an action has, will have, or is likely to have a significant impact on a matter of national environmental significance. The Significant Impact Guidelines 1.1 provide a 'self-assessment' process using detailed criteria for conservation categories (i.e., Endangered/Critically Endangered and Vulnerable species and Threatened Ecological Communities) to assist in determining whether a referral is required to be submitted to the Australian Government Department of the Environment (DoE) for a decision by the Minister on whether assessment and approval is required under the EPBC Act.

2.2 New Listings or Delisting

Species conservation listings under the EPBC Act may change over time, either becoming listed, delisted or their conservation status has changed (i.e., vulnerable to endangered). Under section 158a of the EPBC Act, if a species or ecological community becomes newly listed (defined as a 'listing event') after the Department of Climate Change, Energy, the Environment and Water (DCCEEW) decision on whether an action is a controlled action then the action will not be affected by the listing event. The controlled action decision date for the Project is 23 December 2022 and the listing date for each species and ecological community is listed under each individual plan in Section 5.

In the event that a species that is known or likely to occur within the Project area is delisted, the requirements prior to delisting will remain applicable for the duration of the Project, dependent on state and/or federal legislations or permit conditions. However, in the event a species with no specific management requirements is delisted, management measures and species-specific plans are no longer applicable.

Section 3 Roles and Responsibilities

All personnel involved in the Project (including Project employees, contractors and subcontractors) are required to undertake activities in accordance with this MNES MP. The key roles and responsibilities for the Project are outlined in Table 3-1.

Table 3-1 Project Roles and Responsibilities

Position	Responsibilities
The Client (Principal)	<ul style="list-style-type: none"> ▪ Obtaining state and Commonwealth statutory approvals; ▪ Reviewing contractors construction phase plans and submittals for executing works; ▪ Monitor and inspect Contractors construction activities for Health Safety and Environment (HSE) and Quality compliance; ▪ Monitor progress of site work to verify that the Contractors are executing works in accordance with their contract requirements; and ▪ Undertake environmental and cultural heritage audits to verify compliance with this MNES MP.
Contractors	
Project Manager	<ul style="list-style-type: none"> ▪ Preparation of construction specific management plans, quality plans and HSE plans; ▪ Ensuring that the project environmental performance meets client requirements; ▪ Responsible for the integrity of the work and commercial performance of the Project; ▪ Ensure all environmental requirements are implemented in accordance with the project approvals, client requirements, the specification, the contract requirements and legislative obligations; ▪ Reviewing and implementing this MNES MP; ▪ Communicating requirements of this MNES MP to the Project team, and ensuring compliance; ▪ Ensuring Project environmental documentation records are maintained and provided to the client and their representatives as necessary; ▪ Engage qualified and experienced staff and provide management support to ensure all activities relating to environmental performance are undertaken by trained and competent personnel and in accordance with the contract; and ▪ Select subcontractors and suppliers based on an evaluation of their ability to meet the specified requirements including those for environmental and ensure compliance.
Site Supervisor	<ul style="list-style-type: none"> ▪ Ensure all environmental requirements are implemented in accordance with the project approvals, client requirements, the specification, the contract requirements and legislative obligations; ▪ Monitor the effectiveness of the environmental controls implementation and escalate issues for rectification to the Project manager; ▪ Monitor the subcontractors and suppliers based on an evaluation of their ability to meet the specified requirements including those for environmental and ensure compliance; ▪ Manage the development of construction methods, ensuring that complex of specific processes for safety, environment or quality aspects for the portion of the works are completed in accordance with construction codes of best practice, legislative requirements, client specifications and in coordination with the Project Manager and HSE Advisor; ▪ Ensure that all personnel are inducted in their roles and responsibilities; ▪ Establish and maintain a list of current contact names and telephone numbers for all personnel relevant to environmental matters. This list will include (but not limited to): <ul style="list-style-type: none"> - Principle’s Representative; - Contractor’s Site Supervisors; - HSE Manager; and - DES Pollution Hotline (PH 1300 130 372). ▪ Conduct daily visual inspections and weekly site checklists.

Section 3 Roles and Responsibilities

Position	Responsibilities
Contractor HSE Manager	<ul style="list-style-type: none"> ▪ Ensure all workers are aware of the MNES MP requirements related to their scope of work; ▪ Establish and plan the controls for environmental compliance for the Project; and ▪ Maintain the Project non-conformance system.
All Site Personnel	
All personnel	<ul style="list-style-type: none"> ▪ Follow the requirements and carry out work in accordance with this MNES MP and those of the Site Supervisor; ▪ Report any potential environmental issues to the site supervisor, including: <ul style="list-style-type: none"> - Dust generation; - Non-conformance to noise and vibration; - Non-conformance to air quality; - Uncontrolled waste storage. ▪ Exercise due care, skill and judgement when carrying out tasks; ▪ Implement corrective actions which have been approved by the appointed site supervisor; ▪ Comply with all relevant environmental laws associated with the delivery of the Project and undertake works in accordance with the BSC Environmental Policy (BSC, 2018).

Section 4 Matters of National Environmental Significance

4.1 Ecology Survey Effort

Surveys for the LEIP Enabling Infrastructure were carried out by Evolve Environmental Solutions Pty Ltd (Evolve) which have been supplemented by surveys undertaken by EMM Consulting (EMM) as part of other nearby projects. Information from the EMM Survey was completed for the Access Road referral (EPBC 2022/09281) which overlaps with part of the Project.

A total of ninety-one fauna species were recorded during field survey efforts, excluding domestic livestock. Eighty-five of the detected species were native, with the majority being avian species. During the survey events, the following number of species were recorded:

- 28 March to 1 April 2022 Survey - 40 fauna species, 36 of these being native;
- 22 and 27 May 2022 - 92 fauna species were recorded during the field survey effort, 85 of the detected species were native, with 75 being avian species;
- 12 to 16 September 2022 and 10 to 14 October 2022 - 88 fauna species were recorded during the field survey effort within 1km of the road alignments including domestic species, 72 of the detected species were native, with the majority 69 being avian species; and
- 6 to 10 February 2023 – 93 fauna species were recorded during the field survey effort within 1 km of road alignment, including domestic species. Of the 93, 77 were native species, with the majority 70 being avian species. The field survey identified three microbat species (least concern) and one reptile species (least concern).

4.2 Characteristics of the Project Area

The Project area is predominantly situated within historically cleared vegetation as a result of agricultural and cattle grazing practices, with the majority of terrestrial flora species comprising of invasive species. The Project area intersects multiple areas mapped as MSES Wildlife Habitat.

The total Project footprint is approximately 87.58 hectares (ha) and is generally classed as Least Concern Regional Ecosystems (REs) 11.3.30 and 11.3.35 vegetation. Four REs were confirmed to occur within the Project area, including:

- RE 11.3.30 – *Eucalyptus crebra*, *Corymbia dallachiana* woodland on alluvial plains
- RE 11.3.35 – *Eucalyptus platyphylla*, *Corymbia clarksoniana* woodland on alluvial plains
- RE 11.3.35b – *Eucalyptus platyphylla*, *Corymbia clarksoniana* woodland on alluvial plains; and
- RE 11.3.12 – *Melaleuca viridiflora*, *M. argentea* +/- *M. dealbata* woodland on alluvial plains

All four of the REs confirmed to occur within the Project area are classed as least concern and Category B and Category R vegetation under the *Vegetation Management Act 1999*.

Regulated vegetation essential habitat intersects the Project area in north-west of the Project Area (Jones Road and No Named Road), in the south-west near Manton Quarry Road and in the north-east of the Project Area (along Woodstock Giru Road and Majors Creek Road). There are no areas of Category B Endangered or Of Concern mapped within the Project Area. A number of mapped waterways intercept the Project area and one wetland, being Serpentine Lagoon.

4.3 Threatened Species Habitat Mapping

Ten threatened or migratory species under the EPBC Act were identified as either known or likely to occur within the Project area, including:

- Black-throated finch (southern);

Section 4 Matters of National Environmental Significance

- Squatter pigeon (southern);
- Bare-rumped sheathtail bat;
- White-throated needletail;
- Australian Painted snipe;
- Fork-tailed swift;
- Black-faced monarch;
- Glossy ibis;
- Barn swallow; and
- Oriental cuckoo.

The ecological surveys undertaken during 2022 and 2023 identified the presence of three threatened fauna species listed as either endangered or vulnerable under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The three identified species included:

- Black-throated finch (southern);
- Squatter pigeon (southern); and
- Bare-rumped sheathtail bat.

The ecological surveys also recorded the following migratory species:

- Fork-tailed swift;
- Black-faced monarch;
- Glossy ibis;
- Barn swallow; and
- Oriental cuckoo.

As part of the ecological assessments conducted, habitat mapping was undertaken for the listed species known or likely to occur within the Project area, based on detailed vegetation mapping and the presence of microhabitats of relevant species and are outlined in the following subsections. For additional information please refer to the Preliminary Documentation.

Black-throated finch (southern)

The whole of the alignment provides either suitable foraging or breeding habitat for this species. Vegetated areas have been noted as breeding due to the species nesting requirements, whilst grassland only areas have been noted as foraging. Regularly slashed and maintained roadsides (e.g., along Woodstock Giru Road) have been excluded from foraging habitat as this species feed on the seeds of grasses and this would be largely absent from these areas.

Habitat mapping identified 29.9 ha was deemed to be foraging habitat only, whilst a further 48.8 ha was determined to provide breeding and foraging habitat.

Bare-rumped sheathtail bat

Foraging habitat can be noted on the alignment as the species has a fast, direct flight and is likely to forage primarily for aerial insects over the woodland/forest canopy but may fly lower when foraging over open situations. All areas of the Project area provide this foraging habitat. It is highly unlikely that roost sites are to be found unless hollows are expertly assessed, as the species remains silent at roosting sites and is only audible when disturbed. Vegetation with hollows at around 200 mm diameter constitute possible roosting habitat. Potential roosting hollows were observed once during the

Section 4 Matters of National Environmental Significance

October 2022 survey and seven times during the February 2023 survey. Each of these and an additional hollow within the alignment have been mapped as roosting habitat and total 0.11 ha.

Squatter pigeon (southern)

Habitat mapping has been provided based on the following habitat requirements as per the Species Profile and Threats Database (SPRAT):

- Breeding habitat: remnant/regrowth open forest to sparse open woodland within 1 km of suitable permanent waterbodies (stream order 3 to 5 and perennial watercourses have been considered);
- Foraging habitat: remnant/regrowth open forest to sparse open woodland within 3 km of suitable seasonal or permanent waterbodies;
- Dispersal habitat: any forest or woodland occurring between breeding and foraging habitat, or pasture with scattered trees less than 100 m apart.

A habitat mapping exercise has noted the following habitat is suitable for the squatter pigeon:

- Breeding habitat: 19.58 ha;
- Foraging habitat: 26.6 ha; and
- Dispersal habitat: 2.94 ha.

White-throated needletail

There is some potential for roosting habitat in the Project area although any mature woodland could provide potential roosting habitat. Potential roosting habitat is likely to be restricted to Lansdown Creek and Serpentine Lagoon. No habitat map has been prepared for this species as it is an aerial insectivore that spends most of its time aloft, and could occur anywhere over the Project area, therefore the whole Project area is considered potential foraging habitat.

Australian painted snipe

Breeding habitat for the Australian painted snipe does not occur onsite. The habitat mapping exercise noted that there is approximately 1.19 ha that could potentially be considered suitable foraging habitat for the species, being the swampy, *Melaleuca* area with some adjacent grassland. Majority of premier habitat for the Australian painted snipe is located near Serpentine Lagoon and associated wetlands to the north of the alignment near Serpentine Lagoon.

Fork-tailed swift

This species was previously recorded by EMM (EMM, 2022) in the area and suitable habitat occurs within the Project area. It is considered a species that spends most of its time aloft, and could occur anywhere over the Project area, therefore the whole Project area is considered potential foraging habitat.

Black-faced monarch

An individual was sighted by Evolve in riparian vegetation during September site surveys. Potential foraging habitat within the alignment totals 2.64 ha.

Glossy ibis

The premier habitat for the Glossy ibis is located within Serpentine Lagoon and associated wetlands to the North of the alignment near Serpentine Lagoon. Potential foraging and breeding habitat mapped within the locality of Serpentine Lagoon totals 1.19 ha of the alignment.

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Barn swallow

This species was not recorded previously or as part of the PMST. Species was however recorded as part of the second survey (Evolve, 2022b). Species may occur within the locality of Serpentine Lagoon.

Oriental cuckoo

The species was sighted by EMM in 2021 in riparian vegetation. Evolve surveys did not observe the species over the survey periods. The species does not breed in Australia and can therefore be found potentially in any woodland environment, which has been mapped as 48.8 ha of the alignment.

4.4 Threatened Ecological Communities

There were no Threatened Ecological Communities (TECs) were flagged as having a probability of occurrence within the Project area or buffer area by a PMST report generated for the Project. On-ground flora surveys of the Project area found no evidence of any TECs or associated Regional Ecosystems.

4.5 Relevant Plans and Guidelines

Details on species specific conservation advice, guidelines and management plans are provided in Table 4-1. These documents have been reviewed prior to preparing the MP to inform performance criteria and the key threatening processes to be addressed for each of the MNES species.

Section 4 Matters of National Environmental Significance

Table 4-1 Relevant Conservation Advice, Recovery Plans and Threat Abatement Plans

Fauna Species	Relevant Conservation Advice and Management Plans		Key Threats
Black-throated finch (southern) <i>(Poephila cincta cincta)</i>	Conservation Advice:	There is no approved Conservation Advice for this species.	<ul style="list-style-type: none"> ▪ Habitat clearing; ▪ Habitat degradation by pest fauna, food availability and vegetation structure; ▪ Altered fire regimes; ▪ Weed invasion; ▪ Illegal trapping of birds; ▪ Predation; and ▪ Hybridisation with escapees of the northern subspecies.
	Listing Advice:	<i>Commonwealth Listing Advice on Southern Black-throated Finch (Poephila cincta cincta)</i> (TSSC, 2005)	
	Recovery Plans:	<i>National recovery plan for the black-throated finch southern subspecies Poephila cincta cincta</i> (Black-throated Finch Recovery Team et al., 2007).	
	Threat Abatement Plans:	<ul style="list-style-type: none"> ▪ Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses (DSEWPC, 2012b) ▪ Threat abatement plan for competition and land degradation by rabbits (DoEE, 2016) 	
Squatter pigeon (southern) <i>(Geophaps scripta scripta)</i>	Conservation Advice:	<i>Conservation Advice Geophaps scripta scripta squatter pigeon (southern)</i> . (TSSC, 2015)	<ul style="list-style-type: none"> ▪ Habitat clearing; ▪ Habitat fragmentation; ▪ Overgrazing by livestock and feral herbivores; ▪ Invasive weeds; ▪ Thickening of understory vegetation; ▪ Predation by feral cats and foxes; ▪ Trampling of nests by livestock; and ▪ Illegal shooting.
	Listing Advice:	Listing assessment information may be available in the approved Conservation Advice	
	Recovery Plans:	There is no adopted or made Recovery Plan for this species	
	Threat Abatement Plans:	<ul style="list-style-type: none"> ▪ <i>Threat abatement plan for predation by feral cats (DoE, 2015);</i> ▪ <i>Threat abatement plan for competition and land degradation by rabbits (DoEE, 2016)</i> ▪ <i>Threat abatement plan for predation by the European red fox (DEWHA, 2008)</i> 	
Bare-rumped sheathtail bat <i>(Saccolaimus saccolaimus nudicluniatu)</i>	Conservation Advice:	Conservation Advice <i>Saccolaimus saccolaimus nudicluniatu</i> bare-rumped sheathtail bat (TSSC, 2016)	<ul style="list-style-type: none"> ▪ Habitat loss and degradation; ▪ Competition for tree hollows; ▪ Frequent burning; and ▪ Disease.
	Listing Advice:	Listing assessment information may be available in the approved Conservation Advice	
	Recovery Plans:	<i>National recovery plan for the bare-rumped sheathtail bat Saccolaimus saccolaimus nudicluniatu</i> (shulz & Thomson, 2007)	
	Threat Abatement Plans:	No Threat Abatement Plan has been identified as being relevant for this species	

Section 4 Matters of National Environmental Significance

Fauna Species	Relevant Conservation Advice and Management Plans		Key Threats
Australian painted snipe (<i>Rostratula australis</i>)	Conservation Advice:	<i>Approved Conservation Advice for Rostratula australis (Australian painted snipe)</i> (DSEWPC, 2013).	<ul style="list-style-type: none"> ▪ Habitat loss and degradation; and ▪ Predation by feral animals.
	Listing Advice:	<i>Commonwealth Listing Advice on Rostratula australis (Australian painted snipe)</i> (TSSC, 2013).	
	Recovery Plans:	There is no adopted or made Recovery Plan for this species. Recovery plan required.	
	Threat Abatement Plans:	No Threat Abatement Plan has been identified as being relevant for this species.	
White-throated needletail (<i>Hirundapus caudacutus</i>)	Conservation Advice:	<i>Conservation Advice Hirundapus caudacutus White-throated Needletail</i> (TSSC, 2019)	<ul style="list-style-type: none"> ▪ Habitat loss and degradation; ▪ Collision with human built structures (e.g., windows, powerlines); ▪ Loss of roosting habitat; and ▪ Secondary poisoning from insecticides
	Listing Advice:	Listing assessment information may be available in the approved Conservation Advice	
	Recovery Plans:	There is no adopted or made Recovery Plan for this species	
	Threat Abatement Plans:	No Threat Abatement Plan has been identified as being relevant for this species	
Migratory Birds			
Fork-tailed swift (<i>Apus pacificus</i>)	Conservation Advice:	There is no approved Conservation Advice for this species	<ul style="list-style-type: none"> ▪ No significant threats in Australia. ▪ Potential threats: ▪ Habitat destruction; and ▪ Predation by feral animals
	Listing Advice:	There is no Listing Advice for this species	
	Recovery Plans:	There is no adopted or made Recovery Plan for this species	
	Threat Abatement Plans:	<i>Threat abatement plan for predation by feral cats</i> (DoE, 2015)	
Black-faced monarch (<i>Monarcha melanopsis</i>)	Conservation Advice:	There is no approved Conservation Advice for this species	<ul style="list-style-type: none"> ▪ Window collisions
	Listing Advice:	There is no Listing Advice for this species	
	Recovery Plans:	There is no adopted or made Recovery Plan for this species	
	Threat Abatement Plans:	<i>Threat abatement plan for predation by feral cats</i> (DoE, 2015)	
Glossy ibis (<i>Plegadis falcinellus</i>)	Conservation Advice:	There is no approved Conservation Advice for this species	<ul style="list-style-type: none"> ▪ Wetland destruction and degradation; ▪ Habitat clearing;
	Listing Advice:	There is no Listing Advice for this species	

Section 4 Matters of National Environmental Significance

Fauna Species	Relevant Conservation Advice and Management Plans		Key Threats
	Recovery Plans:	There is no adopted or made Recovery Plan for this species	<ul style="list-style-type: none"> ▪ Grazing by livestock; ▪ Invasion of weeds and pests; ▪ Hunting; ▪ Pesticides; ▪ Disease (influenza); and ▪ Frequent habitat burning;
	Threat Abatement Plans:	No Threat Abatement Plan has been identified as being relevant for this species	
Barn swallow (<i>Hirundo rustica</i>)	Conservation Advice:	There is no approved Conservation Advice for this species	<ul style="list-style-type: none"> ▪ Loss of habitat; and ▪ Pesticides (historically).
	Listing Advice:	There is no Listing Advice for this species	
	Recovery Plans:	There is no adopted or made Recovery Plan for this species	
	Threat Abatement Plans:	No Threat Abatement Plan has been identified as being relevant for this species	
Oriental cuckoo (<i>Cuculus optatus</i>)	Conservation Advice:	There is no approved Conservation Advice for this species	<ul style="list-style-type: none"> ▪ No significant threats in Australia. ▪ Potential threats: ▪ Habitat destruction
	Listing Advice:	There is no Listing Advice for this species	
	Recovery Plans:	There is no adopted or made Recovery Plan for this species	
	Threat Abatement Plans:	No Threat Abatement Plan has been identified as being relevant for this species	

Section 5 Impacts to MNES

This section of the MNES MP outlines the potential impacts to prescribed MNES (as listed in Section 4.3) as a result of the Project.

5.1 Direct Impacts

5.1.1 Vegetation Clearance and Habitat Loss

The Project layout will require clearing of remnant vegetation. There will be no impacts to threatened vegetation communities (including TECs) and any impacts to fauna will be those potentially utilising the remnant habitat on site.

The impacted remnant vegetation is considered Least Concern under the VM Act and is widespread in the surrounding area and bioregion. The following mitigation measures are recommended.

The total Project footprint is approximately 87.58 ha. The disturbance footprints of Project components are identified in Table 5-1.

Table 5-1 Estimated Clearance of National Environmental Significance Habitat

Species	Habitat Type	Habitat Area to be cleared (ha)
Black-throated finch (southern)	Foraging	31.4
	Foraging and Breeding	46.4
Bare-rumped sheathtail bat	Roosting	0.09
	Foraging	79.71
Squatter pigeon (southern)	Breeding	17.87
	Foraging	25.58
	Dispersal	2.64
White-throated needletail	Total	This is an aerial species. Potential roosting habitat is generally absent in the Project area.
Australian painted snipe	Foraging	1.19

5.1.2 Direct Fauna Mortality

Direct mortality of native fauna may occur because of the Project during habitat clearing, entrapment in trenches, and through vehicle collisions.

Mortality during clearing will be managed through the presence of a suitably qualified fauna spotter/catcher during construction. It is anticipated that vehicle collisions caused by an increase in vehicle traffic may pose a risk to native fauna. The following mitigation measures are proposed and further detailed in the Construction Environmental Management Plan (CEMP):

- The Project CEMP includes measures for the establishment of protocols for pre-clearing surveys and data collection regarding fauna incidents;
- Prior to any vegetation disturbance a trained ecologist or other qualified environmental specialist will be on site to remove fauna (if required);

- Fauna shelters and ramps will be installed in trenches to provide shelter and access to exit pathways for entrapped fauna;
- Daily pre-start inspections of the open trench; and
- All vehicles associated with construction will travel at slow speeds to minimise the chance of any fauna strikes occurring.

5.2 Indirect Impacts

5.2.1 Weeds

Sections of the pipeline and road alignment fall within areas of agricultural grazing use as reflected by a high proportion of pastoral grass and legume species such as *Stylosanthes scabra* (shrubby stylo).

The access road corridor is very weed-dense, with open (non-remnant) areas dominated by herbaceous weeds, primarily hyptis (*Hyptis sp.*), joyweed (*Alternanthera sessilis*), grader grass (*Themeda quadrivalvis*), sicklepod (*Senna obtusifolia*), chinee apple (*Ziziphus mauritiana*), rubber vine (*Cryptostegia grandiflora*) and siratro (*Macrosptilium atropurpureum*) and some grasses including signal grass (*Urochloa decumbens*) and *Chloris spp.* (EMM, 2022). Chinee apple, rubber vine and sicklepod are listed as 'Category 3 restricted matters' under *Biosecurity Act 2014*. Chinee apple and rubber vine are also Weeds of National Significance (WoNS) at Commonwealth level. The majority of this area is mapped as Category X, non-remnant vegetation.

Throughout the construction, the Project has the potential to impact on these ecological values through the following activities:

- Vegetation clearing;
- Topsoil stripping;
- Construction of above ground buildings and facilities;
- Construction of road infrastructure; and
- General transportation movements.

Weed invasion within and surrounding the Project area has the potential to be facilitated numerous activities including vegetation clearing and soil disturbance. Invasive flora generally spread within disturbed environments and have the potential to degrade fauna habitats and wetland habitats (aquatic weeds), increase intensity of bushfires and compete with native flora.

Weeds have the potential to impact on MNES threatened fauna species during all Project phases.

5.2.2 Pest Fauna

Ten introduced and pest fauna species were recorded during field surveys, five of which are listed as Restricted Matters under the Biodiversity Act (DAF, 2020). Of particular note are the cane toad (*Rhinella marina*), domestic cat (*Felis catus*), red fox (*Vulpes vulpes*), and feral pig (*Sus scrofa*). Cane toads are listed as a key threatening process under the EPBC Act. The species has had a dramatic impact on populations of native fauna in Australia, including numerous threatened species. An additional 12 species were identified as likely to be present within a 20 km radius of the Project area through Wildlife Online searches.

The impacts of pest fauna have the potential to be increased during the construction of the Project due to clearing of vegetation resulting in reduced refuges for prey species and increased visibility for feral predators.

5.2.3 Noise and Vibration

Proposed construction activities and methods may be the source of noise and vibration impacts for receptors located in close proximity of the works. Noise sources may include:

- Vehicles and equipment, primarily the dozer and excavator;
- Construction of infrastructure including culverts and stormwater drainage (trenching);
- Generator sets to supply power;
- Light trucks/utility vehicles;
- Excavation and stockpiling of construction and clearing material;
- Haulage of excavation material; and
- Reversing alarms on vehicles and equipment.
- Management and mitigation measures engaged during construction are considered to minimise the likelihood of environmental nuisance related to potential impacts.
- Noise generated from construction activities is anticipated to be temporary in nature and associated primarily with earthworks activities.
- The introduction of new noise sources has the potential to:
 - Impact humans including sleep disturbance;
 - Create an annoyance or loss of acoustic amenity;
 - Impact on migratory birds; and
 - Impact fauna behaviours.

Noise and vibration may have impacts on fauna, particularly during the construction phase of the Project. Noise can have adverse impacts on fauna by interfering with communication for mating, territory maintenance, and alarm calls when threats are detected. Noise may also cause stress and avoidance of the area during and after construction activities, masking of predator and prey sounds. These impacts can potentially lead to changes in the mating and other reproductive behaviours, threat avoidance behaviours and prey detection behaviours.

Post-construction, noise and vibration levels are expected to return to levels similar to those during pre-construction, with the exception of traffic noise on new roads around the Precinct. Therefore, any significant impacts relating to noise and vibration disturbance will be temporary.

5.2.4 Artificial Lighting

Artificial lighting has the potential to impact fauna during the construction and operational phases of the Project. Sources of artificial light sources are lights required during any night construction works, roadside lighting along roads surrounding the Precinct, and lighting around the Precinct for operational or safety reasons. Artificial lighting may cause fauna to avoid lit areas, provide greater visibility to predators, distribution of diurnal and nocturnal activity patterns (including reproductive behaviours), and attract insects and potentially attract insectivorous species, such as the Bare-rumped sheath-tail bat.

5.2.5 Dust

Increased dust resulting from clearing vegetation, exposure of soil, earthworks, vehicle movements and other construction activities has the potential to impact flora and fauna in the area. Increased dust can result in reduction of vegetative growth, reduction in habitat quality, respiratory problems for fauna, and increased sedimentation in

waterways. Dust is expected to be of concern during the construction phase only, and therefore any impacts are likely to be temporary.

5.2.6 Fire

The risk of fire during construction and operation activities is expected to be appropriately managed under the Bushfire Management Plan and measure outlined in the CEMP. Uncontrolled bushfire has the potential to threaten the lives of people and fauna, contribute to habitat loss, increased erosion and sedimentation of waterways, food availability, change species composition and increase the likelihood of weed invasion and spread.

5.2.7 Impact Summary

A summary of the above listed impacts which pose potential to impact MNES as a result of the project are summarised in Table 5-2.

Table 5-2 Summary of Potential Impacts to MNES

Impacts	Potential Impacts to MNES	Impacted MNES Species	Applicable Project Phase
Vegetation clearing	Removal of vegetation that provides foraging and/or breeding habitat for threatened species likely or known to occur within the area.	Black-throated finch (southern) Bare-rumped sheath-tail bat Squatter pigeon (southern) White-throated needletail Australian painted snipe Fork tailed swift Glossy ibis Black-faced monarch Barn swallow Oriental cuckoo	Clearing
Direct fauna mortality	Vehicle strike may result in direct mortality of fauna species traversing the Project area and surrounds. As a result of the Project, an increase of vehicle and machinery traffic is expected, particularly during clearing and construction phases.	Black-throated finch (southern) Squatter pigeon (southern) White-throated needletail Australian painted snipe Fork tailed swift Glossy ibis Black-faced monarch Barn swallow Oriental cuckoo	All Project phases, particularly during clearing and construction.

Section 5 Impacts to MNES

Impacts	Potential Impacts to MNES	Impacted MNES Species	Applicable Project Phase
Invasive flora	Weed invasion within and surrounding the Project area has the potential to be facilitated numerous activities including vegetation clearing and soil disturbance. Invasive flora generally spread within disturbed environments and have the potential to degrade fauna habitats and wetland habitats (aquatic weeds), increase intensity of bushfires and compete with native flora.	Black-throated finch (southern) Squatter pigeon (southern) White-throated needletail Australian painted snipe Fork tailed swift Glossy ibis Black-faced monarch Barn swallow Oriental cuckoo	All Project phases, particularly during clearing and construction.
Invasive fauna	The impacts of pest fauna have the potential to be increased during the construction of the Project due to clearing of vegetation resulting in reduced refuges for prey species and increased visibility for feral predators.	Black-throated finch (southern) Squatter pigeon (southern) Bare-rumped sheath tail bat White-throated needletail Australian painted snipe Fork tailed swift Glossy ibis Black-faced monarch Barn swallow Oriental cuckoo	All Project phases, particularly during clearing and construction.
Noise and vibration	Noise can have adverse impacts on fauna by interfering with communication for mating, territory maintenance, and alarm calls when threats are detected. Noise may also cause stress and avoidance of the area during and after construction activities, masking of predator and prey sounds. These impacts can potentially lead to changes in the mating and other reproductive behaviours, threat avoidance behaviours and prey detection behaviours.	Black-throated finch (southern) Bare-rumped sheath tail bat Squatter pigeon (southern) White-throated needletail Australian painted snipe Fork tailed swift Glossy ibis Black-faced monarch Barn swallow Oriental cuckoo	All Project phases, particularly during clearing and construction.
Artificial lighting	Artificial light during night works has the potential to impact habitat occupation within the Project area and on adjacent land.	Bare-rumped sheath tail bat	Construction and operation.

Section 5 Impacts to MNES

Impacts	Potential Impacts to MNES	Impacted MNES Species	Applicable Project Phase
Air quality and dust	Increased dust can result in reduction of vegetative growth, reduction in habitat quality, respiratory problems for fauna, and increased sedimentation in waterways.	Black-throated finch (southern) Bare-rumped sheathtail bat Squatter pigeon (southern) White-throated needletail Australian painted snipe Fork tailed swift Glossy ibis Black-faced monarch Barn swallow Oriental cuckoo	Construction
Fire	Uncontrolled bushfire has the potential to threaten the lives of people and fauna, contribute to habitat loss, increased erosion and sedimentation of waterways, food availability, change species composition and increase the likelihood of weed invasion and spread.	Black-throated finch (southern) Bare-rumped sheathtail bat Squatter pigeon (southern) White-throated needletail Australian painted snipe Fork tailed swift Glossy ibis Black-faced monarch Barn swallow Oriental cuckoo	All Project phases, particularly during clearing and construction.

Section 6 Individual Species Plans

6.1 Black-throated finch (southern)



Plate 1 Black-throated finch (southern) (Queensland Finch Society, 2018¹)

Description

The Black-throated finch (southern) (*Poephila cincta cincta*) is listed as endangered under both the EPBC Act and *Nature Conservation Act 1992* (NC Act). *Poephila cincta cincta* is a small, granivorous bird approximately 120 mm in length and weighing approximately 15 grams. The species exhibits a distinctive black throat, a fawn body colouring, a white rump and pink feet.

Distribution

The Black-throated finch (southern) is distributed within two general locations, including the Townsville region and scattered sites in central-eastern Queensland.

Biology and Reproduction

The southern black throated finch inhabits woodland savannahs, areas of riverine vegetation, grassy, open woodlands and forests, typically dominated by *Eucalyptus*, *Corymbia* and *Melaleuca* species, often near watercourses, or in the vicinity of water. As a general rule areas of seeding grass within 5km of a permanent water source can be considered habitat in the species model distribution area.

Southern black-throated finch breed in colonies throughout the year, however, is dependent on conditions and varies within its range. Within the Townsville Black-throated finch communities breeding generally occurs during the wet season (particularly from February to May); however, within its broader range, breeding is also known to occur from August to December. Black-throated finch typically reach sexual maturity at six months of age, where both sexes assist in building a nest, incubation of up to nine eggs and in feeding and brooding stages of the young. Breeding habitat of the species generally occurs within non-remnant vegetation underlain with solodic soils and alluvial plains.

Habitat

Preferred habitat for the Black-throated finch consists of woodland savannahs, areas of riverine vegetation, grassy, open woodlands and forests typically dominated by *Eucalyptus*, *Corymbia* and *Melaleuca* species, near watercourses, or in the vicinity of water.

¹ Queensland Finch Society (2018) - <https://qfs.org.au/conservation/black-throated-finch-recovery-program/>

As a general rule areas of seeding grass within 5 km of a permanent water source can be considered habitat in the species model distribution area.

Project Area Occurrence

Field surveys conducted in 2022 had one positive species sighting close to Serpentine Lagoon just off Woodstock Giru Road, however due to visual similarity and range overlap it was unable to be determined whether these sightings were the endangered (NC Act and EPBC Act) white rumped southern subspecies, *Poephila cincta cincta*, or the least concern northern subspecies *Poephila cincta atropygialis*. During the February 2023 survey, a pair of Black-throated finch (southern) were confirmed and observed foraging adjacent to the pipeline alignment.

The alignment of the road and water pipeline crosses several drainage and creek crossings, and traverses near both natural and man-made permanent water bodies. The whole of the alignment provides either suitable foraging or breeding habitat for this species. Vegetated areas have been noted as breeding due to the species nesting requirements, whilst grassland only areas have been noted as foraging.

Threats

Key threats to the black-throated finch (southern) include:

- Clearance and fragmentation of woodlands, riparian habitats and wattle shrublands;
- Degradation of habitat by domestic stock and rabbits, including alterations to fuel load, vegetation structure and wet season food availability;
- Alteration of habitat by changes in fire regime;
- Invasion of habitat by exotic weed species, including exotic grasses;
- Illegal trapping of birds;
- Predation by introduced predators; and
- Hybridisation with escapees of the northern subspecies.

Project Specific

Project specific threats to the Black-throated finch (southern) include the clearing of foraging and breeding habitat.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP. Specific management measures for the Black-throated finch (southern) as per the National Recovery Plan for the Black-throated finch (southern) (BTFR et al., 2007) which are proposed to be employed on the Project include:

- Management of overgrazing of the riparian grassland;
- Management of clearing and fragmentation of woodland, riverside habitats and wattle shrubland;
- Management practices aimed at minimising impacts on habitat by domestic stock and rabbits, including alterations to fuel load, vegetation structure and wet season food availability;
- Fire management; and
- Weed management strategies to minimise invasion of habitat by exotic weed species, including toxic grasses.

Management and mitigation measures specific to the Black-throated finch (southern) as a result of Project impacts are outlined in Table 6-1. Additional management measures that are relevant to all fauna are further listed in the CEMP.

Table 6-1 Management Measures Relevant to the Black-throated Finch (Southern)

No.	Action	Responsibility
L24	Disturbed areas are to be progressively rehabilitated during and post construction.	Project Manager / Site Supervisor
W21	Clearing areas to be minimised to only the extent required.	Site Supervisor
TF1	Vegetation clearing will be strictly limited to those areas required for earthworks and construction of the Project.	Project Manager / Site Supervisor
TF2	Access roads, parking, laydown, stockpiling areas, etc. should occur (where possible) in previously cleared areas to avoid the need to clear additional vegetation in the Project area.	Project Manager / Site Supervisor
TF3	Obtain operational works permit for clearing native vegetation (VM Act) for applicable areas.	Client
TF4	A Weed and Pest Management Plan has been developed for the Project with specific advice for key identified species. The plan includes management of weed spread, management of pest infestations and monitoring effectiveness of control measures. The Project area is currently subject to high levels of weed infestation in areas.	Project Manager
TF5	Weed management actions will include hygiene protocols, washdown procedures, monitoring and management of weeds, and vehicle access restrictions.	Project Manager
TF6	Where clearing activities involve disturbing topsoil from known weed infestation areas, this soil material should be quarantined and not used in rehabilitation. The soil contaminated with weed seeds can be buried to a depth of at least 1 m below ground surface.	Site Supervisor
TF7	Conserve and stockpile topsoil containing native seed-bearing vegetation for use in rehabilitation.	Site Supervisor
TF8	Any materials brought onto site (such as gravel and soil) will be certified as weed and disease free.	Site Supervisor
TF9	Vegetation located adjacent to the Project construction works to be appropriately marked to avoid unnecessary clearing/vegetation damage.	Site Supervisor
TF10	The pre-construction environment should be reinstated, and vegetation re-established where it does not affect the Project operation and integrity.	Site Supervisor
TF11	Visual inspection of progressively rehabilitated areas.	Site Supervisor
TF12	Monitoring and weed inspections particularly in response to reported outbreaks or complaints from adjacent property owners.	Site Supervisor
TF13	Implementation of sediment control mechanisms to minimise the risk of weed seed washing into drainage channels.	Project Manager / Site Supervisor
TF14	Formal weed mapping will be undertaken as part of pre-construction activities to confirm weed presences along the Project corridor and form the basis of a Project Weed and Pest Management Plan. The Plan must include management direction taken from the <i>Biosecurity Act 2014</i> and regional biosecurity and pest management plans.	Project Manager

Section 6 Individual Species Plans

No.	Action	Responsibility
TF15	Implement control strategies outlined in the Department of Agriculture and Fisheries (DAF) weed and pest animal fact sheets and other relevant government biosecurity management strategies.	Project Manager
TF16	Weed management during and following rehabilitation to prevent habitat degradation and potential increased fire risk.	Site Supervisor
TF17	Disturbed areas will be rehabilitated using appropriate plant species from locally sourced seed.	Site Supervisor
TF18	Revegetation works to be undertaken where land has been disturbed for construction where land is not required for operations.	Site Supervisor
TF19	Areas stripped of topsoil for Project construction to be rehabilitated as soon as practicable where not required during operations.	Site Supervisor
TF20	Refine location of work areas where it overlaps with ground-truthed remnant vegetation to avoid disturbance as far as possible.	Site Supervisor
TF21	Survey and pegged disturbance footprint, prior to clearing to avoid unnecessary clearing of vegetation beyond that detailed during the design phase.	Site Supervisor
WPMP4	Annual weed mapping to understand nature of the spread of weeds and plan weed control activities for the following 12 months.	Project Manager / Site Supervisor
WPMP5	Undertake routine inspections within the Project area to identify potential new weed species and to determine success of controlling existing species	Site Supervisor
WPMP11	Flora and fauna (native and pest species) will be managed in accordance with the requirements of the: <ul style="list-style-type: none"> ▪ Environmental Protection and Biodiversity Conservation Act 1999; and ▪ Biosecurity Act 2014. 	Project Manager / Site Supervisor
FS1	Clearing of woody vegetation will be undertaken with a suitably qualified wildlife handler to: <ul style="list-style-type: none"> ▪ Inspect habitat in advance of clearing and relocate fauna, ▪ Advise on clearing techniques that will minimise fauna impact, and ▪ Records of fauna interactions will be retained. <p>The fauna spotter/catcher will inspect hollow-bearing limbs prior to removal using a cherry picker. Alternatively, hollows may be checked following plugging of hollow entrances and controlled lowering. In circumstances where access of an elevated work platform is not possible and/or the hollow is in the main trunk, an excavator with a vertical tree-grab attachment may be used to lower a tree to the ground for inspection by the fauna spotter/catcher (Hanger & Nottidge 2021).</p>	Project Manager / Site Supervisor
FS2	Pre-clearance surveys will identify any breeding places for threatened species, and should breeding places be encountered, a response which is consistent with the requirements of any approved Species Management Program under which the fauna spotter catcher(s) will be working	Site Supervisor
FS3	Native fauna that are to be relocated must be handled by suitably qualified and authorised fauna handlers only. Records of all relocations must be retained in accordance with requirements of the CEMP.	Project Manager
FS10	All fauna encountered (e.g., vehicle strike or during clearing activities) will be recorded in a central register by the Project Environment Manager. Any injured fauna will be reported as required in the MP that will be in place for the Project.	Project Manager / All personnel

Section 6 Individual Species Plans

No.	Action	Responsibility
FS14	Disturbed areas will be rehabilitated using appropriate plant species from locally sourced seed.	Site Supervisor
FS15	All construction personnel will be instructed on their responsibilities relating to avoiding and minimising the introduction/attraction to the construction site of feral animals.	Site Supervisor
FS16	A Weed and Pest Management Plan has been developed for the Project with specific advice for key identified species. The plan will include management of weed and pest infestations and monitoring effectiveness of control measures.	Project Manager
FS17	Onsite waste storage and disposal (especially food wastes) will be managed to discourage presence of pest fauna (i.e., covered bins/skips to prevent fauna access).	Site Supervisor
FS18	To reduce the risk of mortality to native wildlife, no domestic animals are permitted onsite.	All personnel
FS19	Avoid impact on fauna habitat, including mature trees and root systems, where possible.	All personnel
FS20	Prior to any vegetation disturbance, a trained ecologist or other qualified environmental specialist to be onsite to inspect and remove fauna (if required). All fauna recorded during pre-clearing surveys will be recorded on a dedicated fauna register. Construction areas that pose a risk to fauna to be fenced off where practical.	Project Manager
FS22	To ensure minimal impact on amphibian species and all minimal requirements for different amphibian species are achieved, construction of culverts should be generally in accordance with the Fauna Sensitive Road Design Manual, Volume 2 (Department of Transport and Main Roads) (Special attention to Section 6.6, Chapter 6 and Section 7.2, Chapter 7), where practical. The proposed reinforced RCPs are expected to provide connectivity at key habitat areas.	Project Manager / Site Supervisor
FS26	Implement control strategies outlined in the DAF weed and pest animal fact sheets and other relevant government biosecurity management strategies.	Project Manager / Site Supervisor
FS27	Regular onsite inspections of site infrastructure / equipment for resident pest fauna and establishment of a register for pest sightings.	Site Supervisor
FS29	Avoid clearing trees with obvious hollows. If trees are required to be removed the proponent shall engage the services of a licensed, qualified Spotter Catcher to complete preclearing checks and be present during removal. They should also inspect the "no go" zone and clearing limits prior to clearing. If hollow bearing trees do require removal, they should first be inspected using an elevated work platform to determine if fauna are present. If fauna are detected, they would be safely removed prior to tree felling.	All Personnel / Project Manager / Site Supervisor
A9	Onsite burning of any material will not be undertaken without a valid permit from the relevant QFES Fire Warden.	Site Supervisor / All personnel
A10	Fire management measures for the Project to be developed and implemented.	Site Supervisor
A11	Ensure onsite fire-fighting equipment is regularly maintained and adequate staff training is implemented.	Site Supervisor
A12	Weed management during and following rehabilitation to prevent habitat degradation and potential increased fire risk.	Site Supervisor

Section 6 Individual Species Plans

No.	Action	Responsibility
A13	Rehabilitate disturbed areas as soon as practicable to restore ground cover and minimise wind erosion.	Site Supervisor
B1	A qualified person will be appointed as Site Safety Advisor during construction and will have on-site a set of safety data sheets (SDS) for hazardous and dangerous materials.	Project Manager
B2	A Bushfire Management Plan will be prepared for Project construction and operations, informed by consultation with the Queensland Fire and Emergency Service (QFES).	Project Manager
B3	The BMP will consider the requirements of the Southern Black-throated Finch in its development. In the Townsville region, cool burns between June and September, no more than one every three years, are most suitable for the Black-throated finch (southern) (DEWHA, 2009). Biomass reduction (for example mowing, slashing, fire etc.) will be avoided during the early wet season resource bottleneck if practicable and safe to do so (e.g., unless required for firebreak maintenance etc).	Environmental Representative
B4	If works are undertaken during the bushfire season, the fire danger rating will be monitored daily through the QFES website.	Project Manager / Site Supervisor
B5	Open fires, including open barbeques, billy fires and brush burning will not be permitted on site.	All personnel
B6	Hot works activities will only be undertaken during a declared Total Fire Ban where an exemption has been issued by QFES.	Site Supervisor
B7	The following precautions will be taken to minimise the possibility of fire due to hot work activities: <ul style="list-style-type: none"> ▪ The area over which hot work will take place will be maintained free of combustible material; ▪ Firefighting equipment, including a validated portable fire extinguisher, and trained personnel will be available during all hot work operations; and ▪ Water trucks will be available to respond to fire. 	Site Supervisor
B8	Vehicles may not idle or be parked in areas of long grass.	All personnel
B9	Smoking is not permitted on site aside from in a designated safe zone.	All personnel
B10	Protocols outlining the fire management measures for the Project will be developed and implemented prior to the Commencement of Project operations.	Site Supervisor
B11	Vegetation within the site will be regularly inspected and managed for fuel loads.	Site Supervisor
WS2	Waste is not to be stored in a manner that poses a fire risk or attracts vermin.	All personnel

Rehabilitation Measures

All disturbed land caused by the construction and operation of the Project must be rehabilitated to meet desirable final acceptance criteria following the completion of construction, decommissioning and/or abandonment for any reason. Rehabilitation measures for the Project consists of stabilisation and rehabilitation works will be completed concurrent to construction and upon completion of construction activities within the Project footprint and surrounding impacted areas. Progressive rehabilitation of clearance areas will be undertaken concurrent to Project construction to ensure safe and effective operation measures and risk minimisation of relevant environmental issues.

Rehabilitation of areas within 400 m of a watercourse, as per the Department of Resources (DoR) Vegetation Management Watercourse and Drainage Feature map will be revegetated with riparian and/or woodland Regional Ecosystems (i.e., Re 11.3.30 and/or RE 11.3.35) and hydromulch comprising endemic grasses to support habitat values for Black-throated finch (southern).

A suitably qualified and experienced contractor will undertake rehabilitation activities (i.e., weed eradication, revegetation, and hydromulching).

Rehabilitation of vegetation that is considered potentially suitable habitat for the Black-throated finch (southern) will consider the following suitable flora species:

- Broad-leafed paperbark (*Melaleuca viridiflora*);
- Clarkson's bloodwood (*Corymbia clarksoniana*);
- Weeping paperbark (*Melaleuca leucadendra*);
- Poplar gum (*Eucalyptus platyphylla*);
- River sheoak (*Casuarina cunninghamiana*);
- Rough-barked apple (*Angophora floribunda*);
- Yellow tea-tree (*Leptospermum flavescens*);
- Sabi grass (*Urochloa mosambicensis*);
- Curly windmill grass (*Enteropogon acicularis*);
- Native millet (*Panicum decompositum*);
- Hairy panic (*Panicum effusum*);
- Bluegrass (*Dichanthium sericeum*);
- Carpet grass (*Alloteropsis semialata*);
- Woodland lovegrass (*Eragrostis sororia*); and
- Kangaroo grass (*Themeda triandra*).

Further details of rehabilitation works are outlined in section 6 of the LEIP Preliminary Documentation.

6.2 Bare-rumped sheathtail bat



Plate 2 Bare-rumped sheathtail bat (DEPWS, 2021²)

Description

The Bare-rumped sheathtail bat (*Saccolaimus saccolaimus nudicluniatus*) is listed as vulnerable under the EPBC Act and endangered under the NC Act. The Bare-rumped sheathtail bat is a large, insectivorous bat with a reddish-brown to dark brown dorsal fur flecked with white and a naked rump (Churchill 1998; Menkhorst & Knight 2001). The Bare-rumped sheathtail bat ranges in a head-body size of approximately 81 to 96 mm, with a weight of 49 to 55 grams.

Distribution

The Bare-rumped sheathtail bat occurs in Australia and Papua New Guinea. Within Australia, the species only occurs within northern and north-eastern Australia, including the Northern Territory and Kimberley regions and northern Queensland. In Queensland, the species is known to occur from Ayr to the Iron Range with most records being near-coastal (TSSC, 2016).

Biology and Reproduction

The species forages for insects high above the canopy and has been observed over gallery forest and melaleuca swamps. Little information is available on foraging habitat due to lack of direct observations however habitat adjacent to roosting locations in the Townsville region has included Poplar Gum woodland on alluvial plains. Breeding within the species is poorly known; however, females typically lactate during the tropical wet season, with a single young.

Habitat

The species is mostly recorded in eucalypt forests and woodlands in near-coastal areas and is also known to be associated with low coastal lowland rainforest (e.g., Iron Range on Cape York). The species roosts in deep tree hollows. All confirmed Australian roosting records (albeit there are few) are from deep tree hollows in Poplar Gum, Darwin Woollybutt or Darwin Stringybark.

² Department of Environment, Parks, Water Security (DEPWS), 2021 - https://nt.gov.au/__data/assets/pdf_file/0007/376117/bare-rumped-sheathtailed-bat.pdf

Project Area Occurrence

Species has previously been recorded onsite using song meters.

Foraging habitat can be noted on the alignment as the species has a fast, direct flight and is likely to forage primarily for aerial insects over the woodland/forest canopy but may fly lower when foraging over open situations. All areas of the Project area provide this foraging habitat. It is highly unlikely that roost sites are to be found unless hollows are expertly assessed, as the species remains silent at roosting sites and is only audible when disturbed.

Thirty potential microbat roosting sites (i.e., hollows and exfoliating bark) were observed by Evolve within and adjacent to the pipeline alignment during the February 2023 survey. However, potential roosting hollows will require an expert assessment to confirm microbat usage.

Threats

Although poorly known, potential threats to the species listed in the Conservation Advice (TSSC, 2016) include:

- Habitat loss and fragmentation;
- Competition for tree hollows by birds (native and non-native) and bees; and
- Too frequent burning, particularly with potential impacts on availability of roosting trees.

Additionally, disease is cited as a possible threat given similar species are known to carry the Australian Bat Lyssavirus.

Project Specific

Project specific threats to the Bare-rumped sheath-tail bat include the clearing of foraging and breeding habitat.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP.

Specific management and mitigation measures outlined in the conservation advice for the Bare-rumped sheath-tail bat include the reduction in frequency, extent and intensity of bushfires, prevention of extensive clearing of trees and known roosting sites and ensuring mature trees and corridors are retained (TSSC, 2016).

Management and mitigation measures specific to the Bare-rumped sheath-tail bat as a result of Project impacts are outlined in Table 6-2. Additional management measures that are relevant to all fauna are further listed in the CEMP.

Table 6-2 Management Measures Relevant to the Bare-rumped Sheathtail Bat

No.	Action	Responsibility
L24	Disturbed areas are to be progressively rehabilitated during and post construction.	Project Manager / Site Supervisor
W21	Clearing areas to be minimised to only the extent required.	Site Supervisor
TF1	Vegetation clearing will be strictly limited to those areas required for earthworks and construction of the Project.	Project Manager / Site Supervisor
TF2	Access roads, parking, laydown, stockpiling areas, etc. should occur (where possible) in previously cleared areas to avoid the need to clear additional vegetation in the Project area.	Project Manager / Site Supervisor
TF3	Obtain operational works permit for clearing native vegetation (VM Act) for applicable areas.	Client
TF7	Conserve and stockpile topsoil containing native seed-bearing vegetation for use in rehabilitation.	Site Supervisor
TF9	Vegetation located adjacent to the Project construction works to be appropriately marked to avoid unnecessary clearing/vegetation damage.	Site Supervisor
TF10	The pre-construction environment should be reinstated, and vegetation re-established where it does not affect the Project operation and integrity.	Site Supervisor
TF11	Visual inspection of progressively rehabilitated areas.	Site Supervisor
TF17	Disturbed areas will be rehabilitated using appropriate plant species from locally sourced seed.	Site Supervisor
TF18	Revegetation works to be undertaken where land has been disturbed for construction where land is not required for operations.	Site Supervisor
TF19	Areas stripped of topsoil for Project construction to be rehabilitated as soon as practicable where not required during operations.	Site Supervisor
TF20	Refine location of work areas where it overlaps with ground-truthed remnant vegetation to avoid disturbance as far as possible.	Site Supervisor
TF21	Survey and pegged disturbance footprint, prior to clearing to avoid unnecessary clearing of vegetation beyond that detailed during the design phase.	Site Supervisor
FS1	<p>Clearing of woody vegetation will be undertaken with a suitably qualified wildlife handler to:</p> <ul style="list-style-type: none"> ▪ Inspect habitat in advance of clearing and relocate fauna, ▪ Advise on clearing techniques that will minimise fauna impact, and ▪ Records of fauna interactions will be retained. <p>The fauna spotter/catcher will inspect hollow-bearing limbs prior to removal using a cherry picker. Alternatively, hollows may be checked following plugging of hollow entrances and controlled lowering. In circumstances where access of an elevated work platform is not possible and/or the hollow is in the main trunk, an excavator with a vertical tree-grab attachment may be used to lower a tree to the ground for inspection by the fauna spotter/catcher (Hanger & Nottidge 2021).</p>	Project Manager / Site Supervisor

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No.	Action	Responsibility
FS2	Pre-clearance surveys will identify any breeding places for threatened species, and should breeding places be encountered, a response which is consistent with the requirements of any approved Species Management Program under which the fauna spotter catcher(s) will be working	Site Supervisor
FS3	Native fauna that are to be relocated must be handled by suitably qualified and authorised fauna handlers only. Records of all relocations must be retained in accordance with requirements of the CEMP.	Project Manager
FS7	In the event that Koala or Bare-rumped sheathtail bat are discovered within the construction footprint, all mobile construction equipment in the surrounding area will cease work, excluding use of light vehicles to move staff to and from the area. Mobile construction equipment will not recommence work until a wildlife handler has removed the individual (if permitted to do so) or it has been confirmed that the individual has left the workspace. Any captured individuals will be removed and relocated to nearby adjacent habitat away from the construction area.	All personnel
FS10	All fauna encountered (e.g., vehicle strike or during clearing activities) will be recorded in a central register by the Project Environment Manager. Any injured fauna will be reported as required in the MP that will be in place for the Project.	Project Manager / All personnel
FS13	Woody debris, logs, tree hollows and rocks will be retained for use in rehabilitation.	Site Supervisor
FS14	Disturbed areas will be rehabilitated using appropriate plant species from locally sourced seed.	Site Supervisor
FS15	All construction personnel will be instructed on their responsibilities relating to avoiding and minimising the introduction/attraction to the construction site of feral animals.	Site Supervisor
FS19	Avoid impact on fauna habitat, including mature trees and root systems, where possible.	All personnel
FS20	Prior to any vegetation disturbance, a trained ecologist or other qualified environmental specialist to be onsite to inspect and remove fauna (if required). All fauna recorded during pre-clearing surveys will be recorded on a dedicated fauna register. Construction areas that pose a risk to fauna to be fenced off where practical.	Project Manager
FS29	Avoid clearing trees with obvious hollows. If trees are required to be removed the proponent shall engage the services of a licensed, qualified Spotter Catcher to complete preclearing checks and be present during removal. They should also inspect the “no go” zone and clearing limits prior to clearing. If hollow bearing trees do require removal, they should first be inspected using an elevated work platform to determine if fauna are present. If fauna are detected, they would be safely removed prior to tree felling.	All Personnel / Project Manager / Site Supervisor
A9	Onsite burning of any material will not be undertaken without a valid permit from the relevant QFES Fire Warden.	Site Supervisor / All personnel
A10	Fire management measures for the Project to be developed and implemented.	Site Supervisor
A11	Ensure onsite fire-fighting equipment is regularly maintained and adequate staff training is implemented.	Site Supervisor
A12	Weed management during and following rehabilitation to prevent habitat degradation and potential increased fire risk.	Site Supervisor
A13	Rehabilitate disturbed areas as soon as practicable to restore ground cover and minimise wind erosion.	Site Supervisor

Section 6 Individual Species Plans

No.	Action	Responsibility
B1	A qualified person will be appointed as Site Safety Advisor during construction and will have on-site a set of safety data sheets (SDS) for hazardous and dangerous materials.	Project Manager
B2	A Bushfire Management Plan will be prepared for Project construction and operations, informed by consultation with the Queensland Fire and Emergency Service (QFES).	Project Manager
B4	If works are undertaken during the bushfire season, the fire danger rating will be monitored daily through the QFES website.	Project Manager / Site Supervisor
B5	Open fires, including open barbeques, billy fires and brush burning will not be permitted on site.	All personnel
B6	Hot works activities will only be undertaken during a declared Total Fire Ban where an exemption has been issued by QFES.	Site Supervisor
B7	The following precautions will be taken to minimise the possibility of fire due to hot work activities: <ul style="list-style-type: none"> ▪ The area over which hot work will take place will be maintained free of combustible material; ▪ Firefighting equipment, including a validated portable fire extinguisher, and trained personnel will be available during all hot work operations; and ▪ Water trucks will be available to respond to fire. 	Site Supervisor
B8	Vehicles may not idle or be parked in areas of long grass.	All personnel
B9	Smoking is not permitted on site aside from in a designated safe zone.	All personnel
B10	Protocols outlining the fire management measures for the Project will be developed and implemented prior to the Commencement of Project operations.	Site Supervisor
B11	Vegetation within the site will be regularly inspected and managed for fuel loads.	Site Supervisor
WS2	Waste is not to be stored in a manner that poses a fire risk or attracts vermin.	All personnel

Rehabilitation Measures

All disturbed land caused by the construction and operation of the Project must be rehabilitated to meet desirable final acceptance criteria following the completion of construction, decommissioning and/or abandonment for any reason. Rehabilitation measures for the Project consists of stabilisation and rehabilitation works will be completed concurrent to construction and upon completion of construction activities within the Project footprint and surrounding impacted areas. Progressive rehabilitation of clearance areas will be undertaken concurrent to Project construction to ensure safe and effective operation measures and risk minimisation of relevant environmental issues.

Rehabilitation of areas within 400 m of a watercourse, as per the Department of Resources (DoR) Vegetation Management Watercourse and Drainage Feature map will be revegetated with riparian and/or woodland Regional Ecosystems (i.e., Re 11.3.30 and/or RE 11.3.35) and hydromulch comprising endemic grasses to support habitat values for Bare-rumped sheathtail bat.

A suitably qualified and experienced contractor will undertake rehabilitation activities (i.e., weed eradication, revegetation, and hydromulching).

Rehabilitation of vegetation that is considered potentially suitable habitat for the Bare-rumped sheathtail bat will consider the following suitable flora species:

- Weeping paperbark (*Melaleuca leucadendra*);
- Poplar gum (*Eucalyptus platyphylla*);
- Clarkson's bloodwood (*Corymbia clarksoniana*);
- Carbeen (*Corymbia tessellaris*); and
- Ghost gum (*Eucalyptus papuana*).

Further details of rehabilitation works are outlined in section 6 of the LEIP Preliminary Documentation.

6.3 Squatter pigeon (southern)



Plate 3 Squatter pigeon (southern) (EBird, 2016³)

Description

The Squatter pigeon (southern) (*Geophaps scripta scripta*) is listed as vulnerable under both the EPBC Act and NC Act. The Squatter pigeon (southern) is largely terrestrial, foraging and breeding on the ground and is usually seen in pairs or small groups of up to 20 or more birds. The species is a medium-sized, ground-dwelling pigeon with an approximate size of up to 30 cm and weighing at 190-250 grams (TSSC, 2015). The species is predominantly grey-brown in colouration, with black and white face stripes, a blue/grey tinge around the eye area and grey-blue and white underbelly.

Distribution

This species was historically found from Cape York Peninsula in Queensland south to the Dubbo region in New South Wales, however, there have been no official records in New South Wales since the 1970s and the species has declined greatly in southern Queensland (Higgins and Davies 1996).

Important populations of the Squatter pigeon (southern) have been identified as those isolated and sparsely distributed sub-populations that occur south of the Carnarvon Ranges in central and southern Queensland, including:

- Populations occurring in the Condamine River catchment and Darling Downs of southern Queensland;
- Populations occurring in the Warwick-Inglewood-Texas region of southern Queensland; and
- Any population that may potentially occur in New South Wales (Queensland Parks and Wildlife Service, 2011).

North of the Carnarvon Ranges the species is relatively common and is considered to be distributed as a single, continuous sub-population (Queensland Parks and Wildlife Service, 2011). As such, the population in the Project area is not considered to be an important population. Based on an evaluation of all criteria, the Project is not expected to have a significant residual impact on Squatter pigeon (southern).

Biology and Reproduction

Limited knowledge is available on the lifecycle of the Squatter pigeon (southern), with sexual maturity and life expectancy unknown. The species breeds year round, dependent on conditions (particularly food resources) and is likely

³ EBird, - <https://ebird.org/species/sqipig1>

to coincide with the Australian dry season as food resources are most abundant. The species predominantly feeds on seeds, including those of *Acacia* species.

Habitat

The southern subspecies occurs mainly in dry grassy eucalypt woodlands and open forests (Frith 1982; Crome and Shields, 1992) but also inhabits *Callitris/Acacia* sp. woodlands and was reported from open plains in its historical southern range (Frith, 1982) and has also been found in sandy sites near permanent water (Blakers et al., 1984). Squatter pigeons dust-bathe and are often encountered on dirt tracks and in areas of bare soil denuded of ground cover by livestock (Frith 1982; Higgins and Davies 1996).

Project Area Occurrence

Species was sighted during the 2022 field surveys adjacent to Majors Creek Road in open eucalypt woodland, approximately 400m from a permanent water source and has several ephemeral or man-made water sources close by. Species was additionally sighted twice by during the October surveys on lot 87 RP911426 within 200m of a permanent farm dam.

Threats

Key threats to Squatter pigeon (southern) include:

- Vegetation clearing and fragmentation;
- Overgrazing of habitat by livestock and feral herbivores;
- Introduction of weeds;
- Inappropriate fire regimes;
- Thickening of understorey vegetation;
- Predation by feral cats and foxes;
- Trampling of nests by livestock; and
- Illegal shooting.

Project Specific

Project specific threats to the Squatter pigeon (southern) include the clearing of foraging and breeding habitat.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP. Specific management guidelines for the Squatter pigeon (southern) as per its conservation advice (TSSC, 2015) are as follows:

- Identify subpopulations of high conservation priority, especially in the southern part of its range;
- Protect and rehabilitate areas of vegetation that support important sub-populations;
- Protect sub-populations of the listed subspecies through the development of covenants, conservation agreements or inclusion in reserve tenure;
- Develop and implement a stock management plan for key sites;
- Develop and implement a management plan, or nominate an existing plan to be implemented, for the control and eradication of feral herbivores in areas inhabited by the Squatter pigeon (southern); and
- Raise awareness of the Squatter pigeon (southern) within the local community, particularly among land managers.

Section 6 Individual Species Plans

Management and mitigation measures specific to the Squatter pigeon (southern) as a result of Project impacts are outlined in Table 6-3. Additional management measures that are relevant to all fauna are further listed in the CEMP.

Table 6-3 Management Measures Relevant to the Squatter Pigeon (Southern)

No.	Action	Responsibility
L24	Disturbed areas are to be progressively rehabilitated during and post construction.	Project Manager / Site Supervisor
W21	Clearing areas to be minimised to only the extent required.	Site Supervisor
TF1	Vegetation clearing will be strictly limited to those areas required for earthworks and construction of the Project.	Project Manager / Site Supervisor
TF2	Access roads, parking, laydown, stockpiling areas, etc. should occur (where possible) in previously cleared areas to avoid the need to clear additional vegetation in the Project area.	Project Manager / Site Supervisor
TF3	Obtain operational works permit for clearing native vegetation (VM Act) for applicable areas.	Client
TF4	A Weed and Pest Management Plan has been developed for the Project with specific advice for key identified species. The plan includes management of weed spread, management of pest infestations and monitoring effectiveness of control measures. The Project area is currently subject to high levels of weed infestation in areas.	Project Manager
TF5	Weed management actions will include hygiene protocols, washdown procedures, monitoring and management of weeds, and vehicle access restrictions.	Project Manager
TF6	Where clearing activities involve disturbing topsoil from known weed infestation areas, this soil material should be quarantined and not used in rehabilitation. The soil contaminated with weed seeds can be buried to a depth of at least 1 m below ground surface.	Site Supervisor
TF7	Conserve and stockpile topsoil containing native seed-bearing vegetation for use in rehabilitation.	Site Supervisor
TF8	Any materials brought onto site (such as gravel and soil) will be certified as weed and disease free.	Site Supervisor
TF9	Vegetation located adjacent to the Project construction works to be appropriately marked to avoid unnecessary clearing/vegetation damage.	Site Supervisor
TF10	The pre-construction environment should be reinstated, and vegetation re-established where it does not affect the Project operation and integrity.	Site Supervisor
TF11	Visual inspection of progressively rehabilitated areas.	Site Supervisor
TF12	Monitoring and weed inspections particularly in response to reported outbreaks or complaints from adjacent property owners.	Site Supervisor
TF13	Implementation of sediment control mechanisms to minimise the risk of weed seed washing into drainage channels.	Project Manager / Site Supervisor
TF14	Formal weed mapping will be undertaken as part of pre-construction activities to confirm weed presences along the Project corridor and form the basis of a Project Weed and Pest Management Plan. The Plan must include management direction taken from the <i>Biosecurity Act 2014</i> and regional biosecurity and pest management plans.	Project Manager

Section 6 Individual Species Plans

No.	Action	Responsibility
TF15	Implement control strategies outlined in the Department of Agriculture and Fisheries (DAF) weed and pest animal fact sheets and other relevant government biosecurity management strategies.	Project Manager
TF16	Weed management during and following rehabilitation to prevent habitat degradation and potential increased fire risk.	Site Supervisor
TF17	Disturbed areas will be rehabilitated using appropriate plant species from locally sourced seed.	Site Supervisor
TF18	Revegetation works to be undertaken where land has been disturbed for construction where land is not required for operations.	Site Supervisor
TF19	Areas stripped of topsoil for Project construction to be rehabilitated as soon as practicable where not required during operations.	Site Supervisor
TF20	Refine location of work areas where it overlaps with ground-truthed remnant vegetation to avoid disturbance as far as possible.	Site Supervisor
TF21	Survey and pegged disturbance footprint, prior to clearing to avoid unnecessary clearing of vegetation beyond that detailed during the design phase.	Site Supervisor
WPMP4	Annual weed mapping to understand nature of the spread of weeds and plan weed control activities for the following 12 months.	Project Manager / Site Supervisor
WPMP5	Undertake routine inspections within the Project area to identify potential new weed species and to determine success of controlling existing species	Site Supervisor
WPMP11	Flora and fauna (native and pest species) will be managed in accordance with the requirements of the: <ul style="list-style-type: none"> ▪ Environmental Protection and Biodiversity Conservation Act 1999; and ▪ Biosecurity Act 2014. 	Project Manager / Site Supervisor
FS1	Clearing of woody vegetation will be undertaken with a suitably qualified wildlife handler to: <ul style="list-style-type: none"> ▪ Inspect habitat in advance of clearing and relocate fauna, ▪ Advise on clearing techniques that will minimise fauna impact, and ▪ Records of fauna interactions will be retained. <p>The fauna spotter/catcher will inspect hollow-bearing limbs prior to removal using a cherry picker. Alternatively, hollows may be checked following plugging of hollow entrances and controlled lowering. In circumstances where access of an elevated work platform is not possible and/or the hollow is in the main trunk, an excavator with a vertical tree-grab attachment may be used to lower a tree to the ground for inspection by the fauna spotter/catcher (Hanger & Nottidge 2021).</p>	Project Manager / Site Supervisor
FS2	Pre-clearance surveys will identify any breeding places for threatened species, and should breeding places be encountered, a response which is consistent with the requirements of any approved Species Management Program under which the fauna spotter catcher(s) will be working	Site Supervisor
FS3	Native fauna that are to be relocated must be handled by suitably qualified and authorised fauna handlers only. Records of all relocations must be retained in accordance with requirements of the CEMP.	Project Manager
FS9	All contractors will be educated on the presence of native fauna including threatened species and need to travel slowly and look out for fauna when driving (especially Squatter pigeon (southern)). This training will form part of mandatory induction.	Project Manager / Site Supervisor

Section 6 Individual Species Plans

No.	Action	Responsibility
FS10	All fauna encountered (e.g., vehicle strike or during clearing activities) will be recorded in a central register by the Project Environment Manager. Any injured fauna will be reported as required in the MP that will be in place for the Project.	Project Manager / All personnel
FS14	Disturbed areas will be rehabilitated using appropriate plant species from locally sourced seed.	Site Supervisor
FS15	All construction personnel will be instructed on their responsibilities relating to avoiding and minimising the introduction/attraction to the construction site of feral animals.	Site Supervisor
FS16	A Weed and Pest Management Plan has been developed for the Project with specific advice for key identified species. The plan will include management of weed and pest infestations and monitoring effectiveness of control measures.	Project Manager
FS17	Onsite waste storage and disposal (especially food wastes) will be managed to discourage presence of pest fauna (i.e., covered bins/skips to prevent fauna access).	Site Supervisor
FS18	To reduce the risk of mortality to native wildlife, no domestic animals are permitted onsite.	All personnel
FS19	Avoid impact on fauna habitat, including mature trees and root systems, where possible.	All personnel
FS20	Prior to any vegetation disturbance, a trained ecologist or other qualified environmental specialist to be onsite to inspect and remove fauna (if required). All fauna recorded during pre-clearing surveys will be recorded on a dedicated fauna register. Construction areas that pose a risk to fauna to be fenced off where practical.	Project Manager
FS22	To ensure minimal impact on amphibian species and all minimal requirements for different amphibian species are achieved, construction of culverts should be generally in accordance with the Fauna Sensitive Road Design Manual, Volume 2 (Department of Transport and Main Roads) (Special attention to Section 6.6, Chapter 6 and Section 7.2, Chapter 7), where practical. The proposed reinforced RCPs are expected to provide connectivity at key habitat areas.	Project Manager / Site Supervisor
FS26	Implement control strategies outlined in the DAF weed and pest animal fact sheets and other relevant government biosecurity management strategies.	Project Manager / Site Supervisor
FS27	Regular onsite inspections of site infrastructure / equipment for resident pest fauna and establishment of a register for pest sightings.	Site Supervisor
FS29	Avoid clearing trees with obvious hollows. If trees are required to be removed the proponent shall engage the services of a licensed, qualified Spotter Catcher to complete preclearing checks and be present during removal. They should also inspect the "no go" zone and clearing limits prior to clearing. If hollow bearing trees do require removal, they should first be inspected using an elevated work platform to determine if fauna are present. If fauna are detected, they would be safely removed prior to tree felling.	All Personnel / Project Manager / Site Supervisor
A9	Onsite burning of any material will not be undertaken without a valid permit from the relevant QFES Fire Warden.	Site Supervisor / All personnel
A10	Fire management measures for the Project to be developed and implemented.	Site Supervisor
A11	Ensure onsite fire-fighting equipment is regularly maintained and adequate staff training is implemented.	Site Supervisor

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No.	Action	Responsibility
A12	Weed management during and following rehabilitation to prevent habitat degradation and potential increased fire risk.	Site Supervisor
A13	Rehabilitate disturbed areas as soon as practicable to restore ground cover and minimise wind erosion.	Site Supervisor
B1	A qualified person will be appointed as Site Safety Advisor during construction and will have on-site a set of safety data sheets (SDS) for hazardous and dangerous materials.	Project Manager
B2	A Bushfire Management Plan will be prepared for Project construction and operations, informed by consultation with the Queensland Fire and Emergency Service (QFES).	Project Manager
B3	The BMP will consider the requirements of the Southern Black-throated Finch in its development. In the Townsville region, cool burns between June and September, no more than one every three years, are most suitable for the Black-throated finch (southern) (DEWHA, 2009). Biomass reduction (for example mowing, slashing, fire etc.) will be avoided during the early wet season resource bottleneck if practicable and safe to do so (e.g., unless required for firebreak maintenance etc).	Environmental Representative
B4	If works are undertaken during the bushfire season, the fire danger rating will be monitored daily through the QFES website.	Project Manager / Site Supervisor
B5	Open fires, including open barbeques, billy fires and brush burning will not be permitted on site.	All personnel
B6	Hot works activities will only be undertaken during a declared Total Fire Ban where an exemption has been issued by QFES.	Site Supervisor
B7	The following precautions will be taken to minimise the possibility of fire due to hot work activities: <ul style="list-style-type: none"> ▪ The area over which hot work will take place will be maintained free of combustible material; ▪ Firefighting equipment, including a validated portable fire extinguisher, and trained personnel will be available during all hot work operations; and ▪ Water trucks will be available to respond to fire. 	Site Supervisor
B8	Vehicles may not idle or be parked in areas of long grass.	All personnel
B9	Smoking is not permitted on site aside from in a designated safe zone.	All personnel
B10	Protocols outlining the fire management measures for the Project will be developed and implemented prior to the Commencement of Project operations.	Site Supervisor
B11	Vegetation within the site will be regularly inspected and managed for fuel loads.	Site Supervisor
WS2	Waste is not to be stored in a manner that poses a fire risk or attracts vermin.	All personnel

Rehabilitation Measures

All disturbed land caused by the construction and operation of the Project must be rehabilitated to meet desirable final acceptance criteria following the completion of construction, decommissioning and/or abandonment for any reason. Rehabilitation measures for the Project consists of stabilisation and rehabilitation works will be completed concurrent to construction and upon completion of construction activities within the Project footprint and surrounding impacted areas. Progressive rehabilitation of clearance areas will be undertaken concurrent to Project construction to ensure safe and effective operation measures and risk minimisation of relevant environmental issues.

Rehabilitation of areas within 400 m of a watercourse, as per the Department of Resources (DoR) Vegetation Management Watercourse and Drainage Feature map will be revegetated with riparian and/or woodland Regional Ecosystems (i.e., Re 11.3.30 and/or RE 11.3.35) and hydromulch comprising endemic grasses to support habitat values for Squatter pigeon (southern).

A suitably qualified and experienced contractor will undertake rehabilitation activities (i.e., weed eradication, revegetation, and hydromulching).

Rehabilitation of vegetation that is considered potentially suitable habitat for the Squatter pigeon (southern) will consider the following suitable flora species:

- Broad-leafed paperbark (*Melaleuca viridiflora*);
- Clarkson's bloodwood (*Corymbia clarksoniana*);
- Weeping paperbark (*Melaleuca leucadendra*);
- Poplar gum (*Eucalyptus platyphylla*);
- River sheoak (*Casuarina cunninghamiana*);
- Rough-barked apple (*Angophora floribunda*);
- Yellow tea-tree (*Leptospermum flavescens*);
- Sabi grass (*Urochloa mosambicensis*);
- Curly windmill grass (*Enteropogon acicularis*);
- Native millet (*Panicum decompositum*);
- Hairy panic (*Panicum effusum*);
- Bluegrass (*Dichanthium sericeum*);
- Carpet grass (*Alloteropsis semialata*);
- Woodland lovegrass (*Eragrostis sororia*); and
- Kangaroo grass (*Themeda triandra*).

Further details of rehabilitation works are outlined in section 6 of the LEIP Preliminary Documentation.

6.4 White-throated needletail



Plate 4 White-throated needletail (Singapore Birds Project, 2022⁴)

Description

The White-throated needletail (*Hirundapus caudacutus*) is listed as a marine and migratory bird under the EPBC Act. The White-throated needletail is a migratory bird exhibiting a cigar-shaped body, stubby tail and long pointed wings, with an average body size of 20 cm and 115-120 grams in weight (TSSC, 2019). The migratory bird exhibits a dark-olive head and neck with a white band spanning across the forehead. The underbellies of White-throated needletail are similar to head and neck colouration with a u-shaped band across rear flanks and a black/greenish glossy undertail. The species is known to be gregarious during the non-breeding season in Australia.

Distribution

White-throated needletails migrate to Australia during the non-breeding season from September to mid-March, distributing across coastal regions of eastern and south-eastern Australia. Within eastern Australia, the migratory bird is known to occur in all coastal regions of Queensland and New South Wales and inland to the western regions of the Great Dividing Range (TSSC, 2019).

Biology and Reproduction

The species does not breed in Australia. Within breeding grounds, the species lays eggs during late May to early June within vertical hollows of coniferous trees or rock-faces. Clutches typically consist of two eggs but have been known to reach seven eggs. Both parents participate in incubation before chicks fledge after 40-42 days (TSSC, 2019). In Australia, White-throated needletail are known to forage for insects including beetles, cicadas, bees, wasps, flies etc. (TSSC, 2019).

Habitat

The species is considered mostly aerial, flying at heights of less than 1 m to more than 1000 m above ground, in all types of habitats, although preferring wooded forests, open forest and rainforest (TSSC, 2019). Roosting habitat for the species generally consists of tall trees in forests and woodlands, or aerially.

⁴ Singapore Birds Project, 2022 - <https://singaporebirds.com/species/white-throated-needletail/>

Project Area Occurrence

The species has previously been recorded in the Project area (most recent record in 2015), however has not been recorded on-site during field visits.

There is some potential for roosting habitat in the Project area, although any mature woodland could provide potential roosting habitat. Potential roosting habitat is likely to be restricted to Lansdown Creek and Serpentine Lagoon. No habitat map has been prepared for this species as it is an aerial insectivore that spends most of its time aloft, and could occur anywhere over the Project area, therefore the whole Project area is considered potential foraging habitat.

Threats

Key threats to Squatter pigeon (southern) include:

- Collision with overhead wires, windows and lighthouses;
- Hunting within breeding grounds;
- Human population expansion within areas of natural resources.

Project Specific

The Project is not expected to produce significant threats to the species.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP. Specific management guidelines for the White-throated needletail as per its conservation advice (TSSC, 2019) are as follows:

- Habitat loss and modifications:
 - Seek the support of governments in East Asia to protect remaining old growth forests within the breeding range of the species;
 - Identify requirements of important habitat in Australia; and
 - Support initiatives to improve habitat management at key sites in Australia.
- Raise awareness of the conservation of White-throated needletail;
- Promote the conservation, and raise the profile, of White-throated Needletail through strategic programs and educational products;
- Promote the exchange of information between governments, NGOs and communities through use of networks, publications and websites; and
- Enhance existing White-throated Needletail monitoring programs, such as BirdLife Australia's Swift Monitoring Sites, particularly to improve coverage in under surveyed parts of Australia.

Management and mitigation measures specific to the White-throated needletail as a result of Project impacts are outlined in Table 6-4. Additional management measures that are relevant to all fauna are further listed in the CEMP.

Table 6-4 Management Measures Relevant to the White-throated Needletail

No.	Action	Responsibility
L24	Disturbed areas are to be progressively rehabilitated during and post construction.	Project Manager / Site Supervisor
W21	Clearing areas to be minimised to only the extent required.	Site Supervisor
TF1	Vegetation clearing will be strictly limited to those areas required for earthworks and construction of the Project.	Project Manager / Site Supervisor
TF2	Access roads, parking, laydown, stockpiling areas, etc. should occur (where possible) in previously cleared areas to avoid the need to clear additional vegetation in the Project area.	Project Manager / Site Supervisor
TF3	Obtain operational works permit for clearing native vegetation (VM Act) for applicable areas.	Client
TF7	Conserve and stockpile topsoil containing native seed-bearing vegetation for use in rehabilitation.	Site Supervisor
TF9	Vegetation located adjacent to the Project construction works to be appropriately marked to avoid unnecessary clearing/vegetation damage.	Site Supervisor
TF10	The pre-construction environment should be reinstated, and vegetation re-established where it does not affect the Project operation and integrity.	Site Supervisor
TF11	Visual inspection of progressively rehabilitated areas.	Site Supervisor
TF17	Disturbed areas will be rehabilitated using appropriate plant species from locally sourced seed.	Site Supervisor
TF18	Revegetation works to be undertaken where land has been disturbed for construction where land is not required for operations.	Site Supervisor
TF19	Areas stripped of topsoil for Project construction to be rehabilitated as soon as practicable where not required during operations.	Site Supervisor
TF20	Refine location of work areas where it overlaps with ground-truthed remnant vegetation to avoid disturbance as far as possible.	Site Supervisor
TF21	Survey and pegged disturbance footprint, prior to clearing to avoid unnecessary clearing of vegetation beyond that detailed during the design phase.	Site Supervisor
FS1	<p>Clearing of woody vegetation will be undertaken with a suitably qualified wildlife handler to:</p> <ul style="list-style-type: none"> ▪ Inspect habitat in advance of clearing and relocate fauna, ▪ Advise on clearing techniques that will minimise fauna impact, and ▪ Records of fauna interactions will be retained. <p>The fauna spotter/catcher will inspect hollow-bearing limbs prior to removal using a cherry picker. Alternatively, hollows may be checked following plugging of hollow entrances and controlled lowering. In circumstances where access of an elevated work platform is not possible and/or the hollow is in the main trunk, an excavator with a vertical tree-grab attachment may be used to lower a tree to the ground for inspection by the fauna spotter/catcher (Hanger & Nottidge 2021).</p>	Project Manager / Site Supervisor

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No.	Action	Responsibility
FS2	Pre-clearance surveys will identify any breeding places for threatened species, and should breeding places be encountered, a response which is consistent with the requirements of any approved Species Management Program under which the fauna spotter catcher(s) will be working	Site Supervisor
FS3	Native fauna that are to be relocated must be handled by suitably qualified and authorised fauna handlers only. Records of all relocations must be retained in accordance with requirements of the CEMP.	Project Manager
FS10	All fauna encountered (e.g., vehicle strike or during clearing activities) will be recorded in a central register by the Project Environment Manager. Any injured fauna will be reported as required in the MP that will be in place for the Project.	Project Manager / All personnel
FS13	Woody debris, logs, tree hollows and rocks will be retained for use in rehabilitation.	Site Supervisor
FS14	Disturbed areas will be rehabilitated using appropriate plant species from locally sourced seed.	Site Supervisor
FS15	All construction personnel will be instructed on their responsibilities relating to avoiding and minimising the introduction/attraction to the construction site of feral animals.	Site Supervisor
FS19	Avoid impact on fauna habitat, including mature trees and root systems, where possible.	All personnel
FS20	Prior to any vegetation disturbance, a trained ecologist or other qualified environmental specialist to be onsite to inspect and remove fauna (if required). All fauna recorded during pre-clearing surveys will be recorded on a dedicated fauna register. Construction areas that pose a risk to fauna to be fenced off where practical.	Project Manager
FS29	Avoid clearing trees with obvious hollows. If trees are required to be removed the proponent shall engage the services of a licensed, qualified Spotter Catcher to complete preclearing checks and be present during removal. They should also inspect the “no go” zone and clearing limits prior to clearing. If hollow bearing trees do require removal, they should first be inspected using an elevated work platform to determine if fauna are present. If fauna are detected, they would be safely removed prior to tree felling.	All Personnel / Project Manager / Site Supervisor
A9	Onsite burning of any material will not be undertaken without a valid permit from the relevant QFES Fire Warden.	Site Supervisor / All personnel
A10	Fire management measures for the Project to be developed and implemented.	Site Supervisor
A11	Ensure onsite fire-fighting equipment is regularly maintained and adequate staff training is implemented.	Site Supervisor
A12	Weed management during and following rehabilitation to prevent habitat degradation and potential increased fire risk.	Site Supervisor
A13	Rehabilitate disturbed areas as soon as practicable to restore ground cover and minimise wind erosion.	Site Supervisor
B1	A qualified person will be appointed as Site Safety Advisor during construction and will have on-site a set of safety data sheets (SDS) for hazardous and dangerous materials.	Project Manager
B2	A Bushfire Management Plan will be prepared for Project construction and operations, informed by consultation with the Queensland Fire and Emergency Service (QFES).	Project Manager

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No.	Action	Responsibility
B4	If works are undertaken during the bushfire season, the fire danger rating will be monitored daily through the QFES website.	Project Manager / Site Supervisor
B5	Open fires, including open barbeques, billy fires and brush burning will not be permitted on site.	All personnel
B6	Hot works activities will only be undertaken during a declared Total Fire Ban where an exemption has been issued by QFES.	Site Supervisor
B7	The following precautions will be taken to minimise the possibility of fire due to hot work activities: <ul style="list-style-type: none"> ▪ The area over which hot work will take place will be maintained free of combustible material; ▪ Firefighting equipment, including a validated portable fire extinguisher, and trained personnel will be available during all hot work operations; and ▪ Water trucks will be available to respond to fire. 	Site Supervisor
B8	Vehicles may not idle or be parked in areas of long grass.	All personnel
B9	Smoking is not permitted on site aside from in a designated safe zone.	All personnel
B10	Protocols outlining the fire management measures for the Project will be developed and implemented prior to the Commencement of Project operations.	Site Supervisor
B11	Vegetation within the site will be regularly inspected and managed for fuel loads.	Site Supervisor
WS2	Waste is not to be stored in a manner that poses a fire risk or attracts vermin.	All personnel

Rehabilitation Measures

The White-throated needletail is a predominantly aerial species, and as such, there are no species-specific rehabilitation requirements. General rehabilitation activities for the Project are outlined in section 6 of the LEIP Preliminary Documentation.

6.5 Australian painted snipe



Plate 5 Australian painted snipe (EBird, 2012⁵)

Description

Australian painted snipe (*Rostratula australis*) is currently listed as endangered under both the EPBC Act and NC Act. The Australian Painted Snipe is a stocky wading bird with a long pink bill and is approximately 220-250 mm in length.

Distribution

The Australian painted snipe inhabits wetlands in all Australian states, however, is known to be most common in eastern Australia, with scattered records in Queensland, New South Wales, Victoria and South Australia.

Biology and Reproduction

The Australian painted snipe is known to breed in response to wetland conditions, as opposed to breeding during a specific season. In Australia, the species has been recorded breeding during all months of the year, with influxes in northern Queensland during May and October (Marchant & Higgins, 1993). Females of the species are known to breed every two years, laying approximately two to six eggs in a clutch, with four clutches in a year. Incubation of eggs varies from 15 to 21 days and males typically take responsibility for incubation and caring of young.

Habitat

The species favours shallow freshwater environments within its range, including lakes, swamps and claypans abundant with tussock grasses, reeds and sedges. The species breeds in response to wetland conditions rather than a typical breeding season, preferring shallow wetlands with areas of bare wet mud, and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover.

Project Area Occurrence

No individuals were recorded during the 2022 field surveys. The closest record of the species occurred approximately 5 km north of the Project area in 2013.

⁵ EBird, 2012: <https://ebird.org/species/auspas1>

Threats

Threats to the Australian painted snipe include:

- Predation;
- Loss of wetland habitat;
- Degradation of habitat;
- Trampling of nests by livestock; and
- Climate change

Project Specific

The Project is not expected to produce significant threats to the species.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP. Specific management guidelines for the Australian painted snipe as per its conservation advice (TSSC, 2013; BirdLife Australia, 2012) are as follows:

- Locate regularly used habitat and determine how/why these wetlands are used;
- Identify wetlands for management in drier years and drought refuges;
- Protect and manage principal breeding and wintering sites;
- Identify and protect any additional habitat used by the species in the last 10 years (precautionary measure);
- Develop guidelines, in consultation with landholders, for the management of suitable wetlands;
- Initiate control programs for feral animals, and erect fencing to prevent grazing and trampling of wetlands by cattle, at suitable wetlands;
- Rehabilitate selected wetlands that were formerly used for breeding;
- Create dedicated shallow wetlands in the Riverina, actively managed to attract the species; and
- Undertake further research to determine movements and improve knowledge of habitat preferences.

Management and mitigation measures specific to the Australian painted snipe as a result of Project impacts are outlined in Table 6-5. Additional management measures that are relevant to all fauna are further listed in the CEMP.

Table 6-5 Management Measures Relevant to the Australian Painted Snipe

No.	Action	Responsibility
L24	Disturbed areas are to be progressively rehabilitated during and post construction.	Project Manager / Site Supervisor
W1	All major watercourse earthworks will commence during the dry season and ensure bed and banks are stabilised before the onset of the wet season	
W2	Impacts to aquatic habitat will be minimised by locating ancillary works outside the waterway where possible and restoring original bed and banks conditions following construction.	Project Manager / Site Supervisor
W3	Watercourse crossings have been located at established crossing points on existing access tracks.	Site Supervisor
W4	Duration of in-stream works will be minimised to reduce the potential for sedimentation.	Project Manager / Site Supervisor
W5	Weather conditions will be monitored during the construction stage and temporary controls will be established during extreme weather events.	Site Supervisor
W6	Construction equipment is to be maintained to minimise risk of spill or leakage.	All personnel
W7	All refuelling facilities, or storage facilities for hydrocarbons and chemicals will be in appropriately designed sites and comply with Australian Standards (e.g., AS 1940: The storage and handling of flammable and combustible liquids).	Site Supervisor
W8	Materials will be stored within bunded areas with a storage capacity of 110% of the storage vessel. Bunding will have floors and walls lined with impermeable material. These areas must be adequately protected from rainfall and stormwater.	Site Supervisor
W9	Refuelling will not take place within 50 m of a watercourse.	All personnel
W10	Refuelling and major maintenance work will be undertaken at predetermined locations away from watercourses and in a manner that prevents spillages.	All personnel
W11	Appropriate spill control materials including booms and absorbent materials will be onsite at refuelling facilities at all times. These will be used for mitigating and managing events where a substance is spilled into surrounding waters.	Site Supervisor
W12	Ensure pipeline trenching near watercourses/waterways is sufficient to avoid exposure of the pipeline as a result of river bed erosion and interference with the flow of water.	Site Supervisor
W13	Store waste prior to transport and disposal off-site (including general waste and hazardous waste) in designated areas away of waterways/watercourses as per the relevant Australian Standards, as required.	All personnel
W14	Should groundwater be encountered during construction works, works will cease until further examination occurs.	All personnel
W15	Develop and implement a certified ESCP and associated monitoring to mitigate the potential impacts.	Project Manager
W16	Where required to undertake works within drainage channels, works should not commence during times of elevated flows. Where possible schedule works in low or no flow periods and ensure that all bed and banks are stabilised prior to the onset of the wet season.	Project Manager / Site Supervisor

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No.	Action	Responsibility
W17	Construction methodology to avoid prolonged open excavations, i.e., suction intake and drainage channel areas, which may accumulate groundwater or surface water	Site Supervisor
W18	Earthworks, particularly within the wetland and or drainage paths are to be conducted to maintain the hydraulic capacity and minimise potential impacts to upstream or downstream.	Site Supervisor
W19	Potentially hazardous and flammable substances/ liquids will be stored in accordance with relevant Australian standards (AS1940), <i>Work Health and Safety Act 2011</i> and National Occupational Health and Safety Commission (NOHSC) 'Approved Criteria for the Storage and Handling of Flammable and Combustible Liquids' and in predetermined locations away from watercourses.	Site Supervisor
W20	Structures and realignments have been designed to minimise changes to flow velocities.	Site Supervisor
W21	Clearing areas to be minimised to only the extent required.	Site Supervisor
W22	The construction of culverts and structures will be programmed during periods of low flow, where possible.	Site Supervisor
W23	Where dry beds are required for the construction of culverts, salvage of fish and aquatic fauna will be undertaken in accordance with the DAF Fish Salvage Guidelines.	Site Supervisor
W24	Site construction personnel will complete inductions and spill kits will be available to all personnel in the event of a spill or leak.	Site Supervisor
W25	During any works around waterways/water courses, water quality will need to be monitored. Downstream turbidity will need to be maintained at comparable levels to upstream turbidity. Water samples are to be tested onsite by a calibrated water quality meter.	Site Supervisor
W26	All temporary erosion and sediment control structures are to be removed post-construction works.	Site Supervisor
W27	Rehabilitation of any disturbed ground due to temporary construction infrastructure will be conducted progressively as soon as construction activities are complete.	Site Supervisor
W28	Bunding of chemical storage facilities and appropriate storage of chemicals according to AS 1940 'The storage and handling of flammable and combustible liquids'.	Site Supervisor
W29	Drainage design that allows for the retention of mine affected water prior to any discharge into the aquatic environment	Project Manager
W30	Excavation within the Serpentine Lagoon are to be minimised to only the extent required.	All personnel
W31	Excavated land for the underground infrastructure within the Serpentine Lagoon are to be restore, as far as practicable, to its original contours after the infrastructure is established.	Site Supervisor
W33	All construction works around waterways will be designated and undertaken in accordance with the IECA Guidelines.	Project Manager / Site Supervisor
W34	Temporary waterway barrier works within waterways mapped as Queensland waterways for waterway barrier works are to be undertaken with the ' <i>Accepted development requirements for operational works that is constructing or raising waterway barrier works</i> ' (DAF 2018), including the requirement for pre and post work notifications.	Project Manager / Site Supervisor

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No.	Action	Responsibility
W35	Waterways/watercourses with no flow which are mapped shall have controls designed from the relevant arrangement with P3.3 of IECA, 2008 regardless of if there is water present or they are dry.	Project Manager / Site Supervisor
FS16	A Weed and Pest Management Plan has been developed for the Project with specific advice for key identified species. The plan will include management of weed and pest infestations and monitoring effectiveness of control measures.	Project Manager
FS17	Onsite waste storage and disposal (especially food wastes) will be managed to discourage presence of pest fauna (i.e., covered bins/skids to prevent fauna access).	Site Supervisor
FS18	To reduce the risk of mortality to native wildlife, no domestic animals are permitted onsite.	All personnel
FS19	Avoid impact on fauna habitat, including mature trees and root systems, where possible.	All personnel
FS20	Prior to any vegetation disturbance, a trained ecologist or other qualified environmental specialist to be onsite to inspect and remove fauna (if required). All fauna recorded during pre-clearing surveys will be recorded on a dedicated fauna register. Construction areas that pose a risk to fauna to be fenced off where practical.	Project Manager
FS26	Implement control strategies outlined in the DAF weed and pest animal fact sheets and other relevant government biosecurity management strategies.	Project Manager / Site Supervisor
FS27	Regular onsite inspections of site infrastructure / equipment for resident pest fauna and establishment of a register for pest sightings.	Site Supervisor

Rehabilitation Measures

All disturbed land caused by the construction and operation of the Project must be rehabilitated to meet desirable final acceptance criteria following the completion of construction, decommissioning and/or abandonment for any reason. Rehabilitation measures for the Project consists of stabilisation and rehabilitation works will be completed concurrent to construction and upon completion of construction activities within the Project footprint and surrounding impacted areas. Progressive rehabilitation of clearance areas will be undertaken concurrent to Project construction to ensure safe and effective operation measures and risk minimisation of relevant environmental issues.

Rehabilitation of areas within 400 m of a watercourse, as per the Department of Resources (DoR) Vegetation Management Watercourse and Drainage Feature map will be revegetated with riparian and/or woodland Regional Ecosystems (i.e., Re 11.3.30 and/or RE 11.3.35) and hydromulch comprising endemic grasses to support habitat values for MNES species.

A suitably qualified and experienced contractor will undertake rehabilitation activities (i.e., weed eradication, revegetation, and hydro-mulching).

Rehabilitation of vegetation that is considered potentially suitable habitat for the Australian painted snipe will consider the following suitable flora species:

- Weeping tea-tree (*Melaleuca fluviatilis*);
- Canegrass (*Eragrostis australasica*);
- Muehlenbeckia (*Muehlenbeckia complexa*);
- Bluegrass (*Dichanthium sericeum*);
- Common Reed (*Phragmites australis*);
- Cumbungi (*Typha spp.*); and
- Samphire (*Salicornia europaea*).

Further details of rehabilitation works are outlined in section 6 of the LEIP Preliminary Documentation.

6.6 Fork-tailed swift



Plate 6 Fork-tailed swift (EBird, 2017⁶)

Description

The Fork-tailed swift (*Apus pacificus*) is listed as a marine and migratory bird under the EPBC Act. Fork-tailed swifts are a medium to large bird, weighing approximately 30-40 grams, averaging a body length of 18-21 cm and a wingspan of approximately 40-42 cm (DCCEEW, 2022). The species exhibits a blackish colouration with bands on the rump, a long, deeply-forked tail with black-brown colouration and a white patch on the chin, throat and underbody.

Distribution

The Fork-tailed swift is a non-breeding visitor within Australia. The species commonly occurs in all states. Within Queensland, Fork-tailed swifts are most commonly sighted in within the north-east, from the eastern Great Dividing Range in Cooktown to Townsville, as well as scattered but widespread records occurring in south-east Queensland and south of Brisbane. Widespread populations exist west of the Great Dividing Range in the adjoining region of Chinchilla and Hughenden.

Fork-tailed swifts arrive in Australia for the non-breeding season, some individuals arriving in as early September, however arrival is most common in October. Within Australia, the species is known to be highly mobile following low pressure systems. Upcoming the breeding season, the Fork-tailed swift departs southern Australia in early April and northern Australia by end of April to returns to breeding grounds.

Biology and Reproduction

Fork-tailed swifts are an insectivorous species, preferring bees, termites, wasps and moths. The species forages aerially in flocks of 10 to 1000 birds, along edges of low pressure systems as they aid in flight and lifting prey.

The Fork-tailed swift breeds outside of Australia, nesting in mountain cliffs or crevices and island rock caves. Breeding season occurs between April and July with females producing 2-3 eggs per brood.

Habitat

The Fork-tailed swift is predominately aerial, flying at heights of 1 m to 300 m above ground. Within its Australian distribution, the species generally flies above dry, open woodlands, inland plains, heathland and marshland, and coastal

⁶ EBird, 2017: <https://ebird.org/species/fotswi>

regions above cliffs and beaches. The species has also been recorded within residential zones, above open farmland and at inland and coastal sand dunes. Important habitat for the species is known to include open plains and wooded areas, although it is exclusively aerial within these (DoE, 2015).

Project Area Occurrence

Fork-tail swifts were recorded in the vicinity of the Project area during 2022 field surveys by EMM. Field surveys noted suitable habitat for the species exists within the Project area and as it is an exclusively aerial species whilst in Australia, there is potential for the species to occur anywhere over the Project area. Therefore, the entirety of the Project area is considered potential foraging habitat.

Threats

Potential threats to the Fork-tailed swift include:

- Habitat loss and destruction; and
- Predation by feral animals.

Project Specific

The Project is not expected to produce significant threats to the species. There is potential for habitat destruction as a result of the Project, however this is expected to be negligible due to the wide range of the species.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP.

Rehabilitation Measures

The Fork-tailed swift is a predominantly aerial species, and as such, there are no species-specific rehabilitation requirements. General rehabilitation activities for the Project are outlined in section 6 of the LEIP Preliminary Documentation.

6.7 Black-faced monarch



Plate 7 Black-faced monarch (EBird, 2017⁷)

Description

Black-faced monarch (*Monarcha melanopsis*) is listed as marine and migratory under the EPBC Act. The Black-faced monarch is distinguishable by its black face, grey upperparts (head, wings, upper body) and a red/orange belly. The species ranges in size, with adult males exhibiting a wingspan of 85.5 – 98.5 mm, tail length of 69 – 81.5 mm and weighing approximately 19 – 27 grams. Whereas adult females exhibit a wingspan of 82.5 – 93 mm, tail length of 68 – 89.5 mm and weighing approximately 20.5 – 25 grams.

Distribution

The Black-faced monarch is distributed in Australia, New Zealand, Papua New Guinea and Aru Island. Within Australia, the species only occurs on the eastern-Australian coastline from the islands of the Torres Strait and Cape York Peninsula in Queensland, south through New South Wales, Australian Capital Territory and within east Gippsland, Victoria. In Queensland, the species range includes Cape York Peninsula, the eastern Great Dividing Range and south to the New South Wales border. Few vagrants are observed outside their normal range.

Biology and Reproduction

The Black-faced monarch breeds in Australia from October to March, with egg production in north Queensland occurring from November to January and in southeast Queensland from October to December. Specific breeding locations have been recorded within the Atherton Tablelands of Far North Queensland. Breeding habitat for the species includes rainforests, with the species nesting in tree tops comprising of large leaves, in sapling tops and in lower shrubby environments. Females lay eggs in a clutch size of approximately 2-3 eggs, with an incubation period of 13-15 days.

Habitat

The Black-faced monarch prefers tropical, subtropical and temperate rainforest ecosystems comprised of semi-deciduous vine thickets, notophyll vine forest, mesophyll thicket and shrubland. Occasionally, the species occurs within 20-30 year-old regrowth rainforest, open eucalypt forests, gullies, coastal foothills, mangroves and suburban parks and gardens. Important habitat for the Black-faced monarch include wet forest specialist, particularly wet sclerophyll forest, rainforest and sheltered gullies and slopes with dense fern understory (DoE, 2015).

⁷ EBird, 2017 - <https://ebird.org/species/blfmon1>

Project Area Occurrence

An individual was sighted within riparian vegetation of the Project area, by Evolve during the 2022 field surveys. Surveys further identified potential foraging habitat within the Project area approximates to 2.64 ha.

Threats

Potential threats to the Black-faced monarch include potential collision with windows and lighthouses.

Project Specific

There are no Project specific threats identified for the species.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP.

Rehabilitation Measures

Rehabilitation methods for the Project are outlined in section 6 of the LEIP Preliminary Documentation.

6.8 Glossy ibis



Plate 8 Glossy ibis (EBird, 2020⁸)

Description

The Glossy ibis (*Plegadis falcinellus*) is Australia's smallest ibis species, averaging 55-65 cm in length, a wingspan of 80-95 cm and weighing approximately 500-800 grams (Hancock et al., 1992; Marchant & Higgins, 1990). The Glossy ibis is listed as marine and migratory under the EPBC Act. The migratory bird exhibits a maroon and black colouration across its body, blue-grey with a white line around the eye area and a long, curved downwards bill.

Distribution

The Glossy ibis is distributed globally, occurring in North America, Europe, Russia, Siberia, Asia, southern Africa, Pakistan, India, Philippines, Indonesia, Papua New Guinea and Australia. Within Australia, the Glossy ibis inhabits the Kimberley region, Eyre Peninsula in South Australia, Western Australia and are vagrant in Tasmania.

Biology and Reproduction

Glossy ibis breed between mid-spring and late summer however may extend if food resources are abundant. Within particular regions, breeding is thought to be responsive of annual rainfall events. During breeding season, typically 3-6 eggs are produced, with both parents caring for young. Young Glossy ibis fledge the nest after approximately 25-28 days with adults feeding young for an additional few weeks.

Habitat

Glossy ibis generally inhabit freshwater marshes within lakes, rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. These habitats are particularly used for foraging and breeding activities. The species has also been recorded in estuaries, saltmarshes and coastal lagoons. Breeding habitat for Glossy ibis consist of wooded and shrubby swamps in semi-arid and arid regions of Northern Territory and Queensland, including Cooba (*Acacia stenophylla*), *Eucalyptus*/lignum swamps of the Murray Darling Basin

⁸ EBird, 2020 - <https://ebird.org/species/gloibi>

and within reed swamps of near-coastal regions in South Australia. Roosting sites for the species include trees and shrubs in close proximity to water bodies.

Project Area Occurrence

Multiple individuals were sighted by Evolve within the locality of Serpentine Lagoon. The premier habitat for the Glossy ibis is located within Serpentine Lagoon and associated wetlands to the North of the alignment near Serpentine Lagoon.

Threats

Potential threats to the Glossy ibis include:

- Human disturbance waterbirds;
- Wetland destruction and degradation;
- Interference with foraging and breeding habitat through water diversion, drainage, irrigation and hydroelectric power production;
- Clearing and grazing activities;
- Burning activities;
- Increased salinity and groundwater extraction;
- Invasive flora;
- Hunting; and
- Pesticides.

Project Specific

Potential Project specific threats to the Glossy ibis include vegetation clearing.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP.

Rehabilitation Measures

Rehabilitation methods for the Project are outlined in section 6 of the LEIP Preliminary Documentation.

6.9 Barn swallow



Plate 9 Barn swallow (EBird, 2020⁹)

Description

The Barn swallow (*Hirundo rustica*) is listed as marine and migratory under the EPBC Act. The Barn swallow is a small bird, averaging a length of 15-18 cm and weighing approximately 17 grams (Higgins et al., 2006). The species exhibits a steel blue colouration along its upper regions (i.e., upper head, along its back and down the rump), a white underbody, and a chestnut colouration along its forehead and chin and throat area. Juveniles are known to appear slightly duller in colouration when compared to adults.

Distribution

The Barn swallow occurs globally, particularly within the subtropical and temperate regions of North America, Europe, northern Africa and Asia. The Barn swallow migrates to Australia during the southern hemisphere winter, occurring in the Philippines, Indonesia, Melanesia and northern Australia from September to March. Within Australia, the species is recorded to occur within the northern regions, associating islands (e.g., Christmas Island and Cocos-Keeling Island) and reefs (e.g., Ashmore reef), from the Pilbara region in Western Australia towards Fraser Island in Queensland. Rare records also exist in south Western Australia, Sydney, South Australia and one unconfirmed record within Victoria.

Biology and Reproduction

Barn swallows generally reach sexual maturity at 2 years of age, when the first breeding event takes place (Cramp, 1988). The species does not breed in Australia, instead within the subtropical and temperate regions of the northern hemisphere. Within its breeding ranges and breeding season, the Barn swallow is known to nest in both solidarity and colonies of up to 100 pairs, with females laying 2-7 eggs annually. Hatching of eggs occurs approximately 2 weeks post egg-laying. Barn swallows are expected to live for four years; however, one individual was recorded being 15 years, 11 months (Turner & Rose, 1989).

⁹ EBird, 2020 - <https://ebird.org/species/barswa>

Habitat

Within Australia, the Barn swallow occupies open country in coastal lowlands, particularly close to water, towns and cities. The species has also been recorded within *Melaleuca* woodlands, wetlands, mesophyll shrub thickets and grassland (Schodde & Mason, 1999).

Project Area Occurrence

The Barn swallow was not recorded during the initial field surveys or identified as part of the PMST report for the Project, however, the species was recorded during secondary surveys of the Project area and is potentially occurring within vicinity to Serpentine Lagoon.

Threats

Threats to the Barn swallow include loss of habitat, and formerly, pesticides (particularly in the 1950's in Israel) (Cramp, 1988).

Project Specific

The Project is not expected to produce significant threats to the species.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP.

Rehabilitation Measures

Rehabilitation methods for the Project are outlined in section 6 of the LEIP Preliminary Documentation.

6.10 Oriental cuckoo



Plate 10 Oriental cuckoo (EBird, 2017¹⁰)

Description

The Oriental cuckoo (*Cuculus optatus*) is listed as migratory under the EPBC Act. The Oriental cuckoo exhibits a dark ashy-grey tone on its upper body, a brown tail spotted and tipped with white, and a light grey chin to breast area (Payne & Kirwan, 2020). The underbelly of the species is generally white with black striped markings. Each adult individual typically sizes 32-33 cm and weighs between 73-139 grams (Payne & Kirwan, 2020).

Distribution

Oriental cuckoos migrate to Australia during the southern hemisphere winter. Within Australia, the species generally occurs within the northern regions of Australia, including widespread records in the Top End and coastal Queensland (Chapman, 2016). Occasional records of the species also exist in Sydney and south of the Pilbara region.

Biology and Reproduction

Oriental cuckoos are insectivorous and generally forages arboreally for caterpillars, grasshoppers, crickets, cicadas, flies, spiders etc. (Payne & Kirwan, 2020). The species forages in solidarity unless food resources are abundant. Species remains within the area of food resources until resources are diminished. Oriental cuckoos do not breed in Australia, instead breeding in the northern hemisphere from March to August, depending on the region. During breeding season, one egg is laid per nest, with incubation and fledging periods unknown (Payne & Kirwan, 2020).

Habitat

Important habitat for the Oriental cuckoo consists of monsoonal rainforests, vine thickets, wet sclerophyll forest and open woodlands containing *Casuarina*, *Acacia* and/or *Eucalyptus* species. The species is known to occur within the edges and ecotones between habitat types and is particularly favourable of riparian forests within the Kimberley (DoE, 2015).

Project Area Occurrence

The species was sighted by EMM in 2021 in riparian vegetation. Evolve surveys did not observe the species over 4 weeks of survey. The species does not breed in Australia and can therefore be found potentially in any woodland environment.

¹⁰ EBird, 2017 - <https://ebird.org/species/oricuc2>

Threats

Threats to the species include habitat loss due to forest fires within its breeding range, particularly in Serbia. Habitat loss in its non-breeding range may pose a lesser threat.

Project Specific

The Project is not expected to produce significant threats to the species.

Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation and also within the CEMP.

Rehabilitation Measures

Rehabilitation methods for the Project are outlined in section 6 of the LEIP Preliminary Documentation.

Section 7 Incidents, Complaints, Corrective and Preventative Actions

7.1 Induction and Training

All site personnel will undergo site specific inductions and training that will include environmental and biosecurity awareness. Toolbox meetings will also be undertaken as and when required to cover specific environmental or biosecurity issues.

Personnel required to conduct weed and pest control, monitoring and reporting activities are to be suitably trained or experienced. Records of all training are to be filed in accordance with the Project filing system.

7.2 Incidents and Complaints

When an incident or complaint occurs, appropriate action is to be undertaken immediately to address the complaint and/or minimise any further impacts¹¹. Corrective actions are to be implemented and an assessment shall be conducted to determine what preventative measure can be taken to prevent similar incidents from occurring in the future.

All incidents and complaints must be reported to the site supervisor and progressed up the reporting hierarchy as soon as possible via an incident report. Information within the incident report will include:

- Date of incident/complaint;
- Details of incident/complaint;
- Actions taken to prevent and control the incident/complaint; and
- Appropriate sign-off, indicating that the incident/complaint was investigated and followed up appropriately.

All complaints and incidents are to be reported within 24 hours of the incident/complaint and investigated within 48 hours to identify the corrective or preventative actions necessary. Actions will be implemented as soon as possible. All incident reports are to be filed in an incident/complaint register and kept on-site.

Subcontractors who become aware of an incident shall report the matter to the site supervisor.

7.3 Non-conformances and Corrective Actions

Non-conformance or corrective actions detected during monitoring tasks such as site inspections and regular internal and external audits are to be reported within 24 hours to site supervisors via a 'non-conformance or corrective action' request form. The site supervisors responses to non-conformance and corrective actions are to be reported to management.

7.4 Data Retention and Record Management

All records are to be legible, identifiable and traceable. Records will be stored and maintained so they are readily retrievable and protected against damage, deterioration or loss.

¹¹ For the purposes of this WMNES MP, an incident could involve the harm of an MNES species during construction and/or failure to complete monitoring and inspections.

Section 7 Incidents, Complaints, Corrective and Preventative Actions

All data will be stored in an electronic database; and kept for seven years following the completion of construction, except when regulations specify longer storage is required.

7.5 Document Control

Documentation resulting under this MNES MP including, but not limited to, correspondence (both incoming and outgoing), reports, licences, permits, receipts and certificates are to be filed and easily retrievable.

Documentation, particularly reports, must provide details of revision and version information in order to avoid confusion and to ensure the appropriate revision/version is being used.

Section 8 References

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