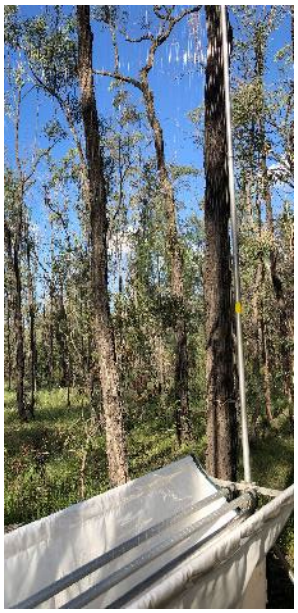
Appendix Q: Management Plans

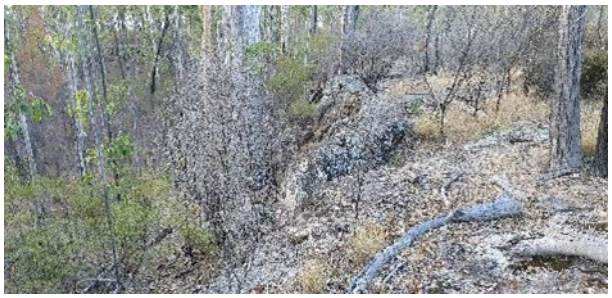
Q1: CEMP

Q2: OEMP

Q3: MNES Management Plan

Q1 CEMP





Elecseed Pty Ltd

Kumbarilla Renewable Energy Park – Construction Environmental Management Plan

11 July 2023

CDM Smith

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Document history & status

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Acronyms and Abbreviations

Acronym / Abbreviation	Definition
AHD	Australian Height Datum
BPESC	Best Practice Erosion and Sediment Control
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
DAF	Department of Agriculture and Fisheries
DAWE	Department of Agriculture, Water and the Environment
DES	Department of Environment and Science
EP Act	Environmental Protection Act
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERP	Emergency Response Plan
ESCP	Erosion and Sediment Control Plan
GCR	Ground Cover Ratio
Ha	Hectare
HSE	Health, Safety and Environment
IECA	International Erosion Control Association
K-REP	Kumbarilla Renewable Energy Park
MLES	Matters of Local Environmental Significance
MNES MP	Matters of National Environmental Significance Management Plan
MSES	Matters of State Environmental Significance
MCU	Material Change of Use
MWp	Megawatt Peak
NC Act	*Nature Conservation Act 1992*
NT Act	*Native Title Act 1993*
OEMP	Operation Environmental Monitoring Plan
PD	Preliminary Documentation
Planning Act	*Planning Act 2016*
PV	Photovoltaic
QFES	Queensland Fire and Emergency Service
SDS	Safety Data Sheets
SMP	Species Management Program
VM Act	*Vegetation Management Act 1999*
WDRC	Western Downs Regional Council

Section 1 Introduction

1.1 Background

Elecseed Pty Ltd (Elecseed) and Korea Midland Power Co., Ltd (Komipo) (together and herein described as the Proponent) is proposing to construct and operate the Kumbarilla Renewable Energy Park (K-REP) which is a photovoltaic (PV) Power Station and associated Access Corridor proposed 40 km west of Dalby, Queensland (the Action, herein referred to as the Project or K-REP).

The Project includes two components:

- PV Power Station – A 100-megawatt peak (MWp) PV Power Station wholly located within a 400-hectare (ha) property described as Lot 4 DY457 (Estate in fee Simple/freehold) including easements over Lot C SP107383 and Lot B SP10738. This component includes the onsite power generation and distribution; and
- Access Corridor – The Access Corridor is located within a gazetted road (crown land) that is the named road, Forest Road, and an unnamed track leading to Lot 4 DY457, crossing to the north of Weranga State Forest. This also includes a small area for clearing associated with an emergency access route in the north-eastern area (refer to note below).

The Project was referred to the Commonwealth Government Department of Agriculture, Water and the Environment (DAWE) on 30 August 2021. On 27 September 2020, and in accordance with section 75 and 87 of the EPBC Act, DAWE deemed the proposed action a 'controlled action' to be assessed by preliminary documentation in accordance with Part 8, Division 4 of the Act. The controlling provisions are listed threatened species and communities (section 18 and 18A) under the Act (reference EPBC 2021/9018).

1.2 Purpose and Scope

This Construction Environmental Management Plan (CEMP) captures the overarching environmental management processes and measures that will be implemented during construction of the Project.

The purpose of this CEMP is to guide environmental management actions for the construction phase of the Project. This CEMP identifies the level of environmental performance, mitigation measures and recommended controls required to manage and mitigate the anticipated environmental impacts. The CEMP scope is limited to the works to be undertaken at the Project site.

1.3 Project Description

The Project's proposed system arrangement is to achieve a 100 MWp installation utilising a maximum Ground Cover Ratio (GCR) of 0.5 MW/ha to fit within the physical site constraints and an approximate 200 ha negotiated lease arrangement. This shall include all ancillary systems and balance of plant. Due to the existing topography and undulating nature of the site, horizon shading must be avoided from natural formations as much as reasonably practicable.

Provisions for the following permanent structures will be included:

- Site 33 kV Switch room (2 x 12.2m container);
- Low voltage, power plant controller and supervisory control and data acquisition control room (6 x 9 m structure);
- Office and control centre (6 x 9m structure);
- Amenities (6 x 9 m structure);
- Store 1 (6 x 9 m structure);
- Store 2 (6 x 9 m structure);

- Space for 20 car park bays (unsealed); and
- Through road, emergency egress track, truck parking bay and turnaround bay.

All structures shall largely be prefabricated off site, delivered and installed on raised structural posts. Surrounding staircases, ramps, pathways, verandas and similar shall be constructed on site to suit the final configuration. The compound shall be fenced and secured with appropriate physical and electronic security measures in place. The compound shall be lightning protected and generally treated as a critical services zone for ongoing operation.

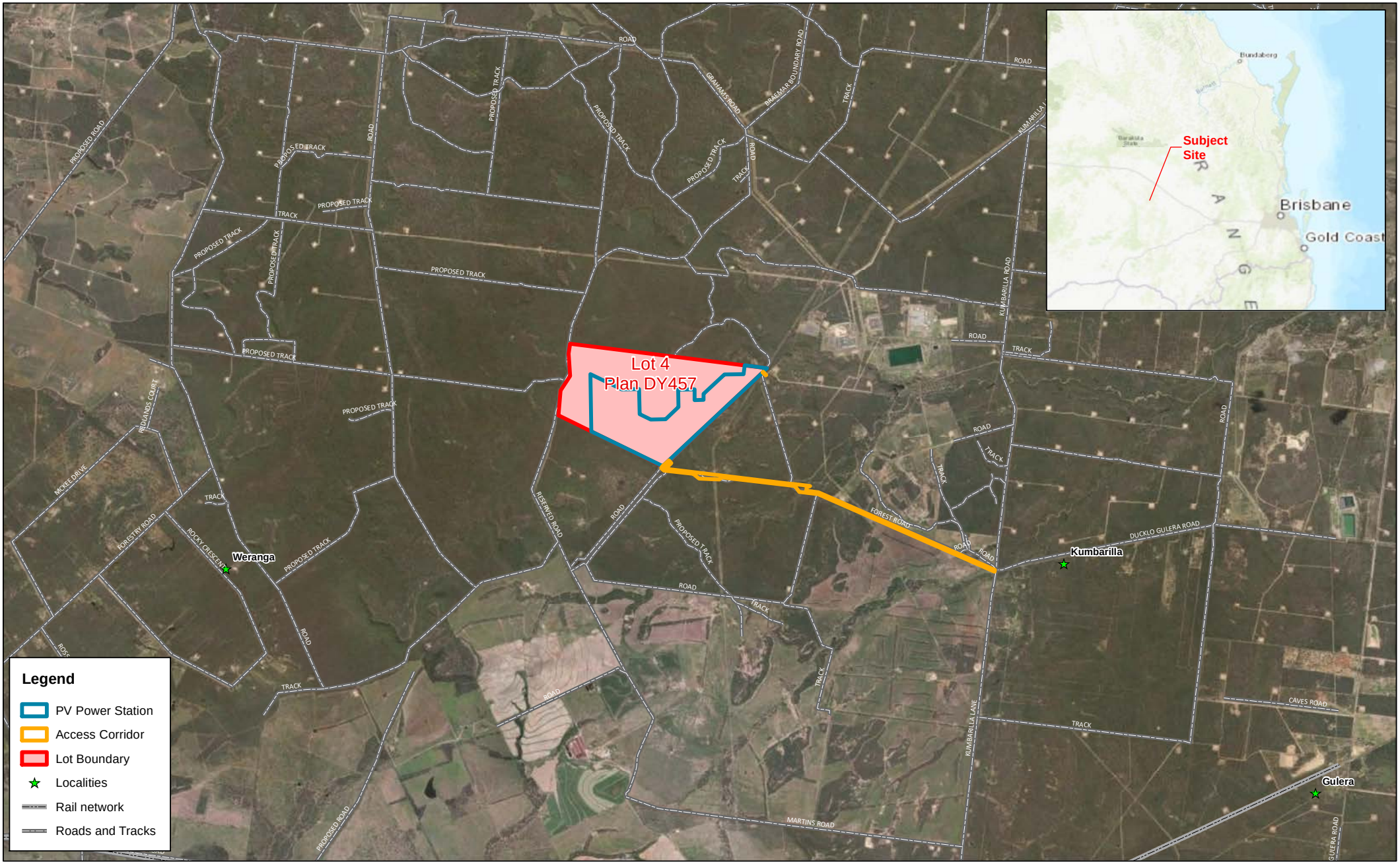
Within the Project Operations Area will be the 33kV site distribution switch room. This is planned around a prefabricated ABB 'Eco Flex' containerised system including all required self-contained services. A Powerlink-compliant 132 kV to 33 kV substation is required to be located on the Project site to provide the PV Power Stations 33kV point of connection and coupling. A spatial allowance of 150 x 100 m has been provisioned for this substation with a 5m wide perimeter emergency egress and access road.

Within the Access Corridor, the Project includes a 5.7 km (approximately 22 ha) long access road (within a public road reserve known as Forest Road and referred to as the Access Corridor). Forest Road provides the final portion of the approved access road and is a rural access road constructed in a road reserve. Condition 61 of the Material Change of Use (MCU) approval requires the upgrading of Forest Road to provide an all-weather 7 m wide gravel pavement on an 8 m formation. There is no stipulation about upgrading Forest Road in its current formed location or in the dedicated road reserve. An approximate 2.5 km section of the public road reserve for Forest Road occurs adjacent to the Weranga State Forest (Lot 201 on FTY1243). As with many rural roads in Queensland, the actual formed location of the road deviates from the road reserve and enters the State Forest lot at two locations totalling approximately 420 m. Based on aerial imagery, these deviations are assumed to be associated with on ground constraints (e.g., drainage lines).

The Project will require the following infrastructure:

- **Solar arrays**. Tier One solar PV panels will be used. Modules will utilise monocrystalline bifacial technology with a power class likely between 550 Wp to 650 Wp. The panels will be elevated off the ground on support columns which include solar trackers to maximise yield and protect the assets from extreme weather events. String combiners take the wires from several different solar panels and combine them into one main feed. A string combiner will be used to combine the output of multiple strings of solar PV modules and will be connected to the substation.
- **Substation**. The substation will contain the Powerlink compliant 132 kV to 33 kV substation transformer and be the point of electrical connection. Earthworks and hardstand will be undertaken to give a flat site above the Q200 (0.5% AEP) flood event. The substation area is located at the north-eastern section of the site.
- **Site-operation compound**. The site operation compound will contain an open area with shed facilities to store equipment and workspace to complete maintenance works. Car parking will be provided as required.
- **Access road**. The access road to the site is from existing Forest Road which is currently an unsealed formed rural road. This road will be regraded and enlarged to a 7 m wide gravel pavement on an 8 m formation. Internal access roads will allow vehicular access between solar PV panel blocks. Internal roads will form into two categories:
  - Main roads – consisting of a 6m wide gravel formation with a 3m wide bitumen surface designed to accommodate large trucks. Passing bays may be required subject to detailed design; and
  - Minor roads – these will be a graded dirt tracks to enable a maintenance vehicle to access solar panels.

  A secondary emergency access track has been considered and will be utilised in the extreme occurrences when it is required, such as bushfire events. The secondary emergency access track will utilise a neighbouring landholder's access track. Relevant agreements with landholders will be obtained.
- **Drainage**. Forest Road will be constructed to a rural standard with table drains and crossroad culverts as necessary. Internal roads and site areas will be disturbed by clearing and earthworks. The site will be designed with table drains, diversion bunds and stormwater pit and pipe necessary to direct water into the multiple basins onsite for treatment.



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2	Revision	23/11/21
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DESIGNED	MM	CHECKED	JM
DRAWN	MM	CHECKED	JM
APPROVED	SM	DATE	23/11/21

Notes:

N

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Meters

1 cm = 576 meters

GCS GDA 1994 MGA Zone 56

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.

DATA SOURCE
QLD Government Open Source Data

DESIGNER
CDM Smith
listen. think. deliver.

CLIENT
calibre

FIGURE 1-1

Regional Area

DRG Ref: **Figure 1-1 Regional Location_22112021**

D:\GIS PROJECTS\KREP\3GIS\02 MXD\July 2021\Figure 1-1 Regional Location_22112021.mxd

1.4 Proponent Details

The proponent details are outlined in Table 1-1.

Table 1-1 Proponent Details

Organisation name (as registered for ABN/CAN)	Elecseed Pty Ltd
ABN	57 632 472 327
Business address	310 Edward Street, Brisbane City, QLD 4000
Postal address	310 Edward Street, Brisbane City, QLD 4000
Primary contact	Robert Saunders
Job title	Managing Director (Australia)

1.5 Related Documents

The CEMP is one of several plans that outline management measures and controls for the Project. Other plans include the Matters of National Environmental Significance Management (MNES MP) and the Operation Environmental Monitoring Plan (OEMP).

1.6 Project Roles and Responsibilities

All personnel involved in the Project including the proponent's employees, contractors and sub-contractors are required to undertake work in accordance with this CEMP. Key roles and responsibilities are included in Table 1-2.

Table 1-2 Project Roles and Responsibilities

Position	Responsibilities
The Proponent (Principal)	▪ 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 CEMP.
Contractors	
Project Manager	▪ 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 CEMP; ▪ Communicating requirements of this CEMP 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.

Position	Responsibilities
Site Supervisor and Environmental Representative / Engineer	▪ 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): - 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.
Contractor HSE Manager	▪ Ensure all workers are aware of the CEMP 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	▪ Follow the requirements and carry out work in accordance with this CEMP and those of the Site Supervisor; ▪ Report any potential environmental issues to the site supervisor, including: - Dust generation; - Non-conformance to noise and vibration; - Non-conformance to air quality; - Uncontrolled waste storage; and - Chemical spills. ▪ 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 Elecseed Environmental Policy.

1.7 Training, Awareness and Competence

Effective implementation of all management plans will require all Project personnel to receive appropriate training. The competency needs of all personnel performing activities affecting the environment during construction shall be identified and documented. All Project personnel will undergo a site induction covering the key environmental issues and measures relating to the Project. All records of training and competencies will be kept and maintained.

1.8 Communication

Environmental requirements and controls necessary at the site, shall be communicated through the following:

- Site environmental inductions;
- Daily pre-start meetings;

- Environmental toolbox talks;
- Incident reports;
- Sub-contractor kick-off meeting; and
- Contractor and client site kick-off meeting.

1.9 Monitoring and Inspections

The Project Manager and Site Supervisor must ensure that environmental protection measures are working effectively on-site through a system of self-checking. The self-check system should comprise inspections of:

- Localised status of the impact (e.g., has there been rain or events contributing to impacts?);
- Anticipating external factors which may increase the potential for environmental impacts (e.g., is inclement weather forecast?);
- Environmental protection measures (e.g., are appropriate measures in place?); and
- Receptors of the effects of the impact (e.g., residents, stormwater drains).

1.10 Records and Reporting

The proponent will be required to retain records sufficient to demonstrate compliance. These records will populate a compliance register. Documents may include flora and fauna investigations, surveys, inspection, emergency procedures, incident report forms, inspection test plans, work procedures, geotagged site photographs and induction checklists.

Incident reporting requirements are to be followed. Reporting requirements may involve weekly, monthly reporting.

1.11 Emergency Response Plan

A site Emergency Response Plan (ERP) for the Project will be developed by the Contractor(s). The ERP will reflect regulatory and proponent requirements for the Project. Management of the potential for environmental harm will be included in the ERP.

The ERP will have regard to the potential risks associated with the Project construction, identify emergency services, measures to undertake consultation with local emergency services and a protocol for notifying appropriate authorities following the occurrence of an incident or emergency, and detailed incident and emergency procedures.

All Project personnel will receive basic training, which will be incorporated into the Project induction, regarding the prevention, the communication activities and the escalation, planning, response to and recovery from incident or emergency.

2.1 Summary of Impacts

Throughout the construction phase and operational phase, 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;
- Day and night-time operation and maintenance facilities;
- General transportation movements; and
- Glare and Lighting.

A summary of the above listed impacts which pose potential to impact MNES as a result of the Project are summarised in Table 2-1.

Table 2-1 Summary of Potential Impacts to MNES

Impacts	Potential Impacts to MNES	Potentially 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.	All	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.	All	All Project phases, particularly during clearing and construction.
Invasive flora	Weed invasion within and surrounding the Project area has the potential to be facilitated through numerous activities including vegetation clearing, soil disturbance and vehicle/machinery movement. 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.	All	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. Additionally, poor waste management may attract feral animals to the area.	All	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.	All	All Project phases, particularly during clearing and construction.

Impacts	Potential Impacts to MNES	Potentially Impacted MNES Species	Applicable Project Phase
Artificial lighting	Artificial light during night works has the potential to impact habitat occupation within the Project area and on adjacent land.	All (specially bats)	Construction and operation.
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.	All	Construction
Release of Pollutants	The release of pollutants into the surrounding environment and waterways has the potential to degrade stream habitat quality near the site, degrade stream water quality and thereby impact vegetation communities and terrestrial fauna utilising these areas.	All	All Project phases, particularly during construction
Site run-off	Erosion and sediment run-off into the surrounding environment and waterways have the potential to degrade stream habitat quality near the site, degrade stream water quality and thereby impact vegetation communities and terrestrial fauna utilising these areas.	All	All Project phases, particularly during clearing and construction.
Heat island effect	Solar arrays will affect air and soil temperatures within the solar array perimeter, however in relation to outside of the solar array perimeter a heat island effect is unlikely to occur.	All	Operation (therefore not considered further)
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.	All	All Project phases, particularly during clearing and construction.

2.2 General

A summary of the general management and mitigation measures for the Project are presented in Table 2-2, which may apply to various aspects of construction and operational works/phases.

Table 2-2 General Management Measures

Objectives			
▪ Compliance with legal and other requirements (i.e., permits, licences and approval conditions); ▪ Environmental performance and compliance are monitored; and ▪ Ensure all staff are aware of the environmentally friendly sensitive features on-site.			
Management Measures			
No.	**Action**	**Responsibility**	**Frequency / timing**
G1	Environmental awareness training aimed at ecological issues as part of site induction.	Site Supervisor	During construction and operation
G2	Ensure all vehicles are strictly controlled and do not operate in areas outside the needs of the Project construction.	All Personnel	During construction and operation
G3	Ensure all vehicles comply with designated speed limits whilst traversing site.	All Personnel	During construction and operation
G4	Minimise the occurrence of off-road vehicle movements.	All Personnel	During construction and operation

Objectives			
G5	Provide timely, ongoing communication and consultation with all directly impacted landowners and other stakeholders	Site Supervisor	During construction and operation

2.3 Habitat Clearing and Direct Fauna Mortality

The potential existing environmental values and the activities to be undertaken, these include:

- Potential habitat for threatened flora and fauna; and
- Ecological functioning (e.g., habitat connectivity).

There was one (1) conservation significant species were detected by the ecology surveys, being the Koala (*Phascolarctos cinereus*), listed as endangered under the EPBC Act and NC Act. Koala remains were found onsite, including two skulls and the discovery of koala scats. Four species of bats were captured during the field surveys, all of which are listed as least concern species under the NC act and not listed under the EPBC Act. Additionally, there were nine (9) conservation significant fauna raised as having a potential to occur on the basis of nearby records and suitable habitat within the area, including:

- Koala (*Phascolarctos cinereus*);
- Yakka skink (*Egernia Rugosa*);
- Five-clawed worm-skink (*Anomalopus mackayi*);
- Regent honeyeater (*Anthochaera phrygia*);
- Painted honeyeater (*Grantiella picta*);
- White-throated needletail (*Hirundapus caudacutus*);
- Squatter pigeon (southern) (*Geophaps scripta scripta*);
- Greater glider (southern and central) (*Petauroides volans*);
- Brigalow woodland snail (*Adclarkia cameroni*);

Construction throughout the Project area has the potential to impact fauna movement, including fish, amphibians, reptiles and mammals. Construction activities may increase the spread and movement of pests and particularly weeds within the Project Area. The field surveys detected several listed species although naturalised.

Relevant objectives and management measures for the construction phase of the Project are outlined in Table 2-3. MNES species specific management measures are outlined in Section 6 of the MNES MP.

Table 2-3 Habitat Clearing and Direct Fauna Mortality Objectives and Management Measures

Objectives			
▪ Compliance with legal and other requirements e.g., permits, licences and approval condition; ▪ Environmental harm is minimised; ▪ Environmental performance and compliance are monitored; ▪ To prevent the introduction or spread of new declared weeds into construction area and control existing pest species within construction work areas during construction; and ▪ Ensure all staff are aware of the environmentally sensitive features on site.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**

HC1	Vegetation located adjacent to the Project construction works to be appropriately marked to avoid unnecessary clearing/vegetation damage.	Environmental Representative / Environmental Engineer	During pre-clearing, clearing and construction.
HC2	Revegetation works to be undertaken in areas where land has been disturbed but is not required for operations, using hydromulch and native grass to minimise erosion.	Environmental Representative	Subsequent to construction works.
HC3	Survey and pegged disturbance footprint, prior to clearing to avoid unnecessary clearing of vegetation beyond that detailed during the design phase.	Environmental Representative / Contractors	During pre-clearing, clearing and construction.
HC4	Prior to any vegetation disturbance, a trained ecologist or other qualified environmental specialist to be onsite to inspect and remove fauna (if required). Construction areas that pose a risk to fauna to be fenced off where practical.	Environmental Representative	During pre-clearing and clearing.
HC5	All fauna and flora, including fauna habitat (i.e., hollows, fallen logs, cracking soils etc) and weed species must be recorded in a detailed register during pre-clearing surveys. All fauna recorded during the pre-clearing, clearing, construction and operation will be recorded on a dedicated fauna register. Environmental representative is to manage all records of threatened species and upload data to a public mapping register (e.g., ALA or Wildlife Online databases).	All staff and contractors / Environmental representative	During pre-clearing works, clearing, construction and operation.
HC6	Design and construction of fencing/infrastructure to direct fauna towards safe passage and around construction area. Temporary fencing will assist in keeping animals out of the disturbance area and will guide them away from unsafe environments to remaining habitats.	Environmental Representative / Environmental Engineer	During the design, clearing and construction phases.
HC7	Vehicle washdown procedures. Wash-down areas will be clearly marked to prevent contaminated water from leaching into soils or flowing into nearby watercourses.	Environmental Representative	During clearing, construction and operation.
HC8	Appropriate speed limits should be in place throughout the site and all contractors will be educated on the risks to local fauna and reduce increase in dust emissions when driving.	Environmental Representative	During all project phases.
HC9	To reduce the risk of mortality to native wildlife, no domestic animals are permitted onsite.	All Staff and Contractors	During all project phases.
HC10	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 pre-clearing checks and be present during removal. They should also inspect the clearing limits. 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 safety removed prior to tree felling.	Environmental Representative / Contractors	During pre-clearing works, clearing and construction.
HC11	Habitat trees must only be cleared once there are no animals present within the tree.	All staff and contractors	During clearing and construction.

HC12	Tree hollow preparation and clearing must be undertaken through the following steps: • Clearly mark the HBT to be removed and/or retained by differentiating with coloured flagging tape • Remove all non-hollow bearing vegetation prior to the removal of hollow-bearing trees; • Following the clearing of non-hollow bearing vegetation, there must be 12 hours between clearing works prior to clearing hollow bearing trees; • Hollows must be checked again and gently tapped along tree trunk using an excavator or loader to scare fauna from hollows; • Re-check hollows after felling to ensure no fauna have become trapped or injured during the clearing works; • If taking the hollow-bearing trees down in stages, the non-hollow-bearing branches should be removed using a cherry picker before the hollow-bearing branches are removed; • Fell trees into the zone of disturbance to avoid damaging adjacent vegetation; • Any logs from the felled trees should be distributed into areas of vegetation to be retained where it would not be considered a fire hazard; and • Any stockpiles of vegetation that are left for 12 hours must be re-checked before removal or mulching.	Environmental Representative / All staff and contractors	During clearing and construction.

HC13	Any hollows that are removed are to be stored and transported safely by a fauna spotter catcher as per the Guideline for the Relocation of Large Tree Hollows (Central Coast Council, 2016): **Hollow Removal:** • A fauna spotter catcher is required to inspect tree hollows for resident fauna before removal procedure; • Any unnecessary limbs should be removed using a chainsaw and trunk above the hollow should be cut using a chainsaw before cutting the lower section, a cloth sling should be attached to the section. • The cutting point of the hollow is to be selected, if the hollow is to include the compete chamber, the cut should be positioned low enough to conserve enough termite mud (Central Coast Council, 2016); • The cut hollow section is to be lowered carefully to prevent damage (potentially using friction drum or crane, this is dependent on the decision of tree arborist, based on size and weight of the hollow section). **Storage:** • If the hollow sections is stored on the ground temporarily, the hollow must be re-inspected before relocation and installation. **Relocation/Transportation:** • Relocation of a hollow must be undertaken subsequent to submission of the relevant approvals and permissions; • A fauna spotter catcher is required to inspect tree hollows for resident fauna and collect any evidence samples of tree hollow use (i.e., feathers, pellets etc.); • A fauna spotter catcher is to assess the recipient tree with suitability for roosting habitat, and located in an ideal locations (i.e., away from noise and lighting); • An arborist is to inspect the recipient tree for structural integrity and whether tree is suitable for hollows to be place 10-15 m high; and • The hollow section is to be transported carefully to prevent damage, using a cloth swing and crane. **Installation in recipient tree:** • Termite mud is to be used at the base of the hollow, with a minimum thickness of 100 mm; • The hollow section is to be lifted carefully to prevent damage, using a cloth swing and crane. Tree arborists are to guide the placement of the hollow sections onto the supporting branch; • All fasteners and hardware used to affix the section to the recipient tree are to be suitable for external use. (e.g., galvanised, stainless steel, brass).	Environmental Representative / contractors	During clearing and construction.
HC14	All clearing and construction staff and fauna spotter/catchers onsite must have a two-way radio on hand at all times to effectively communicate the observation of fauna or potential risks and/or injuries.	All staff and contractors	During clearing and construction.

HC15	Any native bee nests identified during pre-clearance, clearing on construction works must be safely relocated using the following procedure: • Nest entrances to be blocked using cloth at dusk; • Nests are to be removed the following day by a fauna spotter / catcher, via appropriate hollow removal methods (i.e., cherry picker) and are to be relocated more than 2 km from the site.	All staff and contractors	During clearing and construction.
HC16	Following the widening and grading of the access road, road verges will be revegetated to maintain and enhance the narrow east-west connectivity along the current Forest Road track, particularly where it runs through otherwise cleared pasture.	Environmental Representative	Post clearing and construction
HC17	Habitat clearing activities should be undertaken during 'quiet' periods for the relevant species (i.e., no clearing is to be undertaken during breeding periods when fauna are most active/mobile) where practicable.	Environmental Representative	During clearing and construction.
HC18	Pre-emergent herbicides must be applied following vegetation clearing before the weed seeds germinate and are to be irrigated into the soil. Potential pre-emergent herbicides can include dimethphenamid-d, flumioxazin, indaziflam, isoxaben, napropamide, oryzalin, oxadiazon, oxyfluorfen, pendimethalin, prodiamine, and trifluralin. A secondary layer of pre-emergent herbicide will be required 7 to 10 days after initial application and irrigated into the soil.	Environmental Representative	During clearing and construction.

2.4 Pest and Weeds Management Measures

Pests and particularly weeds may pose a threat to flora and fauna within the Project Area. The field surveys detected several listed species although naturalised. Relevant objectives and management measures for the construction phase of the Project are outlined in Table 2-4**Error! Reference source not found.**.

Table 2-4 Pest and Weeds Objectives and Management Measures

Objective			
▪ Compliance with legal and other requirements e.g. permits, licences and approval condition; ▪ Environmental harm is minimised; ▪ Environmental performance and compliance is monitored; and ▪ To prevent the introduction or spread of new declared weeds into construction area and control existing pest species within construction work areas during construction and operation.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**
PW1	Implementation of sediment control mechanisms to minimise the risk of weed seed washing into drainage channels.	Environmental Representative / Environmental Engineer	During clearing and construction.
PW2	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.	Environmental Representative	During all Project phases.
PW3	Onsite waste disposal strategies (particularly for food wastes) to be employed that will not encourage the presence of pest fauna	All Staff and Contractors	During clearing, construction and operation.

PW4	Monitoring and weed inspections particularly in response to reported outbreaks or complaints from adjacent property owners	Environmental Representative / Contractors	During all Project phases.
PW5	Regular onsite inspections of site infrastructure / equipment for resident pest fauna and establishment of a register for pest sightings	Environmental Representative / Contractors	During all Project phases.
PW6	Weed management during and following rehabilitation to prevent habitat degradation and potential increased fire risk.	Environmental Representative	During construction and operation.

2.5 Air Quality and Dust

Air pollution has the potential to impair human health and the health of flora and fauna. Air quality impacts may result from dust, particulate and gaseous emissions and odour during construction. The potential impacts to the local air environment are listed below:

- Deposition of dust on surfaces where it may cause damage and/or lead to a need for increased cleaning or repair;
- Aesthetic effects that arise from visible airborne dust plumes and from deposits of dust on surfaces;
- Need for increased maintenance of air filtering systems (e.g., air conditioners etc.);
- Potential adverse health effects including eye, nose and throat irritation from excessive inhalation of fine particles;
- Impacts on water quality and/or vegetation health from dust deposition;
- Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities; and
- Complaints from the public relating to dust or odours.

Dust generated from construction activities is anticipated to be temporary in nature and associated primarily with earthworks activities. Relevant objectives and management measures for the construction phase of the Project are outlined in Table 2-5.

Table 2-5 Air Objectives and Management Measures

Objective			
▪ No adverse impacts from air pollution and dust during construction and operation			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**
A1	Implementation of dust suppression measures, if dust is visible or when wind conditions become adverse, including: ▪ Watering of exposed areas; and ▪ Physical barriers (e.g., covering of exposed soil piles). The aim of measures is to prevent an increase of particulates (PM^{10} and $PM^{2.5}$) above the current baseline conditions.	Environmental Representative	At all times during clearing and construction
A2	Trigger points for management decisions based on any or all of the following: ▪ Real-time measurements of wind conditions; ▪ Wind conditions as forecast by predictive numerical weather systems; and ▪ Dust monitoring at sensitive receptors when complaints are received.	Environmental Representative	At all times during clearing and construction

A3	Suspension of earthworks during high wind conditions and change in operations during worst-case conditions (e.g., implementation of stricter dust controls).	All Staff and Contractors	At all times during clearing and construction
A4	Monitor dust control measures regularly for effectiveness.	Environmental Representative	At all times during clearing and construction
A5	If required, vehicles carrying loads with the potential to produce dust will be covered when moving within or outside the construction-site.	All Staff and Contractors	At all times during clearing and construction
A6	Minimise extended engine idling and queuing adjacent to sensitive receptors.	All Staff and Contractors	At all times during clearing , construction and operation
A7	Onsite burning of any material will not be undertaken without a valid permit from the relevant QFES Fire Warden.	Environmental Representative	During all Project phases.
A8	Ensure onsite fire-fighting equipment is regularly maintained and adequate staff training is implemented.	Environmental Representative	During all Project phases.
A9	Regular cleaning of machinery and vehicle tyres to prevent wheel entrained dust emissions.	Environmental Representative	At all times during clearing , construction and operation
A10	Areas stripped of topsoil for Project construction will be rehabilitated as soon as practicable where not required during operations.	Environmental Representative	During construction and operation
A11	All plant and equipment (e.g., haulage trucks) are to be maintained and operated in accordance with Australian Design Rules and manufacturer's specification.	Site supervisor	At all times during construction and operation
A12	Report any malfunctioning equipment to the Site Supervisor	All staff and contractors	At all times during construction and operation
A13	Visually inspect the Project area and operations for smoke, fumes and dust	All staff and contractors	At all times during construction and operation
A14	Change in operations during worst-case conditions (e.g., implementation of stricter dust controls).	Site Supervisor	During operations
A15	Maintain vehicles according to manufacturer specifications to minimise exhaust emissions	All personnel	At all times during construction and operation
A16	Weed management during and following rehabilitation to prevent habitat degradation and potential increased fire risk.	Site Supervisor	During operations

2.6 Noise

Noise will be generated by the construction phase of the Project through the use of machinery, plant, and vehicles. The generation of construction and operational noise may be in areas which have the potential to support threatened fauna species. Individuals that occur on or near the site are expected to leave the area of impact. Project construction works and therefore potential noise impacts will be temporary. No further potential for impacts is expected following construction of the Project.

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.

Relevant objectives and management measures for the construction phase of the Project are outlined in Table 2-6.

Table 2-6 Noise Objectives and Management Measures

Objective			
▪ Minimise any potential nuisance or loss of amenity due to construction activities of the Project in accordance with planning, environmental and other approvals.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**
N1	Work hours are restricted to 6.30 am to 6.30 pm Monday to Sunday (noise generating activities). If work required outside of normal hours consultation to be undertaken with Environmental Representative.	All Staff and Contractors	During clearing and construction.
N2	Use of horns, bells, beepers, and other audible signals will be minimised as much as practicable without contravening safe work procedures.	All Staff and Contractors	During clearing, construction and operation.
N3	Plant and equipment will be switched off when not required.	All Staff and Contractors	During clearing, construction and operation.
N4	In cases where noise or vibration levels are identified as being too high, modification or substitution of work methods will be considered and undertaken where possible.	Environmental Representative	During clearing, construction and operation.
N5	Noise to be mitigated by properly maintaining all equipment used onsite in accordance with manufacturers specifications. Where in accordance with manufactures specifications, equipment will be fitted with noise suppression equipment.	Environmental Representative	During clearing, construction and operation.
N6	Designated access routes, unloading areas and parking areas.	All Staff and Contractors	During clearing, construction and operation.
N7	Sensitive receptors located in proximity to the proposed works will be consulted with and given advance warning of any out of hours or high noise work activities.	Environmental Representative	During clearing, construction and operation.
N8	Minimise the drop heights of materials.	All Staff and Contractors	During clearing, construction and operation.
N9	Enforcing speed limits to ensure that all operations are operating at the lowest operable noise level to minimise the impacts of noise and vibration upon wildlife; and	Environmental Representative	During clearing, construction and operation.

2.7 Accidental Release of Pollutants

The release of pollutants into the surrounding environment and waterways has the potential to degrade stream habitat quality near the site, degrade stream water quality and thereby impact vegetation communities and terrestrial fauna utilising these areas. Without mitigation, potential exists for contaminants to enter waterways through activities associated with the washdown and fuelling facilities, storage of lubricants and coolant, wastes and sewerage.

Surface water contaminants have the potential to impact the local catchment and vegetation communities in the surrounding areas. Refer to Table 2-7 for management measures related to the accidental release of pollutants.

Table 2-7 Accidental Release of Pollutants Objectives and Management Measures

Objective			
▪ Minimise any potential pollution nuisance or damage to the surrounding environment due to construction activities of the Project in accordance with planning, environmental and other approvals.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**
RP1	All refuelling activities and the storage and handling of oil and chemicals will comply with relevant Australian Standards.	All Staff and Contractors	During clearing, construction and operation.
RP2	Bunding of chemical storage facilities and appropriate storage of chemicals according to AS 1940 'The storage and handling of flammable and combustible liquids'.	All Staff and Contractors	During construction and operation.
RP3	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.	All Staff and Contractors	During clearing, construction and operation.
RP4	Locate and design roads and other built infrastructure so that minimal runoff to waterways occurs.	Environmental Representative	During design and construction.
RP5	Drainage design that allows for the retention of mine affected water prior to any discharge into the aquatic environment.	Environmental Representative	During design and construction.

2.8 Bushfire and Fire Management

The Project has the potential to result in fires as a result of construction and operational tasks. Fire management measures have been developed to reduce the potential impacts of a site fire. Bushfire setbacks will be provided around Project infrastructure and powerlines in accordance with standards and legislation. Setbacks and firebreaks will be in accordance with the Australian Standard for the Construction of Buildings in Bushfire Prone Areas - AS3959 – 2009. AS3959. Refer to Table 2-8 for management measures related to fire.

Table 2-8 Fire Objectives and Management Measures

Objective			
▪ No adverse impacts from fire during construction and operation			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project phase**
BF1	Protocols outlining the fire management measures for the Project will be developed and implemented prior to the commencement of Project operations.	Environmental Representative	Prior to operations. During clearing and construction.

BF2	A qualified person will be appointed as Site Safety Advisor and will have on-site a set of safety data sheets (SDS) for hazardous and dangerous materials.	Environmental Representative	During clearing, construction and operations.
BF3	A Bushfire Management Plan (BMP) will be prepared for Project operations, informed by consultation with the Queensland Fire and Emergency Service (QFES).	Environmental Representative	Prior to construction.
BF4	If works are undertaken during the bushfire season, the fire danger rating will be monitored daily through the QFES website.	Environmental representative	During clearing, construction and operations.
BF5	Open fires, including open barbeques, billy fires and brush burning will not be permitted on site.	All staff and contractors	During clearing, construction and operations.
BF6	Hot works activities will only be undertaken during a declared Total Fire Ban where an exemption has been issued by QFES.	Site Supervisor	During clearing, construction and operations.
BF7	The following precautions will be taken to minimise the possibility of fire due to hot work activities: ▪ 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	During clearing, construction and operations.
BF8	Vehicles may not idle or be parked in areas of long grass.	All staff and contractors	During clearing, construction and operations.
BF9	Smoking is not permitted on site aside from in a designated safe zone.	All staff and contractors	During clearing, construction and operations.
BF10	In accordance with solar array standards a 10 m bushfire setback will be established from the Project boundary, within the Project area.	Environmental representative	During construction and operations.
BF11	Vegetation within the site will be regularly inspected and managed for fuel loads.	Environmental representative	During clearing, construction and operations.
BF12	Fire management should be undertaken in accordance with the Bushfire Management Plan.	Environmental representative	During clearing, construction and operations.

2.9 Koala Habitat

The Project has the potential to result in an impact to Koala and Koala habitat. Refer to management measures in Table 2-9.

Table 2-9 Koala Habitat Objectives and Management Measures

Objective			
▪ No significant impacts to Koalas as a result of construction and operation.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**

K1	Site inductions and pre-start meetings are conducted prior to construction works to raise awareness of koalas on site and protocols relating to the protection of koalas and their habitat.	Environmental Representative	During pre-clearing works, clearing, construction and operation.
K2	Any retained habitat is to be clearly demarcated with temporary fencing, tape and/or other visible markers, and access to this habitat is restricted to reduce the degradation and loss of habitat.	Environmental Representative / Environmental Engineer	During pre-clearing works, clearing and construction.
K3	Clearing of vegetation should be staged and timed to provide a minimum of 12 hours between clearing events including between non-habitat and habitat trees.	Environmental Representative/ Environmental Engineer	During clearing.
K4	Any appropriate habitat links, or trees retained as stepping stones, are maintained from the clearing site to adjacent habitat areas.	Environmental Representative	During clearing and construction.
K5	Trees are to be thinned out on the site prior to bulk clearing to encourage resident koalas to establish new home ranges.	Environmental Representative	During clearing.
K6	Trees are to be felled in a controlled manner using a vertical tree grab on an excavator	Environmental Representative	During clearing.
K7	Trees with koalas are clearly flagged with a specific colour or design of flagging tape and the on-site fauna spotter is alerted.	Environmental Representative	During pre-clearing, clearing and construction.
K8	A 60 km/h speed limit on the Access Corridor between dusk and dawn with appropriate signage recommendation will be put forward to Council. As part of site inductions, staff will be reminded to adhere to this recommendation to not exceed 60 km/h.	Environmental Representative / Environmental Engineer	During pre-clearing, clearing, construction and operation.
K9	Road signage to be used to alert drivers of potential koala movement across the road.	Environmental Representative / Environmental Engineer	During all project phases.
K10	Night-time vehicle movements on site and travelling to and from the site is restricted when koalas are most active between 6pm to 6am.	All staff and contractors	During pre-clearing, clearing, construction and operation.
K11	In the event of a person recording a sick, injured or dead Koalas located in the Project Area, all work must cease immediately and the koala is reported to RSPCA on 1300 ANIMAL (1300 264 625).	All staff and contractors	During pre-clearing, clearing, construction and operation.
K12	Fauna spotter/catchers are to be aware of appropriate quarantine and biosecurity procedures for koalas found to be affected by disease	Environmental Representative	During all project phases.
K13	Hygiene and biosecurity measures to minimise the of introduction and/or spread of myrtle rust (caused by the fungus *Austropuccinia psidii*) in the Project area are enforced through vehicle washdown procedures. Wash down areas will be clearly marked to prevent vehicles entering the site that may carry vegetation pathogens known to affect koala food trees (e.g., myrtle rust).	Environmental Representative	During all project phases.
K14	Visual monitoring of adjacent habitat by site personnel to record and notify RSPCA of any koalas and potential disease occurrence.	Environmental Representative	During all project phases.
K15	Fauna egress infrastructure installed along fencing to prevent entrapment.	Environmental Representative/ Environmental Engineer	During design, construction and operation.

K16	In the event a Koala is observed at the Project Area, all work must cease immediately within the surrounding area until the Koala has moved on from the area.	All Staff and Contractors	During pre-clearing, clearing and construction.
K17	In the event that a tree within the Myrtaceae family is left within the disturbance footprint boundaries, the trees are to be monitored on a regular basis for the presence of myrtle rust. If myrtle rust is detected on the trees, they are to be treated in accordance with appropriate disease control measures.	Environmental Representative	During all project phases.
K18	Domesticated dogs are not permitted onsite.	All staff and contractors	During all project phases.
K19	Clearing of Koala habitat trees should be undertaken during the non-breeding season only. Therefore, clearing should only be undertaken between April – July.	Environmental representative / All staff and contractors	During clearing and construction.

2.10 Cultural Heritage

The Proponent has an agreed Cultural Heritage Management Plan (CHMP) with the Barunggam People. The Project will be developed in strict obeyance of the agreed management measures within the CHMP. General management measures relating to Cultural Heritage are provided in Table 2-10.

Table 2-10 Cultural Heritage Objectives and Management Measures

Objectives			
▪ To minimise adverse impacts on Indigenous and European archaeology and heritage items.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**
CH1	In the event that any items of cultural heritage are uncovered during the course of the Project, work in the immediate area will cease and the find reported to the Project Manager immediately.	All personnel Project Manager (for notification)	At all times
CH2	Visual observations will be conducted during all Project phases to identify any potential indigenous and non-indigenous cultural heritage sites and artefacts.	All personnel	At all times
CH3	Site inductions for all staff are to include education sessions regarding Cultural Heritage.	Project Manager / Site Supervisor	Prior to clearing and construction.
CH4	All measures within the agreed CHMP are to be implemented.	All personnel	At all times

2.11 Traffic

The Project will result in increased vehicle use on the surrounding road network. This may result in disruption to flow and delays as well minor impacts to the overall road condition. Additionally, increased traffic movement has the potential to increase direct mortality of native fauna through vehicle collision. During construction, vehicles traversing the Project area may increase the potential risk of injury or depth of wildlife. The specific activities with the most potential to cause impact include:

- General movement of heavy plant and equipment to and from site, mobilisation, demobilisation;
- Movement of plant and vehicles on, around or entering or exiting public or private roads;
- Material deliveries or waste collection from site;

- Movement of workforce between accommodation and work fronts; and
- Light vehicle movements to different project components.

Relevant objectives and management measures for the construction phase of the Project are outlined in **Error! Reference source not found.**.

Table 2-11 Traffic Objectives and Management Measures

Objective			
▪ To minimise adverse impacts on socio economic environment during construction.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**
T1	Appropriate speed limits should be in place throughout the site and all contractors will be educated on the risks to local fauna to minimise impacts when driving.	Site Supervisor	During pre-clearing works, clearing, construction and operation.
T2	The onsite protocols to include measures for monitoring and recording wildlife road collision incidents throughout construction to help remediate 'high risk' collision areas and set conditions for attending to injured native wildlife.	All personnel	During construction
T3	Awareness of access arrangements and potential traffic conflicts at the intersection will be provided to all drivers who will access the Project area.	Site Supervisor	During pre-clearing works, clearing and construction.
T4	Heavy vehicles accessing the Project will be staggered during the day to minimise traffic impacts.	Site Supervisor	During construction.
T5	Additional signage, traffic control and cautionary 'road safety' marking will be used during the construction, where deemed necessary through the ongoing evaluation of site risks.	Site Supervisor	During construction.
T6	In the event of a complaint or incident, an assessment or investigation will be undertaken to determine the cause of the problem, through which processes or activities will be modified if required.	HSE Manager	During pre-clearing works, clearing and construction.

2.12 Waste

Inappropriate handling of waste from construction activities has the potential to negatively impact the environment and cause health risks. Potential impacts may include:

- Land contamination caused by spills or inappropriate waste disposal to soil;
- Groundwater contamination caused by spills of solid or liquid waste;
- Litter due to unsuitable storage and containment measures for general waste;
- Odour and potential spread of disease due to inappropriate storage of waste;
- Pests and diseases; and
- Risks to human health and safety through poor management of hazardous materials.

Waste has the potential to impact flora and fauna, attracting pests and vermin through the supply of artificial food sources. This may impact on natural behaviour and natural species assemblages. A range of waste minimisation strategies will be in place to reduce waste streams generated. As such, it is not anticipated that waste generated as part of the Project will have a significant impact on flora and fauna communities within the Project Area. Waste storages are not likely to have significant impacts on native fauna and flora within or adjacent to the Project Area, as all waste produced as a result of the Project will be stored and disposed of appropriately, as per the relevant legislation.

Waste management during construction will be undertaken using the services of a specialist and appropriately licensed waste management sub-contractor(s). Waste materials will be collected, segregated and appropriately stored prior to removal from site. The waste management processes will comply with the requirements of the relevant statutory legislation. Relevant objectives and management measures for the construction phase of the Project are outlined in **Error! Reference source not found.**.

Table 2-12 Waste Objectives and Management Measures

Objective			
▪ No adverse impacts from waste management during construction.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**
WS1	Housekeeping in site work areas will be regularly undertaken to ensure no waste materials are present on site for longer than reasonably acceptable.	All personnel	During clearing and construction.
WS2	Waste is not to be stored in a manner that poses a fire risk or attracts vermin.	All personnel	During clearing and construction.
WS3	Hazardous or regulated waste to be appropriately contained and stored on-site in approved hazardous or regulated waste bins. Hazardous or regulated waste to be removed from site by a licensed waste transporter to approved disposal facility in accordance with the relevant legislation.	Site Supervisor	During construction.
WS4	All waste will be removed on an as-needed basis, by a licensed waste transporter.	Site Supervisor	During clearing and construction.
WS5	All waste bins will be clearly labelled for intended contents.	Site Supervisor	During clearing and construction.
WS6	Spill kits will be provided in hazardous material storage areas.	Site Supervisor / HSE Manager	During clearing and construction.
WS7	Any regulated wastes are transported and disposed of by and at an appropriately licenced facility.	Site Supervisor	During clearing and construction.

2.13 Health and Safety

The Contractor shall be responsible for the development and implementation of a Contractor Health, Safety and Environment (HSE) Management Plan, which shall be submitted to the Senior Project Manager for approval.

The Contractor shall take the necessary precautions and actions to ensure the safety of employees, equipment, existing services, nearby buildings, structures and infrastructure. Relevant objectives and management measures for the construction phase of the Project are outlined in **Error! Reference source not found.**.

Table 2-13 Health and Safety Objectives and Management Measures

Objective			
▪ Ensure human health and safety of the workforce and public is not adversely affected.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**
HSE1	Instruction in occupational health and accident prevention for all employees.	HSE Manager / Site Supervisor	Prior to clearing and construction.
HSE2	Instruction in handling hazardous materials and implementation of a Contractor Hazardous Material.	HSE Manager / Site Supervisor	Prior to clearing and construction.
HSE3	Provision of adequate personal protective equipment and life-saving equipment.	HSE Manager	During clearing and construction.
HSE4	Implementation of safety controls for Workers on Foot to ensure the appropriate separation of people and plant during roadworks.	HSE Manager / Site Supervisor	During clearing and construction.
HSE5	Adequate traffic control and implementation of a Contractor Traffic Management Plan.	HSE Manager	During clearing and construction.
HSE6	Adequate dust suppression and implementation of a Contractor Dust Management Plan.	HSE Manager	During clearing and construction.
HSE7	Provision of safety devices, equipment and apparel as are necessary to prevent accidents or injury during construction.	HSE Manager	During clearing and construction.
HSE8	Undertaking job hazard analyses and preparing safe work procedures for hazardous operations.	HSE Manager	During clearing and construction.

2.14 Water

The Access Corridor intersects a low stream order (2) creek; however, the creek is typically dry for most of the year and only flows during heavy rainfall events.

Relevant objectives and management measures for the construction phase of the Project in relation to potential impacts on watercourses are outlined in Table 2-14.

Table 2-14 Water Objectives and Management Measures

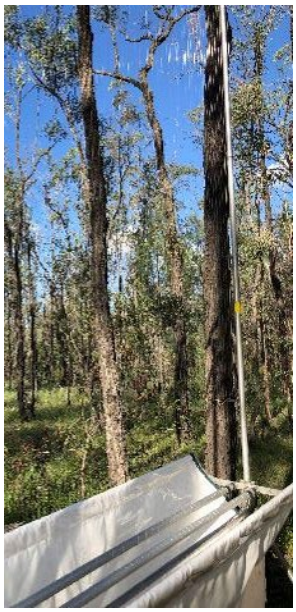
Objective			
▪ To prevent the degradation or contamination of water quality in the area surrounding the Project; ▪ Environmental harm is minimised; and ▪ Construction of the Project in accordance with planning, environmental and other approvals.			
Management Measures			
No.	**Action**	**Responsibility**	**Applicable Project Phase**

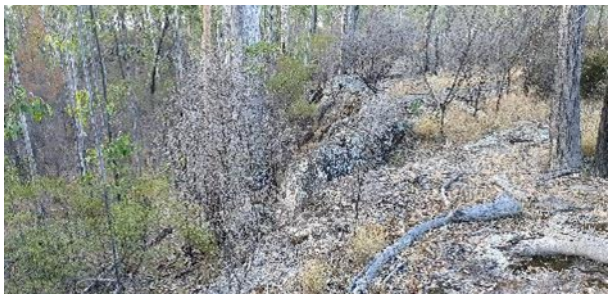
W1	Impacts to aquatic habitat will be minimised by locating ancillary works outside waterway environments.	Project Manager / Site Supervisor	During construction
W2	Weather conditions will be monitored during the construction stage and temporary controls will be established during extreme weather events.	Site Supervisor	During construction
W3	Construction equipment is to be maintained to minimise risk of spill or leakage.	All personnel	During construction
W4	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	During construction
W5	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	During construction
W6	Refuelling will not take place within 50 m of a watercourse.	All personnel	During construction
W7	Refuelling and major maintenance work will be undertaken at predetermined locations away from watercourses and in a manner that prevents spillages.	All personnel	During construction
W8	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	During construction
W9	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	During clearing and construction
W10	Should groundwater be encountered during construction works, works will cease until further examination occurs.	All personnel	During construction
W11	Develop and implement a certified ESCP and associated monitoring to mitigate the potential impacts.	Project Manager	During construction
W12	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	During clearing and construction
W13	Construction methodology to avoid prolonged open excavations, i.e., suction intake and drainage channel areas, which may accumulate groundwater or surface water	Site Supervisor	During construction
W14	Earthworks, particularly within drainage paths are to be conducted to maintain the hydraulic capacity and minimise potential impacts to upstream or downstream.	Site Supervisor	During clearing and construction
W15	Potentially hazardous and flammable substances/ liquids will be stored in accordance with relevant Australian standards (AS1940), *Work Health and Safety Act 2011* 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	During construction
W16	Structures and realignments have been designed to minimise changes to flow velocities.	Site Supervisor	During Project design
W17	Clearing areas to be minimised to only the extent required.	Site Supervisor	During Project design and clearing

W18	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	Prior to clearing and construction
W19	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	During clearing and construction
W20	All temporary erosion and sediment control structures are to be removed post-construction works.	Site Supervisor	Post construction, pre-rehabilitation
W21	Rehabilitation of any disturbed ground due to temporary construction infrastructure will be conducted progressively as soon as construction activities are complete.	Site Supervisor	Post construction, during rehabilitation
W22	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	During construction
W23	All construction works around waterways will be designated and undertaken in accordance with the IECA Guidelines.	Project Manager / Site Supervisor	During construction
W24	Temporary waterway barrier works within waterways mapped as Queensland waterways for waterway barrier works are to be undertaken with the '*Accepted development requirements for operational works that is constructing or raising waterway barrier works*' [2], including the requirement for pre and post work notifications.	Project Manager / Site Supervisor	During construction
W25	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	During construction

[2] Department of Agriculture and Fisheries 2018, Accepted development requirements for operational work that is constructing or raising waterway barrier works, available:workshttps://www.daf.qld.gov.au/__data/assets/pdf_file/0006/1476888/adr-operational-waterway-barrier-works.pdf

Q2: OEMP





Elecseed Pty Ltd

Kumbarilla Renewable Energy Park – Operational Environmental Management Plan

11 July 2023

CDM Smith

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Document history & status

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Acronyms and Abbreviations

Acronym / Abbreviation	Definition
AHD	Australian Height Datum
BPESC	Best Practice Erosion and Sediment Control
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
DAF	Department of Agriculture and Fisheries
DAWE	Department of Agriculture, Water and the Environment
DES	Department of Environment and Science
EP Act	Environmental Protection Act
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERP	Emergency Response Plan
(ESCP	Erosion and Sediment Control Plan
GCR	Ground Cover Ratio
Ha	Hectare
HSE	Health, Safety and Environment
IECA	International Erosion Control Association
K-REP	Kumbarilla Renewable Energy Park
MLES	Matters of Local Environmental Significance
MNES MP	Matters of National Environmental Significance Management Plan
MSES	Matters of State Environmental Significance
MCU	Material Change of Use
MWp	Megawatt Peak
NC Act	*Nature Conservation Act 1992*
NT Act	*Native Title Act 1993*
OEMP	Operation Environmental Monitoring Plan
PD	Preliminary Documentation
Planning Act	*Planning Act 2016*
PV	Photovoltaic
QFES	Queensland Fire and Emergency Service
SDS	Safety Data Sheets
SMP	Species Management Program
VM Act	*Vegetation Management Act 1999*
WDRC	Western Downs Regional Council

Section 1 Introduction

1.1 Background

Elecseed Pty Ltd (Elecseed) and Korea Midland Power Co., Ltd (Komipo) (together and herein described as the Proponent) is proposing to construct and operate the Kumbarilla Renewable Energy Park (K-REP) which is a photovoltaic (PV) Power Station and associated Access Corridor proposed 40 km west of Dalby, Queensland (the Action, herein referred to as the Project or K-REP).

The Project includes two components:

- PV Power Station – A 100-megawatt peak (MWp) PV Power Station wholly located within a 400-hectare (ha) property described as Lot 4 DY457 (Estate in fee Simple/freehold) including easements over Lot C SP107383 and Lot B SP10738. This component includes the onsite power generation and distribution; and
- Access Corridor – The Access Corridor is located within a gazetted road (crown land) that is the named road, Forest Road, and an unnamed track leading to Lot 4 DY457, crossing to the north of Weranga State Forest. This also includes a small area for clearing associated with an emergency access route in the north-eastern area (refer to note below).

The Project was referred to the Commonwealth Government Department of Agriculture, Water and the Environment (DAWE) on 30 August 2021. On 27 September 2020, and in accordance with section 75 and 87 of the EPBC Act, DAWE deemed the proposed action a 'controlled action' to be assessed by preliminary documentation in accordance with Part 8, Division 4 of the Act. The controlling provisions are listed threatened species and communities (section 18 and 18A) under the Act (reference EPBC 2021/9018).

1.2 Purpose and Scope

This Operation Environmental Management Plan (OEMP) captures the overarching environmental management processes and measures that will be implemented during operational phase of the Project.

The purpose of this OEMP is to guide environmental management actions for the operational phase of the Project. This OEMP identifies the level of environmental performance, mitigation measures and recommended controls required to manage and mitigate the anticipated environmental impacts. The OEMP scope is limited to the works to be undertaken at the Project site.

1.3 Project Description

Once the roadworks and construction of all elements that comprise of the PV Power Station are completed the operation will consist of generating electricity from the solar panels and exporting it to the power grid via the sub-station. The facility will be remotely monitored, and maintenance operations will consist of periodic ground keeping works and replacement of solar components as necessary of the lifetime of the facility. When operational, the Project will have an ongoing anticipated maximum workforce of 5 full time equivalent staff.

The operational activities will be solar panel maintenance and ground maintenance. An onsite storage facility will contain components for maintenance of the solar panels. Maintenance to the solar panels will be carried out using light vehicles and labour to replace the panels. When problems arise, most faults will be electrical in nature and will require specialist technical personnel and equipment to resolve.

1.4 Proponent Details

The proponent details are outlined in Table 1-1.

Table 1-1 Proponent Details

Organisation name (as registered for ABN/CAN)	Elecseed Pty Ltd
ABN	57 632 472 327
Business address	310 Edward Street, Brisbane City, QLD 4000
Primary contact	Robert Saunders
Job title	Managing Director

1.5 Related Documents

The OEMP is one of several plans that outline management measures and controls for the Project. Other plans include the Matters of National Environmental Significance Management (MNES MP) and the Construction Environmental Monitoring Plan (CEMP).

1.6 Project Roles and Responsibilities

All personnel involved in the Project including the proponent's employees, contractors and sub-contractors are required to undertake work in accordance with this OEMP. Key roles and responsibilities are included in Table 1-2.

Table 1-2 Project Roles and Responsibilities

Position	Responsibilities
The Client (Principal)	▪ Obtaining state and Commonwealth statutory approvals; ▪ 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 OEMP.
Contractors	
Project Manager	▪ 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 OEMP; ▪ Communicating requirements of this OEMP 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	▪ 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;

Position	Responsibilities
	▪ Monitor the subcontractors and suppliers based on an evaluation of their ability to meet the specified requirements including those for environmental and ensure compliance; ▪ 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): - 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.
Contractor HSE Manager	▪ Ensure all workers are aware of the OEMP 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	▪ Follow the requirements and carry out work in accordance with this OEMP and those of the Site Supervisor; ▪ Complete a site induction and other required training before commencing work onsite. ▪ Ensuring their areas of control, works and associated personnel are complying with the requirements of this OEMP; ▪ Report any potential environmental issues to the site supervisor, including: - Dust generation; - Non-conformance to noise and vibration; - Non-conformance to air quality; - Uncontrolled waste storage; and - Chemical spills. ▪ 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).

1.7 Training, Awareness and Competence

Effective implementation of all management plans will require all Project personnel to receive appropriate training. The competency needs of all personnel performing activities affecting the environment during operations shall be identified and documented. All Project personnel will undergo a site induction covering the key environmental issues and measures relating to the Project. All records of training and competencies will be kept and maintained.

1.8 Communication

Environmental requirements and controls necessary at the site, shall be communicated through the following:

- Site environmental inductions;
- Daily pre-start meetings;
- Environmental toolbox talks;
- Incident reports;
- Sub-contractor kick-off meeting; and
- Contractor and client site kick-off meeting.

1.9 Monitoring and Inspections

The Project Manager and Site Supervisor must ensure that environmental protection measures are working effectively on-site through a system of self-checking. The self-check system should comprise inspections of:

- Localised status of the impact (e.g., has there been rain or events contributing to impacts?);
- Anticipating external factors which may increase the potential for environmental impacts (e.g., is inclement weather forecast?);
- Environmental protection measures (e.g., are appropriate measures in place?); and
- Receptors of the effects of the impact (e.g., residents, stormwater drains).

1.10 Records and Reporting

The proponent will be required to retain records sufficient to demonstrate compliance. These records will populate a compliance register. Documents may include flora and fauna investigations, surveys, inspection, emergency procedures, incident report forms, inspection test plans, work procedures, geotagged site photographs and induction checklists.

Incident reporting requirements are to be followed. Reporting requirements may involve weekly, monthly reporting.

1.11 Emergency Response Plan

A site Emergency Response Plan (ERP) for the Project will be developed by the Contractor(s). The ERP will reflect regulatory and proponent requirements for the Project. Management of the potential for environmental harm will be included in the ERP.

The ERP will have regard to the potential risks associated with the Project construction and operations, identify emergency services, measures to undertake consultation with local emergency services and a protocol for notifying appropriate authorities following the occurrence of an incident or emergency, and detailed incident and emergency procedures.

All Project personnel will receive basic training, which will be incorporated into the Project induction, regarding the prevention, the communication activities and the escalation, planning, response to and recovery from incident or emergency.

Section 2 Operation Environmental Management Plan

2.1 Summary of Impacts

Throughout the operational phase, the Project has the potential to impact on ecological values through the following activities:

- Day and night-time operation and maintenance facilities;
- General transportation movements; and
- Glare and Lighting.

A summary of the above listed impacts which pose potential to impact MNES as a result of the Project are summarised in Table 3-1.

Table 3-1 Summary of Potential Impacts to MNES

Impacts	Potential Impacts to MNES	Impacted MNES Species	Applicable Project Phase
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.	All	All Project phases.
Invasive flora	Weed invasion within and surrounding the Project area has the potential to be facilitated through numerous activities including vegetation clearing, soil disturbance and vehicle/machinery movement. 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.	All	All Project phases.
Invasive fauna	Invasive fauna have the potential to impact the Project area and threatened species throughout the Project lifecycle if poor waste management strategies are adopted.	All	All Project phases.
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 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.	All	All Project phases.
Artificial lighting	Artificial light during night works has the potential to impact habitat occupation within the Project area and on adjacent land.	All (specially bats)	Construction and operation.
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.	All	Construction and operation.
Release of Pollutants	The release of pollutants into the surrounding environment and waterways has the potential to degrade stream habitat quality near the site, degrade stream water quality and thereby impact vegetation communities and terrestrial fauna utilising these areas.	All	All Project phases.

Impacts	Potential Impacts to MNES	Impacted MNES Species	Applicable Project Phase
Site run-off	Erosion and sediment run-off into the surrounding environment and waterways have the potential to degrade stream habitat quality near the site, degrade stream water quality and thereby impact vegetation communities and terrestrial fauna utilising these areas.	All	All Project phases.
Heat island effect	Solar arrays will affect air and soil temperatures within the solar array perimeter, however in relation to outside of the solar array perimeter a heat island effect is unlikely to occur.	All	Operation
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.	All	All Project phases.

2.2 General

A summary of the general management and mitigation measures for the Project are presented in Table 3-2, which may apply to various aspects of operational works/phases.

Table 3-2 General Management Measures

Objectives		
▪ Compliance with legal and other requirements (i.e., permits, licences and approval conditions); ▪ Environmental performance and compliance are monitored; and ▪ Ensure all staff are aware of the environmentally friendly sensitive features on-site.		
Management Measures		
No.	**Action**	**Responsibility**
G1	Environmental awareness training aimed at ecological issues as part of site induction.	Site Supervisor
G2	Ensure all vehicles are strictly controlled and do not operate in areas outside the needs of the Project.	All Personnel
G3	Ensure all vehicles comply with designated speed limits whilst traversing site.	All Personnel
G4	Minimise the occurrence of off-road vehicle movements.	All Personnel
G5	Provide timely, ongoing communication and consultation with all directly impacted landowners and other stakeholders	Site Supervisor

2.3 Land

Topography across the PV Power Station ranges from 337.8m Australian Height Datum (AHD) to 442.1m AHD above sea level. Although there is over 100 m difference between the lowest and highest point due to a small section containing a rocky outcrop, the area is considered flat with gently undulating areas from the south-west to the north-east (where the lowest point is located). No Acid Sulphate Soils have been mapped in the area.

Operational works have the potential to cause physical degradation of the soil, soil contamination, and erosion. A Relevant objectives and management measures for the operational phase of the Project are outlined in Table 3-3.

Table 3-3 Land Objectives and Management Measures

Objective		
▪ Reduce accumulation of contaminants leading to land and water contamination; ▪ Ensure soil and sediment transport do not significantly impact on the receiving environment; ▪ Prevent spill or leakage of chemicals and fuel; and ▪ Prevent infiltration of chemicals to groundwater as a result of spills and leaks.		
Management Measures		
No.	**Action**	**Responsibility**
L1	Erosion and sediment control devices are to be installed and monitored as per the certified Erosion and Sediment Control Plan (ESCP).	Project Manager / Site Supervisor
L2	Sediment and erosion control measures to prevent soil loss will be developed consistent with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control (BPESC) documents. ▪ Minimising the area and duration of soil disturbance; ▪ Progressively rehabilitating disturbed areas; ▪ Maintaining sheet flow conditions to the maximum extent possible; ▪ Water velocity reduction measures and redirection of runoff to stable ground; ▪ Diversion banks at the crest of steep areas such as stream banks to divert flow away from backfilled trenches or disturbed areas; ▪ Trench blocks (i.e., trench/sack breakers) and compaction of backfilled soils to be used to prevent subsurface erosion and subsidence along backfilled trenches.	Project Manager / Site Supervisor
L3	Inspect erosion and sediment control devices immediately after rainfall events to ensure good working order.	Site Supervisor
L4	Management of runoff will be of particular focus to limit environmental impact to watercourses.	Site Supervisor
L5	Dust suppression is to be managed using water when and where necessary.	All Personnel
L6	Roads and access tracks are to be appropriately maintained to limit environmental harm to immediate and surrounding areas.	Site Supervisor
L7	Spill kit(s) are to be located at the Project site.	Site Supervisor
L8	Handling and storage of combustible and flammable liquids is to be done in accordance with AS1940:2017.	Site Supervisor
L9	Vehicles are to be visually monitored to ensure movements are compliant with management measures.	All Personnel
L10	Any spills are to be immediately cleaned using appropriate spill kit equipment and methods.	All Personnel
L11	Staff are to be made aware of spill response procedure and reporting requirements.	Project Manager / Site Supervisor
L12	Fuel, oil and chemical storage and handling are to be in accordance with Australian Standards.	Project Manager / Site Supervisor

L13	Appropriately designed laydown areas are to be used.	Site Supervisor
L14	Spills of hazardous materials will be rendered safe (unable to further contaminate) and, where required, collected for treatment and disposal at a designated site, including cleaning materials, absorbents and contaminated soils.	Site Supervisor
L15	No equipment or materials will be stored across flow paths.	All personnel
L16	The extent of the area required to carry out the permitted activity must be limited to the minimum area necessary to reasonably carry out the works.	Site Supervisor

2.4 Water

The Access Corridor intersects a low stream order (2) creek; however the creek is typically dry for most of the year and only flows during heavy rainfall events. During operation, water will be required for worker facilities; however, with minimal employees, water requirements will be minimal and primarily for functioning of the ablutions block, potable purposes and bushfire fighting purposes. It is expected that water will be trucked to and stored on-site throughout the Project's lifetime.

Relevant objectives and management measures for the operational phase of the Project in relation to potential impacts on watercourses are outlined in Table 3-4.

Table 3-4 Water Objectives and Management Measures

Objective		
▪ To prevent the degradation or contamination of water quality in the area surrounding the Project; and ▪ Environmental harm is minimised.		
Management Measures		
No.	**Action**	**Responsibility**
W1	Weather conditions will be monitored and temporary controls will be established during extreme weather events.	Site Supervisor
W2	Operational equipment is to be maintained to minimise risk of spill or leakage.	All personnel
W3	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
W4	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
W5	Refuelling will not take place within 50 m of a watercourse.	All personnel
W6	Refuelling and major maintenance work will be undertaken at predetermined locations away from watercourses and in a manner that prevents spillages.	All personnel
W7	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
W8	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
W9	Develop and implement a certified ESCP and associated monitoring to mitigate the potential impacts.	Project Manager
W10	Potentially hazardous and flammable substances/ liquids will be stored in accordance with relevant Australian standards (AS1940), *Work Health and Safety Act 2011* 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
W11	Site personnel will complete inductions and spill kits will be available to all personnel in the event of a spill or leak.	Site Supervisor
W12	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
W13	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

2.5 Terrestrial Flora

The vegetation surveys confirmed the Project area does not contain any Threatened Ecological Communities protected under the EPBC Act. It was previously thought that RE 11.9.5 (*Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on fine-grained sedimentary rocks) could be present in the southern part of the Project Area; however, surveys confirmed this has been incorrectly mapped (refer to Section 3.3.6.2 of the PD). Additionally, no vegetation corresponding to any EPBC listed TEC was observed within the PV Power Station or Access Corridor. There were no listed MNES flora species listed as likely to occur within the Project area. However, one flora species, the Kogan wax flower (*Philotheca sporadica*), was listed as Near Threatened was discovered during the preliminary survey. The population extent and the location of each individual of Kogan waxflower plant was recorded, with a total of 157 individual plants documented, of which, only 2 juvenile plants (15-20 cm high) were recorded. The Kogan waxflower is no longer listed as a threatened species under the EPBC Act.

Pests and particularly weeds may pose a threat to flora and fauna within the Project Area. The field surveys detected several listed species although naturalised.

Relevant flora objectives and management measures for the operational phase of the Project are outlined in Table 3-5.

Table 3-5 Flora Objectives and Management Measures

Objective		
▪ Ensure impacts to vegetation as a result of the Project are minimised.		
Management Measures		
No.	**Action**	**Responsibility**
TF1	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
TF2	Weed management actions will include hygiene protocols, washdown procedures, monitoring and management of weeds, and vehicle access restrictions.	Project Manager
TF3	Any materials brought onto site (such as gravel and soil) will be certified as weed and disease free.	Site Supervisor
TF4	Visual inspection of progressively rehabilitated areas.	Site Supervisor
TF5	Monitoring and weed inspections particularly in response to reported outbreaks or complaints from adjacent property owners.	Site Supervisor
TF6	Implementation of sediment control mechanisms to minimise the risk of weed seed washing into drainage channels.	Project Manager / Site Supervisor
TF7	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
TF8	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
TF9	Undertake routine inspections within the Project area to identify potential new weed species and to determine success of controlling existing species	Site Supervisor
TF10	Flora and fauna (native and pest species) will be managed in accordance with the requirements of the: ▪ *Environmental Protection and Biodiversity Conservation Act 1999*; and ▪ *Biosecurity Act 2014*.	Project Manager / Site Supervisor
TF11	In the event that a tree within the *Myrtaceae* family is left within the disturbance footprint boundaries, the trees are to be monitored on a regular basis for the presence of myrtle rust. If myrtle rust is detected on the trees, they are to be treated in accordance with appropriate disease control measures.	Environmental Representative

2.6 Fauna

The potential impacts to ecological values during the operational phase of the Project have been considered based on the existing environmental values and the activities to be undertaken, these include:

- Potential habitat for threatened flora and fauna; and
- Ecological functioning (e.g., habitat connectivity).

There was one (1) conservation significant species were detected by the ecology surveys, being the Koala (*Phascolarctos cinereus*), listed as endangered under the EPBC Act and NC Act. Koala remains were found onsite, including two skulls and the discovery of koala scats. Four species of bats were captured during the field surveys, all of which are listed as least concern species under the NC act and not listed under the EPBC Act. Additionally, there were nine (9) conservation significant fauna raised as having a potential to occur on the basis of nearby records and suitable habitat within the area, including:

- Koala (*Phascolarctos cinereus*);
- Yakka skink (*Egernia Rugosa*);
- Five-clawed worm-skink (*Anomalopus mackayi*);
- Regent honeyeater (*Anthochaera phrygia*);
- Painted honeyeater (*Grantiella picta*);
- White-throated needletail (*Hirundapus caudacutus*);
- Squatter pigeon (southern) (*Geophaps scripta scripta*);
- Greater glider (southern and central) (*Petauroides volans*);
- Brigalow woodland snail (*Adclarkia cameroni*);

Relevant objectives and management measures for the operational phase of the Project are outlined in Table 3-6. MNES species specific management measures are outlined in Section 6 of the MNES MP.

Table 3-6 Fauna Species Objectives and Management Measures

Objectives		
▪ Compliance with legal and other requirements e.g., permits, licences and approval condition; ▪ Environmental harm is minimised; ▪ Environmental performance and compliance are monitored; ▪ To prevent the introduction or spread of new declared weeds into Project area and control existing pest species; and ▪ Ensure all staff are aware of the environmentally sensitive features on site.		
Management Measures		
No.	**Action**	**Responsibility**
FS1	All vehicles associated with operation will travel at slow speeds to minimise the chance of any fauna strikes occurring. Speed limit signage will be placed at the entrance to the site and other key points. This will also minimise dust fall onto surrounding vegetation and habitat areas and vehicular noise.	All personnel
FS2	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
FS3	All fauna encountered (e.g., vehicle strike) will be recorded in a central register by the Project Environment Manager. Any injured fauna will be reported as required in the CEMP that will be in place for the Project.	Project Manager / All personnel

FS4	Once operational, appropriate signage will be installed on roads to warn of potential fauna crossing if deemed necessary.	Project Manager / Site Supervisor
FS5	All personnel will be instructed on their responsibilities relating to avoiding and minimising the introduction/attraction to the attraction of feral animals.	Site Supervisor
FS6	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
FS7	To reduce the risk of mortality to native wildlife, no domestic animals are permitted onsite.	All personnel
FS8	Avoid impact on fauna habitat, including mature trees and root systems, where possible.	All personnel
FS9	Implement control strategies outlined in the DAF weed and pest animal fact sheets and other relevant government biosecurity management strategies.	Project Manager / Site Supervisor
FS10	Regular onsite inspections of site infrastructure / equipment for resident pest fauna and establishment of a register for pest sightings.	Site Supervisor
HIE4	A fully-funded agreement will be put in place with a relevant organisation or authority for the maintenance and monitoring of the fencing and fauna escape mechanisms in perpetuity.	Environmental Representative / Environmental Engineer
K4	Any appropriate habitat links, or trees retained as stepping stones, are maintained from the clearing site to adjacent habitat areas.	Environmental Representative
K8	A 60 km/h speed limit on the Access Corridor between dusk and dawn with appropriate signage recommendation will be put forward to Council. As part of site inductions, staff will be reminded to adhere to this recommendation to not exceed 60 km/h.	Environmental Representative
K9	Road signage to be used to alert drivers of potential koala movement across the road.	Environmental Representative / Environmental Engineer
K10	Night-time vehicle movements on site and travelling to and from the site is restricted when koalas are most active between 6pm to 6am.	All staff and contractors
K11	In the event of a person recording a sick, injured or dead Koalas located in the Project Area, all work must cease immediately, and the koala is reported to RSPCA on 1300 ANIMAL (1300 264 625).	All staff and contractors All staff and contractors
K13	Hygiene and biosecurity measures to minimise the of introduction and/or spread of myrtle rust (caused by the fungus *Austropuccinia psidii*) in the Project area are enforced through vehicle washdown procedures. Wash down areas will be clearly marked to prevent vehicles entering the site that may carry vegetation pathogens known to affect koala food trees (e.g., myrtle rust).	Environmental Representative
K14	Visual monitoring of adjacent habitat by site personnel to record and notify RSPCA of any koalas and potential disease occurrence.	All staff and contractors / Environmental Representative
K18	Domesticated dogs are not permitted onsite.	All staff and contractors

2.7 Landscape and Visual Amenity

Visual impacts may arise as a result of operations and vehicle movements, including:

- Road infrastructure and facilities;
- Light and glare; and
- Vehicle movements.

Potential impact caused by operation activities listed above are:

- Increased visual permeability;
- Change in landscape from native vegetation to cleared land;
- Increase in presence of built infrastructure in the landscape; and
- Operational periods will result in localised and temporary light pollution, including direct glare, periodic increased illumination and temporary unexpected fluctuations in lighting associated with potential increased passing cars.

Relevant objectives and management measures for the operational phase of the Project are outlined in Table 3-7.

Table 3-7 Landscape and Visual Amenity Objectives and Management Measures

Objective		
▪ Minimal change to visual amenity from residential viewpoints and sensitive receptors.		
Management Measures		
No.	**Action**	**Responsibility**
LV1	Site inductions for all staff are to include education sessions regarding Visual Amenity. Induction and training sessions should also include information / discussion on waste management behaviour such as roadside littering from vehicles.	Site Supervisor
LV2	Locate mobile plant as far as practicable away from the nearest sensitive receptors.	Site Supervisor
LV3	All service roads, loading areas, turning circles and other manoeuvring areas must be located away from and/or screened from nuisance sensitive places to avoid lighting, noise and air quality impacts.	Site Supervisor
LV4	Temporary hoardings, barriers, traffic management and signage will be removed when no longer required.	Site Supervisor
LV5	Operational areas to be operated in a neat and tidy manner to minimise visual impact on neighbouring landholders.	All personnel
LV6	In the event of a complaint or incident, an assessment or investigation will be undertaken to determine the cause of the problem, through which processes or activities will be modified if required.	Site Supervisor
LV7	Use of material/paint colours that blend with the environment.	All personnel

2.8 Cultural Heritage

The Proponent has an agreed Cultural Heritage Management Plan (CHMP) with the Barunggam people. Relevant objectives and management measures for the upgrades works of the Project are outlined in Table 3-8.

Table 3-8 Cultural Heritage Objectives and Management Measures

Objectives		
▪ To minimise adverse impacts on Indigenous and European archaeology and heritage items.		
Management Measures		
No.	**Action**	**Responsibility**
CH1	In the event that any items of cultural heritage are uncovered during the course of the Project, work in the immediate area will cease and the find reported to the Project Manager immediately.	All personnel Project Manager (for notification)
CH2	Visual observations will be conducted during all Project phases to identify any potential indigenous and non-indigenous cultural heritage sites and artefacts.	All personnel
CH3	Site inductions for all staff are to include education sessions regarding Cultural Heritage.	Project Manager / Site Supervisor
CH4	All measures within the agreed CHMP are to be implemented.	All personnel

2.9 Social and Economic

The Project is not expected to have adverse social and economic impacts. The facility will be remotely monitored, and maintenance operations will consist of periodic ground keeping works and replacement of solar components as necessary of the lifetime of the facility. When operational, the Project will be manned during the daytime, with an ongoing anticipated maximum workforce of 5 full time equivalent staff. These staff are expected to be based locally in Dalby or surrounding centres. Potential adverse impacts from the Project include:

- Minor localised inflation leading to displacement of persons and businesses not benefiting from the Project related businesses;
- Housing shortages and increased housing prices can limit the positive economic flow on to communities and create pressure on non-mining businesses and local communities; and
- Higher road trauma as a result of workers driving from local centres to the Project.

The Project is anticipated to result in a range of beneficial social and economic impacts including:

- Economic stimulus to the regional, state and national economies during the construction and operational phases of the Project;
- Increased employment opportunities within WDRC which would serve to reduce unemployment within the region;
- Opportunities for suppliers in the WDRC and surrounding regions to support the construction and operation of the Project;
- Increased employment, business and training increasing the capacity and skillset of the region;
- Population growth and diversification in communities;
- Increased financial support in towns through substantial contributions by companies to community infrastructure development; and
- Infrastructure improvements such as roads and communications.

Relevant objectives and management measures for the operational phase of the Project are outlined in Table 3-9.

Table 3-9 Social and Economic Objectives and Management Measures

Objective		
▪ To minimise adverse impacts on socio-economic environment.		
Management Measures		
No.	**Action**	**Responsibility**
SE1	No site access permitted without a permit to work issued by the contractors in charge. Conditions and evidence of compliance will be required to be complied with LAAs.	HSE Manager
SE2	The site induction will contain a section relevant Code of Conduct for workforce, environmental obligations and contractor behaviour.	HSE Manager
SE3	A Workplace Health and Safety Plan to address worker health and safety.	HSE Manager
SE4	In the event of a complaint or incident, an assessment or investigation will be undertaken to determine the cause of the problem, through which processes or activities will be modified if required.	HSE Manager

2.10 Traffic

The Project will result in increased vehicle use on the surrounding road network. This may result in disruption to flow and delays as well minor impacts to the overall road condition. Additionally, increased traffic movement has the potential to increase direct mortality of native fauna through vehicle collision. During operations, vehicles traversing the Project area may increase the potential risk of injury or depth of wildlife. The specific activities with the most potential to cause impact include:

- General movement of vehicles to and from site, mobilisation, demobilisation;
- Movement of vehicles on, around or entering or exiting public or private roads;
- Material deliveries or waste collection from site;
- Movement of workforce between accommodation and work fronts; and
- Light vehicle movements to different project components.

Relevant objectives and management measures for the operational phase of the Project are outlined in Table 3-10.

Table 3-10 Traffic Objectives and Management Measures

Objective		
▪ To minimise adverse impacts on socio economic environment.		
Management Measures		
No.	**Action**	**Responsibility**
T1	Appropriate speed limits should be in place throughout the site and all contractors will be educated on the risks to local fauna to minimise impacts when driving.	Site Supervisor
T2	The onsite protocols to include measures for monitoring and recording wildlife road collision incidents to help remediate 'high risk' collision areas and set conditions for attending to injured native wildlife.	All personnel
T3	Awareness of access arrangements and potential traffic conflicts at the intersection will be provided to all drivers who will access the Project area.	Site Supervisor
T4	Heavy vehicles accessing the Project will be staggered during the day to minimise traffic impacts.	Site Supervisor
T5	In the event of a complaint or incident, an assessment or investigation will be undertaken to determine the cause of the problem, through which processes or activities will be modified if required.	HSE Manager

2.11 Air Quality and Dust

Air pollution has the potential to impair human health and the health of flora and fauna. Air quality impacts may result from dust, particulate and gaseous emissions and odour during operation. The potential impacts to the local air environment are listed below:

- Deposition of dust on surfaces where it may cause damage and/or lead to a need for increased cleaning or repair;
- Aesthetic effects that arise from visible airborne dust plumes and from deposits of dust on surfaces;
- Need for increased maintenance of air filtering systems (e.g., air conditioners etc.);
- Potential adverse health effects including eye, nose and throat irritation from excessive inhalation of fine particles;
- Impacts on water quality and/or vegetation health from dust deposition;
- Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities; and
- Complaints from the public relating to dust or odours.

Increased dust resulting from vehicle movement, construction of infrastructure has the potential to impact flora and fauna values within the Project Area throughout construction and operation. Increased dust can result in respiratory issues in fauna, adverse impacts on plant photosynthesis and productivity (Chaston & Doley 2006), changes in soil properties ultimately impacting plant assemblages (Farmer 1993) and mortality and / or decrease in aquatic communities from the toxicity of poor water quality.

Relevant objectives and management measures for the operational phase of the Project are outlined in Table 3-11.

Table 3-11 Air Objectives and Management Measures

Objective		
▪ No adverse impacts from air pollution and dust.		
Management Measures		
No.	**Action**	**Responsibility**
A1	Implementation of dust suppression measures, if dust is visible or when wind conditions become adverse, including: ▪ Watering of exposed areas; and ▪ Physical barriers (e.g., covering of exposed soil piles). The aim of measures is to prevent an increase of particulates (PM10 and PM2.5) above the current baseline conditions.	Site Supervisor
A2	Trigger points for management decisions based on any or all of the following: ▪ Real-time measurements of wind conditions; ▪ Wind conditions as forecast by predictive numerical weather systems; and ▪ Dust monitoring at sensitive receptors when complaints are received.	Site Supervisor
A4	Monitor dust control measures regularly for effectiveness.	Site Supervisor
A5	If required, vehicles carrying loads with the potential to produce dust will be covered when moving within or outside the Project area.	All personnel
A6	Minimise extended engine idling and queuing adjacent to sensitive receptors.	All personnel
A7	Onsite burning of any material will not be undertaken without a valid permit from the relevant QFES Fire Warden.	Site Supervisor / All personnel
A8	Ensure onsite fire-fighting equipment is regularly maintained and adequate staff training is implemented.	Site Supervisor
A9	Regular cleaning of machinery and vehicle tyres to prevent wheel entrained dust emissions.	All personnel

A11	All plant and equipment (e.g., haulage trucks) are to be maintained and operated in accordance with Australian Design Rules and manufacturer's specification.	Site supervisor
A12	Report any malfunctioning equipment to the Site Supervisor	All staff and contractors
A13	Visually inspect the Project area and operations for smoke, fumes and dust	All staff and contractors
A14	Change in operations during worst-case conditions (e.g., implementation of stricter dust controls).	Site Supervisor
A15	Maintain vehicles according to manufacturer specifications to minimise exhaust emissions	All personnel
A16	Weed management during and following rehabilitation to prevent habitat degradation and potential increased fire risk.	Site Supervisor
HIE1	Fencing around the solar array perimeter is to be checked and maintained regularly to minimise fauna within the solar array perimeter and minimise potential impacts from the heat island effect.	Environmental representative / site supervisor

2.12 Heat Island Effect

Although contradictory, solar arrays have potential to affect air and soil temperatures within the solar array perimeter, however in relation to outside of the solar array perimeter a heat island effect is unlikely to occur. Studies on heat island effect are contradictory and the actual impact from heat island effects is not clear. As the areas that directly comprise solar panels will be cleared impacts to fauna are not expected to occur as a result of the heat island effects.

Relevant objectives and management measures for the operational phase of the Project are outlined in Table 3-12.

Table 3-12 Heat Island Effect Objectives and Management Measures

Objective		
▪ No adverse impacts from heat island effect.		
Management Measures		
No.	**Action**	**Responsibility**
HIE1	Fencing around the solar array perimeter is to be checked and maintained regularly to minimise fauna within the solar array perimeter and minimise potential impacts from the heat island effect.	Environmental representative / site supervisor
HIE2	Fauna proof fencing will be established along the PV Power Station area and will: • Be a minimum 1.8m high; • Be 3 m from any retained trees (excluding grasses) on the habitat side of the fence or plantings and be clear of all overhanging branches and vines; • Have a minimum 50 cm wide scratch panelling installed along the top of the length of the habitat side of the fence; and • Be dug into the ground to a depth of at least 150 mm. Refer to Section 5.2.5 of the Preliminary Documentation for further details.	Environmental Representative / Engineering Representative
HIE3	Inclusion of fauna and Koala escape mechanisms along the PV Power Station side of the fencing i.e., escape climbing poles and fauna escape ramps will be implemented. These will involve the following: • Koala escape poles will be made from salvaged tree trunks (where possible) to encourage the use by entrapped Koalas and be a minimum of 125 mm in diameter; • Koala escape poles will be installed within 300 mm of the fencing; • Shrubs will be planted around the base of escape poles to provide cover and refuge for entrapped fauna and encourage the use of escape poles by entrapped Koalas; and • Fauna escape ramps will be designed as specified in the Preliminary Documentation. Refer to Section 5.2.5 of the Preliminary Documentation for further details.	Environmental Representative / Environmental Engineer
HIE4	A fully-funded agreement will be put in place with a relevant organisation or authority for the maintenance and monitoring of the fencing and fauna escape mechanisms in perpetuity.	Environmental Representative / Environmental Engineer
HIE5	Solar panels will be made of non-reflective glass to minimise the amount of glare	Environmental Representative / Environmental Engineer
HIE6	Any glare or external lighting identified as hazardous to be modified if requested by the Civil Aviation Authority.	All staff and contractors

2.13 Bushfire

Bushfire has the potential to threaten people and fauna, through incineration or smoke suffocation. Additionally, fire can cause short term impacts including loss of habitat, increased erosion and sedimentation of waterways. Changes in the natural fire regime may result in changes in the species composition and/or structure of the vegetation including an increase in weed species.

Through the development and implementation of relevant bushfire management measures, it is considered that potential bushfire risk associated with the Project can be appropriately managed. Measures outlined in Table 3-12 will be implemented to manage and mitigate bushfire risk.

Table 3-13 Bushfire Risk Objectives and Management Measures

Objective		
▪ No adverse impacts from fire during operation.		
Management Measures		
No.	**Action**	**Responsibility**
BF1	Protocols outlining the fire management measures for the Project will be developed and implemented prior to the commencement of Project operations.	Project Manager
BF2	A qualified person will be appointed as Site Safety Advisor and will have on-site a set of safety data sheets (SDS) for hazardous and dangerous materials.	Project Manager
BF3	A Bushfire Management Plan (BMP) will be prepared for Project operations, informed by consultation with the Queensland Fire and Emergency Service (QFES).	Project Manager
BF4	If works are undertaken during the bushfire season, the fire danger rating will be monitored daily through the QFES website.	Project Manager / Site Supervisor
BF5	Open fires, including open barbeques, billy fires and brush burning will not be permitted on site.	All personnel
BF6	Hot works activities will only be undertaken during a declared Total Fire Ban where an exemption has been issued by QFES.	Site Supervisor
BF7	The following precautions will be taken to minimise the possibility of fire due to hot work activities: ▪ 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
BF8	Vehicles may not idle or be parked in areas of long grass.	All personnel
BF9	Smoking is not permitted on site aside from in a designated safe zone.	All personnel
BF10	In accordance with solar array standards a 10 m bushfire setback will be established from the Project boundary, within the Project area.	Project Manager / Site Supervisor
BF11	Vegetation within the site will be regularly inspected and managed for fuel loads.	Project Manager
BF12	Fire management should be undertaken in accordance with the Bushfire Management Plan.	Project Manager / Site Supervisor

2.14 Waste

Inappropriate handling of waste from construction and operation activities has the potential to negatively impact the environment and cause health risks. Potential impacts may include:

- Land contamination caused by spills or inappropriate waste disposal to soil;
- Groundwater contamination caused by spills of solid or liquid waste;
- Litter due to unsuitable storage and containment measures for general waste;
- Odour and potential spread of disease due to inappropriate storage of waste;
- Pests and diseases; and
- Risks to human health and safety through poor management of hazardous materials.

Waste has the potential to impact flora and fauna, attracting pests and vermin through the supply of artificial food sources. This may impact on natural behaviour and natural species assemblages. A range of waste minimisation strategies will be in place to reduce waste streams generated. As such, it is not anticipated that waste generated as part of the Project will have a significant impact on flora and fauna communities within the Project Area. Waste storages are not likely to have significant impacts on native fauna and flora within or adjacent to the Project Area, as all waste produced as a result of the Project will be stored and disposed of appropriately, as per the relevant legislation.

Waste management during construction and operation will be undertaken using the services of a specialist and appropriately licensed waste management sub-contractor(s). Waste materials will be collected, segregated and appropriately stored prior to removal from site. The waste management processes will comply with the requirements of the relevant statutory legislation. Relevant objectives and management measures for the operational phase of the Project are outlined in Table 3-14.

Table 3-14 Waste Objectives and Management Measures

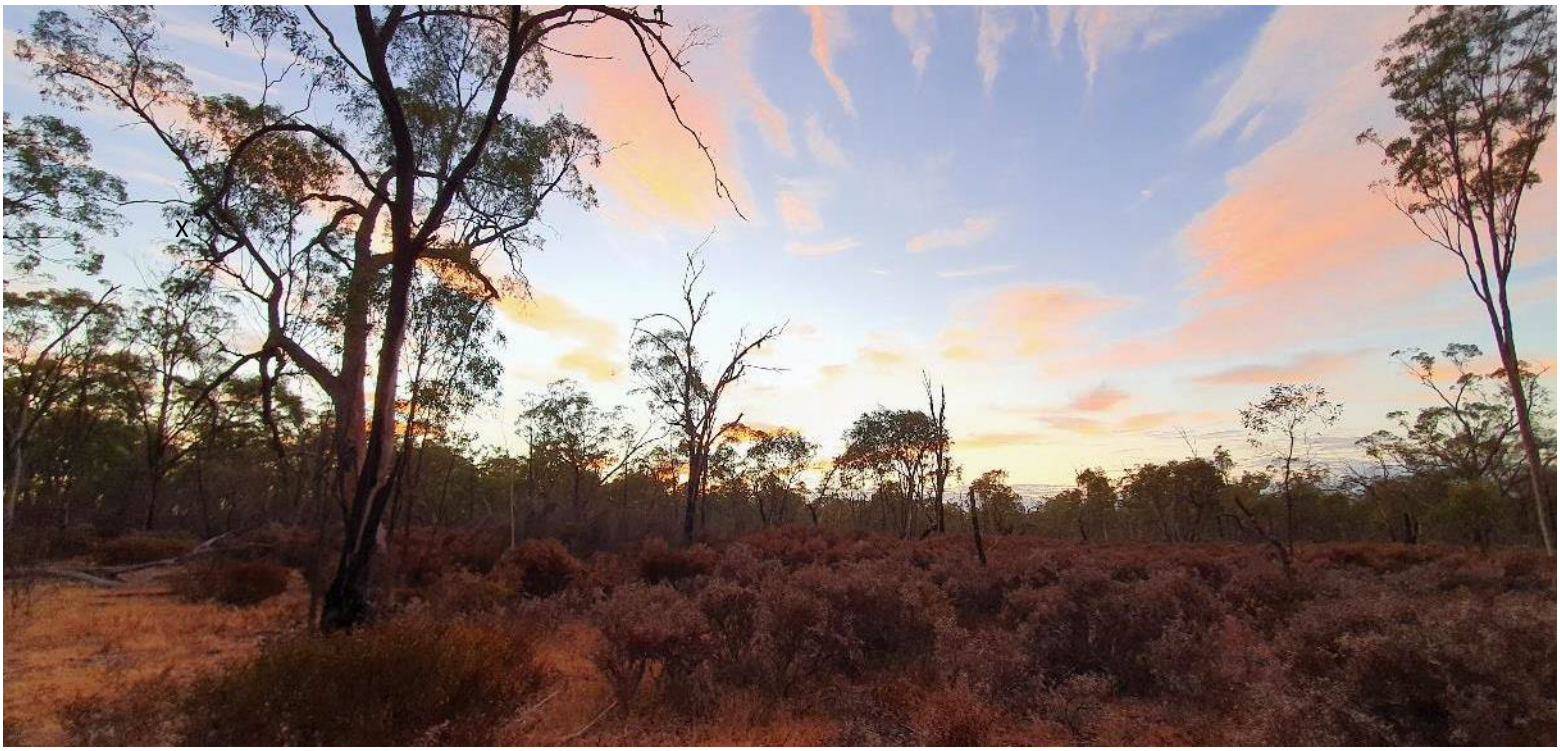
Objective		
▪ No adverse impacts from waste management.		
Management Measures		
No.	**Action**	**Responsibility**
WS1	Housekeeping in site work areas will be regularly undertaken to ensure no waste materials are present on site for longer than reasonably acceptable.	All personnel
WS2	Waste is not to be stored in a manner that poses a fire risk or attracts vermin.	All personnel
WS3	Hazardous or regulated waste to be appropriately contained and stored on-site in approved hazardous or regulated waste bins. Hazardous or regulated waste to be removed from site by a licensed waste transporter to approved disposal facility in accordance with the relevant legislation.	Site Supervisor
WS4	All waste will be removed on an as-needed basis, by a licensed waste transporter.	Site Supervisor
WS5	All waste bins will be clearly labelled for intended contents.	Site Supervisor
WS6	Spill kits will be provided in hazardous material storage areas.	Site Supervisor / HSE Manager
WS7	Any regulated wastes are transported and disposed of by and at an appropriately licenced facility.	Site Supervisor

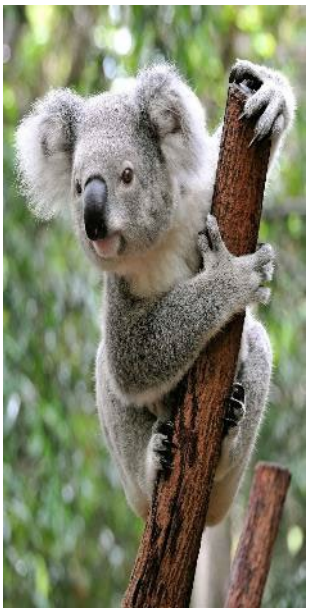
Section 3 References

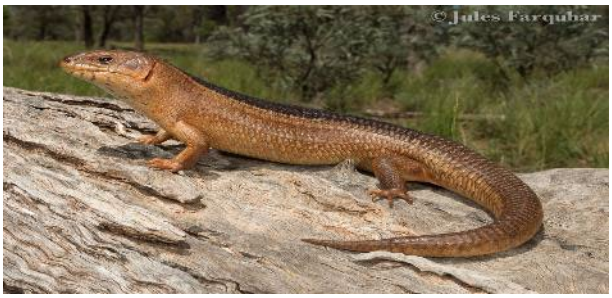
Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2012. *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*. Commonwealth of Australia, Canberra.

Hanger, J. & Nottidge, B. 2021. Queensland code of practice for the welfare of wild animals affected by land-clearing and other habitat impacts and fauna spotter/catchers. Australia Zoo Wildlife Warriors Worldwide and Endeavour Veterinary Ecology.

Q3: MNES Management Plan







Elecseed

Matters of National Environmental Significance Management Plan

11 July 2023

CDM Smith

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Document history & status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
Draft Rev A	28/04/2023	SM	SM	09/05/2023	Draft Rev A
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Rev 0	29/06/2023	1	PDF and Word	ERM
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Project Manager:	SM
Client:	Elecseed
Document Title:	**Matters of National Environmental Significance Management Plan**
Document Version:	Rev 1
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Section 1 Introduction

1.1 Background

Elecseed Pty Ltd (Elecseed) and Korea Midland Power Co., Ltd (Komipo) (together and herein described as the Proponent) is proposing to construct and operate the Kumbarilla Renewable Energy Park (K-REP) which is a photovoltaic (PV) Power Station and associated Access Corridor proposed 40 km west of Dalby, Queensland (the Action, herein referred to as the Project or K-REP).

The Project includes two components:

- PV Power Station – A 100-megawatt peak (MWp) PV Power Station wholly located within a 400-hectare (ha) property described as Lot 4 DY457 (Estate in fee Simple/freehold) including easements over Lot C SP107383 and Lot B SP10738. This component includes the onsite power generation and distribution; and
- Access Road (herein described as an Access Corridor) – The Access Corridor is located within a gazetted road (crown land) that is the named road, Forest Road, and an unnamed track leading to Lot 4 DY457, crossing to the north of Weranga State Forest. This also includes a small area for clearing associated with an emergency access route in the north-eastern area (refer to note below).

The Project was referred to the Commonwealth Government Department of Agriculture, Water and the Environment (DAWE) on 30 August 2021. On 27 September 2020, and in accordance with section 75 and 87 of the EPBC Act, DAWE deemed the proposed action a 'controlled action' to be assessed by preliminary documentation in accordance with Part 8, Division 4 of the Act. The controlling provisions are listed threatened species and communities (section 18 and 18A) under the Act (reference EPBC 2021/9018).

1.2 Purpose

The EPBC Act referral (EPBC 2021/9018) for the Project was deemed a controlled action, assessment by preliminary documentation on 27 September 2021. 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, likely to or possible to occur within the Project include:

- Koala (*Phascolarctos cinereus*);
- Yakka skink (*Egernia rugosa*);
- Five-clawed worm-skink (*Anomalopus mackayi*);
- Regent honeyeater (*Anthochaera phrygia*);
- Painted honeyeater (*Grantiella picta*);
- White-throated needletail (*Hirundapus caudacutus*);
- Squatter pigeon (southern) (*Geophaps scripta scripta*);
- Greater glider (southern and central) (*Petauroides volans*);
- Brigalow woodland snail (*Adclarkia cameroni*).

The Poplar Box Grassy Woodland on Alluvial Plains Threatened Ecological Community (TEC) is considered as possibly occurring within a 25 km radius of the Project area. Vegetation aligning with this TEC (e.g., Poplar Box, *Eucalyptus populnea*) was identified onsite; however, the TEC itself was not confirmed. In the extremely rare occurrence that the TEC is recorded, Section 8 of this MNES MP will be implemented.

1.3 Project Description

The Project's proposed system arrangement is to achieve a 100 MWp installation utilising a maximum Ground Cover Ratio (GCR) of 0.5 MW/ ha to fit within the physical site constraints and an approximate 200 ha negotiated lease arrangement. This shall include all ancillary systems and balance of plant. Due to the existing topography and undulating nature of the site, horizon shading must be avoided from natural formations as much as reasonably practicable.

Provisions for the following permanent structures will be included:

- Site 33 kV Switch room (2 x 12.2m container);
- Low voltage, power plant controller and supervisory control and data acquisition control room (6 x 9 m structure);
- Office and control centre (6 x 9m structure);
- Amenities (6 x 9 m structure);
- Store 1 (6 x 9 m structure);
- Store 2 (6 x 9 m structure);
- Space for 20 car park bays (unsealed); and
- Through road, emergency egress track, truck parking bay and turnaround bay.

All structures shall largely be prefabricated off site, delivered and installed on raised structural posts. Surrounding staircases, ramps, pathways, verandas and similar shall be constructed on site to suit the final configuration. The compound shall be fenced and secured with appropriate physical and electronic security measures in place. The compound shall be lightning protected and generally treated as a critical services zone for ongoing operation.

Within the Project Operations Area will be the 33kV site distribution switch room. This is planned around a prefabricated ABB 'Eco Flex' containerised system including all required self-contained services. A Powerlink-compliant 132kV to 33kV substation is required to be located on the Project site to provide the PV Power Stations 33kV point of connection and coupling. A spatial allowance of 150 x 100 m has been provisioned for this substation with a 5m wide perimeter emergency egress and access road.

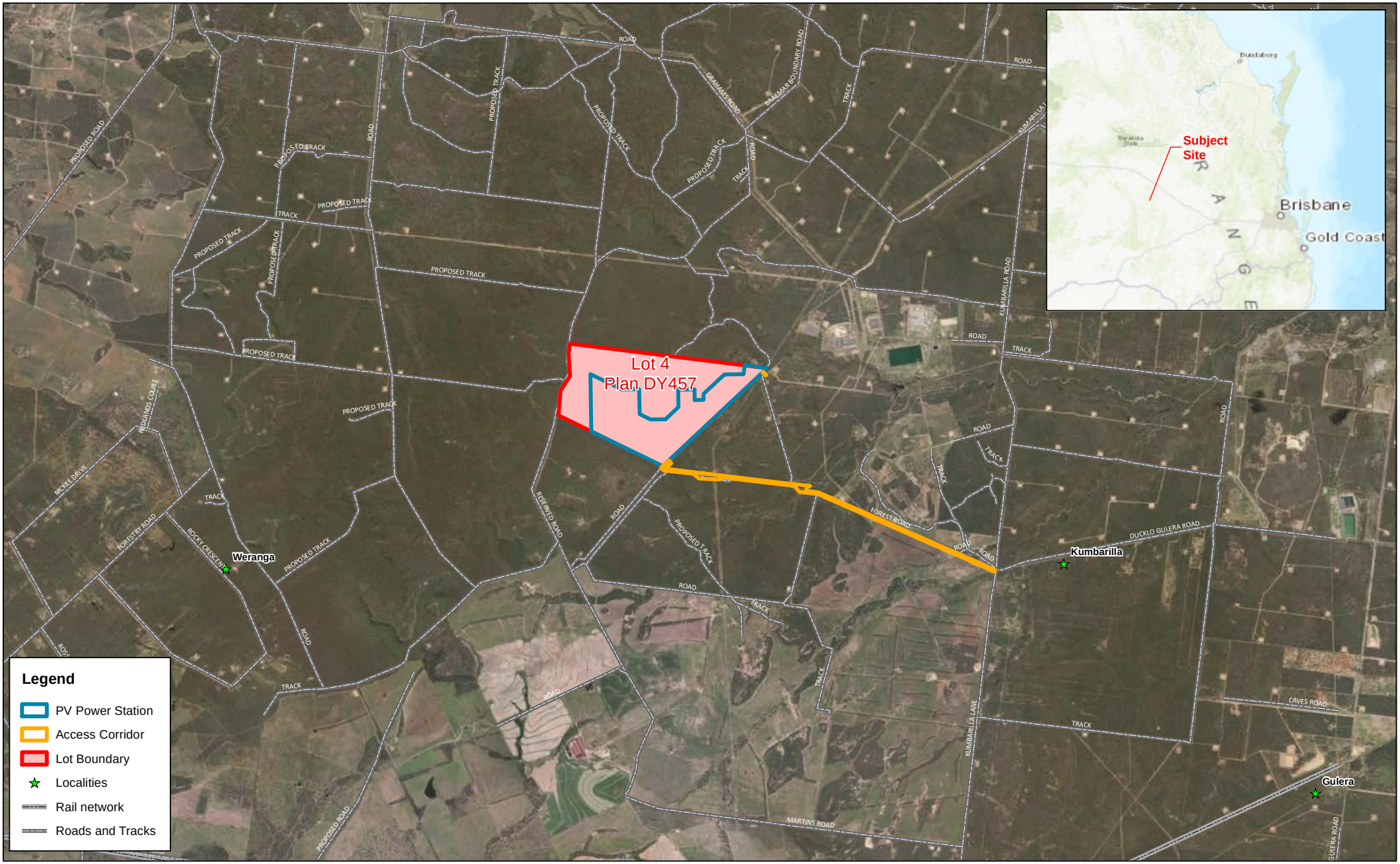
Within the Access Corridor, the Project includes a 5.7 km (approximately 22 ha) long access road (within a public road reserve known as Forest Road and referred to as the Access Corridor). Forest Road provides the final portion of the approved access road and is a rural access road constructed in a road reserve. Condition 61 of the Material Change of Use (MCU) approval requires the upgrading of Forest Road to provide an all-weather 7 m wide gravel pavement on an 8 m formation. There is no stipulation about upgrading Forest Road in its current formed location or in the dedicated road reserve. An approximate 2.5 km section of the public road reserve for Forest Road occurs adjacent to the Weranga State Forest (Lot 201 on FTY1243). As with many rural roads in Queensland, the actual formed location of the road deviates from the road reserve and enters the State Forest lot at two locations totalling approximately 420 m. Based on aerial imagery, these deviations are assumed to be associated with on ground constraints (e.g., drainage lines).

The Project will require the following infrastructure:

- **Solar arrays**. Tier One solar PV panels will be used. Modules will utilise monocrystalline bifacial technology with a power class likely between 550Wp to 650Wp. The panels will be elevated off the ground on support columns which include solar trackers to maximise yield and protect the assets from extreme weather events. String combiners take the wires from several different solar panels and combine them into one main feed. A string combiner will be used to combine the output of multiple strings of solar PV modules and will be connected to the substation.
- **Substation**. The substation will contain the Powerlink compliant 132kV to 33kV substation transformer and be the point of electrical connection. Earthworks and hardstand will be undertaken to give a flat site above the Q200 (0.5% AEP) flood event. The substation area is located at the north-eastern section of the site.

- **Site-operation compound**. The site operation compound will contain an open area with shed facilities to store equipment and workspace to complete maintenance works. Car parking will be provided as required.
- **Access road**. The access road to the site is from existing Forest Road which is currently an unsealed formed rural road. This road will be regraded and enlarged to a 7m wide gravel pavement on an 8 m formation. Internal access roads will allow vehicular access between solar PV panel blocks. Internal roads will form into two categories:
  - Main roads – consisting of a 6m wide gravel formation with a 3m wide bitumen surface designed to accommodate large trucks. Passing bays may be required subject to detailed design; and
  - Minor roads – these will be a graded dirt tracks to enable a maintenance vehicle to access solar panels.

  A secondary emergency access track has been considered and will be utilised in the extreme occurrences when it is required, such as bushfire events. The secondary emergency access track will utilise a neighbouring landholder's access track. Relevant agreements with landholders will be obtained.
- **Drainage**. Forest Road will be constructed to a rural standard with table drains and crossroad culverts as necessary. Internal roads and site areas will be disturbed by clearing and earthworks. The site will be designed with table drains, diversion bunds and stormwater pit and pipe necessary to direct water into the multiple basins onsite for treatment.



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2	Revision	23/11/21
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DESIGNED	MM	CHECKED	JM
DRAWN	MM	CHECKED	JM
APPROVED	SM	DATE	23/11/21

Notes:

N

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Meters

1 cm = 576 meters

GCS GDA 1994 MGA Zone 56

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.

DATA SOURCE
QLD Government Open Source Data

DESIGNER
CDM Smith
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CLIENT
calibre

FIGURE 1-1

Regional Area

DRG Ref: **Figure 1-1 Regional Location_22112021**

D:\GIS PROJECTS\KREP\3GIS\02 MXD\July 2021\Figure 1-1 Regional Location_22112021.mxd

1.4 Proponent

The proponent details are outlined in Table 1-1.

Table 1-1 Proponent Details

	Proponent Details
Organisation name (as registered for ABN/CAN)	Elecseed Pty Ltd
ABN	57 632 472 327
Business address	310 Edward Street, Brisbane City, QLD 4000
Postal address	310 Edward Street, Brisbane City, QLD 4000
Primary contact	Robert Saunders
Job title	Managing Director (Australia)

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);
- Operation Environmental Monitoring Plan (OEMP).

1.6 Management Review and Document Control

1.6.1 Review

The MNES MP will be reviewed regularly by Elecseed 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 Table 3-1) and then disseminated to the broader team. This can be through management meetings, special communications or toolbox talks.

Section 2 Legislative Requirements

2.1 Environmental 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 following explains the key events in the referral process to this point in time. On 30 August 2021, the Project was referred to the Commonwealth Government Department of Agriculture, Water and the Environment (DAWE); On 27 September 2021, and in accordance with section 75 and 87 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), DAWE deemed the proposed action a 'controlled action' to be assessed by preliminary documentation in accordance with Part 8, Division 4 of the Act. The controlling provisions are listed threatened species and communities (section 18 and 18A) under the Act (reference EPBC 2021/9018). On 2 December 2021 the draft preliminary documentation was submitted to DAWE and fees for Stage 2 were paid. Various request for information (RFI) have been received and responded to, the most recent being on 3 March 2023.

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 Minster on whether assessment and approval is required under the EPBC Act.

2.2 Changes to Species Listings

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 was 27 September 2021 and the listing date for each species and ecological community is listed under each individual plan in Section 6.

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.

On 12 February 2022 the conservation status of Koala under the EPBC Act was revised from vulnerable to endangered. As per correspondence with the DAWE on Monday 21 February 2022, the provisions of Section 158A of the EPBC Act, specifically subsections 3 and 4(a) and Section 2 of the Policy Statement for listing events under the EPBC Act, listing events do not need to be considered for projects under assessment and as part of offsetting requirements after a Section 75 decision is made. As such the assessment process and offsetting requirements will continue as per the Koala's previous listing as vulnerable.

For listing events that occur after the controlled action decision is made, section 158A of the EPBC Act provides that assessment processes under Parts 7 – 9 of the EPBC Act cannot be affected by the listing event. Therefore, the impact to such species cannot be considered as part of this assessment. At the time of the controlled action decision date, the following species were not listed under the EPBC Act and therefore were not considered in the original Preliminary Documentation submission or this submission:

- Yellow bellied glider (*Petaurus australis australis*) – listed as Vulnerable effective 2 March 2022;
- Grey snake (*Hemiaspis damelii*) – listed as Endangered effective 5 October 2022;
- Glossy black-cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*) – listed as Vulnerable effective 10 August 2022;
- Southern whiteface (*Aphelocephala leucopsis*) – listed as Vulnerable effective 31 March 2023; and
- Diamond firetail (*Stagonopleura guttata*) – listed as Vulnerable effective 31 March 2023.

In the addition to the above species, the Brigalow woodland snail has been added to the assessment as a precautionary approach as per DCCEEW's disclosure that distribution mapping has been revised and updated for the species.

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 Proponent (Principal)	▪ 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 CEMP.
Contractors	
Project Manager	▪ 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 CEMP; ▪ Communicating requirements of this CEMP 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 and Environmental Representative / Engineer	▪ 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): - 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.

Position	Responsibilities
Contractor HSE Manager	▪ Ensure all workers are aware of the CEMP 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	▪ Follow the requirements and carry out work in accordance with this CEMP and those of the Site Supervisor; ▪ Report any potential environmental issues to the site supervisor, including: - 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

Numerous field surveys have been completed across the PV Power Station component of the Project Area (and partly outside). The surveys were carried out by Paul Fox (Principal Environmental Scientist/ Project Manager – Fox & Co Environmental), Dave Moore (Principal Botanist – Fox & Co Environmental), Bruce McLennan (Arcadian Ecology Pty Ltd) and Ben Nottidge (GreenLeaf Ecology):

- **Preliminary Survey –** A preliminary ecology survey of the PV Power Station was undertaken over a 3-day / 2-night period between 6-8 May 2020 (herein referred to as the **preliminary survey**). This was undertaken to ground-truth desktop information and identify any additional flora and fauna values not identified through the desktop study. Following this preliminary survey, a population of Kogan waxflower (*Philotheca sporadica*), a near threatened (NT) flora species listed under the NC Act and not Listed (delisted recently in December 2020) under the EPBC Act was identified in the south-eastern portion of the site. Refer to additional information below.

  The site was fully accessible at the time of the surveys. The ecology survey was conducted over approximately 200 ha. The PV Power Station was traversed by vehicle and on foot.

- **Targeted Survey –** A subsequent survey was undertaken between 18-22 January 2021 (herein referred to as the **targeted survey**). This included a targeted protected plant survey, Koala (*Phascolarctos cinereus)* habitat survey, quaternary vegetation assessments1 and targeted Corben's long-eared bat (*Nyctophilus corbeni*) surveys.

  Fox & Co Environmental Pty Ltd (Fox & Co) partnered with the specialist Koala Detection Team (KDT) from the University of the Sunshine Coast (USC) to assist with Koala surveys for the Project Area. The KDT have provided a stand-alone report outlining the results of the Koala field assessment which includes mapping of presence/absence and the survey coverage area (Detection Dogs for Conservation, 2021). Fox & Co have subsequently prepared an assessment of the Koala habitat using the Koala Habitat Assessment Tool in accordance with the Matters of National Environmental Significance, Significant Impact Guidelines (1.1), Department of Environment (DoE), 2013 and the EPBC Act Referral Guidelines for the Vulnerable Koala, DoE, 2014 (Department of the Environment, 2013; Department of the Environment, 2014).

  The site was fully accessible at the time of the surveys. The ecology surveys were conducted over approximately 200 ha. The PV Power Station was traversed by vehicle and on foot.

- **BioCondition and Habitat Quality Assessment –** A BioCondition survey and habitat quality assessment was undertaken in the PV Power Station area between 24-27 May 2021 by Bruce McLennan (Principal Ecologist – Arcadian Ecology) (herein referred to as the **BioCondition survey**). This assessment was to verify RE mapping for the PV Power Station footprint of the Project Area, identify any conservation significant species under the Queensland NC Act and Commonwealth EPBC Act and to identify and conduct BioCondition assessments as prescribed. Ecological values present within the study area were measured through the BioCondition assessment method. The data scores derived provide the baseline for deriving Terrestrial Habitat Quality through the *Guide to determining terrestrial habitat quality – Methods for assessing habitat quality under the Queensland*

[1] Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F, Addicott, E.P. and Appelman, C.N. (2020) Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 5.1. Updated March 2020. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.

Environmental Offsets Policy (DES 2020) as well as forming the basis for any offset calculator scoring of MNES offsets required under the EPBC Act;

- **Access Corridor Survey –** An additional ecological survey was undertaken between 24-27 May 2021 within the Access Corridor (herein referred to as the **Access Corridor survey**). The survey was conducted by Bruce McLennan (Principal Ecologist – Arcadian Ecology) and Ben Nottidge (Ecologist – Greenleaf Ecology). This was undertaken to ground-truth desktop information and identify any additional flora and fauna values.

  The Access Corridor (approximately 22 ha) was fully accessible at the time of the surveys and was traversed by vehicle and by foot.

Data was collected using general site notes, photo points with waypoint references. The waypoints correlate to Quaternary Vegetation Assessment, RE assessments, Song Meter™, camera locations and general environmental points. Refer to the Preliminary Documentation for quaternary site locations and flora and fauna assessment locations. Survey methods included:

- **Quaternary Assessments –** Quaternary assessments at sites across the Project Area were completed. Vegetation community assessment were undertaken using the quaternary level of assessment as described within the Methodology for survey and mapping of REs and vegetation communities in Queensland (Neldner, et al., 2020);

- **BioCondition Assessments** – Field surveys were undertaken to confirm the identity of REs and correct the mapping, collect BioCondition data and to conduct targeted searches for endangered, vulnerable and near threatened (EVNT) flora species across the proposed impact area. RE boundaries were assessed using the State RE mapping (Version 11, Department of Resources 2021), historical imagery from Qimagery and the latest available aerial imagery for the area (Queensland Globe 2021) and field assessment results.

  Vegetation communities within 5 assigned assessment units were assessed at a total of 10 sites. A BioCondition and fauna habitat survey was conducted at each site.

- **Fauna Habitat Assessments** – Fauna surveys were undertaken at 12 locations within the PV Power Station area as part of the BioCondition survey and 9 within the Access Corridor as part of the Access Corridor survey. Comprehensive survey sites were 100 m x 50 m. Survey methods were consistent with those recommended in the 'Terrestrial Vertebrate Fauna Survey Guidelines for Queensland' (Eyre et al. 2018).

- **Opportunistic Fauna Observations** – Opportunistic fauna observations were recorded during all surveys;

- **Nocturnal surveys** – Completed during the preliminary survey 2 night with 2 people for approximately 12 hrs in total for nocturnal assessment);

- **Targeted Species Searches** – Targeted searches were undertaken for:
  - Golden-tailed geckos (*Strophurus taenicauda*) and reptiles through nocturnal surveys during the preliminary survey (2 nights/2 people – approximately 12 hrs in total for nocturnal assessments) and turning logs and debris in areas within the mapped Essential Habitat (EH) and also outside of these areas.
  - The presence of the NT listed Kogan wax flower which was discovered during the preliminary survey which triggered the targeted survey conducted on 21 February 2021 to assess the extent of the species. The flora surveys was prepared in accordance with the Flora Survey Guidelines – Protected Plants v2.01 (Department of Environment and Science, 2020).;
  - Koala surveys were conducted during the targeted survey with the assistance of Koala detection dogs to find evidence of Koala populations within the Project Area;
  - Bat surveys was undertaken over a five-night period during the targeted survey (18-22 January 2021).
  - As part of the Access Corridor survey, rigorous field searches were undertaken within suitable habitat for evidence of Koala, Greater glider, Yakka skink and Golden-tailed gecko.
- **Bird Surveys –** Twenty-minute bird census surveys were undertaken over the entire survey period during the preliminary survey including around the onsite water bodies;
- **Remote Cameras** – three remote cameras were established over a two-night period during the preliminary survey; and
- **Song-meters** – three song-meters were deployed over a two-night period for microbats during the preliminary survey.

4.2 Characteristics of the Project Area

The Project footprint is comprised of an approximately 191 ha area allocated to the PV Power Station and the associated 22 ha Access Corridor approximately 40 km west of Dalby, Queensland and located within the Western Downs Regional Council (WDRC) Local Government Area (LGA). The PV Power Station is to be wholly located within a 400 ha property described as Lot 4 DY457 (Estate in fee Simple/freehold) including easements over Lot C SP107383 and Lot B SP107382 The Access Corridor is to be located within a gazetted road (crown land) that is the named road, Forest Road, and an unnamed track leading to Lot 4 DY457, crossing to the north of Weranga State Forest.

The PV Power Station area is currently vacant and contains mapped remnant and regrowth woody vegetation covering most of the site with the exception of access roads / vehicle tracks and a small non-referrable dam located slightly north-west along the northern boundary of the Lot.

4.3 Threatened Species Habitat Mapping

Threatened Species Habitat Mapping and quantification of potential habitat types within the Project Area for the listed species was completed. The maps for these species are included in Section 3.4 of the Preliminary Documentation (PD). The habitat mapping was informed by field investigations and the following subsequent reviews:

- Review of ground-truthed REs and review of potential habitat for relevant listed species;
- The presence of the following microhabitat features such as :
  - Cracking clay soils
  - Presence of waterbodies (drainage lines, waterholes and farm dams)

  - Native vegetation present
  - The presence of shelter sites such as woody debris, hollows, burrows, leaf litter; and obvious soil cracking.
- Undertaking koala habitat scoring and habitat quality assessment (refer to Section 3.3.2.3 of the PD).

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

Fauna Species	Relevant Conservation Advice and Management Plans		Key Threats
Koala (*Phascolarctos cinereus*)	**Conservation Advice:**	*Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022a).	▪ Loss of climatically suitable habitat; ▪ Increased intensity/frequency of drought; ▪ Increased intensity/frequency of heatwaves; ▪ Increased intensity/frequency of bushfire; ▪ Declining nutritional value of foliage; ▪ Clearing and degradation of Koala habitat; ▪ Mortality with vehicle and dog encounters; and ▪ Koala retrovirus (KoRV) and Chlamydia (*Chlamydia percorum*).
	Listing Advice:	Listing assessment information may be available in the approved Conservation Advice.	
	Recovery Plans:	*National Recovery Plan for the Koala Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (DAWE, 2022b).	
	Threat Abatement Plans:	No Threat Abatement Plan has been identified as being relevant for this species.	
Yakka skink (*Egernia rugosa*)	**Conservation Advice:**	*Approved Conservation Advice for Egernia rugosa (Yakka Skink)* (DoE, 2014).	▪ Land clearing and habitat degradation; ▪ Inappropriate road management; ▪ Removal of wood debris and rock microhabitat; ▪ Ripping of rabbit warrens; and ▪ Predation by feral animals.
	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.	
Five-clawed worm-skink (*Anomalopus mackayi*)	**Conservation Advice:**	*Approved Conservation Advice for Anomalopus mackayi (Five-clawed Worm-skink)* (DEWHA, 2008).	▪ Habitat clearing and fragmentation; ▪ Habitat degradation from overgrazing; ▪ Removal of refuge sites and ground litter; ▪ Predation by foxes and feral cats; and ▪ Soil and water pollution.
	Listing Advice:	Listing assessment information may be available in the approved Conservation Advice	
	Recovery Plans:	Listing assessment information may be available in the approved Conservation Advice	
	Threat Abatement Plans:	*Threat abatement plan for predation by feral cats* (DoE, 2015).	
Regent honeyeater	**Conservation Advice:**	*Conservation Advice Anthochaera phrygia regent honeyeater* (DoE, 2015a).	▪ Habitat clearing, fragmentation and degradation;

Fauna Species	Relevant Conservation Advice and Management Plans		Key Threats
(*Anthochaera phrygia*)	**Listing Advice:**	Listing assessment information may be available in the approved Conservation Advice.	▪ Competition for resources with nectarivorous and non-nectarivorous birds; and ▪ Increased predation by native nest predators, including pied currawongs (*Strepera graculina*).
	Recovery Plans:	National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia) (DoE, 2016).	
	Threat Abatement Plans:	Threat abatement plan for competition and land degradation by rabbits (DoEE, 2016).	
Painted honeyeater (*Grantiella picta*)	**Conservation Advice:**	*Conservation Advice Grantiella picta painted honeyeater* (DoE, 2015b).	▪ Habitat clearing; ▪ Habitat degradation by livestock, native macropods and rabbits; ▪ Competition with the noisy minor (Manorina melanocephala); ▪ Predation by invasive species (e.g., Black rats); ▪ Deliberate destruction of mistletoe is production forests; ▪ Exacerbation of tree decline through pasture improvement activities; ▪ Vehicle collision; and ▪ Nest predation by pied currawongs, pied and grey butcherbirds (Cracticus nigrogularis and Cracticus torquatus), crows and raves (Corvidae).
	Listing Advice:	Listing assessment information may be available in the approved Conservation Advice.	
	Recovery Plans:	*National Recovery Plan for the Painted Honeyeater* (Grantiella picta) (DAWE, 2021).	
	Threat Abatement Plans:	No Threat Abatement Plan has been identified as being relevant for this species	
White-throated needletail (*Hirundapus caudacutus*)	**Conservation Advice:**	*Conservation Advice Hirundapus caudacutus White-throated Needletail* (TSSC, 2019)	▪ 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	

Fauna Species	Relevant Conservation Advice and Management Plans		Key Threats
Squatter pigeon (southern) (*Geophaps scripta scripta*)	**Conservation Advice:**	*Conservation Advice Geophaps scripta squatter pigeon (southern).* (TSSC, 2015)	▪ 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:	▪ *Threat abatement plan for predation by feral cats (DoE, 2015);* ▪ *Threat abatement plan for competition and land degradation by rabbits (DoEE, 2016)* ▪ *Threat abatement plan for predation by the European red fox (DEWHA, 2008)*	
Greater glider (southern and central) (*Petauroides armillatus*)	**Conservation Advice:**	*Conservation Advice for Petauroides volans (greater glider (southern and central))* (DCCEEW, 2022a).	▪ Inappropriate fire regimes; ▪ Habitat clearing and fragmentation; ▪ Timber harvesting; ▪ Entanglement in barbed wire fencing; ▪ Increased temperatures and changes to rainfall patterns; ▪ Hyper-predation by owls ▪ Competition from Sulphur-crested cockatoos (Cacatua galerita); and ▪ Predation by feral cats and foxes.
	Listing Advice:	Listing assessment information may be available in the approved Conservation Advice	
	Recovery Plans:	Recovery plan required, however 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	
Brigalow woodland snail (*Adclarkia cameroni*)	**Conservation Advice:**	*Conservation Advice Adclarkia cameroni brigalow woodland snail* (TSSC, 2016)	▪ Land clearing; ▪ Habitat disturbance; ▪ Predation by rats (Rattus spp.), mice (Mus musculus) and feral pigs (Sus scrofa); ▪ Invasion of Buffel grass; ▪ Trampling by cattle and horses; and ▪ Fire.
	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	

Section 5 Project Threats

The main Project threat to conservation significant species and communities from construction and operational works is the direct loss of species habitat through clearing activities. There are additional threats identified as a result of the Project, these are outlined in the following subsections. Management measures for the Project are presented in the Project's CEMP, OEMP and section 5.2 of the Preliminary Documentation. Species specific management measures are presented in their respective sections within Section 7.

5.1 Construction and Development

- Clearing for project infrastructure, resulting in the loss of ecosystems, habitat and direct fatality or injury of flora and fauna;
- Clearing of hollow bearing trees;
- Fragmentation of habitats;
- Potential for accidental fire ignitions associated with construction activities;
- Increased likelihood and intensity of fire;
- Increased likelihood of weed invasion and associated impacts to threatened species, leading to altered habitat, compromise of community structure and/or altered fire patterns;
- Vehicle traffic resulting in mortality; and
- Increased likelihood of cane toads and mortality from attempted predation (snakes only).

5.2 Operational Threats

Threats relating to the operational lifecycle of the Project include:

- Maintenance of access tracks
- Increased likelihood of weed invasion in disturbed areas that may potentially lead to degraded habitats;
- Increased predation due to increased presence of invasive species;
- Vehicle traffic resulting in mortality;
- Increased predation by native species which may benefit from the disturbance.

5.3 Decommissioning Threats

- Vehicle traffic resulting in mortality;
- Accidental fire ignitions associated with decommissioning activities;
- Establishment of weeds during rehabilitation activities which may potentially alter fire frequency and intensity, adjacent to fire sensitive vegetation communities;
- Re-disturbance of reinstated/regenerating ecosystems, plants or habitat within project footprints for decommissioning activities.

Section 6 Impacts to MNES

This section of the MNES MP outlines the potential impacts to prescribed MNES as a result of the Project.

6.1 Direct Impacts

6.1.1 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.

Direct impacts related to habitat clearing are temporary and in accordance with timing identified in Table 5-1.

The Project will result in the clearing of up to 141.3 ha of Category B vegetation, 59.9 ha of Category C vegetation and 12.3 ha of Category X vegetation.

The impacted remnant vegetation is considered Least Concern under the VM Act and is widespread in the surrounding area and bioregion.

Table 6-1 Estimated Clearance of National Environmental Significance Habitat

Species	Habitat Type	Habitat Area to be cleared (ha)
Koala	Total	207.5
Yakka Skink	Total	76.2
Five-clawed worm-skink	Total	2.5
Regent Honeyeater	Total	0
Painted Honeyeater	Total	11.3
White-throated needletail	Total	207.5
Squatter pigeon (southern)	Breeding	59
	Foraging	147
	Dispersal	1.22
Greater glider (southern and central)	Total	0
Brigalow woodland snail	Total	2.5

6.1.2 Direct Fauna Mortality

Direct mortality of native fauna may occur because of the Project during habitat clearing 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 Project's CEMP and OEMP:

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

6.2 Indirect Impacts

6.2.1 Weeds

Weeds may pose a threat to flora and fauna within the Project Area. The field surveys detected several listed species although naturalised.

The transport and operation of construction vehicles and equipment has the potential to introduce weeds into the Project Area.

6.2.2 Pest Fauna

Pests may pose a threat to flora and fauna within the Project Area. The field surveys detected several listed species. The species which known to occur within the Project area or surrounds are listed in Table 5-2.

The transport and operation of construction vehicles and equipment has the potential to introduce pests and weeds into the Project Area. Waste has the potential to impact flora and fauna, attracting pests and vermin through the supply of artificial food sources. This may impact on natural behaviour and natural species assemblages. A range of waste minimisation strategies will be in place to reduce waste streams generated. As such, it is not anticipated that waste generated as part of the Project will have a significant impact on flora and fauna communities within the Project Area. Waste storages are not likely to have significant impacts on native fauna and flora within or adjacent to the Project Area, as all waste produced as a result of the Project will be stored and disposed of appropriately, as per the relevant legislation.

Table 6-2 Introduced Fauna Species Known from the Project and Surrounding Areas

Species name	Common name	Biosecurity Act Category Numbers
Rhinella marina	Cane toad	-
Columba livia	Rock dove	-
Streptopelia chinensis	Spotted dove	-
Passer domesticus	House sparrow	-
Sturnus vulgaris	Common starling	-
Acridotheres tristis	Common myna	-
Danaus plexippus	Monarch	-
Capra hircus	Wild goat	-
Canis sp.	Wild dog	-
Vulpes	European red fox	-
Canis familiaris	Dog	Categories 3,4,6
Felis catus	Cat	Categories 3,4,6
Lepus europaeus	European brown hare	-
Oryctolagus cuniculus	Rabbit	-
Mus musculus	House mouse	-
Rattus	Black rat	-
Sus scrofa	Feral pig	Categories 3,4,6

6.2.3 Noise and Vibration

Understanding the impact of noise on fauna is limited. There are no current government policies or guidelines that recommend thresholds or limits in relation to fauna. Noise may adversely affect wildlife by interfering with communication, masking the sound of predators and prey, causing stress or avoidance reactions, and in some cases, may lead to changes in reproductive or nesting behaviour. Excessive noise may lead some species to avoid noisy areas, potentially resulting in the fragmentation of species habitat. Radle (2007) states the consensus that terrestrial fauna will avoid any industrial plant or construction area where noise or vibration presents an annoyance to them. Additionally, many animals react to new noise initially as a potential threat, but quickly learn that the noise is not associated with a threat (Radle 2007).

Noise will be generated by the Project through the use of machinery, plant, and vehicles. The generation of construction and operational noise may be in areas which have the potential to support threatened fauna species. Individuals that occur on or near the site are expected to leave the area of impact. Project construction works and therefore potential noise impacts will be temporary. No further potential for impacts is expected following construction of the Project.

6.2.4 Accidental Release of Pollutants

The release of pollutants into the surrounding environment and waterways has the potential to degrade stream habitat quality near the site, degrade stream water quality and thereby impact vegetation communities and terrestrial fauna utilising these areas. Without mitigation, potential exists for contaminants to enter waterways through activities associated with the washdown and fuelling facilities, storage of lubricants and coolant, wastes and sewerage.

Surface water contaminants have the potential to impact the local catchment and vegetation communities in the surrounding areas.

6.2.5 Dust

Increased dust resulting from clearing and earthworks, vehicle movement, construction of infrastructure has the potential to impact flora and fauna values within the Project Area throughout construction and operation. Increased dust can result in respiratory issues in fauna, adverse impacts on plant photosynthesis and productivity (Chaston & Doley 2006), changes in soil properties ultimately impacting plant assemblages (Farmer 1993) and mortality and / or decrease in aquatic communities from the toxicity of poor water quality. Evidence of potential impacts on entire vegetation communities is scarce. Many studies focus on specific impacts to single species. Recent research on threatened flora in a semi-arid environment in Western Australia found no significant impact on plant health as a result of a range of dust accumulation loads caused by vehicle movements (Matsuki et al. 2016).

6.2.6 Fire

The Project has the potential to result in fires as a result of construction and operational tasks. Fire management measures have been developed to reduce the potential impacts of a site fire. Bushfire setbacks will be provided around Project infrastructure and powerlines in accordance with standards and legislation. Setbacks and firebreaks will be in accordance with the Australian Standard for the Construction of Buildings in Bushfire Prone Areas – AS3959 – 2009. AS3959.

6.2.7 Climate Change

Climate change effects within the Brigalow Belt South Bioregion include a potentially increased incidence of drought and may have a lead on effect to particularly impacting Koala and Greater glider (southern and central). As a result of an increased incidence of drought, impacts may include increased stress on vegetation, a reduced capacity for the region to support local flora and fauna, dieback from tree stress reduced surface water to support flora and fauna species that are dependent on water bodies, and reduced resilience to parasites and diseases.

Impacts relating to the PV Solar Station and Access Road are likely to add further stress to the periodically stressed (from drought) remaining environments in the local surrounding area. These include impacts such as:

- Reduced habitat availability;
- Increased edge effects;
- Increased pressure on the remaining habitat from potentially exceeding the carrying capacity of some species (due to increased densities from displaced individuals);
- Increased stress on and risks to displaced individuals (while they re-establish their home ranges and potentially compete with other individuals and species from the remaining habitat); and
- Reduced capacity for the surrounding environment to provide refuge during and following bushfires, floods, droughts and other stochastic events (which are predicted to increase in extremity under climate change scenarios).

However, the development of a solar farm will result in positive impacts on climate change in the long term as renewable energy will assist in mitigating the effects of climate change.

A summary of the above listed impacts which pose potential to impact MNES as a result of the project are summarised in Table 5-3.

Table 6-3 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.	All	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.	All	All Project phases, particularly during clearing and construction.
Invasive flora	Weed invasion within and surrounding the Project area has the potential to be facilitated through numerous activities including vegetation clearing, soil disturbance and vehicle/machinery movement. 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.	All	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. Additionally, poor waste management may attract feral animals to the area.	All	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.	All	All Project phases, particularly during clearing and construction.

Impacts	Potential Impacts to MNES	Impacted MNES Species	Applicable Project Phase
Artificial Lighting	Artificial light during night works has the potential to impact habitat occupation within the Project area and on adjacent land.	All (specially bats)	Construction and operation.
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.	All	Construction
Release of Pollutants	The release of pollutants into the surrounding environment and waterways has the potential to degrade stream habitat quality near the site, degrade stream water quality and thereby impact vegetation communities and terrestrial fauna utilising these areas.	All	All Project phases, particularly during construction
Site run-off	Erosion and sediment run-off into the surrounding environment and waterways have the potential to degrade stream habitat quality near the site, degrade stream water quality and thereby impact vegetation communities and terrestrial fauna utilising these areas.	All	All Project phases, particularly during clearing and construction.
Heat island effect	Solar arrays will affect air and soil temperatures within the solar array perimeter, however in relation to outside of the solar array perimeter a heat island effect is unlikely to occur.	All	Operation
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.	All	All Project phases, particularly during clearing and construction.
Climate change	The impacts of climate change have the potential to increase incidence of drought, resulting in increased stress on vegetation, a reduced capacity for the region to support local flora and fauna, dieback from tree stress reduced surface water to support flora and fauna species that are dependent on water bodies, and reduced resilience to parasites and diseases.	All, particularly Koala and Greater glider (southern and central)	All Project phases, particularly during clearing and construction.

Section 7 Individual Species Plans

7.1 Koala

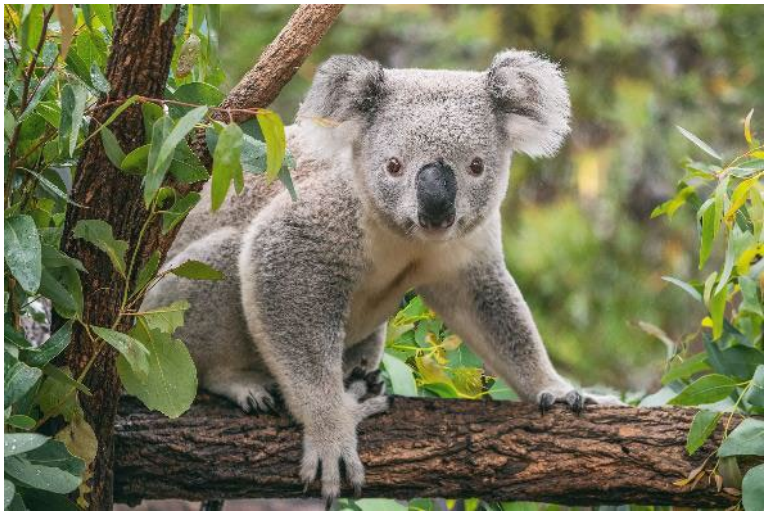

Plate 7-1 Koala (Australian Geographic, 2019)[2]

7.1.1 Description

Koalas (*Phascolarctos cinereus*) are listed as Endangered under the EPBC Act and NC Act. Typically, Koala are a medium-sized marsupial with a predominantly grey fur coloration and white underbody, large, rounded ears, sharp claws and two thumbs per hand. The species appearance varies depending on its range, where in the south, Koalas are generally larger and darker in appearance. Whereas in the north, Koalas are generally lighter in colouration and smaller compared to those in the southern ranges. Koalas range in weight from an average 6.5 kg (Queensland) to 12 kg (Victoria).

7.1.2 Distribution

Koalas are endemic to Australia, occurring in eastern Australian forests and woodlands dominated by *Eucalyptus*, *Corymbia* and *Angophora* species. Koalas are distributed throughout the eastern Australian coast, including Queensland (QLD), New South Wales (NSW), the Australian Capital Territory, Victoria and South Australia. However, species distribution is not continuous within its range, as the species occurs in several subpopulations separated by either cleared land or unsuitable habitat (Martin and Handasyde, 1999).

Koala distribution is highly determined by the availability of resources, generally being specialist food (*Eucalyptus* species) (Melzer et al. 2000), habitat and environmental factors (i.e., rainfall, distance to water sources and temperature). Favourable mean temperatures during summer months range from 23 to 26°C and mean annual rainfall between 700 to 1,500 mm (Adams-Hosking et al., 2011). Home ranges for the species are further characterised by variable factors including life stages, soil fertility, habitat quality and nutritional requirements, with reported home ranges in QLD and NSW varying between 3 hectares (ha) and 500 ha (Wilmott, 2020).

Within Queensland, Koalas are widespread, occurring in patchy and low-density populations across numerous bioregions (Melzer et al. 2018). The species range in QLD occurs from Einasleigh Uplands and Wet Tropics bioregions in the north to the southern and western regions of Desert Uplands, Central Mackay Coast, Mitchell Grass Downs, Mulga Lands, Brigalow Belt North, Brigalow Belt South and South Eastern Queensland (Adams-Hosking et al., 2016). All eight

[2] Australian Geographic. 2019. *Koala*. Available at: https://www.australiangeographic.com.au/fact-file/fact-file-koala-phascolarctos-cinereus/

Queensland bioregions with koalas cover a total area of 1,489,650 km^2, representing a mean density of 0.0005 koalas per hectare (based off 2012 population estimates).

7.1.3 Biology and Reproduction

Females produce one offspring yearly once they have reached sexual maturity between 2 and 3 years of age (McLean & Handasyde 2007). Offspring are weaned off the parents after a 12 month lactation period, with weaning periods depending on food availability and favourable climatic conditions.

Breeding seasons are highly influenced by population density, food quality and availability, soil type and climate factors (McLean & Handasyde 2007; Ballantyne et al. 2015). As breeding periods generally line up with favourable conditions and Koala health status, Koalas may not breed on a yearly basis.

In the northern regions of the species range, majority of births (60%) occur in summer and early autumn months, being December to March, with the remainder of births distributed throughout the year (Ellis et al., 2010).

7.1.4 Habitat

Koala habitat consists of forest and woodland habitats that contain flora species known for Koala food trees, or shrubland with emergent food trees. The Koala's diet is restricted mainly to foliage of the *Eucalyptus* spp., however it may also consume leaves of *Corymbia* spp., *Angophora* spp. and *Lophostemon* spp. Within the Brigalow Belt bioregion, Koala's are more likely to inhabit fringing riparian REs associated with watercourses and adjoining woodlands and low ranges particularly dominated by *E. camaldulensis, E. coolabah, E. populnea, E. thozetiana, E. melanophloia* and *E. tereticornis*.

7.1.5 Important Populations

The conservation advice for Koalas identifies important populations as "*those that are valued for cultural, social, and economic reasons as well as for the species conservation.*

- *For conservation of the listed koala, among other reasons, it will be imperative to maintain populations that:*
  - *have the potential to act as source populations to adjacent areas of suitable, or potentially suitable, habitat;*
  - *Exist in areas of climatically suitable refugia during periods of environmental stress including droughts, heatwaves, and long-term climate change;*
  - *Are genetically diverse;*
  - *Are disease free and/or exhibit low rates of infection with important pathogens;*
  - *Contain genes which may confer adaptation to current and future environmental stressors;*
  - *Are geographical or environmental outliers within the species range.*
- *Populations are also valued for social, cultural or economic reasons, and may or may not, overlap with populations listed above. Reasons may include, but not limited to:*
  - *Cultural and spiritual importance to Indigenous people;*
  - *The social value and enjoyment of having koalas close to residential areas;*
  - *The economic value brought to local business and tourism;*
  - *The iconic species value at the national and international political and community level."*

There are four spatially distinct, genetic Koala management units identified nationally, including:

1. Queensland and New South Wales populations north of the Clarence River Valley, New South Wales;
2. South of the Clarence River Valley, New South Wales to north of the Sydney Basin;

3. South of the Sydney Basin to approximately the New South Wales /Victorian boarder; and
4. Victoria and South Australia populations.

7.1.6 Project Area Occurrence

The species is known to occur within the Project Area. Two skulls were found on Project site, along with discovery of Koala scats. As per the Atlas of Living Australia (ALA) database, there are 7 records within 10 km of the Project area and 23 records within 25 km of the Project area, with all records dating between 1987 and 2016. The ALA database further identified 602 records of the species within 100 km of the Project area.

7.1.7 Threats

Key threats to Koala include:

- Loss of climatically suitable habitat;
- Increased intensity/frequency of drought;
- Increased intensity/frequency of heatwaves;
- Increased intensity/frequency of bushfire;
- Declining nutritional value of foliage;
- Clearing and degradation of Koala habitat;
- Mortality with vehicle and dog encounters; and
- Koala retrovirus (KoRV) and Chlamydia (*Chlamydia percorum*).

7.1.7.1 Project Specific Threats

The main Project specific threat to the Koala include the clearing of habitat and fragmentation. Additional Project related threats are outlined in Section 5.

7.1.8 Management and Mitigation

Management and mitigation measures specific to Koalas during clearing, construction and operation of the Project area provided in Table 6-1. Additional broader management measures regarding the Project are further provided in the CEMP and OEMP.

Table 7-1 Management Measures Relevant to the Koala

No.	Action	Responsibility
HC4	Survey and peg disturbance footprint, prior to clearing to avoid unnecessary clearing of vegetation beyond that detailed during the design phase.	Environmental Representative / Environmental Engineer
K1	Site inductions and pre-start meetings are conducted prior to construction works to raise awareness of koalas on site and protocols relating to the protection of koalas and their habitat.	Environmental Representative
K2	Any retained habitat is to be clearly demarcated with temporary fencing, tape and/or other visible markers, and access to this habitat is restricted to reduce the degradation and loss of habitat.	Environmental Representative

No.	Action	Responsibility
HIE2	Fauna proof fencing will be established along the PV Power Station area and will: • Be a minimum 1.8m high; • Be 3 m from any retained trees (excluding grasses) on the habitat side of the fence or plantings and be clear of all overhanging branches and vines; • Have a minimum 50 cm wide scratch panelling installed along the top of the length of the habitat side of the fence; and • Be either dug into the ground to a depth of at least 150 mm or be attached to cement footings along the length of the fence. • Refer to Section 5.2.5 of the Preliminary Documentation for further details.	Environmental Representative / Engineering Representative
HIE3	Inclusion of fauna and Koala escape mechanisms along the PV Power Station side of the fencing i.e., escape climbing poles and fauna escape ramps will be implemented. These will involve the following: • Koala escape poles will be made from salvaged tree trunks (where possible) to encourage the use by entrapped Koalas and be a minimum of 125 mm in diameter; • Koala escape poles will be installed within 300 mm of the fencing; • Shrubs will be planted around the base of escape poles to provide cover and refuge for entrapped fauna and encourage the use of escape poles by entrapped Koalas; and • Fauna escape ramps will be designed as specified in the Preliminary Documentation. Refer to Section 5.2.8 of the Preliminary Documentation for further details.	Environmental Representative / Environmental Engineer
HIE4	A fully-funded agreement will be put in place with a relevant organisation or authority for the maintenance and monitoring of the fencing and fauna escape mechanisms in perpetuity.	Environmental Representative / Environmental Engineer
K3	Clearing of vegetation should be staged and timed to provide a minimum of 12 hours between clearing events.	Environmental Representative
K4	Any appropriate habitat links, or trees retained as stepping stones, are maintained from the clearing site to adjacent habitat areas.	Environmental Representative
K5	Trees are to be thinned out on the site prior to bulk clearing to encourage resident koalas to establish new home ranges.	Environmental Representative
K6	Trees are to be felled in a controlled manner using a vertical tree grab on an excavator	Environmental Representative
K7	Trees with koalas are clearly flagged with a specific colour or design of flagging tape and the on-site fauna spotter is alerted.	Environmental Representative
K8	A 60 km/h speed limit on the Access Corridor between dusk and dawn with appropriate signage recommendation will be put forward to Council. As part of site inductions, staff will be reminded to adhere to this recommendation to not exceed 60 km/h.	Environmental Representative / Environmental Engineer
K9	Road signage to be used to alert drivers of potential koala movement across the road.	Environmental Representative / Environmental Engineer
K10	Night-time vehicle movements on site and travelling to and from the site is restricted when koalas are most active between 6pm to 6am.	All staff and contractors
K11	In the event of a person recording a sick, injured or dead Koalas located in the Project Area, all work must cease immediately and the koala is reported to RSPCA on 1300 ANIMAL (1300 264 625).	All staff and contractors / Environmental Representative
K12	Fauna spotter/catchers are to be aware of appropriate quarantine and biosecurity procedures for koalas found to be affected by disease.	Environmental Representative

No.	Action	Responsibility
K13	Hygiene and biosecurity measures to minimise the of introduction and/or spread of myrtle rust (caused by the fungus *Austropuccinia psidii*) in the Project area are enforced through vehicle washdown procedures. Wash down areas will be clearly marked to prevent vehicles entering the site that may carry vegetation pathogens known to affect koala food trees (e.g., myrtle rust).	Environmental Representative
K14	Visual monitoring of adjacent habitat by site personnel to record and notify RSPCA of any koalas and potential disease occurrence.	All staff and contractors / Environmental Representative
K15	Fauna egress infrastructure installed along fencing to prevent entrapment.	Environmental Representative/ Environmental Engineer
K16	In the event a Koala is observed at the Project Area, all work must cease immediately within the surrounding area until the Koala has moved on from the area.	All Staff and Contractors
K17	In the event that a tree within the Myrtaceae family is left within the disturbance footprint boundaries, the trees are to be monitored on a regular basis for the presence of myrtle rust. If myrtle rust is detected on the trees, they are to be treated in accordance with appropriate disease control measures.	Environmental Representative
K18	Domesticated dogs are not permitted onsite.	All staff and contractors
K19	Clearing of Koala habitat trees should be undertaken during the non-breeding season only. Therefore, clearing should only be undertaken between April – July.	Environmental representative / All staff and contractors

7.1.9 Rehabilitation Measures

The Koala typically only occurs in eucalypt dominated ecosystems, as such rehabilitation through natural regeneration may be considered, but should be employed only where demonstrated to have a high likelihood of success. As per DES 2022, Koala specific rehabilitation measures should consider the following:

- Seedlings are to be grown from locally collected seed are planted to enhance revegetation efforts as they are best suited to local conditions.
- Seedlings are planted at densities slightly higher than the average stem density for the regional ecosystem to account for up to 10% tree loss as the habitat matures.
- Site preparation, planting and maintenance is carried out by experienced habitat restoration teams.
- tree species are mixed, not planted in monocultures around the site, and planted in areas on the site that are better suited to that species.
- Access by the public or residents is limited or prohibited while the habitat is regenerating.

7.2 Yakka skink

Plate 7-2 Yakka skink (Australian Reptile Guide, 2023)[3]

7.2.1 Description

The Yakka skink (*Egernia rugosa*) is listed as Vulnerable under the EPBC Act and NC Act. Yakka skink are a robust bodied skink with a dark brown/black stripe from the nape to tail and cream-yellow throat and underbelly with black spots. The flanks are typically a dark brown to reddish-brown scale colouration. The species generally grows to approximately 40 cm long, making it one of the largest skinks within its range (TSN, 2008).

7.2.2 Distribution

The Yakka skink is endemic to Queensland and has a patchy distribution throughout the state. Isolated populations of the Yakka skink are distributed throughout subhumid areas from Cape York in the north to Coen and St George in the south of Queensland. However, the core habitat for the Yakka skink is distributed within the Mulga Lands and Brigalow Belt South bioregions (TSN, 2008). Populations of the Yakka skink have also been recorded along the Queensland and New South Wales border (TSN, 2008).

7.2.3 Biology and Reproduction

Yakka skink generally reach sexual maturity at five years of age and produce live young, with an average litter size of six juveniles (QLD DERM 2010; TSN 2008). The average life expectancy of the species is an average of <12 years (Peck et al., 2017).

7.2.4 Habitat

The Yakka skink typically inhabits open dry sclerophyll forest or woodland (Wilson and Knowles, 1988; Cogger, 2000). Within these habitats, the Yakka skink often refuges among dense ground vegetation, large hollow logs, cavities in soil-bound root systems of fallen trees and beneath rocks (Wilson and Knowles, 1988; Cogger, 2000). However, they are also commonly known to excavate burrow systems (Ehmann, 1992). Yakka skink are extremely secretive species and generally do not venture far from their shelter sites, in which they will retreat to in the first sign of disturbance. Within previously cleared habitats, the species occurs in areas exposed to tunnel erosion, rabbit warrens and log piles (TSN, 2008).

[3] Australian Reptile Guide. 2023. *Yakka Skink*. Available at: https://www.australianreptileguide.com/yakka_skink

7.2.5 Project Area Occurrence

Land zones within the Project Area include 3 (alluvium), 7 (ironstone jump-ups) and 5 (old loamy and sandy plains) which are considered suitable for Yakka skink (refer to Section 3.4.2.1.3 of the PD). There is one QGC record of Yakka skink within the Braemar State Forest, approximately 2 km north of the Project Area (QGC 2020). Rocky sections of the Project Area are likely to provide habitat suitable for Yakka skink, with large laterite overhangs and deep hollows under the rock platform.

Given that the Yakka skink are difficult to detect, and population information is limited, the Commonwealth government considers that an occurrence of important habitat for the Yakka skink is a surrogate for an 'important population' (DSEWPC 2011; DAWE 2021). Suitable habitat is considered important if it is:

- Habitat where the species has been identified during a survey;
- Near the limit of the species' known range;
- Large patches of contiguous, suitable habitat and viable landscape corridors; or
- A habitat type where the species is identified during a survey, but which was previously thought not to support the species.

Although the species was not detected during surveys and there are no historical records within the site, the site falls well within modelled distribution mapping for Yakka skink (i.e., it is not at the limit of the species' known range). Lot 4 DY457 is, however, located partially within a state-wide biodiversity corridor buffer area and the lots surrounding the Project are generally undeveloped. The uniformity of the vegetation and the landscape in the vicinity of the Project Area means that the site is located within a large patch of 'contiguous suitable habitat and viable landscape corridors'. This therefore constitutes the Project Area as important habitat for the Yakka skink and should a population be present, it would be considered to be an important population.

A search of the ALA database did not identify any records of the Yakka skink within 25 km of the Project area. However, the ALA database identified 2 records of the species within 100 km of the Project area.

7.2.6 Threats

Threats to the Yakka skink include:

- Land clearing and habitat degradation;
- Inappropriate road management;
- Removal of wood debris and rock microhabitat;
- Ripping of rabbit warrens; and
- Predation by feral animals.

7.2.6.1 Project Specific Threats

The main Project specific threats to the Yakka skink include habitat clearing and fragmentation. Additional Project related threats are outlined in Section 5.

7.2.7 Management and Mitigation

Suggested management and mitigation measures specific to Yakka skink (as per the species conservation advice; DoE, 2014) are provided in Table 6-2. Additional broader management measures regarding the Project are further provided in the CEMP and OEMP.

Table 7-2 Suggested Management Measures Relevant to the Yakka skink

No.	Action	Responsibility
1	Actively discourage the removal of fallen logs, leaf litter and rocks from known and potential habitat sites	Environmental representative
2	Ensure that road widening and maintenance activities and ripping of rabbit warrens in areas where the Yakka Skink occurs do not adversely impact on known populations.	Environmental representative
4	Develop and implement a suitable fire management strategy for the habitat of the Yakka Skink	Environmental representative
5	Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions	Environmental representative
6	Retention of impacted microhabitat during clearing and construction to aid in rehabilitation	Environmental representative
7	Where a single yakka skink is found, works must stop and a search for the burrow site and other individuals from the colony conducted by a suitably qualified fauna spotter/catcher.	All staff and contractors
8	Avoid direct disturbance to any known, active burrow sites.	Environmental representative
9	Relocation of individuals must be within the shortest distance possible and not exceed 500m, preferably less than 250m.	Environmental representative
10	In the event feral cats are located onsite, implement effective control measures as per the threat abatement plan for predation by feral cats (DEWHA, 2008).	Environmental representative
11	In the event European red foxes are located onsite, implement effective control measures as per the threat abatement plan for predation by the European red fox (DEWHA, 2008).	Environmental representative

7.2.8 Rehabilitation Measures

Rehabilitation measures for the Yakka skink include the reinstatement of any retained microhabitat features during the rehabilitation process. To be successfully rehabilitate to the acceptance criteria, the following must be met:

- The area has the structural components and floristic elements of the pre-disturbance RE and has reached remnant status (50/70 rule); and
- Presence of suitable potential burrow locations in 10% of the area.

7.3 Five-clawed worm-skink

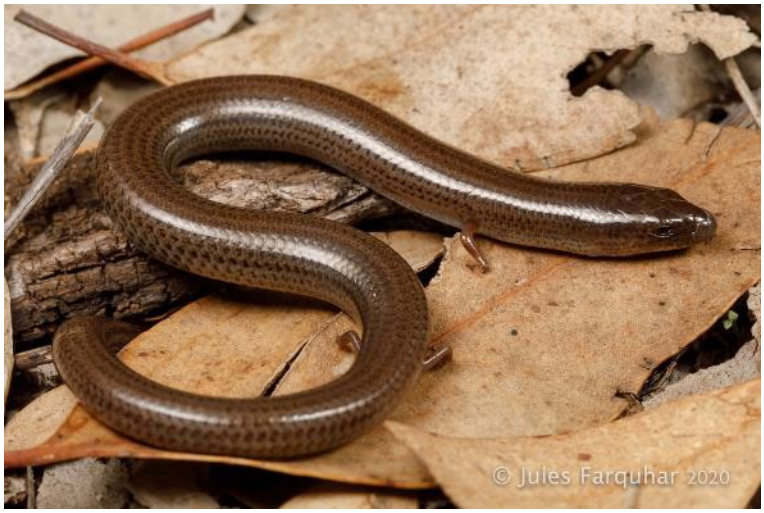

Plate 7-3 Five-clawed worm-skink (Farquhar J., 2020[4])

7.3.1 Description

Five-clawed worm-skink (*Anomalopus mackayi*) are listed as Vulnerable under the EPBC Act. The Five-clawed worm-skink are a medium-sized species with three fingers and two toes and is generally a dark-brown to brown colouration with a paler underbelly. The species grows up to an average of 27 cm long. In the southern regions of its distribution range, the species is unpatterned, whereas those in the northern regions feature longitudinal rows of dark spots, approximately one per scale over the dorsal and lateral surfaces (Cogger et al., 1993; Cogger, 2000) and rows of dark spots on the ventral surface (Cogger, 2000; EPA, 2007).

7.3.2 Distribution

The Five-clawed worm-skink inhabits a relatively small region along the western-edge of the Great Dividing Range, north-eastern NSW and south-eastern QLD (Sadlier & Pressy, 1994). However, records between 1980 and 2008 have only come from Oakey and Dalby regions in QLD and the Wallangra, Mungindi and Wee Waa regions of NSW (Sadlier & Pressy, 1994; DECC, 2005).

7.3.3 Biology and Reproduction

Biology and reproduction information on the Five-clawed worm-skink is limited, however, one specimen was recorded to lay a clutch size of three eggs in spring (NSW DECCW 2005).

7.3.4 Habitat

The Five-clawed worm-skink inhabits grassy White Box woodlands, open woodlands and River Red Gum–Coolibah-Bimble Box woodlands. These woodlands are generally supported by clay-loam soils (Shea et al., 1987). The species lives in permanent deep tunnel-like burrows and deep soil cracks, using fallen logs and timber as sheltering sites on the surface.

In Queensland, particularly in Dalby, the Five-clawed worm-skink occurs in Bluegrass (*Dichanthium sericeum*) and/or Mitchell Grass dominated grasslands or mixed grasslands dominated by other grass species but still categorised as Queensland Regional Ecosystem (RE) 11.3.21 (Brigalow Belt Reptiles Workshop 2010). In south-east Queensland, the

[4] Farquhar J., 2020. Available at: https://www.flickr.com/photos/126237772@N07/49983103888

species may occur in River Red Gum–Queensland Blue Gum–Coolibah–Bimble/Poplar Box grassy woodland/open forests (Brigalow Belt Reptiles Workshop 2010).

7.3.5 Important Populations

In Queensland, important populations occur where suitable habitat remains throughout the species' known distribution on the Condamine River Floodplain, particularly the region (including agricultural farming land) between Bowenville/Oakey, Pittsworth and Jimbour (Brigalow Belt Reptiles Workshop 2010; Richardson 2006). Whereas in north-eastern New South Wales, important populations occur in suitable remnant vegetation and non-remnant vegetation corridors linking remnant patches on the Namoi and Gwydir River floodplains and on the lower north-western slopes of the Great Dividing Range (Brigalow Belt Reptiles Workshop 2010).

7.3.6 Project Area Occurrence

A search of the ALA database did not identify any records of the Five-clawed worm-skink within 25 km of the Project area. However, the ALA database identified 25 records of the species within 100 km of the Project area.

7.3.7 Threats

Threats to the Five-clawed worm-skink include:

- Clearing and fragmentation of habitat for agriculture and development;
- Habitat degradation from overgrazing;
- Removal of refuge sites and litter;
- Predation by feral cats and foxes; and
- Soil and water pollution.

7.3.7.1 Project Specific

The main Project specific threats to the Five-clawed worm-skink include habitat clearing and fragmentation. Additional Project related threats are outlined in Section 5.

7.3.8 Management and Mitigation

Suggested management and mitigation measures specific to Five-clawed worm-skink (as per the species conservation advice; DEWHA, 2008) are provided in Table 6-3. Additional broader management measures regarding the Project are further provided in the CEMP and OEMP.

Table 7-3 Management Measures Relevant to the Five-clawed worm-skink

No.	Action	Responsibility
1	Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.	Environmental representative
2	In the event feral cats are located onsite, implement effective control measures as per the threat abatement plan for predation by feral cats (DEWHA, 2008).	Environmental representative
3	In the event European red foxes are located onsite, implement effective control measures as per the threat abatement plan for predation by the European red fox (DEWHA, 2008).	Environmental representative
4	Manage known sites to control introduced pests, such as foxes and feral cats.	Environmental representative
5	Implement fire management measures to ensure fire regimes maintain the species' habitat	Environmental representative

No.	Action	Responsibility
6	Monitor any weed populations that spread during the Project lifecycle and implement effective weed management measures to contain or eradicate weeds within site where the species occurs, particularly in relation to Buffel Grass.	Environmental representative
7	Manage resource use to ensure habitat and shelter exists to protect the species from prey	Environmental representative
8	Establish an adequate buffer zone surrounding the Project disturbance footprint to protect habitat	Environmental representative

7.3.9 Rehabilitation Measures

Rehabilitation measures for the Project are outlined in Section 5.4 of the Preliminary Documentation. There are no additional rehabilitation measures for the five-clawed worm-skink.

7.4 Regent honeyeater

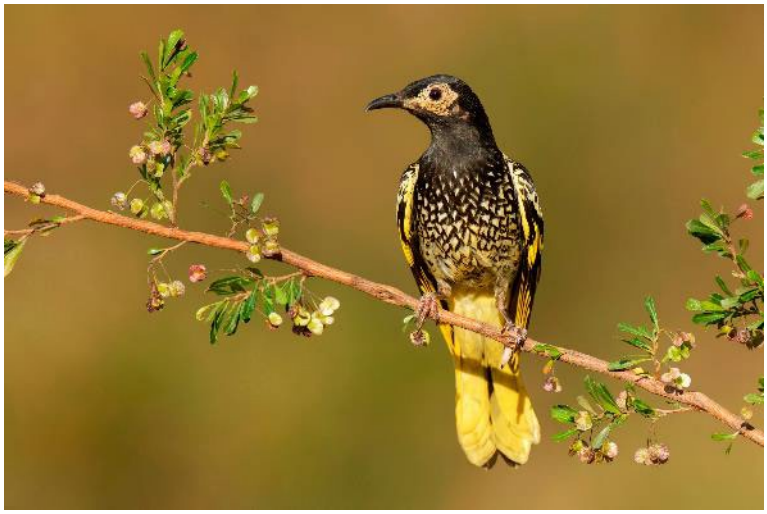

Plate 7-4 Regent honeyeater (Local Land Services, 2023[5])

7.4.1 Description

Regent honeyeater (*Anthochaera phrygia*) are listed as critically endangered under the EPBC Act. The Regent honeyeater is a predominantly black bodied bird, with a yellow under-tail and warty pink skin around the eyes. The bird's body features pale-yellow specks over its body.

7.4.2 Distribution

The Regent honeyeater is endemic to mainland south-eastern Australia. The species is disturbed in a patchy manner across south-east Queensland, New South Wales, the Australian Capital Territory to central Victoria, where records are widely distributed throughout.

Species range has declined, with historical records showing the species previously ranged from Rockhampton (QLD) to South Australia, where it is now considered extinct within the state.

Movement patterns of the Regent honeyeater are known to be governed by flowering Eucalypt species.

7.4.3 Biology and Reproduction

Breeding timing varies throughout its range and is thought to coincide with the flowering of eucalypt and mistletoe species (Franklin et al., 1989; Geering and French, 1998). However, breeding generally occurs during the spring and summary months of August to January (Franklin et al., 1989), where nests are typically placed in canopies of mature trees with rough bark. Females lay two to three eggs per breeding season. There are currently four known breeding areas for the Regent honeyeater, three of which are in NSW and one in Victoria (Garnett et al., 2011; Higgins et al., 2001; Ingwersen et al., 2013; Webster and Menkhorst, 1992).

7.4.4 Habitat

Regent honeyeater typically inhabit the inland slopes of the Great Dividing Range where box-ironbark eucalypt woodland and dry sclerophyll forest with moist, fertile soils are present. Regent honeyeater are also known to occur in riparian vegetation including sheoak (*Casuarina spp.*) for the purpose of breeding and feeding on needle-leaved

[5] Local Land Services. 20XX. Available at: https://www.lls.nsw.gov.au/regions/central-west/key-projects/national-landcare-program-phase-two/regent-honeyeater

mistletoe (Franklin et al., 1989; Higgins et al., 2001; Oliver et al., 1998; Webster and Menkhorst, 1992). Coastal forests may also be used by Regent honeyeater in the event of drought affecting their usual habitat (Menkhorst, 1999).

7.4.5 Project Area Occurrence

A search of the ALA database did not identify any records of the Regent honeyeater within 25 km of the Project area. However, the ALA database identified 8 records of the species within 100 km of the Project area.

7.4.6 Threats

Threats to the Regent honeyeater include:

- Habitat clearing, fragmentation and degradation;
- Competition for resources with nectarivorous and non-nectarivorous birds; and
- Increased predation by native nest predators, including pied currawongs (*Strepera graculina*).

7.4.6.1 Project Specific Threats

The main Project specific threats to the Regent honeyeater include habitat clearing, fragmentation and possible edge effects. An increase in forest edge habitats may lead to an increase in Noisy miner populations, therefore creating competition for habitat. Noisy miners are considered aggressive in the competition for habitat and due to size, have the potential to drive out smaller bird species. Additional Project related threats are outlined in Section 5.

7.4.7 Management and Mitigation

Suggested management and mitigation measures specific to Regent honeyeaters (as per the species conservation advice; DoE, 2015a) are provided in Table 6-4. Additional broader management measures regarding the Project are further provided in the CEMP, OEMP and Section 5.4 of the Preliminary Documentation.

Table 7-4 Management Measures Relevant to the Regent honeyeater

No.	Action	Responsibility
1	Progressively rehabilitate degraded areas that were previously commonly used by the Regent honeyeater, using favourable vegetation for the species.	Environmental representative
2	In the event a noisy miner individual or noisy miner population is observed at the Project area, during the lifecycle of the Project, noisy miner control actions must be undertaken.	Environmental representative

7.4.8 Rehabilitation Measures

Rehabilitation measures for the Project are outlined in Section 5.4 of the Preliminary Documentation. The following rehabilitation measures are specific to the Painted honeyeater:

- During rehabilitation, areas of box-gum woodlands and box-ironbark forests must be targeted for restoration, including the re-seeding a variety of mistletoe species.

7.5 Painted honeyeater

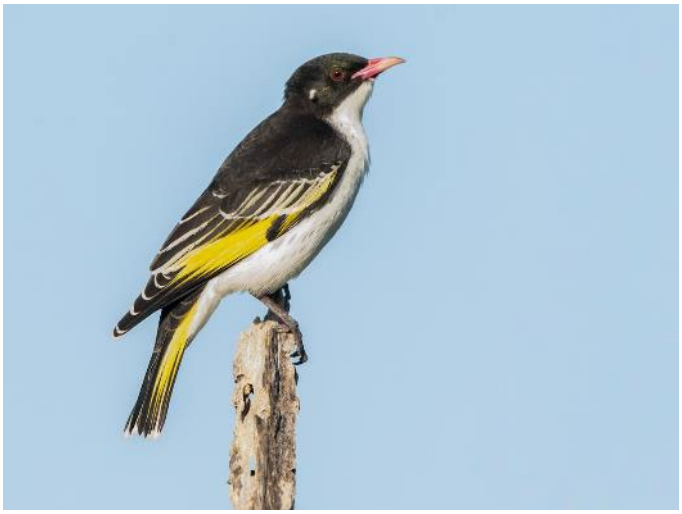

Plate 7-5 Painted honeyeater (EBird, 2019[6])

7.5.1 Description

Painted honeyeater (*Grantiella picta*) are listed as vulnerable under the EPBC Act. The Painted honeyeater features black upperparts, a white underbelly, yellow edges on the flight and tail feathers, a pink bill and red eye. Female Painted honeyeaters are known to be smaller than males, also exhibiting a browner back than the males (Higgins et al., 2001).

7.5.2 Distribution

The Painted honeyeater is distributed in a sparse manner throughout eastern Northern Territory, north-western Queensland and to south-eastern Australia.

The Painted honeyeater migrates seasonally between the north and south of its range coinciding with the fruiting of mistletoe (Barea and Watson, 2007). Considering its dispersive habits, the species is considered to have a single population (Garnett et al., 2011).

7.5.3 Biology and Reproduction

Breeding seasons generally occur from October to March as this is when mistletoe fruits are most available across its range. Females typically lay a nest of 2 to 3 eggs on average, with both parents incubating the nest, brooding and feeding young (Barea, 2008; Higgins et al., 2001; Garnett et al., 2011, Barea, 2012)

The majority, if not all breeding records come from the south of 26°S, on inland slopes of the Great Dividing Range, particularly between the Grampians (Victoria) and Roma (Queensland) (Higgins et al., 2001). The species generally breeds in woodlands with access to mistletoe fruits, however the species is also known to breed in narrow roadside strips if ample mistletoe fruit is available (BirdLife International, n.d.).

7.5.4 Habitat

The Painted honeyeater inhabits mistletoes in Eucalypt forests/woodlands, riparian woodlands of Black-box and river red gum, Box-ironbark-yellow gum woodlands, Acacia-dominated woodlands, paperbarks, Casuarinas, Callitris, and trees on farmland or gardens (TSCC, 2015b). However, the species favours woodlands containing mature trees due to the higher abundance of available mistletoes they contain.

[6] EBird. 2019. Available at: https://ebird.org/species/paihon1

7.5.5 Project Area Occurrence

Essential habitat was mapped for Painted honeyeater and there is one record located in Weranga State Forest, just south of the Project Access Corridor. It is considered possible that the species occurs within the Project Area. A search of the ALA database identified 1 record of the Painted honeyeater within 10 km of the Project area and 2 within 25 km. The ALA database further identified 690 records of the species within 100 km of the Project area.

7.5.6 Threats

Threats to the Painted honeyeater include:

- Habitat clearing;
- Habitat degradation by livestock, native macropods and rabbits;
- Competition with the noisy minor (*Manorina melanocephala*);
- Predation by invasive species (e.g., Black rats);
- Deliberate destruction of mistletoe is production forests;
- Exacerbation of tree decline through pasture improvement activities;
- Vehicle collision; and
- Nest predation by pied currawongs, pied and grey butcherbirds (*Cracticus nigrogularis* and *Cracticus torquatus*), crows and raves (Corvidae).

7.5.6.1 Project Specific Threats

The main Project specific threats to the Painted honeyeater include habitat clearing, fragmentation and possible edge effects. An increase in forest edge habitats may lead to an increase in Noisy miner populations, therefore creating competition for habitat. Noisy miners are considered aggressive in the competition for habitat and due to size, have the potential to drive out smaller bird species. Additional Project related threats are outlined in Section 5.

7.5.7 Management and Mitigation

Suggested management and mitigation measures specific to Painted honeyeaters (as per the species conservation advice; Doe, 2015b) are provided in Table 6-5. Additional broader management measures regarding the Project are further provided in the CEMP and OEMP.

Table 7-5 Management Measures Relevant to the Painted honeyeater

No.	Action	Responsibility
1	Progressively rehabilitate degraded areas that were previously commonly used by the Painted honeyeater, using favourable vegetation for the species.	Environmental representative
2	In the event a noisy miner individual or noisy miner population is observed at the Project area, during the lifecycle of the Project, noisy miner control actions must be undertaken.	Environmental representative

7.5.8 Rehabilitation Measures

Rehabilitation measures for the Project are outlined in Section 5.4 of the Preliminary Documentation. The following rehabilitation measures are specific to the Painted honeyeater:

- During rehabilitation, areas of box-gum woodlands and box-ironbark forests must be targeted for restoration, including the re-seeding a variety of mistletoe species.

7.6 White-throated needletail

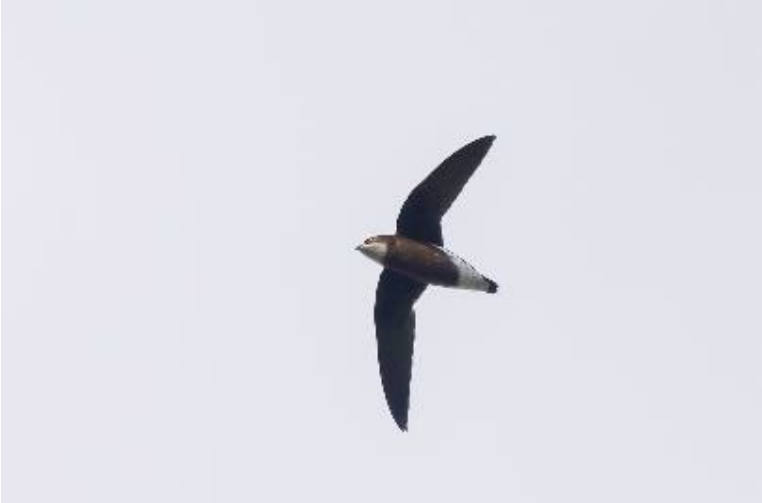

Plate 7-6 White-throated needletail (Singapore Birds Project, 2022[7])

7.6.1 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.

7.6.2 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).

7.6.3 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).

7.6.4 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.

[7] Singapore Birds Project, 2022 - https://singaporebirds.com/species/white-throated-needletail/

7.6.5 Project Area Occurrence

The species may be a seasonal visitor to the area between September and November, mostly likely flying over on their migration south, and again in March and April on their northward migration from Australia (Higgins 1999, cited in TSSC 2019).

A search of the ALA database identified 2 records of the White-throated needletail within 10 km of the Project area and 10 within 25 km. The ALA database further identified 366 records of the species within 100 km of the Project area.

7.6.6 Threats

Key threats to White-throated needletail include:

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

7.6.6.1 Project Specific Threats

The main Project specific threats to the White-throated needletail include habitat clearing and fragmentation. Additional Project related threats are outlined in Section 5.

7.6.7 Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation. Additional management measures that are relevant to all fauna are further listed in the CEMP. As the White-throated needletail are considered an exclusively aerial species within the Project area, there are no additional species-specific management measures required.

7.6.8 Rehabilitation Measures

Rehabilitation measures for the Project are outlined in Section 5.4 of the Preliminary Documentation. There are no additional measures for the White-throated needletail.

7.7 Squatter pigeon (southern)

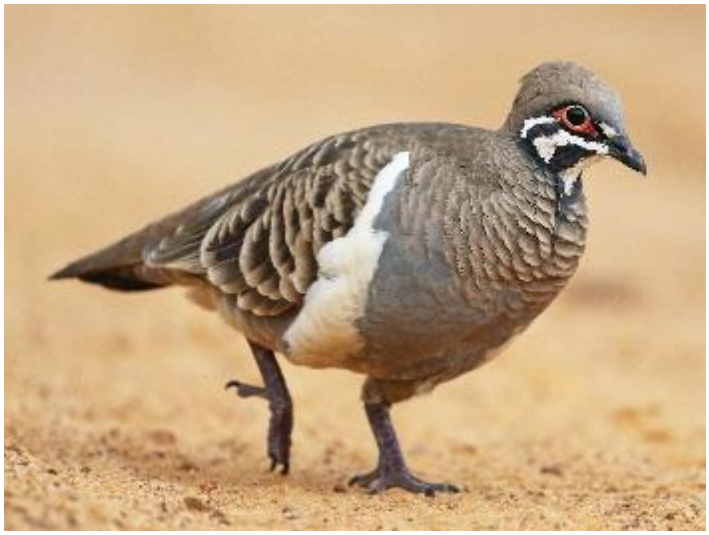

Plate 7-7 Squatter pigeon (southern) (EBird, 2016[8])

7.7.1 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.

7.7.2 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).

7.7.3 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

[8] EBird, - https://ebird.org/species/squpig1

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

7.7.4 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).

7.7.5 Project Area Occurrence

The RE Land Zones within the Project Area include 5 and 7 which are consistent with the suitable foraging and breeding habitat description for Squatter pigeon (southern) (refer to Section 3.4.2.3.4 of the PD). A search of the ALA database did not identify any records of the Squatter pigeon (southern) within 25 km of the Project area. However, the ALA database identified 11 records of the species within 100 km of the Project area.

7.7.6 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.

7.7.6.1 Project Specific Threats

The main Project specific threats to the Squatter pigeon (southern) include habitat clearing and fragmentation. Additional Project related threats are outlined in Section 5.

7.7.7 Management and Mitigation

Management measures for threats associated with the Project are outlined in section 5 of the LEIP Preliminary Documentation. Additional management measures that are relevant to all fauna are further listed in the CEMP. Species specific management measures for the Squatter pigeon (southern) are outlined in Table 6-6.

Table 7-6 Management Measures Relevant to the Squatter pigeon (southern)

No.	Action	Responsibility
1	In the event feral cats are located onsite, implement effective control measures as per the threat abatement plan for predation by feral cats (DEWHA, 2008).	Environmental representative
2	In the event European red foxes are located onsite, implement effective control measures as per the threat abatement plan for predation by the European red fox (DEWHA, 2008).	Environmental representative
3	Protect and rehabilitate areas of vegetation that support important sub-populations	Environmental representative

No.	Action	Responsibility
4	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).	Environmental representative

Rehabilitation Measures

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

Rehabilitation of vegetation that is considered potentially suitable habitat for the Squatter pigeon (southern) includes 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*);
- 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 5.4 of the Preliminary Documentation.

7.8 Greater glider (southern and central)

Plate 7-8 Greater glider (southern and central) (Bowell, 2019[9])

7.8.1 Description

Greater glider (southern and central) (*Petauroides armillatus*) are listed as vulnerable under the EPBC Act. The Greater glider (southern and central) is the largest gliding possum in eastern Australia, with a head and body length of 35 – 46 cm, tail length of 45 – 60 cm and an average weight of 900 – 1,700 grams. Females are typically larger than males (McKay 1989, 2008; McGregor et al. 2020). The Greater glider (southern and central) features thick fur with a grey to brown colouration, white underbelly, a long furry tail, large furry ears and short snout (TSSC, 2022).

7.8.2 Distribution

The Greater glider (southern and central) occurs throughout eastern Australia, from Proserpine (QLD) south through New South Wales, the Australian Capital Territory to Wombat State Forest in central Victoria. Greater glider (southern and central) typically inhabit regions occurring across elevation ranges of 0 to 1,200 m above sea level (Kavanagh, 2004). Species home ranges are relatively small, being 1 to 4 hectares, however, can also range up to 19 hectares in open woodlands and forests on less fertile soils.

7.8.3 Biology and Reproduction

Females reach sexual maturity at the age of two and give birth to a singular live young yearly, between March and June (Tyndale-Biscoe & Smith 1969; McKay 2008). Greater glider (southern and central) are known to have a lifecycle reaching 15 years (Jones et al., 2009), of which, the generation time is 6 to 8 years (Pacifici et al. 2013; Woinarski et al. 2014).

7.8.4 Habitat

The Greater glider (southern and central) is restricted to habitats comprised of Eucalypt forests and woodlands in eastern Australia, particularly in those that contain a higher abundance of taller, montane, moist Eucalypt forests on fertile soils and trees with the presence of abundant hollows. During daytimes, the species shelters in tree hollows, particularly favouring those with a diameter larger than 10 cm. The species inhabits both live and dead trees for denning.

[9] Bowell J. 2019. Available at: https://www.smh.com.au/politics/federal/extinction-looms-for-australia-s-equivalent-of-the-panda-20220705-p5az95.html

7.8.5 Project Area Occurrence

A search of the ALA database 2 records of the Greater glider (southern and central) within 10 km of the Project area and 3 within 25 km. The ALA database further identified 22 records of the species within 100 km of the Project area.

7.8.6 Threats

Threats to the Greater glider (southern and central) include:

- Inappropriate fire regimes;
- Habitat clearing and fragmentation;
- Timber harvesting;
- Entanglement in barbed wire fencing;
- Increased temperatures and changes to rainfall patterns;
- Hyper-predation by owls
- Competition from Sulphur-crested cockatoos (Cacatua galerita); and
- Predation by feral cats and foxes.

7.8.6.1 Project Specific Threats

The main Project specific threats to the Greater glider (southern and central) include habitat clearing and fragmentation. Additional Project related threats are outlined in Section 5.

7.8.7 Management and Mitigation

Suggested management and mitigation measures specific to Greater glider (southern and central) (as per the species conservation advice; TSSC, 2022) are provided in Table 6-6. Additional broader management measures regarding the Project are further provided in the CEMP and OEMP.

Table 7-7 Management Measures Relevant to the Greater glider (southern and central)

No.	Action	Responsibility
1	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 pre-clearing 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 safety removed prior to tree felling.	Environmental representative
2	Protect and maintain sufficient areas of suitable habitat, including denning and foraging resources and habitat connectivity, to sustain viable subpopulations throughout the species' range.	Environmental representative
3	As a last resort, where hollows are limiting, consider the use of nest boxes and artificial hollows that are suitable for the species. Monitor use of these structures to ensure they are being utilised, and revise designs or placement as required.	Environmental representative
4	Restore habitat and habitat connectivity during the rehabilitation works, particularly where habitat has been substantially fragmented, disturbed or modified.	Environmental representative
5	Avoid the use of barbed wire in fencing and replace the top strands of existing barbed wire with single-strand wire in habitat known to be occupied by greater gliders.	Environmental representative
6	Undertake habitat restoration to improve micro-climate conditions in areas at high risk of extreme temperatures and drought.	Environmental representative
7	In the event feral cats are located onsite, implement effective control measures as per the threat abatement plan for predation by feral cats (DEWHA, 2008).	Environmental representative

No.	Action	Responsibility
9	In the event European red foxes are located onsite, implement effective control measures as per the threat abatement plan for predation by the European red fox (DEWHA, 2008).	Environmental representative

7.8.8 Rehabilitation Measures

The Greater glider (southern and central) only occurs in eucalypt dominated ecosystems, as such rehabilitation through natural regeneration may be considered, but should be employed only where demonstrated to have a high likelihood of success.

7.9 Brigalow woodland snail

Plate 7-9 Brigalow woodland snail (Stanisic, 2014[10])

7.9.1 Description

The Brigalow woodland snail (*Adclarkia cameroni*) is listed as Endangered under the EPBC Act and NC Act. The snail species exhibits a medium to large-sized shell (approx. diameter 20 mm) which is brownish yellow in colour with a reddish band on the whorls. The whorls are rounded and tightly coiled with the last whorl being flared. The snail's shell is partially flattened with a low, domed spine (TSSC, 2016).

7.9.2 Distribution

The Brigalow woodland snail is endemic to southeast Queensland, occurring only in a small number of remnant and scattered brigalow and eucalypt woodland patches, particularly road verges and riparian corridors along the Condamine River floodplain. The species predominantly occurs in Dalby and Chinchilla. Species distribution is severely fragmented with an area of occupancy of 76 m^2 (DotEE, 2016).

The Brigalow woodland snail occurs in the 'Brigalow (Acacia harpophylla dominant and co-dominant)' ecological community, currently listed as Endangered under the EPBC Act (TSSC, 2013), however may also occur in the Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt Bioregions' ecological community, also currently listed as Endangered under the EPBC Act (TSSC, 2011).

7.9.3 Biology and Reproduction

It is currently unknown at what age the Brigalow woodland snail reaches sexual maturity, however it is thought to be at approximately two years of age due to similarities of other snails in the family (Stanisic, 2011). Eggs are laid on an annual basis by mature snails. Mature snails may lay more than one clutch of eggs in a year dependent on the length of the summer rain period. The species life expectancy is also unknown; however, they are thought to live up to five years.

7.9.4 Habitat

The Brigalow woodland snail commonly resides under logs (Stanisic et al., 2010) and leaf litter. Stanisic (2011) notes the species required canopy and on-ground timber cover for survival and egg-laying (although egg-laying has not been recorded for this species).

[10] Stanisic, J. (2014): Available at: https://factsaboutsnails.com/snail-facts/endangered-species/

7.9.5 Project Area Occurrence

A search of the ALA database resulted in 0 records of the Brigalow woodland snail within 25 km of the Project area. The ALA database identified 22 records of the species within 100 km of the Project area.

7.9.6 Threats

Threats to the Brigalow woodland snail include:

- Land clearing;
- Habitat disturbance;
- Predation by rats (Rattus spp.), mice (Mus musculus) and feral pigs (Sus scrofa);
- Invasion of Buffel grass;
- Trampling by cattle and horses; and
- Fire.

7.9.6.1 Project Specific Threats

The main Project specific threats to the Brigalow woodland snail include habitat clearing and fragmentation. Additional Project related threats are outlined in Section 5.

7.9.7 Management and Mitigation

Suggested management and mitigation measures specific to Brigalow woodland snail (as per the species conservation advice; TSSC, 2016) are provided in Table 6-8. Additional broader management measures regarding the Project are further provided in the CEMP and OEMP.

Table 7-8 Management Measures Relevant to the Brigalow woodland snail

No.	Action	Responsibility
1	In the event a Brigalow woodland snail individual is observed onsite, a buffer of native vegetation and leaf litter must be retained around all occurrences of this species.	Environmental representative
2	Implement appropriate signage to indicate conservation of individuals or groups of this species.	Environmental representative
3	Identify and control Buffel grass and any other weeds that could threaten the brigalow woodland snail with the careful use of herbicides. Ensure that any mechanical Adclarkia cameroni (brigalow woodland snail) disturbance and overspray associated with chemical control are minimised, and do not impact this species.	Environmental representative
4	Where possible, manage predation by rats and mice using appropriate methods (e.g. DEWHA 2009). Consider monitoring the impact of feral predator control after any large fire or large rain event.	Environmental representative
5	Manage predation and possible trampling by feral pigs at important sites through exclusion fencing or other barriers. Where possible, control feral pigs using appropriate methods (DEH 2005).	Environmental representative
6	If fire operations are necessary, physical damage to the habitat and individuals of the brigalow woodland snail must be avoided during and after operations, noting that fires during the active life stages of the snail are likely to be highly detrimental.	Environmental representative
7	Any planned fires must be undertaken in accordance with the Bushfire Management Plan.	Environmental representative
8	Ensure that areas of dense ground cover/leaf litter are retained within the habitat if any prescribed low intensity fires are implemented.	Environmental representative

7.9.8 Rehabilitation Measures

Rehabilitation measures for the Project are outlined in Section 5.4 of the Preliminary Documentation. There are no additional measures for the Brigalow woodland snail.

Section 8 Threatened Ecological Communities

8.1 Poplar Box Grassy Woodlands

8.1.1 Description

Vegetation within the Poplar Box Grassy Woodland TEC varies from grassy woodland to grassy open woodland and can occasionally exhibit an open forest structure with overstorey dominated by Poplar Box (Eucalyptus populnea), as well as an understorey dominated by perennial forbs and C_4 grasses (Specht 1970; Beeston et al. 1980; Sivertsen and Clarke 2000; Metcalfe et al. 2003; Benson et al. 2010).

The Poplar Box Grassy Woodland TEC is generally associated with ancient and recent depositional alluvial plains with clay, clay-loam, loam and sandy-loams. To classify Poplar Box Grassy Woodland TEC the following structural factors must be met, as per DoE, 2019:

- *"A grassy woodland to grassy open woodland with a tree crown cover11 of 10% or more at patch scale. A tree canopy must be present that shows these features:*
  - *Canopy tree species are capable of reaching 10 m or more in height;*
  - *Eucalyptus populnea (Poplar Box) must be present in the canopy and is the dominant tree species;*
  - *Where hybrids of Poplar Box with other Eucalyptus spp. are present, they should be counted as part of the Eucalyptus populnea component of the tree canopy when assessing the previous criterion.*
- *Mid layer (1-10 m) crown cover of shrubs to small trees13 is low, about 30% or less.*
- *A ground layer (<1 m) mostly dominated across a patch by native grasses, other herbs and occasionally chenopods (during extended dry periods), ranging from sparse to thick (in response to canopy development, soil moisture, disturbance and/or management history).*
- *A list of diagnostic native plant species and some of the key native fauna that make up the ecological community is given at Appendix A; although particular species may be abundant or rare, or not necessarily present, at every location."*

8.1.2 Distribution

Poplar Box Grassy Woodland occurs in eastern Australia and is distributed throughout New South Wales and southern Queensland, particularly occurring in the Brigalow Belt North, Brigalow Belt South, Southeast Queensland, Cobar Peneplains, Darling Riverine Plains, NSW South Western Slopes, Riverina and Murray Darling Depression IBRA bioregions (DoE, 2019).

8.1.3 Threats

Threats to the Poplar Box Grassy Woodlands TEC include:

- Clearing and fragmentation;
- Weed invasion;
- Inappropriate fire regimes;
- Inappropriate grazing regimes;
- Dieback;
- Chemical impact and spray drift;
- Hydrological changes;

- Salinisation;
- Nutrient enrichment;
- Invasive fauna; and
- Climate change.

8.1.3.1 Project Specific Threats

The main Project specific threats to the Poplar Box Grassy Woodlands TEC include clearing and fragmentation. Additional Project related threats are outlined in Section 5.

8.1.4 Management and Mitigation

Suggested management and mitigation measures specific to the Poplar Box Grassy Woodlands TEC (as per the conservation advice; DoE, 2019) are provided in Table 7-1. Additional broader management measures regarding the Project are further provided in the CEMP and OEMP.

Table 8-1 Management Measures Relevant to the Poplar Box Grassy Woodlands TEC

No.	Action	Responsibility
1	Apply recommended buffers of at least 30 m (native vegetation buffers are preferred) around patches of the ecological community and avoid activities that could cause significant hydrological change.	Project Manager / Environmental Representative
2	Protect mature trees, particularly with hollows, even if they are dead.	Environmental Representative
3	Manage access to remnants to prevent, for example, disturbance and spread of weeds and plant pathogens.	Project Manager
4	Retain other native vegetation remnants and mature isolated trees near patches of the ecological community where they are important for connectivity or as buffers.	Environmental Representative
5	Protect the native soil seed bank by minimising soil disturbance and removal. This will prevent further weed invasion.	Environmental Representative
6	Retain habitat features for fauna, noting species requirements (e.g., fallen timber) or particular vegetation structure. If removed, re-use these features during the rehabilitation process.	Environmental Representative
7	Following disturbances implement a weed control program that responds to weed establishment, particularly in the following 1–2 years after disturbance.	Project Manager
8	Implement effective control and management techniques for invasive grasses, such as Buffel grass (*Cenchus ciliaris*).	Project Manager / Environmental Representative
9	Fire management should be undertaken in accordance with the Bushfire Management Plan.	Project Manager / Environmental Representative
10	Prior to removal of any trees, or use of heavy machinery that may also damage the understorey, ensure comprehensive flora and fauna surveys have identified threatened species on site and their potential shelter and nesting sites, for example hollows, burrows and tree crevices, as well as visible nests. Damage to these should be avoided altogether, but if approved for removal, care should be taken to appropriately relocate fauna.	Project Manager / Environmental Representative
11	Control runoff to prevent movement of weed material and plant diseases into natural areas.	Project Manager
12	Prevent further introduction of feral animals	Environmental Representative
13	Monitor for signs of new disease such as myrtle rust or incursions by new weeds, or pest animals, and manage early for local eradication.	Environmental Representative

No.	Action	Responsibility
14	Use appropriate hygiene to minimise the introduction or spread of weeds and diseases at susceptible sites. For example, keep vehicles and machinery to dedicated roads and out of remnants wherever possible. If vehicles must be taken into remnants ensure vehicles are washed first to remove soil, potential fungal pathogens and weed seeds.	Environmental Representative
15	Ensure actions to control invasive or other pest species avoid impacts on non-target species and do not have any long-term adverse impacts upon the ecological community: • Ensure workers are appropriately trained in the use of relevant herbicides and pesticides, best methodologies (e.g., spot-spraying, stem injection) and what to target; • Avoid chemical spray drift and off-target damage within or near to the ecological community, having regard to minimum buffer zones.	Project Manager
16	Develop and include education program as part of site inductions to discourage damaging activities such as the removal of dead timber, the dumping of rubbish (particularly garden waste), creation of informal paths and the use of off-road vehicles in patches of the ecological community.	Project Manager / Environmental Representative

8.1.5 Rehabilitation Measures

Rehabilitation measures for the Project are outlined in Section 5.4 of the Preliminary Documentation. During the rehabilitation of the Project area, restoration activities should be site specific, using both native and present vegetation species of the area. Replanting should be undertaken using vegetation that are characteristic species of the TEC and region, as specified in Appendix A of the TEC conservation advice (DoE, 2019).

Section 9 Incidents, Complaints, Corrective and Preventative Actions

9.1 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.

9.2 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 impacts[11]. 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.

9.3 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.

9.4 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.

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.

[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.

9.5 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.

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