Preliminary Vegetation and Fauna Management Plan

Dugald River Wind Farm

PREPARED FOR

MMG Dugald River Pty Ltd

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Preliminary Vegetation and Fauna Management Plan

Dugald River Wind Farm

0755929

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
ALA	Atlas of Living Australia
BBMP	Bird and Bat Management Plan
BESS	Battery Energy Storage System
DETSI	Department of the Environment, Tourism, Science and Innovation
DPI	Department of Primary Industries
DRM	Dugald River Mine
DSDIP	Department of State Development, Infrastructure and Planning
EAR	Ecological Assessment Report
ERM	Environmental Resources Management Pty Ltd
GDP	Ground Disturbance Permits
LoO	Likelihood of Occurrence
Met Masts	Meteorological Masts
MMG	MMG Dugald River Pty Ltd
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
PCVMP	Preliminary Cleared Vegetation Management Plan
PCEMP	Preliminary Construction Environmental Management Plan
PMST	Protected Matters Search Tool
PNRWMP	Purple-necked Rock-wallaby Management Plan
PVFMP	Preliminary Vegetation and Fauna Management Plan
RE	Regional Ecosystem
TECs	Threatened Ecological Communities
WPMP	Weed and Pest Management Plan
WTG	Wind Turbine Generators
WTS	Wulguru Technical Services

1. INTRODUCTION

MMG Dugald River Pty Ltd (MMG) proposes to develop the Dugald River Wind Farm Project (the Project) which comprises the construction, operation and decommissioning of up to 24 Wind Turbine Generators (WTGs) and a Battery Energy Storage System (BESS).

Ancillary features of the Project include up to two (2) permanent Meteorological Masts (Met Masts) and associated infrastructure including access tracks, foundations, hardstand areas, underground cabling, overhead powerlines, material laydown areas, construction areas and a centralised operations area.

1.1 OBJECTIVES AND SCOPE

This Preliminary Vegetation and Fauna Management Plan (PVFMP) has been prepared to satisfy the requirements of State Code 23 Wind Farm Development and State Code 27: Battery Storage Facility Development and outlines how vegetation cleared as part of the Project will be stored, managed and reused.

Further, this PVFMP will establish best-practice mitigation and management measures to avoid or minimise the impact of Project activities in consideration of relevant Commonwealth and State legislation, regulations, conditions of approval and permit requirements during delivery stages of the Project.

1.2 PROJECT DESCRIPTION

The Project will be located on the Knapdale Range, adjacent to the Dugald River Mine, owned and operated by MMG. The Project is situated on State Land, 63 km north-east of the Township of Cloncurry and immediately west of Dugald River Mine.

The Knapdale Range is situated within the Mount Isa subregion, which is characterised by tilted metamorphic hills and ranges, low open woodlands with *Eucalyptus spp., Corymbia spp* and Spinifex dominant grasslands with *Acacia spp.* dominant shrub layers throughout. Soil types range from rocky, skeletal soil types to shallow-moderate sandy loam towards the eastern base of the range.

The Project is proposed to be constructed in two stages. The first stage is proposed to comprise the construction and operation of a Met Mast and up to eight WTGs, with an associated substation and BESS. Following the construction and operation of the first stage of the Project, the second stage is proposed to consist of an additional Met Mast, up to 16 WTGS and an expanded BESS.

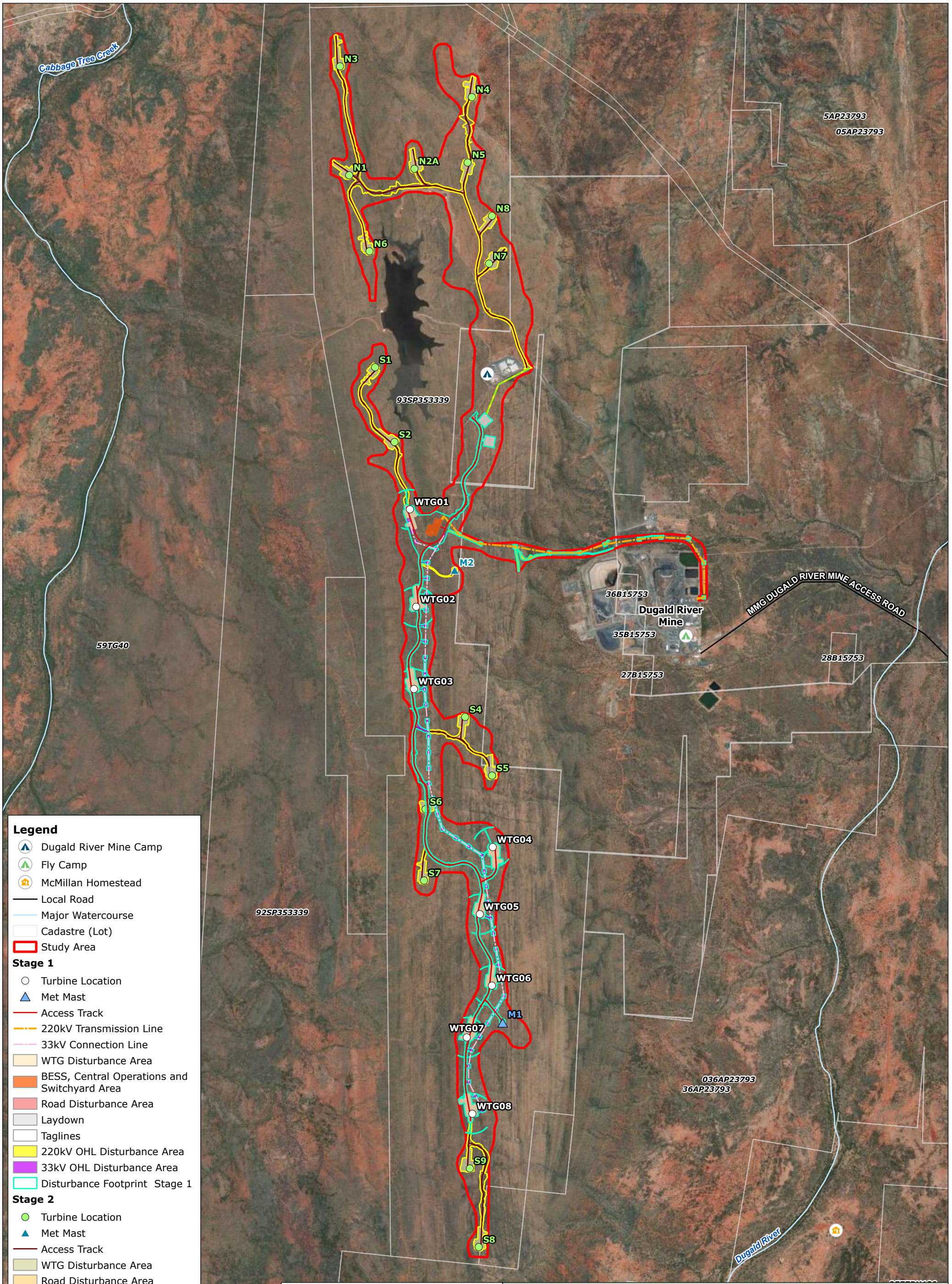
Once both stages of construction are completed, the Project will consist of the following:

- Up to 24 X 6 MW WTGs;
- A staged BESS facility comprising maximum 66 battery units and 33 Medium Voltage Power Stations;
- Two permanent Met Masts;
- Access tracks, Hardstand and Material laydown areas;
- Supporting infrastructure (including a collection substation, switchyard and underground and overhead powerlines);
- An Operations And Maintenance Facility.

The Project comprises a total disturbance footprint of 136.74 ha as detailed in Table 1-1 and as shown in Figure 1-1.

TABLE 1-1 PROJECT SPECIFICATIONS

Feature	Details	Area (ha)
Stage One		
WTG Construction Areas	8 X WTGs	21.67
Central Operations and Switchyard Area	• 18 X Battery Units • 9 X MVPS • Substation and Switching Infrastructure • Operations Facility	2.29
Access Tracks	Access Tracks	30.09
Met Mast 1	Stage 1 Met Mast	0.28
33 kV Powerline	Stage 1 Overhead Powerline which links each WTG to the Central Switchyard Area. This area includes the underground power corridors between each WTG and the closest power pole	11.34
220 kV Powerline	Overhead Powerline linking the Central Operations and Switchyard Area to the DRM	4.69
Laydowns	2 X Laydown areas for storage and construction purposes	2.42
Taglines	Temporary Taglines used during construction of each WTG	1.26
	Stage One Disturbance Area	*74.04*
Stage Two		
WTG Construction Areas	Up to 16 X WTGs	31.5
Central Operations and Switchyard Area	• 30 X Battery Units • 15 X MVPS	Nil additional disturbance
Access Tracks	Access Tracks	30.64
Met Mast 2	Stage 2 Met Mast	0.28
Stage 1 and 2 Link	Easement between Stages 1 and 2	0.27
	Stage Two Disturbance Area	*62.69*
	Total Disturbance Footprint	136.74



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2. LEGAL AND OTHER REQUIREMENTS

2.1 KEY GUIDELINES

Key standards and guidelines that were reviewed during the development of this PVFMP include the following:

- Arrive Clean, Leave Clean – Guidelines to help prevent the spread of invasive plant diseases and weeds threatening our native plants, animals and ecosystems (Department of the Environment (DoE), 2015);
- Code of Practice: Care of Sick, Injured or Orphaned Protected Animals in Queensland (NC Act) (Department of Environment and Science (DES), 2020);
- Environmental Management Plan Guidelines (Department of Climate Change, Energy, the Environment and Water, 2024);
- Hygiene protocols for the prevention and control of diseases (particularly beak and feather disease) in Australian birds (Department of the Environment and Heritage (DEH), 2006); and
- National Light Pollution Guidelines for Wildlife (Department of Climate Change, Energy, the Environment and Water, 2023).

2.2 LEGISLATIVE CONTEXT

Key legislation relevant to this PVFMP are outlined in Table 2-1 below.

TABLE 2-1 KEY RELEVANT LEGISLATION

Legislation	Legislative Jurisdiction	Intent	Applicability
Commonwealth			
Environment Protection and Biodiversity Conservation Act 1999	Australia and its Territories. Specifically, projects that involve or have the potential to impact upon nationally and internationally important flora, fauna, ecological communities, and heritage places – defined under the EPBC Act as MNES	The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation and provides the legal basis for the management and protection of nationally and internationally important flora, fauna, ecological communities, and heritage places. Under Section 45 of the EPBC Act, the Australian Government and Queensland Government have implemented a bilateral agreement relating to environmental assessment. This agreement allows the Australian Government Minister for the Environment and Department to rely on specified environmental impact assessment processes of Queensland in assessing actions under the EPBC Act. The bilateral agreement specifically aims to achieve the following objectives: • Protect the environment in accordance with the requirements of the EPBC Act; • Promote the conservation and sustainable use of natural resources; and • Ensure an efficient, timely and effective process for environmental assessment and approval of actions.	EPBC Act is applicable for this PVFMP as it relates to management of impacts to listed threatened and/or migratory species and listed threatened ecological communities (TECs). The EPBC Act allows for the listing of processes that threaten biodiversity, many of which are invasive weeds, pest animals, or pathogens. These listings trigger the development of Threat Abatement Plans (TAPs) to reduce or manage the threat, particularly from Weeds of National Significance.
State			
Biosecurity Act 2014	Queensland	The *Biosecurity Act 2014* (Biosecurity Act) seeks to provide a framework for an effective biosecurity system for Queensland that helps to manage and minimise State biosecurity risks, as well as facilitate the response to biosecurity issues and events in a timely and effective way, to align with national and international obligations. The Biosecurity Act introduces the general biosecurity obligation upon all persons to take all reasonable and practical measures to prevent or minimise biosecurity risks. The Biosecurity Act defines	The Biosecurity Act is relevant due to the requirements in this PVFMP to manage impacts that may occur to listed species, as a result of invasive species. The Biosecurity Act is considered due to its general biosecurity obligation upon all persons to take reasonable and practical measures to prevent or minimise biosecurity risks.

Legislation	Legislative Jurisdiction	Intent	Applicability
		Prohibited Matter and Restricted Matter in which specific actions are required to limit the spread and impact of this matter by reducing, controlling, or containing it, depending on the category. The Biosecurity Act identifies requirements for invasive animal barrier fencing including authority for building and maintaining the wild dog check fence, rabbit fence and agreements that are required in order to make an opening in the barrier fences.	These principles are implemented in this PVFMP.
Fisheries Act 1994	Queensland	The *Fisheries Act 1994 (*Fisheries Act) provides for the management, use, development and protection of fish habitats and resources, together with the management of aquaculture activities. The Fisheries Act covers both marine and freshwater and natural and artificial waterbodies. Administered by the Department of Primary Industries (DPI), the Fisheries Act applies to, but not limited to: • Works in a declared fish habitat area (FHA); and • Waterway barrier works resulting in the construction of instream structures inhibiting the free movement of fish along waterways. **Waterway Barrier Works:** A waterway includes a river, creek, stream, watercourse, or inlet of the sea as defined in the Schedule under the Fisheries Act and mapped according to the spatial data layer, Queensland waterways for waterway barrier works. Waterways providing for fish passage are MSES. A waterway barrier is defined under the Fisheries Act as a dam, weir, or other barrier across a waterway if the barrier limits fish stock access and movement along a waterway. Under the provisions of the Fisheries Act and Planning Act, a Development Permit for Operational Works involving Waterway Barrier Works is required for works which pose a barrier to fish passage (including permanent, partial, and temporary barriers) within a waterway which is mapped by DPI on the spatial data layer *'Queensland waterways for waterway barrier works'* unless: • The works have a low impact to fisheries productivity and comply with DPI's requirements for 'works which are not	Fisheries Act is relevant due to the requirements necessary for this PVFMP in relation to the protection of watercourses.

Legislation	Legislative Jurisdiction	Intent	Applicability
		waterway barrier works' which include (subject to specific design and construction requirements): ° New single or multi-span bridges; ° Maintenance of existing bridge structures not subject to an existing permit; ° Bank revetment; ° Road resurfacing at waterway crossings; and ° Stormwater outlet construction. Works that occur within these waterways will be defined as waterway barrier works, unless the works comply with the Accepted development requirements for operational work that is constructing or raising waterway barrier works (1 October 2018).	
Nature Conservation Act 1992	Queensland	The *Nature Conservation Act 1992* (NC Act) provides for the conservation of nature through the protection of all native plants, birds, reptiles, mammals and amphibians in Qld (along with a limited range of invertebrates and freshwater fish). The NC Act is based on principles aimed at conserving biological diversity, ecologically sustainable use of wildlife, ecologically sustainable development and international criteria developed by the International Union for the Conservation of Nature (IUCN) for establishing and managing protected areas. • Relevant regulations of the NC Act includes *Nature Conservation (Animals) Regulation 2020*, which prohibits the taking or destruction, without authorisation, of protected animals and lists all fauna species that are considered to be extinct in the wild, Endangered, Vulnerable, Near Threatened, Least Concern and Special Least Concern wildlife (Glossary and Abbreviations for definitions of these terms). Also listed is international wildlife and prohibited wildlife; and • *Nature Conservation (Plants) Regulation 2020*, which prohibits the taking or destruction, without authorisation, of protected plants and lists all flora species that are considered to be Extinct in the Wild, Endangered, Vulnerable, Near Threatened, Least Concern and Special Least Concern wildlife (Glossary and Abbreviations for definitions of these terms). Also listed is international wildlife and prohibited wildlife.	NC Act is applicable due to the requirements necessary for this PVFMP to address impacts and protection to MSES and State listed species. This PVFMP considers listed species under the NC Act, and provides mitigation measures to the impacts to such MSES.

Legislation	Legislative Jurisdiction	Intent	Applicability
		The NC Act also includes provisions for protected areas such as national parks, nature refuges, and world heritage management areas.	
Vegetation Management Act 1999	Queensland. Specifically, activities that are regulated through the Planning Act	The *Vegetation Management Act 1999* (VM Act) regulates the conservation and management of vegetation communities and clearing of vegetation identified as Regulated Vegetation identified as Category A, B, C and R. The VM Act provides a framework for identification, description, and mapping of remnant Regional Ecosystems (RE) certified by Department of State Development, Infrastructure and Planning (DSDIP) as Endangered, Of Concern or Least Concern (Glossary for definitions of these terms). It also provides a framework for the identification, description, and mapping of High Value Regrowth (HVR) vegetation as Endangered, Of Concern or Least Concern.	The VM Act is relevant due to the requirements within this PVFMP to manage impacts that may occur to vegetation communities and clearing of vegetation identified as Regulated Vegetation identified as Category A, B, C and R. PVFMP considers vegetation communities under the VM Act, and provides mitigation measures to the impacts to such MSES.

3. ENVIRONMENTAL CONTEXT

Ecological assessments have been undertaken within the Study Area. All survey methodologies and results are discussed in the Ecological Assessment Reports for MNES under the EPBC Act, and MSES under the NC Act. Provided below is a summary of the present ecological values relevant to this management plan.

3.1 VEGETATION

The vegetation communities within the Project have been ground-truthed through ecological surveys undertaken by independent third-parties.

Table 3-1 provides details of the vegetation, which comprises a mixture of mapped and ground-truthed regional ecosystems (REs), and a summary of the total area of impact to each.

The vegetation communities identified within the Study Area as well as the Project's Disturbance Footprint are displayed on Figure 3-1, prepared by Wulguru Technical Services.

The ground-truthed REs provide context on the habitat available on the Knapdale Range and within the Disturbance Footprint. Whilst the majority of survey locations occur outside of the Disturbance Footprints, the habitat present across the Knapdale Range is fairly homogeneous and therefore it is likely that the areas surveyed provide sufficient data to assess the ecological values present with the Disturbance Footprint.

Legend

Project Disturbance Footprint

RE Ground Truting Sites

- Quaternary
- Secondary

GTRE

- 1.11.2/1.5
- 1.11.2a
- 1.11.2a/1.
- 1.11.2e/1.
- 1.11.3a
- 1.11.3b
- 1.11.7
- 1.3.13a
- 1.3.7b
- 1.5.4x2
- Non-remnan

Google Imagery

FIGURE 6. GROUNDTRUTHED REGIONAL ECOSYSTEM

1 0 1 2 km

CRS: GDA94 / MGA zone 54
Scale: 1:40,000 @A3

Date: 2 April 2026
Author: M. Kaminski
Version: 0.01

WULGURU TECHNICAL SERVICES

Project Number: 2024.1104

Client: MMG

TABLE 3-1: GROUND-TRUTHED REGIONAL ECOSYSTEMS

Regional Ecosystem	Description	Area within the Study Area (ha)	Area within Stage 1 Footprint (ha)	Area within Stage 2 Footprint (ha)
1.3.7b	*Eucalyptus camaldulensis* fringing woodland, usually with *Lophostemon grandiflorus* and *Melaleuca bracteata* and/or *M. dissitiflora.* Occurs on recent levees and channel deposits of medium and smaller tributaries which are dry for most of the year; alluvial soils. Riverine.	2.13	0.27	0
1.5.4	*Eucalyptus leucophylla* and/or *Corymbia terminalis* low open woodland to low woodland over annual grasses with areas of *Triodia spp*. Occasional *Corymbia aparrerinja*, *Atalaya hemiglauca* and *Grevillea striata* and small areas of *Acacia cambagei* and *Eucalyptus leucophloia*. Occurs on plains and valley bottoms; red earths, shallow loams, clays and skeletal soils. Not a Wetland.	6.81	0.83	0
1.7.7b	*Corymbia capricornia* and/or *Eucalyptus miniata* low open woodland often with *Eucalyptus herbertiana*, *Eucalyptus leucophloia* and/or *Corymbia ferruginea*. *Eucalyptus tetrodonta* may be present in the far north. A second tree layer of *Terminalia canescens* may be present. The shrub layer is mixed and includes *Petalostigma quadriloculare*, *Grevillea dryandri*, *Terminalia canescens* and *Acacia calligera*. Ground layer of *Triodia spp*. and tussock grasses. Occurs on silcrete and lateritic surfaces. Not a Wetland.	2.47	0.0	0.52
1.11.2a	*Eucalyptus leucophloia* low open woodland often with *Corymbia terminalis*, *Corymbia capricornia*, *Terminalia aridicola* and *Eucalyptus leucophylla* with shrub layer of *Acacia spp*. and ground layer of Triodia spp. Occurs on steep hills and strike ridges. Not a Wetland.	577.59	67.60	61.17
1.11.3a	*Eucalyptus leucophylla* low open woodland often with *Corymbia terminalis*, *C. aparrerinja*, *Eucalyptus leucophloia* and *Atalaya hemiglauca* with scattered shrubs of *Acacia chisholmii* and a sparse ground layer of *Triodia pungens* and tussock grasses. Occurs on broad low hills; metamorphosed igneous rocks. Not a Wetland.	25.89	5.02	0.48
Non-remnant	N/A	16.68	0.35	0.56
	Total	**631.57**	**74.07**	**62.73**

3.2 FAUNA

A post-survey Likelihood of Occurrence (LoO) assessment was undertaken following the methodology outlined in WTS's EARs for MSES and MNES. The post-survey LoO was undertaken after ground-truthing of habitat within the Knapdale Range, and with consideration given to the comments of EcoSmart Ecology who have undertaken significant assessment of flora within the Knapdale Range and surrounding areas. The full LoO assessment, inclusive of the justification for each species' likelihood, is located in Appendix A.

The results of the post survey LoO indicated that the following Endangered, Vulnerable and Near Threatened (EVNT) species are possible, likely or known to occur within the Study Area

- Purple-necked rock-wallaby (*Petrogale purpureicollis*): V (NC Act) – Known
- Australian painted-snipe (*Rostratula australis*): E, Ma (EPBC), E (NC Act) – Possible
- Purple-crowned Fairy-wren (*Malurus coronatus*): V (NC Act) – Possible
- Curlew Sandpiper (*Calidris ferruginea*): CE, M, Ma (EPBC Act), CE (NC Act) – Possible
- Great Knot (*Calidris tenuirostris*): CE, M, Ma (EPBC Act), CE (NC Act) – Possible
- Greater Sand Plover (*Charadrius leschenaultii*): V, M, Ma (EPBC Act), V (NC Act) – Possible
- Lesser Sand Plover (*Charadrius mongolus*): E, M, Ma (EPBC Act), E (NC Act) – Possible
- Red Knot (*Calidris canutus*): E, M, Ma (EPBC Act), E (NC Act) – Possible
- Ruddy Turnstone (*Arenaria interpres*): V, M, Ma (EPBC Act), V (NC Act) – Possible
- Terek Sandpiper (*Xenus cinereus*): V, M, Ma (EPBC Act), V (NC Act) – Possible

Merten's Water Monitor (*Varanus mertensi*) was identified as unlikely to occur within the Disturbance Footprint, however this species has still been assessed for impacts. The potential impacts relevant to this species resulting from the Project are indirect impacts associated with the Project occurring in an area upstream to the identified habitat in Dugald River Mine.

Additionally, 15 species listed as migratory under the EPBC Act were identified as possible, likely or known to occur transiently within the Knapdale Range. Impacts and management for these species are discussed in detail in WTS's EAR for MNES and the Bird and Bat Management Plan (BBMP).

4. ENVIRONMENTAL MANAGEMENT

4.1 ROLES AND RESPONSIBILITIES

A summary of the roles and responsibilities of relevant entities for delivery of the Project works, as they relate to environmental management, are set out in Table 4-1. As the commercial agreements between MMG and contractors are finalised, the roles and responsibilities will be refined.

Each member of the Project delivery team has a 'General Environmental Duty' under Section 319 of the *Environmental Protection Act 1994* (EP Act), and will not carry out any activities that cause, or are likely to cause, unauthorised environmental harm, unless all reasonable and practical measures are taken to prevent or minimise harm.

TABLE 4-1 ROLES AND RESPONSIBILITIES

Role	Responsibility
Principal Contractor	• Responsible for site environmental management, PVFMP compliance, including subcontractors; • Deliver the Project in accordance with all laws, including conditions of approval; • Provide notifications and reports, as required by law, including conditions of approval; • Ensure the construction workforce are properly and regularly trained in environmental responsibilities, including site inductions and toolbox talks in accordance with the PVFMP; • Establish and maintain a complaints management system, to receive and respond to complaints; • Monitors work to ensure all PVFMP obligations are met; and • Reports on and responds to identified hazards, non-compliances and incidents.
Project Manager	• Oversees the contractor's detail design process and construction to achieve the environmental outcomes; • Notification to State and/or Commonwealth authorities of any incidents or non-conformances in accordance with approval requirements; • Ensures adequate planning and resources are provided for the implementation of the PVFMP, including relevant inductions and training; • Identifies changes during construction and ensures the PVFMP is updated accordingly; • Ensures that vegetation and fauna management obligations are embedded into Project design, systems and processes; • Ensures reporting requirements are completed and opportunities for improvement are identified and communicated; and • Review and approves the completion of assurance audits to confirm compliance with the PVFMP.
Environmental Manager	• Reviews the PVFMP to ensure compliance with site environmental management, Emergency Management Systems compliance, and performance expectations; • Oversees development and ensures environmental awareness material meets required standard(s); • Oversight of environmental advisor's duties for the duration of construction; • Oversight of Principal Contractor's performance to compliance and environmental reporting expectations; • Undertakes internal audits in accordance with the Health, Safety and Environment Audit Schedule; • Reports demonstration of compliance with applicable environmental legislation, conditions of approval and contractual obligations;

Role	Responsibility
	• Collaborates with community team to support community feedback and expectations; • Approval of relevant Ground (and vegetation) Disturbance Permits (GDPs), including disturbance to vegetation and topsoil and sub-soils; • Support Project in rectifying PVFMP non-conformances to the MMG Project Manager; • Supports environmental incident investigations, including Incident Cause Analysis Method as and if required; • Non-conformances are actioned and corrective actions are implemented where needed; and • Notification of relevant government departments of any incidents or non-conformances in accordance with approval requirements.
Environmental Advisor	• Monitor compliance with the PVFMP, and any imposed conditions; • Review any audit and compliance reports prepared by the contractor or proponent; • Have an oversight of the implementation of the environmental monitoring requirements established. Review the results of the monitoring and verify these results against conformance requirements; • Oversee compliance against relevant GDPs, including disturbance to vegetation and topsoil and sub-soils; and • Immediate notification to MMG of any incidents or non-conformances to the Project or Environmental Manager in accordance with approval requirement.
Site Supervisors	• Responsible for the implementation and maintenance of environmental management and mitigation measures for all activities and work areas; and • Ensure relevant environmental permits are approved, communicated and implemented with relevant environmental controls and performance expectations.
Site Personnel	• Ensure that environmental nuisance or harm is minimised by adhering to all Project environmental management plans and documentation; • Maintain familiarity with key environmental risks and associated management and mitigation measures as outlined in Section 6 of this document; • Complete relevant inductions, training and ongoing toolbox talks; • Report all observed hazards, non-compliances and incidents to a supervisor; and • Continually seeks to identify areas for improvement of cleared vegetation management and reports these to a supervisor.
Fauna Spotter Catcher / Suitably Qualified Ecologist	• Pre-clearance surveys, habitat relocation supervision and fauna handling/rescue works; and • Provision of pre-clearance and ongoing monitoring reports for all vegetation clearing works in accordance with the requirements of the PVFMP.

4.2 ENVIRONMENTAL TRAINING

It is mandatory that all Project personnel undergo site induction training to inform them of their responsibilities commensurate to their scope of work, with particular focus on environmental management issues and corrective actions. All environmental training will be documented within a developed training register and be maintained throughout the Project lifecycle. The training register will include:

- Personnel receiving the training;
- Required minimal qualifications and competencies per role;
- The date the training was received;
- The date of expiry for critical qualifications, competencies and training;
- The name of the person conducting the training; and
- A summary of the training.

Environmental training will be communicated as relevant throughout the Project lifecycle through methods outlined in Table 4-2.

TABLE 4-2 ENVIRONMENTAL TRAINING DETAILS

Environmental Training	Learning Outcomes/Topics of Training
Environmental induction programs and training	• Requirements of this PVFMP in relation to the Project; • Relevant legislation and conditions of approval as determined for the Project; • Roles and responsibilities specific to flora and fauna; • Reporting and management procedures of injured fauna; • Protected (including NC Act listed threatened) flora and fauna that reside within the Disturbance Footprint; • Identification of any demarcated exclusion zones; and • Contact information of Fauna Spotter Catcher and Environmental Manager.
Daily pre-start meetings	• Delineate what work will occur on the day; • Reviewing any incidents or events of significance from the previous day applicable to the work undertaking; • Ensuring high value habitat areas are avoided; and • Ensuring adequate environmental controls are implemented.
Weekly toolbox meetings	• Clear delineation of exclusion zones where threatened fauna habitat or protected flora is present; • Likely threatened species present in the area of works; • The procedure of unexpected finds of threatened flora and fauna; • Hygiene procedures for weeds / pathogens and vehicle biosecurity requirements; • Key contact information of Fauna Spotter Catcher, site representative i.e. Environmental Advisor; and • Requirements of this PVFMP in relation to the Project.
Risk workshops	• Risk associated with fauna within the Project; and • Mitigations and controls to manage the risks identified to flora and fauna.
Management meetings	• Updates to the Project's status; • Effectiveness of the PVFMP; • Discussions regarding evaluations of the PVFMP; • Conditions of approval for the Project; and • Conformance improvement opportunities.

Environmental Training	Learning Outcomes/Topics of Training
Noticeboards	• Map of exclusion zones in which no clearing is approved or to protect threatened fauna or flora habitat; • Contact information for Fauna Spotter Catcher; • Unexpected finds procedure; • Updates to locations undergoing works; and • Safety updates with Project specific risks.
Environmental incident reports	• Incident report procedure; and • Relevance of these incident reports to the Project and legislative outcomes.

4.3 REPORTING

4.3.1 ENVIRONMENTAL INCIDENT

All staff and contractors will be required to report any environmental incidents (including complaints) or breaches of any approval conditions in accordance with the requirements and timeframes set out in the Preliminary Construction Environmental Management Plan (PCEMP) and any statutory requirements.

As soon as the Principal Contractor becomes aware of an environmental issue or incident either by complaint, report or observation, the Principal Contractor must immediately commence control measures to minimise the environment and heritage impacts (if not already done so). Staff are to notify their direct (Principal Contractor) Supervisor of the incident under the General Environmental Duty and Duty to Notify under the *Environmental Protection Act 1994*.

If the actual and potential environmental impact of the issue or event is a Minor Incident, then the issue may be recorded on a Minor Incident Log. The Minor Incident Log is used to report minor incidents that occur on the Project for the purpose of trend identification and self-management. The Principal Contractor is to update this form and forward to the relevant Environmental position as part of monthly reporting requirements.

Where the issue or event is not a Minor Incident, the incident/ issue/ event is considered an Environmental Incident and must be reported to the relevant Project Manager as soon as practicable (within 24 hours of becoming aware of the incident). The Project Manager, with the Environmental Advisor must report the incident in the applicable reporting system.

Environmental incidents relating to flora and fauna may include, but are not limited to:

- Clearing or damage to habitat outside of the designated clearing areas;
- Clearing or damage to habitat to be retained inside the Disturbance Footprint;
- Deviation from approved clearing methods;
- Unauthorised interference with a threatened species;
- Interference with an active animal breeding place;
- Uncontrolled discharge of water from or within the Project site resulting in the degradation of waterways;
- Sediment or erosion polluting waterways;
- Spills of hydrocarbons or hazardous substances;
- Fire ignitions;
- Noise or dust events outside of the acceptance limits defined in the PCEMP; and

- Unauthorised or accidental death or injury of native fauna as a result of Project activities and/or Project personnel.

In the event that fauna is encountered within the work area, works in the immediate area will stop to allow it to move out of the work area. If fauna will not move out of the work area, the Site Supervisor will be notified, and a suitably qualified Fauna Spotter Catcher or wildlife handler will be contacted. Relocation of fauna from within the Project construction site by a suitably qualified Fauna Spotter Catcher is to be recorded as part of the pre-clearance reporting obligations or Principal Contractor worksite inspection reports/diary and recorded in the Project Fauna Register.

Update the PVFMP and include newly identified fauna species in subsequent inductions and toolbox talks. Where impacts can be avoided, works may proceed. Where impacts cannot be avoided, consult with agencies and submit management plan for approval, and recommence works with updated controls where necessary.

If the animal is not injured or stressed, it may be released nearby in accordance with the following:

- If the species is nocturnal, it must be released at dusk;
- The release area is to contain similar habitat (the same vegetation community if possible) and occur as close as possible to the original capture location, in a predetermined area that will not be disturbed by construction activities;
- Fauna will not be released during periods of heavy rainfall, unless ecologist or fauna rescue service determines this is the best outcome for the fauna; and
- Hollow-dependent species, particularly those with dependent young, shall be released into a temporary nest box.

All fauna handling will be undertaken by a suitably qualified Fauna Spotter Catcher, and in accordance with relevant hygiene protocols including:

- National Wildlife Biosecurity Guidelines (Wildlife Health Australia, 2018); and
- Hygiene Protocol for the Control of Disease in Frogs (Murray et al., 2011).

In instances where previously unidentified habitat for threatened flora or fauna listed under the EPBC Act and/or NC Act is identified in construction areas, the area is to remain undisturbed until it has been assessed by a suitably qualified ecologist and, if necessary, reported to relevant government departments.

A fauna handling procedure and a Protected Matters unexpected finds procedure will be incorporated within the PCEMP prior to construction to detail the management and handling of fauna, and the actions to be taken if any threatened species or threatened species habitat are unexpectedly encountered. The procedures will be communicated to personnel through site inductions and toolbox talks.

The success of management strategies will be reviewed on a regular basis to confirm its continued suitability for the Project. Should the risk to the environment or to human health change during the construction period, management options will be reviewed and this PVFMP will be updated.

4.3.2 DETSI NOTIFICATION

For a notifiable incident occurring on an infrastructure project site under the possession of a Principal Contractor, the Principal Contractor must notify MMG so they can notify the Department of the Environment, Tourism, Science and Innovation (DETSI) within 24 hours of becoming aware of the incident.

DETSI is to be notified in writing, with the written notification describing the incident, its nature and the circumstances in which it happened. A DETSI Duty to Notify of Environmental Harm form ESR/2016/2271 is to be completed and sent to DETSI. The subject line must include 'Duty to Notify of Environmental Harm'. It is an offence not to report to DETSI any incident causing serious environmental harm.

4.3.3 FURTHER MANAGEMENT OF ENVIRONMENTAL INCIDENT

The Project Manager, with guidance and advice from the Environmental Superintendent / Officer will commence investigation to:

1. Identify the extent and seriousness of the issues/ event; and
2. Determine suitable management controls.

All incidents are to be documented. Investigations will then be conducted and action plans (if required) developed to ensure no repetition of the event. Where current procedures are identified as being ineffective, the PVFMP should be revised by the Principal Contractor and approved by the MMG Environmental Manager. All incidents / issues / events / non-conformance minor and significant shall be reported to the MMG Environmental Manager and /or advisor on a monthly basis.

All personnel should report all incidents, as incident reporting is regarded as a valuable method of addressing shortcomings in procedures, training, or equipment, and is an opportunity for improvement.

4.4 RECORDS AND REGISTERS

The Principal Contractor will be required to keep records of all environmental inspection, monitoring results and any non-compliances with performance criteria. Any complaints received will also be recorded in a Complaints Register.

Records generated will be provided to MMG when requested. Records shall be stored in such a manner that they are readily accessible and protected from damage, loss or deterioration due to environmental conditions. All electronic records will be regularly backed up, and the backup is kept off site. All records shall be maintained as per contract requirements. Records shall be made available as requested (auditors, authorities) at MMG's discretion.

The Principal Contactor will be required to submit monthly records to MMG which include:

- Daily diary including inspection of all environmental elements for the month;
- Monitoring results, analysis and corrective actions (if required);
- Environmental nuisance and non-conformance via the Environmental Monthly Report;
- Minor Environmental Incident Log; and
- Any other monthly reports as required or requested within contract.

4.4.1 PVFMP AND EMERGENCY CONTACTS

The details for the personnel to be contacted in the event of an environmental emergency or other incident will be designated prior to construction commencing.

5. POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

The Project has been determined to have the potential to result in direct and indirect impacts on vegetation and listed flora and fauna species, as a result of the three Project phases: construction, operation and decommissioning. Upon completion of decommissioning, the Project will undergo rehabilitation that is in line with the conditions of Approval.

Any impacts as a result of the WTG elements of the Project (i.e. avifauna and bat collision risks, flight displacement and barotrauma) are to be discussed and addressed as part of the BBMP.

The hierarchy of control for mitigation measures is as follows:

1. Avoid – avoiding impacts altogether;
2. Minimising – avoiding impacts so far as reasonably practicable, and then minimising impacts through implementation of targeted management measures and monitoring; and
3. Management – determining the best ways to manage impacts that are unable to be avoided or completely minimised, through administrative controls.

Throughout the design phase, the Project team has prioritised reducing impacts to environmentally sensitive areas prior to construction.

Across the three Project phases analysed in the following sections, the potential impacts on MSES and the expected duration of those impacts have been identified.

5.1 PROJECT PHASE ACTIVITIES

5.1.1 PRE-CONSTRUCTION AND CONSTRUCTION ACTIVITIES

Table 5-1 details the construction phase activities with the potential to result in impacts to MSES.

TABLE 5-1 CONSTRUCTION PHASE ACTIVITIES, POTENTIAL IMPACTS AND DURATION

Construction Activity	Potential Impact	Anticipated Duration of Impact[a]
Site preparation (clearing for Project infrastructure including access tracks, WTG pads, temporary construction compounds and laydown areas etc.)	• Direct clearance and reduction of habitat for native flora and fauna species. • Injury/fatality of fauna. • Result in barriers to connectivity and dispersal through removal of native habitat (particularly for the Purple-necked rock-wallaby). • Creating barriers that may potentially dam the flow of water to downstream water holes. • Generation of dust prone areas (cleared areas) that may result in increased sedimentation in such downstream areas.	Medium term
Vehicular and pedestrian movements	Introduction of invasive species (flora and fauna) • Invasive flora species introduction resulting in decreased native vegetation structure and stability. Also results in increased competition for resources with native flora species. • Invasive fauna species introduction resulting in direct competition, predation on, and injury and/or mortality to native fauna species.	Medium term

Construction Activity	Potential Impact	Anticipated Duration of Impact[a]
	• Indirect reduction in habitat quality for native fauna species. • Invasive fauna species may also introduce potentially harmful infectious diseases to native species. Potential to strike fauna • Potential for vehicle strike to fauna, resulting in injury and/or mortality (i.e. to low dwelling bird species, or dispersing small mammals and reptiles).	
Potential contamination and waste production	• Direct harm to native vegetation and fauna habitat through destruction of vegetation quality. • Direct harm to native fauna through ingestion of any chemicals or waste products that are not managed properly.	Medium term
Machinery works	Light and noise pollution and vibration impacts • Disturbance to native fauna species habitat, resulting in potential displacement due to light, noise and/or vibration pollution.	Medium term
Work area production including trenches and machinery	• Potential to entrap native fauna species and result in injury and/or fatality.	Medium term

Table Note:
[a]Duration of disturbance timeframes (DSDIP):
- Short term – up to 12 months;
- Medium term – from 1 to 3 years;
- Long term – from 3 to 100 years; and
- Permanent.

5.1.2 OPERATION ACTIVITIES

Table 5-2 details the operation phase activities with the potential to result in impacts to MSES.

TABLE 5-2 OPERATION PHASE ACTIVITIES, POTENTIAL IMPACTS AND DURATION

Operation Activity	Potential Impact	Anticipated Duration of Impact[a]
Operation maintenance works	Noise pollution and potential vibrations from machinery usage • Disturbance to native fauna species habitat, resulting in potential displacement due to such noise and vibration pollution.	Long term
Vehicular and pedestrian movements	Introduction of invasive species (flora and fauna) • Invasive flora species introduction resulting in decreased native vegetation structure and stability. Also results in increased competition for resources with native flora species. • Invasive fauna species introduction resulting in direct competition, predation on, and injury and/or mortality to native fauna species.	Long term

Operation Activity	Potential Impact	Anticipated Duration of Impact[a]
	• May result in an indirect reduction in habitat quality for native fauna species. • Invasive fauna species may also introduce potentially harmful infectious diseases to native species. Dust Generation • Dust generation resulting in potential sedimentation within waterways. Potential to strike fauna • Potential for vehicle strike to fauna, resulting in injury and/or mortality (i.e. to low dwelling bird species, or dispersing small mammals and reptiles).	

Table Note:
[a]Duration of disturbance timeframes (DSDIP):
- Short term – up to 12 months;
- Medium term – from 1 to 3 years;
- Long term – from 3 to 100 years; and
- Permanent.

5.1.3 DECOMMISSIONING ACTIVITIES

Table 5-3 details the decommissioning phase activities with the potential to result in impacts to MSES.

TABLE 5-3 DECOMMISSIONING PHASE ACTIVITIES, POTENTIAL IMPACTS AND DURATION

Decommissioning Activity	Potential Impact	Anticipated Duration of Impact[a]
Vehicular and pedestrian movements	Introduction of invasive species (flora and fauna) • Invasive flora species introduction resulting in decreased native vegetation structure and stability. Also results in increased competition for resources with native flora species. • Invasive fauna species introduction resulting in direct competition, predation on, and injury and/or mortality to native fauna species. • May result in an indirect reduction in habitat quality for native fauna species. • Invasive fauna species may also introduce potentially harmful infectious diseases to native species. Potential to strike fauna • Potential for vehicle strike to fauna, resulting in injury and/or mortality (i.e. to low dwelling bird species, or dispersing small mammals and reptiles).	Medium term
Potential contamination and waste production	• Direct harm to native vegetation and fauna habitat through destruction of vegetation quality. • Direct harm to native fauna through ingestion of any chemicals or waste products that are not managed properly.	Medium term

Decommissioning Activity	Potential Impact	Anticipated Duration of Impact[a]
Machinery works	Light and noise pollution and vibration impacts • Disturbance to native fauna species habitat, resulting in potential displacement due to such noise and vibration pollution.	Medium term
Work area production including trenches and machinery	• Potential to entrap native fauna species and result in injury and/or fatality.	Medium term

Table Note:
[a]Duration of disturbance timeframes (DSDIP):
- Short term – up to 12 months;
- Medium term – from 1 to 3 years;
- Long term – from 3 to 100 years; and
- Permanent.

5.2 MSES-SPECIFIC POTENTIAL IMPACTS

As part of the MSES Report, the following were concluded as having a possible significant residual impact due to the Project:

- Regulated Vegetation Intersecting a Watercourse;
- Regulated Vegetation that is Essential Habitat; and
- Protected Habitat for a Vulnerable listed NC Act species, being the Purple-necked rock-wallaby (*Petrogale purpureicollis*).

The MSES report (refer to *Appendix N* of the Planning Report) delineates the areas of the MSES associated with the Project. Specific information on the impacts and impact assessments related to MSES are detailed in the MSES Ecological Assessment Report. The impact assessments within this report indicate that the Project is unlikely to have a significant impact on any of the additional MSES or MNES assessed.

6. ENVIRONMENTAL MANAGEMENT MEASURES

6.1 MITIGATION MEASURES, PERFORMANCE TARGETS, AND CORRECTIVE ACTIONS

Mitigation measures to avoid, minimise or manage the potential impacts of the Project on flora and fauna (described in Section 5), have been detailed in Table 6-1 for the construction and operation Project phases. It is noted that decommissioning impacts are similar to that of the construction phase, and as such, the mitigation measures to be implemented are similar. Specific controls implemented include positioning the WTGs to avoid habitat for species of concern (particularly Purple-necked rock wallaby), where reasonably possible.

These mitigation measures address Project specific issues and opportunities and outline how mitigation measures will be achieved through the implementation of other relevant Management Plans. Mitigation measures have been selected based on the best available information including State or Commonwealth guidelines, and the appropriateness and effectiveness in managing the identified impacts including mitigation measures used on similar projects that have been subject to legislative approval.

Mitigation measures will regularly monitored, and corrective actions implemented to maintain effectiveness.

TABLE 6-1 VEGETATION AND FAUNA MITIGATION MEASURES FOR THE CONSTRUCTION AND OPERATION PHASES OF THE PROJECT

Impact	Mitigation Actions	Performance Indicator	Timing	Responsibility	Trigger for Corrective Action	Corrective Action
Modification of habitat through reduction of habitat for native flora and fauna species, and fragmentation of habitat connectivity areas.	Suitable qualified Fauna Spotter Catchers to be present prior to construction commencing and during (fauna to move on at own accord first –Fauna Spotter Catcher to safely relocate them if they do not move).	Records maintained of any fauna interactions.	Construction phase.	• Environmental Advisor • Site Supervisors and Personnel. • Fauna Spotter Catcher / Suitably Qualified Ecologist.	Mortality or injury to fauna.	• Instances of mortality or injury will be recorded and reported as required to relevant government departments. • The existing work process will be reviewed to establish root cause and to prevent recurrence before clearing work recommences.
	Site personnel and contractors to be made aware of requirements through environmental training program prior to construction commencing.	• All personnel and contractors signed onto daily pre-start. • All personnel and contractors completed site inductions.	Prior to and during construction phase.	• MMG Project Manager • Environmental Manager • Environmental Advisor • Principal Contractor • Site Supervisors and Personnel.	Breach of requirements.	• Personnel are to repeat environmental training. • Training information to be reviewed to ensure clarity and accuracy.
	• The boundary / edge of the Disturbance Footprint is to be marked to prevent extraneous clearing of adjacent habitat and/or vegetation. • All clearing to be complied with in accordance with permit and legislative requirements.	• Cleared areas are to be clearly marked. • Personnel to be made aware of clearing boundary markings. • Personnel to be made aware of permit and legislative requirements.	Construction phase.	• Environmental Advisor. • Principal Contractor. • Site Supervisors and Personnel.	Clearing occurs outside of disturbance footprint.	• Cleared areas outside of approved disturbance areas will be rehabilitated. • The existing work process will be reviewed to establish root cause and to prevent recurrence before clearing work recommences.
	Where possible, avoid the clearing of areas of rocky habitat due to the importance of native fauna species reliant on such habitat. Refined footprint to avoid any areas of rocky habitat used by the Purple-necked rock-wallaby.	• No known or potential dens as identified in Purple-necked rock-wallaby monitoring or habitat spatial analysis disturbed. • No rocky habitat identified during pre-clearance surveys or by Fauna Spotter Catchers as suitable for the Purple-necked rock-wallaby disturbed.	Prior to and during construction phase.	• MMG Project Manager. • Principal Contractor. • Site Supervisors and Personnel. • Fauna Spotter Catcher / Suitably Qualified Ecologist.	• Disturbance of Purple-necked rock-wallaby habitat occurs. • Clearing occurs outside of disturbance footprint.	• Impacts to the species habitat will be recorded and reported as required to relevant departments. • Clearing activities in areas of potential habitat will be stopped immediately. • Cleared areas outside of approved disturbance areas will be rehabilitated. • The existing work process will be reviewed to establish root cause to prevent recurrence before clearing work recommences. • The Project design will be reviewed to ensure avoidance of Purple-necked rock-wallaby habitat. • Cleared areas outside of approved disturbance areas will undergo rehabilitation works immediately upon identification of non-compliant clearing. • The existing work process will be reviewed to establish root cause to prevent recurrence before clearing work recommences.
	Where possible, avoid the creation of barriers within Purple-necked Rock-wallaby habitat.					
	Infrastructure shall be located preferentially to avoid or minimise edge effects or dissecting tracts of native vegetation.	Project design positions infrastructure to avoid or minimise edge effects or dissecting tracts of native vegetation where possible.				

Impact	Mitigation Actions	Performance Indicator	Timing	Responsibility	Trigger for Corrective Action	Corrective Action
Injury or fatality of fauna, including from WTG strike.	Pre-clearance fauna surveys to be conducted to define occupied habitat prior to commencement of clearing works – avoiding unintentional interference or disruption to any breeding areas.	• Records maintained of any fauna or fauna breeding habitat interactions. • If breeding places are identified within clearing area and cannot be avoided, the development of a species management program is required.	• Within two weeks prior to the commencement of clearing. • Construction phase.	• MMG Project Manager. • Principal Contractor. • Fauna Spotter Catcher / Suitably Qualified Ecologist.	• Breach of requirements. • Breeding places are identified within clearing area and cannot be avoided. • Mortality or injury to fauna.	• The development of a species management program is required before clearing of breeding places. • Instances of mortality or injury will be recorded and reported as required to relevant government departments. • The existing work process will be reviewed to establish root cause to prevent recurrence before clearing work recommences.
	Implement Construction Environmental Management Plan (CEMP) and permit to clear system.					
	All people driving on site to stay on roads to lower risk of hitting an animal. Vehicle speed limits will be in place to further lower risk.					
	• Injured wildlife to be reported to Environmental Manager. • Injured wildlife can be brought to local wildlife carers: **Western Qld Wildlife Rehabilitation Centres: Cloncurry – 0419 422 900** • Collisions with WTGs are to be recorded as per the requirements of the BBMP. • Fauna spotter/catchers operating under an approved rehabilitation permit to check areas prior to work commencing, and to be present during clearing. • Fauna will preferably be allowed to move on their own accord, but if this does not occur, and access is required immediately, then fauna spotter/catchers operating under an approved rehabilitation permit will relocate them.	Records maintained of any fauna or fauna breeding habitat interactions.	All stages of the Project.			
	Before After Control Impact surveys will be conducted at impact and control areas during construction to determine bird and bat composition, abundance and density. This includes Bird Utilisation Survey and use of bat survey techniques (as required in the Projects BBMP).	Before After Control Impact surveys completed and requirements of the BBMP met.	Prior to and during construction phase.	• MMG Project Manager. • Environmental Manager. • Principal Contractor. • Suitably Qualified Ecologist.	Requirements of BBMP are not met.	• Corrective actions outlined within the BBMP will be adopted where necessary. • Adaptive management process will be undertaken to improve existing processes.
	BBMP created and implemented to manage risk to birds and bats. Including operation phase bird and bat utilisation surveys, trigger threshold limits and	Impacts to bird and bat species from WTG collisions remain insignificant.	Operation phase.	• MMG Project Manager. • Environmental Manager. • Principal Contractor.	• Impacts to bird and bat species from WTG collision occur over threshold limits as defined in BBMP.	• Corrective actions outlined within the BBMP will be adopted where necessary.

Impact	Mitigation Actions	Performance Indicator	Timing	Responsibility	Trigger for Corrective Action	Corrective Action
	adaptive management processes.					• Adaptive management process will be undertaken to improve existing processes.
	Targeted monitoring to occur should carrion monitoring detect a trend in fatalities of a significant aerial fauna species to inform the requirement for adaptive management strategies.					
	• Development and implementation of a Purple-necked rock-wallaby management plan (PNRWMP) that details the following: a. Sub-population monitoring at known dens both in proximity to WTGs ('impact' - to be defined within PNRWMP) and away from WTGs ('control'). Comparative assessment between 'control' and 'impact' dens to determine any impacts that can be attributed to Project activity. Monitoring may include the use of camera traps and/or remote thermal sensing; b. Inferential monitoring of entire population across Knapdale Range using data from monitored sub-populations combined with known and potential dens identified during spatial analyses (discussed in WTS's EAR for MSES); and c. Appropriate management and mitigation actions for any impact identified.	No decline in Purple-necked rock-wallaby population across the Knapdale Range that can be attributed to Project activity, as per the PNRWMP.	All phases of the Project.	• MMG Project Manager. • Environmental Manager. • Principal Contractor.	• Decline in Purple-necked rock-wallaby population. • Requirements of PNRWMP not met.	• Impacts to the species habitat will be recorded and reported as required to relevant departments. • Clearing activities in areas of potential habitat will be stopped immediately. • Cleared areas outside of approved disturbance areas will undergo rehabilitation works immediately upon identification of non-compliant clearing • The existing work process will be reviewed to establish root cause to prevent recurrence before clearing work recommences. • The Project design will be reviewed to ensure avoidance of Purple-necked rock-wallaby habitat.
	Daily pre-start / toolbox talks for site specific bird, bat and fauna information and checks to determine any sheltering native fauna in/or around construction areas and equipment during clearing and construction.	• All personnel and contractors signed onto daily pre-start. • Records maintained of any fauna or fauna breeding habitat interactions.	During construction phase.	• Principal Contractor. • Site Supervisors and Personnel. • Fauna Spotter Catcher / Suitably Qualified Ecologist.	• Breach of requirements. • Mortality or injury to fauna.	• Personnel are to repeat inductions. • Induction / information distributed to personnel to be reviewed to ensure clarity. • Instances of mortality or injury will be recorded and reported as required to relevant government departments.

Impact	Mitigation Actions	Performance Indicator	Timing	Responsibility	Trigger for Corrective Action	Corrective Action
						• The existing work process will be reviewed to establish root cause and to prevent recurrence before clearing work recommences.
	Speed limits are to be signed and enforced on all site access tracks.	• Speed limits to be made known in site inductions. • Records of speed limit enforcements to be maintained. • No vehicle-related fauna mortality events.	All phases of the Project.	• Principal Contractor. • Site Supervisors and Personnel.	Vehicle-related fauna mortality.	• Instances of mortality or injury will be recorded and reported as required to relevant government departments. • Root cause to be investigated and determined (i.e. driver complying with requirements). • Review and revise current speed limit and adjust as required.
	Fauna exclusion devices (i.e., fencing) must be implemented, where practical, around areas of potential risk to fauna, to discourage fauna from entering.	• Maintain records of any fauna injuries or fatalities from work area production incidents. • Records maintained of any fauna interactions.	Construction phase.	• Principal Contractor. • Site Supervisors and Personnel. • Suitably Qualified Fauna Spotter Catchers.	Mortality or injury to fauna.	• Instances of mortality or injury will be recorded and reported as required to relevant government departments. • The existing work process will be reviewed to establish root cause and to prevent recurrence before clearing work recommences.
	Fauna ramps to be installed in excavations or trenching to allow fauna to safely escape.					
	Open excavations to be checked daily by Fauna Spotter Catcher to safely relocate any trapped fauna.					
Creation of barriers that may potentially restrict the flow of water.	Micrositing to avoid watercourses, where possible.	Project design to microsite and avoid watercourses or sensitive receptors where possible.	Prior to construction phase.	• MMG Project Manager. • Environmental Manager.	Flow of water or fauna movement restricted along watercourse.	Site engineering mitigations methods to be reviewed and revised to remove flow or fauna movement restrictions.
	Construction activities must not interfere or block natural drainage areas including disturbing channel contours without site appropriate engineering mitigations.	Culverts or appropriate engineering mitigation installed in all areas where tracks are constructed over watercourses to avoid blockage to flow of water and fauna movements along watercourse.	Construction phase.	• MMG Project Manager. • Environmental Manager. • Principal Contractor.		
Generating dust that may lead to sedimentation of downstream areas	Implementation of diversion banks/ drains to divert clean runoff waters away from disturbed areas to reduce erosion and the potential for contamination of clean runoff.	Monitoring and management as per the Stormwater Management Plan and Erosion and Sediment Control Plan.				
	Implementation of a Surface Water Management Plan and Erosion and Sediment Control Plan.					
	Vehicle speed limits will be in place to reduce dust generation		• Construction Phase. • Operation Phase.			

Impact	Mitigation Actions	Performance Indicator	Timing	Responsibility	Trigger for Corrective Action	Corrective Action
	Deploy water carts to reduce dust generation.		Construction Phase.			
	Minimise the area of disturbance, thus minimising the volume of dirty or contaminated Runoff.					
	Deploy rocking in high erosion risk areas to provide protection against erosive forces acting to mobilise sediment.					
Introduction of invasive species (flora and fauna) through vehicular or foot movements	Invasive flora and fauna species to be identified and managed in accordance with the Weed and Pest Management Plan (WPMP).	• Documented adherence to WPMP, including biosecurity procedures for reporting and removal of invasive species. • No increase in weed spread that can be attributed to project activity or negligence, as per the WPMP. • Records and monitoring of all weed hygiene documentation. • Records of completed invasive species control to be kept, including herbicide and management techniques used.	• Construction phase. • Decommissioning phase. • Ongoing. • On each occasion that equipment enters site.	• Environmental Advisor. • Principal Contractor. • Site Supervisors and Personnel.	• Increase in invasive species. • WPMP requirements not adhered to. • Records of novel invasive species.	• Weed hygiene documentation to be reviewed to determine and rectify if non-compliance has occurred. • New weed species to be reported to Principal contractor and the Department of Primary Industries as required. • Rectification works to be conducted as soon as possible to prevent further spread and establishment.
	Where possible, activities must be planned to avoid movement of vehicles or machinery between properties, corridors, or areas with weed infestations.					
	All vehicles, equipment, machinery and PPE to be adequately cleaned and washed down prior to entering site.					
	Access roads, easements and yards will be kept weed free where practicable.					
	Only registered herbicides will be used by licenced and suitably qualified personnel.					
Contamination and waste production	All food waste generated to be stored, handled and transported within sealed containers. The Project is to be kept free of litter. Spill kits to be readily available near all chemical working areas.	• Recordings and monitoring of all spill or leak events – to be managed accordingly. • Site inductions to include briefing on location and use of spill kits.	All phases of the Project.	• MMG Project Manager. • Environmental Manager. • Principal Contractor. • Site Supervisors and Personnel.	Spill or leak event occurs.	• Review and revise management measures and emergency response protocols. • Rectification works to be completed, as necessary, as soon as possible.
	Green waste produced on site may be used for rehabilitation or erosion and sediment control, with more detail provided in the PCEMP and PCVMP.	Green waste used in line with the details and protocols set out in the PCEMP and PCVMP.	Construction phase.	• MMG Project Manager. • Environmental Manager. • Principal Contractor. • Site Supervisors and Personnel.		

Impact	Mitigation Actions	Performance Indicator	Timing	Responsibility	Trigger for Corrective Action	Corrective Action
	Emergency response protocols to be implemented in the event of chemical leaks or spills.	Documentation of emergency response protocols implemented and undertaken where necessary.	All phases of the Project.	• MMG Project Manager. • Environmental Manager. • Principal Contractor. • Site Supervisors and Personnel.		
Light, noise and vibration impacts as a result of machinery works (particularly during night-time works)	Light meters to be used to monitor light pollution levels.	Light meters to not exceed safe light pollution levels, with documentation of monitoring to be kept.	Construction phase.	• Environmental Advisor. • Site Supervisors and Personnel.	• Light levels exceed limit. • Noise levels exceed limit. • Lighting does not meet requirements of BBMP. • Management processes not adhered to.	• Root cause to be investigated and determined. • Lighting to be redesigned or reinstalled if found to be installed incorrectly or to not meet requirements. • Further corrective actions will be developed as necessary to ensure limits are not exceeded and impacts are minimised.
	Hours and amount of artificial light and noise from machinery to be minimised as much as practicable to avoid disturbance to adjacent habitats.	Documentation of light and noise from machinery to be kept and monitored.		• Principal Contractor. • Environmental Advisor. • Site Supervisors and Personnel.		
	Implementation of BBMP which details lighting requirements for WTGs. Lights to be directed away from species habitats or shields used to block light from habitat.	Adherence to safe lighting levels as detailed within the BBMP.		• MMG Project Manager. • Environmental Manager. • Principal Contractor. • Site Supervisors and Personnel.		
	Regular maintenance of machinery to be undertaken, with maintenance activities to avoid the night period where possible.	Maintenance records to be kept.	All phases of the Project.	• Principal Contractor. • Site Supervisors and Personnel.		
Risk to fauna from work area production including trenches and machinery	Open pits to be checked regularly by the Fauna Spotter Catcher to safely relocate any trapped fauna. Fauna ramps to be installed in excavations or trenching to allow fauna to safely escape.	Maintain records of any fauna injuries or fatalities from work area production incidents.	Construction phase	• Principal Contractor. • Site Supervisors and Personnel. • Fauna Spotter Catcher / Suitably Qualified Ecologist.	Mortality or injury to fauna.	• Instances of mortality or injury will be recorded and reported as required to relevant government departments. • The existing work process will be reviewed to establish root cause and to prevent recurrence before clearing work recommences.
Bushfire	Designated smoking areas to be established away from combustible materials or dry vegetation. Ensure combustible items are stored in suitable conditions. • All vehicles are to remain on designated access and parking areas. • All vehicles are to be fitted with a 4L DCP fire extinguishers in accordance with existing DRM site access protocols. • All vehicles must stick to graded roads (i.e. no off-roading). • Do not park hot vehicles in long grass (particularly during the dry season).	• All personnel and contractors made aware of requirements through site inductions. • Fire Danger rating threshold triggers implemented.	All phases of the Project.	• MMG Project Manager. • Environmental Manager. • Principal Contractor. • Site Supervisors and Personnel.	• Bushfire Management Plan processes or requirements not adhered to. • Fire Danger rating exceeds specified threshold.	• Root cause to be investigated and determined. • Further corrective actions will be developed as necessary to ensure bushfire risk is minimised. • Activities with risks of spark will cease until safe to resume.

Impact	Mitigation Actions	Performance Indicator	Timing	Responsibility	Trigger for Corrective Action	Corrective Action
	• All vehicles and machinery must have adequate shielding for exhaust fumes. A Bushfire Management Plan will be created and implemented which details additional mitigation and management measures, including details on asset protection zones, emergency access and fire danger triggers.					

7. MONITORING

The Principal Contractor will monitor the effectiveness of the proposed mitigation measures following commencement of construction and up to five years after commencement of operations or as deemed appropriate for specific measures. An adaptive management framework will facilitate change and improvement to the management strategies where the objectives of the proposed measures are not met (see above Section 6).

Where monitoring and auditing determines that the existing management measures are not effective and meeting the 'triggers for corrective actions' listed in Table 6-1, the corrective actions listed in those tables will be implemented as soon as practicable. MMG is also committed to ensuring that additional measures and corrective actions will also be implemented as required, based on best practice at the time, and the circumstances for the ineffective measures.

The following flora and fauna (and habitat) monitoring methods will be undertaken during the construction stage of the Project to determine whether triggers for corrective actions are being exceeded:

- Daily inspections of the extent of works by the Environmental Manager to ensure management action compliance including pre-start inspections of site demarcations and clearing extents, and any excavations;
- Daily inspections by suitably qualified Fauna Spotter/Catcher before clearing and during clearing, specifically relating to fauna habitat trees or food tree species;
- Monitoring of construction site lighting by Environmental Manager in accordance with the requirements of the PCEMP;
- Weekly site inspections by the Environmental Manager or nominated representative to review flora and fauna control measures during construction, including effectiveness of speed restrictions;
- Monitoring in accordance with the requirements of any other relevant management plans including:
    - Any secondary approvals including Species Management Programs;
    - The PVPMP as a component of the PCEMP; and
    - Bird and bat monitoring as outlined in the BBMP.

Annual reports outlining the findings of these monitoring programs will be formulated and submitted to the relevant Departments to demonstrate compliance with the PCEMP and associated Management Plans. These will record any triggers for corrective action and the actions taken in response.

As part of the Project's monitoring program, maps will be prepared to show environmentally sensitive areas, vegetation that requires protection, buffer and exclusion zones, and monitoring locations.

The following flora and fauna (and habitat) specific surveys and follow-up monitoring will be conducted during the operation stage of the Project:

- Purple-necked rock-wallaby population monitoring, including records of road injuries and mortalities, including number and location of vehicle strikes;

- Success of rehabilitation and/or reinstatement to be monitored over the initial stabilisation period, in accordance with the timeframes established in the Preliminary Rehabilitation Management Plan;
- Weed monitoring within the Disturbance Footprint will be conducted in accordance with MMG's maintenance procedures and policies, the PCEMP and WPMP; and
- Corrective actions are to be implemented where additional Project-associated impacts are identified.

The *Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland* (Eyre et al., 2022) will be referenced when planning fauna surveys. These will be adopted to ensure any species-specific monitoring undertaken is in accordance with the relevant standards necessary.

7.1 PRELIMINARY VEGETATION FAUNA MANAGEMENT PLAN REVIEW

This PVFMP is a dynamic document that will be reviewed and amended throughout the development and life of the Project to ensure the mitigation and management measures remain effective. The implementation and effectiveness of this PVFMP will be regularly evaluated to ensure:

- Uncertainty's of the Project's ecological values and potential impacts (i.e. possibly occurring species, potential impacts) have been accounted for and incorporated with the intent of adapting to potentially occurring MNES and MSES values and subsequent impacts throughout the life of the Project;
- As new components of the Project are revealed that they are adaptively managed to ensure environmental impact is avoided and then minimised;
- Compliance with legal and landholder obligations;
- Issues raised during inspections/monitoring are managed accordingly;
- Any change in the Project scope is managed and communicated;
- Changes in legislative requirements of species are communicated and management strategies are updated accordingly;
- Environmental incidents and non-compliance are being recorded;
- Management strategies are effective, relevant and up to date; and
- The PVFMP effectively manages Project ecological and environmental values.

This document will be updated:

- Throughout the detailed development phase of the Project, and prior to construction of the Project;
- Where there is a significant change to the Project schedule, Disturbance Footprint, or a change in the construction methods that require amendment to vegetation and fauna protection measures;
- Where a corrective action is required or implemented, or performance criteria are not being met, and additional measures are identified for inclusion to prevent reoccurrence; and
- Where a change in legislation or best practice methodology has been identified.

The PVFMP will undergo six monthly evaluations during the period of construction. Following construction, the PVFMP will be evaluated on an annual basis during the operational phase.

These periodic evaluations are set to ensure the PVFMP is continually effective, appropriate and relevant for managing flora and fauna impacted or potentially impacted by the Project.

If monitoring, auditing or reporting determines that the current Management Plans are not effective (indicated by repeated failure to achieve performance outcomes) in achieving the desired environmental objectives, then a revised Management Plan/s will be submitted for approval.

The responsibility of carrying out the review of the PVFMP will be in accordance with the roles and responsibilities detailed in Section 4.1.

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APPENDIX A POST-SURVEY DETAILED LIKELIHOOD OF OCCURRENCE TABLES

EVNT species

Common Name (Scientific Name)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC ACT[1]	EPBC[2]			
Plants (n[4] = 3)					
Mt Isa Mallee (Eucalyptus nudicaulis)	E	E	PMST	*Eucalyptus nudicaulis* is known from a restricted distribution to the west of Cloncurry. It grows in skeletal granite soils amongst open woodland of *E. leucophloia* and *Corymbia capricornia* on exposed quartzite, rocky gullies, and steep hillsides between 400-520 m above sea level (Bean 1991). It is typically associated with a dense understorey of Triodia spp. (Bean, Two new species of red gum (Eucalyptus L'Herit., Myrtaceae) from Queensland, 1991) and occurs in Queensland Region Ecosystem 1.11.2 – *Eucalyptus leicophloia* low open woodland (Bean, Conservation status assessment for Eucalyptus nudicaulis (Myrtaceae), 2009) (Queensland Herbarium, 2023). Associated species include *Acacia* sp., *Corymbia aspersa*, *E. normantonensis* and *Plectrachne pugens*.	**Unlikely** – No records exist within a 50 km buffer from a central point within the Study Area. The 50 km buffer falls outside of the extent of occurrence identified within the conservation advice for the species.
Ipomoea antonschmidii	NT	NL	WO	This species is currently known from a restricted area southwest of Lake Julius Dam, north-northeast of Mt. Isa. It grows on shallow, red, stoney soils in *Eucalyptus leucophloia* woodland (Johnson, 1986). Records within the past 20 years have been centered around gunpowder creek, north of Mt. Isa (Atlas of Living Australia, 2023).	**Unlikely*** – The initial population is ~40 km to the east of the Study Area. A newer population has been found ~100 km northwest of the Study Area. All records have been found in relatively low elevations, proximal to waterbodies or ephemeral streams, the Study Area does not provide suitable conditions for this species.

Common Name (Scientific Name)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC ACT[1]	EPBC[2]			
Ptilotus maconochiei	NT	NL	WO	The native range of this species is western & central Queensland. It is a subshrub or shrub and grows primarily in the desert or dry shrubland biome (Kew Royal Botanic Gardens, 2023). The original collections of the species were found between 550 and 570 m in elevation around Mount Isa (Benl, 1979).	**Unlikely** - One record exists approximately 40 km west of the Study Area. The majority of records are centred around Mount Isa.
Birds (n = 8)					
Australian Painted Snipe (*Rostratula australis*)	E	E, Ma	PMST	Heavily vegetated margins of wetlands, dams, marshy areas, swamps etc.; wet pasture, irrigated areas, lignum, tea-tree shrubs. (Pizzey and Knight, 2012).	**Possible** – one record has been recorded approximately 40 km southwest of the Study Area. Any waterholes within the Study Area are ephemeral and are fed by streams flowing from the ridgeline. All of the waterholes are small and surrounded by rocks, unsuitable habitat for the species.
Carpentarian Grasswren (*Amytornis dorotheae*)	E	E	PMST, WO	Generally confined to long-unburnt mature Triodia spp. hummock grassland or very open low woodland with Triodia understorey, avoiding recently (3 to 4 years previously) burnt areas, forages for seeds and insects around sandstone outcropping, on the ground, in rock crevices, leaf litter under Triodia hummocks and shrubs. Breeding season is November to March (Threatened Species Scientific Committee, 2016).	**Unlikely*** – While one record is located approximately 40 km northwest of the Study Area, habitat assessments confirm a lack of hummocking spinifex grasses with which the species is typically associated.12 years of fauna survey effort have not produced records of the species in the Knapdale Range.
Gouldian Finch (*Erythrura gouldiae*)	E	E	PMST	A rarely encountered species in the region due to ongoing population declines. Favours Eucalyptus woodlands with a significant layer of tall native grasses. As with other finch species, the Gouldian finch has a high association with water sources, particularly in the dry season (Pizzey and Knight, 2012).	**Unlikely** – no records exist within a 50 km buffer from a central point within the Study Area. The site does not contain suitable habitat as there are no permanent water sources on site.

Common Name (Scientific Name)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC ACT[1]	EPBC[2]			
Grey Falcon (*Falco hypoleucos*)	V	V	PMST, WO	The grey falcon exists in a variety of habitats, from inland plains and deserts to well-timbered watercourses. It is considered rare and probably exists in low densities throughout most of its range (Pizzey and Knight, 2012).	**Unlikely** – due to the lack of sparsely treed areas preferred by the grey falcon, and the low density of the species, it is considered unlikely to occur in the Study Area.
Night Parrot (*Pezoporus occidentalis*)	E	E	PMST	Not well known, most associated with spinifex grasslands and chenopod shrublands (Pizzey & Knight, 2012).	**Unlikely** - no records exist within a 50 km buffer from a central point within the Study Area. The nearest record is over 250 km south of the site.
Painted Honeyeater (*Grantiella picta*)	V	V	PMST, WO	Elusive species with high association with mistletoe, particularly in woodlands with larger numbers of mature eucalypt trees (Pizzey and Knight, 2012). Migration movements are influenced by rainfall and fruiting of mistletoes.	**Unlikely** – Despite the species being recorded three times within a 50 km buffer from a central point within the Study Area, there are no mistletoe species present on site which this species is highly associated with.
Purple-crowned Fairy-wren (*Malurus coronatus*)	V	NL	WO	The species occurs from the Kimberly region to the gulf of Carpentaria drainage of western Queensland and north-eastern Northern Territory (Threatened Species Scientific Committee, 2015). The species is restricted to a narrow band around well-vegetated river channels. They prefer thick riparian vegetation, typically of cane grass and/or pandanus, but also dense patchy shrubs up to 3 m (Ward & Woinarski, 2012). It is probable the record near the Study Area was the eastern subspecies (*Malurus coronatus macgillivrayi*), which occurs along most rivers draining into south-western and southern Gulf of Carpentaria from Roper River in Northern Territory to Leichhardt and Flinders Rivers in Queensland. A natural biogeographic barrier of approximately 300 km of unsuitable habitat separates this subspecies from the western subspecies (*Malurus coronatus coronatus*).	**Possible** – One record exists within a 50 km buffer from a central point within the Study Area. Vegetation along the Dugald River and smaller order streams that run through the site may provide potential habitat for the species.

Common Name (Scientific Name)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC ACT[1]	EPBC[2]			
Red Goshawk (*Erythrotriorchis radiatus*)	E	E	PMST	Rarely encountered species. Habitat is open forests, woodlands, and rainforest fringes, particularly near rivers and wetlands. Range from Kimberly, WA to Sydney, NSW in coastal and subcoastal regions (Pizzey and Knight, 2012).	**Unlikely** – No records exist within a 50 km radius of the site using the ALA database. Habitat on site may be suitable, but it is unlikely that the species utilizes it.
Mammals (n = 5)					
Ghost Bat (*Macroderma gigas*)	E	V	PMST	Patchy and uncommon in most areas with populations limited by the availability of caves, disused mine shafts or similar structures for roosting habitat (Menkhorst and Knight, 2011).	**Unlikely** – No records exist within a 50 km buffer from a central point within the Study Area. The habitat on site may be suitable if roosting structures are available.
Greater Bilby (*Macrotis lagotis*)	E	V	PMST	Open tussock grasslands, Mulga shrublands, hummock grassland. Once widespread through arid and semi-arid areas of the country, now reduced to isolated populations. In QLD, this species is restricted almost exclusively to Astrebla Downs National Park, east of Bedourie (Menkhorst & Knight, 2011).	**Unlikely** - No records exist within a 50 km buffer from a central point within the Study Area. The nearest record in the ALA database is approximately 250 km southwest of the site.
Julia Creek Dunnart (*Sminthopsis douglasi*)	E	V	PMST	Known from open grasslands on deeply cracked soils of the Mitchell Grass Downs bioregion. Infrequently encountered and poorly known species, likely utilising deep soil cracks for shelter (Menkhorst & Knight, 2011).	**Unlikely** - No records exist within a 50 km buffer from a central point within the Study Area. Most records for this species are centred around Julia Creek, with occasional outliers.
Purple-necked rock-wallaby (*Petrogale purpureicollis*)	V	NL	WO	As the name suggests, this species is a rock specialist and generally inhabits rocky outcrops and boulder piles in spinifex grasslands and mulga (Menkhorst & Knight, 2011).	**Known*** – Over 12 years of targeted surveys, this species has been recorded on 611 instances on site.
Short-beaked echidna (*Tachyglossus aculeatus*)	SL	NL	WO	This species is Australia's most widely distributed mammal, inhabiting almost every terrestrial habitat on the continent (Menkhorst and Knight, 2011). Exists in lower densities in north.	**Known*** – Four records exist within a 50 km buffer from a central point within the Study Area. This species is widely distributed and utilizes a variety of habitat including that present within the Study Area.

Common Name (Scientific Name)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC ACT[1]	EPBC[2]			
Reptiles (n = 3)					
Gulf Snapping Turtle (*Elseya lavarackorum*)	V	E	PMST	This species is restricted to rivers draining into the Gulf of Carpentaria. It occurs within the Northern Territory and the Southern Gulf (Queensland) Natural Resource Management Regions (Department of the Environment, Water, Heritage and the Arts, 2008).	**Unlikely** - No records exist within a 50 km buffer from a central point within the Study Area. The nearest population is over 225 km northwest of the site.
Mertens' water monitor (*Varanus mertensi*)	E	NL	WO	It has a broad distribution that encompasses coastal and inland waters across far north Australia from the Kimberley to Cape York. This species is rarely seen far from water. It is often seen basking on branches overhanging water or on rocks in the middle of streams.	**Unlikely** – This species has been recorded ~2 km east of the Study Area twice in 12 years of fauna surveys. However, habitat analysis has determined this species to be unlikely to occur within this area.
Plains Death Adder (*Acanthophis hawkei*)	V	V	PMST	Not well described. Primarily known from flat, treeless plains of Barkly Tableland where it is associated with Mitchell grasses and deep cracking soils. Taxonomic uncertainty and extreme morphological similarity make correct species identification difficult. (Wilson & Swan, 2021)	**Unlikely** – No records exist within a 50 km buffer from a central point within the Study Area. The site is likely unsuitable habitat as this species favours habitat that is flat, while the site is geographically complex.
Cartilaginous fish (n=1)					
Freshwater sawfish (*Pristis pristis*)	LC	V, M	PMST	This species inhabits marine, estuarine, and freshwater habitats. In Queensland, it is known to travel significant distances upstream through large rivers (Department of the Environment, 2014).	**Unlikely** – The nearest record on ALA is located over 250km north of site, near the Gulf of Carpentaria. There is no suitable habitat for this species on site as there is no permanent water source.

[1]NC ACT Status – Nature Conservation Act (1992) Status. LC – Least Concern, SL – Special Least Concern, NT – Near Threatened, V – Vulnerable, E – Endangered, CR – Critically Endangered.

[2]EPBC Status – Environment Protection and Biodiversity Conservation Act (1999) Status. V – Vulnerable, E – Endangered, CE – Critically Endangered, NL – Not Listed, M – Migratory, Ma - Marine.

[3]50 km search radius around central coordinate for records in: PMST – EPBC Act Protected Matters Report; WO – Wildlife Online Database, ALA – Atlas of Living Australia, Flightpath Modelling – WTS, 2023. 2 km search radius around central coordinate for: MPH – Modelled Potential Habitat layer in Qspatial.

[4]Number of species for each group

*Indicates likelihood of occurrence was changed between pre-survey and post-survey assessments

EPBC Migratory Species

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
Asian Dowitcher (*Limnodromus semipalmatus*)	SL	M, Ma	EAA Flyway, Flightpath modelling	A large migratory wader that breeds in isolated colonies in central and eastern Siberia, Mongolia, and north-east China. The species is a regular visitor to the north-west between Port Hedland and Broome. Elsewhere they are sporadic and rare. They occur in sheltered coastal environments, such as embayments, coastal lagoons, estuaries, and tidal creeks (Higgins & Davies, 1996).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area. The species is a regular visitor to the north-west of Australia between Port Hedland and Broome. Elsewhere they are sporadic and rare.
Bar-tailed Godwit (*Limosa lapponica*)	SL	M, Ma	EAA Flyway, Flightpath modelling	A large, primarily coastal migratory wader rarely found inland. However, some inland records suggest there is some passage overland and there are records at Lake Moondarra, approximately 70 km southwest of the Study Area (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area, and records at Lake Moondarra, indicate there is a possibility for this species to occur, likely transiently if at all, within the Study Area.
Black-tailed Godwit (*Limosa limosa*)	SL	M, Ma	EAA Flyway, Flightpath modelling	A large, migratory wader that inhabits both coastal and inland wetlands. Birds travelling south from northern Australia often pass through the Mt Isa region and there are several records of birds congregating at Lake Moondarra, approximately 70 km southwest of the Study Area, as well as records at Rifle Creek Dam (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area, and records at Lake Moondarra and Rifle Creek Dam, indicate there is a possibility for this species to occur, likely transiently if at all, within the Study Area.
Broad-billed Sandpiper (*Limicola falcinellus*)	SL	M, Ma	EAA Flyway, Flightpath modelling	A small, primarily coastal migratory wader rarely recorded inland. There are no records in the vicinity of the Study Area (ALA, 2023).	**Possible*** – The presence of modelled flight paths in the vicinity of the Study Area indicates there is a possibility for this species to occur transiently within the Study Area, despite the lack of nearby records.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
Caspian tern (*Hydroprogne caspia*)	SL	M, Ma	EAA Flyway, ALA, Flightpath modelling	A large part-migratory to migratory species of tern with a cosmopolitan distribution. In Australia, this species is primarily coastal, though travels inland to visit large bodies of water (Pizzey and Knight, 2012).	**Possible** – within a 50 km buffer from a central point within the Study Area, the Caspian tern has 15 records. The Study Area has no large bodies of water that are suitable for the species, however, the species may use the Study Area temporarily while in transit between waterholes.
Common greenshank/ greenshank (*Tringa nebularia*)	SL	M, Ma	PMST, ALA, EAA Flyway	Inhabits mudflats, estuaries, saltmarshes, lake and pond margins, wetlands. Generally found in coastal environments, but present inland where habitat is suitable. Widespread summer migrant, with some overwintering. (Pizzey and Knight, 2012).	**Possible** – four records exist within a 50 km buffer from a central point within the Study Area. The habitat on Study Area is largely unsuitable due to the lack of permanent water sources, however the species may be a temporary resident.
Common Redshank (*Tringa totanus*)	SL	M, Ma	EAA Flyway	A stout migratory wader that breeds in Iceland, the British Isles, and Scandinavia and spends the non-breeding season in Asia, primarily China, Australasia, Australia, and some Pacific islands (Higgins & Davies, 1996). In Australia, the Common Redshank has been recorded at scattered locations. In Queensland, the species is known to occur in the Cairns district.	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Common Sandpiper (*Actitis hypoleucos*)	SL	M, Ma	EAA Flyway	A small sandpiper that is found along all coastlines of Australia and in many areas inland, it is widespread in small numbers. When in Australia, populations are concentrated in northern and west Australia (Higgins and Davies, 1996). They typically occur in sandy, pebbly, or muddy edges of streams or rivers, either coastal or inland (Pizzey & Knight, 2012).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
Common Tern (*Sterna hirundo*)	SL	M, Ma	EAA Flyway	A medium-sized slender sea-tern that breeds in North America and Eurasia. They are a non-breeding migrant to Australia, where they are widespread and common on the eastern coast south to eastern Victoria, and common on parts of the northern coast, mainly east of Darwin. In Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms, and headlands and in sheltered waters (Higgins & Davies, 1996).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Curlew sandpiper (*Calidris ferruginea*)	CR	CE, M, Ma	ALA, PMST, Flightpath modelling	Usually inhabits intertidal mudflats, such as lagoons, bays, estuaries, inlets etc. Recorded less often inland around permanent and ephemeral water sources such as dams, ponds, lakes, waterholes. Inland records are sparse. (Pizzey and Knight, 2012) (DAWE, 2022d).	**Possible** – Two records exist within a 50 km radius of the Study Area; they are located approximately 40 km southwest of the Study Area. A very small percentage of the Study Area would be considered suitable habitat, furthermore due to the seasonal and ephemeral nature of the waterholes, it is unlikely that it would be used as habitat for the species. The species may use the Study Area temporarily while in transit between waterholes.
Double-banded Plover (*Charadrius bicinctus*)	SL	M, Ma	EAA Flyway	A medium-sized dotterel that is generally found in pairs during the breeding season but are gregarious in the non-breeding season. The Double-banded Plover breeds only in New Zealand, where it is widespread. During the non-breeding season, it is common in eastern and southern Australia, mainly between the Tropic of Capricorn and western Eyre Peninsula, with occasional records in northern Queensland and Western Australia (Marchant & Higgins, 1993). They are found on littoral, estuarine and fresh or	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
				saline terrestrial wetlands and also saltmarsh, grasslands, and pasture.	
Eastern Curlew (*Numenius madagascariensis*)	E	CE, M, Ma	EAA Flyway	Within Australia, the eastern curlew has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. Eastern curlews are rarely recorded inland. They have a continuous distribution from Barrow Island and Dampier Archipelago, Western Australia, through the Kimberley and along the Northern Territory, Queensland, and NSW coasts and the islands of Torres Strait. They are patchily distributed elsewhere (Department of the Environment, 2015).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area. Eastern curlews are rarely recorded inland.
Fork-tailed swift (*Apus pacificus*)	SL	M, Ma	PMST	Widespread across Australia. Scattered records from throughout the Gulf of Carpentaria and Cape York. Almost exclusively aerial, have been recorded in most habitats across Australia (Pizzey and Knight, 2012).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Glossy ibis (*Plegadis falcinellus*)	SL	M, Ma	ALA	Prefers well-vegetated wetlands, floodplains, irrigated pastures, sewage ponds, mangroves, mudflats, and the like. Occasionally occurs in dry grasslands. The migratory and nomadic species breeds in southern Australia between October to December and in north Australia between February to April. Range may extend far inland after good rains. (Pizzey and Knight, 2012).	**Known*** – 14 records exist within a 50 km radius of the Study Area. Most of the occurrences are proximal to water sources, due to the lack of permanent water sources on Study Area, the species may be less likely to frequent the Study Area.
Great Knot (*Calidris tenuirostris*)	CE	CE, M, Ma	EAA Flyway, Flightpath modelling	The largest of its genus. A migratory bird that breeds in Siberia and spends the non-breeding season in Australia. Recorded primarily around coastal wetlands with sparse scattered inland records, usually on inland lakes (Garnett, Szabo, & Dutson, 2011).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area indicates there is a possibility for this species to occur transiently within the Study Area, despite the lack of nearby records.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
Greater Sand Plover (*Charadrius leschenaultii*)	V	V, M, Ma	EAA Flyway, Flightpath modelling	A medium-sized migratory plover that breeds in Asia and migrates to Australia and some western-pacific islands for the non-breeding season. They are primarily coastal, arriving in northern Australia and dispersing around the country. The scarcity of inland records suggests that movements to southern and eastern areas in Australia occur around the coastline rather than across the continent (Bamford, 1988) (Blakers, Davies, & Reilly, 1984) (Lane, 1987) (Sibson, 1948) (Stewart, Rogers, & Rogers, 2007). However, there is a single record in the vicinity of the Study Area at Lake Moondarra, approximately 70 km southwest of the Study Area (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area indicates there is a possibility for this species to occur transiently within the Study Area, despite the lack of nearby records.
Grey Plover (*Pluvialis squatarola*)	SL	M, Ma	EAA Flyway, Flightpath modelling	A medium-sized migratory plover that breeds in the far northern hemisphere and spends the non-breeding season on the coasts of America, southern Europe, Africa, southern Asia, and Australia (Cramp & Simmons, 1983) (de Schauensee, 1970) (de Schauensee, The Birds of China, 1984) (Grimmett, Inskipp, & Inskipp, 1999b) (Orn. Soc. Japan, 2000) (Urban, Fry, & Keith, 1986) (Wiersma, 1996). In Australia, Grey Plovers occur almost entirely in coastal areas, however there are records of overland movement. There is a single record in the vicinity of the Study Area at Lake Moondarra, approximately 70 km southwest of the Study Area (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area indicates there is a possibility for this species to occur transiently within the Study Area, despite the lack of nearby records.
Grey-tailed Tattler (*Tringa brevipes*)	SL	M, Ma	EAA Flyway, Flightpath modelling	A medium-sized migratory wader that breeds in the northern hemisphere, specifically north Siberia, and migrates south to Australia for the boreal winter. In Australia, the species is found in most coastal regions, primarily along the northern coast. There are rare inland records, including Burdekin Weir, Charters Towers and Mount Isa. There are no records in the vicinity of the Study Area (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area indicates there is a possibility for this species to occur transiently within the Study Area, despite the lack of nearby records.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
Grey Wagtail (*Motacilla cinerea*)	SL	M, Ma	PMST	Distribution suggests this species favours coastal regions with higher rainfall. Typically found near running water in sandy or rocky streams in escarpments and rainforests, sometimes in disused quarries. Also found near sewage ponds, agricultural/cropping areas, and airfields (Pizzey and Knight, 2012).	**Unlikely -** no records exist within a 50 km buffer from a central point within the Study Area. The nearest record is over 600 km away, on the coast.
Gull-billed Tern (*Gelochelidon nilotica*)	SL	M, Ma	EAA Flyway	A medium-sized, stocky tern. Preferred habitat includes beaches, mudflats, fresh and brackish wetlands including far inland grasslands, crops, ploughed fields and airfields (Pizzey & Knight, 2012). Breeding occurs in September–May usually in small colonies on islands.	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Latham's snipe (*Gallinago hardwickii*)	SL	M, Ma	PMST	Typically inhabits soft wet ground, including shallow waters with vegetation and wet parts of paddocks, seepage, irrigation, and similar habitats. Mostly found in coastal regions of eastern Australia but exhibits strong inland movements in certain areas (Pizzey and Knight, 2012).	**Possible** – Two records are located within a 50 km buffer from a central point within the Study Area, they are located approximately 40 km southwest of Study Area. The Study Area may contain potential habitat.
Lesser Sand Plover (*Charadrius mongolus*)	E	E, M, Ma	ALA, EAA Flyway, Flightpath modelling	Two Lesser Sand Plover subspecies migrate to Australia for the boreal winter. In Australia, this species is present in coastal regions in all states but are most common in northern and eastern Australia. They are rarely recorded inland; however, they have been recorded at margins of lakes and soaks and swamps associated with artesian bores (Marchant & Higgins, 1993). Within the vicinity of the Study Area, there are three records around Mt Isa City (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area, and records around Mt Isa City, indicate there is a possibility for this species to occur transiently within the Study Area.
Little curlew (*Numenius minutus*)	SL	M, Ma	EAA Flyway	A small migratory curlew that breeds in Siberia, and generally spends the non-breeding season in northern Australia from Port Hedland, WA to the Queensland coast. They are widespread in coastal regions with some inland records. In the vicinity of the Study Area, they are known to congregate at Lake Moondarra, approximately 70 km	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
				southwest of the Study Area, and there are records scattered in and around Mt Isa City (ALA, 2023).	
Little Ringed Plover (*Charadrius dubius*)	SL	M, Ma	EAA Flyway	A small delicately built plover that breeds on stony substrates around lakes, gravel pits, and along rivers. Migrants occur in wide variety of fresh and brackish wetland habitats, but rarely out on open tidal areas (Sullivan, et al., 2009).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Little Tern (*Sterna albifrons*)	SL	M, Ma	Flightpath modelling	A small, slender tern that breeds overseas and in Australia. In Australia there are three distinct populations of Little Tern: two breeding populations in northern and eastern Australia and one non-breeding population that migrates from breeding grounds in Asia to avoid the winter. They are associated with sheltered coastal environments. There are no records of this species in the vicinity of the Study Area (ALA, 2023).	**Possible*** – The presence of modelled flight paths in the vicinity of the Study Area indicates there is a possibility for this species to occur transiently within the Study Area, despite the lack of nearby records.
Long-toed Stint (*Calidris subminuta*)	SL	M, Ma	EAA Flyway	A very small migratory sandpiper that is believed to breed in Siberia and is a regular summer visitor to Australia, but uncommon in the east. In Australia, the Long-toed Stint occurs in a variety of terrestrial wetlands. They prefer shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds. They have been recorded at Mount Isa (Higgins & Davies, 1996).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Marsh sandpiper (*Tringa stagnatilis*)	SL	M, Ma	ALA, Flightpath modelling	A medium-sized migratory sandpiper often found singly or in small to large flocks. They are a non-breeding visitor to Australia, where they are found on coastal and inland wetlands around the country. In the vicinity of the Study Area, they are known to congregate at Lake Moondarra, approximately 70 km southwest of the Study Area, and there are abundant records in and around Mt Isa City, as well as at Corella Dam and Chinaman Dam (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area, and records at Late Moondarra, Corella Dam, Chinaman Dam, and around Mt Isa City, indicate there is a possibility for this species to occur within the Study Area.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
Oriental Plover (*Charadrius veredus*)	SL	M, Ma	PMST	Inland swamps or wetlands, may venture far from water into open plains or bare country (Pizzey & Knight, 2012).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Oriental Pratincole (*Glareola maldivarum*)	SL	M, Ma	PMST, EAA Flyway	A tern-like shorebird with long, pointed wings and a forked tail (Department of Climate Change, Energy, the Environment and Water., 2023). This species generally migrates to Australia from Nov-Feb, and inhabits plains, shallow edges of wetlands, mudflats, beaches. Nomadic, follows rainfall, appearing in large companies before moving on.	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Pacific Golden Plover (*Pluvialis fulva*)	SL	M, Ma	EAA Flyway, Flightpath modelling	A medium-sized migratory plover often found in flocks of 20-50 birds (Marchant & Higgins, 1993). They breed in northern Siberia and Alaska, and spend the non-breeding season in Asia, Australia, and Polynesia (Grimmett, Inskipp, & Inskipp, 1999b) (de Schauensee, 1984). They are common in coastal regions in all states, though there are also inland records in all states often along major river systems. In the vicinity of the Study Area, there are several records at Lake Moondarra, approximately 70 km southwest of the Study Area, and in and around Mt Isa City (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area, and records at Late Moondarra and around Mt Isa City, indicate there is a possibility for this species to occur within the Study Area.
Pectoral Sandpiper	SL	Ma	EAA Flyway	A small to medium sized sandpiper characterised by a flat back and a plump body that tapers to a drawn-out rear end (Higgins & Davies, 1996). Typically, they inhabit shallow fresh water, often with grasses or other herbage. Associated with swamp margins, flooded agricultural land, tidal areas, saltmarshes. Regular but uncommon summer migrant. (Pizzey & Knight, 2012). In Queensland, most records occur around Cairns with scattered records elsewhere including a few inland records around Mt Isa.	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Red Knot (*Calidris canutus*)	E	E, M, Ma	EAA Flyway,	A robust small to medium-sized migratory wader that breeds in the Arctic and migrates to non-breeding areas that extend	**Possible** – The presence of modelled flight paths in the vicinity of the Study

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
			Flightpath modelling	to south America, Africa, and Australasia (del Hoyo, Elliott, & Sargatal, 1996). They are primarily coastal and mainly inhabit intertidal mudflats, sandflats, and sandy beaches of sheltered coasts. There is evidence of some overland movement, however there are no records in the vicinity of the Study Area (ALA, 2023).	Area indicates there is a possibility for this species to occur transiently within the Study Area, despite the lack of nearby records.
Red-necked Phalarope (*Phalaropus lobatus*)	SL	M, Ma	EAA Flyway	A distinctive marine wader that is the smallest of its family. One of the only waders occurring regularly at sea. They mainly winter at sea around the tropics but are occasionally seen on coastal and inland wetlands (Higgins & Davies, 1996). In Queensland the species has been found at Lake Moondarra, Mount Isa, Hood's Lagoon and Helidon.	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area..
Red-necked Stint (*Calidris ruficollis*)	SL	M, Ma	ALA, EAA Flyway, Flightpath modelling	The smallest shorebird in Australia. They breed in Siberia and Alaska and migrate to Australasia, primarily Australia, for the Boreal winter (Higgins & Davies, 1996). In Australia, they are found mainly on the coast in sheltered inlets, bays, lagoons, and estuaries with intertidal mudflats, and can also occur on near coastal or inland ephemeral or permanent shallow wetlands. They often move overland and there are several records within the vicinity of the Study Area at Lake Moondarra, approximately 70 km southwest of the Study Area, in and around Mt Isa City, at Chinaman Dam, and in Cloncurry (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area, and records at Lake Moondarra, Chinaman Dam, and around Mt Isa City and Cloncurry, indicate there is a possibility for this species to occur within the Study Area.
Ruddy Turnstone (*Arenaria interpres*)	V	V, M, Ma	EAA Flyway, Flightpath modelling	A stocky medium-sized wader that breeds in coastal Europe, Asia, and North America. Their non-breeding distribution is almost cosmopolitan, they are common throughout Australasia and are widespread in Australia (Higgins & Davies, 1996). In Australia, they are found in most coastal regions with exposed rock coastlines or coral reefs, with occasional records of inland populations in habitats such as riverbeds, and on inland lakes and adjacent farmland	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area, and records at Lake Moondarra, indicate there is a possibility for this species to occur within the Study Area.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
				(Higgins & Davies, 1996). In the vicinity of the Study Area, there are several records at Lake Moondarra, approximately 70 km southwest of the Study Area (ALA, 2023).	
Ruff (*Philomachus pugnax*)	SL	M, Ma	EAA Flyway	A medium-sized wader that breeds in Europe from north Russia to north-west Kazakhstan. They are a rare but regular visitor to Australia, being recorded in all States and Territories. In Australia the Ruff is found on generally fresh, brackish of saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and flood lands.	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Sanderling (*Calidris alba*)	SL	M, Ma	EAA Flyway, Flightpath modelling	A migratory sandpiper typically found in small to large flocks, sometimes in the hundreds. They breed in the northern hemisphere, specifically in northern North America, northern Russia, and islands in the Arctic Ocean. They migrate south to spend the non-breeding season on sandy coastal shores of all continents except Antarctica. They are mainly coastal, however there are rare records of birds stopping inland on sandy shores of ephemeral brackish lakes or river-pools (Higgins & Davies, 1996). There are no records of the species in the vicinity of the Study Area (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area indicates there is a possibility for this species to occur transiently within the Study Area, despite the lack of nearby records.
Sharp-tailed sandpiper (*Calidris acuminata*)	SL	M, Ma	ALA, EAA Flyway	Species typically inhabits tidal mudflats, saltmarshes, mangroves, wetlands, floodwater, irrigated agricultural land, ponds. Strong association with water. Widespread summer migrant to coastal and inland Australia (Pizzey and Knight, 2012).	**Possible** – Within a 50 km buffer from a central point within the Study Area, three records exist within the ALA database. The Study Area has several small, ephemeral waterholes that the species could potentially utilize.
Short-tailed Shearwater (*Ardenna tenuirostris*)	SL	M, Ma	EAA Flyway	A medium-sized shearwater that is common in the Pacific Ocean, especially around Australia, New Zealand and up to the Bering Sea. Can be abundant in ocean waters off Alaska,	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
				gathering in enormous flocks; less common further south (Sullivan, et al., 2009).	
Swinhoe's Snipe (*Gallinago megala*)	SL	M, Ma	EAA Flyway	Very similar in morphology to Latham's snipe (*Gallinago hardwickii*). Swinhoe's Snipe breeds in central and southern Siberia. Few definite records exist for Swinhoe's Snipe in Australia. The species has been recorded in the north between the Kimberley Divide and Cape York Peninsula. During the non-breeding season Swinhoe's Snipe occurs at the edges of wetlands, such as wet paddy fields, swamps, and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens (Higgins & Davies 1996).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Terek Sandpiper (*Xenus cinereus*)	V	V, M, Ma	EAA Flyway, Flightpath modelling	A small migratory wader that breeds in the northern hemisphere, specifically Russia, Ukraine, Finland, and northern Estonia. They migrate south for the boreal winter, occurring in coastal Africa, throughout southern Asia from the Persian Gulf east to Japan, Indomalaya and Indochina, New Guinea, Australia, and New Zealand (Marchant & Higgins, 1993). Approximately 1/8th of the global population spends the non-breeding season in Australia (Geering A, 2007). They are associated with coastal areas and prefer mangroves for roosting and soft wet intertidal mudflats or sheltered estuaries, embayments, harbors or lagoons for foraging (Marchant & Higgins, 1993). Inland records suggest there is some overland migration (Blakers, Davies, & Reilly, 1984). There is a single record in the vicinity of the Study Area at Lake Moondarra, approximately 70 km southwest of the Study Area (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area, and records at Lake Moondarra, indicate there is a possibility for this species to occur within the Study Area.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
Wandering Albatross (*Diomedea exulans*)	V	V, M, Ma	EAA Flyway	A large migratory bird with the longest wing-span of any ocean bird (2.5-3.5m). They are solitary or gregarious at sea. It breeds in colonies (Marchant & Higgins, Handbook of Australian, New Zealand and Antarctic Birds. Volume One - Ratites to Ducks, 1990). The Wandering Albatross has a circumpolar distribution. It breeds on six subantarctic island groups (Marchant & Higgins, 1990). In the Australasian region, it occurs inshore, offshore and in pelagic waters (Barton, 1979).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Whimbrel (*Numenius phaeopus*)	SL	M, Ma	EAA Flyway, Flightpath modelling	A medium-sized migratory curlew that breeds in the northern hemisphere, mainly in Alaska but has also been observed breeding across northern Europe into Russia. They migrate south for the boreal winter and can occur through Central and South America, coastal Africa, the Persian Gulf, south-east Asia, New Guinea, Micronesia, Melanesia, Polynesia, and Australia. Only one subspecies, *Numenius phaeopus variegates*, occurs in the East Asian-Australasian Flyway. In Australia, Whimbrels are often found on the intertidal mudflats of sheltered coasts or harbors. Inland records suggest there is some overland movement, however there are no records of the Whimbrel in the vicinity of the Study Area (ALA, 2023).	**Possible** – The presence of modelled flight paths in the vicinity of the Study Area indicates there is a possibility for this species to occur transiently within the Study Area, despite the lack of nearby records.

Common Name (*Scientific Name*)	Status		Source[3]	Description and Ecology	Likelihood of Occurrence
	NC Act[1]	EPBC[2]			
White-winged Black Tern (*Chlidonias leucopterus*)	SL	M, Ma	EAA Flyway	A slender, compact migratory marsh tern that breeds in a wide range in the northern hemisphere, from Italy through Russia to Eastern China. The species migrates south for the boreal winter, occurring in sub-Saharan Africa, southern Asia, Indonesia, New Guinea, Australia, and New Zealand. Within Australia, White-winged Black Terns are common along most coastal areas except the south-east. They are commonly found on tidal wetlands and rarely on inland wetlands such as lakes, billabongs, rivers, floodplains, or reservoirs (Higgins & Davies, 1996) (Gochfeld & Burger, 1996). In the vicinity of the Study Area, there are several records on Lake Moondarra and scattered records near Mt Isa City, approximately 70 km southwest of the Study Area, at Corella Dam, and at Chinaman Dam near Cloncurry (ALA, 2023).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.
Wood Sandpiper (*Tringa glareola*)	SL	M, Ma	EAA Flyway	A small, thin wader that is seen singly, in pairs or in small flocks. Occasionally they will flock in the hundreds. They associate freely with other waders (Higgins & Davies, 1996). This species is a regular summer (September – April) migrant to northern Australia, however Queensland records are scattered (Pizzey & Knight, 2012). Typical habitat includes well vegetated, shallow, freshwater wetlands such as swamps, billabongs, lakes, pools, and waterholes. They are typically associated with emergent, aquatic plants and areas dominated by taller fringing vegetation. This species will also use artificial wetlands including open sewage ponds, large farm dams and bore drains (Higgins & Davies, 1996).	**Unlikely** - no records or modelled flight paths exist within a 50 km buffer from a central point within the Study Area.

[1]NC ACT Status – Nature Conservation Act (1992) Status. LC – Least Concern, SL – Special Least Concern, NT – Near Threatened, V – Vulnerable, E – Endangered, CR – Critically Endangered.

[2]EPBC Status – Environment Protection and Biodiversity Conservation Act (1999) Status. V – Vulnerable, E – Endangered, CE – Critically Endangered, NL – Not Listed, M – Migratory, Ma - Marine.

[3]50 km search radius around central coordinate for records in: PMST – EPBC Act Protected Matters Report; ALA – Atlas of Living Australia; Flightpath Modelling – WTS, 2023; EAA Flyway – East Australasian Flyway

*Indicates likelihood of occurrence was changed between pre-survey and post-survey assessments

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