AECOM Imagine it. Delivered.

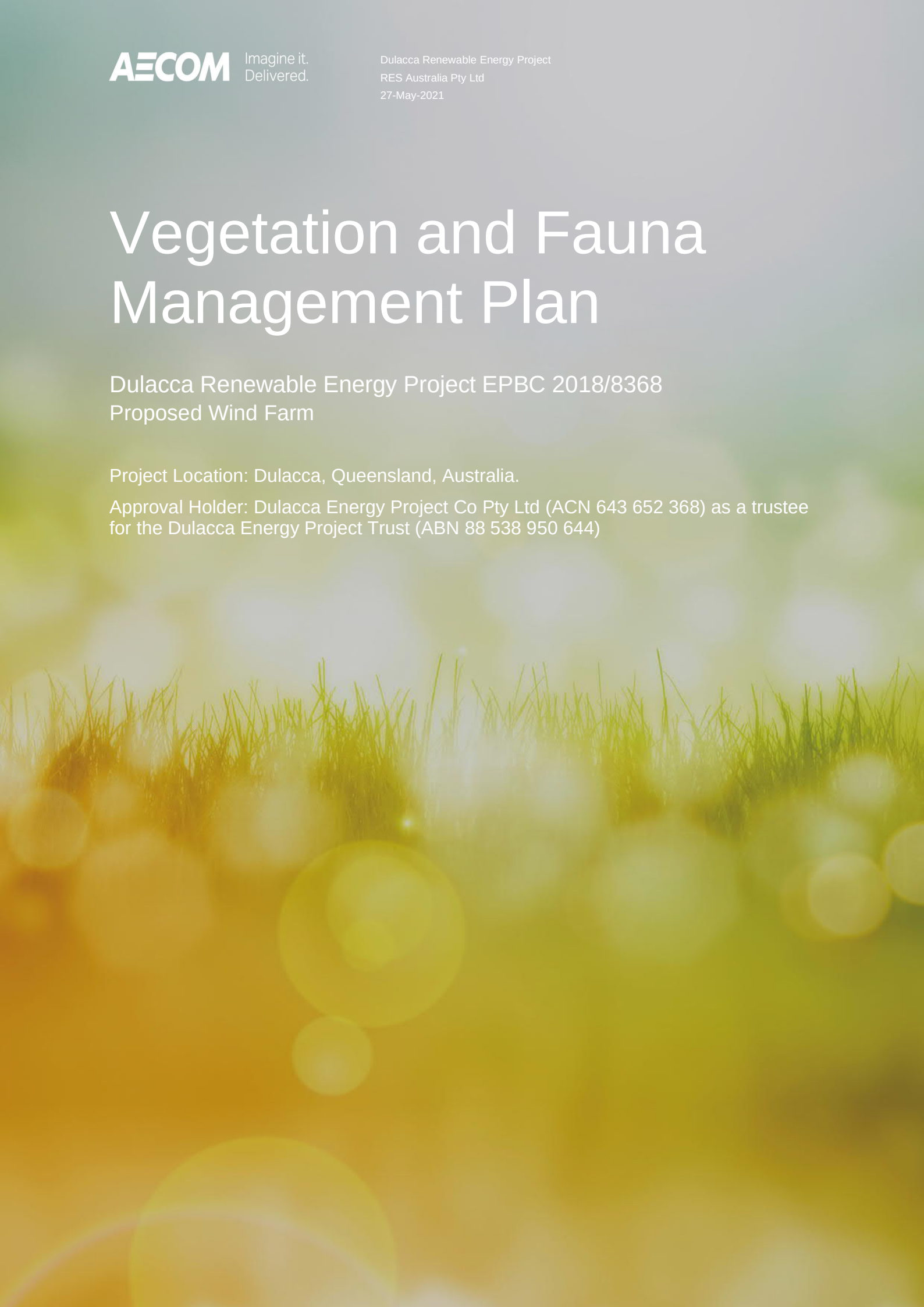
Dulacca Renewable Energy Project
RES Australia Pty Ltd
27-May-2021

Vegetation and Fauna Management Plan

Dulacca Renewable Energy Project EPBC 2018/8368
Proposed Wind Farm

Project Location: Dulacca, Queensland, Australia.

Approval Holder: Dulacca Energy Project Co Pty Ltd (ACN 643 652 368) as a trustee for the Dulacca Energy Project Trust (ABN 88 538 950 644)



Vegetation and Fauna Management Plan

Dulacca Renewable Energy Project EPBC 2018/8368

Client: RES Australia Pty Ltd

ABN: 55 106 637 754

Prepared by

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 7 3553 2000 F +61 7 3553 2050 www.aecom.com
ABN 20 093 846 925

27-May-2021

Job No.: 60567855

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

Quality Information

Document Vegetation and Fauna Management Plan

Ref 60567855

Date 27-May-2021

Prepared by Sebastian Knight - Senior Ecologist

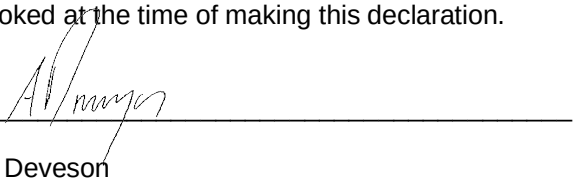
Reviewed by Chris Todd - Principal Ecologist

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
0	13-Nov-2019	Final for lodgement	Chris Adamson Principal Environmental Planner	
1	24-Mar-2020	Updated in response to DAWE comments	Chris Adamson Principal Environmental Planner	
2	26-May-2020	Updated in response to DAWE comments	Chris Adamson Principal Environmental Planner	
3	26-Mar-2021	Updated to include EPBC Act approval requirements	Chris Adamson Principal Environmental Planner	
4	27-May-2021	Updated in response to DAWE comments	Chris Adamson Principal Environmental Planner	

Declaration of accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed: 

Full name (please print): Annette Deveson

Organisation and position (please print): Director

Dulacca Energy Project Co Pty Ltd as a trustee for the Dulacca Energy Project Trust

Date: 28 / 05 / 2021

Table of Contents

List of Tables

List of Figures

Glossary

AECOM	AECOM Australia Pty Ltd
CEMP	Construction Environmental Management Plan
DAWE	Department of Agriculture, Water and the Environment (Cth)
DoR	Department of Resources
DRMP	Decommissioning and Rehabilitation Management Plan
DSDMIP	Department of State Development, Manufacturing, Infrastructure and Planning (Qld)
DWS	Dulacca Woodland Snail
EO Act	*Environmental Offsets Act 2014 (Qld)*
EOP	EPBC Act Environmental Offsets Policy (Cth)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Cth)*
EPBC Act Approval	Approval issued by DAWE on 21 August 2020 (Ref. EPBC 2018/8368)
EPC	Engineering, Procurement and Construction
ha	Hectares
HSE	Health, Safety and Environmental
km	Kilometres
m	Metres
MNES	Matters of National Environmental Significance
MW	Megawatt
NC Act	*Nature Conservation Act 1992 (Qld)*
OEMP	Operational Environmental Management Plan
Planning Act	*Planning Act 2016 (Qld)*
Planning Regulation	*Planning Regulation 2017 (Qld)*
Project	Dulacca Renewable Energy Project
REs	Regional Ecosystems
RES	RES Australia Pty Ltd
State Development Approval	Approval issued by DSDMIP on 8 March 2019 (Ref. SDA-1812-8802)
TEC	Threatened Ecological Community
VFMP	Vegetation and Fauna Management Plan
VM Act	*Vegetation Management Act 1999 (Qld)*

1.0 Introduction

1.1 Background

AECOM Australia Pty Ltd (AECOM) was commissioned by RES Australia Pty Ltd (RES) to prepare a Vegetation and Fauna Management Plan (VFMP) for the Dulacca Renewable Energy Project (the Project) to satisfy the relevant conditions of State and *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) Approvals.

The Project was conditionally approved by the Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) on 8 March 2019 (Ref. SDA-1812-8802) (the State Development Approval). State Development Approval was granted for a Development Permit - Material Change of Use for a Wind Farm and Operational Work for Clearing Native Vegetation. The State Development Approval consented to up to 56 wind turbines, ancillary infrastructure and battery storage. Post the receipt of State Development Approval, the Project has been optimised to 43 wind turbines following further consideration of a range of matters and constraints, including:

- energy yield optimisation, including preferential turbine options
- network capacity
- economic
- constructability
- environmental
- landowner negotiations.

The Project was approved with conditions by the Department of Agriculture, Water and the Environment (DAWE) under sections 130(1) and 133(1) of the EPBC Act, on 21 August 2020 (Ref. EPBC 2018/8368) (the EPBC Act Approval).

This 43 turbine layout is as separately approved under the EPBC Act Approval and is the maximum number of turbines allowed under this Approval.

The Project was referred to the DAWE on 20 December 2018 and on 15 July 2019, the DAWE delegate made a determination that the proposed action is a 'controlled action' that would require assessment (by preliminary documentation) and approval under the EPBC Act before it can proceed. The relevant controlling provisions of the EPBC Act include, as follows:

- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A).

The EPBC Act Approval includes conditions specific to the action and standard administrative conditions.

This VFMP reflects the relevant conditions of the State Development Approval and EPBC Act Approval, as further described in Section 1.4.

1.2 Project Description

The Project will involve the construction and operation of a wind farm consisting of 43 wind turbines generating approximately 180 MW of clean, renewable electricity from the power of the wind resource at the site. The Project includes supporting and ancillary infrastructure including substation, operational and maintenance facilities, three meteorology masts, construction compounds and laydown areas, foundations and hardstand areas, access tracks and cabling (overhead lines and underground cabling). The Project also includes approval for the construction of an energy storage facility that is proposed for placement adjacent to the substation area. This energy storage facility is proposed to be progressed as a separate phase of the development project.

1.3 Site Description

The Project is proposed over 21 lots and numerous unformed road reserves, totalling approximately 8,177 hectares (ha) (Study Area – Figure 1). The Study Area is bisected by the Warrego Highway and Western Rail Line which run parallel to each other.

The 'Disturbance Footprint' will be up to 292 ha and refers to the anticipated extent within which wind turbines, access tracks, underground cables and other associated infrastructure will be located. The anticipated Disturbance Footprint is illustrated in Figure 1.

In accordance with the provisions of the State Development Approval, micro-siting of the Disturbance Footprint may still occur within the approved limits in the broader Study Area as part of the detailed design of the project. However, importantly, micro-siting will not increase overall clearing and disturbance above upper approved limits from the State Development Approval and final EPBC Act Approval. This ultimately provides the Project will a level of flexibility through detailed design whilst ensuring certainty of impacts to Matters of National Environmental Significance (MNES). Should micro-siting of project infrastructure result in disturbance and impacts not already anticipated within this VFMP, additional significant impact assessment will occur to determine if any amendment actions are necessary.

The Study Area and its surrounds are primarily used for agriculture (grazing) and cropping. The majority of the vegetation has been cleared; however, patches of native vegetation remain. The Study Area's altitude ranges from as low as 300 metres (m) Australian Height Datum (AHD) to as high as 405 m AHD.

1.4 Aims and Objectives

This VFMP has been prepared to meet the relevant conditions of the State Development Approval and EPBC Act Approval, as described in Table 1.

Table 1 State Development Approval and EPBC Act Approval conditions

Condition ref.	Relevant condition requirement	Relevant section of VFMP
State Development Approval		
Condition 8(a)	Prepare a Vegetation and Fauna Management Plan (VFMP) certified by a suitably qualified ecologist.	Quality Information page and declaration of accuracy, 1.4
	The VFMP must include details of all measures to identify and avoid fauna resources and habitats prior to clearing.	Pre-clearing surveys and micrositing requirements - 5.1, 5.2, 5.3, 6.3.1
	The plan must include measures to protect and recover fauna during clearing operations, including presence of a qualified wildlife officer during clearing operations, pre-clearing inspections, staging and sequence of clearing and recovery procedures.	Pre-clearing surveys, spotter-catcher, clearing and procedures - 5.1, 5.2, 5.3
	Measures to replace/relocate habitat and resources that will be unavoidably lost needs to be included.	Habitat and fauna relocation - 5.1, 5.2, 5.3 Rehabilitation measures - 3.6, 5.1, 5.2, 5.3, 6.3.2
EPBC Act Approval		
Condition 1	To minimise impacts to the Dulacca Woodland Snail, the approval holder must not clear more than a total of 1.49 hectares (ha) of Dulacca	Clearing limits - 5.1, 5.2.1

Condition ref.	Relevant condition requirement	Relevant section of VFMP
	Woodland Snail habitat, and this clearing must be in the Key impact areas for Dulacca Woodland Snail habitat within the project area.	
Condition 2	The approval holder must undertake pre-clearance surveys of all areas to be cleared, to identify any protected matters, prior to undertaking clearing. All pre-clearance surveys must be undertaken by a suitably qualified ecologist and undertaken in accordance with the Department's survey guidelines.	Pre-clearing surveys - 5.1, 5.2, 5.3, 6.3.1
Condition 5	The approval holder must implement the Vegetation and Fauna Management Plan within 10 m of any area disturbed as part of the action shown in the Final Layout Plan for the duration of this approval. In particular, the approval holder must:	VFMP implementation - 1.4, 5.1, 5.2, 5.3
	a. prior to the commencement of the action, undertake weed management control across all areas within the project area subject to disturbance;	Pre-construction phase weed management and control - 3.6.2, 5.1, 5.2, 5.3, 6.3.1
	b. during the construction, undertake weed management control across all areas within the project area subject to disturbance to promptly suppress outbreaks;	Construction phase weed management and control - 3.6.2, 5.1, 5.2, 5.3, 6.3.2
	c. upon the cessation of disturbance, undertake weed control within disturbed areas until such time that weed presence in these areas cannot be attributed to disturbance associated with construction activities; and	Post-construction phase weed management and control - 3.6.2, 5.1, 5.2, 5.3, 6.3.2
	d. undertake weed management and control within 1 m of any project infrastructure at ground level for the rest of the period of effect of this approval. The weed management and control must minimise the risk of and potential for weed cover occurring, suppress any outbreak that occurs, and remove any weeds that may occur.	Post-construction phase weed management and control - 3.6.2, 5.1, 5.2, 5.3, 6.3.2

This VFMP has been prepared by a suitably qualified ecologist and details how potential impacts to vegetation and fauna will be managed and mitigated, as well as providing the framework for monitoring these potential impacts during the construction, operation and maintenance phases of the Project. The approval holder will be responsible for implementing this VFMP within 10 m of any area disturbed as part of the action.

This VFMP has been developed based on the Disturbance Footprint. This area has been established to manage the worst-case scenario for ecological impacts and has been informed by detailed discussions with RES.

Further to this VFMP a Construction Environmental Management Plan (CEMP) has been developed to address management of environmental values additional to vegetation and fauna specific values. The CEMP has been prepared in accordance with condition 12 of the State Development Approval. These plans include, but not be limited to, the management of noise, vibration, and weed and pest management.

A Decommissioning and Rehabilitation Management Plan (DRMP) will be prepared to provide guidance on removal of infrastructure, site clean-up and rehabilitation of construction areas and access tracks. This DRMP, developed in accordance with condition 18 of the State Development Approval, will be established no later than six months prior to the commencement of decommissioning.

DATUM GDA 1994, PROJECTION MGA ZONE 55

0 1 2

Kilometres

1 cm = 650 m (when printed @ A3)

Legend

- Study Area (8,177 ha)
- Disturbance Footprint
- Highway
- Other roads
- Wind Turbine

OVERVIEW QUEENSLAND

1. Site layout elements © RES, 2019
2. Local Goverment Areas © State of Queensland (Department of Natural Resources and Mines) 2017
3. Place names gazetteer - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
4. Baseline roads and tracks Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
5. Rail network - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
6. Electrical Network - Ergon Energy 2018
7. World Topographic Base Map © Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Disclaimer:

DULACCA RENEWABLE ENERGY PROJECT

STUDY AREA AND DISTURBANCE FOOTPRINT

PROJECT #:	60567855
CREATED BY:	AS
LAST MODIFIED:	16/10/2020
VERSION:	2

Figure 1

A3 size

Document Path: P:\605X\60567855\4. Tech Work Area\4.99 GIS\MXD\Commonwealth Documentation Mapping\Vegetation and Fauna Management Plan\60567855_ECO_001_Study_Area_A3L.mxd

2.0 Legislative and Regulatory Framework

2.1 Commonwealth Legislative Considerations

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act protects the environment in relation to MNES. Under the EPBC Act, if a development proposal involves an action that is likely to result in a significant impact on an MNES, referral to DAWE is required.

The Project was referred to DAWE on 20 December 2018 and on 15 July 2019 the DAWE delegate determined that that the proposed action is a 'controlled action' requiring assessment by preliminary documentation under the EPBC Act.

Following preparation, assessment and public notification of the preliminary documentation, the Project was approved with conditions by the DAWE delegate under sections 130(1) and 133(1) of the EPBC Act on 21 August 2020 (Ref. EPBC 2018/8368). The EPBC Act Approval approved the taking of the action with regard to each relevant controlling provisions of the EPBC Act, as follows:

- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A).

2.1.2 EPBC Act Environmental Offsets Policy

The EPBC Act 'Environmental Offsets Policy' (EOP) outlines the Federal Government's approach to the use of environmental offsets under the EPBC Act. The EOP was finalised on 20 September 2012 and applies to any EPBC referrals and variations to EPBC Act Approval conditions from 2 October 2012.

Specifically, the EPBC Act EOP applies to project assessments and approvals under Parts 8 and 9 of the EPBC Act, in addition to strategic assessments under Part 10. Where appropriate, 'environmental offsets' are considered during the assessment phase of an environmental impact assessment under the EPBC Act. Offsets are relative and should compensate for 'residual significant impacts' an action has on MNES after all reasonable actions to avoid or mitigate environmental damage have been investigated.

All information regarding the management of the offset for this EPBC Act Approval is contained in the Biodiversity Offset Plan. Offsets are not considered under the VFMP.

2.2 State Legislative Considerations

2.2.1 Planning Act 2016

The *Planning Act 2016* (Planning Act) is Queensland's key piece of legislation pertaining to the strategic planning and development of the State. The Planning Act mandates the framework of planning instruments and process for development assessment whilst incorporating the regulatory requirements of other Queensland environmental statutory legislation, such as the *Vegetation Management Act 1999* (VM Act), *Coastal Protection and Management Act 1995* and *Fisheries Act 1994* (Fisheries Act).

Subordinate to the Planning Act, the *Planning Regulation 2017* (Planning Regulation) details the mechanics for the operation of the Planning Act. This includes prescription of accepted, prohibited and assessable development, assessment benchmarks for assessable development and identification of the assessment manager (i.e. the Chief Executive or local government).

2.2.2 Vegetation Management Act 1999

The clearing of native vegetation and essential habitat in Queensland is regulated by the VM Act. The purpose of the VM Act is to conserve remnant vegetation, conserve vegetation in declared areas, prevent the loss of biodiversity, maintain ecological processes, allow for sustainable land use etc.

Mapping is provided by the Department of Resources (DoR), which outlines vegetation categories used to determine clearing and assessment requirements under the Planning Act. The State

Development Approval for the Project includes provision for the clearing of native vegetation to support the construction and operation of the development.

2.2.3 Nature Conservation Act 1992

The primary purpose of the *Nature Conservation Act 1992* (NC Act) is to conserve biodiversity by creating and managing protected areas, managing and protecting native flora and fauna, and managing the spread of introduced/non-native (i.e. pest) wildlife. Proposed developments must take in to consideration wildlife and natural areas protected under the NC Act and associated regulations and determine if permits or approvals are required to undertake the proposed works.

2.2.4 Environmental Offsets Act 2014

The *Environmental Offsets Act 2014* (EO Act) outlines the framework for environmental offsets within Queensland and how they should be provided. As defined within Section 7 of the EO Act, an environmental offset is an "…*activity undertaken to counterbalance a significant residual impact of a prescribed activity on a prescribed environmental matter*", such as matters of national, State or Local significance.

Environmental offsets are not an assessment trigger but are imposed as a condition for a proposed activity. Categorising instruments such as the Planning Regulation and local planning schemes identify assessment benchmarks that require prescribed activities to firstly demonstrate how all reasonable avoidance and mitigation measures have been, or will be, undertaken. Following this, if a significant residual impact on the prescribed environmental matter remains, an environmental offset may be required and conditioned.

No environmental offset conditions have been imposed on this Project by the Queensland Government through the State Development Approval.

3.0 Vegetation and Fauna Values

3.1 Study Area Characteristics

The Study Area (Figure 1) is dominated by cleared agricultural land used for cropping and grazing. Remnant *Eucalyptus* woodland occurs within the north of the Study Area predominantly along the ironstone jump-ups. Dominant canopy species include *Eucalyptus crebra* (narrow-leaved ironbark), with small areas of *Acacia harpophylla* (brigalow)-dominated vegetation occurring along the Warrego Highway road reserve and along some property boundaries within the north of the Study Area. Some exotic plant species were detected during the survey, however the Study Area is largely dominated by native species. The primary land use is cattle grazing which has had varying impacts to the ground and shrub layers of the vegetation communities with impact predominantly dependent on the accessibility to cattle which is influenced by the terrain.

3.2 Species Diversity

3.2.1 Fauna

The fauna field survey undertaken over a 6 day period between 18 and 23 March 2018, identified a total of 143 fauna species, including 101 bird, 17 reptile, 24 mammal and 1 amphibian species (AECOM, 2018a). During an earlier field survey undertaken by Ecology and Heritage Partners, (2018), 43 fauna species were identified, comprising 25 bird, 4 reptile, 12 mammal and 2 amphibian species.

The combined species list totals 156 fauna species within the Study Area, comprised of 103 bird, 19 reptile, 31 mammal and 3 amphibian species.

3.2.2 Flora

A flora field survey undertaken over a 5 day period between 13 and 17 March 2018, identified a total of 159 flora species from 47 families and 118 genera (AECOM, 2018b). Families represented by four or more species included Acanthaceae (4 species), Amaranthaceae (4), Apocynaceae (4), Asteraceae (9), Chenopodiaceae (4), Euphorbiaceae (4), Fabaceae (15), Malvaceae (8), Mimosaceae (10), Myrtaceae (5), Poaceae (38), Sapindaceae (4), and Solanaceae (4).

The survey identified 23 exotic (non-native) taxa representing 14% of the flora species recorded.

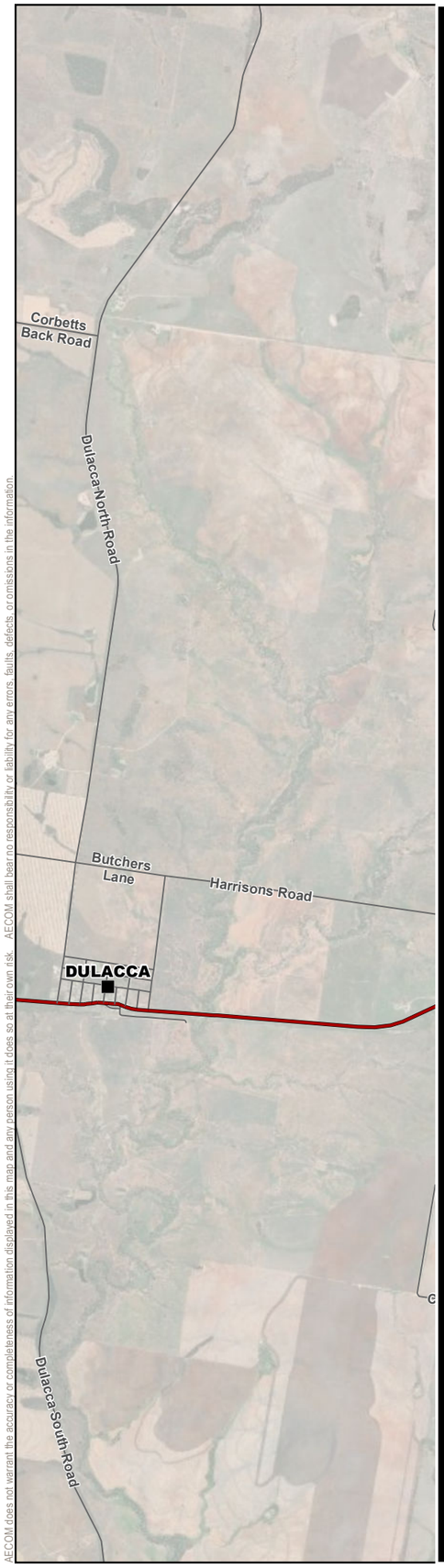
3.3 Fauna Habitat Types

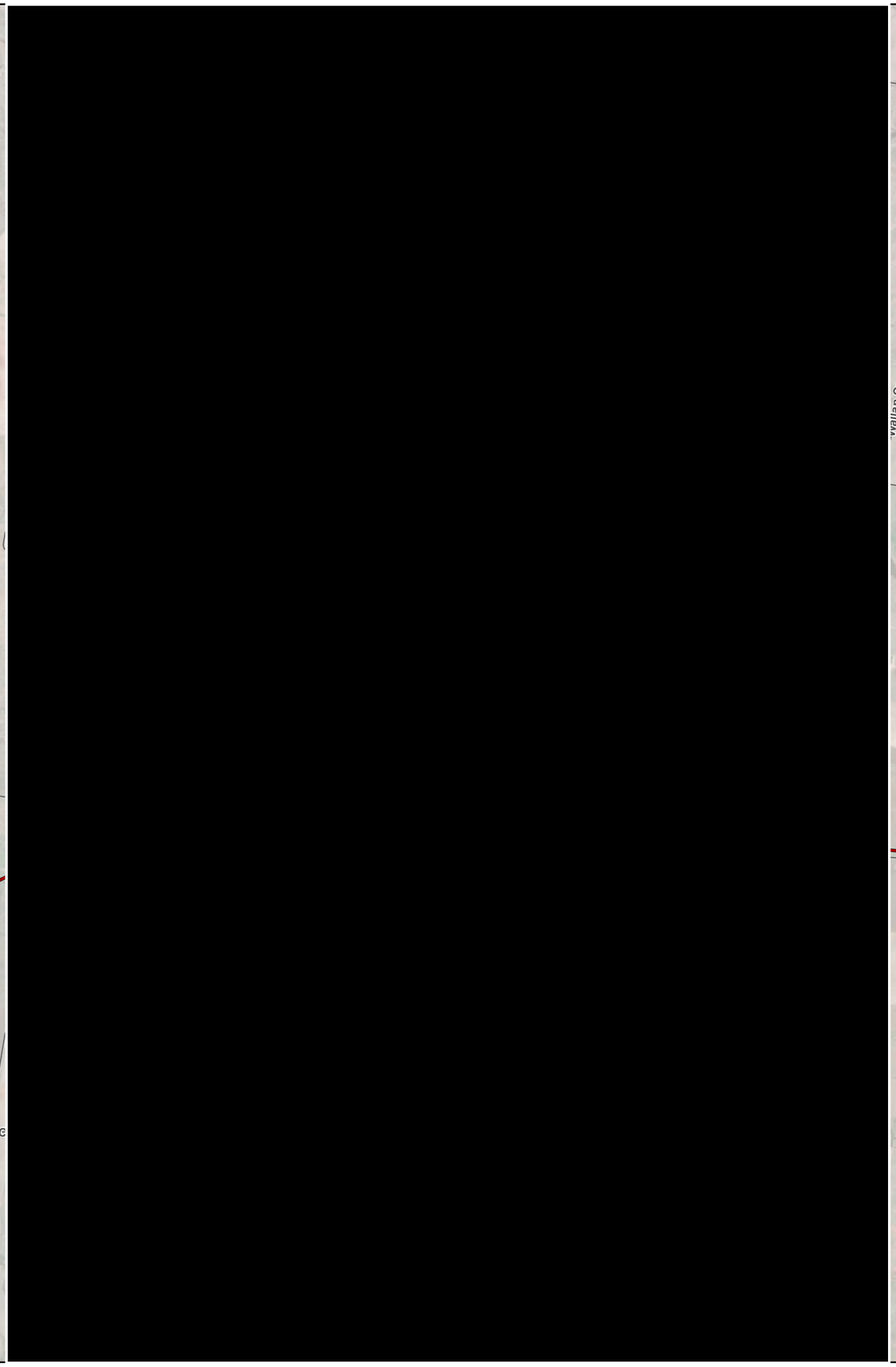
Five habitat types were described within the Study Area (Table 2, Figure 2) (AECOM, 2018a; Boobook Ecological Consulting, 2019). Habitat types were categorised based on similarity in vegetation community, geology and habitat features which are suitable for sustaining populations or communities of particular species or taxa. Four of the five habitat types were analogous with Regional Ecosystems (REs) and one encompasses all non-remnant vegetation within the Study Area.

Table 2 Habitat Types within the Study Area

Habitat Type	Analogous RE	Description	Area (ha) within Study Area	Area (ha) within Disturbance Footprint
1	11.7.6	*Eucalyptus crebra* open woodland on laterite. Key habitat values recorded in this community include fallen woody habitat logs, tree hollows, ground litter, grass and surface rocks and stones	501.43	0.01

Habitat Type	Analogous RE	Description	Area (ha) within Study Area	Area (ha) within Disturbance Footprint
2	11.9.5	*Acacia harpophylla* and *Casuarina cristata* open forest on fine-grained sedimentary rocks. Key habitat values recorded in this community include an abundance of fallen woody habitat logs, tree hollows, decorticating bark, soil cracks and ground litter.	124.58	0.95
3	11.7.1 and 11.9.1,	*Acacia harpophylla* and *Eucalyptus* species woodland on laterite. Key habitat values recorded in this community include fallen woody habitat logs, decorticating bark, ground litter, and occasional soil cracks.	16.18	0.29
4	Non-remnant (excluding cultivated areas)	Non remnant vegetation, including areas that of regrowth (but do not meet remnant RE or High Value Regrowth (HVR) status) creek lines and farm dams. Key habitat values recorded in this community include tree hollows in riparian zones, permanent or semi-permanent water resources in the dams and reeds and macrophytes. Grass within the cleared areas may provide habitat opportunities for small mammals, reptiles and granivorous birds.	4056.68	164.23
5	11.7.1 x 1	Semi-evergreen vine thicket. Key habitat values recorded in this community include fallen woody habitat logs, tree hollows, ground litter, grass and surface rocks and stones.	36.83	0.00





RES AECOM

DATUM GDA 1994, PROJECTION MGA ZONE 55
0 1 2
Kilometres
1 cm = 650 m (when printed @ A3)

Legend

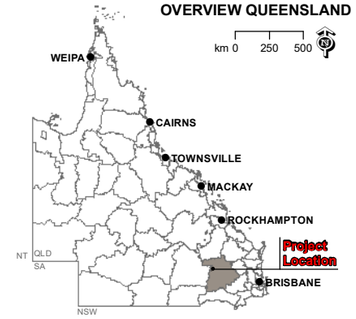
- Study Area (8,177 ha)
- Disturbance Footprint
- Highway
- Other roads

Conservation Significant Species

- Echidna
- Fork-tailed swift
- Dulacca Woodland Snail

Fauna Habitat Type

- 1. *Eucalyptus crebra* open woodland on laterite
- 2. *Acacia harpophylla* and *Casuarina cristata* open forest on fine-grained sedimentary rocks
- 3. *Acacia harpophylla* and *Eucalyptus* species woodland
- 4. Non remnant vegetation, including creek lines and dams
- 5. Semi-evergreen vine thicket



Data Sources:
1. Site layout elements © RES, 2019
2. Local Goverment Areas © State of Queensland (Department of Natural Resources and Mines) 2017
3. Place names gazetteer - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
4. Baseline roads and tracks Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
5. Rail network - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
6. Electrical Network - Ergon Energy 2018
7. World Topographic Base Map © Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Disclaimer:

DULACCA RENEWABLE ENERGY PROJECT

FAUNA HABITAT TYPES AND CONSERVATION SIGNIFICANT FAUNA SPECIES

PROJECT #:	60567855
CREATED BY:	AS
LAST MODIFIED:	16/10/2020
VERSION:	2

Figure 2

A3 size

Document Path: P:\605X\60567855\4. Tech Work Area\4.99 GIS\MXD\Commonwealth Documentation Mapping\Vegetation and Fauna Management Plan\60567855_ECO_002_Fauna_Habitats_A3L.mxd

3.4 Vegetation Communities

The Study Area is dominated by cleared agricultural land used for cropping and grazing with remnant Eucalypt woodland within the north of the Study Area and *Acacia harpophylla* (brigalow)-dominated vegetation occurring along the Warrego Highway road reserve and along some property boundaries. The remnant vegetation is consistent with five Regional Ecosystems (REs), including two Endangered REs and three Least Concern REs (Table 3,) (AECOM, 2018b; Boobook Ecological Consulting, 2019).

Table 3 Vegetation Communities Mapped within the Study Area

RE	Community Description	[1]VM Act Status	Area (ha) within Study Area	Area (ha) within Disturbance Footprint
11.7.1	*Acacia harpophylla* and/or *Casuarina cristata* and *Eucalyptus thozetiana* or *E. microcarpa* woodland on lower scarp slopes on Cainozoic lateritic duricrust.	LC	2.73	0.29
11.7.1 x 1	Semi-evergreen vine thicket	LC	36.83	0.00
11.7.6	*Corymbia citriodora* and/or *Eucalyptus crebra* woodland.	LC	501.43	0.004
11.9.1	*Acacia harpophylla-Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks.	E	13.45	0.00
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks.	E	124.58	0.95
Non-remnant	Non-remnant vegetation (including regrowth, grasslands and cultivated land)	N/A	7,497.98	284.11

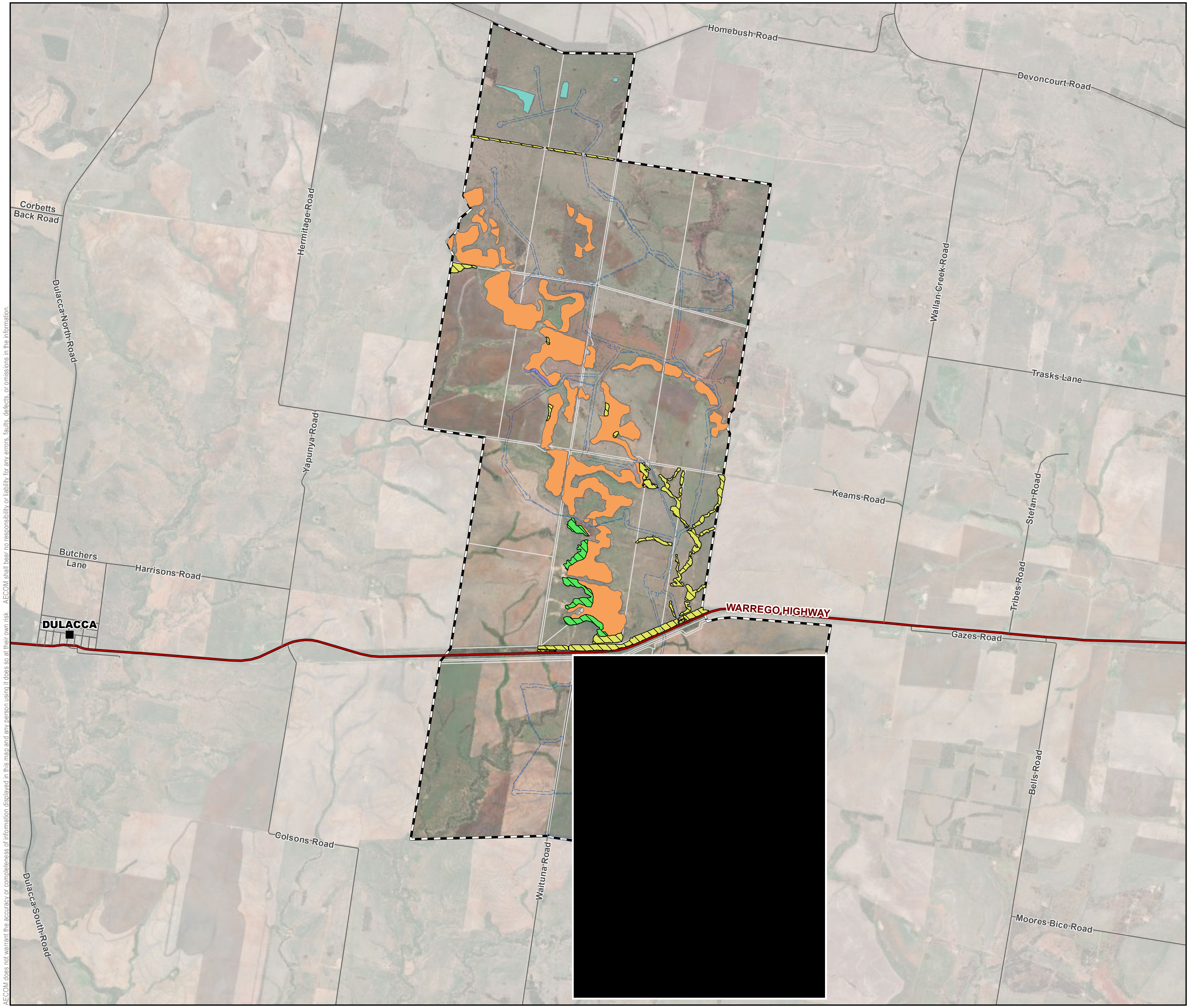
[1]VM Act Status – LC = Least Concern, OC = Of Concern, E = Endangered

3.4.1 Threatened Ecological Communities

Two of the REs within the Study Area are consistent with EPBC Act listed Threatened Ecological Community (TECs), which are described in Table 4 and illustrated on Figure 3.

Table 4 Threatened Ecological Community Mapped within the Study Area

EPBC TEC	Analogous REs	EPBC Act Status	VM Act Status	Area (ha) within Study Area	Area (ha) within Disturbance Footprint
Brigalow (*Acacia harpophylla* dominant and co-dominant)	11.9.5	Endangered	Endangered	124.58	0.95
Semi-evergreen Vine Thickets of the Brigalow Belt	11.7.1x1	Endangered	Least Concern	36.83	0.00



[redacted]

RES

AECOM

DATUM GDA 1994, PROJECTION MGA ZONE 55

0 1 2

Kilometres

1 cm = 6 (when printed @ A3)

Legend

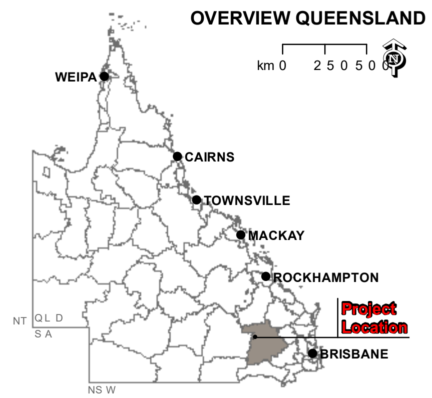
- Study Area (8,177 ha)
- Disturbance Footprint
- Highway
- Other roads
- Threatened Ecological Community
  - Brigalow (*Acacia harpophylla* dominant and co-dominant)
  - Semi-evergreen Vine Thickets of the Brigalow Belt

Vegetation Communities

- RE 11.7.1
- RE 11.7.1x1
- RE 11.7.6
- RE 11.9.1
- RE 11.9.5

Conservation Significant Flora Species

- [redacted]



Data Sources:

1. Site layout elements © RES, 2019
2. Local Goverment Areas © State of Queensland (Department of Natural Resources and Mines) 2017
3. Place names gazetteer - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
4. Baseline roads and tracks Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
5. Rail network - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
6. Electrical Network - Ergon Energy 2018
7. World Topographic Base Map © Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

DULACCA RENEWABLE ENERGY PROJECT

VEGETATION COMMUNITIES AND THREATENED ECOLOGICAL COMMUNITIES

PROJECT #: 60567855
CREATED BY: AS
LAST MODIFIED: 16/10/2020
VERSION: 2

Figure 3

Document Path: P:\605X\60567855\4. Tech Work Area\4.99 GIS\MXD\Commonwealth Documentation Mapping\Vegetation and Fauna Management Plan\60567855_ECO_003_VegetationCommunities_A3L.mxd

A3 size

3.5 Threatened Species

3.5.1 Threatened Flora

Based on the findings of the Flora Technical Report (AECOM, 2018b), six flora species were identified as having a moderate or higher likelihood of occurrence within the Study Area, including one species *Homopholis belsonii* (Belson's panic) that is specifically known to occur (Table 5).

Table 5 Potential Impact on Conservation Significant Flora Habitat

Species	Conservation Status[1]		Likelihood of Occurrence	Predicted RE/s	Area (ha) within Disturbance Footprint
	NC Act	EPBC Act			
Acacia wardellii (Wardel's wattle)	NT	-	Moderate	RE 11.7.6	0.004
Callitris baileyi (Bailey's cypress)	NT	-	Moderate	RE 11.7.6	0.004
Cyperus clarus	V	-	Moderate	RE 11.9.5 and non-remnant areas that have not been cultivated	165.18
Homopholis belsonii (Belson's panic)	E	V	Known	RE 11.7.1, 11.9.1, 11.9.5 and non-remnant areas that have not been cultivated	165.47
Rutidosis lanata	NT	-	Moderate	RE 11.7.6 and non-remnant areas that have not been cultivated	164.23
Solanum stenopterum	V	-	Moderate	RE 11.7.1, 11.7.1 x 1, 11.7.6, 11.9.1, 11.9.5 and non-remnant areas that have not been cultivated	165.47

[1] Conservation Status: E=Endangered; V=Vulnerable; NT=Near Threatened; SLC=Special Least Concern, Mi=Migratory.

Based on the proposed Disturbance Footprint at the time of assessment, which was during the development of the Floral Technical Report) (AECOM, 2018b), the above flora species were subjected to Significant Impact Assessments by a suitably qualified ecologist again in a manner compliant with the Commonwealth guidelines (Department of the Environment, 2013b) and Significant Residual Impact Assessments compliant with State guidelines (Department of State Development, 2014). This process identified Belson's Panic (*Homopholis belsonii*) as a species with potential to be significantly impacted by the development of the Project.

Belson's Panic (*Homopholis belsonii*) was identified within RE 11.9.5 in the south of the Study Area (Figure 4) outside of the Disturbance Footprint (but within the Study Area); however, given the cryptic nature of the species, there is a high likelihood of occurrence within other areas of remnant vegetation (RE 11.9.5, 11.7.1 and 11.9.1) and within the cleared areas of the Study Area that support native grasses. Areas that have been cultivated within the Study Area are considered unlikely to support the species owing to the disturbance of these areas. Suitable potential habitat for *Homopholis belsonii* is illustrated on Figure 4 and the species profile is presented in Section 3.5.1.

DATUM GDA 1994, PROJECTION MGA ZONE 55

0 1 2

Kilometres

1 cm = 650 m (when printed @ A3)

Legend

- Study Area (8,177 ha)
- Disturbance Footprint
- Highway
- Other roads
- Belson's Panic (*Homopholis belsonii*) records (AECOM 2018)
- Belson's Panic Habitat (confirmed)
- Belson's Panic Habitat (potential)

OVERVIEW QUEENSLAND

km 0 250 500

1. Site layout elements © RES, 2019
2. Local Goverment Areas © State of Queensland (Department of Natural Resources and Mines) 2017
3. Place names gazetteer - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
4. Baseline roads and tracks Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
5. Rail network - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
6. Electrical Network - Ergon Energy 2018
7. World Topographic Base Map © Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Disclaimer:

DULACCA RENEWABLE ENERGY PROJECT

HABITAT FOR BELSON'S PANIC

PROJECT #:	60567855
CREATED BY:	AS
LAST MODIFIED:	16/10/2020
VERSION:	2

Figure 4

A3 size

Document Path: P:\605X\60567855\4. Tech Work Area\4.99 GIS\MXD\Commonwealth Documentation Mapping\Vegetation and Fauna Management Plan\60567855_ECO_005_BelsonsPanicHabitat_A3L.mxd

3.5.2 Threatened Fauna

Based on the findings of the Fauna Technical Report (AECOM, 2018a), a total of 14 conservation significant fauna species were identified as having a moderate or higher likelihood of occurrence within the Study Area. This includes species listed as Critically Endangered, Endangered, Vulnerable, Near Threatened, Migratory or Special Least Concern under the NC Act and/or the EPBC Act.

Bird and bat species identified through this process have been addressed in a specific Bird and Bat Management Plan (BBMP) (Nature Advisory, 2019) developed in accordance with condition 9 of the State Development Approval and conditions 6-14 of the EPBC Act Approval. Table 6 addresses the remaining fauna species not captured within this BBMP, including habitat types which may provide suitable habitat for each species.

Table 6 Potential Impact on Conservation Significant Fauna Habitat

Species	Conservation Status[1]		Likelihood of Occurrence	Predicted Habitat Type/s	Area (ha) within Disturbance Footprint
	NC Act	EPBC Act			
Gastropods					
Brigalow woodland snail (*Adclarkia cameroni*)	V	E	Moderate	1, 2, 3, 5	1.49
Dulacca Woodland Snail (*Adclarkia dulacca*)	E	E	Known	1, 2, 3, 5	1.49
Insects					
Pale imperial hairstreak (*Jalmenus eubulus*)	V	-	Moderate	2, 3	1.48
Mammals					
Koala (*Phascolarctos cinereus*)	V	V	Moderate	1, 3 Foraging and dispersal habitat only	0.30
Short-beaked echidna (*Tachyglossus aculeatus*)	SLC	-	Known	1, 2, 3, 4, 5	165.61
Reptiles					
Yakka skink (*Egernia rugosa*)	V	V	Moderate	1, 2, 3	1.49

Species	Conservation Status[1]		Likelihood of Occurrence	Predicted Habitat Type/s	Area (ha) within Disturbance Footprint
	NC Act	EPBC Act			
Woma (*Aspidites ramsayi*)	NT	-	Moderate	1, 2, 3	1.49
Dunmall's snake (*Furina dunmalli*)	V	V	Moderate	1, 2, 3	1.49
Golden-tailed gecko (*Strophurus taenicauda*)	NT	-	Moderate	1, 2, 3	1.49

[1] Conservation Status: E=Endangered; V=Vulnerable; NT=Near Threatened; SLC=Special Least Concern, Mi=Migratory.

Based on the proposed Disturbance Footprint the above species were subjected to Significant Impact Assessments by a suitably qualified ecologist in a manner compliant with the Commonwealth guidelines (Department of the Environment, 2013b) and Significant Residual Impact Assessments compliant with State guidelines (Department of State Development, 2014). This process identified the Dulacca Woodland Snail (*Adclarkia dulacca*) as a species with potential to be significantly impacted by the development of the Project. A targeted survey for the Dulacca Woodland Snail (*Adclarkia dulacca*) was undertaken in October 2019 (Boobook Ecological Consulting, 2019), and the species presence (both live specimens and shells) was recorded in REs 11.7.1, 11.7.6, 11.9.5, 11.9.1 and 11.7.1 x 1 (Figure 5) across 15 of the 18 locations assessed within the Study Area. Suitable habitat for the Dulacca Woodland Snail (*Adclarkia dulacca*) is illustrated in Figure 5 and the species profile is presented in Section 3.5.3.

DATUM GDA 1994, PROJECTION MGA ZONE 55

0 1 2

Kilometres

1 cm = 650 m (when printed @ A3)

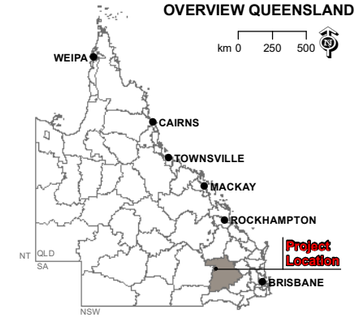
Legend

- Study Area (8,177 ha)
- Disturbance Footprint
- Highway
- Other roads
- Dulacca Woodland Snail records (Boobook 2019)

Dulacca Woodland Snail Habitat

- Potential
- Confirmed

OVERVIEW QUEENSLAND



Data Sources:

1. Site layout elements © RES, 2019
2. Local Government Areas © State of Queensland (Department of Natural Resources and Mines) 2017
3. Place names gazetteer - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
4. Baseline roads and tracks Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
5. Rail network - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
6. Electrical Network - Ergon Energy 2018
7. World Topographic Base Map © Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

DULACCA RENEWABLE ENERGY PROJECT

HABITAT FOR THE DULACCA WOODLAND SNAIL

PROJECT #:	60567855
CREATED BY:	AS
LAST MODIFIED:	16/10/2020
VERSION:	2

Figure 5

A3 size

Document Path: P:\605X\60567855\4. Tech Work Area\4.99 GIS\MXD\Commonwealth Documentation Mapping\Vegetation and Fauna Management Plan\60567855_ECO_004_Habitat_DWS_A3L.mxd

3.5.3 Species and Community Profiles

Two species (excluding birds and bats which have been assessed as part of the Bird and Bat Management Plan) listed as threatened or migratory under the EPBC Act and two TECs have been identified as having the potential to be impacted by the Project. Profiles of these species can be found below, and mitigation measures specific to these species have been outlined in Section 5.2 and Section 5.3.

3.5.3.1 Dulacca Woodland Snail

Table 7 Dulacca Woodland Snail species profile

Dulacca Woodland Snail	
	**Legislative status**: Endangered (EPBC Act & NC Act) The Dulacca Woodland Snail belongs to the family Camaenidae. It is one of three species within the genus *Adclarkia*. Although first discovered in the early 1990's, *A. dulacca* was formally described in 2010 (Stanisic, Shea, Potter, & Griffiths, 2010). The shell of Dulacca Woodland Snail is pale brown. Adults are approximately 17 mm in diameter and have a low spire giving a flattened appearance (Stanisic et al., 2010). The brown spiral band on the shell described by Stanisic et al. (2010) is a variable feature and may be lacking in some specimens (C. Eddie pers. obs.). Like all species of *Adclarkia*, the microsculpture on the upper half of the shell is of weak growth lines with fine scales which are part of the periostracum or 'skin' on the shell (Stanisic et al., 2010). Protoconch (i.e. the first whorl) sculpture is of tiny, scattered pustules (Stanisic et al., 2010). The lower half of the shell is smooth and glossy with a narrow umbilicus (i.e. opening on the underside). The lip is thin (Stanisic et al., 2010) but is noticeably thicker than Brigalow woodland snail (*A. cameroni*) and Boggomoss snail (*A. dawsonensis*) (C. Eddie pers. obs.). The shell is much flatter than the Brigalow woodland snail which also occurs within the range of the Dulacca Woodland Snail. The Boggomoss snail does not occur within the range of the Dulacca Woodland Snail (Stanisic, 1996). The living animal of Dulacca Woodland Snail is described as being "orange-brown" (Stanisic et al., 2010). The mantle is pale orange (C. Eddie pers. obs.).

(Source: Boobook Ecological Consulting, 2019)

Dulacca Woodland Snail	
Distribution	Publicly accessible records of Dulacca Woodland Snail (Australian Government, 2020; Queensland Museum, 2019) show that it is found in a small area of southern inland Queensland between Yuleba and Miles in the west and east respectively, and between Wandoan and Meandarra in the north and south respectively. Most records are centred on the Dulacca area (Australian Government, 2020). The entire distribution of the species is within the Brigalow Belt South Bioregion. The majority of records lie within Subregion 28 (Dulacca Downs) with outliers in Subregion 26 (Southern Downs) and Subregion 31 (Eastern Darling Downs). All of these subregions have extensive areas of fertile clay plains (Sattler & Williams, 1999) that are substantially cleared of native vegetation. Most notably, Subregion 28 (Dulacca Downs) which contains the bulk of the known distribution of Dulacca Woodland Snail in Queensland, has less than 15% remnant vegetation cover (Queensland Government, 2019). Consequently, the current distribution of Dulacca Woodland Snail is highly fragmented (Australian Government, 2020) being largely restricted to patches or strips of habitat retained on roadsides, shade lines and/or ridges.
Ecology	There are no studies of the ecology of Dulacca Woodland Snail. The species is known to live in a variety of forest and woodland types where it shelters under logs, rocks, and other ground debris (Stanisic et al., 2010; Threatened Species Scientific Committee, 2016). Like other camaenid land snails the species is presumed to be active at night after rain. During periods of inactivity the Dulacca Woodland Snail will aestivate (i.e. enter a period of dormancy) at its chosen shelter site. In order to conserve moisture live snails attach to the underside of a log, rock, leaves or the ground surface and seal any gaps in the shell opening with mucus. Burrowing into shallow soil has been observed in captivity (C. Eddie pers. obs.) **Movement patterns:** Nothing is known of the movements of Dulacca Woodland Snail; however the species is considered to be of low mobility (Threatened Species Scientific Committee, 2016). Movement between suitable microhabitat sites (e.g. log piles) may be possible (Threatened Species Scientific Committee, 2016). Studies of camaenid land snail species have found that these snails moved only short distances during any one observation (often <1 m) and that the longest recorded movement was 3.5 m out of 50 survey-animal nights. Very low dispersal rates recorded for two of the species suggested that they are highly susceptible to habitat fragmentation. Although not confirmed, it is probable that Dulacca Woodland Snails also move short distances and are equally as susceptible to habitat fragmentation. **Breeding biology:** Nothing is known of the breeding biology of Dulacca Woodland Snail other than that a captive population produced a clutch of 20 eggs (Threatened Species Scientific Committee, 2016). It is assumed, like other camaenid land snails, that it lays its eggs in depressions in soil under logs and other ground debris; multiple egg laying events per season are possible depending on the frequency and timing of weather events (Threatened Species Scientific Committee, 2016). Although not confirmed, the species is expected to reach sexual maturity during its second wet season.

Dulacca Woodland Snail	
	Land snail eggs are prone to desiccation therefore an overstorey of trees and shrubs, in addition to ground shelter sites (e.g. logs and other debris), is considered critical to maintaining high levels of humidity at potential egg-laying sites (Threatened Species Scientific Committee, 2016). **Feeding ecology:** Nothing is known of the food or feeding ecology of Dulacca Woodland Snail. Like other camaenid land snails it is presumed to feed at night after rain upon hyphae and fruiting bodies of native fungi, lichen, algae and other detritus/biofilm among ground debris (Threatened Species Scientific Committee, 2016).
Habitat	**Vegetation associations:** At the time of the species description Stanisic et al. (2010) described the habitat of the Dulacca Woodland Snail as "vine thicket/woodland on rocky outcrop". This description refers primarily to the habitat at the type locality which is within the Study Area. At this location snails were found under rocks in "degraded thicket/*Brachychiton*" (Stanisic et al., 2010). Other than vine thicket, the species is known to occur in Brigalow woodland/open forest, ironbark (*Eucalyptus* spp.) woodland, lancewood (*Acacia shirleyi*) woodland and gum-topped box (*E. woolsiana*) woodland (Threatened Species Scientific Committee, 2016). Although habitat preferences are not completely known most records of the species are from regrowth or remnant Brigalow communities (Queensland Museum, 2019; C. Eddie unpublished data) or other vegetation types that adjoin Brigalow communities. Brigalow woodland and open forest can therefore be considered an important habitat for the species. All Brigalow communities within the known range of the Dulacca Woodland Snail are endangered regional ecosystems (REs) under the *Vegetation Management Act 1999* and/or have a biodiversity status of endangered as per the REDD (Queensland Herbarium, 2019). Most Brigalow REs within the range of the Dulacca Woodland Snail are also TECs (Department of Agriculture Water and the Environment, 2020). Hence, most of the habitat of high importance to the species is under threat. **Microhabitat:** The Dulacca Woodland Snail shelters beneath logs, under rocks, among leaflitter and in loose bark at the base of trees (Stanisic et al., 2010; C. Eddie pers. obs.). The species can occur in non-remnant habitats (e.g. regrowth) providing there are suitable shelter sites (Threatened Species Scientific Committee, 2016). In summary, microhabitat features critical to the survival of the species include: • logs • rocks • timber/vegetation piles

Dulacca Woodland Snail	
	• loose bark piles • loose bark at the base of trees • dense leaflitter.
Existing Study Area values	Although a limited amount of land snail survey has been undertaken in parts of the Study Area (Stanisic, 1998), no targeted surveys specifically for Dulacca Woodland Snail have been previously undertaken. Previous land snail surveys (Stanisic, 1998) were focussed on the ridge within the central part of the Study Area (to the immediate north of the Warrego Highway) which resulted in the discovery and subsequent description of Dulacca Woodland Snail. No targeted land snail surveys were performed as part of previous fauna surveys within the Study Area (AECOM, 2018a; Ecology and Heritage Partners, 2018). The desktop search results show that the Dulacca Woodland Snail has previously been recorded from the Study Area (Australian Government, 2020; Queensland Museum, 2019). The Study Area contains the type locality for the species i.e. the place where the specimens used to formally name the species were found. The type locality is described by Stanisic et al. (2010) as "rocky peak, c. 9.7 km E of Dulacca". This equates to the southern end of the low ridgeline within the central part of the Study Area on the northern side of the Warrego Highway (Figure 5). Note that the precision of the co-ordinates at the type locality is 500 m (Australian Government, 2020). The supplementary targeted field survey for Dulacca Woodland Snail determined that the species was present in a number of areas throughout the Study Area with a total of 155 dead shells and 3 live individuals located from 30 person hours of search effort.
Threats to species	Threats to Dulacca Woodland Snail identified by Threatened Species Scientific Committee (2016) are summarised as follows: • habitat loss and fragmentation: - broad-scale removal of woody vegetation due to clearing for agriculture, mining and infrastructure (e.g. roads, powerlines) - fine-scale removal of microhabitat such as stick-raking and burning of timber piles or removal of timber for firewood. • invasive species: - predation by rats, mice and feral pigs – all are known to prey upon land snails - invasion of buffel grass (*Cenchrus ciliaris*) – replaces native grasses and increases fuel load. • impacts of domestic species: - trampling by cattle and horses – animals with solid hooves may trample snails or important microhabitat features which provide breeding, feeding and shelter sites.

Dulacca Woodland Snail	
	• fire: - any fire can potentially remove microhabitat (especially logs and fallen bark) but hot fires are particularly destructive - fire regimes may change and become hotter and more frequent with changes in ground layer composition (e.g. due to buffel grass invasion). All of the above threats, with the exception of rats and mice, were observed during the field survey (Boobook, 2019) within the Study Area.

3.5.3.2 Belson's Panic

Table 8 Belson's Panic species profile

Belson's Panic	
	**Legislative status**: Endangered (EPBC Act & NC Act) Belson's panic is a perennial grass growing to 0.5 m high with leaf blades between 2 and 4.5 mm wide. The ligule is 0.8 mm to 1.5 mm long with primary branches 8-15 cm long with hairy axils. Belson's Panic is rhizomatous and stoloniferous, and can form colonies through prostrate spreading by the stolons The known flowering season is February-May however fruiting has been recorded in February which suggest flowering may also occur in November-December (Threatened Species Scientific Committee, 2008). **Distribution**: The distributional range of this species lies within the southern Brigalow Belt Queensland, namely the Darling Downs area west of Toowoomba, near Oakey, Jondaryan, Bowenville, Dalby, Acland, Sabine, Quinalow, Goombungee, Gurulmundi and Millmerran, and further west between Miles and Roma. **Habitat**: The species occurs at elevations ranging from 200 m to 520 m above sea level. Three general habitat types have been identified for this species: • Rocky, basaltic hills supporting *Eucalyptus albens*/*Geijera parviflora* woodland with assorted shrubs and a number of grass species. • Flat to gently undulating alluvial areas supporting *Casuarina cristata* forest and sometimes *Acacia harpophylla* or *Geijera parviflora*. Understorey varied from the presence of only Belson's Panic to a mixture of shrubs, sub-shrubs and grasses. • Drainage lines supporting *Casuarina cristata* and sandy country dominated by Cypress Pine-Bloodwood-Ironbark-She-Oak Forest (Department of Agriculture Water and the Environment, 2020). Belson's Panic shows preference for light to moderate shade in areas beneath or between trees. This habitat feature is consistent among areas where it has been observed in the greatest abundance. Belson's Panic is also thought to have the ability to recolonise cleared or highly disturbed areas as it has been found in regenerating vegetation along roadsides.

Belson's Panic	
Existing Study Area values	Belson's Panic was identified within the Study Area, consisting of a few individuals in RE 11.9.5 south of the Warrego Highway. The species identification was confirmed by the Queensland Herbarium and the location of the record is shown on Figure 4. Targeted surveys were additionally undertaken in suitable habitat across the Study Area, including cleared areas that support a mix of native and introduced grassland species. Despite targeted searches during suitable seasonal conditions, no additional populations of the species were recorded. However, given the cryptic nature of the species, and applying the precautionary principle, there is still a high likelihood of occurrence within both remnant vegetation (RE 11.9.1, 11.9.5 and 11.7.1) and within the cleared areas of the Study Area that support regrowth vegetation and native grasses. Areas that have been cultivated within the Study Area are considered unlikely to support the species owing to the disturbed nature of these areas. Potential habitat mapping for the species is displayed in Figure 4. The recorded population of Belson's Panic within the Study Area has been avoided by all proposed impacts through the project design. The DAWE SPRAT database does not identify 'important populations' of Belson's Panic (Department of Agriculture Water and the Environment, 2020). However, the Study Area is at the north-western extent of the species range, therefore the population within the Study Area is considered an important population.
Threats to species	The primary threats which have been identified for the species are (Threatened Species Scientific Committee, 2008): • Habitat clearing, particularly of Poplar Box (*Eucalyptus populnea*) woodlands in Queensland. • Proliferation of weeds within habitat, e.g. Green Panic grass (*Panicum maximum var. trichoglume*), *Hyparrhenia hirta* and Tiger Pear (*Opuntia aurantiaca*). • Herbicide application. • Soil compaction – from grazing leading to replacement of native grass communities with more hardy species. • Grazing – leading to a proliferation of a range of exotic species due to community changes and seeding of preferred grazing species. • Roadworks – impacts include road construction, trench digging and poisoning of roadside vegetation. • Rubbish dumping and firewood collection.

3.5.3.3 Brigalow TEC

Table 9 Brigalow TEC profile

Brigalow TEC	
	**Legislative status**: Endangered (EPBC Act) Brigalow TEC is characterised by *Acacia harpophylla* (brigalow) as one of the dominant species in the tree layer. The species may also be co-dominant (in some circumstances with other Myrtaceous species, most commonly *Casuarina cristata (*belah)). The community ranges in composition and structure however is typically represented by a combination of a number of species which are associated with acidic and salty clay soils (Threatened Species Scientific Committee & Department of the Environment, 2013). In Queensland, the Brigalow TEC is defined using the RE framework, where a number of REs are considered analogous with the TEC, provided that other key diagnostic criteria and condition thresholds are met.

Brigalow TEC	
Distribution	The Brigalow TEC occurs in semi-arid eastern New South Wales and Queensland, predominantly west of the Great Dividing Range (Threatened Species Scientific Committee & Department of the Environment, 2013). The TEC reaches as far north as Townsville in Queensland and as far south as Narrabri in New South Wales. In Queensland it is found in a number of bioregions including: 1. Brigalow Belt North 2. Brigalow Belt South 3. Mulga Lands 4. Darling Riverine Plains 5. Southeast Queensland.
Key diagnostic criteria and condition thresholds	**Key diagnostic criteria:** 1. The presence of *Acacia harpophylla* as one of the most abundant tree species in the patch. *A. harpophylla* is either dominant in the tree layer, or co-dominant with other species (notably *Casuarina cristata*, other species of Acacia, or species of Eucalyptus. 2. In Queensland, the patch is in one of the following Queensland bioregions (including outliers) and it meets the description of one of 16 Queensland REs prescribed: - Brigalow Belt Bioregion: REs 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.14, 11.12.21. - Southeast Queensland Bioregion: REs 12.8.23, 12.9-10.6, 12.12.26. - Mulga Lands Bioregion: RE 6.4.2. **Condition thresholds:** 1. The patch is 0.5 ha or more in size. 2. Exotic perennial plants comprise less than 50 % of the total vegetation cover of the patch, as assessed over a minimum sample area of 0.5 ha (100 m by 50 m), that is representative of the patch.
Existing Study Area values	A number of patches of remnant RE 11.9.5 were ground-truthed and mapped within the Study Area. This RE is analogous to a listed RE that describes the Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC. Assessment of these patches determined that all areas of RE 11.9.5 within the Study Area met the key diagnostic and condition threshold criteria and as such are of TEC status.

Brigalow TEC	
Threats to species	A number of key threats to the Brigalow TEC have been identified as those which may lead to further reduction in extent or cause a decline in condition. These include: • Clearing: listing of this community was a result of extensive clearing. The community has been modified at a landscape scale with clearing resulting in significant fragmentation and reduction in patch size. Clearing for resource extraction and illegal logging are an ongoing threat to the community. • Fire: due to the species composition of intact Brigalow TEC, fire has not historically threatened the community. However, the introduction of invasive pasture species such as *Chloris gayana*, Cenchrus ciliaris** and *Megathyrsus maximus*,* can result in significant increases in biomass and fuel load (Threatened Species Scientific Committee & Department of the Environment, 2013). • Weeds: the infestation of introduced weeds can alter the structure of the community and in turn the habitat for fauna species which it supports. As discussed above invasive pasture species also contribute to greater fire risk. Weed invasion is an ongoing threat to the Brigalow TEC (Threatened Species Scientific Committee & Department of the Environment, 2013). • Feral animals: A number of feral animals are considered to be threats to the ecological community, many of which are listed as key threatening processes (KTP) under the EPBC Act. Pigs (*Sus scrofa**) degrade habitat by disturbing soil and destroying young and small plants. Cane toads (*Bufo marinus**), outcompete and feed on native frog species and cause death through toxic lethal ingestion to mammalian carnivores, snakes, birds and goannas. Foxes (*Vulpes vulpes**) and feral cats (*Felis catus**) can have devastating impacts to the community through predation on native fauna and noisy miners (*Manorina melanocephala**) aggressively exclude other native species, primarily honeyeaters (Department of the Environment, 2013a). • Inappropriate grazing: Cattle grazing is a dominant land use in much of the distribution of the Brigalow TEC. Cattle and other large bodied herbivores can impact the ground layer through disturbing leaf litter, interfering with recruitment, altering the composition of the ground and shrub layer and compacting the soil profile (Department of the Environment, 2013a). • Climate change: *Acacia harpophylla* and the flora species which typically dominate this community are generally well equipped to cope with climate change due to their ability to tolerate broad environmental stressors. However, adaptability may be compromised with the increased rate of change predicted from future climate change.

3.5.3.4 SEVT TEC

Table 10 SEVT TEC profile

SEVT TEC	
	**Legislative status**: Endangered (EPBC Act) SEVT TEC is a form of dry subtropical rainforest that is predominantly comprised of trees with microphyll sized leaves and emergent bottle trees (*Brachychiton* spp.) on soils with a high to medium fertility. It occurs in areas with a subtropical and seasonally dry climate. The thickets typically have an uneven canopy 4–9m high with mixed evergreen, semi-evergreen and deciduous emergent tree species 9–18m high. Vines, twining or scrambling plants are prominent (McDonald, 2010). Remnants of the listed SEVT ecological community in Queensland are generally considered to be floristically diverse, with species richness decreasing as rainfall decreases and/or becomes more seasonal. **Distribution**: The SEVT TEC occurs in eastern Queensland and northern New South Wales within the Brigalow Belt North, Brigalow Belt South and Nandewar bioregions.

SEVT TEC	
Key diagnostic criteria and condition thresholds	In Queensland, the national ecological community includes the following 11 regional ecosystems (REs) within the Brigalow Belt Bioregion: • RE 11.2.3-Microphyll vine forest ("beach scrub") on sandy beach ridges • RE 11.3.11-Semi-evergreen vine thicket on alluvial plains • RE 11.4.1-Semi-evergreen vine thicket ± Casuarina cristata on Cainozoic clay plains • RE 11.5.15-Semi-evergreen vine thicket on Cainozoic sand plains/remnant surfaces • RE 11.8.3-Semi-evergreen vine thicket on Cainozoic igneous rocks • RE 11.8.6-Macropteranthes leichhardtii thicket on Cainozoic igneous rocks • RE 11.8.13-Semi-evergreen vine thicket and microphyll vine forest on Cainozoic igneous rocks • RE 11.9.4-Semi-evergreen vine thicket on Cainozoic fine-grained sedimentary rocks • RE 11.9.8-Macropteranthes leichhardtii thicket on Cainozoic fine-grained sedimentary rocks • RE 11.11.18-Semi-evergreen vine thicket on old sedimentary rocks with varying degrees of metamorphism and folding. • RE 11.7.1x-Semi-evergreen vine thicket on Cainozoic lateritic duricrusts.
Existing Study Area values	A number of patches of the analogous RE 11.7.1x1 were ground-truthed within the Study Area and as such have been mapped as the SEVT TEC.
Threats to species	A number of key threats to the Brigalow TEC have been identified as those which may lead to further reduction in extent or cause a decline in condition. These include: • Clearing: clearing for construction of roads, fence lines, firebreaks, resource projects resulting in further loss and/or fragmentation. • Fire: generally, the community is located in positions in the landscape that are protected from fire; however fire can be threat where fuel characteristics have changed such as the incursion of exotic grasses. • Weeds: exotic grass incursion is the main weed group considered to pose a threat to SEVT as they alter the fuel characteristics. • Inappropriate grazing: this includes domestic stock, native herbivores and feral animals such as pigs. Most disturbance to the community from grazing is from native herbivore, especially black-striped wallaby.

3.6 Introduced Pests and Weeds

3.6.1 Pest Fauna

The field survey recorded six introduced fauna species, three of which are listed as restricted matter under the *Biosecurity Act 2014*:

- European rabbit (*Oryctolagus cuniculus*) – Listed as a category 3, 4, 5, 6 restricted matter
- Feral pig (*Sus scrofa*) – Listed as a category 3, 4, 6 restricted matter
- European fox (*Vulpes vulpes*) – Listed as a category 3, 4, 5, 6 restricted matter
- Common myna (*Acridotheres tristis*)
- European hare (*Lepus europaeus*)
- House mouse (*Mus musculus*).

Ecology and Heritage Partners, (2018) also identified Cane Toad (*Rhinella marina*) within the Study Area. Other species not identified within the Study Area but are likely to be present include Feral Cat (*Felis catus*), Black Rat (*Rattus rattus*), and Wild Dog/Dingo (*Canis lupus*).

3.6.2 Weeds

Twenty-three exotic (non-native) flora species were recorded during biodiversity surveys undertaken within the Study Area. To help limit the impact from weeds through their spread or exacerbation that can reasonably be attributable to the Project, invasive weeds have been defined that will require control by theapproval holder. Invasive weeds have been deemed to include:

- Known weed species at the site defined by the *Biosecurity Act 2014* as a 'Restricted Matter' and/or 'Prohibited Matter'
- Known weed species at the site defined by the *Western Downs Regional Council Biosecurity Plan* as 'Priority pest plants'
- Known high biomass exotic grasses present at the site which can quickly invade disturbed areas and degrade threatened species habitat.

The invasive weeds defined above known to occur within the site are presented in Table 11. No 'Prohibited Matter' plant species defined by the *Biosecurity Act 2014* were identified within the Study Area. Appendix A provides species descriptions and control measures for these species. A full and updated list of invasive weed species will be determined following pre-clearance surveys undertaken ahead of the commencement of construction. While Buffel grass (*Cenchrus ciliaris*) occurs within the site and is acknowledged to degrade habitat and increase fire risk, it has not been included in the invasive weed list, due to its prevalence within the site. It would be almost impossible to control this species without finding a suitable replacement native species that would outcompete it. However, reasonable efforts will be made by the approval holder to prevent the establishment of this species in areas subject to seeding and rehabilitation. This will include establishing native groundcover in rehabilitation areas.

The approval holder will be responsible for:

- Prior to the commencement of the action[1], undertaking invasive weed[2] management control across all areas within the Study Area subject to disturbance

[1] The EPBC Act Approval defines commencement of the action as the first instance of any specified activity associated with the action including clearing and construction. Commencement of the action/commence the action does not include minor physical disturbance necessary to:
(a) undertake geotechnical surveys, pre-clearance surveys, monitoring programs, and weed management activities under condition 5(a);
(b) install signage and/or temporary fencing to prevent unapproved use of the Project site (as defined in the preliminary documentation); and
(c) protect environmental and property assets from fire, weeds and pests, including maintenance or use of existing surface access tracks.
[2] The EPBC Act Approval defines a weed as the invasive weed species identified in this VFMP.

- During the construction, undertaking invasive weed management control across all areas within the Study Area subject to disturbance, to promptly suppress outbreaks
- Upon the cessation of disturbance, undertaking invasive weed control within disturbed areas until such time that invasive weed presence in these areas cannot be attributed to disturbance associated with construction activities
- Undertaking invasive weed management and control within 1 m of any Project infrastructure at ground level for the life of the Project, comprising invasive weed management and control that minimises the risk of and potential for invasive weed cover occurring, suppresses any outbreak that occurs, and removes any invasive weeds that may occur.

It is noted that responsibility for control of invasive weed species outside of the Disturbance Footprint (the registered lease area on title) for the wind farm will remain the responsibility of the landowner. Responsibility for invasive weed management in areas subject to construction phase disturbance, but not forming part of the operational infrastructure footprint, will be the responsibility of the approval holder until the establishment of suitable vegetation cover post construction. Generally, it is anticipated that within two years land management in agricultural areas subject to construction phase disturbance and rehabilitation will return to the management of the landowner, except where ongoing management obligations exist as defined by this VFMP including weed management and control required by condition 5(d) of the EPBC Act Approval. As outlined, the approval holder will be responsible for invasive weed control up to 1 m from the edge of operational infrastructure across the site, except where the activities of the approval holder (including operational contractors) can be reasonably accountable for invasive weed establishment beyond this limit.

Table 11 Invasive Weed Species Recorded within the Study Area

Species	Category 3 Restricted Matter (*Biosecurity Act 2014*)	Western Downs Regional Council Priority Pest Plants	High biomass grasses
Mimosa bush *Acacia farnesiana*	No	Yes	No
Mother of Millions *Bryophyllum delagoense*	Yes	Yes	No
Rhodes grass *Chloris gayana*	No	No	Yes
Green panic *Megathyrsus maximus*	No	No	Yes
Red natal *Melinis repens*	No	No	Yes
Velvety prickly pear *Opuntia tomentosa*	Yes	Yes	No
Prickly pear *Opuntia stricta*	Yes	Yes	No
Sabi grass *Urochloa mosambicensis*	No	No	Yes
Noogoora Burr *Xanthium occidentale* *(Syn. Xanthium pungens)*	No	Yes	No
Bathurst Burr *Xanthium spinosum*	No	Yes	No

4.0 Extent of Works

Potential impacts to fauna and vegetation communities may occur in both the construction phase, and the operation and maintenance phase of the Project.

The Disturbance Footprint will be up to 292 ha and refers to the anticipated extent within wind turbines, access tracks, underground cables and other associated infrastructure will be located. The greatest impact to fauna and vegetation communities will occur in non-remnant vegetation which provides fewer microhabitat features and generally lower value fauna habitat than other habitat types.

Table 12 Habitat Types within the Disturbance Footprint

Habitat Type	Analogous RE	Habitat Description	Area (ha) within Disturbance Footprint
1	11.7.6	*Eucalyptus crebra* open woodland on laterite	0.01
2	11.9.5	*Acacia harpophylla* and *Casuarina cristata* open forest on fine-grained sedimentary rocks	0.95
3	11.7.1 and 11.9.1	*Acacia harpophylla* and *Eucalyptus* species woodland on laterite	0.29
4	Non-remnant	Non remnant vegetation, including regrowth that does not meet remnant or High Value Regrowth status, creek lines and dams (excluding cultivated areas)	164.23
5	11.7.1x1	Semi-evergreen vine thicket	0.00

4.1 Potential Impacts to Vegetation and Fauna

The activities and infrastructure required to develop and operate the Project may impact upon fauna and vegetation communities within the Disturbance Footprint. The most significant impacts on ecological values will occur during the Project's construction phase, when vegetation and habitat removal will occur. Impacts associated with the maintenance and operational phase of the Project are typically lesser to those identified for the construction phase. The operation of the project will include the introduction of some ongoing impacts such as increased background noise levels and will include ongoing risk around weeds and pests and the management of dust. Project activities, risks and potential impacts to fauna and vegetation are summarised below in Table 13.

All impacts to birds and bats during the operation and maintenance phase of the Project are addressed in a separate Bird and Bat Management Plan (BBMP) (Nature Advisory, 2019). This BBMP has been prepared in accordance with condition 9 of the State Development Approval and conditions 6-14 of the EPBC Act Approval.

Table 13 Project Activities, Risks and Potential Impacts to Fauna and Vegetation

Project Activity	Risk/threat	Potential Impacts
Design	Habitat loss	• Reduced extent and quality of suitable habitat. • Restricting movement between habitat areas, potential reducing access to food, refuge and mating resources. • Increase or introduction of edge effects.
	Habitat fragmentation	
	Exacerbation of pest flora and fauna	
	Habitat loss and degradation	

Project Activity	Risk/threat	Potential Impacts
Site Clearing and Establishment	Habitat fragmentation Weed introduction and spread Exacerbation of pest fauna species (i.e. cane toad, European rabbit, European hare, fox, pig, house mouse) Bushfire	• Injury or death to individuals. • Reduced extent and quality of suitable habitat. • Increased competition and predation from pest fauna species and a reduction in foraging and breeding resources as a result of weed invasion. • Introduction of biosecurity risk through vehicles, equipment and mobile plant. • Increase or introduction of edge effects.
Construction Works	Dust generation Noise and vibration generation Fuel and chemical spills Loss of waste materials (inert, putrescible and hazardous) Bushfire	• Decline in population health. • Disturbance of fauna life cycle (breeding, foraging, dispersal). • Reduced extent and quality of suitable habitat. • Reduction in population abundance. • Impacts to fauna species use of acoustic communication for a range of essential, biological functions such as for mating, territorial defence, predator detection and foraging. • Introduction of biosecurity risk through vehicles, equipment and mobile plant. • Increase or introduction of edge effects.
Vehicular movements	Vehicular strike Weed introduction and spread	• Injury or death to individuals. • Nest destruction. • Reduced extent and quality of suitable habitat. • A reduction in foraging and breeding resources as a result of weed invasion. • Introduction of biosecurity risk through vehicles, equipment and mobile plant.

Project Activity	Risk/threat	Potential Impacts
Operation and maintenance	Weed introduction and spread Noise generation Bushfire	• Reduced extent and quality of suitable habitat. • A reduction in foraging and breeding resources as a result of weed invasion.
Decommissioning and rehabilitation	Dust generation Noise and vibration generation Weed introduction and spread Bushfire	• Decline in population health. • Disturbance of fauna life cycle (breeding, foraging, dispersal). • Reduction in population abundance. • Impacts to fauna species use of acoustic communication for a range of essential, biological functions such as for mating, territorial defence, predator detection and foraging. • Introduction of biosecurity risk through vehicles, equipment and mobile plant. • Increase or introduction of edge effects. • A reduction in foraging and breeding resources as a result of weed invasion.

5.0 Management and Control Strategies

5.1 General Mitigation Measures

The mitigation and management measures proposed in Table 14 are relevant to all species and vegetation communities identified within the Study Area and have been developed to reduce Project-related impacts to biodiversity values. Species-specific mitigation measures have also been developed to reduce impacts to EPBC Act listed threatened species and TECs which have the potential to be impacted by the Project. These EPBC specific measures have been outlined in Section 5.2 and 5.3.

Importantly, pre-clearance surveys will be undertaken by a suitably qualified ecologist in accordance with the DAWE survey guidelines in order to identify any protected matters and inform potential further avoidance measures.

The mitigation and management measures have been developed with the aim to achieve the following management objectives:

- No exceedance of approved disturbance limits (1.25 ha of remnant vegetation and 290.75 ha of non-remnant areas)
- Micro-siting does not result in additional disturbance to threatened flora or communities above the approved limits
- Maintain the condition of retained habitat compared against baseline condition
- No introduction or spread of invasive weed species or pest fauna species within areas of Project disturbance and in areas of the Study Area under the control of the approval holder
- Successful removal of invasive weeds within the Disturbance Footprint
- Progressive stabilisation of disturbed areas and rehabilitation of the Disturbance Footprint following construction, where not required for ongoing operations
- No incidence of fire on site as a result of Project activities.

Table 14 Management Actions for the Avoidance of Impacts to Fauna and Vegetation Communities

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
Habitat loss and fragmentation	Design	Detailed design does not exceed clearing of 1.25 ha of remnant vegetation.	Minimise habitat loss and fragmentation by consolidation of Project infrastructure to minimise Disturbance Footprint.	Prior to commencement of any site disturbance construction activities.	N/A	N/A
			Microsite and optimise the placement of infrastructure, within the Study Area, to actively avoid habitat areas.	Prior to commencement of any site disturbance construction activities.	N/A	N/A
	Pre-construction	Detailed design does not exceed clearing of 1.25 ha of remnant vegetation.	All activities including site access, laydown of plant and equipment and construction activities must be contained within the finalised Disturbance Footprint.	Prior to commencement of any construction activities.	N/A	N/A
			• Identify stockpile locations for retaining soil and vegetation for rehabilitation purposes. These stockpile locations will be within previously cleared areas. • Topsoil and vegetation temporarily disturbed to support cable trenching activities will be temporarily stockpiled separately to subsoil material and will be utilised to support the reestablishment of the soil profile and rehab of the cable trench. Soil and vegetation removed trenching and cable laying will be supported to remain along the length of the excavated trench where the placement of the excavated material does not impact on remnant areas. Where impact on remnant vegetation cannot be avoided, material from this extent of trench will be temporarily stockpiled at a pre-determined stockpile location within previously cleared areas. • Location of long-term stockpiles will not alter in the absence of consultation with a suitable environmental specialist, or be placed in, natural drainage lines or preferred natural flow paths (as evidenced by onsite landforms). • Suitable stockpile areas will be identified during Pre-clearance survey in consultation with the approval holder and the EPC Contractor. These locations will be mapped for communication to the EPC Contractor personnel ahead of the commencement of onsite works. Where utilised, the stockpile location will be supported by suitable signage at the site to ensure placement is within this pre-determined area.	0 – 6 months prior to site disturbance for construction.	• Pre-clearance survey and report. • Construction audits.	<u>Trigger:</u> Stockpiles occurring on or impacting on retained habitat. <u>Corrective Action:</u> • Stockpiles are relocated to appropriate location • Rehabilitation is undertaken to retained habitat where impacted • Review site procedures.
		High-value fauna habitat trees to be retained are marked prior to construction.	• A suitably qualified ecologist to complete a site survey prior to the commencement of clearing to identify, record the location of and mark high-value fauna habitat trees (i.e. hollow bearing trees; mistletoe bearing trees) which are not to be removed with flagging tape (or other appropriate marking method), trees that are not to be felled without the presence of a spotter-catcher (where clearing cannot be avoided and the tree is an identified habitat trees), and to identify habitat features suitable for relocation to non-disturbed areas immediately adjacent to the Disturbance Footprint. • Habitat features must be of a size where these can be safely handled and relocated. • The ecologist is to provide necessary mapping of these habitat trees and features to support the implementation of mitigation controls during felling and clearing activities.	0 – 6 months prior to site disturbance for construction.	Pre-clearance survey and report.	N/A

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
	Construction	Clearing does not exceed 1.25 ha of remnant vegetation.	'No-go' areas, including clearing limits will be clearly demarcated using visual aids (i.e. flagging or bunting).	Immediately prior to clearing activities.	Construction audits.	Trigger: Clearing outside of the Project Disturbance Footprint or clearing within the footprint exceeding 1.49 ha of habitat in key impact areas for Dulacca Woodland Snail. Action: • Immediately notify Project Responsible Officer • Notify DAWE in accordance with condition 28 of the EPBC Act Approval • Cease activity and remove equipment from habitat area • Immediate restoration and rehabilitation of native vegetation • Treat weeds (as defined in Section 3.6.2) and manage spread • Additional offsets where a suitably qualified ecologist identifies that impacts have occured that necessitate the establishment of an offset as mitigation to the identified impact • Reinstate or install additional demarcating fencing or flagging • Review clearing procedures • Re-educate / train site personnel on management requirements and practices.
			Restrict clearing of canopy trees to the minimum required to establish infrastructure and any necessary buffer area. Clearing of canopy trees must be undertaken in accordance with the methods specified in the CEMP.	At all times during clearing.	Construction audits.	
			• Clearly mark high-value fauna habitat trees (i.e. hollow bearing trees; mistletoe bearing trees) which are not to be removed with flagging tape (or other appropriate marking method), trees that are not to be felled without the presence of a spotter-catcher (where clearing cannot be avoided and the tree is an identified habitat trees), and habitat features suitable for relocation to non-disturbed areas immediately adjacent to the Disturbance Footprint. • Figures will be developed and kept for all high-value fauna habitat trees retained, relocated and felled (with the presence of a spotter-catcher).	Immediately prior to clearing/construction activities.	Construction audits.	
			• Reductive pruning of canopy trees is to be undertaken in preference to clearing, where appropriate. • Reductive pruning will only take place in the circumstance that vegetation must be removed to the permitted clearing extent and the trunk of the tree sits outside of the Disturbance Footprint. • Areas that are pruned will be mapped and area (m^2) of pruning will be recorded.	At all times throughout construction period.	NA	Trigger: Pruning of vegetation beyond the permitted clearing extent. Action: • Immediately notify Project Responsible Officer • Notify DAWE in accordance with condition 28 of the EPBC Act Approval • Cease activity and remove equipment from habitat area • Immediate restoration and rehabilitation of native vegetation • Treat weeds (as defined in Section 3.6.2) and manage spread

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
						• Additional offsets where a suitably qualified ecologist identifies that impacts have occurred that necessitate the establishment of an offset as mitigation to the identified impact. • Reinstate or install additional demarcating fencing or flagging • Review clearing procedures • Re-educate / train site personnel on management requirements and practices
		All site personnel informed of sensitive environmental features.	Inform all personnel of the sensitive areas and procedures for minimising ecological impacts through site inductions and toolbox meetings.	All times throughout construction period. Prior to personnel entering and working on site.	Training registers.	NA
		Tree hollows and large woody debris (>10cm diameter and >50cm length) to be retained or relocated.	Tree hollows are to be retained in-situ wherever possible. If not possible, tree hollows are to be cut out of the cleared tree and relocated as follows: a. A natural tree hollow shall need no modification prior to relocation i.e. the saw cut shall be made after the extent of the hollow. The length of the hollow shall be a minimum of 400 mm and a maximum of 1,000 mm long. b. The Contractor, in liaison with a suitably qualified spotter catcher, shall select suitable host trees for the relocation of hollows. The host trees shall be mature, in good health and will be part of the same area of vegetation. c. Hollows shall be mounted vertically or as close as possible to their original orientation. Hollows shall be mounted a minimum of 5 m from ground level or at a similar height and angle to where it was in the original tree. The aperture shall be faced away from prevailing weather to reduce entry of rain. d. The hollow shall be attached to the host tree at bifurcations of a suitable height. The location of installed hollows shall be recorded using approved GPS equipment.	All times throughout construction period.	Construction audits.	<u>Trigger:</u> Tree hollows are not retained in situ. <u>Actions:</u> Publish number of hollows not retained in annual compliance reporting and notify DAWE if more than 10 hollow trees are removed and hollows are not relocated.
			• A qualified spotter-catcher is required to oversee the relocation and placement of marked habitat features (i.e. large woody debis) to habitat areas outside of the Disturbance Footprint. Where required, the feature is to be checked for fauna before relocation. • Features are to be placed in a natural formation (as far as practicable) and in a way which will not create barriers to fauna movement.			
			Selected logs and branches from the cleared trees (where not otherwise habitat features) are to be stockpiled in designated stockpile areas for use in rehabilitation in areas with existing tree	At all times during construction period.	Construction audits.	<u>Trigger:</u> No logs or branches being stockpiled in designated areas.

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
			cover (e.g. where the action of stockpiling does not create a fire risk). This measure is not to be adopted on cropped land.			Action: • Notify Project Responsible Officer • Publish information in the annual compliance reporting on the use of stockpiled logs and branches in rehabilitated areas. • Review clearing procedures • Re-educate / train site personnel on management requirements, practices and site rules.
Direct mortality or injury of fauna	Pre-construction	Minimise mortality of threatened fauna species as a result of project activities.	A pre-clearance survey, by a suitably qualified spotter catcher, of the Disturbance Footprint is to be conducted prior to commencement of clearing. This survey will involve locating and recording high-value fauna habitat features for retention as well as animal breeding places and locations of threatened fauna species. This is to include inspection, where practicable, of gilgais/ melon holes proposed to be disturbed during the wet season. Where threatened fauna are located, these will be relocated to adjacent habitat where practicable or allowed time to move out of the Disturbance Footprint of own accord.	0 – 6 months prior to site disturbance.	Pre-clearance survey and report.	NA
	Construction	All site personnel informed of protected fauna species and site rules for interactions with fauna.	All site personnel to be introduced through a site induction, to protected fauna species which have the potential to occur within the site (Refer to section 3.5).	Prior to personnel entering and working on site.	Training registers.	NA
			Site induction shall include training in the following: a. Impairment or killing of native fauna may incur penalties. b. Information will be provided in relation to protected and/or dangerous fauna which may be encountered on site, i.e. venomous snakes. c. Only designated and trained personnel are allowed to handle and remove fauna. d. Tampering with an animal breeding place may also incur penalties.			
		Minimise mortality of native fauna.	Site clearing works involving the felling of vegetation are not to be undertaken immediately after heavy rainfall.	At all times during construction and clearing activities.	• Construction audits. • Environmental incidents register.	Trigger: • Native fauna injured or killed during construction. • Clearing occurring without a spotter-catcher being present Corrective action: • Clearing • Injured fauna is to be taken immediately to the nearest vet or wildlife carer • Any injuries or mortality to fauna are to be reported to the Project's Responsible
			All clearing will be undertaken in the presence of a suitably qualified spotter-catcher with current Damage Mitigation Permit. Where safely accessible, hollows must be inspected immediately prior to felling and any fauna relocated. This is to include inspection, where practicable, of gilgais/ melon holes proposed to be disturbed during the wet season.			
			Any fauna that require relocation shall be relocated using appropriate animal hygiene. These include: • Wash hands between handling of different animals • Handling of frogs will be done with the use of disposable and pre-rinsed vinyl gloves. Do not handle multiple individuals wearing the same gloves.			

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
			• Animals are to be immediately bagged in a suitably sized calico bag or plastic zip lock bag for amphibians. Do not reuse bags or use a single bag for multiple individuals.			Officer within 24 hours of the incident • Where a threatened species is injured or killed, notify the responsible Department – DAWE and/or DES within 48 hours of the incident • Assess prescribed mitigation measures and update VFMP where required.
			Any fauna that require relocation shall be relocated to the closest area of suitable habitat outside of the Disturbance Footprint. Where disturbance extends beyond the mapped footprint, e.g. in the case of gilgais / melon holes, the individuals are to be relocated outside of the area disturbance is reasonably expected to occur.			
			Any fauna which are relocated will be documented throughout the course of construction. This record will include: • Species • Location found • Location of relocation area • Condition of the animal. Records are to be retained for audit purposes.			
			Clearing will be undertaken in a sequential manner to allow fauna present sufficient time and space to move out of the area of their own accord, rather than being forcefully moved.			
			If any threatened fauna species are observed during construction, work will cease in the immediate vicinity of the sighting until it has relocated, or it has been removed by a suitably qualified spotter-catcher. The fauna spotter-catcher will provide a suitable record to the Site Supervisor.			
			Construction of trenches will be managed to minimise fauna injury and mortality by: • Cable trenches must be filled as soon as reasonably practicable. Where trenches are required to remain open for more than 24 hours, inspections of the trenches must be completed each morning ahead of the commencement of further trenching works until such time that the trench is backfilled. • No trenches are to be backfilled without the completion of a fauna check prior to backfilling. • Where trenches are required to remain open for more than 72 hours, fauna egress points (ramps) are to be established every 50m of open trench. • Where trenches are constructed in a north / south orientation (or reasonable variation) and required to remain open for more than 24 hours, fauna respite points (e.g. a wet hessian sack) are required to be placed every 50m of open trench. These respite points are to be checked at least once per day and any fauna removed from the trench.			
	Operation, maintenance, decommissioning and rehabilitation	No native fauna injured or killed during operation, maintenance, decommissioning and rehabilitation.	• Any animal requiring care or treatment will be immediately transported to a veterinarian or licenced wildlife career. The fauna spotter-catcher will provide a suitable record to the Site Supervisor. • Any native fauna injuries or mortality to fauna are to be reported to the Project's Responsible Officer within 24 hours of occurrence.	At all times throughout operation, maintenance, decommissioning and rehabilitation.	Environmental incident register.	<u>Trigger:</u> Native fauna injured or killed during operation, maintenance / decommissioning and rehabilitation. <u>Corrective action:</u> • Injured fauna is to be taken immediately to the nearest vet or wildlife carer

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
						• Any injuries or mortality to fauna are to be reported to the Project's Responsible Officer within 24 hours of the incident • Where a threatened species is injured or killed, notify the responsible Department, DAWE and/or DES, within 48 hours of the incident. • Assess prescribed mitigation measures and update VFMP to include any new mitigation measures or procedures reasonably required to prevent reoccurence.
Introduction or proliferation of weeds and pests (as defined in Section 3.6)	Pre-construction	Pest species presence identified across the Project Disturbance Footprint and in adjacent areas.	Baseline pest species survey will be undertaken across the Disturbance Footprint and adjacent areas to record direct observations as well as indirect evidence / impacts of pest activity.	0 – 6 months prior to site disturbance during suitable seasonal conditions.	Pre-clearance survey and report.	NA
		Invasive weed presence and abundance identified across the Disturbance Footprint including a 10 m buffer.	• Pre-clearance survey will be undertaken across the Disturbance Footprint including a 10 m buffer to record presence and abundance of invasive weeds (species as defined in section 3.6.2). Invasive weed hot spot areas within the Disturbance Footprint are to be identified. • Pre-disturbance treatment and control of invasive weed species will be undertaken within all areas of the Study Area subject to disturbance. • A combination of manual, mechanical and chemical weed control methods are the recommended approach for the invasive species identified within the study area. Details of the preferred control methods for each species are provided in Appendix A. • Herbicide use should be avoided adjacent to the confirmed Dulacca Woodland Snail and Belson Panic habitat and where individuals of either species are known to be present. If required, herbicide use will be limited to controlled, spot spraying methods.	0 – 6 months prior to site disturbance during suitable seasonal conditions.	Pre-clearance survey and report.	NA
	Design, construction and operation	No water retaining voids or pits suitable for cane toad breeding which are not required for erosion and sediment control measures.	• Avoid inclusion of any water retaining voids or pits in the design where these are not otherwise required for the control of stormwater run-off and erosion and sediment control measures under the State Development Approval. Where pits and voids are required, include appropriate cover to prevent extended water retention in these spaces and/or subsequent breeding opportunities for cane toads. • For pits and voids where long term presence of retained water is reasonably anticipated and covering is not practicable, fencing to exclude access by cane toads will be incorporated in the design. Sediment fencing, free standing or attached to the base of other fencing material, has proven to be effective. • Wash down and laydown areas will be designed to include cane toad traps where exclusion from areas of potential water	Prior to commencement of construction activities	NA	NA

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
			retention is not practicable and where cane toad activity is locally detected. • Cane toad traps can be easily constructed using designs available at: http://cart.frogwatch.org.au/index.cfm?attributes.fuseaction=shop&goto=trap			
	Construction, operation and maintenance, decommissioning and rehabilitation	All vehicles and plant entering site to be free from weeds and pests.	• Mobile plant (including light vehicles) and equipment is to arrive on site 'clean' of weed seeds and are to be inspected and recorded with documented evidence, e.g. a washdown register, prior to being approved to mobilise on the project site. • Mobile plant (including light vehicles) and equipment demobilising and remobilising to the project site, where utilised in an offsite unsealed location ahead of re-mobilisation, is to be clean on re-entry and subject to another inspection prior to being approved to mobilise on to the project site. • Inspections of mobile plant (including light vehicles) and equipment is to be undertaken at a location at a suitable and safe location near the entry points to the project site. • Ensure machinery hygiene by establishing a wash down area on or in proximity to the project site with a capture vessel for weed seeds and organic matter. • Vehicles to remain on access tracks where possible and off-road driving minimised. • Avoid contamination when driving between properties within the project site (as far as practicable). • Drive to conditions – minimise speed in wet conditions to avoid mud / organic matter / weed seeds to become stuck or caught on your vehicle. • Vehicles to be washed down following working in mapped weed impacted areas on the project site (where identified) where weed control has not been implemented. • Light vehicles and worker transport vehicles to remain on formed / sealed roads during periods they are offsite, e.g. between work shifts. Where this is maintained further inspections will not be required. • During the annual wet season light vehicles shall be maintained in a clean condition with washdowns proactively progressed at least every 2-4 weeks irrespective of whether the vehicle is utilised off of the project site.	Throughout construction, operation and maintenance, decommissioning and rehabilitation.	• Vehicle washdown register. • Construction audits.	Trigger: No documented evidence of vehicle washdowns. Corrective action: • Notify the Project Responsible Officer • Treatment of all new weed incursions within the disturbed area reasonably attributable to the non-compliance or construction. • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
		No increase in weed and pest (as defined in Section 3.6) presence and abundance within and adjacent to the Disturbance Footprint.	• During construction, undertake invasive weed management control across all areas within the Study Area subject to disturbance to promptly suppress outbreaks. • Undertake invasive weed control within areas disturbed as part of the action, including construction of the project (including rehab areas), until such time that invasive weed presence in these areas cannot be attributed to disturbance associated with construction activities. • Minimise the impact of construction activities on vegetation adjacent to construction areas to prevent weed incursion by ensuring: - Vegetation to be retained will be clearly demarcated and avoided during construction	Throughout construction, operation and maintenance, decommissioning and rehabilitation, for the duration of the approval.	• Construction audits. • Ecological condition monitoring.	Trigger: New or increased weeds located within the Disturbance Footprint or adjacent areas reasonably attributable to the construction or operation of the project. Corrective action: • GPS locate any new weed occurrences within the disturbance footprint, especially weed infestations • Undertake weed management

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
			- Any new weed incursion within this habitat will be located and recorded - Vehicles and plant will remain on designated tracks wherever possible. • Undertake ongoing weed inspections and weed management and control, within 1 m of the edge of the any Project infrastructure for the period of EPBC Act Approval. The weed management and control must minimise the risk of and potential for weed cover occurring, suppress any outbreak that occurs, and remove any weeds that may occur. • The control area shall be increased where operational maintenance activities are required to be undertaken from unformed areas of the site until such time when weed presence in this area (if existing) can no longer be directly attributed to the project. This obligation is triggered for areas where activities are required to be undertaken which are beyond the areas required to be managed under this VFMP. • A combination of manual, mechanical and chemical weed control methods are the recommended for the invasive species identified within the study area. Details of the preferred control methods for each species are provided in Appendix A. • Herbicide use should be avoided adjacent to the confirmed Dulacca Woodland Snail and Belson Panic habitat. • Herbicide use should be avoided where individuals of either species are known to be present, and if required, limited to controlled, spot spraying methods.			• Ongoing weed monitoring treatments • Assessment of prescribed mitigation measures and update VFMP where required. • Record occurrence and treatment and retain records for audit.
			• If material is required to be imported to the Study Area (i.e. for use as road base etc.), the material must be obtained from an appropriately licensed source where the source location is deemed 'weed clean' and free of pests (rodents, cane toads etc.). Evidence must be obtained from the provider prior to import of material to the project site from the source. • Local providers with consistent weed profiles to the project site shall be supported wherever practicable. • Equipment or material being brought into port facilities for direct transfer to site is required to pass the quarantine inspections and protocols as requested by the AQIS directives. • Only native or certified weed free seeds will be used in all rehabilitation works within areas of native vegetation, including hydro mulch. • Imported fill (rocks/screenings) shall be free of contamination from mud clumps and weed seeds.	At all times during construction, operation and maintenance, reinstatement and rehabilitation.	Construction audits.	<u>Trigger:</u> No documented evidence of material, including seeds for rehabilitation, being deemed 'weed clean'/free of pest/having passed quarantine inspection, by a licenced source. <u>Corrective action:</u> • Immediately inform Project Responsible Officer • Remove material from site • Treatment of any new weed incursions • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
			Material must be utilised and stockpiled on property and not trucked to other properties within the Disturbance Footprint. Process is to be adopted in order to reduce impact on the soil profile and the risk of weed spread between properties.	At all times during construction, operation and maintenance, reinstatement and rehabilitation.	Construction audits.	<u>Trigger:</u> Evidence of material being moved between properties within the Disturbance Footprint. <u>Corrective action:</u>

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
						• Immediately inform Project Responsible Officer • Return material to source property • Treatment of any new weed incursions • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
			No viable weed species (declared or otherwise) are to be mulched or chipped.	At all times during construction, operation and maintenance, reinstatement and rehabilitation.	Construction audits.	<u>Trigger:</u> Evidence of weeds being mulched or chipped. <u>Corrective action:</u> • Immediately inform Project Responsible Officer • Suitably dispose of the material • Treatment of any new weed incursions • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
			Use of herbicides, in identified weed hotspots, to be prioritised for use in the early wet season to limit seed formation. All personnel managing and using herbicides are to receive appropriate training prior to commencing work and hold any necessary licences required under QLD law. Only herbicides registered for use over water will be used within 10 m of watercourses.	Prior to construction, during construction, for two years post construction.	Operational maintenance.	<u>Trigger:</u> Herbicides not applied during early wet season in weed hotspots. <u>Corrective action:</u> • Treatment of any new weed incursions • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
			Clean boots daily by removing excess mud / organic material. Cleaning excess mud / organic material off boots between properties. Check clothing for weed seeds prior to moving between properties / offsite.	At all times during construction, operation and maintenance, reinstatement and rehabilitation.	Training registers	<u>Trigger</u>: Evidence of non-compliance. <u>Corrective Action:</u> Re-educate / train site personnel on management requirements, practices and site rules.

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
			• To reduce the presence of feral animals or other pests, all food scraps must be placed into designated waste bins, and their lids securely closed. • Skip bins must be emptied regularly, and at a frequency of no more than 14 days.	At all times throughout the life of the project.	Operational maintenance.	<u>Trigger:</u> • Bins not being emptied within 14 days • Evidence of food scraps, poor disposal practices. <u>Corrective action:</u> Re-educate / train site personnel on management requirements, practices and site rules.
			• Identify and train workforce in the pest and feral animal species present in the area (e.g. rabbits, cane toads, dogs, house mouse, black rat, feral cat and pigs). • All staff to be trained in the identification of key introduced weed species (refer section 3.6.2) known on site during general induction and toolbox talks. • Known introduced weeds (refer section 3.6.2) on the site are displayed on posters on the HSE board and any other suitable locations around the site.	Prior to personnel entering and working on site	Training registers.	NA
			Implement a species-specific control program for pest fauna in consultation with the landowner(s). This is only to be completed if the incidence of any feral species has increased during construction or operation as reasonably attributable to the project.	Throughout construction and operation phases as required.	• Construction audits. • Ecological condition monitoring. • Maintenance of pest animal register.	<u>Trigger:</u> Reoccurring encounter/increased incidence of rabbits, cane toads, dogs, house mouse, black rat, feral cat and/or pigs. <u>Corrective Action:</u> Develop species specific control program and review as necessary to ensure it remains effective and applicable.
			Any live cane toads or cane toad tadpoles encountered on site or captured in traps will be killed humanely. The RSPCA acknowledges two methods for humanely killing cane toads which are appropriate for use on this project. These methods are outlined here: https://www.rspcaqld.org.au/~/media/files/animal%20care%20tips/fs%20humane%20killing%20of%20cane%20toads.ashx?la=en.	At all times throughout the life of the project.	• Construction audits. • Operational maintenance. • Maintenance of feral animal register.	<u>Trigger:</u> Evidence of cane toads breeding (i.e. tadpoles in water holding areas and/or reoccurring encounter with cane toads within/adjacent the Disturbance Footprint. <u>Corrective Action:</u> Revise environmental safeguards as necessary to ensure they remain effective and applicable (i.e. minimise opportunities for water to pond).
			No alterations to landform, or refuse left exposed, which will specifically assist breeding opportunities for cane toad, feral cat, dog, or house mouse or rat on site.	During and post construction, and rehabilitation activities.	Construction audits.	<u>Trigger:</u> Evidence of exposed refuse or depressions left in substrate as a result of project activities. <u>Corrective action:</u>
			Any shallow depressions left in substrate as a result of clearing, construction or rehabilitation works to be immediately levelled so as not to encourage water retention and breeding of cane toads.			

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
						• Immediately remove any refuse • Level ground/backfill with weed and pest free material.
			Groundcover vegetation (grasses, forbes, herbs etc.), if free of viable weed material, is to be push-cleared by excavator bucket or equivalent into stockpiles in designated stockpile areas for use in rehabilitation (where practicable, e.g. where the action of stockpiling does not create a fire risk or impact on drainage).	At all times during construction/clearing activities.	Construction audits.	<u>Trigger:</u> Evidence of weed infested groundcover vegetation being stockpiled in designated areas. <u>Corrective action:</u> • Notify Project Responsible Officer • Treat stockpile areas to remove weeds • Review clearing procedures • Re-educate / train site personnel on management requirements, practices and site rules.
Dust generation	Construction, operation and maintenance, decommissioning and rehabilitation	Dust levels maintained within compliance levels.	Secure an appropriately licensed water source for dust suppression during the construction phase.	At all times during site based construction /clearing activities.	• Construction audits. • Ecological condition monitoring. • Training registers.	<u>Trigger:</u> Evidence of dust deposition on leaves of adjacent remnant vegetation and / or dust nuisance leaving project site with impact on sensitive receptors. <u>Corrective Action:</u> • Review adequacy of dust management procedures • Increase frequency of dust suppression measures • Re-educate / train site personnel on management requirements, practices and site rules.
			Progressively rehabilitate and/or stabilise disturbed areas.			
			Immediately clean up material spilt on traffic areas before vehicle movement can disturb it.			
			Use construction water cart to suppress dust during earthworks.			
			Where watering is used, monitor the procedure to ensure that there is no surface ponding/pooling of water.			
			Enforce a maximum speed limit of 40km/hr on sealed access tracks, 20km/hr where access tracks are in construction and past landowner dwellings, 10km/hr past livestock and stationary work crews. Speeds on public roads are to be observed except for Waituna Road where speeds are not permitted to exceed 60km / hr. Personnel will be informed of this requirement during induction.			
			Restrict vehicles to approved access tracks (where constructed, or where approval for use exists with the landowner) and only those vehicles required for the safe, efficient and essential construction activities will be allowed in the work area.			
			Cover all loose loads for transport to and from the work site.			
			Maintain stockpiles, for example stripped topsoil, in a condition which prevents windblown dust generation, especially during dry or windy conditions. This will include watering or covering of stockpiles with an appropriate erosion and sediment control solution.			
			Limit bare earth exposure to that essential to the efficient and effective construction of project infrastructure. Using vegetation cover, mulch covers or other suitable methods will be adopted where practicable.			
			Rehabilitate or allow natural regeneration of bare areas as soon as the area is no longer needed for construction.			

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
Hazardous materials/chemical spills	Construction, operation and maintenance, decommissioning and rehabilitation	No spills of oil, other hydrocarbons and hazardous materials resulting in environmental harm.	• Tanks and hazardous material storage areas are to be appropriately bunded and covered. • Ensure that spill response procedures are in place, the workforce is trained in their use and the spill clean-up/ containment equipment is maintained. • Refuel/lube machines are to be self bunded and are to be situated at least 40 m away from any waterways. Where refuelling occurs on site, refuelling is to be supported by a drip tray and spill response kit. • Development of a spill contingency planning as part of the site Emergency Response Plan on which to base a response in case of a spill or accident involving chemicals. Any such spill may result in possible surface or ground water contamination. • Brief all site personnel involved in the use of chemicals on the correct handling and use of oil, grease, fuel and chemicals on site. • Handling and storage of flammable and combustible liquids (where required) in accordance with AS 1940. • Storing and handling corrosive materials (where required) in accordance with AS 3780.8. • Make provision for the spill catchment capacity to be at least the larger of 110% of the volume of the largest bulk container or 25% of the total capacity of all containers stored in a bunded area. All bunded areas are to have an impervious lining. • Drain bunded areas when necessary and test and dispose of accordingly, which may include using a licenced waste operator. • Undertake machinery maintenance on a sealed surface or suitable ground covering to capture spills. • Maintain a manifest of chemicals (storage location, volumes, type of chemical, receipt date). • Maintain all material/chemical Safety Data Sheets (SDS) and information relating to the storage, use and handling of chemicals close enough to where the substances are being used to allow a worker who may be exposed to the substance to refer to it easily, e.g. appended to safety documentation. Hard copies of SDS's to be maintained at the site compound, e.g. first aid room and / or site office, for access. • SDS's and chemical labelling must comply with legislative requirements prescribed under health and safety law. • Portable metal or plastic fuel containers of normal capacities up to and including 25 litres must comply with the requirements under AS/NZS 2906:2001 Fuel containers - portable-plastic and metal. Containers covered by this Australian Standard are suitable for use with leaded, unleaded and super grades of petrol, two-stroke engine fuel, and kerosene and distillate (diesel fuels).	At all times throughout the life of the project.	Construction audits.	<u>Trigger:</u> Evidence/reporting of hazardous materials/chemical spills within the Study Area which are reasonably attributable to project activities. <u>Corrective Action:</u> 1. Stop work 2. If safe to do so, make immediate arrangements to minimise further environmental impact or harm 3. Project Responsible Officer will notify, in order: - Emergency services, if required - RES Project Manager - Other nominated RES contact - Regulator in the case of a notifiable environmental non-compliance. 4. Amend procedures relating to hazardous materials and chemical management if found to be inadequate. 5. If hazardous material or chemical spill occurs impacts Belson's panic, report the incident to DAWE in accordance with condition 28 of the EPBC Act Approval.
Vehicular strike	All	No injury or death to native fauna	Enforce a maximum speed limit of 40km/hr on sealed access tracks, 20km/hr where access tracks are in construction and past landowner dwellings, 10km/hr past livestock and stationary work crews. Speeds on public roads are to be observed except for Waituna Road where speeds are not permitted to exceed 60km / hr. Personnel will be informed of this requirement during Project induction.	At all times throughout the life of the project.	• Environmental incident register. • Fauna interaction register.	<u>Trigger:</u> • Vehicles travelling above speed limits • Vehicles observed not using designated tracks

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
			Vehicles to remain on designated access tracks and roads as far as operationally practicable. Many animals become more active at dawn and dusk. As far as practicable, avoid vehicular movements to/from site outside of daylight hours. Where this is unavoidable, drive to the conditions and reduce speed along vegetated stretches of road.		• Observation by Project Responsible Officer. • Construction audits. • Training registers.	• Native fauna injured or killed. <u>Corrective action:</u> • Notify Site Responsible Officer to record incident in register • Re-educate / train site personnel on management requirements, practices and site rules • Injured fauna is to be taken immediately to the nearest vet or wildlife carer with the ability to treat or accept the injured animal • Any injuries or mortality to fauna are to be reported to the Project's Responsible Officer within 24 hours of the incident • Where a threatened species is injured or killed, notify the responsible Department, DAWE and/or DES within 48 hours of the incident. Nb: For bird or bat mortality please refer to the response process described in the Bird and Bat Management Plan (BBMP). • Assess prescribed mitigation measures and update VFMP where required.
Fire	Construction and operation	No incidences of fire as a result of project activities.	• Awareness and implementation of RES general bushfire rules, which will be included in site induction and available on site HSE boards: - No smoking - Journey management planning - Stay on formed access tracks (wherever practicable) - Only diesel vehicles allowed on site - Vehicles, machinery and equipment is well maintained - Vehicles have appropriate fire suppression systems (e.g. extinguishers) and be within test date (e.g. AS1851) - Hot works and or works that could generate sparks are not permitted on Total Fire Ban days, and managed appropriately during high fire danger periods - Appropriate management and storage of flammable chemicals - Emergency planning to consider fire risk and evacuation plans. • Implement bushfire management in accordance with a Bushfire Management Plan (BMP) (as required by condition 10 of the State Development Approval) as prepared by a suitably qualified person and in consultation with Queensland Fire and Emergency Services. The BMP will include specific	All times throughout construction and operation.	• Construction audits. • Operational maintenance. • Daily monitoring of fire weather warnings. • Training registers.	<u>Trigger:</u> Fire event as a result of project activities. <u>Corrective action:</u> • Rehabilitate and restore any impacted areas • Review incident to identify causes • Review of site procedures for fire management including BMP • Re-educate / train site personnel on management requirements, practices and site rules.

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
			management actions to minimise bushfire risk and potential impacts to MNES. Measures will include but not be limited to: - Asset protection zones - Access and evacuation tracks maintained for egress and emergency vehicles - Installation of dedicated fire-fighter water storage tanks - Hazardous chemicals and fuel stored according to codes of practice and AS - Adherence with fire danger ratings (FDR) and fire weather warnings. • During construction and operation the Project will also be subject to an Emergency Response Plan (ERP) as required by with section 43 of the Work Health and Safety Regulation 2019 (QLD). The ERP will include inputs necessary to meet the requirements of Safety and Emergency Management Plan required by condition 11 of the State Development Approval. The ERP developed will prescribe additional fire risk management and response procedures. In accordance with condition 11 the ERP will be developed in consultation with State and Regional Emergency Services, including relevant fire authority/ies. • Inclusion of bushfire awareness in the site induction • Fire danger ratings and associated work restrictions included in toolbox/prestart meetings.			
	Construction	No increase in fuel loads within and directly adjacent the Disturbance Footprint associated with increase in exotic perennial grass incursion above baseline levels.	Implement weed measures as described.	All times throughout construction period.	Ecological condition monitoring.	Trigger: Groundcover >60% or 1,500kg/ha pasture biomass. Corrective action: • Implement fuel reduction methods, including controlled grazing • Review of site procedures for weed management • Review of site procedures for rehabilitation • Re-educate / train site personnel on management requirements, practices and site rules.
Habitat degradation	Rehabilitation (post construction)	Rehabilitation of disturbed non-operational areas.	The period of time between completion of construction activities and restoration of disturbed areas will be minimised to prevent loss of soils and weed incursion.	Rehabilitation of disturbed non-operational areas to be undertaken progressively across the project site with initial rehabilitation works completed within 3 months of the completed construction of all site turbines and site	Rehabilitation condition monitoring.	Trigger: • Minimum plant survival <80% of planted stock • >5% invasive weed cover • No evidence of native plant growth • Signs of erosion. Corrective action: • Promptly treat invasive weeds to eradicate new species and control spread of existing species
		All disturbed land will be rehabilitated to achieve stable and sustainable conditions of soil cover and vegetation.	Disturbed areas will be rehabilitated as follows: • Compacted areas to be ripped where required and practicable to do so. • Application of seed mix of either sterile cover crop to promote rapid site stabilisation and / or relevant pasture grasses (including native grasses). Grass types to be identified in consultation with the landowners. Where practicable vegetation best aligned with the historic vegetation at the rehabilitation site will be selected.			

Risk	Project Phase	Performance Criteria	Management Action (s)	Timing	Monitoring Activity	Trigger / Corrective Action
			• Areas within dryland cropping areas will be left fallow in consultation with the landowner. To minimised disturbance to the landowner, no grass species will be introduced to dryland cropping areas where ongoing cropping activities are anticipated by the landowner. • Previous land use allowed to naturally regenerate.	infrastructure. Follow up monitoring of rehabilitated areas ongoing until the disturbance is stabilised.		• Where rehabilitation areas are not meeting performance criteria, utilise tube-stock to assist with rehabilitation • Replace dead seedlings • Install fencing in consultation with the landowner to prevent damage by livestock or pest species • Remediate eroded areas and implement additional control measures.
		Sensitive environmental areas sufficiently buffered from operational areas.	At locations where the maximum clearing for the project Disturbance Footprint has occurred and abuts Brigalow TEC, SEVT TEC, Dulacca Woodland Snail habitat and Belson's Panic habitat, the following rehabilitation works will occur: • Original stockpiled materials is to be utilised to reinstate the natural soil profile in disturbed areas, being: 1. Subsoil 2. Topsoil 3. Vegetation (where available). • Where rock was naturally occurring on the ground surface in the above cited disturbance locations, the rock can be reinstated to these areas as part of rehabilitation. Rock is not to be utilised where its use will create a new impact or hazard to the landowner's ability to utilise their land, e.g. rock found on the ground surface in cropping areas is not to be utilised in rehabilitation of these cropping areas. • Rock excavated in trenching activities must be returned to the trench wherever possible. Waste rock must be disposed of in accordance with Queensland Government guidance and not left on the project site in areas where this was not naturally occurring. • The areas disturbed for construction but not forming part of the operational footprint, will be re-profiled to original or stable contours, re-establishing surface drainage lines and other land features. Site specific stabilisation measures will be necessary to prevent slumping or erosion. Erosion and sediment control is to be completed in accordance with the ESCP required by condition 25 of the State Development Approval. Where practicable, temporary erosion control measures will be left in place until bare soil has stabilised, i.e. rock (where naturally occurring at that location) and other natural material dragged over as cover until vegetation cover has re-established etc. • Revegetation is to occur through natural regeneration as well as through assisted planting to create a vegetated buffer between the Disturbance Footprint and adjacent values. Plantings (tube stock and seed) to consist of native species analogous to adjacent vegetation community. • All rehabilitation works to be consistent with bushfire and operational safety requirements.			

5.2 Species Specific Mitigation Measures

5.2.1 Dulacca Woodland Snail

A suite of mitigation and management measures have been developed to reduce potential impacts to Dulacca Woodland Snail as a result of Project activities. These mitigation and management measures have been based on the only available guidelines for the species:

- Conservation Advice *Adclarkia dulacca* Dulacca Woodland Snail (Threatened Species Scientific Committee, 2016).

The overarching management objectives relating to Dulacca Woodland Snail are summarised below:

- To minimise disturbance to the Dulacca Woodland Snail within the Disturbance Footprint through micro-siting of infrastructure and avoiding microhabitat where possible
- To minimise loss of individual Dulacca Woodland Snails and its habitat by minimising the Disturbance Footprint
- To ensure no disturbance or degradation to identified Dulacca Woodland Snail populations or their habitat outside of the approved Disturbance Footprint
- To increase awareness of the Dulacca Woodland Snail among Project personnel, landholders and the general community.

Specific mitigation measures relevant to the Dulacca Woodland Snail (*Adclarkia dulacca*) are presented in Table 15.

Table 15 Mitigation Measures and Management Measures for Dulacca Woodland Snail

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
Clearing of habitat	Design	Detailed design does not exceed clearing of 1.49 ha of mapped Dulacca Woodland Snail habitat limited to the Key impact areas described in the - EPBC Act Approval.	Micro-siting of infrastructure will be undertaken to avoid known habitat.	NA	NA	NA
	Construction	Construction does not result in clearing >1.49 ha of mapped Dulacca Woodland Snail habitat limited to the Key impact areas described in the EPBC Act Approval.	Demarcation of known Dulacca Woodland Snail habitat and clearing extents with fencing or flagging.	Immediately prior to clearing activities.	Construction audits.	<u>Trigger:</u> Clearing outside of the Project Disturbance Footprint. <u>Corrective Action:</u> • Reinstate or install additional demarcating fencing or flagging • Review clearing procedures • Re-educate / train site personnel on management requirements and practices • Report clearing of habitat in key impact areas to DAWE within 10 business days of the conclusion of clearing across all 5 of the defined key impact areas.
		All site personnel informed of site's sensitive environmental features including Dulacca Woodland Snail and associated habitat.	All site personnel will undergo site induction and will be made aware of key characteristics and habitat of Dulacca Woodland Snail as well as its location on site.	All times throughout construction period. Prior to personnel entering and working on site.	Training registers.	NA
Habitat degradation through disturbance	Pre-construction	No loss of microhabitat features of Dulacca Woodland Snail habitat.	• Pre-clearance surveys to be undertaken within the Disturbance Footprint (or supervised) by a suitably qualified person experienced with land snail identification and their habitat – this would include the identification of potential shelter places, marking of microhabitat to be relocated, determining how each microhabitat feature will be moved and identifying where microhabitat will be relocated and how it will be	0 – 6 months prior to construction.	Pre-clearance survey and report. Ecological condition monitoring.	<u>Trigger:</u> Evidence of clearing, disposal or burning of microhabitat features. <u>Corrective Action:</u> • Immediately notify Project Responsible Officer

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
			repositioned to maximise occupation by Dulacca Woodland Snail. • Baseline ecological condition surveys completed to determine Habitat Quality Scores for the Dulacca Woodland Snail (methodology described in Section 6.3.1.2) prior to the commencement of approved habitat clearing. • Microhabitat to be relocated would include all suitable logs (those with dimensions: >50 cm long, >10 cm diameter) with at least some portion (>25%) in contact with the ground), loose rocks/rock piles and fallen bark slabs/piles. • As even small logs and slabs of fallen bark are potential microhabitat much of this could be hand shifted; small pieces of debris could be piled to enhance occupation by DWS. • Felled vegetation (such as brigalow suckers) could be utilised to enhance cover in habitats adjoining the Disturbance Footprint. • Larger logs may require shifting with suitable machinery (e.g. Bobcat). • It is envisaged that microhabitat within the clearing footprint would be moved to immediately adjoining habitat to predetermined locations as identified above.			• Cease activity and/or remove equipment from habitat area • Additional offsets if required, as agreed with DAWE or the relevant Department • Reinstate or install additional demarcating fencing or flagging • Review clearing procedures • Re-educate / train site personnel on management requirements and practices. • Report degradation or unauthorised disturbance of habitat to DAWE in accordance with condition 28 of the EPBC Act Approval.
	Construction, operation and maintenance, decommissioning and rehabilitation	No overall decline in Habitat Quality Score for Dulacca Woodland Snail	• Baseline ecological condition surveys completed to determine Habitat Quality Scores for the Dulacca Woodland Snail (methodology described in Section 6.3.1.2) prior to the commencement of approved habitat clearing. • All other species-specific mitigation measures proposed for Dulacca Woodland Snail in this table.	At all times throughout the life of the project.	Ecological condition monitoring.	<u>Trigger:</u> Decline in Habitat Quality Score in Dulacca Woodland Snail monitoring habitat site/s. Decline must be disproportionate to any decline in the reference site, such that it can be attributed to Project activities i.e. rather than broad climatic changes or other influences. <u>Corrective Action:</u> • Stabilise the surface and create a native groundcover to prevent weed incursion in any impacted areas not required for the safe operation of the Project • Treatment of new invasive weed incursions • Review of site procedures for weed management • If incidence of feral pigs has increased during construction and operation as reasonably attributable to the Project, develop species specific control program for feral pig and review as necessary to ensure it remains effective and applicable • Review adequacy of dust management procedures

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
						• Review adequacy of erosion and sedimentation management procedures • Monitoring of success of treatments and procedures • Re-educate / train site personnel on management requirements, practices and site rules.
Habitat degradation through hazardous materials/chemical spills	Construction, operation and maintenance, decommissioning and rehabilitation	No spills of oil, other hydrocarbons and hazardous materials resulting in impacts to Dulacca Woodland Snail habitat.	• Tanks and hazardous material storage areas are to be appropriately bunded and covered. • Ensure that spill response procedures are in place, the workforce is trained in their use and the spill clean-up/ containment equipment is maintained. • Refuel/lube machines are to be self bunded and are to be situated at least 40 m away from any waterways. Where refuelling occurs on site, refuelling is to be supported by a drip tray and spill response kit. • Development of a spill contingency planning as part of the site Emergency Response Plan on which to base a response in case of a spill or accident involving chemicals. Any such spill may result in possible surface or ground water contamination. • Brief all site personnel involved in the use of chemicals on the correct handling and use of oil, grease, fuel and chemicals on site. • Handling and storage of flammable and combustible liquids (where required) in accordance with AS 1940. • Storing and handling corrosive materials (where required) in accordance with AS 3780.8. • Make provision for the spill catchment capacity to be at least the larger of 110% of the volume of the largest bulk container or 25% of the total capacity of all containers stored in a bunded area. All bunded areas are to have an impervious lining. • Drain bunded areas when necessary and test and dispose of accordingly, which may include using a licenced waste operator. • Undertake machinery maintenance on a sealed surface or suitable ground covering to capture spills. • Maintain a manifest of chemicals (storage location, volumes, type of chemical, receipt date). • Maintain all material/chemical Safety Data Sheets (SDS) and information relating to the storage, use and handling of chemicals close enough to where the substances are being used to allow a worker who may be exposed to the substance to refer to it easily, e.g. appended to safety documentation. Hard copies of SDS's to be maintained at the site compound, e.g. first aid room and / or site office, for access. • SDS's and chemical labelling must comply with legislative requirements prescribed under health and safety law.	At all times throughout the life of the project.	Construction audits.	<u>Trigger:</u> Evidence/reporting of hazardous materials/chemical spills within the Dulacca Woodland Snail habitat which are reasonably attributable to project activities. <u>Corrective Action:</u> 1. Stop work 2. If safe to do so, make immediate arrangements to minimise further environmental impact or harm 3. Project Responsible Officer will notify, in order: - Emergency services, if required - RES Project Manager - Other nominated RES contact - Regulator in the case of a notifiable environmental non-compliance. 4. Amend procedures relating to hazardous materials and chemical management if found to be inadequate. 5. After the incident, promptly notify DAWE of any impacts to listed threatened species in accordance with condition 28 of the EPBC Act Approval.

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
			• Portable metal or plastic fuel containers of normal capacities up to and including 25 litres must comply with the requirements under AS/NZS 2906:2001 Fuel containers - portable-plastic and metal. Containers covered by this Australian Standard are suitable for use with leaded, unleaded and super grades of petrol, two-stroke engine fuel, and kerosene and distillate (diesel fuels).			
Introduction or proliferation of invasive weeds (as defined in Section 3.6.2)	Pre-construction	Successful removal of invasive weeds within the Disturbance Footprint.	• Pre-clearance survey will be undertaken across the Disturbance Footprint including a 10 m buffer to record presence and abundance of invasive weeds (species as defined in section 3.6.2). Invasive weed hot spot areas within the Disturbance Footprint are to be identified. • Pre-disturbance treatment and control of invasive weed species will be undertaken within all areas of the Study Area subject to disturbance. • Implement weed management measures as outlined in General Mitigation Measures (section 5.1) and detailed in Appendix A for invasive weeds identified within the Disturbance Footprint. • Herbicide use should be avoided adjacent to the confirmed Dulacca woodland snail and Belson Panic habitat and if required, limited to controlled, spot spraying methods. Any mortality of EPBC listed species following herbicide application should be reported to DAWE in accordance with condition 28 of the EPBC Act Approval.	0 – 6 months prior to site disturbance during suitable seasonal conditions.	Pre-clearance survey and report.	NA
	Construction	Maintain the Disturbance Footprint including a 10m buffer free of invasive weeds.	Implement weed measures as outlined in General Mitigation Measures (section 5.1) and detailed in Appendix A for invasive weeds within the Disturbance Footprint.	All times throughout construction.	Construction audits.	<u>Trigger:</u> Presence of invasive weeds within the Disturbance Footprint. <u>Corrective action:</u> • Treatment of new weed incursions • Monitoring of success of treatment • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
		Cover of invasive weeds in adjacent Dulacca Woodland Snail habitat does not exceed baseline levels as a result of project activities.	• Implement weed measures as outlined in General Mitigation Measures (section 5.1) and detailed in Appendix A and this table for invasive weeds within the Disturbance Footprint. • Due to the potential sensitivity of Dulacca Woodland Snail to herbicide use, manual and mechanical methods are to be the preferred measures of eradication and control. However, where this is not possible or feasible, herbicide use is to be undertaken in a controlled manner and limited to spot spraying.	All times throughout construction.	Ecological condition monitoring.	<u>Trigger:</u> Increase in invasive weed coverage above baseline conditions or introduction of new weed species as a result of the project. <u>Corrective action:</u> • Treatment of new weed incursions

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
						• Monitoring of success of treatment • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
		Cover of buffel grass (*Cenchrus ciliaris*) in adjacent Dulacca Woodland Snail habitat does not exceed baseline levels as a result of project activities.	Implement weed measures as outlined in General Mitigation Measures (section 5.1) for invasive weeds within the Disturbance Footprint.	All times throughout construction.	Ecological condition monitoring.	<u>Trigger:</u> Increase in invasive weed coverage above baseline conditions or introduction of new weed species as a result of the project. <u>Corrective action:</u> • Treatment of new weed incursions and reduction to baseline levels within Disturbance Footprint and within the 10m buffer around this Disturbance Footprint • Monitoring of success of treatment • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
		No decline in baseline vegetation condition and health within adjacent Dulacca Woodland Snail habitat as a result of project activities.	All rehabilitation activities adjacent to remnant areas to consist only of native species. No aerial or broad scale spraying of herbicide is to occur within the Disturbance Footprint or within the 10m buffer around this Disturbance Footprint. Any use of herbicide within Disturbance Footprint for invasive weed management is to be minimal and limited to direct application methods.	All times throughout construction period. Ecological monitoring.	• Construction audits. • Ecological condition monitoring.	<u>Trigger:</u> Non-compliance with management actions. <u>Corrective actions:</u> Re-educate / train site personnel on management requirements, practices and site rules.
	Operation	No high risk weed incursion areas (i.e. exposed earth) present within the Disturbance Footprint.	Implement weed measures as outlined in General Mitigation Measures (section 5.1).	0 – 6 months following completion of construction	Operational maintenance.	<u>Trigger:</u> Invasive weed incursion areas present within the Disturbance Footprint. <u>Corrective action:</u> Rehabilitate and stabilise disturbed non-operational areas.
Proliferation of feral pigs	Construction, operation and maintenance, decommissioning and rehabilitation	No proliferation of feral pigs within the Study Area as a result of project activities.	Implement a species-specific control program in consultation with the landowner(s). This is only to be completed if the incidence of feral pigs has increased during construction or operation as reasonably attributable to the project.	Throughout construction and operation phases as required.	• Construction audits. • Ecological condition monitoring. • Maintenance of pest animal register.	<u>Trigger:</u> Reoccurring encounter/increased incidence of feral pigs. <u>Corrective Action:</u> Develop species specific control program and review as necessary to

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
						ensure it remains effective and applicable.
Fire	Construction and Operation	No incidences of fire as a result of project activities.	Implement fire measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction and operation.	• Construction audits. • Operational maintenance.	Trigger: Fire event as a result of project activities. Corrective action: • Rehabilitate and restore any impacted areas • Review incident to identify causes • Review of site procedures for fire management • Re-educate / train site personnel on management requirements, practices and site rules • Report mortality of EPBC listed species to DAWE and/ or fire within mapped Dulacca Woodland Snail habitat (as defined in Appendix B of the EPBC Act Approval) in accordance with condition 28 of the EPBC Act Approval.
Pathogen introduction	Construction and Operation	No introduction or spread of pathogens within the Disturbance Footprint as a result of project activities.	Implement weed hygiene outlined in General Mitigation Measures (section 5.1).	All times throughout construction and operation.	• Construction audits • Operation maintenance	Trigger • Evidence of non-compliance with weed and pathogen hygiene procedures. Action: • Review adequacy of weed and pathogen hygiene procedures • Review incident to identify causes • Re-educate / train site personnel on management requirements, practices and site rules.
Habitat degradation from dust generation (desiccation of vegetation)	Construction and Operation	Dust levels maintained within compliance levels.	Implement dust measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction and operation.	• Construction audits. • Operational maintenance. • Ecological condition monitoring.	Trigger: Evidence of dust deposition on leaves of adjacent remnant vegetation. Action: • Review adequacy of dust management procedures. • Increase frequency of dust suppression measures. • Re-educate / train site personnel on management requirements, practices and site rules.

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
Habitat degradation from erosion and sedimentation	Construction and Operation	No increased levels of erosion and sedimentation within and adjacent the Disturbance Footprint above baseline levels.	Implement erosion and sedimentation measures outlined in General Mitigation Measures (section 5.1).	All times throughout construction and operation.	• Construction audits. • Operational maintenance. • Ecological condition monitoring.	Trigger: Evidence of erosion or sedimentation within the Disturbance Footprint or adjacent habitat. Action: • Review adequacy of erosion and sedimentation management procedures • Increase erosion and sediment management within the Disturbance Footprint • Rehabilitate bare areas with native species • Re-educate / train site personnel on management requirements, practices and site rules.

5.2.2 Belson's Panic

The specific mitigation and management measures to reduce threats to Belson's panic (*Homopholis belsonii*) are presented in Table 16. Mitigation and management measures have been based on current best practice and information provided in the following guidelines:

- Approved Conservation Advice for *Homopholis belsonii* (Threatened Species Scientific Committee, 2008)
- Draft National Recovery Plan for *White Box – Yellow Box – Blakely's Red Gum Grassy and Derived Native Grassland* (NSW DECC, 2010),

The overarching management objectives relating to Belson's panic are summarised below:

- To minimise loss of individuals or populations of Belson's panic and its habitat by minimising the Disturbance Footprint and micro-siting of infrastructure to avoid known habitat or populations
- To ensure survival of translocated individuals or populations and restock where survival drops below 50% of the translocated stock
- To ensure no disturbance to identified Belson's panic populations or suitable habitat for the species outside of the approved Disturbance Footprint
- To increase awareness of Belson's panic among Project personnel, landholders and the general community.

Table 16 Summary of Proposed Mitigation and Management Measures for Belson's Panic

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
Clearing of habitat	Design	Detailed design does not exceed 165.67 ha of mapped potential habitat for Belson's panic	Micro-siting of infrastructure will be undertaken to avoid known habitat.	NA	NA	NA
	Pre-construction	The Disturbance Footprint is surveyed for Belson's panic habitat and individuals.	Pre-clearance surveys will be undertaken across the Disturbance Footprint to identify suitable habitat and the presence, location and quantity of Belson's panic.	0 – 6 months prior to site disturbance during suitable seasonal conditions.	Pre-clearance survey and report.	<u>Trigger:</u> Population of Belson's panic identified within Project Disturbance Footprint. <u>Action:</u> • Occurrence of Belson's panic to be reported to DAWE • Micro-siting of project infrastructure around areas of identified Belson's panic • If micro-siting is not possible, develop a translocation plan for the species, which includes survival rates and restocking if survival of translocated species falls below 50%.
	Construction	No exceedance of approved clearing limits.	Demarcation of known Belson panic habitat and clearing extents with fencing or flagging.	Immediately prior to clearing activities.	Construction audits.	<u>Trigger:</u> Clearing outside of the Project Disturbance Footprint. <u>Action:</u> • Reinstate or install additional demarcating fencing or flagging • Review clearing procedures • Re-educate / train site personnel on management requirements and practices.
		All site personnel informed of site's sensitive environmental features including Belson's panic and associated habitat.	The Project site induction will include material to ensure worker awareness of key characteristics and habitat of Belson's panic as well as its known locations on site.	All times throughout construction period. Prior to personnel entering and working on site.	Training registers.	NA
	Construction	No disturbance to individuals or populations of Belson's panic during construction.	• Demarcation of known Belson panic habitat and clearing extents within the Disturbance Footprint with fencing or flagging. Develop translocation plan if	Immediately prior to clearing activities.	Construction audits.	<u>Trigger:</u> Population of Belson's panic is located within the Disturbance Footprint. <u>Action:</u>

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
			the population cannot be microsited and/or will be disturbed.			• Reinstate or install additional demarcating fencing or flagging around the extent of Belson's panic applying a 5m buffer around the confirmed extent of the identified area • Occurrence of Belson's panic within the Disturbance Footprint to be reported to DAWE within the annual compliance reporting • Micro-siting of project infrastructure around areas of identified Belson's panic • If micro-siting is not possible, develop a translocation plan for the species, which includes survival rates and restocking if survival of translocated species falls below 50% • Review clearing procedures.
						<u>Trigger:</u> A population of Belson's panic is disturbed during construction activities. <u>Action</u>: • Immediately notify Project Responsible Officer • Cease activity and/or remove equipment from impacted area • Additional offsets if required, as agreed with DAWE or the relevant Department • Reinstate or install additional demarcating fencing or flagging around the extent of Belson's panic applying 5m buffer around the confirmed extent of the identified area • Review clearing procedures • Re-educate / train site personnel on management requirements and practices • Report degradation or unauthorised disturbance of habitat to DAWE in accordance with condition 28 of the EPBC Act Approval.
	Operation	No disturbance to individuals or populations of Belson's panic during operation	• Demarcation of known Belson's panic population with fencing or flagging. • All site personnel will undergo site induction and will be made aware of key characteristics and habitat of Belson's panic as well as its location on site.	Throughout operation	• Ecological condition monitoring.	<u>Trigger:</u> Population of Belson's panic is located within the Disturbance Footprint. <u>Action:</u> • Reinstate or install additional demarcating fencing or flagging around the extent of Belson's panic applying 5m buffer around the confirmed extent of the identified area • Occurrence of Belson's panic within the Disturbance Footprint to be reported to DAWE within the annual compliance reporting • Re-educate / train site personnel on management requirements and practices.
Habitat degradation from dust generation	Construction and Operation	Dust levels maintained within compliance levels.	Implement dust measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction.	• Construction audits.	<u>Trigger:</u> Evidence of dust deposition on leaves of adjacent remnant vegetation.

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
					• Ecological condition monitoring.	<u>Action:</u> • Review adequacy of dust management procedures • Increase frequency of dust suppression measures • Re-educate / train site personnel on management requirements, practices and site rules.
Introduction or proliferation of invasive weeds (as defined in Section 3.6.2)	Pre-construction	Weed presence and abundance identified within Belson's panic habitat within Disturbance Footprint and adjacent areas.	• Pre-clearance survey will be undertaken across the Disturbance Footprint including a 10 m buffer to record presence and abundance of invasive weeds (species as defined in section 3.6.2). Invasive weed hot spot areas within the Disturbance Footprint are to be identified. • Pre-disturbance treatment and control of invasive weed species will be undertaken within all areas of the Study Area subject to disturbance. • Implement weed management measures as outlined in General Mitigation Measures (section 5.1) and detailed in Appendix A for invasive weeds identified within the Disturbance Footprint. • Herbicide use should be avoided adjacent to the confirmed Dulacca woodland snail and Belson Panic habitat and if required, limited to controlled, spot spraying methods. .	0 – 6 months prior to site disturbance during suitable seasonal conditions.	Pre-clearance survey and report.	NA
	Construction	No increase in weed and pest (as defined in Section 3.6) presence and abundance within and adjacent to the Disturbance Footprint.	Implement weed measures as outlined in General Mitigation Measures (section 5.1) for weeds within the Disturbance Footprint.	All times throughout construction.	• Construction audits. • Monthly checks of weeds within Disturbance Footprint • Ecological condition monitoring	<u>Trigger:</u> Presence of invasive weeds within the Disturbance Footprint. <u>Corrective action:</u> • Treatment of new weed incursions • Monitoring of success of treatment • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
		Cover of invasive weeds in adjacent Belson's panic habitat does not exceed baseline levels as a result of project activities.	Implement weed measures as outlined in General Mitigation Measures (section 5.1) for invasive weeds within the Disturbance Footprint.	All times throughout construction.	Ecological condition monitoring.	<u>Trigger:</u> Increase in invasive weed coverage above baseline conditions or introduction of new weed species as a result of the project. <u>Corrective action:</u> • Treatment of new weed incursions • Monitoring of success of treatment • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
		No decline in baseline vegetation condition and health within adjacent Belson's Panic habitat as a result of project activities.	All rehabilitation activities adjacent to remnant areas to consist only of native species. No aerial or broad scale spraying of herbicide is to occur within the Disturbance Footprint. Any use of herbicide within Disturbance Footprint for invasive weed management is to be minimal and limited to direct application methods.	All times throughout construction period. Ecological monitoring.	• Construction audits. • Ecological condition monitoring.	Trigger: Non-compliance with management actions. Corrective actions: Re-educate / train site personnel on management requirements, practices and site rules.
	Operation	No high risk weed incursion areas (i.e. exposed earth) present within the Disturbance Footprint.	Implement weed measures as outlined in General Mitigation Measures (section 5.1).	0 – 6 months following completion of construction	Operational maintenance.	Trigger: Invasive weed incursion areas present within the Disturbance Footprint. Corrective action: Rehabilitate and stabilise disturbed non-operational areas.
Fire	Construction and Operation	No incidences of fire as a result of project activities.	Implement fire measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	• Construction audits. • Operational maintenance.	Trigger: Fire event as a result of project activities. Corrective action: • Rehabilitate and restore any impacted areas • Review incident to identify causes • Review of site procedures for fire management • Re-educate / train site personnel on management requirements, practices and site rules.

5.3 Threatened Ecological Community Specific Mitigation Measures

5.3.1 Brigalow TEC

Specific mitigation measures relevant to the Brigalow ecological community are presented in Table 17. Mitigation and management measures have been based on current best practice and information provided in the following guidelines:

- *Approved Conservation Advice for the Brigalow (Acacia harpophylla dominant and co-dominant)* (Department of the Environment, 2013a).
- Recovery plan for the Brigalow *(Acacia harpophylla dominant and co-dominant) endangered ecological community* (Butler, 2007).
- *Threat abatement plan for the biological effects, including lethal toxic ingestion caused by cane toads* (Department of Sustainability Environment Water Population and Communities, 2011).

The mitigation and management measures have been developed with the aim to achieve the following management objectives:

- No exceedance of approved disturbance limits (0.95 ha of Brigalow TEC)
- Micro-siting does not result in additional disturbance to Brigalow TEC
- Maintain the condition of retained Brigalow TEC compared against baseline condition
- No introduction or spread of invasive weed species or pest fauna species within Brigalow TEC which is reasonably attributable to Project disturbance and in areas of the study area under the control of the approval holder.
- No bushfire in Brigalow TEC as a result of Project activities.

Table 17 Summary of Proposed Mitigation and Management Measures for Brigalow TEC

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
Vegetation clearing	Design	Detailed design does not exceed clearing of 0.95 ha Brigalow TEC.	Micro-siting of infrastructure will be undertaken to avoid identified areas of Brigalow TEC.	NA	NA	NA
	Construction	Only 0.95 ha of Brigalow TEC cleared.	Demarcation of Brigalow TEC and extent of clearing works with fencing or flagging.	Immediately prior to clearing activities.	Construction audits.	<u>Trigger:</u> Clearing outside of the Project Disturbance Footprint. <u>Corrective Action:</u> • Stop work and immediately contact Project Responsible Officer • Contact DAWE within 24 hours • Immediate restoration and rehabilitation of native vegetation • Reinstate or install additional demarcating fencing or flagging • Review clearing procedures • Re-educate / train site personnel on management requirements and practices.
		All site personnel informed of site's sensitive environmental features including Brigalow TEC and vegetation associations.	All site personnel will undergo site induction and will be made aware of key characteristics of Brigalow TEC as well as its location on site.	All times throughout construction period. Prior to personnel entering and working on site.	Training registers.	NA
Reduced vegetation condition from dust generation	Construction and Operation	Dust levels maintained within compliance levels.	Implement dust measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	Construction audits. Ecological condition monitoring.	<u>Trigger:</u> Evidence of dust deposition on leaves of adjacent Brigalow TEC. <u>Action:</u> • Review adequacy of dust management procedures • Increase frequency of dust suppression measures

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
						• Re-educate / train site personnel on management requirements, practices and site rules.
Introduction or proliferation of weeds (as defined in Section 3.6.2)	Pre-construction	Weed presence and abundance identified in Brigalow TEC across the Disturbance Footprint and adjacent areas.	• Pre-clearance survey will be undertaken across the Disturbance Footprint including a 10 m buffer to record presence and abundance of invasive weeds (species as defined in section 3.6.2). Invasive weed hot spot areas within the Disturbance Footprint are to be identified. • Pre-disturbance treatment and control of invasive weed species will be undertaken within all areas of the Study Area subject to disturbance. • Implement weed management measures as outlined in General Mitigation Measures (section 5.1) and detailed in Appendix A for invasive weeds identified within the Disturbance Footprint.	0 – 6 months prior to site disturbance during suitable seasonal conditions.	Pre-clearance survey and report.	NA
	Construction	Cover of invasive weeds in adjacent Brigalow TEC does not exceed baseline levels as a result of project activities. Exotic perennial grass cover in adjacent Brigalow TEC does not exceed TEC condition thresholds.	Implement weed measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	• Construction audits. • Ecological condition monitoring.	<u>Trigger:</u> • Increase in invasive weed coverage in Disturbance Footprint above baseline conditions or introduction of new weed species as a result of the project. • Exotic perennial grassland cover >50% of vegetated ground cover. <u>Corrective action:</u> • Treatment of new weed incursions / exotic grass • Monitoring of success of treatment • Review of site procedures for weed management • Review of site procedures for rehabilitation with consideration to providing a rehabilitated buffer around adjacent Brigalow TEC areas • Re-educate / train site personnel on management requirements, practices and site rules.
			All rehabilitation activities adjacent to Brigalow TEC to consist only of native species.	All times throughout construction period.		
	Operation	No high risk weed incursion areas (i.e. exposed earth) present within the Disturbance Footprint.	Implement weed measures as outlined in General Mitigation Measures (section 5.1).	0 – 6 months following completion of construction.	Operational maintenance.	<u>Trigger:</u> High risk weed incursion areas present within the Disturbance Footprint. <u>Corrective action:</u> Rehabilitate and stabilise disturbed non-operational areas.
Introduction or proliferation of pests	Pre-construction	Pest species presence identified across the Project Disturbance Footprint and in adjacent areas of Brigalow TEC.	Baseline pest species survey will be undertaken across the Disturbance Footprint and adjacent areas to record direct observations as well as indirect evidence / impacts of pest activity.	0– 6 months prior to site disturbance during suitable seasonal conditions.	NA	NA
	Construction	Pest activity / impacts in adjacent Brigalow TEC does	Implement pest management measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	• Construction audits.	<u>Trigger:</u>

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
		not exceed baseline levels as a result of project activities.			• Ecological condition monitoring.	• Increase in pest activity / impacts above baseline conditions or introduction of new pest species as a result of the project. <u>Corrective action:</u> • Implement pest eradication program in conjunction with surrounding landholders • Review of site procedures for pest management • Re-educate / train site personnel on management requirements, practices and site rules
Fire	Construction and Operation	No incidences of fire as a result of project activities.	Implement fire measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	• Construction audits. • Operational maintenance.	<u>Trigger:</u> Fire event as a result of project activities. <u>Corrective action:</u> • Rehabilitate and restore any impacted areas • Review incident to identify causes • Review of site procedures for fire management • Re-educate / train site personnel on management requirements, practices and site rules.
	Construction	No increase in fuel loads associated with increase in exotic perennial grass incursion above baseline levels within the project Disturbance Footprint.	Implement weed measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	Ecological condition monitoring.	<u>Trigger:</u> Groundcover >60% or 1,500kg/ha pasture biomass. <u>Corrective action:</u> • Implement fuel reduction methods, including controlled grazing and mowing • Review of site procedures for weed management • Review of site procedures for rehabilitation • Re-educate / train site personnel on management requirements, practices and site rules.

5.3.2 Semi-Evergreen Vine Thicket Ecological Community

Specific mitigation measures relevant to the semi-evergreen vine thicket ecological community are presented in Table 18. Mitigation and management measures have been based on current best practice and information provided in the following guidelines:

- Commonwealth listing advice on Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (Department of the Environment, 2001)
- National recovery plan for the Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (McDonald, 2010)
- Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (Department of Sustainability Environment Water Population and Communities, 2011)
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Sus scrofa) (Department of the Environment and Energy, 2015).

The mitigation and management measures have been developed with the aim to achieve the following management objectives:

- No clearing of SEVT TEC
- Micro-siting does not result in disturbance to SEVT TEC
- Maintain the condition of adjacent SEVT TEC compared against baseline condition
- No introduction or spread of invasive weed species or pest fauna species within SEVT TEC which is reasonably attributable to Project disturbance and in areas of the study area under the control of the approval holder

Table 18 Summary of Proposed Mitigation and Management Measures for SEVT TEC

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
Vegetation clearing	Design	Detailed design does not clear SEVT TEC.	Micro-siting of infrastructure will be undertaken to avoid identified areas of SEVT TEC.	NA	NA	NA
	Construction	No SEVT TEC cleared as a result of the project.	Demarcation of SEVT TEC and extent of works with fencing or flagging.	Immediately prior to clearing activities.	Construction audits.	Trigger: Clearing outside of the Disturbance Footprint. Action: • Stop work and immediately contact Project Responsible Officer • Contact DAWE within 24 hours • Immediate restoration and rehabilitation of native vegetation • Reinstate or install additional demarcating fencing or flagging • Review clearing procedures • Re-educate / train site personnel on management requirements and practices.
		All site personnel informed of site's sensitive environmental features including SEVT TEC and vegetation associations.	All site personnel will undergo site induction and will be made aware of key characteristics of SEVT TEC as well as its location on site.	All times throughout construction period. Prior to personnel entering and working on site.	Training registers.	NA
Reduced vegetation condition from dust generation	Construction and Operation	Dust levels maintained within compliance levels.	Implement dust measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	• Construction audits. • Ecological condition monitoring.	Trigger: Evidence of dust deposition on leaves of adjacent SEVT TEC. Action: • Review adequacy of dust management procedures • Increase frequency of dust suppression measures • Re-educate / train site personnel on management requirements, practices and site rules.

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
Introduction or proliferation of weeds	Pre-construction	Successful removal of invasive weeds within the Disturbance Footprint.	• Pre-clearance survey will be undertaken across the Disturbance Footprint including a 10 m buffer to record presence and abundance of invasive weeds (species as defined in section 3.6.2). Invasive weed hot spot areas within the Disturbance Footprint are to be identified. • Pre-disturbance treatment and control of invasive weed species will be undertaken within all areas of the Study Area subject to disturbance. • Implement weed management measures as outlined in General Mitigation Measures (section 5.1) and detailed in Appendix A for invasive weeds identified within the Disturbance Footprint.	0 – 6 months prior to site disturbance during suitable seasonal conditions.	Pre-clearance survey and report.	NA
	Construction	Maintain the Disturbance Footprint free of invasive weeds.	Implement weed measures as outlined in General Mitigation Measures (section 5.1) for invasive weeds within the Disturbance Footprint.	All times throughout construction.	Construction audits.	<u>Trigger:</u> Presence of invasive weeds within the Disturbance Footprint. <u>Corrective action:</u> • Treatment of new weed incursions • Monitoring of success of treatment • Review of site procedures for weed management • Re-educate / train site personnel on management requirements, practices and site rules.
	Construction	Cover of invasive weeds in adjacent SEVT TEC does not exceed baseline levels as a result of project activities.	Implement weed measures as outlined in General Mitigation Measures (section 5.1) for invasive weeds within the Disturbance Footprint.	All times throughout construction period.	• Construction audits. • Ecological condition monitoring.	<u>Trigger:</u> • Increase in weed coverage above baseline conditions or introduction of new weed species as a result of the project. <u>Corrective action:</u> • Treatment of new weed incursions • Monitoring of success of treatment • Review of site procedures for weed management • Review of site procedures for rehabilitation with consideration to providing a rehabilitated buffer around adjacent SEVT TEC areas • Re-educate / train site personnel on management requirements, practices and site rules
			All rehabilitation activities adjacent to SEVT TEC to consist only of native species.	All times throughout construction period.		
	Operation	No high risk weed incursion areas (i.e. exposed earth) present within the Disturbance Footprint.	Implement weed measures as outlined in General Mitigation Measures (section 5.1).	0 – 6 months following completion of construction.	Operational maintenance.	<u>Trigger:</u> High risk weed incursion areas present within the Disturbance Footprint. <u>Corrective action:</u> Rehabilitate and stabilise disturbed non-operational areas.
Introduction or proliferation of pests	Pre-construction	Pest species presence identified across the Disturbance Footprint and in adjacent areas of SEVT TEC.	Baseline pest species survey will be undertaken across the Disturbance Footprint and adjacent areas to record direct observations as well as indirect evidence / impacts of pest activity.	0 – 6 months prior to site disturbance during suitable seasonal conditions.	NA	NA

Risk	Project Phase	Performance Criteria	Management action	Timing	Monitoring Activity	Trigger / Corrective Action
	Construction	Pest activity / impacts in adjacent SEVT TEC does not exceed baseline levels as a result of project activities.	Implement pest management measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	• Construction audits. • Ecological condition monitoring.	Trigger: • Increase in pest activity / impacts above baseline conditions or introduction of new pest species as a result of the project. Corrective action: • Implement pest eradication program in conjunction with surrounding landholders • Review of site procedures for pest management • Re-educate / train site personnel on management requirements, practices and site rules.
Fire	Construction and Operation	No incidences of fire as a result of project activities.	Implement fire measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	• Construction audits. • Operational maintenance.	Trigger: Fire event as a result of project activities. Corrective action: • Rehabilitate and restore any impacted areas • Review incident to identify causes • Review of site procedures for fire management • Re-educate / train site personnel on management requirements, practices and site rules.
	Construction	No increase in fuel loads associated with increase in exotic perennial grass incursion above baseline levels.	Implement weed measures as outlined in General Mitigation Measures (section 5.1).	All times throughout construction period.	Ecological condition monitoring.	Trigger: Groundcover >60% or 1,500kg/ha pasture biomass within Disturbance Footprint. Corrective action: • Implement fuel reduction methods, including controlled grazing • Review of site procedures for weed management • Review of site procedures for rehabilitation • Re-educate / train site personnel on management requirements, practices and site rules.

6.0 Compliance Management

6.1 Roles and Responsibilities

6.1.1 Construction Phase

During the construction phase, the Site Supervisor (or delegate, e.g. HSE Coordinator) will be the Project's Responsible Officer and will undertake the following:

- ensure that the requirements of the VFMP are satisfied
- ensure that contractors and any sub-contractors engaged in the construction of the project are advised of their responsibilities to undertake their activities required by this VFMP
- ensure that the auditing/monitoring program is implemented properly
- prepare incident reports and implement corrective actions
- ensure appropriate records are kept and maintained on-site
- retain a copy of this VFMP on-site for reference by appropriate personnel and provide a copy of the plan to contractors, if requested
- recommend additions or changes to this VFMP based on experience gained from implementation of the plan.

6.1.2 Operation and Maintenance Phase

During the operational phase and subsequent de-commissioning period, the Project's Responsible Officer will be responsible for undertaking the following:

- ensure that the requirements of the VFMP are satisfied
- ensure that the auditing/monitoring program is implemented properly
- prepare incident reports and implement corrective actions
- ensure appropriate records are kept and maintained on-site
- retain a copy of this VFMP for reference by appropriate personnel
- recommend additions or changes to this VFMP based up on experience gained from implementation of the plan.

6.2 Training

All employees, contractors and sub-contractors working on site will undergo site induction training, including matters relating to fauna and flora management. The induction training will address elements related to fauna and flora management including:

- existence and requirements of this VFMP
- relevant legislation
- specific species and communities (including conservation significant species and TECs) likely to be affected by the construction works and how these species can be recognised. Images of the conservation significant species identified in this VFMP can be found in Section 3.5
- weed and pest species likely to be located within the Study Area
- informing all personnel of the sensitive areas and procedures for minimising ecological impacts
- familiarity with site environmental controls
- Training specific to certain roles to ensure compliance with statutory requirements, site environmental approvals, licences and permits.

- fauna rescue requirements
- general fauna management measures
- specific responsibilities for the protection of fauna.

The Contractor, on behalf of RES, will maintain a register signed by those inducted. The register will contain the name of inductees, dates inducted and the name of the facilitator.

Further details regarding staff induction and training are outlined in the CEMP and will be carried in to the project's Operational Environmental Management Plan (OEMP) (or equivalent).

6.3 Inspections and Monitoring

The mitigation and management measures identified in Section 5 will be monitored throughout the life of the project to ensure their ongoing effectiveness. Regularly monitoring of the effectiveness of the mitigation measures over time allows the VFMP to be adapted if performance criteria are not met.

The following sections detail the monitoring activities and reporting requirements for the project's pre-construction, construction and operation phase.

6.3.1 Pre-construction

6.3.1.1 Pre-clearance survey

The objective of the pre-clearance survey is to establish baseline data demonstrating the condition or status of environmental values prior to disturbance. Key monitoring and reporting requirements prior to construction relate to the identification and avoidance of impacts to habitat, habitat features, threatened species and weed species. The pre-clearance survey will be undertaken within the Disturbance Footprint. The pre-clearance survey will be undertaken 0 to 6 months prior to clearing activities and will be undertaken by a qualified ecologist in accordance with the relevant DAWE survey guidelines. Prior to the commencement of clearing, the Project's Responsible Officer will provide the approval holder and EPC Contractor with a report specifying (as a minimum):

- the location and extent of threatened flora individuals and/or habitat
- the location, extent and abundance of invasive weeds
- the location/area of canopy trees to be identified for removal
- the location/area of trees identified for lopping / pruning
- the total area of disturbance required for the Project works
- the location and type of habitat features within the Disturbance Footprint identified by the ecologist during pre-clearing inspection
- a summary of any habitat features to be relocated prior to the commencement of clearing, including the preferred location for the habitat features
- the location of designated stockpile areas for soil and vegetation management
- the location of all protected matters and/or their habitat as defined in the -EPBC Act Approval, including:
    - Brigalow and SEVT TEC
    - the location of Dulacca Woodland Snail habitat via the presence of the following:
        - Brigalow, Eucalypt or SEVT dominated woodland, open forest or regrowth; and
        - abundance of logs, deep leaf litter, loose bark at base of trees and other required microhabitat features.

6.3.1.2 Baseline ecological condition monitoring

Prior to clearing activities, baseline condition monitoring sites will be established in retained vegetation adjacent to the Disturbance Footprint to monitor the condition of the surrounding vegetation including the following environmental values:

- Dulacca Woodland Snail habitat
- Belson's panic habitat
- Brigalow and SEVT TEC.

The threatened species habitat and TEC extents are illustrated on Figure 3-Figure 4.

BioCondition monitoring sites will be established and assessed in accordance with the *BioCondition assessment manual* (Eyre et al., 2015) with a minimum of four (100m x 50m) sites for each value adjacent to the Disturbance Footprint and a minimum of one control site established for each value at a distance of greater than 1 km from the Disturbance Footprint. The environmental values identified above can be co-located e.g. habitat for the Dulacca Woodland Snail can occur within SEVT. Indicative site locations are provided on Figure 6.

In addition to BioCondition monitoring, specific habitat data will be collected at Dulacca Woodland Snail monitoring sites. The data collected will be used to determine 'Habitat Quality Scores' for the snail in accordance with the *Guide to Determining Terrestrial Habitat Quality* (Department of Environment and Heritage Protection, 2017) to provide a baseline of habitat condition. Data for the parameters detailed below will be required to inform the Species Habitat Index component of the habitat quality assessment. This will include:

- abundance of logs in various size classes
- abundance of rocks/stones
- abundance of fungi, lichen, algae, detritus/biofilm
- density of leaflitter
- density of shrub layer
- density of ground layer
- patch size
- presence or signs of invasive (i.e. pigs, rats, mice), domestic (i.e. cattle, horses) and native species (i.e. black-striped wallaby) which may pose a threat to the Dulacca Woodland Snail.

Species Habitat Index scoring criteria for the Dulacca Woodland Snail are detailed in Appendix B.

Disturbances (and their severity) will also be recorded at each survey site including clearing (including historical), logging, grazing, feral animal diggings/wallows, fire and storm damage.

For Brigalow TEC and SEVT TEC monitoring sites, TEC diagnostic and condition threshold data not covered by the BioCondition monitoring will be collected. This will include:

- Patch size
- Tree species dominance in canopy layer
- Full flora species composition and diversity in all vegetation strata.

AECOM does not warrant the accuracy or completeness of information displayed in this map and any person using it does so at their own risk. AECOM shall bear no responsibility or liability for any errors, faults, defects, or omissions in the information.

DATUM GDA 1994, PROJECTION MGA ZONE 55

0 1 2

Kilometres

1 cm = 6 5 0 0 (when printed @ A3)

Legend

- Study Area (8,177 ha)
- Disturbance Footprint
- Highway
- Other roads

Threatened Ecological Community

- Brigalow (*Acacia harpophylla* dominant and co-dominant)
- Semi-evergreen Vine Thickets of the Brigalow Belt

Vegetation Communities

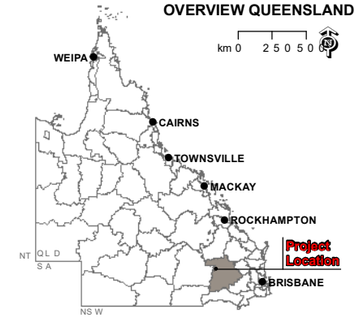
- RE 11.7.1
- RE 11.7.1x1
- RE 11.7.6
- RE 11.9.1
- RE 11.9.5

- Indicative Ecological Monitoring Sites

Conservation Significant Flora Species

- Belson's Panic (*Homopholis belsonii*)

OVERVIEW QUEENSLAND



Data Sources:

1. Site layout elements © RES, 2019
2. Local Government Areas © State of Queensland (Department of Natural Resources and Mines) 2017
3. Place names gazetteer - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
4. Baseline roads and tracks Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
5. Rail network - Queensland © State of Queensland (Department of Natural Resources and Mines) 2017
6. Electrical Network - Ergon Energy 2018
7. World Topographic Base Map © Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Disclaimer:

DULACCA RENEWABLE ENERGY PROJECT

INDICATIVE ECOLOGICAL MONITORING SITES

PROJECT #:	60567855
CREATED BY:	AS
LAST MODIFIED:	16/10/2020
VERSION:	2

Figure 6

A3 size

Document Path: P:\605X\60567855\4. Tech Work Area\4.99 GIS\MXD\Commonwealth Documentation Mapping\Vegetation and Fauna Management Plan\60567855_ECO_006_Indicativ eEcoMonitoring_A3L.mxd

6.3.2 Construction and Operation

During construction and operation, the key monitoring and reporting requirements relate largely to ensuring compliance with vegetation and habitat protection and weed management prescribed in this plan. Further, a site inspection checklist which will be developed as part of the CEMP required by condition 25 of the State Development Approval.

To ensure these construction phase mitigation measures are effective, the performance criteria, triggers and monitoring specifications required to evaluate the prescribed mitigation measures are detailed in Section 5.1, with specific requirements for threatened species and communities detailed in Sections 5.2 & 5.3.

Site inspections must be completed to monitor the environmental controls mentioned in the CEMP and this VFMP, and to ensure any corrective actions are being appropriately implemented if there are any unintended environmental impacts from the construction works.

The records of inspections are to be maintained on project files and copies provided to the Project's Responsible Officer.

6.3.2.1 Post-clearing monitoring

Following the completion of site clearing works, the Project's Responsible Officer will provide the approval holder with a report specifying (as a minimum):

- the location and number of threatened flora species removed
- the location and area of canopy trees removed
- the location and area of trees lopped / pruned
- the total area of disturbance
- a register of all fauna species observed, injured and/or relocated by the spotter-catcher during site preparation works
- a register of the hollows and habitat features (including microhabitat features of the Dulacca Woodland Snail) relocated as part of the clearing works, including the location, condition, and presence / absence of fauna within the hollow or feature.

6.3.2.2 Construction audits

Construction audit inspections will be conducted on a quarterly basis (every three months) during the construction of the Project by the Project's Responsible Officer (or appropriate delegate, e.g. HSE Coordinator). The audit will include the completion of the Site Inspection Checklist which will be developed as part of the CEMP and will incorporate the key performance indicators identified within this VFMP.

Site inspections must be completed to monitor the environmental controls mentioned in the CEMP and this VFMP, and to ensure any corrective actions are being appropriately implemented if there are any unintended environmental impacts from the construction works.

The records of inspections are to be maintained on project files and copies provided to theApproval Holder's Project Representative.

6.3.2.3 Operation audits

Formal operational phase audit inspections will be conducted annually during normal operation procedures by the Project's Responsible Officer (or appropriate delegate, e.g. HSE Coordinator). The audit will include the Site Inspection Checklist which will be developed as part of the CEMP and will incorporate the key performance indicators identified within this VFMP.

6.3.2.4 Ecological condition monitoring

Ongoing ecological condition monitoring will be undertaken at established BioCondition sites across the Study Area. The sites will be monitored according to the method established during baseline ecological condition monitoring (outlined in Section 6.3.1.2) and will be undertaken at a frequency of every year during construction and the first two years of operation. Operational monitoring beyond this

initial two-year term will be conducted in the unlikely occurrence that activities are anticipated beyond the formed access tracks and hardstand areas used for operations and maintenance. The monitoring will be undertaken by a suitably qualified ecologist. The results of the monitoring and compliance with the VFMP performance criteria will be documented in a report.

6.3.2.5 Rehabilitation monitoring

Rehabilitation management measures will be progressively implemented throughout construction across cleared areas that are no longer required for construction activities. This will occur no later than 3 months after an area is no longer required.

The intent of the rehabilitation is to re-establish a native ground cover as soon as possible after disturbance to assist with erosion mitigation and prevent the establishment of weed species. Replanting of native species will be consistent with surrounding vegetation.

Successful rehabilitation would meet the following performance criteria:

- self-sustaining vegetative cover
- no signs of erosion
- plants showing healthy growth and signs of recruitment (>80% plant survival)
- free of invasive weeds.

Rehabilitation will be monitored to identify if it meets the performance criteria specified above, and maintenance will be undertaken on the same schedule. Rehabilitation monitoring and maintenance will be undertaken in 6 monthly intervals for the first two years. At two years, if the performance criteria are met, the rehabilitation is deemed complete, or a schedule is developed for ongoing maintenance.

6.4 Reporting

An annual monitoring report will be completed during the construction term and for two years post-construction, to confirm compliance with the VFMP and the performance criteria, including survey data, mitigation measures implemented. These reporting requirements will be specified within the CEMP. Beyond construction the reporting requirement will be replaced with the annual BioCondition monitoring outlined in section 6.3.2.4 which will be undertaken for the first two years of operation. Operational monitoring beyond this initial two-year term will be subject to the unlikely occurrence of activities at the project site where material ecological disturbance beyond the formed access tracks and hardstand areas used for operations and maintenance are anticipated. The described annual monitoring and BioCondition monitoring data will be made available to DAWE for compliance purposes.

Construction audits will be undertaken quarterly throughout the construction period (first two years) then operational audit inspections will be conducted annually thereafter.

Any activity resulting in the unlawful/unauthorised removal of native vegetation or causing death or injury to native fauna during site activities shall be reported to the Project's Responsible Officer immediately.

Any impacts to native fauna are to be reported to the Project's Responsible Officer within 24 hours of occurrence.

Any known instance of ecological disturbance occurring as a result of the Project where the disturbance results in impacts to MNES outside of the Disturbance Footprint will be reported to the Project's Responsible Officer and DAWE.

Any mortality of threatened fauna is to be reported to DES and/or DAWE within 24 hours of occurrence.

Injured fauna can be reported to Woop Woop Wildlife Rescue ((07) 4665 3064) or Chinchilla Wildlife Rescue (0477 429 172).

A series of registers relevant to vegetation and fauna management practices will be maintained throughout the life of the Project. These are listed below:

- Pest animal register (feral animal sightings, capture, euthanasia)
- Fauna interaction register (fauna sightings, injuries and mortality)
- Spotter-catcher register
- Training register
- Vehicle washdown register
- Environmental incident register.

6.5 VFMP Amendments and Corrective Actions

This VFMP is a dynamic document that requires review and amendment throughout the life of the Project to ensure the measures within this document remain effective. It is recommended that this document be updated:

- Where there is a significant change to the project schedule, site layout, or a change in the construction methods that require amendment to vegetation and fauna protection measures
- Where a corrective action is recorded, or performance criteria are not being met and additional measures are identified for inclusion to prevent reoccurrence
- Where a change in legislation or best practice methodology has been identified.

To ensure compliance with this VFMP a schedule of obligations will be developed to outline all obligations and track how these obligations are being met.

All incidents and non-conformances with this VFMP will be reviewed by the Project's Responsible Officer, the EPC Contractor's HSE Coordinator and Project's Site Supervisor. Where appropriate, management and control actions will be identified and implemented to prevent future occurrence of the incident/non-conformance.

7.0 Resourcing

7.1 Specialist Resources

The following specialist resources are required to support specific construction activities:

Table 19 Specialised resources required to implement obligations of this VFMP

Role	Minimum Qualifications	Construction Activities
Ecologist	• Minimum of five years' experience as a practising ecology professional. • Tertiary qualification in ecology, or similar.	• Pre-clearance surveys to identify fauna habitat values and threatened flora species. • Pre-clearing site demarcation. • Creating of mapping identifying habitat trees (including hollow bearing trees) and habitat features for relocation.
Spotter-catcher	• Must hold a current damage mitigation permit, licensed under the NC Act.	• Inspect site prior to clearing. • Tree clearing. • Other vegetation clearing. • Tree pruning. • Ad hoc fauna relocation (e.g. snake handling) beyond the site establishment period.
Project HSE Coordinator	• Minimum of a bachelors degree in an applicable environmental science discipline, or lesser qualification with no less than five years practical experience.	• Oversight of the spotter-catcher. • Oversight of habitat feature relocation and hollow relocation and mounting. • Day to day oversight of compliance with the VFMP during construction, including oversight of the implementation of corrective actions. • Management of records required by this VFMP. • Incident response.

It may be possible for more than one of the above-mentioned roles to be filled by a single person, on the condition that they hold the minimum qualifications for each.

8.0 References

AECOM. (2018a). *Dulacca Wind Farm Terrestrial Fauna Survey*. Brisbane, QLD: Unpublished report for RES Australia Pty Ltd.

AECOM. (2018b). *Dulacca Wind Farm Terrestrial Flora Survey*. Brisbane, QLD: Unpublished report for RES Australia Pty Ltd.

Australian Government. (2020). Atlas of Living Australia. Retrieved from Atlas of Living Australia website: http://www.ala.org.au/about-the-atlas/

Boobook Ecological Consulting. (2019). *Dulacca Wind Farm Fauna Survey Report - Targeted survey for Dulacca Woodland Snail Adclarkia dulacca*. Unpublished report for RES Australia Pty Ltd.

Butler, D. W. (2007). *Recovery plan for the "Brigalow (Acacia harpophylla dominant and co-dominant" endangered ecological community (draft of 1 May 2007)*. Canberra.

Chenoweth EPLA and Bushland Restoration Services. (2012). *South East Queensland Ecological Restoration Framework: Manual*. Brisbane, QLD: Prepared on behalf of SEQ Catchements and South East Queensland Local Governments.

Department of Agriculture Water and the Environment. (2020). *Species Profile and Threats Database*. Retrieved from http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Department of Environment and Heritage Protection. (2017). *Guide to determining terrestrial habitat quality. A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy Version 1.2 April 2017*. Retrieved from https://www.ehp.qld.gov.au/assets/documents/pollution/management/offsets/habitat-quality-assessment-guide.pdf

Department of State Development, I. and P. (2014). *Significant Residual Impact Guideline - For matters of state environmental significance and prescribed activities assessable under the Sustainable Planning Act 2009*. Retrieved from https://www.dilgp.qld.gov.au/resources/guideline/planning/dsdip-significant-residual-impact-guideline.pdf

Department of Sustainability Environment Water Population and Communities. (2011). *Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads*. Retrieved from http://cutlass.deh.gov.au/biodiversity/threatened/publications/tap/pubs/marine-debris-background-paper.rtf

Department of the Environment. (2001). *Commonwealth Listing Advice on Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregion*. Canberra.

Department of the Environment. (2013a). *Approved Conservation Advice for the Brigalow (Acacia harpophylla dominant and co-dominant) ecological community.* jurisdiction=Commonwealth of Australia; corporateName=Department of the Environment.

Department of the Environment. (2013b). *Significant Impact Guildelines 1.1: Matters of National Environmental Significance*. Canberra.

Department of the Environment and Energy. (2015). *Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Sus scrofa)*. (February).

Ecology and Heritage Partners. (2018). *Preliminary Ecological Assessment of the Proposed Dulacca Wind Farm, Drillham and Dulacca, Queensland*.

Eyre, T. J., Kelly, A. L., Neldner, V. J., Wilson, B. A., Ferguson, D. J., Laidlaw, M. J., & Franks, A. J. (2015). *BioCondition: A condition assessment framework for terrestrial biodiversity in Queensland - biocondition-assessment-manual. Version 2.2.* Retrieved from https://www.qld.gov.au/environment/assets/documents/plants-animals/biodiversity/biocondition-assessment-manual.pdf

McDonald, W. J. . (2010). *National recovery plan for the "Semi-evergreen vine thickets of the Brigalow*

Belt (North and South) and Nandewar Bioregions" ecological community. Department of the Environment, Water, Heritage and the Arts, Canberra. Queensland Department of Environment and Resource Management, Brisbane.

Nature Advisory. (2019). *Dulacca Wind Farm Bird and Bat Management Plan*. Unpublished report for RES Australia Pty Ltd.

NSW DECC. (2010). *Draft National Recovery Plan for White-Box - Yellow Box - Blakeleys Red Gum Grassy and Derived Native Grassland*. NSW DECC.

Queensland Government. (2019). Remnant vegetation cover by subregion. Retrieved from https://www.publications.qld.gov.au/dataset/subregions-remnant-veg/resource/9371bc4d-94b4-4cae-a47e-a52a6d590eef

Queensland Government. (2020). Environmental Weeds of Australia Biosecurity Queensland Edition.

Queensland Herbarium. (2019). *Regional Ecosystem Description Database (REDD) Version 11.1 April 2019*. Brisbane, QLD: Queensland Herbarium, State of Queensland Department of Primary Industries.

Queensland Museum. (2019). Zoology Data Search. Retrieved from https://www.qm.qld.gov.au/Research/Biodiversity/Zoology+Data+Search#.Xbt1g_UzZ9M

Sattler, P., & Williams, R. (1999). *The Conservation Status of Queensland's Bioregional Ecosystems* (R. Sattler, P., Williams, Ed.). Brisbane: Environmental Protection Agency, Queensland Government.

Stanisic, J. (1996). New land snails from the boggomoss environments in the Dawson Valley, Southeastern Queensland (Eupulmonata: Charapidae and Camaenidae). In *Memoirs of the Queensland Muesum* (pp. 343–354).

Stanisic, J. (1998). *A survey of the land snails of the Queensland Brigalow lands: their distribution, conservation status and close association with dry vine thickets.* Brisbane, QLD: Queensland Museum.

Stanisic, J., Shea, M., Potter, D., & Griffiths, O. (2010). *Australian Land Snails. Volume 1. A field guide to eastern Australian species.* Mauritius: Bioculture Press.

Threatened Species Scientific Committee. (2008). *Approved Conservation Advice for Homopholis belsonii*. Canberra, ACT.

Threatened Species Scientific Committee. (2016). Conservation Advice, Adclarkia dulacca (Dulacca woodland snail). Retrieved from http://www.environment.gov.au/biodiversity/threatened/species/pubs/83885-conservation-advice-07122016.pdf

Threatened Species Scientific Committee, & Department of the Environment. (2013). *Commonwealth Conservation Advice for the Brigalow (Acacia harpophylla dominant and co-dominant) ecological community*. Canberra.

Appendix A

Invasive weed species profiles and control methods

Species	Image	Description	Preferred control method
Mimosa bush *Acacia farnesiana* Western Downs Priority Pest Plant	  	An upright (i.e. erect) or often spreading, multi-stemmed shrub usually growing 1.5 to 4 m tall, or occasionally a small tree reaching up to 7 m in height. Distinguishing features: • an upright or often spreading, multi-stemmed shrub usually growing 1.5 to 4 m tall. • its younger branches are covered with numerous tiny whitish spots and bear pairs of whitish-coloured spines (2-45 mm long) at the base of each leaf. • its twice-compound leaves (5-75 mm long) usually have two to four pairs of branchlets, each bearing numerous pairs of small leaflets. • its bright yellow and fluffy flowers are arranged in small globular clusters (10-13 mm across) in the leaf forks. • its cigar-shaped pods (1.5-8.5 cm long and 8-17 mm wide) turn dark brown or black as they mature.	Basal barking or cut-scrape-paint if stem diameter is less than 5 cm. Basal barking involves mixing an oil soluble herbicide in diesel/kerosene and painting the full circumference of the trunk or stem of the plant from ground level to a height of approximately 45 cm (reference). This method is suitable for thin-barked woody weeds like mimosa bush. Cut-scrape-paint involves cutting the stem close to the ground (approximately 1-2 cm) ensuring the soil does not come in contact with the cut surface. Apply herbicide immediately using poison pot and brush or dripper bottle. Then using a knife, scrape the sides of the stump thoroughly to expose the green tissue and apply herbicide to the scraped stump. Herbicide: • Basal bark: Fluroxypyr (210ml Fluroxypyr/10L diesel). • Cut-scrape-paint: Glyphosate (1 Glyphosate: 1.5 water).

Species	Image	Description	Preferred control method
Mother of millions *Bryophyllum delagoense* Restricted Matter (*Biosecurity Act 2014*) Western Downs Priority Pest Plant		A long-lived (i.e. perennial) fleshy (i.e. succulent) plant with upright (i.e. erect) stems usually growing 30-180 cm tall, but occasionally reaching up to 2.5 m or more in height. Distinguishing features: • a fleshy herbaceous plant with upright stems growing 30-180 cm tall. • its mottled leaves are cylindrical and have a few small 'teeth' near their tips. • tiny plantlets are often produced at the tips of its leaves. • its drooping bell-shaped flowers (2-4 cm long) are usually red or reddish-pink in colour. • these flowers are borne in dense clusters at the top of its stems.	Manual removal (i.e. hand pulling or grubbing using a hand tool) can be undertaken for this species if there are only very sparse weeds present, if the area is sensitive habitat (i.e. confirmed Dulacca woodland snail or Belson panic habitat) or if the soil is sandy or loose where the plant can be pulled with the root intact. Care must be taken when using this method as plantlets can detach from the leaves during removal and establish new plants. Some regrowth will therefore occur, and follow-up treatment may be required. For larger infestations and/or where the soil precludes hand pulling, spot spraying with herbicide is recommended. Spot spraying involves a knapsack filled with a herbicide mix used by an operator to selectively control weeds. A keen eye and an ability to distinguish between native and weed species is essential. Marker dye is added to the mix to allow the operator to see what has already been sprayed, in additional to the addition of a penetrant and/or surfactant. Herbicide: • Metsulfuron methyl (1.5g Metsulfuron methyl: 10L water + surfactant + colour marking dye)

Species	Image	Description	Preferred control method
Rhodes grass *Chloris gayana* High biomass grass		A long-lived (i.e. perennial) grass usually growing 0.4-1.6 m tall, but occasionally reaching up to 2 m in height. It forms small clumps with upright stems (i.e. erect culms) and also produces creeping (i.e. stoloniferous) stems. Distinguishing features: • a large grass with upright flowering stems (up to 1.5 m tall) as well as creeping stems. • its very elongated leaves (8-28 cm long and 2-10 mm wide) are mostly hairless. • its greenish-brown seed-heads are borne at the tops of the stems. • each seed-head has several branches (5-10 cm long) that radiate from the same point. • the branches have numerous flower spikelets, which leave two small bracts behind when they fall off.	Mechanical slashing of invasive grasses can be undertaken where they occur as thick stands with a low number of native species. Care should be taken not to spread grass seed on equipment. Vehicles to be washed down following working in mapped weed impacted areas on the project site (where identified) where weed control has not been implemented. Sensitive environmental areas should be clearly protected through the use of fencing or flagging tape prior to the completion of slashing. Slashed areas can then be spot sprayed with an appropriate herbicide. If the grasses occur interspersed with native species, spot spraying of herbicide should be undertaken, taking care not to impact native species. Spot spraying involves a knapsack filled with a herbicide mix used by an operator to selectively control weeds. A keen eye and an ability to distinguish between native and weed species is essential. Marker dye is added to the mix to allow the operator to see what has already been sprayed. Herbicide: • Glyphosate (100 ml Glyphosate: 10L water + Colour marking dye).

Species	Image	Description	Preferred control method
Green panic *Megathyrsus maximus* High biomass grass		A long-lived (i.e. perennial) grass with short underground stems (i.e. rhizomes) forming tufted clumps and aboveground stems that are usually upright (i.e. erect) in nature. Guinea grass (*Panicum maximum* var. *maximum*) grows up to 3 m tall, but is usually about 2 m in height. Distinguishing features: • a large, clumping, long-lived grass growing up to 3 m tall. • its long and narrow leaves are very large (up to 100 cm long and 3.5 cm wide). • its large and much-branched seed-heads bear large numbers of small flower spikelets. • the lowermost branches of its seed-heads are arranged in a cluster. • its hairless flower spikelets are green or purplish in colour and are shed from the seed-head entire when mature.	Mechanical slashing of invasive grasses can be undertaken where they occur as thick stands with a low number of native species. Care should be taken not to spread grass seed on equipment. Vehicles to be washed down following working in mapped weed impacted areas on the project site (where identified) where weed control has not been implemented. Sensitive environmental areas should be clearly protected through the use of fencing or flagging tape prior to the completion of slashing. Slashed areas can then be sprayed with an appropriate herbicide. If the grasses occur interspersed with native species, spot spraying of herbicide should be undertaken, taking care not to impact native species. Spot spraying involves a knapsack filled with a herbicide mix used by an operator to selectively control weeds. A keen eye and an ability to distinguish between native and weed species is essential. Marker dye is added to the mix to allow the operator to see what has already been sprayed. Herbicide: • Glyphosate (100 ml Glyphosate: 10L water + Colour marking dye).

Species	Image	Description	Preferred control method
Red natal *Melinis repens* High biomass grass		A short or long-lived (i.e. annual or perennial) grass forming open tussocks and growing up to 1.2 m tall. Distinguishing features: • a short-lived or long-lived grass forming open tussocks with upright flowering stems up to 1 m tall. • its open seed-heads are usually a distinctive reddish colour when young. • these seed-heads turn pink and then whitish in colour as they mature. • its numerous flower spikelets are covered in silky hairs that give the seed-heads a fluffy appearance.	Mechanical slashing of invasive grasses can be undertaken where they occur as thick stands with a low number of native species. Care should be taken not to spread grass seed on equipment. Vehicles to be washed down following working in mapped weed impacted areas on the project site (where identified) where weed control has not been implemented. Sensitive environmental areas should be clearly protected through the use of fencing or flagging tape prior to the completion of slashing. Slashed areas can then be sprayed with an appropriate herbicide. If the grasses occur interspersed with native species, spot spraying of herbicide should be undertaken, taking care not to impact native species. Spot spraying involves a knapsack filled with a herbicide mix used by an operator to selectively control weeds. A keen eye and an ability to distinguish between native and weed species is essential. Marker dye is added to the mix to allow the operator to see what has already been sprayed Herbicide: • Glyphosate (100 ml Glyphosate: 10L water + Colour marking dye).

Species	Image	Description	Preferred control method
Velvety prickly pear *Opuntia tomentosa* Restricted Matter (*Biosecurity Act 2014*) Western Downs Priority Pest Plant		An upright (i.e. erect), fleshy (i.e. succulent), tree-like plant usually growing 2-6 m tall, but occasionally reaching up to 8 m in height. Distinguishing features: • an upright, fleshy, tree-like plant (growing up to 8 m tall) with a single woody main stem at its base. • its stems are much-branched and consist of a series of flattened segments. • these stem segments are covered in fine hairs and bear small raised structures that are usually spineless. • its orange flowers have reddish markings on the outermost 'petals'. • the fleshy fruit (about 50 mm long and 35 mm wide) turn dull red in colour as they mature.	Spot spray or cut-scrape-paint in horizontal cuts across flat stem. Manual removal (i.e. hand pulling or grubbing using a hand tool) can be undertaken for this species if the plant is a small specimen (e.g. shrub size), there are only very sparse weeds present and if the soil is sandy or loose where the plant can be pulled with the root intact. Spot spraying involves a knapsack filled with a herbicide mix used by an operator to selectively control weeds. A keen eye and an ability to distinguish between native and weed species is essential. Marker dye is added to the mix to allow the operator to see what has already been sprayed, in additional to the addition of a penetrant and/or surfactant. The cut-scrape-paint technique for this species should be done in horizontal cuts across the flat stems. Then apply herbicide to the cut stems. Herbicide: • Spot spray: Glyphosate + Metsulfuron Mythyl (100ml Gly + 1.5MM in 10L water + surfactant + colour marking dye). • Cut-scrape-paint: Glyphosate + Metsulfuron Mythyl (1g MM added to 1 Gly: 1.5 water).

Species	Image	Description	Preferred control method
Prickly pear *Opuntia stricta* Restricted Matter (*Biosecurity Act 2014*) Western Downs Priority Pest Plant		An upright (i.e. erect) or spreading fleshy (i.e. succulent) shrub usually growing 50-100 cm tall, but occasionally reaching up to 2 m in height. Distinguishing Features: • an upright or spreading fleshy shrub usually growing only 50-100 cm tall. • its stems are much-branched and consist of a series of flattened fleshy segments. • these stem segments are longer than they are broad and have groups of one or two sharp spines (2-4 cm long). • its showy yellow flowers (6-8 cm across) are borne along the margins of the stem segments and the fleshy fruit turn reddish-purple in colour as they mature. • its fruit (4-8 cm long and 3-4 cm wide) are egg-shaped and have several tufts of small barbed bristles on their surface.	Spot spray or cut-scrape-paint in horizontal cuts across flat stem. Manual removal (i.e. hand pulling or grubbing using a hand tool) can be undertaken for this species if the plant is a small specimen (e.g. shrub size), there are only very sparse weeds present and if the soil is sandy or loose where the plant can be pulled with the root intact. Spot spraying involves a knapsack filled with a herbicide mix used by an operator to selectively control weeds. A keen eye and an ability to distinguish between native and weed species is essential. Marker dye is added to the mix to allow the operator to see what has already been sprayed, in additional to the addition of a penetrant and/or surfactant. The cut-scrape-paint technique for this species should be done in horizontal cuts across the flat stems. Then apply herbicide to the cut stems. Herbicide: • Spot spray: Glyphosate + Metsulfuron Mythyl (100ml Gly + 1.5MM in 10L water + Additive and Colour marking dye). • Cut-scrape-paint: Glyphosate + Metsulfuron Mythyl (1g MM added to 1 Gly: 1.5 water).

Species	Image	Description	Preferred control method
Sabi grass *Urochloa mosambicensis* High biomass grass		A perennial, loosely tufted grass sometimes rooting and branching from the lower nodes, variable in size and habit (20-150 cm tall), Distinguishing features: • a loosely tufted grass, variable in size and habit (20-150 cm tall). • Branches bent and then ascending with pubescent nodes). • Inflorescence a panicle of usually 3-15 racemes, each 2-10 cm long.	Mechanical slashing of invasive grasses can be undertaken where they occur as thick stands with a low number of native species. Care should be taken not to spread grass seed on equipment. Vehicles to be washed down following working in mapped weed impacted areas on the project site (where identified) where weed control has not been implemented. Sensitive environmental areas should be clearly protected through the use of fencing or flagging tape prior to the completion of slashing. Slashed areas can then be sprayed with an appropriate herbicide. If the grasses occur interspersed with native species, spot spraying of herbicide should be undertaken, taking care not to impact native species. Spot spray should use Glyphosphate (100 ml Glyphosphate: 10L water + Colour marking dye).

Species	Image	Description	Preferred control method
Noogoora Burr *Xanthium occidentale (Syn. Xanthium pungens)* Western Downs Priority Pest Plant		This upright (i.e. erect) or spreading short-lived (i.e. annual) herbaceous plant usually grows to about 1 m tall, but occasionally reaches up to 2.5 m in height. Distinguishing Features • an upright or spreading short-lived herbaceous plant usually growing to about 1 m in height. • its much-branched stems are covered in short, stiff, hairs that give them a rough texture. • its large, broad, irregularly toothed leaves are also rough to the touch and commonly have three or five broad lobes. • separate male and female flower-heads are produced on different regions of the branches. • its fruit is a shortly-stalked and oval-shaped 'burr' (7-20 mm long) containing two seeds. • this fruit is covered in numerous hooked spines (about 2 mm long) and has two larger spines (about 4 mm long) at its tip.	Manual removal (i.e. hand pulling or grubbing using a hand tool) can be undertaken for this species if there are only very sparse weeds present, if the area is sensitive habitat (i.e. confirmed Dulacca woodland snail or Belson panic habitat) or if the soil is sandy or loose where the plant can be pulled with the root intact. For larger infestations and/or in non-sensitive areas and/or where the soil precludes hand pulling, spot spraying with herbicide is recommended. Herbicide: • Glyphosate: (200 ml Gly: 10L water + spray adjuvant +colour marking dye).

Species	Image	Description	Preferred control method
Bathurst Burr *Xanthium spinosum* Western Downs Priority Pest Plant		An upright (i.e. erect) and much-branched short-lived (i.e. annual) herbaceous plant usually growing 30-100 cm tall, but occasionally reaching up to 1.2 m in height. Distinguishing Features • an upright and much-branched herbaceous plant usually growing 30-100 cm tall. • its stems are armed with yellowish three-pronged spines (15-50 mm long) in the leaf forks. • its leaves are usually irregularly lobed, with dark green and shiny upper surfaces and pale green lower surfaces covered in downy hairs. • male flowers are borne in dense clusters near the tips of the stems, while separate female flowers are borne in the leaf forks. • its stalkless 'burrs' (8-15 mm long) are covered in numerous small hooked spines (2-3 mm long).	Manual removal (i.e. hand pulling or grubbing using a hand tool) can be undertaken for this species if there are only very sparse weeds present, if the area is sensitive habitat (i.e. confirmed Dulacca woodland snail or Belson panic habitat) or if the soil is sandy or loose where the plant can be pulled with the root intact. For larger infestations and/or in non-sensitive areas and/or where the soil precludes hand pulling, spot spraying with herbicide is recommended. Herbicide: Glyphosate: (200 ml Gly: 10L water +spray adjuvant +colour marking dye).

Images and description text taken from Environmental Weeds of Australia Biosecurity Queensland Edition (Queensland Government, 2020). Preferred control methods formulated from SEQ Ecological Restoration: Manual (Chenoweth EPLA and Bushland Restoration Services, 2012).

Appendix B

Dulacca Woodland Snail - Species Habitat Index Scoring Criteria

Appendix B Dulacca Woodland Snail - Species Habitat Index Scoring Criteria

Attribute	Criteria	Score
Threat to species	Intact habitat, grazing absent, no invasive weeds or pest species	15
	Intact habitat, light grazing, low weed and pest invasion	10
	Fragmented habitat, light grazing, scattered/moderate weed and pest species invasion	7
	Highly fragmented habitat, heavy grazing, invasive weed and pest species abundant	1
Quality and availability of food and foraging habitat	Abundance of fungi, lichen, algae, detritus/biofilm	10
	Occasional fungi, lichen, algae, detritus/biofilm	5
	Lack of fungi, lichen, algae, detritus/biofilm	1
Quality and availability of shelter	Abundant ground debris and overstorey of trees and shrubs	10
	Occasional ground debris and limited overstorey of trees and shrubs	5
	Ground debris and overstorey of trees and shrubs absent	1
Species mobility capacity	Connected habitat with suitable ground debris and canopy cover	10
	Functional habitat patches disconnected by 5m - 10m (i.e. no suitable microhabitat features for 5m-10m)	7
	Functional habitat patches disconnected by 10m-50m	4
	Functional habitat patches disconnected by >50m	1