WOOLOOGA SOLAR FARM – STAGE 1

Biodiversity Management Plan

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V1.5
21 June 2021

rpsgroup.com

REPORT

Document status

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Approval for issue

Mark Aitkens  11 June 2021

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1 INTRODUCTION

1.1 Overview and Location

RPS has been engaged by Lightsource bp to prepare a Biodiversity Management Plan (BMP) for Stage 1 of a Solar Photovoltaic (PV) Farm over land at Wide Bay Highway, Lower Wonga (hereafter referred to as the 'Project'; **Figure 1**).

The Project Area consists of:

- Site 1 - Lot 158 on LX327, Lot 159 on SP237339, Lot 86 on LX472, and Lot 90 on SP237339 (total area of 415.156 ha); and
- Site 2B - Lot 157 on LX2424 (total area of 105.083 ha).

1.2 Project Background

Development approval was granted with conditions (Application No. 2018-0809 and 2019-2559). These conditions were set out in Attachment 1 (Assessment Manager Conditions) of the Negotiated Decision Notices provided by Gympie Regional Council. The consent allows for Material Change of Use - Renewable Energy Facility (Solar Farm) for both sites.

The Project involves:

- Establishment of a Solar Photovoltaic (PV) Farm with a generation capacity of approximately 185MW across Site 1 and 20MW across Site 2B;
- The solar panels will be suspended above the ground on piles to ensure minimal ground disturbance;
- Direct vehicle ingress and egress will be provided via the existing unnamed road reserve along the site's eastern boundary approximately 500 m North of the Wide Bay Highway and existing property access off Wide Bay Highway at Site 2B;
- Retention of field-verified remnant vegetation, waterbodies and high order waterways;
- Landscaping to act as a visual buffer from Wide Bay Highway; and
- Connection to the electrical network via a cable to an existing Powerlink-owned substation.

1.3 Purpose and Scope

This BMP has been developed to comply with Conditions 21 and 23 of the Woolooga Solar Farm – Site 1 Negotiated Decision Notice (Application No. 2018-0809). In addition, this BMP also addresses Conditions 19 and 21 of the adjoining Site 2B Negotiated Decision Notice (2019-2559). The aforementioned Negotiated Decision Notices for Site 1 and Site 2b both contain identical conditions for a Fauna Management Plan (hereafter 'FMP') and Vegetation Management Plan (hereafter 'VMP'). The FMP and VMP must be prepared for the development to the satisfaction of Gympie Regional Council (hereafter 'Council') prior to the commencement of construction. Collectively these Conditions have been addressed in this BMP. Following Council's approval, the proponent must implement this BMP and the recommendations of this BMP are to be adhered to thereafter. Requirements of the relevant FMP and VMP Conditions from Site 1 and 2B Negotiated Decision Notices are listed in **Table 1**, along with the report section and page number where they are addressed.

Table 1 Conditions of Consent and Corresponding Location within this BMP

Condition of Consent	Report Section	Page Number
Fauna Management		
a. Provide a Fauna Management Plan to demonstrate how potential impacts on native fauna will be reduced.	5	13
i. Procedures for dealing with fauna observed immediately prior to vegetation clearing;	5.1 ,5.2	13, 13
ii. Procedures for dealing with fauna during vegetation clearing including the engagement of a qualified fauna spotter/catcher	5.3, 5.4	13, 14
iii. Procedures for the treatment/removal of injured fauna from site	5.3, 5.4	13, 14
iv. Procedures for managing native and other fauna that may enter the solar farm and potentially damage photovoltaic cells, racks, conduits or cables	5.5	17
v. Measures to avoid and respond to potential 'lake effects' of photo voltaic arrays on locally significant birds in flight	5.7	19
Vegetation Management		
a. Provide a whole-of-site vegetation management plan is required for the whole site.	6	20
i. Assessment and recommendations on the potential retention of vegetation along waterways and drainage features (Stream Order 2 and above)	6.1	20
ii. Ongoing natural regeneration of waterway vegetation	4.1.3, 6.1, 6.3	11, 20, 20
iii. Identification of vegetation to be removed	2.1.1, 4.1.1	7, 11
iv. Proposed treatment of vegetation that is to be removed, including disposal of vegetative material and re-use of habitat hollows if any	6.3, 6.4	20, 21
v. Management of vegetation underneath and between photovoltaic arrays, chemicals used and frequency of use	6.2, 6.5	20, 21
vi. Control measures, maintenance procedures and monitoring programs, including management of restricted plants and other biosecurity matters	6.5, 6.6	21, 24

This BMP addresses each of the items listed above in **Table 1** and provides potential impacts, mitigation measures and monitoring responses.

Mitigation measures of relevance to biodiversity management from the mitigation measures in the Ecological Assessment prepared by Ecosure (refer Appendix F of the Town Planning Report dated April 2018) are reproduced below in **Table 2,** with the phase (i.e. constructions or operation), report section and page number where they are addressed.

Section 7 summarises the management objectives, performance criteria and corrective actions, responsible party and a timeframe for their implementation. Section 8 details the roles and responsibilities for implementing this BMP, as well as triggers for revisions. Section 8 also outlines the key elements which are to be communicated during the site induction for construction and operational phases.

1.3.1 Potential for Significant Residual Impacts

The Environmental Offsets Act 2014 (EO Act) identifies habitat for endangered, vulnerable or special least concern fauna as a matter of state environmental significance (MSES), and significant residual impacts to habitat would result in an offset being required. The Woolooga Development for Stage 1 consisted of Ecological Assessments for Site 1 (Ecosure, 2018) and Site 2B (RPS 2020).

The Ecological Assessment prepared by Ecosure (2018) for Site 1 stated that: "*No impacts to the habitat for koala are expected as the development will seek to retain all remnant habitat areas (RE 12.3.11) and proposed Category C regulated vegetation as well as regrowth vegetation adjacent to watercourses (i.e. eastern extent of Hookey Creek). Minimal impacts to the habitat for other threatened fauna species are expected as the development will seek to retain the majority of remnant vegetation, apart from the clearing of a small portion of Category B vegetation within the north-east portion. This clearing is unlikely to significantly impact on any potentially occurring threatened species.*"

Similarly, in the Ecological Assessment for Site 2B prepared by RPS (2020) stated that; *"As outlined in **Section 3.4.2**, impacts to habitat for MSES from the Project are likely to be negligible, given they are limited*

to non-remnant vegetation and small areas, open areas mapped as Category R regrowth. Therefore, it is considered that the Project will not have a significant residual impact on any MSES."

Given the above statements; the proposed clearing is not likely to result in significant residual impacts to remnant vegetation containing of concern Regional Ecosystems (RE). Consequently, an environmental offset is not considered necessary in accordance with the EO Act. However, an environmental offset will be provided at a Federal level in accordance with the controlled action assessed via Preliminary Documentation in relation to the EPBC Referral (reference 2019/8554). As such, an offset management plan has been prepared in a separate report to address the Federal requirements and adequate offset measures will be secured prior to commencement of construction activities. Note that clearing should be undertaken in accordance with the Conditions of Approval for EPBC 2019/8554.

Table 2 Mitigation Measures and Corresponding Location within this BMP

Potential Impact	Mitigation Measures from Ecological Assessment	Phase of works	Report Section	Page Number
Removal of habitat	• Avoid riparian habitats for koala • Set clear boundaries for clearing works • Keep clearing footprints to a minimum • Minimal clearing of Category B vegetation	Construction	4, 5.3, 6.1	8, 13, 20
Erosion of waterways	• Develop and implement a sediment and erosion control plan for watercourse crossings, should upgrade works require disturbance to the bed and/or banks. • The Best Practice Erosion and Sediment Control Guidelines (Witheridge 2014) should be referred to prevent off-site impacts to downstream receiving environments.	Construction	6.3, also see detailed Sediment and Erosion Control Plan in Construction Environmental Management Plan (CEMP)	20
Removal of hollow bearing trees or logs	• Where possible, logs and hollow limbs cleared during construction should be placed in adjacent vegetation so they can be used for habitat by a qualified Fauna Spotter Catcher.	Construction	5.2	13
Removal of potential and active breeding sites	• Fauna spotter catcher to undertake pre-clear survey to identify habitat features and potential breeding sites prior to clearing works so that eggs or young can be removed and taken to qualified carer.	Construction	5.1, 5.3, 5.4	13, 13, 14
Spread of weeds	• Restricted weed species must be treated prior to construction commencing using an appropriate control technique. Reasonable control would include treating individual plants with a registered herbicide and must be applied by a licenced weed control contractor.	Construction Operation	6.5	21
Setbacks should be made for all project infrastructure from remnant vegetation, proposed high growth regrowth and significant fauna habitat	• The following setbacks are recommended to be implemented into the project design: – 25 m from the defining bank of watercourses (or centerline if defining bank not present) containing remnant vegetation or 25 m from edge of remnant vegetation, whichever is greater; – 10 m from defining bank of stream order 1 or 2 watercourses (or centerline if defining bank not present) and dams where remnant vegetation not present; – 25 m from defining bank of stream order 3 or 4 watercourses (or centerline if defining bank not present); and – 25 m from mapped remnant vegetation and proposed high value regrowth vegetation.	Construction Operation	4	11

1.4 Definitions

Table 3 Definitions

Term	Definition
ANARRA	Australian Native Animals Rescue and Rehabilitation Association
APZ	Asset Protection Zone
BMP	Biodiversity Management Plan
CEMP	Construction Environmental Management Plan
Council	Gympie Regional Council
DAF	Department of Agriculture and Fisheries
DoES	Department of Environment and Science
EPBC Act	*Environmental Protection and Biodiversity Conservation Act* 1999
EPC	Engineering, Procurement and Construction
FMP	Fauna Management Plan
GPS	Global Positioning System
HBT	Hollow-bearing tree
NC Act	*Nature Conservation Act* 1992
O&M	Operation and maintenance
Project Area	Site 1 (Lot 158 on LX327, Lot 159 on SP237339, Lot 86 on LX472 and Lot 90 on SP237339) and Site 2B (Lot 157 on LX2424)
PV	Photovoltaic
RE	Regional Ecosystems
VMP	Vegetation Management Plan
WoNS	Weeds of National Significance
VM Act	*Vegetation Management Act* 1999
Zone A	Operational Zone
Zone B	Electricity Easement Zone
Zone C	Non-Operational Zone

Project Footprint
Woolooga Site 1
Woolooga Site 2B
Site access point
Perimeter fencing
Livestock fencing
Road
River/stream
Cadastre

LOCATION

Woolooga Site 2B

Woolooga Site 1

Wide Bay Hwy

Gympie Wooloonga Rd

Hayes Rd

84 LX549
161 LX326
4 SP133367
3 SP133367
1 SP133367
85 SP310637
86 LX472
90 SP237339
1 SP285774
2 SP285774
155 LX2414
216 LX509
2 SP295954
159 SP237339
1 SP295954
2 RP186174
3 RP186174
4 RP186174
2 RP190311
234 LX495
310 LX2129
EMT LX2129
235 LX2129
236 LX496
1 RP851778
2 RP851778
3 RP851778
233 RP851778
235 LX2129
2 RP151892

Mount Walsh National Park
Tuan State Forest
742 m
Gronganh National Park
Gympie
Toolara State Forest
Wrattens National Park
Yabba State Forest
Imbil State Forest

N

0 100 200 400 600 800 1,000 m
SCALE: 1:15,000 AT A3 SIZE

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FIGURE 1
LOCATION MAP - STAGE 1

LOCATION:
1706 WIDE BAY HWY WOOLOOGA

PURPOSE:
BIODIVERSITY MANAGEMENT PLAN

DATE: **21/06/2021**
VERSION: **C**

CO-ORD SYSTEM:
DATA SOURCE: **RPS, ESRI, QLD GOVT**
PATH:
\\ntlfile1\data\JOBS\147k\147105 Lower Wonga\10 - Drafting\147105_LowerWonga_Woolooga\147105_LowerWonga_Woolooga.aprx

CLIENT: **Lightsource bp**
JOB REF: **PR146667**
TECHNICIAN: **Robert.Suansri**

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2 ECOLOGICAL VALUES

2.1.1 Vegetation

Site 1 is mapped and field validated as containing areas of Category B (remnant) regulated vegetation containing of concern REs and Category X (non-remnant) vegetation. The site also contains proposed Category C and R regulated vegetation. RE 12.11.18 /12.11.17 / 12.11.6 is mapped as occurring as a mixed polygon fringing upper drainage lines / gullies and hillslopes in the northern portion of the site (see **Table 4** for RE descriptions; **Figure 2** shows vegetation mapping). RE 12.3.11 is mapped as occurring at the junction of two watercourses in the north-east corner of the site.

At Site 2B, the majority (63%) of lot 157 is mapped as non-remnant vegetation in version 11.0 of the Vegetation Management Regional Ecosystem Map, with 36% mapped as high value regrowth and 1% mapped as remnant vegetation. Surveys by Astrebla (2020) found remnant vegetation consisted of one RE – the least concern RE 12.11.6. Lot 157 contains 37.76 ha mapped as high value regrowth, of which 26 ha is designated as reef regrowth (Category R), which has been mapped over minor waterways. The remaining 11.76 ha is mapped as Category C regrowth, which is most consistent with RE 12.11.6 in the north of Site 2B. In the south-western corner, vegetation was most consistent with RE 12.11.14.

Table 4 Regional ecosystems mapped as occurring on the site

RE Code	VM Reg.Status	Short description	Confirmed on site
12.3.11	Of Concern	Queensland blue gum +/- grey ironbark *Eucalyptus siderophloia*, pink bloodwood Corymbia intermedia open forest on alluvial plains usually near coast	Sites 1 and 2B
12.11.6	Least Concern	Lemon-scented gum *Corymbia citriodora subsp. variegata*, narrow-leaved ironbark *Eucalyptus crebra* woodland on metamorphics +/- interbedded volcanics	Sites 1 and 2B
12.11.14	Of Concern	*Eucalyptus crebra*, *E. tereticornis*, *Corymbia intermedia* woodland on metamorphics +/- interbedded volcanics	Site 2B
12.11.17	Of Concern	White stringybark *Eucalyptus acmenoides* or white mahogany *E. portuensis* open forest on metamorphics +/- interbedded volcanics	Site 1
12.11.18	Least Concern	Gum-topped box *Eucalyptus moluccana* woodland on metamorphics +/- interbedded volcanics	Site 1

Note: VM Status is the conservation status of the RE under the Vegetation Management Regulation 2000

2.1.2 Fauna habitat

Four broad fauna habitat types were recorded across the site:

- Watercourses with riparian woodland;
- Constructed dams;
- Improved pasture grasslands with isolated mature trees; and
- Open forest on hills.

2.1.3 Threatened species

Based on the disturbed nature of the Project Area it is considered unlikely to provide suitable habitat for any threatened plants recorded from surrounding areas (Ecosure 2018; Astrebla 2020).

No threatened fauna species nor signs of their presence have been recorded within the site. However, the site was identified as providing habitat values for the Koala (*Phascolarctos cinereus*), which is listed as Vulnerable under the EPBC Act and *Nature Conservation Act* 1992 (NC Act). Suitable habitat for the Koala was also identified on Site 2B in areas of regrowth and among stands of paddock trees. Habitat was also

identified for several threatened fauna species in the north-western and north-eastern portions of Sites 1 and 2B, respectively, which will largely be retained by the Project.

2.1.4 Migratory Species

One listed migratory species, Black-faced Monarch (*Monarcha melanopsis*), was observed within the north-eastern portion of the site. Several other migratory species are potentially occur within the site, including wetland birds [e.g. Curlew Sandpiper (*Calidris ferruginea*)] and aerial species [e.g. White-throated needletail (*Hirundapus caudacutus*)].

2.1.5 Weeds

Common weed species include *Gomphocarpus physocarpus* (Balloon Cotton Bush), *Cirsium vulgare* (spear thistle), *Ageratum houstonianum* (Blue Billygoat weed), *Bidens pilosa* (Cobbler's Pegs), *Verbena bonariensis* (Purple Top), *Sida cordifolia* (Flannel weed), *Stylosanthes scabra* (Shrubby stylo), *Megathyrsus maximus* (Guinea grass) and *Melinus repens* (Red Natal grass).

Four species of significant pest plants were recorded on-site: *Opuntia stricta* (Prickly Pear; Sites 1 and 2B), *Parthenium hysterophorus* (Parthenium; Site 2B), *Sporobolus jacquemontii* (American Rat's Tail Grass; Site 2a) and *Lantana camara* (Lantana; Sites 1 and 2B). All four weeds are classed as Restricted under the *Biosecurity Act* 2014, whilst Prickly Pear, Parthenium and Lantana are Weeds of National Significance (WoNS).

Perimeter fencing
Livestock fencing
Road
River/stream
Cadastre

Management zones
Zone A - Operational Zone
Zone B - Electrical Easement
Zone C - Non-operational Zone

Regulated vegetation
Category B
Category C
Category R

12.11.18/12.11.17/12.11.6 40/35/25
12.11.6 100
non-rem 100
RR 100

Wide Bay Hwy
Gympie Wooloonga Rd

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N

0 100 200 400 600 800 1,000 m
SCALE: 1:12,500 AT A3 SIZE

FIGURE 2
VEGETATION MAPPING - STAGE 1

LOCATION:
1706 WIDE BAY HWY
WOOLOOGA

PURPOSE:
BIODIVERSITY MANAGEMENT PLAN

DATE: **21/06/2021**
VERSION: **C**

CO-ORD SYSTEM: **GDA2020 MGA Zone 56**
DATA SOURCE: **RPS, ESRI, QLD GOVT**
PATH:
\\ntlfile1\data\JOBS\147k\147105 Lower Wonga\10 - Drafting\147105_LowerWonga_Woolooga\147105_LowerWonga_Woolooga.aprx

CLIENT: **Lightsource bp**
JOB REF: **PR146667**
TECHNICIAN: **Robert.Suansri**

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3 PROJECT IMPACTS

Impacts to flora, fauna and ecological communities were evaluated in the Ecological Assessments that supported the Development Application (Ecosure 2018; Astrebla 2020). Impacts expected to occur during construction and operation of the Project include:

- Removal of habitat;
- Erosion of waterways;
- Removal of hollow bearing trees or logs;
- Removal of potential and active breeding sites;
- Death or injury to fauna; and
- Spread of weeds.

At Site 1, limited impacts to non-remnant vegetation will occur to allow for installation of solar PV panels, with no significant areas of remnant habitats are expected to be disturbed.

At Site 2B, the Project has been located to avoid clearing in mapped Category C (regrowth) and Category B (remnant) areas. However, up to 2.003 ha of Category R woodland will be impacted to allow installation of infrastructure.

4 MANAGEMENT ZONES

4.1.1 Zone A: Operational Zone

This zone reflects the solar panel array and associated infrastructure. It will be used during the construction phase of the infrastructure, and during operation and maintenance (O&M) activities. Although most of this zone is already cleared of native vegetation, some paddock trees will be impacted. A small area of Category B vegetation within the northeast portion of Site 1 is proposed to be cleared for construction of the Project.

No revegetation is to take place in this zone, as it must be maintained free of woody vegetation for fuel reduction purposes. Apart from this, all operation zones have been setback from remnant vegetation and waterbodies by 25 m, with the exception of a 10 m setback for stream order 1 or 2 watercourses where remnant vegetation is not present (see **Section 4.1.3**; **Figure 3**). This setback also serves as an Asset Protection Zone (APZ) around the plant infrastructure, to provide defendable space and to manage heat intensities at the infrastructure interface. Note that this setback was not applied to mapped waterways that have been field verified as being grassy depressions/drainage lines.

The following setbacks were applied to the Project:

- 25 m from the defining bank of watercourses (or centreline if the defining bank is not present) containing remnant vegetation or 25 m from the edge of remnant vegetation, whichever is greater;
- 10 m from defining bank of stream order 1 or 2 watercourses (or centreline if the defining bank is not present) and dams where remnant vegetation not present;
- 25 m from defining bank of stream order 3 or 4 watercourses (or centreline if the defining bank is not present); and
- 25 m from mapped remnant vegetation and high value regrowth vegetation.

4.1.2 Zone B: Electricity Easement Zone

This zone reflects the path of an existing electricity easement for a transmission supply network that connects to a Powerlink Substation, on the southern side of Wide Bay Highway. These are registered easements (Easement A on RP125971, Easement B on RP214286, and Easement L on RP139547). Ongoing management of biodiversity values within this zone is outside of the responsibility of the client.

4.1.3 Zone C: Non-operational Zone

The non-operational zone includes proposed high value regrowth vegetation and significant fauna habitats which are to be retained. This area is to be excluded from construction and operational activities to protect native vegetation and habitat values.

To avoid inadvertent impacts to the patches of remnant vegetation during construction, all remnant patches will be temporarily fenced off during construction using flagging, bunting, parawebbing or similar and will be marked as a no-go zone. To protect this area during operation, all Project infrastructure will be set back or buffered at a minimum distance from these areas, as detailed in **Section 4.1.1**. Management involving the control of weed species is authorised as outlined in **Section 6.5**.

A 5 m wide landscaping strip to act as a visual buffer from the Wide Bay Highway and to mitigate any potential impacts associated with glare. Species to be planted are consistent with Regional Ecosystems 12.12.5 and 12.11.6, as detailed in Appendix F of the Town Planning Report for Site 2B.

Offset Site
Perimeter fencing
Livestock fencing
Road
River/stream
Cadastre

Management zones
Zone A - Operational Zone
Zone B - Electrical Easement
Zone C - Non-operational Zone

Wide Bay Hwy

Gympie Wooloogа Rd

N

0 100 200 400 600 800 1,000 m

SCALE: 1:12,500 AT A3 SIZE

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3. Without limiting paragraph 1 or 2 above, this plan may not be copied, distributed, or reproduced by any process unless this note is clearly displayed on the plan.

4. The aerial photography used in this plan has not been rectified. This image has been overlaid as a best fit on the boundaries shown and position is approximate only.

FIGURE 3
MANAGEMENT ZONES - STAGE 1

LOCATION:
1706 WIDE BAY HWY
WOOLOOGA

PURPOSE:
BIODIVERSITY
MANAGEMENT PLAN

DATE: **21/06/2021**
VERSION: **C**

CO-ORD SYSTEM: **GDA2020 MGA Zone 56**
DATA SOURCE: **RPS, ESRI, QLD GOVT**
PATH:
\\ntlfile1\data\JOBS\147k\147105 Lower Wonga\10 - Drafting\147105_LowerWonga_Woolooga\147105_LowerWonga_Woolooga.aprx

CLIENT: **Lightsource bp**
JOB REF: **PR146667**
TECHNICIAN: **Robert.Suansri**

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MAKING COMPLEX EASY

5 FAUNA MANAGEMENT PLAN

5.1 Habitat Assessment Prior to Vegetation Clearing

Prior to vegetation clearing, clearing limits and the Project Area boundary must be identified on all design, construction and operational drawings, as detailed in **Section 4.1.3**.

Within the Project Area, all trees and natural habitat features that could potentially be used by resident or migratory fauna (i.e. potential shelter sites, nest sites, hollows, termitaria, epiphytes, crevices, standing dead trees, large hollow logs, bush rocks or felled branches) are to be located. These habitat features are to be recorded using a Global Positioning System (GPS) device and clearly demarcated throughout the site using flagging tape and/or fluorescent paint and clearly reflected on the operational drawings.

Suitable nearby habitat is to be identified in the event of fauna relocation.

5.2 Habitat Management

Clearing of habitat (e.g. fallen timber, rock and hollow-bearing trees) will be synchronised with relevant species lifecycles. If possible, hollow-bearing tree removal is to occur between March and August to avoid the main breeding period of hollow-dependent fauna. If hollow-bearing trees (HBTs) are to be removed, nest boxes should be installed in the remnant vegetation zone to compensate for the loss of each hollow bearing tree (i.e. an offset ratio of 1:1). The size of the nest boxes should reflect the size of the hollow being removed, to adequately support the fauna species occupying the hollow, if any. A qualified ecologist should install the nest boxes to ensure suitable trees are selected for installation and the direction and design of the nest box is optimal for candidate species.

Where possible, logs and hollow limbs cleared during construction should be placed in adjacent vegetation so they can be used for habitat by a qualified Spotter Catcher.

5.3 Vegetation Clearing protocol

- All fauna handling is to be undertaken by a suitably qualified Spotter Catcher with the required Rehabilitation Permit.
- Clearing of trees is carried out in a way that ensures koalas on the area being cleared (the clearing site) have enough time to move out of the clearing site without human intervention, by:
  - Carrying out the clearing in stages;
  - Ensuring not more than 3 ha or 3% of the site's area is cleared in any 1 stage, whichever is the greater;
  - Ensuring that between each stage and the next there is at least 1 period of 12 hours starting at 6p.m. on a day and ending at 6a.m. on the following day during which no trees are cleared on the site;
  - Clearing of the trees is carried out in a way that ensures, while the clearing is carried out, appropriate habitat links are maintained within the clearing site and between the site and its adjacent area, to allow koalas living on the site to move out of the site; and
  - No tree in which a koala is present, and no koala habitat tree with a crown overlapping a tree in which a koala is present, is cleared.
- Within seven days prior to clearing all recorded habitat features should be inspected (where safe and practicable) using a nest box scope or other suitable inspection device. Any fauna found within habitat features should be removed where safe to do so and relocated to previously chosen suitable habitat (see **Section 5.1**). GPS coordinates are to be taken for the location of any fauna that cannot be safely removed. These coordinates are to be reflected on the operational drawings.
- Clearing is carried out in the presence of a spotter who has the primary role of locating koalas in the trees for the person, as well as handling and relocating fauna (other than koala). All fauna handling is to be undertaken by a suitably qualified Spotter Catcher with the required Rehabilitation Permit. The

spotter also requires qualifications and experience, demonstrated skills and knowledge in locating koalas in koala habitats or conducting arboreal fauna surveys.

Prior to the commencement of clearing all site personnel are to be:

- Made aware of the clearing limits and how they are marked;
- Informed that they are not to encroach on areas beyond the clearing limits;
- Made aware of the locations of trees that will be retained, measures required to protect them, and the consequences of damage to these areas;
- Made aware of threatened and migratory species known or likely to occur in the Project Area and their habitat;
- Made aware of the location of any habitat features that have been found to previously contain fauna; and
- Made aware of the two-stage approach to clearing.

- Undertake a pre-start-up check for sheltering native fauna of all infrastructure, plant and equipment and/or during relocation of stored construction materials. If fauna is identified, notify the Spotter Catcher or Australian Native Animals Rescue and Rehabilitation Association (ANARRA) so they can relocate uninjured animals and manage injured animals.
- Undertake a two-stage approach to clearing, as described below:
  - **Stage 1**: Under-scrubbing of the entire Project Area should be carried out by a 4x4 tractor (or similar) with a slashing deck and a layer of mulch is to be left to aid in soil retention. Non-hollow-bearing tree and non-habitat trees will be cleared in a sequence that leaves trees that allow fauna to move to adjacent vegetation to be retained, as outlined for koala (above). Clearing should be carried out in a south to north direction.
  - **Stage 2:** After a period of at least two days and preferably up to two weeks, clearing of trees can commence, pertaining to the rules regarding koala (see above). All trees should be checked for koala, and if present left alone to allow for natural dispersal from the site, as detailed above. Trees identified as being previously occupied by fauna (including those associated with habitat and hollow-bearing trees) should be checked by the spotter catcher and fauna and removed if safe to do so. If fauna is identified, the Fauna Handling and Relocation Procedure in **Table 5** must be adhered to. If fauna is unable to be removed, revert to soft felling (except for koala, as per above). Hollow bearing trees are to be knocked with an excavator bucket or other machinery to encourage fauna to evacuate the tree immediately prior to felling. Trees should be “soft felled”. Felled hollow bearing trees must be inspected by the Spotter Catcher as soon as possible for the presence of fauna, including trapped, shocked or injured fauna. Felled hollow bearing trees must be left for a two night period on the ground to give any fauna trapped in the trees an opportunity to escape before further processing of the trees.

    As aforementioned, any suitable salvaged hollows from felled trees are to be set aside and placed in adjacent retained vegetation. Remaining trees can then be mulched, relocated for re-use and/or stacked for disposal (**Section 6.3.3**).

5.4 Fauna Handling and Relocation Procedure

If an animal (including shocked, juvenile animals or eggs) are discovered on the Project Area during clearing or other construction activities, STOP ALL WORK within the vicinity of the animal and handle fauna in accordance with the procedure detailed in **Table 5**.

Table 5 Fauna handling and relocation procedure

Action	Timing	Responsibility
Animal Handling		
If an animal is located within the works area, stop all work in the vicinity of the animal and immediately notify the Environmental Manager. The Environmental Manager is to notify the Spotter Catcher, who may nominate to contact a rescue agency [e.g. ANARRA or Royal Society for the Prevention of Cruelty to Animal (RSPCA)].	As soon as an animal is identified in the construction footprint	Contractors Environmental Manager Spotter Catcher
Minimise stress to the animal and reduce the risk of further injury by: • Handling fauna with care and as little as possible; • Covering larger animals with a towel or blanket and placing in a large cardboard box (or similar); • Placing small animals in a cotton bag, tied at the top; and • Keeping the animal in a quiet, warm, ventilated and dark place away from construction activities. This location is to be designated in advance of construction work.	As soon as possible after an animal is identified in the construction footprint	Spotter Catcher
Where handling of frogs is necessary, captured frogs must be handled in accordance with the Hygiene Protocol for the control of Disease in Frogs (Murray et al. 2011), specifically: • A new pair of disposable gloves must be used between the handling of each frog; and • Use one plastic bag per frog when transporting frogs. Do not reuse bags, or place in disinfected containers.	As soon as possible after a frog is identified in the construction footprint	Spotter Catcher
Dangerous animals such as venomous reptiles must not be handled by inexperienced/unqualified personnel. The following actions must therefore be taken when a dangerous animal is identified within the construction footprint: • Exclude all personnel from the vicinity with fencing and/or signage; • Contact the Spotter Catcher. The Spotter Catcher may nominate to contact a rescue agency (e.g. ANARRA or RSPCA) or professional snake handler to assist. – Australian Native Animal Rescue and Rehabilitation Association (ANARRA) (07) 5484 9111 – RSPCA (07) 5482 9407; and • Record the exact location of the animal and provide this location to the local wildlife rescue agency. The Spotter Catcher or other nominated personnel are, where practical, to keep the dangerous animal in sight where it remains within the construction site.	As soon as possible after a venomous snake or other dangerous animal is identified in the construction footprint	Spotter Catcher Wildlife Rescue Agency
If the fauna species is identified by the Spotter Catcher, as a threatened species that was not identified and assessed in the Environmental Assessment or other Project documentation, then the Spotter Catcher must inform the Environmental Manager, who must: • Immediately cease all work that may affect the threatened species; • Contact the Environmental Manager and advise them of the situation; • Contact relevant stakeholders; • Determine in consultation with stakeholders, corrective actions and additional safeguards to be undertaken; and • Construction works may recommence only once the Environmental Manager in consultation with the Spotter Catcher,	As soon as possible after an additional threatened species is identified in the construction footprint	Spotter Catcher Environmental Manager

Action	Timing	Responsibility
has confirmed that all corrective actions and additional safeguards have been implemented.		
Release of Animals		
Release the animal, outside of the construction footprint, into similar habitat and as close as possible to the area where the animal was found. To be carried out accordance with the Code of Practice: Care of Sick, Injured or Orphaned Protected Animals in Queensland (NC Act) (DoES 2013)	As soon as practical after animal is caught, and only when animal is determined to be fit for release	Spotter Catcher
Time the release of the animal to coincide with the active period of the species; i.e. nocturnal animals to be released at dusk. To be carried out accordance with the Code of Practice: Care of Sick, Injured or Orphaned Protected Animals in Queensland (NC Act) (DoES 2013)	As soon as practical after animal is caught, and only when animal is determined to be fit for release	Spotter Catcher
Do not undertake fauna relocation during periods of heavy rainfall or extreme weather conditions (e.g. very high temperatures), unless the animal is too stressed to be held any longer.	As soon as practical after animal is caught, and only when animal is determined to be fit for release	Spotter Catcher
Injured Animal Management		
Contact the Spotter Catcher if an injured animal is found on or in the vicinity of the construction site. The Spotter Catcher will determine if the animal is seriously injured and requires attention. If the animal is injured, contact one of the following local wildlife rescue agencies and/or veterinary surgeries immediately: • ANARRA (07) 5484 9111	As soon as practical after injured animal is identified in the construction footprint	Spotter Catcher Environmental Manager
Contact the local wildlife rescue agency and/or veterinary surgeon if the Spotter Catcher is not present, or cannot immediately attend the site. Follow advice from the Spotter Catcher, wildlife rescue agency and/or veterinary surgeon while waiting for any of the above parties to attend the site.	As soon as practical after injured animal is identified in the construction footprint	Environmental Manager
Once the rescue agency arrives at the site, they are responsible for the animal. Any decisions regarding the care of the animal will be made by the rescue agency.	Upon arrival of wildlife rescue agency	Wildlife Rescue Agency
If the rescue agency and/or local veterinary service cannot be contacted, the Spotter Catcher, or in their absence, the Environmental Manager, will deliver the injured animal to the agency/local veterinary service as soon as practically possible.	As soon as practical after injured animal is identified in the construction footprint	Environmental Manager
The Spotter Catcher must record the following information about the animal, prior to the animal leaving the site: • Species; • Location of where animal was found (exact as possible, GPS co-ordinates); • Date; • Gender (if possible); and • Photograph the animal (if possible).	Prior to injured animal leaving the Project Area	Spotter Catcher
Contact the Environmental Manager immediately if a dead animal is found within the site. Carcasses must be buried to a depth that will prevent scavengers from reaching them and to minimise the risk of disease transmission. The Spotter Catcher must record the following details: • Species; • Location of where animal was found (exact as possible, GPS co-ordinates); • Date; • Gender (if possible); and • Photograph the animal (if possible).	As soon as practical after a dead animal is found within the site	Spotter Catcher

Action	Timing	Responsibility
Reporting		
The Spotter Catcher must prepare a report upon completion of clearing activities for submission to the Environmental Manager and Council, that includes: • A description of the assessment of habitat trees undertaken prior to clearing. • How fauna was handled that was affected by clearing activities. • Procedures that were adopted for the relocation of non-injured fauna from clearing areas and operations, including the identification of appropriate locations, timings and weather conditions for the relocation of non-injured fauna. • Procedures, dates, areas and fauna specialist(s) present during clearing and structures removal operations. • A description of any animals that were sighted, captured, released, injured or shocked. • Procedures that were adopted for handling injured fauna from clearing areas and operations, including details on liaison with wildlife rescue groups, veterinary surgeons and any other appropriate organisations or individuals. • A description of any dead animals that were found as a result of clearing of structures operations and fauna rescue. • A description of any tree that is used for breeding or roosting by fauna. Include tree species, location, size, height and depth of hollow. • A description of any bridge or culvert structure that is used for breeding or roosting by fauna. Include location, size, gap height and depth. • Photos (where possible) of rescued and dead fauna.	Within 30 days of the completion of clearing activities	Spotter Catcher

5.5 Fauna Management Protocols

A 2.3 m high security fence comprised of 1.85 m chain wire fence will be constructed around the Project Area, in effort to exclude fauna (**Figure 3**). Preferentially, barbed wire should not be used at the top of this fence as it is harmful to wildlife, such as bats, gliders and owls.

The construction of the security fence should be carried out in a manner that allows any fauna within the Project Area to escape into remnant vegetation before the security fence entirely encloses the Project Area. This would involve constructing the fence in a south to north direction towards the remnant vegetation. Gates should be installed to aid in the release of animals that are accidently enclosed within the Project Area. Should any fauna become stuck or injured within the Project Area they should be handled and removed by a suitably qualified Spotter Catcher and released back into suitable habitat or relinquished into the care of a local wildlife rescue organisation if injured.

5.5.1 Mammals and Macropods

Security fencing around the Project Area will provide sufficient deterrent for larger mammals and macropods (i.e. Kangaroos, Wallabies or feral species), as shown in **Figure 3**.

Smaller native and exotic burrowing mammals or macropods (i.e. wombats, rabbits and hares) could potentially burrow underneath the security fence. Whilst this may be unlikely due to ample surrounding pastureland, fence lines will be regularly inspected and maintained to prevent fauna intrusion. Fence lines will also be inspected for any overhanging trees or branches that could provide access for arboreal mammals to enter the Project Area.

5.5.2 Birds

Solar panels and infrastructure will be regularly inspected for any signs of bird activity (i.e. nesting material, whitewash, roosting sites). Any nesting material or established nests will be inspected. If there are any fauna present within the nests, a suitably qualified Spotter Catcher will be required to remove, relocated or relinquish fauna to local wildlife rescue organisation.

5.5.3 Feral Pest Management

Feral pests have the potential to intrude into the project boundary via fence gaps in streams or improperly maintained fencing.

Annual feral pest monitoring will be undertaken within the retained vegetation zone during operation. Monitoring will consist of visual inspections for signs of introduced fauna species (scats, diggings etc.) and camera trapping (**Section 5.6**). If significant introduced fauna species outbreaks are identified, specific controls will be developed and undertaken. Any vertebrate pest control activities undertaken will be done in accordance with the best practise methods available.

Pest management options for species most likely to occur, are outlined below:

- European Rabbit (*Oryctolagus cuniculus*): current best practice control is the inspection, ripping and rehabilitation of rabbit warrens as detected. Initial pest management audit that establishes trapping and baiting requirements;
- European Fox (*Vulpes vulpes*) and feral cat (*Felis catus)*: 1080 baiting of foxes and Curiosity® baiting for cats in accordance with relevant legislation (i.e. usage signs erected around the Project Area, avoid placement near waterways), the disposal and recording of carcasses;
  - Notification to neighbours regarding commencement of a 1080 and Curiosity® baiting program onsite; and
  - Trapping with cage traps – euthanasia undertaken in accordance with legislation (NSW Agriculture – Animal Care and Ethics Committee).
- Pig (*Sus scrofa*) - 1080 baiting of feral pigs in accordance with relevant legislation. Other management options include trapping, hunting and exclusion fencing (DAF 2008). (i.e. usage signs erected around the Project Area, avoid placement near waterways), the disposal and recording of carcasses;
  - Notification to neighbours regarding commencement of a 1080 and Curiosity® baiting program onsite; and
  - Trapping with cage traps – euthanasia undertaken in accordance with legislation
- Black Rat (*Rattus rattus*) and House Mouse (*Mus musculus*): Non-trapping/poison methods are to be maintained as the primary method of management. A clean operational area is to be maintained to reduce potential for home range establishment (i.e. limit refugia habitat and food sources). Water availability is to strictly be managed to prevent occurrence. Vegetation management is to include maintenance of low groundcover (i.e. <10 cm high vegetation). Chemical/ trapping control measures to be deployed if primary method is ineffective.

Baiting programs will be employed following local government area guidelines (Gympie Regional Council 2020) to control or eradicate feral species.

5.5.4 Livestock

Periodic livestock grazing may occur within Zones A and B (see **Section 6.2**). Consideration should be given to the type of livestock utilised for this task. Historically sheep have been the ideal choice as they are less destructive to infrastructure and the landscape. If utilising livestock for vegetation management consideration should be given to solar panel installation height and any exposed wiring within proximity to livestock. It is also imperative that livestock are fenced off from Zone C (see **Section 6.2**).

5.6 Fauna Monitoring

Camera trapping will be used to evaluate pest species type and estimated activity within the retained vegetation within Zone C. Monitoring locations will be determined during the first monitoring event. Camera deployment will be a single annual monitoring event comprising a minimum of one trap per five hectares for a period of no less than three consecutive weeks.

Results of fauna monitoring will be reported in conjunction with findings from vegetation monitoring, as detailed further in **Section 6.6**.

5.7 Lake Effect Mitigation

The chance of lake effects for water birds was reduced by allowing for considerable spacing between arrays and rows of panels:

- The photovoltaic array will be installed no higher than 4.0 m above natural ground level and will be separated according to the topographical features of the site;
- It is expected that each row of panels will be located approximately 5.0 – 8.0 m apart to allow access between each row; and
- The proposed plan retains water bodies (e.g. existing farm dams), remnant vegetation and associated riparian areas.

The initial stages of construction are likely to see minimal lake effects, due to smaller numbers of solar panels. However, chances of lake effects are likely to occur as the project progresses, with the greatest potential impacts being evident throughout the operational phase. Water bird mortality (if any) will be monitored to ensure the assumptions of lake effects are accurate. In the case that it is deemed that water bird mortality is identified, further management measures will be considered.

6 VEGETATION MANAGEMENT PLAN

6.1 Remnant Vegetation and habitat

The layout of the Project, as approved, has been designed to minimise clearing and unnecessary disturbance of vegetation. Remnant vegetation and fauna habitat is to be protected and passively managed in the Non-operational Zone, thereby allowing for natural regeneration following fencing and removal of grazing. The following measures will be implemented for the protection and management of the remnant native vegetation and habitat within the Project Area that is to be retained:

- Construction of a solar farm perimeter fence, for long term protection of retained vegetation within the site and unnecessary disturbance to soil, regenerating vegetation and fauna habitat during operation;
- Establishment of temporary fencing prior to the commencement of construction, around the remnant patches of using flagging, bunting, parawebbing or similar, and marking the fenced areas as a no-go zone (note: environmental monitoring and weed/pest management is authorised);
- The no-go zones and sensitive environmental areas will be included in the site induction;
- Exclusion of livestock grazing from remnant vegetation Zone C;
- Weed inspections will be conducted in Zone C during construction and operation to identify any priority and/or invasive weeds and conduct weed control as appropriate. Control of weeds is outlined further in **Section 6.5**; and
- Feral pest inspections will be conducted in Zone C during operation to identify any feral pest outbreaks and conduct pest control as appropriate. Control of feral pests is outlined in the FMP (**Section 5)**.

6.2 Livestock Grazing

Periodic livestock (e.g. sheep) grazing may occur within Zones A and B. Sustainable livestock grazing within this zone would require ongoing protection of soils from erosion (i.e. landform stability). In the absence of trees and shrubs, landform stability will be controlled by the integrity of the groundcover layer (i.e. vegetation < 1 m high). To protect against rain splash damage in a livestock grazed environment, it is proposed to maintain a grassy herbaceous groundcover stratum of no less than 30% cover at any time with mean vegetation cover being at least 50 % cover. This performance measure falls within the natural range of groundcover vegetation cover and considers the absence of leaf litter and shrubs, which are important factors in minimising rain splash damage and associated incidence of sheet erosion. If livestock are used to reduce groundcover in Zone A, it is imperative that they are excluded from Zone C using appropriate fencing, such as a temporary electric fence.

6.3 Restoration of Temporary Disturbance Areas

Rehabilitation and revegetation activities of temporary disturbance areas will ensure they are safe, stable and non-polluting, and will reduce the area of exposed soil. The objectives of rehabilitation are to establish a low maintenance but effective groundcover to protect the soil and minimise the potential for erosion; and minimise the conditions that could facilitate weed establishment and infestation.

Rehabilitation will be undertaken in all areas that are not required to be maintained for the Operational phase of the project. Temporary disturbance areas may include:

- Construction laydown areas;
- Temporary construction compounds;
- Drainage areas;
- Underground infrastructure trenches;
- Access road verges; and
- Batters and areas of cuts and fills.

Construction works may involve stripping of topsoil in limited areas for the purposes of road construction and to flatten the site prior to installation of the solar array and associated infrastructure. Following construction activities, groundcover will be re-established in stripped areas. Soil preparation and groundcover re-establishment for these areas are outlined below.

6.3.1 Topsoil Preparation

Where practical, shallow ripping should be undertaken from 50 to 100 mm in depth. Multiple passes may be required depending on the equipment being used. The final surface should be presented in a roughened state to reduce runoff and provide furrows for seeds to wash into, and then be covered by soil for germination. Topsoil removed for permanent construction activities (as discussed in **Section 6.3**) should be appropriately stockpiled on site and used in areas subject to rehabilitation such as this. Sediment fencing is to be installed where required to minimise erosion and should be left in situ until vegetation has re-established.

6.3.2 Seed Broadcasting

Where required, seeds can be broadcast or applied with hydromulch. Recommended seeds include a mix of native grasses found within the Management Area, such as *Microlaena stipoides* (Weeping Grass), *Dichanthium sericeum* (Queensland Bluegrass), *Heteropogon contortus* (Black spear grass) and *Themeda triandra* (Kangaroo Grass).

The groundcover will be kept free of weeds by implementing the measures described in **Section 6.5**. In areas where no groundcover has been removed no groundcover restoration is required, provided that ongoing maintenance allows for natural regeneration. During periods of extended drought, topsoil preparation and seed broadcasting will not commence until conditions are more seasonally favourable. This will be assessed during regular monitoring periods as outlined in **Section 6.6**.

6.3.3 Stockpiling

Stockpiled material is to be restricted to the Zone A to avoid impacts on waterways and the floodplain (**Figure 4**). Stockpiled material should be used as soon as practicable to ensure the microbes remain viable.

6.4 Reuse of Vegetative and Soil Resources

Felled vegetation with hollows is to be collected and placed into adjacent suitable habitat outside the development footprint. Where practical, non hollow-bearing vegetation will be mulched and stockpiled or relocated for re-use. Salvaged topsoil and any mulched vegetation will be stored for short periods of time and utilised during groundcover restoration efforts to stabilise bare ground and prevent erosion.

6.5 Weed Management Plan

Weed removal shall target any species likely to significantly invade bushland, prevent natural regeneration, or impede native seedling growth. During the initial primary weed control phase, priority shall be given to areas where Weeds of National Significance (WoNS) and/or Restricted Invasive Plants occur. Weed removal techniques should be appropriate to the weed type, growth form, and ecology. Wherever possible, weed removal should be carried out prior to annual seed set.

It is generally not possible to remove a weed from a site on a single occasion, as many weeds have a persistent seed bank that can remain viable for long periods of time. Seeds may germinate rapidly after the parent plant has been removed due to increases in light and habitat availability. Therefore, a secondary consolidation phase of weed control will be undertaken, which will involve control of minor infestations and revisiting the primary control phase sites for follow-up weeding. This is likely to consist of spraying with herbicide (in areas not in the vicinity of a water body) or removal by hand, as any weeds present will generally be small and easily eradicated. Minimal weed cover should be evident at the completion of this stage. Preventative measures and an ongoing maintenance phase control program will be undertaken to ensure this remains the case.

Minimising or active control of the spread of weeds as part of an integrated strategy will ameliorate the movement of weeds within the Management Zones and surrounds. Weeds that bypass these strategies or naturally disperse into retained remnant vegetation (i.e. Non-operation zone) will be controlled as part of the maintenance phase.

6.5.1 WoNS and Priority Weeds

Table 6 details the duties required for weed species referred to under the *Biosecurity Act* 2014 that occur within the Management Area.

Table 6 Weed Biosecurity Duties

Weed	Site	WoNS	Biosecurity Act status	Gympie Region Council (2018)	Duty
Opuntia stricta Prickly Pear	Site 1 Site 2b	Yes	Restricted Invasive Plant	Restricted 3; Asset Protection; Risk Score 76	• The Act requires that all sightings to be reported to Biosecurity Queensland within 24 hours. • By law, everyone has a general biosecurity obligation (GBO) to take all reasonable and practical steps to minimise the risk of it spreading until they receive advice from an authorised officer; • Individuals and organisations whose activities pose a biosecurity risk must: – take all reasonable and practical steps to prevent or minimise each biosecurity risk; – minimise the likelihood of causing a 'biosecurity event', and limit the consequences if such an event is caused; and – prevent or minimise the harmful effects a risk could have, and not do anything that might make any harmful effects worse. • GRBP goal for landholders: – Landholders implementing best practice activities to reduce the impact of invasive plants and animals; and – Landholders throughout the region have the capacity and commitment to manage widespread invasive species.
Parthenium hysterophorus Parthenium	Site 2b	Yes	Restricted Invasive Plant	Restricted 3; Asset Protection; Risk Score 205	
Sporobolus jacquemontii American rat's tail grass	Site 2b	No	Restricted Invasive Plant	Restricted 3; Asset Protection; Risk Score 148	
Lantana camera Lantana	Site 1 Site 2b	Yes	Prohibited Invasive Plant	Restricted 3; Asset Protection; Risk Score 38	

6.5.2 Weed Control Methods

Weed control requires an integrated approach and a single method of treatment should not be relied upon. Bush regeneration principles (Bradley 2006) designed for use in bushland settings, in combination with designated plantings, should be employed. The systematic removal of weeds will allow native plants to establish themselves naturally (Buchanan 1989) in designated regeneration areas.

The Bradley Method of bush regeneration employs four basic principles:

1. Work outwards from good bush areas towards areas of weed;
2. Make minimal disturbance to the environment;
3. Weed control will involve primary, consolidation and long-term maintenance; and
4. Do not over-clear; where possible let native plant regeneration dictate the rate of weed removal.

Manual removal of herbaceous weeds, regrowth and seedlings is preferred where practicable, with minimal disturbance to soil stability and existing native species. Ecologically sensitive areas where weeds are removed manually should be stabilised or planted within 24 hrs or prior to forecast rainfall events. Removal work will be undertaken outside the seeding period of weeds, especially those weeds that produce large quantities of seed. If any work is undertaken within these periods, seed will be collected, bagged and disposed of off-site, ensuring that no seed remains.

6.5.3 Herbicide Use

Chemical removal is only considered appropriate for larger weeds and areas of large infestation or in areas containing few natives. Regarding larger woody weed species and infestations, felling and digging up the roots can be dangerous, expensive, time consuming and could potentially increase erosion. Where practical the application of herbicides should only be carried out by qualified personnel and the use of chemicals should be kept to a minimum. Care should also be taken when implementing chemical spraying techniques near waterways, environmentally sensitive areas and non-target plant species.

The use of more environmentally friendly herbicides such as “Roundup Biactive ®” should be adopted when working within or adjacent to riparian areas. Herbicides should not be applied immediately prior to rain occurring. This reduces the effectiveness of the herbicide and poses the risk that the herbicide could be transported by runoff into local creek lines and waterways.

Herbicide use has the advantage of reduced management effort (i.e. cost) compared to physical removal, particularly for large areas or large infestations of weeds. In this respect, it is considered that the use of herbicides is warranted in the following circumstances:

- There are small areas of dense weeds with few or no native plants to protect;
- There are large areas of weeds;
- The weeds are growing too rapidly for physical removal; and
- The receiving environment is tolerant of herbicide applications with respect to indirect impacts on non-target species such as threatened plant species.

It is important to plan herbicide control of target species according to a weeding calendar that recognises the weed's life form and seasonality (i.e. flowering, fruiting and seed set).

Herbicide application associated with the implementation of this BMP shall be limited to the following techniques. Always remember to read the product label and any relevant permit before using any herbicide.

- Cut-stump and poison (cut and dab);
- Stem injection;
- Stem-scrape or frilling and poison;
- Basal bark painting; and
- Selective spot-spraying (suitable for herbaceous weeds, grasses and saplings of woody weeds).

Annual weed monitoring will be undertaken during construction and operation. This will involve of traverses on foot by a suitably qualified person, across retained vegetation zones and groundcover re-establishment zones, as well as opportunistic observations.

All herbicides and pesticides must be used in accordance with the requirements on the label. Any person undertaking pesticide (including herbicide) application must be trained to do so and have the proper certificate of completion/competency or statement of attainment issued by a registered training organisation.

6.5.4 Weed hygiene

All tracked vehicles/plant/equipment must be made free of soil, seed and plant material prior to entering the Project Area and on leaving the site – this will be managed as follows:

- An initial vehicle inspection will include a check for weeds and seeds on the vehicle;
- Public roads will be inspected weekly for tracked soil and will be removed as required;
- Vehicles and equipment shall remain on existing roads and defined site access tracks where possible; and
- Parking will be restricted to designated areas. These areas will be communicated at the induction.

All imported fill must have certification that demonstrates that the material is weed free.

6.5.5 Significant weed outbreaks

Uncontrolled weed outbreaks are to be managed by a qualified bush regeneration contractor following Department of Agriculture and Fisheries weed eradication programs and control methods (DAF 2020).

6.6 Vegetation Monitoring

Monitoring will be used to determine whether management actions outlined in this BMP are achieving performance criteria; hence trending towards the performance measures/ completion criteria (refer to **Table 7**). Three methods are to be used to evaluate performance as listed below:

- Point intercept method;
- Photo monitoring; and
- Camera trapping for pest fauna species.

6.6.1 Point Intercept Method

The BioMetric method (Gibbons et al. 2009) is the basis for calculating the percent cover of native and exotic plants. Monitoring transects used for this purpose are shown in **Figure 4** (i.e. 50 m length placed along contour).

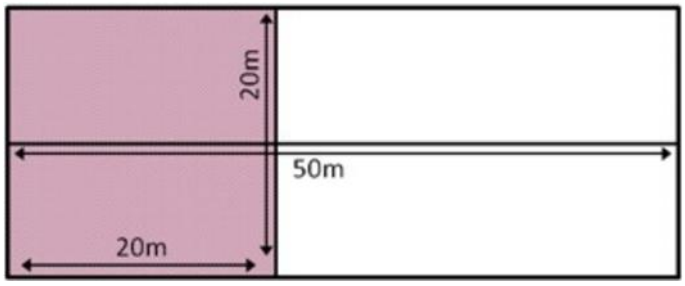

Figure 4 BioMetric Plot

Data to be recorded at each 1 m interval along the 50 m transect includes:

- Native plant cover in the overstorey (i.e. woody plants with > 10 m height) and midstorey (i.e. woody plants with 1-10 m height);
- Native plant species observed (i.e. one or more) in the groundcover stratum (i.e. < 1 m height);
- Counts for native groundcover 'grasses', shrubs' and 'other' to generate a percent cover statistic;
- Presence of exotic flora in any vegetation stratum (including species name); and
- Total native plant species richness is to be recorded within a 400 m^2 area (i.e. 4 m either side of the transect).

Data generated from post construction monitoring will be compared with benchmarks described in **Table 7**. Compliance with performance targets and completion criteria is to be determined from this comparison.

Two fixed monitoring points will be installed within the Zone C. A minimum of five randomly selected biometric transects to measure groundcover conditions (i.e. % grassiness and exotic flora) and record weed species incidence is to be performed within Zone A. The location of these monitoring sites is to be determined during the first monitoring event (see **Section 6.6.3**).

6.6.2 Photo Monitoring

The progressive photo monitoring will provide an indication of the success or failure of any areas of rehabilitation conducted in accordance with this BMP. They will enable contractors to adjust rehabilitation works accordingly to enhance the quality of retained vegetation further and provide required information for ongoing monitoring reports.

Photo monitoring will be performed for review of weed cover during scheduled monitoring works. Photos supplied are to be date stamped together with location (GPS) and bearing for central view in photo. The purpose of the photo is to be provided (e.g. removal of Lantana, ground cover monitoring in Zone A).

6.6.3 Monitoring Locations

Monitoring locations and pre-construction conditions for the Project Area are to be quantified prior to the start of construction works using the monitoring methods specified in **Section 6.6.1**. The monitoring locations and results are to be reported as part of the inaugural monitoring report, which is to be a key reference for future monitoring and performance management. This BMP may also be reviewed, as indicated in **Section 8.2**, for the purposes of updating the monitoring locations and pre-construction environmental conditions.

6.6.4 Monitoring frequency

The frequency of monitoring events is specified in the last column of **Table 7**.

6.6.5 Reporting

Records will be kept in order to document the dates, methods and outcomes of the management and monitoring measures to be implemented relevant to this BMP. Records of all environmental activities will be maintained by the proponent to demonstrate compliance with this BMP and the conditions of the Development Consent. The monitoring measures described in **Table 7** will be implemented and reported biannually for the first year from the commencement of construction, then annually thereafter.

A report will be submitted to Council within 12 months of construction and annually for a period of three years thereafter. These reports will assess the efficacy of the management measures implemented against the relevant performance criteria in **Table 7**. If performance criteria have been achieved after the four-year reporting period, no further reporting will be undertaken. If completion criteria are not met, recommendations may be made to continue implementing management measures and monitoring requirements until completion criteria are met.

7 IMPLEMENTATION

Table 7 summarises the management objectives, performance criteria and corrective actions, responsible party and a timeframe for their implementation.

Records will be kept in order to document the dates, methods and outcomes of the management and monitoring measures to be implemented relevant to this BMP to demonstrate compliance.

Table 7 Management Measures and Implementation

Management objective	Actions ID	Actions Description	Applicable Zone	Responsibility	Performance measure/ Completion criteria	Trigger for correction	Corrective actions	Monitoring frequency
Protect remnant native vegetation and habitat outside the approved disturbance areas	B1	Install temporary fencing prior to construction to demarcate remnant vegetation and waterbodies using flagging, bunting, parawebbing or similar, as a no-go zone. Maintain for the duration of construction.	Zone C	Engineering, Procurement and Construction (EPC) Contactor (during construction)	Temporary fencing in good working order and prevents unauthorised impacts on Zone C	Fencing fails to exclude unauthorised activity.	Restore fencing failures. Investigate damage and rectify. Conduct refresher staff inductions.	Weekly during construction
	B2	Install permanent security fence to exclude livestock and unauthorised access to remnant vegetation in Zone C for the duration of operation.	Zones A Zone C	EPC Contactor (during construction) O&M Contractor (during operation)	Permanent fencing in good working order and prevents livestock intrusion/ unauthorised impacts on Zone C	Livestock or unauthorised activity detected within Zone C	Restore fencing failures. Remove livestock. Investigate damage and rectify. Conduct refresher staff inductions.	Weekly during operation
	B3	Incorporate no-go zones and sensitive environmental areas in the site induction	N/A	EPC Contractor (during construction)	Unauthorised impacts avoided	Staff repeatedly perform unauthorised activities in protected areas	Amend site induction material and perform refresher inductions	Each time the site induction material is updated
	B4	Stockpiled material is to be restricted to Zone A. Use sediment and erosion measures to contain impacts.	Zone A	EPC Contractor (during construction)	No adverse impacts on adjoining lands by stock piling	Stockpiled material escapes Zone A	Relocate or stabilise stockpile and/ or Reinstate sediment and control measures	Weekly during construction

	B5	Control weed outbreaks in accordance with the Weed Management Plan (**Section 6.5** of this BMP) Listed Biosecurity weeds are managed in accordance with Biosecurity duties (see **Table 6**)	Zone C	EPC Contactor (during construction) O&M Contractor (during operation)	Biosecurity weeds not listed in Table 7 are found within Zone C Known Biosecurity weeds listed in Table 7 are managed and maintained to < 5% cover	New Biosecurity listed weeds identified within Zone C Listed Biosecurity weeds exceed 5% cover	Conduct weed control in accordance with the Weed Management Plan (**Section 6.5** of this BMP). Where required, consult with Council to initiate broader control measures.	Twice yearly during construction and operation (spring and autumn)
Manage remnant vegetation and fauna habitat within the Project Area	B6	Control and monitoring of feral pests in accordance with **Section 5.5.3** and **Section 5.6** of this BMP. As required in response to annual monitoring and identified corrective actions.	Zone C	O&M Contractor (during operation)	Feral pests are maintained at or below baseline conditions	Feral pests rise above baseline levels.	Control feral pests in accordance with **Section 5.5.3** and **Section 5.6** of this BMP. Where required, consult with Council to initiate broader control measures.	Twice yearly during construction and operation (spring and autumn) Monitoring undertaken annually
	B7	Livestock grazing. Exclude livestock from Zone C using appropriate fencing, such as temporary electric fence.	Zone A	O&M Contractor (during operation)	Livestock restricted to Zone A and groundcover condition remains above 30% vegetated cover	Livestock found within exclusion area (i.e. Zone C) and/ or groundcover vegetation < 30% cover	Remove/ relocate livestock to approved grazing precincts. Investigate and rectify damage to Zone C. Revegetated ground surfaces to 50% or greater vegetation cover.	Monthly during operation
	B8	Maintain grassy groundcover through rotational grazing, regular seeding and grazing exclusion during drought conditions	Zone A	O&M Contractor (during operation)	Protect soils from erosion by maintaining a mean annual vegetation cover of 50% in the groundcover	Groundcover falls below 30% vegetated groundcover in any given month	Remove livestock, revegetate with seeding to restore vegetation cover to 50% or more and refrain from future livestock grazing.	Monthly during operation
	B9	Undertake annual monitoring of vegetation in accordance with VMP in **Section 6.6**.	Zone A Zone C	O&M Contractor (during operation)	Ensure goals of BMP are achieved.	Allocate monitoring locations upon first effort. Adjust if new areas of concern arise that need monitoring.	If BMP is failing to achieve goals, mitigation measures can be revised in accordance with **Section 8.2**.	Biannually for the first year from the commencement of construction,

								then annually thereafter
Minimising impacts to fauna within the Project Area	B10	Security fence must not have three-strand barbed wire (barbed wire is avoided where possible).	Zone A	EPC Contactor (during construction)	Fence design excludes the use of three-strand barbed wire	Barbed wire is detected as a fencing material	Remove and replace barbed wire with appropriate material.	Construction
	B11	Implement fauna management protocols as per **Section 5** of this BMP.	Zone A	EPC Contactor and engaged ecologist (during construction)	No injury or death to fauna	Fauna death or injury occurs	Seek veterinarian assistance if required. Review fauna management protocol (**Section 5**) and revise of shortfalls identified.	During vegetation clearing activities.
	B12	Where practicable, remove hollow-bearing tree between March and August to avoid the main breeding season. (If not practicable to undertake clearing of hollow-bearing trees from between March and August, an assessment of fauna habitat will be made prior to clearing. Where and when hollows are identified as likely to contain eggs/chicks, they will be removed by a suitably qualified arborist / ecologist prior to felling.)	Zone A	EPC Contactor and engaged ecologist (during construction)	Hollow-bearing tree removal occurs only between March and August (if practicable)	Removal occurs outside specified timeframe	Stop work in the area of the unauthorised tree clearing activities and report incident immediately to Council/DoES.	During vegetation clearing activities.
	B13	One nest box should be installed in Zone C to compensate for the loss of each HBT removed (i.e. an offset ratio of 1:1).	Zone C	EPC Contactor and engaged ecologist (during construction)	Checking to ensure nest boxes still present and functioning.	Nest box fallen or broken	Salvage nest box and reinstall. If unsalvageable, install a new nest box.	Annual monitoring of nest box functionality
	B14	Undertake monitoring of Wetland Bird mortality.	Zone A	O&M Contractor (during operation)	No wetland bird mortality due to lake effect.	If wetland bird mortality is considered more than negligible	Adopt adaptive management measures to reduce impacts of lake effect.	Monthly during the first year of operation Monitoring frequency to be re-evaluated based on

								monitoring results.
	B15	Undertake monitoring of fauna mortality due to barbed wire used along fence line (if barbed wire is used).	Zone A	O&M Contractor (during operation)	No fauna mortality due to barbed wire.	If fauna mortality is considered more than negligible	Remove and replace barbed wire with appropriate material.	Monthly during the first year of operation Monitoring frequency to be re-evaluated based on monitoring results.
Rehabilitate and revegetate temporary disturbance areas to protect soil and minimise erosion	B16	Undertake rehabilitation and revegetation in accordance with **Section 6.3** of this BMP at temporary disturbance areas where groundcover has been removed or chronically disturbed.	Zone A	EPC Contractor (during construction) O&M Contractor (during operation)	Following completion of construction	Successful perennial groundcover re-establishment within 12 months of completion of construction	Consult and ecologist or agronomist to identify appropriate corrective actions	Monthly during the first year of operation Monitoring frequency to be re-evaluated based on monitoring results.
	B17	Where appropriate and practical, salvaged topsoil and any mulched vegetation will be utilised during groundcover restoration.	Zone A Zone C	EPC Contractor (during construction)	Construction	No unnecessary offsite disposal of spoil or mulch	Amend rehabilitation method to include the reuse of salvaged material.	During construction, and prior to seed application
Maximise the salvage of vegetative and soil resources within the approved disturbance area	B18	Felled timber with hollows is to be collected and placed into the remnant woodland or used as instead of nest boxes in Zone C (see B13)	Zone A Zone C	EPC Contactor (during construction)	Construction	No mulching of felled timber with hollows	Consider installing two nest boxes in Zone C to further compensate loss of each hollow.	During vegetation clearing
	B19	Retain topsoil where possible	Zone A	EPC Contactor (during construction)	During construction	Topsoil is not unnecessarily being stripped	Amend construction method to avoid unnecessary topsoil stripping.	Weekly during construction

1. If not practicable to undertake clearing of hollow-bearing trees from between March and August, an assessment of fauna habitat must be made prior to clearing. Where and when hollows are identified as likely to contain eggs/chicks, they are to be removed by a suitably qualified arborist / ecologist prior to removal.

8 ROLES, RESPONSIBILITIES AND REVIEW

8.1 Responsibilities

The owner of the Project (referred to as the 'Project Owner') has ultimate responsibility and accountability to ensure that the Project is designed, built, operated, upgraded and decommissioned in accordance with the Development Consent including this BMP (**Figure 5**). However, all actions to achieve compliance with the Development Consent and this BMP will be undertaken by the EPC contractor during construction, and O&M contractor during operation, at the timings indicated in **Table 7**.

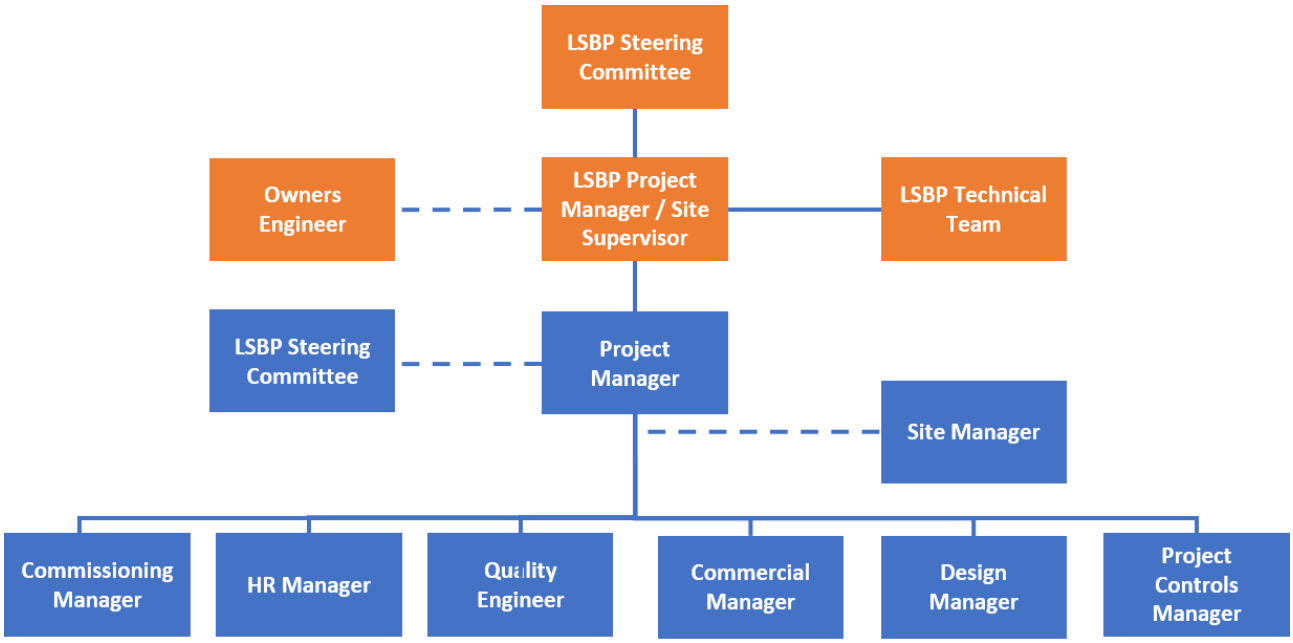

Figure 5 Chain of command

8.2 BMP review

A review of this BMP may be initiated by the following reasons:

- Completion of the first monitoring event to document monitoring locations and condition of the management area prior to construction;
- On completion of construction (O&M Contractor);
- Five yearly following the start of operations;
- In response to the occurrence of an incident (e.g. significant mortality of wetland birds; see **Section 5.7**); or
- Modification to the conditions of the Development Consent.

Any revisions to this BMP must be approved by Council.

8.3 Project inductions

Key elements of this BMP should be communicated to all on-site personnel during the site induction for construction and operation phases. In particular, the following key elements should be communicated as relevant to the construction or operation phases:

- Vegetation approved to be disturbed;
- Vegetation to be retained, no-go zones and other sensitive environmental areas to be aware of;
- Fauna management protocols; and
- Stockpile management.

Records of site inductions will be maintained by the EPC and O&M Contractors.

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