BIODIVERSITY MANAGEMENT PLAN

Wollar Solar Farm

July 2024

Project Number: 22-169

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ACRONYMS AND ABBREVIATIONS

AC	Alternating Current
AS	Australian Standard
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCD	*Biodiversity Conservation Division (part of DPIE)*
Biosecurity Act	*Biosecurity Act 2015* (NSW)
BMP	Biodiversity Management Plan
CCP	Community Consultation Plan
CEEC	Critically Endangered Ecological Community
CoC	Conditions of Consent
Cwth	Commonwealth
DECCW	Refer to OEH
DPE	(NSW) Department of Planning and Environment, formerly Department of Planning, Industry and Environment (incorporates BCD formerly known as OEH)
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EIS	Environmental Impact Statement
EMS	Environmental Management Strategy
EPC	Engineering, Procurement' and Construction
EPBC Act	(Cwth) *Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	(NSW) *Environmental Planning and Assessment Act 1979*
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statements
FM Act	(NSW) *Fisheries Management Act 1994*
GCMP	Groundcover Management Plan
ha	hectares
HBT	Hollow Bearing Tree
HSEQ	Health, Safety, Environment and Quality Control
km	kilometres
kV	kilovolt
LEP	Local Environment Plan
LGA	Local Government Area

m	Metres
MW	Megawatt
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
PCT	Plant Community Type
PV	photovoltaic
SSD	State Significant Development
TARP	Trigger, Action Response Plan
TEC	Threatened Ecological Community
TIA	Traffic Impact Assessment

1. INTRODUCTION

1.1. CONTEXT

Wollar Solar Farm received planning approval on 24 February 2020 for the construction and operation of a 290-megawatt (MW) capacity alternating current (AC) photovoltaic (PV) solar farm ('the Project'). The Wollar Solar Farm proposal would be located on a rural property approximately 7 kilometres (km) south of Wollar village. The general layout of the development is shown in Figure 1-1.

The construction period of the solar farm will last for 12 to 18 months from the commencement of site establishment work. Construction hours will generally be limited to Monday to Friday 7am to 6pm, and Saturday 8am to 1pm in accordance with the Conditions of Consent. Works are not permitted Sundays and NSW Public Holidays. Night works are not anticipated.

This Biodiversity Management Plan (BMP) describes how flora and fauna impacts will be managed across the lifespan of the Project. The BMP describes anticipated hazards during flora and fauna management and mitigation measures to identify and manage potential impacts that may occur during Project works. The BMP has been prepared using the *Draft Post Approval Guideline for Environmental Management Plans* (DPIE 2018) as a guide in its preparation. Additionally, this plan considers legislation, policies and guidelines applicable to biodiversity management.

1.2. PURPOSE AND OBJECTIVES

The purpose of this Plan is to address the requirements for biodiversity impact mitigation and management listed in the:

- EIS (NGH Environmental, 2019)
- Amendment Report (NGH Environmental, 2019)
- Submissions Report (NGH Environmental, 2020)
- Modification Report 2 (Mod 2) (DPIE, 2020)
- Modification Report 3 (Mod 3) (NGH Consulting, 2022)
- The Conditions of Consent (CoC) from the New South Wales, Minister for Planning and Public Spaces. Revised post approval of Mod 3, 23rd August 2022
- Approval from Commonwealth Environment Approvals and wildlife Trade Branch

Modification Report 1 (Mod 1) was prepared, withdrawn and then re-submitted as Mod 2. Therefore, Mod 1 has been superseded.

The key objective of the BMP is to ensure that all avoidance, mitigation and management measures relevant to the protection of native flora and fauna, including threatened species and threatened ecological communities, referred to in the environmental assessment documents and relevant permits and approvals are addressed. To achieve this objective, the following will be undertaken:

- Identify the key biodiversity issues that require control measures
- Develop strategies to manage impacts on biodiversity and implementing those strategies and provide the necessary details, timeframes and responsibilities for implementing those strategies
- Assigning responsibilities for impact monitoring and management
- Providing sufficient information to assist with auditing the implementation of the BMP
- Establishing a biodiversity monitoring program and management measures to evaluate and report against performance criteria

- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 7 of this plan.

This BMP applies specifically to proposed activities carried out within the Project area. Some management measures are only applicable during the construction period, while others continue throughout operation, as summarised in

Table 1-1.

Table 1-1 Timeframe of environmental management measures.

Construction	Operation
Ground disturbance	N/A
Vegetation clearance	N/A
Re-use of resources protocol	N/A
Unplanned Threatened Species Finds	
Weed and Pest Management	
Vehicle Hygiene	
Vegetation Constraint Management	
Groundcover Management	

1.3. THE PROJECT

1.3.1. Development Staging

The Development will be staged, with public road upgrades as described by CoC Schedule 3 Condition 8 to occur as Stage 1 prior to any construction being undertaken for the Solar Farm. This BMP applies to stages 1, 2, 3a and 3b of construction, with consideration of stage 4:

- Stage 1 – Road upgrades/maintenance works on Barigan Road as required for use of the Northern Access is complete.
- Stage 2 – Construction of the Northern Access between Barigan Road and the Solar Farm site is complete.
- Stage 3a – Construction of the substation is complete.
- Stage 3b – Construction of the main Solar Farm including piled foundations, solar panels and ancillary infrastructure is in progress.
- Stage 4 - Road upgrades/maintenance works on Barigan Road and Maree Road as required for the Southern Access Option. Note that this stage is not expected to be undertaken for the project. References to Stage 4 actions have therefore been removed except in Table 2-1 and figures.

The stages are shown in Figure 1-2.

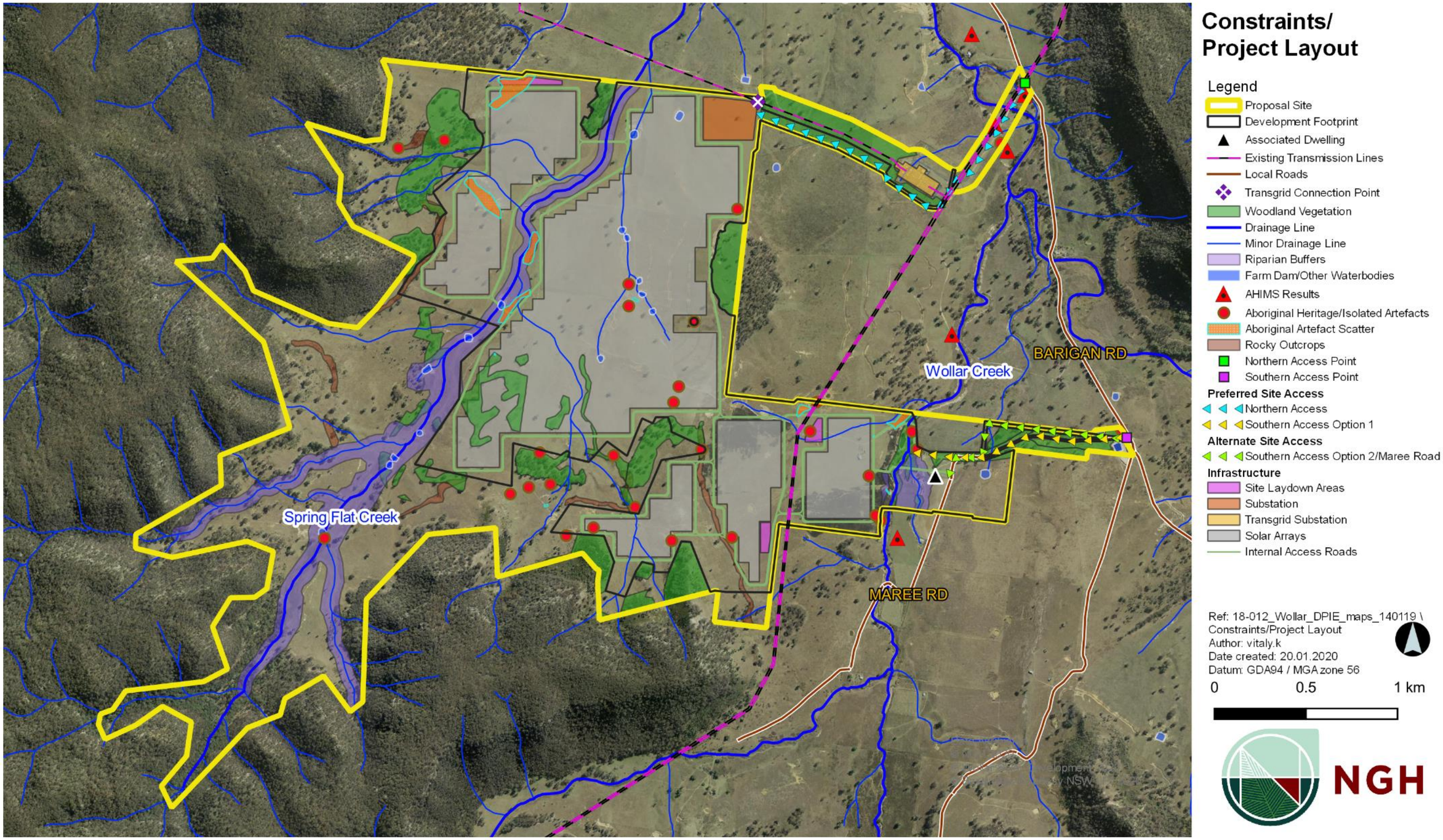
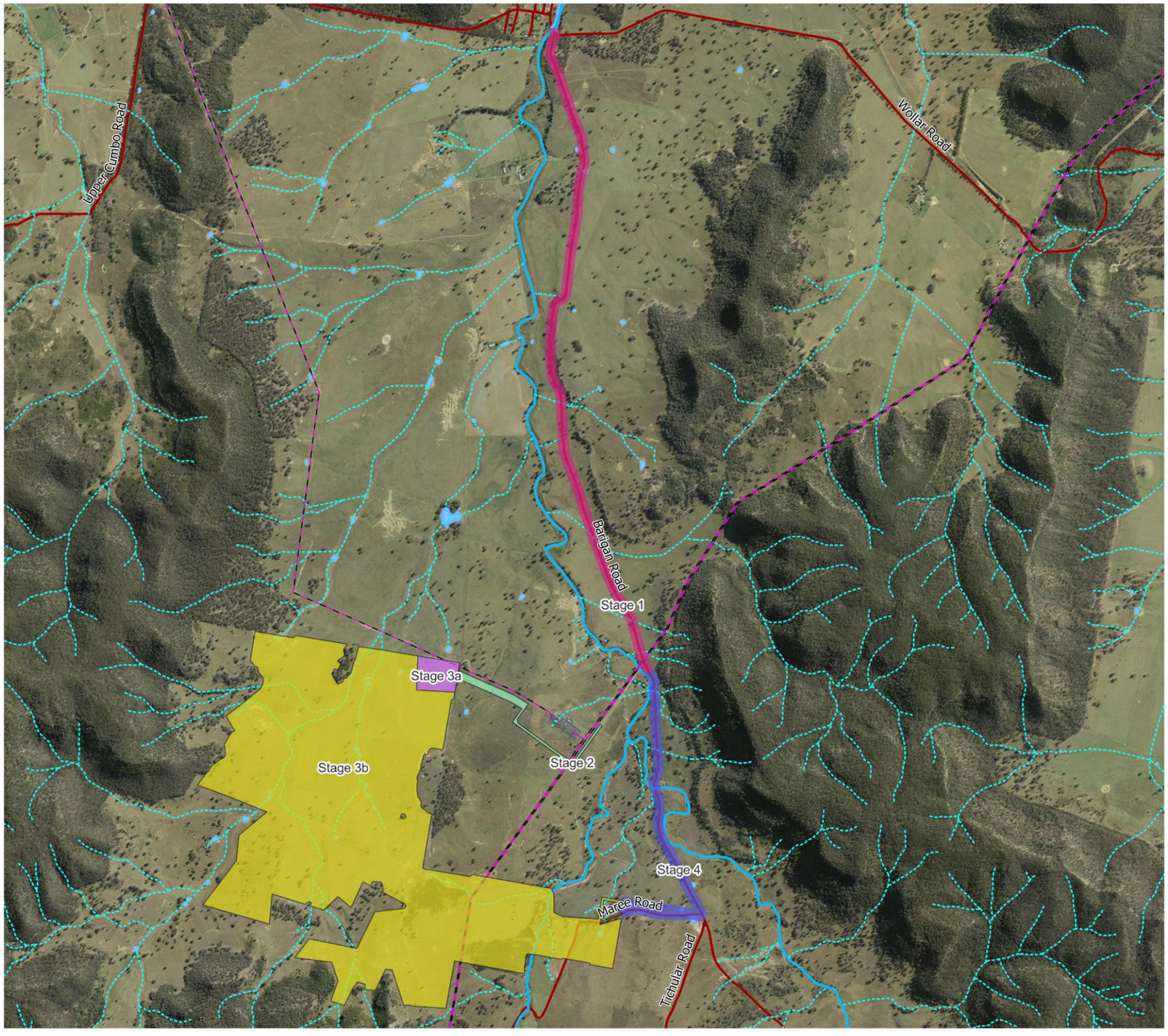


Figure 1-1 General layout of development



EMP Project staging

Legend

Project footprint (stages)
- 1
- 2
- 4
- 3a
- 3b

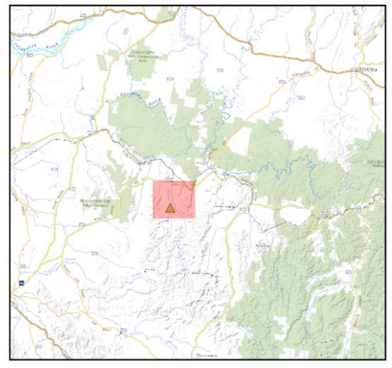
Transmission lines

Roads

Waterway
- Perennial
- Non perennial

Farm dam/other water body

LGA: Mid-Western Regional
CMA: Hunter Central Rivers
IBRA Bioregion: Sydney Basin (SB)
IBRA Subregion: Kerrabee (SB01) and Wollemi (SB04)



0 1,000 2,000 m

Ref: 20-179 MOD1 and BDAR 20200406 \ EMP
Project staging
Author: kyle.m
Date created: 12.08.2022
Datum: GDA94 / MGA zone 55

NGH

Figure 1-2 Project Stages: 1-4

1.3.2. Revised layout and impacts following modification application

NGH prepared a modification application pursuant to section 4.55(1A) of the *Environmental Planning and Assessment Act 1979* (NGH Pty Ltd, 2020), approved on the 12 November 2020, to relocate a section of the main site access route which traverses the TransGrid substation lot (Stage 2 on Figure 1-2), allow for subdivision of land within the solar farm site for TransGrid electrical connection infrastructure and to increase the number of over-dimensional vehicle movements from two movements during construction, maintenance and decommissioning, to five movements during construction, maintenance and decommissioning.

The relocation of a section of the main site access route would result in a net increase in impact area of 0.3 hectares. The modified site access route would increase the area of native vegetation cleared by 0.32 ha. This is a larger area than the net change in footprint as the modified footprint includes proportionally more native vegetation than the consented footprint (that is being excised). A small change to the consented offset obligation also resulted.

Allowance for subdivision of Lot 106 DP 755430 and Lot 80 DP 755430, and the increase of over-dimensional vehicles would not have any additional impacts on biodiversity.

The proposed change in project footprint is shown Figure 1-3, Figure 1-4 and Figure 1-5.

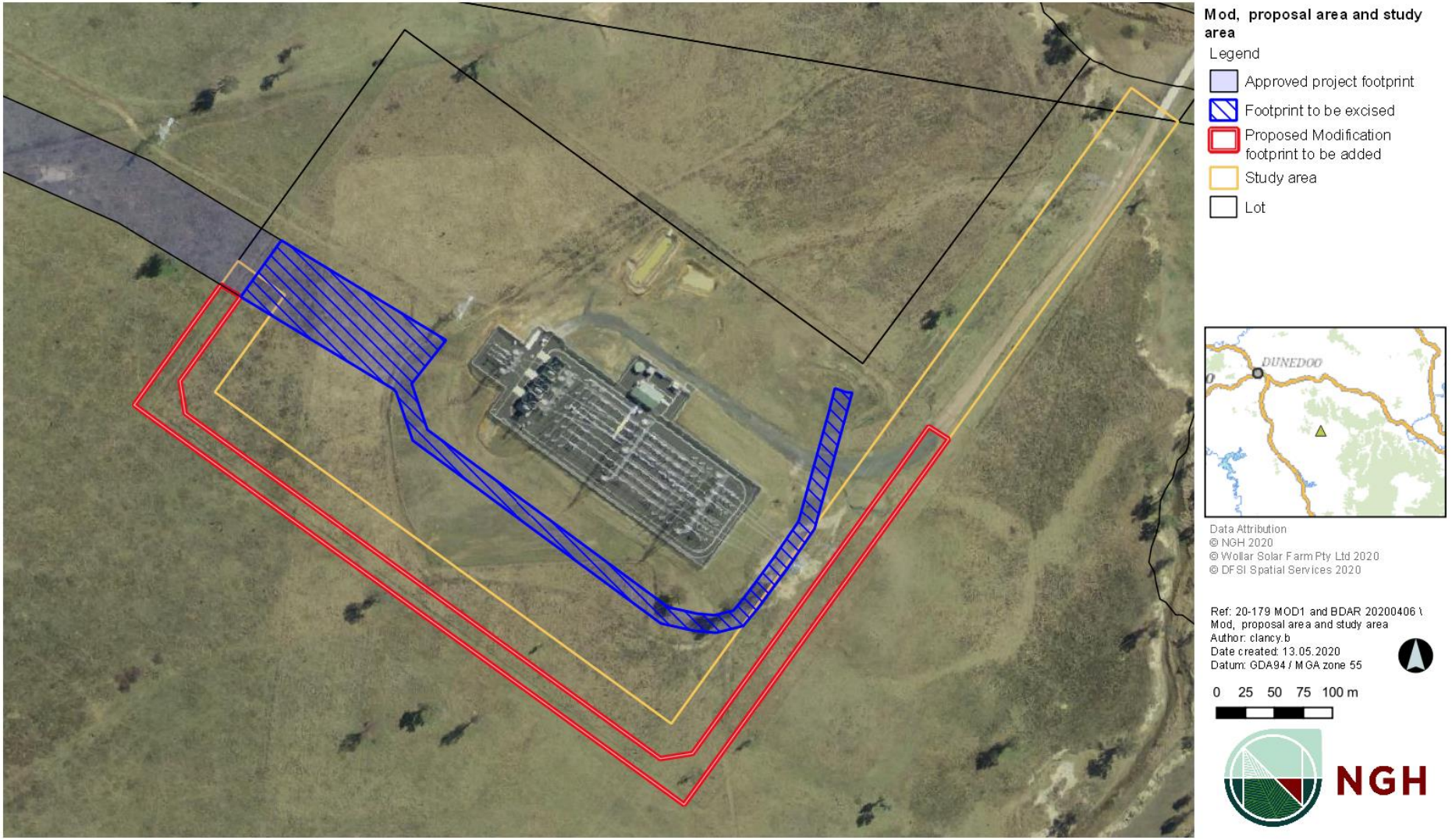


Figure 1-3 Areas to be excised (in blue) and added (in red) for the modification

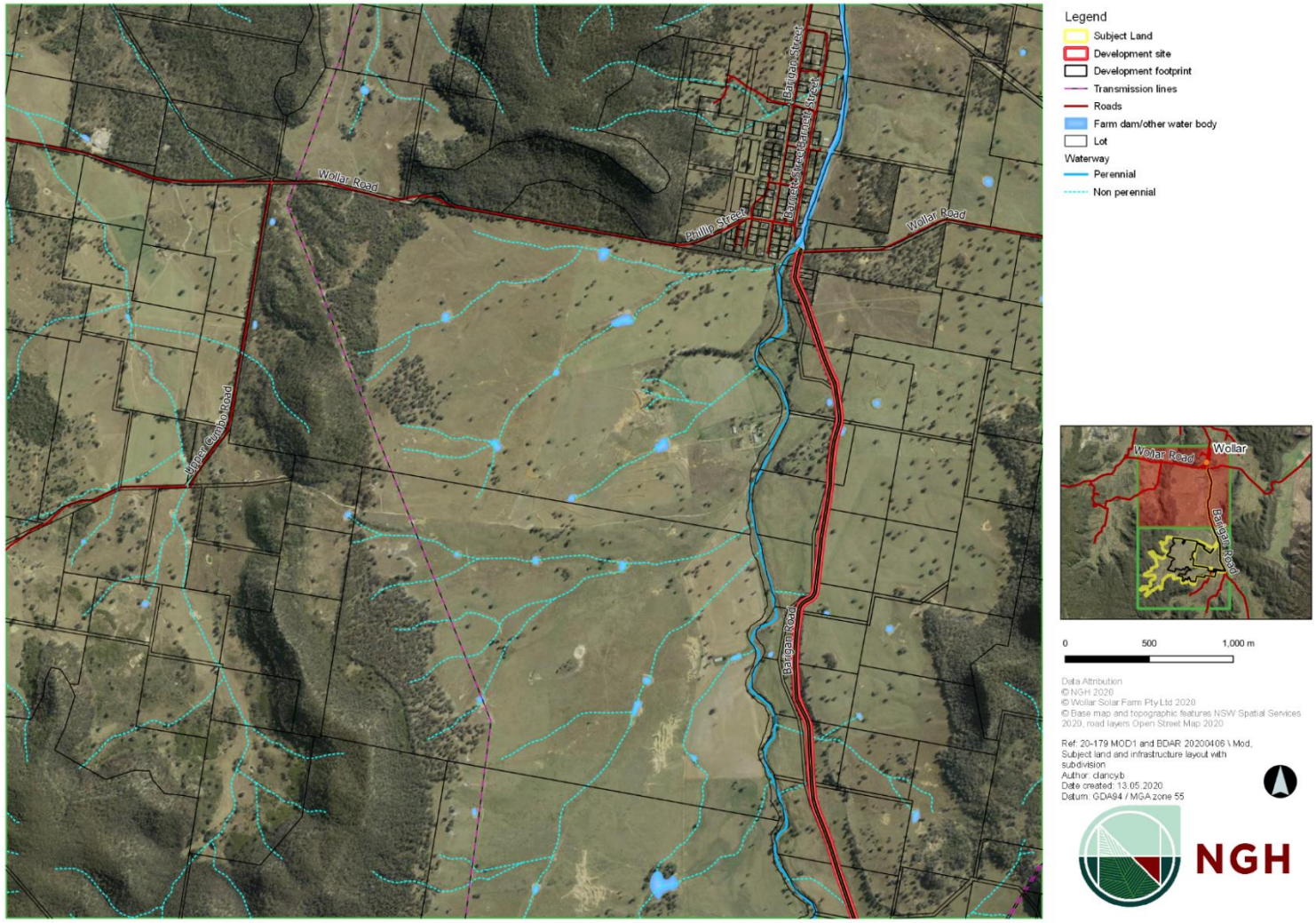


Figure 1-4 Modified general layout (map 1 of 2)

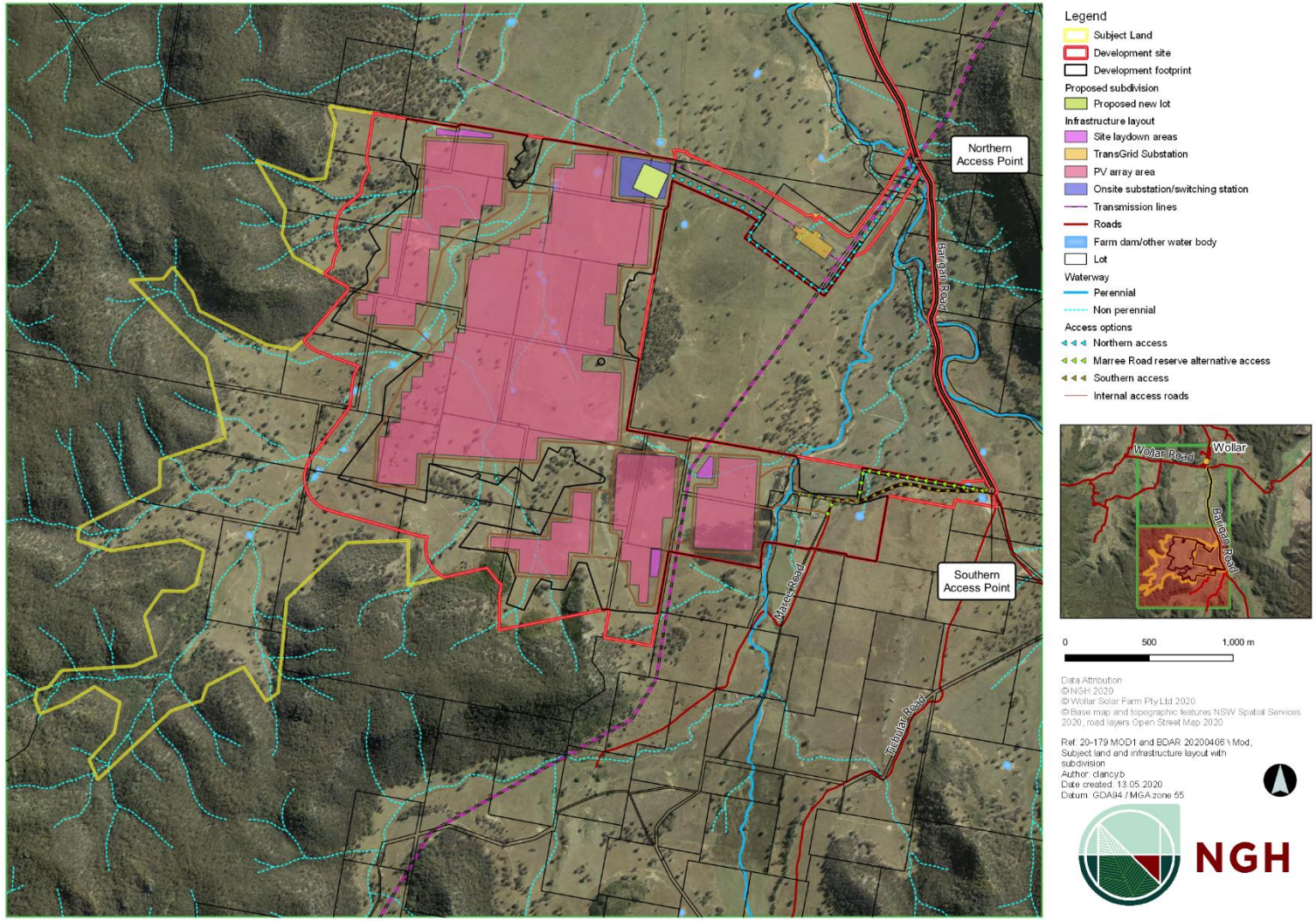


Figure 1-5 Modified general layout (map 2 of 2)

1.4. ENVIRONMENTAL MANAGEMENT SYSTEMS OVERVIEW

The BMP is part of the Project's overall Environmental Management Strategy (EMS). Mitigation and management measures identified in this BMP will be incorporated into the relevant plans and documentation of the contractors undertaking Works on site. A copy of the Proponent's Environmental Policy is provided in the EMS.

1.5. CONSULTATION

Consultation was undertaken with the NSW Biodiversity Conservation Division (BCD, formerly the Office of Environment and Heritage). The draft BMP was provided for comment on the 25/05/2020. It is noted that this BMP addresses points raised by BCD for Wellington Solar Farm BMP, in order to ensure that BCD expectations are met as much as possible, for this utility scale solar farm located in the same region. Their comments were addressed including clear quantitative performance criteria and weed cover targets. The NSW DPE approved this BMP on the 16 July 2020.

Consultation was undertaken with Commonwealth Department of Climate Change, Energy and the Environment (DCCEEW) in 2023, including by email in July and August. Consultation occurred around the Approval condition 5a) methods to re-quantify impacts of the development upon derived native grassland persistence. The outcome of this consultation was the repetitive BAM plot monitoring method described in Table 9-2.

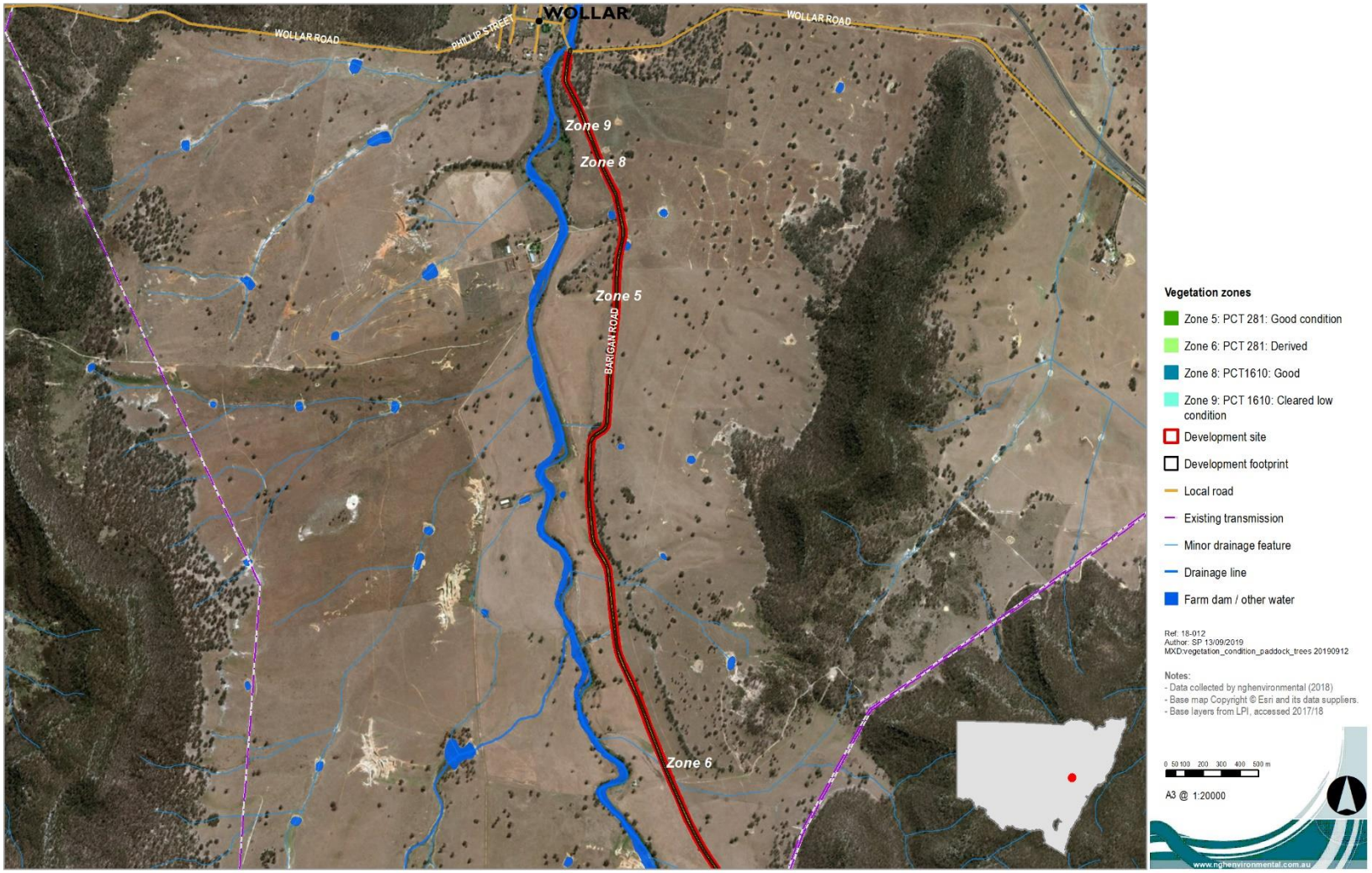


Figure 1-6 Site map 2 showing biodiversity PCTs

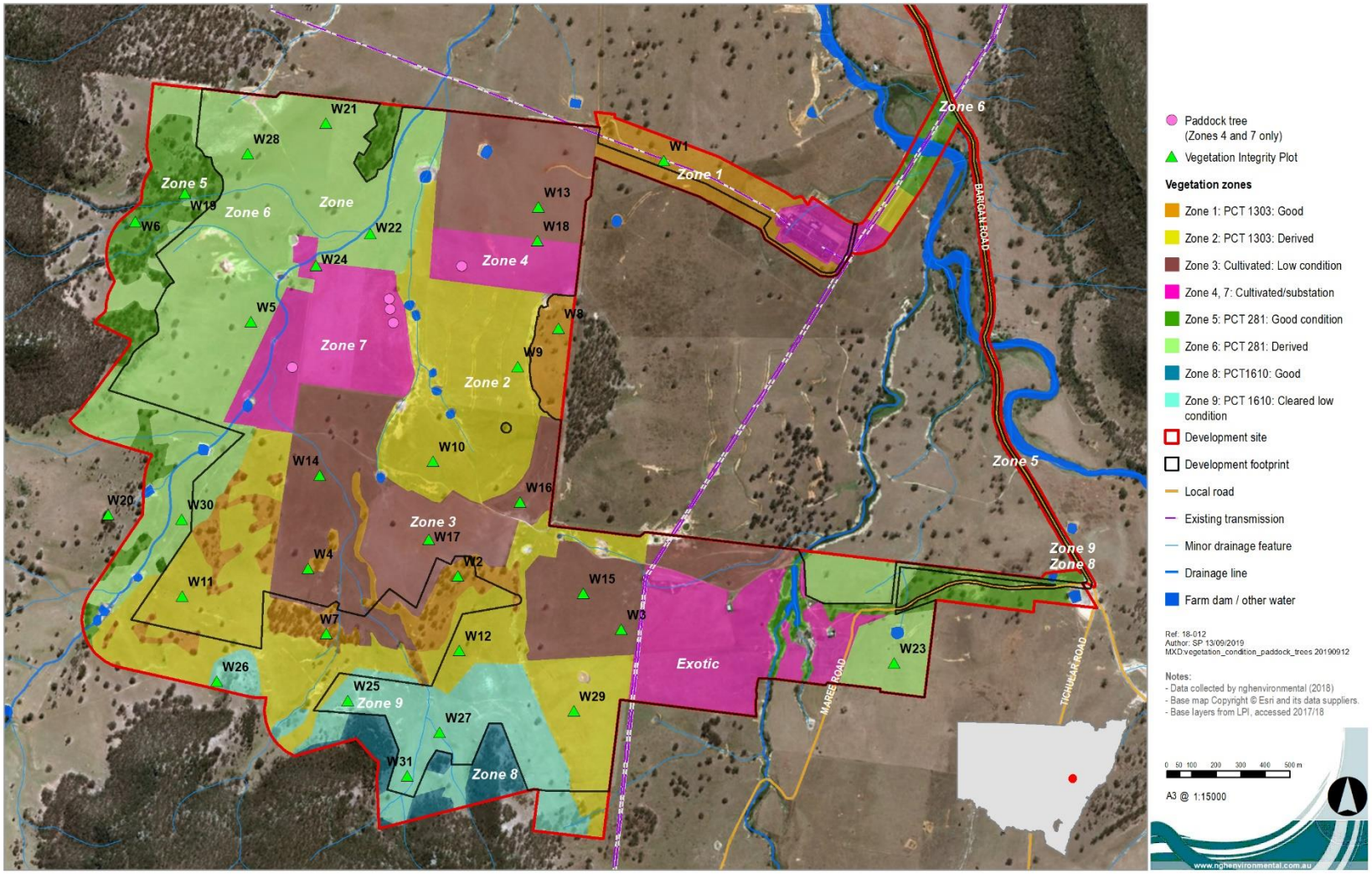


Figure 1-7 Site map 1 showing biodiversity PCTs

2. PLANNING FRAMEWORK

2.1. LEGISLATIVE AND OTHER ENVIRONMENTAL MANAGEMENT REQUIREMENTS

2.1.1. Legislation

Legislation relevant to biodiversity management includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *National Parks and Wildlife Act 1974* (NPW Act).
- *Biodiversity Conservation Act 2016* (BC Act).
- *Protection of the Environment Operations Act 1997* (POEO Act).
- *Fisheries Management Act 1994* (FM Act).
- *Biosecurity Act 2015.*
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix C of the EMS.

2.1.2. Guidelines and Standards

The main guidelines, specifications and policy documents relevant to this BMP include:

- NSW National Parks & Wildlife Service. 2001. *Policy for the Translocation of Threatened Fauna in NSW: Policy and Procedure Statement No. 9* Threatened Species Unit, Hurstville NSW.
- Relevant recovery plans, priority action statements and best practice guidelines.
- NSW DPIE. 2020. *Saving Our Species. Hygiene guidelines - Protocols to protect priority biodiversity areas in NSW from Phytophthora cinnamomi, myrtle rust, amphibian chytrid fungus and invasive plants*
- DECCW. 2008. *Hygiene protocol for the control of disease in frogs*.
- Australian Standard AS 4373 Pruning of Amenity Trees.
- Australian Standard AS 4970 – 2009 Protection of Trees.

2.1.3. Conditions of Consent and Compliance Tracking

NSW

Preparation of a BMP prior to the commencement of the development is a requirement of Schedule 3, condition 14 of the CoC, as follows:

14. Prior to commencing the development, the Applicant must prepare a Biodiversity Management Plan for the development in consultation with BCD, and to the satisfaction of the Planning Secretary in writing. This plan must:

a) include a description of the measures that would be implemented for:
   - *protecting vegetation and fauna habitat outside the approved disturbance areas;*
   - *managing the remnant vegetation and fauna habitat on site;*
   - *minimising clearing and avoiding unnecessary disturbance of vegetation that is associated with the construction and operation of the development;*
   - *minimising the impacts to fauna on site and implementing fauna management protocols;*

- *avoiding the removal of hollow-bearing trees during spring to avoid the main breeding period for hollow-dependent fauna;*
- *rehabilitating and revegetating temporary disturbance areas with species that are endemic to the area;*
- *maximising the salvage of vegetative and soil resources within the approved disturbance area for beneficial reuse in the enhancement or the rehabilitation of the site; and*
- *controlling weeds, feral pests and pathogens; and*

b) *include details of who would be responsible for monitoring, reviewing and implementing the plan, and timeframes for completion of actions.*

Following the Planning Secretary's approval, the Applicant must implement the Biodiversity Management Plan.

Note: If the biodiversity credits are retired via a Biodiversity Stewardship Agreement, then the Biodiversity Management Plan does not need to include any of the matters that are covered under the Biodiversity Stewardship Agreement.

This BMP meets this requirement. Each of the requirements of the biodiversity conditions as well as commitments from the EIS, Submissions Report and Amendment Report and where they are addressed are detailed in Table 2-1 and Table 2-2 below. No additional biodiversity mitigation measures were identified within Modification Report 2 (DPIE, 2020) or Modification Report 3 (NGH, 2022).

Commonwealth

The Commonwealth Approval under the EPBC Act was graded on 6 July 2020. The following conditions are relevant to this BMP:

2. The approval holder must not clear more than:

- *229.6 ha of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland ['Box Gum Woodland'] and derived native grassland (24.5 ha occurring as woodland; 205.1 ha occurring as derived native grassland).*
- *24.6 ha of Regent Honeyeater foraging habitat, corresponding to 24.5 ha of Box Gum Woodland and 0.1 ha of White Box – Black Cyprus Pine shrubby woodland.*

5. The offset strategy may include provisions for:

a) the impacts of the action on derived native grassland to be re-quantified after three years of operation, based on the results of monitoring data. The monitoring data must be collected in accordance with a monitoring methodology and monitoring criteria set out in the Biodiversity Management Plan approved by the Minister.

6. The approval holder must comply with Condition 14 of Schedule 3 the NSW Development Consent, for the preparation and implementation of a Biodiversity Management Plan, as it relates to the avoidance and mitigation of impacts to protected matters.

The Commonwealth Offset Strategy is provided in Appendix G.

Table 2-1 Compliance requirements from the CoC and where they are addressed in this plan.

Condition requirement (CoC)	Report/Section	Stage	When to implement	Responsibility
Land Management				
Schedule 3 condition 11 The Applicant must maintain the agricultural land capability of the site, including: (a) establishing the ground cover of the site within 3 months following completion of any construction or upgrading; (b) properly maintaining the ground cover with appropriate perennial species and weed management; and maintaining grazing within the development footprint, where practicable, unless the Planning Secretary agrees otherwise in writing.	Appendix A	Stage 2 Stage 3	Construction Operation	Proponent and all Contractors
Vegetation Clearance				
Schedule 3 condition 12 The Applicant must not clear any native vegetation or fauna habitat located outside the approved disturbance areas described in the EIS.	Section 1.2 Section 7.1 Section 7.2	Stage 1 Stage 2 Stage 3 Stage 4	Pre-construction Construction	Proponent and all Contractors
Biodiversity Offsets				
Schedule 3 condition 13 Prior to commencing development under this consent, the Applicant must retire biodiversity credits of a number and class specified in Table 1 and Table 2 below, to the satisfaction of BCD, unless the Planning Secretary agrees otherwise in writing. The retirement of these credits must be carried out in accordance with the *NSW Biodiversity Offsets Scheme* and can be achieved by:	Section 2 Retirement confirmation (Appendix F)	Stage 1 Stage 2 Stage 3 Stage 4	Pre-construction	Proponent

<table>
<tr><th>Condition requirement (CoC)</th><th>Report/Section</th><th>Stage</th><th>When to implement</th><th>Responsibility</th></tr>
<tr><td>
a) acquiring or retiring ‘biodiversity credits’ within the meaning of the *Biodiversity Conservation Act 2016;*
b) making payments into an offset fund that has been developed by the NSW Government; or
c) funding a biodiversity conservation action that benefits the entity impacted and is listed in the ancillary rules of the biodiversity offset scheme.

Table 1: Ecosystem Credit Requirements
<table>
<tr><th>*Vegetation Community*</th><th>*PCT ID*</th><th>*Credits Required*</th></tr>
<tr><td>White Box - Grey Gum - Kurrajong grassy woodland on slopes of the northern Capertee Valley, Sydney Basin Bioregion</td><td>1303</td><td>479</td></tr>
<tr><td>Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion</td><td>281</td><td>242</td></tr>
<tr><td>White Box - Black Cypress Pine shrubby woodland of the Western Slopes</td><td>1610</td><td>2</td></tr>
</table>

Table 2: Species Credit Requirements
<table>
<tr><th>*Species Credit Species*</th><th>*Credits Required*</th></tr>
<tr><td>Austfeld’s Wattle (*Acacia ausfeldii*)</td><td>34</td></tr>
<tr><td>Bush Stone-curlew (*Burhinus grallarius*)</td><td>34</td></tr>
<tr><td>Gang-gang Cockatoo (*Callocephalon fimbriatum*)</td><td>67</td></tr>
<tr><td>Large-eared Pied Bat (*Chalinolobus dwyeri*)</td><td>50</td></tr>
<tr><td>*Commersonia procumbens*</td><td>2</td></tr>
<tr><td>Large-leafed Monotaxis</td><td>34</td></tr>
</table>
</td><td></td><td></td><td></td><td></td></tr>
</table>

Condition requirement (CoC)	Report/Section	Stage	When to implement	Responsibility
(*Monotaxis macrophylla*)				
Barking Owl (*Ninox connivens*) 16 Powerful Owl (*Ninox strenua*) 16 Squirrel Glider (*Petaurus norfolcensis*) 34 Brush-tailed Phascogale (*Phascogale tapoatafa*) 13 Koala (*Phascolarctos cinereus*) 34 Masked Owl (*Tyto novaehollandiae*) 16 Note: Any residual impact on EPBC Act listed threatened species and ecological communities must be offset in accordance with an offset process endorsed by DAWE.				
Biodiversity Management Plan				
Schedule 3 condition 14 Prior to commencing the development, the Applicant must prepare a Biodiversity Management Plan for the development in consultation with BCD, and to the satisfaction of the Planning Secretary in writing. This plan must: a) include a description of the measures that would be implemented for: i. protecting vegetation and fauna habitat outside the approved disturbance areas; *ii.* managing the remnant vegetation and fauna habitat on site; iii. minimising clearing and avoiding unnecessary disturbance of vegetation that is associated with the construction and operation of the development; iv. minimising the impacts to fauna on site and implementing fauna management protocols;	General - Sections 1.2, 5.1, 7, 8, and 9 Point (a) (i) - Section 7.7 Point (a) (ii) - Sections 7.5, 7.6, 7.7, 8 and 9 Point (a) (iii) - Sections 7.2.1, 7.2.2 and 7.2.4 Point (a) (iv) - Section 7.4	Stage 1 Stage 2 Stage 3 Stage 4	Pre-construction (prepare plan) Construction (implement plan) Operation (implement plan)	Proponent for preparation of the plan. All contractors for adhering to the plan.

Condition requirement (CoC)	Report/Section	Stage	When to implement	Responsibility
v. avoiding the removal of hollow-bearing trees during spring to avoid the main breeding period for hollow-dependent fauna; vi. rehabilitating and revegetating temporary disturbance areas with species that are endemic to the area; vii. maximising the salvage of vegetative and soil resources within the approved disturbance area for beneficial reuse in the enhancement or the rehabilitation of the site; and viii. controlling weeds, feral pests and pathogens; and b) include details of who would be responsible for monitoring, reviewing and implementing the plan, and timeframes for completion of actions. Following the Planning Secretary's approval, the Applicant must implement the Biodiversity Management Plan. *Note: If the biodiversity credits are retired via a Biodiversity Stewardship Agreement, then the Biodiversity Management Plan does not need to include any of the matters that are covered under the Biodiversity Stewardship Agreement.*	Point (a) (v) - Sections 7.2.3 and 7.2.6 Point (a) (vi) - Appendix A Point (a) (vii) - Section 7.3) Point (a) (viii) - Section 7.5 Point (b) - Section 9			

Table 2-2 Compliance requirements from the EIS, Submissions Report, Amendment Report and where they are addressed in this plan

Condition requirement	Report/Section	Stage	Responsibility	Report
Biodiversity				
• Hollow-bearing trees would not be removed during breeding season (spring to summer) for threatened hollow dependant fauna. • If clearing outside of this period cannot be achieved, pre-clearing surveys would be undertaken to ensure no impacts to fauna would occur	Section 7.2.2, Section 7.2.6	Stage 1 Stage 2 Stage 3 Stage 4	Proponent and all Contractors	EIS section 7.1.5

Condition requirement	Report/Section	Stage	Responsibility	Report
A tree clearing procedure would be implemented to minimise harm to resident fauna.	Section 7.2	Stage 1 Stage 2 Stage 3 Stage 4	Proponent and all Contractors	EIS section 7.1.5
Procedure for relocation of habitat features to adjacent area for habitat enhancement would be implemented.	Section 7.3	Stage 1 Stage 2 Stage 3 Stage 4	Proponent and all Contractors	EIS section 7.1.5
• Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction commencing. • No stockpiling or storage within dripline of any mature trees. • Access and laydown in areas of Box-Gum Woodland TEC will be minimised to reduce impacts. • Exclusion fencing and signage or similar would be installed around habitat to be retained.	Section 5.1	Stage 1 Stage 2 Stage 3 Stage 4	Proponent will ensure all Contractors meet requirements	EIS section 7.1.5
• Avoid night works where possible • Direct lights away from vegetation	Section 5.1	Stage 1/ Stage 2 Stage 3 Stage 4	Proponent will ensure all Contractors meet requirements	EIS section 7.1.5
A Weed Management procedure would be developed for the proposal to prevent and minimise the spread of weeds. This would include: • Management protocol for declared priority weeds under the Biosecurity Act 2015 during and after construction • Weed hygiene protocol in relation to plant, machinery, and fill • Any occurrences of pathogens such as Myrtle Rust and Phytophthora would be monitored, treated, and reported.	Section 7.5	Stage 1 Stage 2 Stage 3 Stage 4	Proponent will ensure all Contractors develop and implement Weed Management procedure and meet this requirement	EIS section 7.1.5

Condition requirement	Report/Section	Stage	Responsibility	Report
• The weed management procedure would be incorporated into the Biodiversity Management Plan.				
Site induction and toolbox talks for ecologically sensitive areas would be undertaken.	Section 9.2	Stage 1 Stage 2 Stage 3 Stage 4	Proponent will ensure all Contractors meet requirements	EIS section 7.1.5
• Awareness training during site inductions regarding enforcing site speed limits. • Site speed limits to be enforced to minimise fauna strike.	Section 9.2	Stage 1 Stage 2 Stage 3 Stage 4	Proponent will ensure all Contractors meet requirements	EIS section 7.1.5
Dust management would be implemented as follows: • Daily monitoring of dust generated by construction activities • Construction would cease if dust observed being blown from site until control measures were implemented • All activities relating to the proposal would be undertaken with the objective of preventing visible dust emissions from the development site	Section 7.7.3	Stage 1 Stage 2 Stage 3 Stage 4	Proponent will ensure all Contractors monitor dust and meet requirements	EIS section 9.2
The Applicant must minimise the dust generated by the development.	Section 7.7.3	Stage 1 Stage 2 Stage 3 Stage 4	Proponent will ensure all Contractors meet requirements	EIS section 9.2
The two main tributaries (Wollar Creek and Spring Flat Creek) would not be altered by the proposal with the exception for the construction of crossings for the internal access roads and for the installation of underground cables. The design and construction of the waterway crossings would need to consider the requirements of the following publications:	Section 5.1, Section 7.7.4	Stage 3	Proponent will ensure all Contractors meet requirements	Section 8.2.2

Condition requirement	Report/Section	Stage	Responsibility	Report
• Why do fish need to cross the road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003). • Policy and Guidelines for Fish Friendly Waterway Crossings (NSW DPI, 2003). • Guidelines for Watercourse Crossings on Waterfront Land (NSW DPI, 2012). • Guidelines for Laying Pipes and Cable in Watercourses on Waterfront Land (NSW DPI, 2012). Given the waterway is categorised as a 4th order stream under the Strahler System, a 40m buffer would apply and crossings would need to be in the form of bridges or culverts.				

2. NSW CREDIT RETIREMENT

The NSW biodiversity offset requirement has been achieved by retiring biodiversity credits through payments into the Biodiversity Conservation Fund in accordance with Schedule 3, Condition 13, options a) and b). Confirmation of credit retirement was provided by NSW Department of Planning, Housing and Infrastructure on 4 March 2024 (Appendix F). It is noted that the retirement process was not completed (due to recalculation of credits required) prior to construction commencing, as conditioned, and that this non-compliance was recorded under SSD 9254-PA-29.

3. EXISTING ENVIRONMENT

3.1. SOILS

The development site is in the Upper Goulburn Valleys and Escarpment Landscape. This landscape as described by Mitchell, 2002 is distinguished by steep hills and escarpments with rock outcrops on a mix of quartz sandstone, lithic sandstone and conglomerate and shale, making up harsh texture-contrast soils.

3.2. FLORA

The development site is agricultural land comprising of cleared areas (primarily cultivated land where there is evidence of past ploughing/cultivation and where infrastructure is located (i.e. the substation and farm buildings) and native vegetation (predominantly grassy woodland on the Wollar Valley flats).

The development footprint is 463 hectares, with 367 hectares comprising of native vegetation. Five paddock trees were identified in areas of native vegetation (assessed under BAM).

The project would impact up to:

- 24.92 hectares of high diversity structural woodland,
- 343.24 hectares of derived grasslands and cultivated low condition areas.

Native vegetation along the Barigan Road reserve provides habitat for the following threatened flora species (presence has been assumed):

- *Acacia ausfeldii*
- *Commersonia procumbens*
- *Monotaxis macrophylla.*

3.2.1. Vegetation Communities

Three Plant Community Types (PCTs) were identified within the development site:

- White Box – Grey Gum – Kurrajong grassy woodland on slopes of the northern Capertee Valley, Sydney Basin Bioregion, White Box - Grey Gum - Kurrajong grassy woodland on northern Capertee Valley, Sydney Basin Bioregion (PCT 1303)
- Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion (PCT 281), and
- White Box - Black Cypress Pine shrubby woodland of the Western Slopes (PCT 1610).

The locations of these PCTs are shown in Figure 6-1 and Figure 6-2. Of these areas:

- 343.24 hectares of vegetation meets the NSW EEC criteria; most (92%) in degraded condition that does not generate offsets under the Biodiversity Assessment Methodology (BAM).
- 229.9 hectares of vegetation that meets the Commonwealth criteria for Critically Endangered Ecological Communities; most (89%) in degraded condition.

3.3. FAUNA

Table 3-1 breaks down the hollow bearing trees with potential to be utilised by various threatened species that will be impacted by the proposal by stage. The site contains woodland habitat including hollow-bearing trees:

- Stage 1 of the development impacted 56 hollow-bearing trees inside Barigan Road reserve
- Stage 3 of the development will impact nine hollow-bearing trees
-

Table 3-1 Hollow bearing trees impacted by proposal

Stage	Number of HBTs impacted
Stage 1	56
Stage 2	0
Stage 3a	0
Stage 3b	9

Habitat is assumed to occur along Barigan Road (Zones 5 and 8 in Figure 1-6):

- Bush Stone-Curlew
- Gang-gang Cockatoo
- Barking Owl
- Powerful Owl
- Squirrel Glider
- Brush-tailed Phascogale
- Masked Owl
- Koala
- Large-eared Pied Bat.

Ultrasonic surveys did not detect Large-eared Pied Bat, Eastern Bentwing-bat and Eastern Cave Bat, however species may utilise fringing vegetation within lower slopes surrounding development site.

3.3.1. Regent Honeyeater important areas

Regent Honeyeater habitat is mapped within the Solar Farm Site. The development footprint was adjusted to avoid mapped areas for the Regent Honeyeater. Thus prior to February 2020, the assessment under BAM purposefully avoided development within 'important areas mapping' for Regent Honeyeater.

Since this time, there have been updates to 'important areas mapping' for Regent Honeyeater (Figure 3-1 and Figure 3-2) and now intersects the approved footprint. BCD have clarified (11/05/2020, phone call between Gillian Young (NGH) and David Geering (BCD) that further assessment (under Ch 10.2 of the BAM) of expanded 'important areas mapping' is not needed for the Solar Panel array and Barigan Road as there is no change to the footprint in this area. BCD have indicated they are satisfied with the initial Assessments of Significance (AoS) concluding a significant impact was unlikely. The Commonwealth approval includes clearing of 24.6 ha of Regent Honeyeater habitat.

3.4. SUMMARY OF KEY BIODIVERSITY CONSTRAINTS

Key biodiversity constraints requiring management have been broken into stages below. The Biodiversity Assessment Report (BDAR) describes the biodiversity constraints of the development. These constraints have been separated into those associated with the road upgrades (stage 1) and the construction of the Solar Farm (stages 2 and 3).

Stage 1

- Threatened species habitat along Barigan Road (Bush Stone-Curlew, Gang-gang Cockatoo, Barking Owl, Powerful Owl, Squirrel Glider, Brush-tailed Phascogale, Masked Owl, Koala and Large-eared Pied Bat)[1]. These species have been assumed to be present.
- Along the Barigan Road reserve, presence was also assumed for *Acacia ausfeldii, Commersonia procumbens, Monotaxis macrophylla*

Remnant White Box – Yellow Box – Blakely's Red Gum Grassy Woodland (Box-gum woodland and derived native grassland) Threatened Ecological Community (TEC) along Barigan Road.

- Road upgrades were contained to a 12 metre wide disturbance footprint.

Stages 2 & 3

- Remnant White Box – Yellow Box – Blakely's Red Gum Grassy Woodland (Box-gum woodland and derived native grassland) TEC in Stages 2 and 3b. Stages 1, 2 and 3 impacts 229.90 ha of Box-gum Woodland and derived native grassland which is a TEC listed under the BC (vegetation zones 1, 2, 3, 5 and 6) and EPBC (vegetation zones 1, 2, 5 and 6) Acts.
- A 40m buffer riparian area buffer has been applied to protect riparian vegetation along two 4th order streams under the Strahler System (Wollar Creek and Spring Flat Creek) associated with Stage 3b.
- Regent Honeyeater important areas in Stages 2 and 3b.

[1] As project timing precluded appropriate seasonal survey, these species were assumed to occur and currently generate an offset, as such.

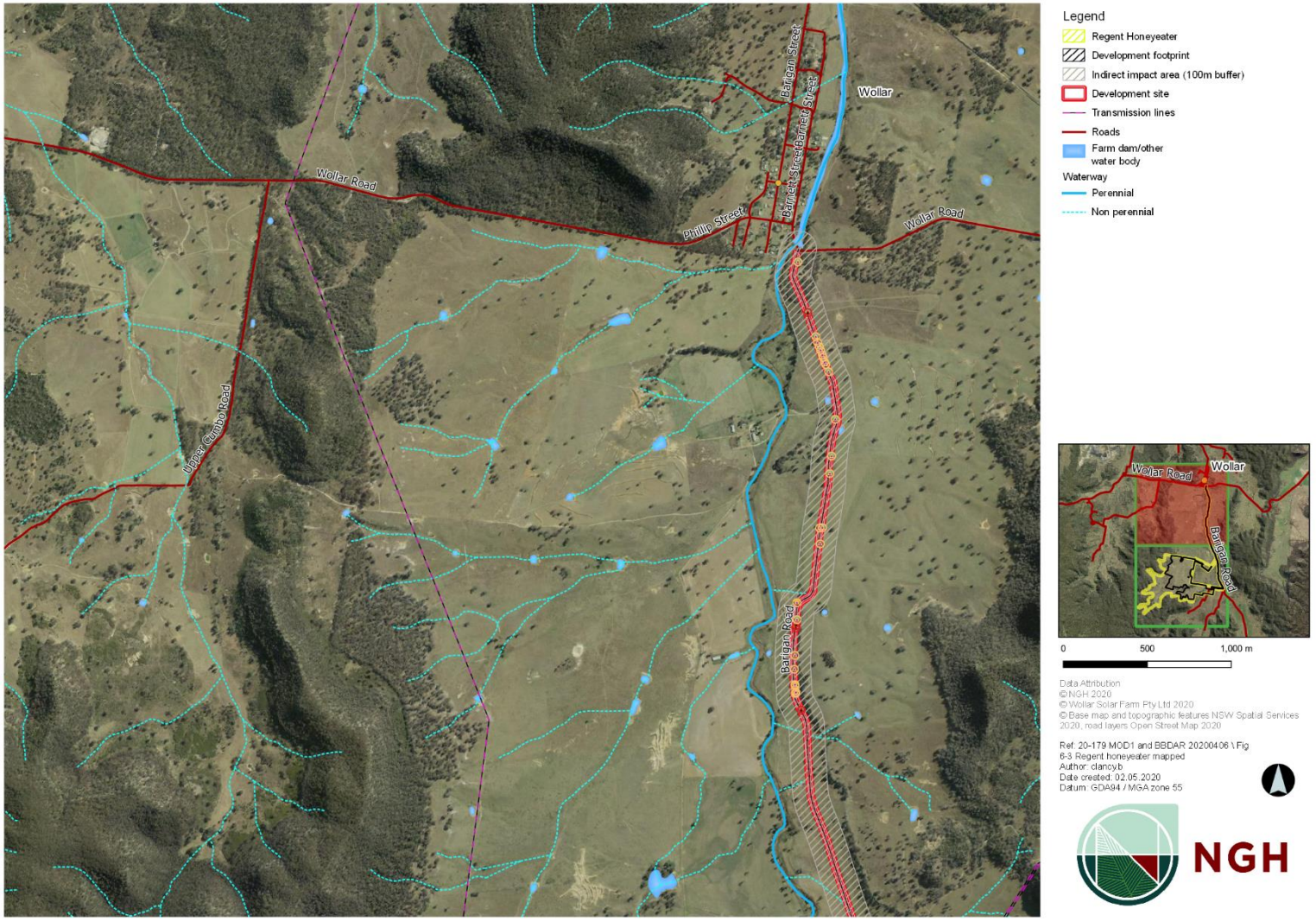


Figure 3-1 Updated mapped Regent Honeyeater habitat in relation to the project

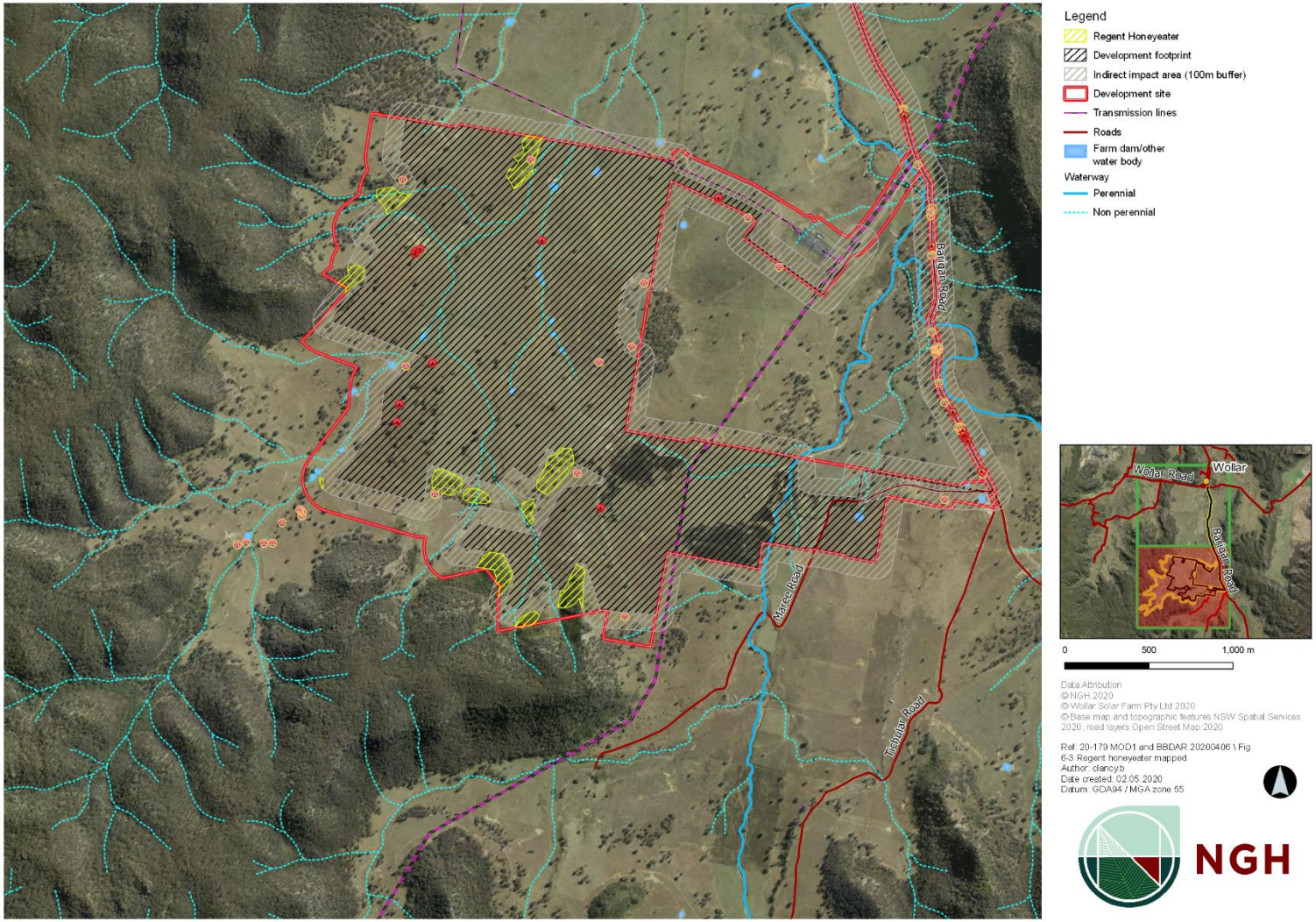


Figure 3-2 Updated mapped Regent Honeyeater habitat in relation to the project

3.5. WEEDS AND PESTS

3.5.1. Pest Species

Opportunistic surveys undertaken in May 2018 identified the following pest species to be present within the project footprint.

- Rabbits
- Feral Pigs
- Foxes.

3.5.2. Weed Species

80 exotic flora species were recorded within the development footprint. These species and their zones are listed in Table 3-2.

Table 3-2 Exotic flora species observed within the proposal site for the road upgrades

Common Name	Scientific Name	Zone
Common Thornapple	*Datura stramonium*	1
Khaki Weed	*Alternanthera pungens*	1, 2
Mallow	*Malva spp.*	1
Paspalum	*Paspalum dilatatum*	1, 2
Sandspurry	*Spergularia rubra*	1
A Bindweed	*Convolvulus spp.*	1, 2
A Fleabane	*Conyza spp.*	1
Yellow Hawkweed	*Tolpis barbata*	1, 2, 3
A Medic	*Medicago spp.*	2
White Clover	*Trifolium repens*	2, 3
-	*Rytidosperma spp.*	2
Flax	*Linum usitatissimum*	2
Rat's-tail Fescue	*Vulpia spp.*	2
Sweet Briar	*Rosa rubiginosa*	2

Common Name	Scientific Name	Zone
Prickly Sowthistle	*Sonchus asper*	3
Narrow-leaved Cotton	*Gomphocarpus fruticosus*	3
Patterson's Curse	*Echium plantagineum*	3
Shepherd's Purse	*Capsella bursa-pastoris*	3
Brassica	*Brassica spp.*	4, 7
Lucerne	*Medicago sativa*	2, 3, 4, 8
-	*Silene spp.*	2, 3, 4, 8, 9
Perennial Ryegrass	*Lolium perenne*	1, 2, 3, 4, 6, 7
Long Storksbill	*Erodium botrys*	1, 2, 3, 4, 5, 6
Saffron Thistle	*Carthamus lanatus*	1, 2, 3, 4, 5, 6, 8, 9
Barley Grass	*Hordeum leporinum*	2, 3, 4, 5, 6, 7
Phalaris	*Phalaris aquatica*	1, 4
Common Peppercress	*Lepidium africanum*	1, 2, 3, 4
Small Flowered Mallow	*Malva Parviflora*	2, 3, 4, 5, 8
Skeleton Weed	*Chandrilla juncea*	2, 3, 4, 5, 6, 8
Wireweed	*Polygonum aviculare*	2, 4, 6, 9
Scarlet Pimpernel	*Lysimachia arvensis*	1, 2, 3, 4, 5, 6, 7, 8, 9
-	*Geranium spp.*	5
Four-leaved Allseed	*Polycarpon tetraphyllum*	5
Spear Thistle	*Cirsium vulgare*	2, 3, 5
Flaxleaf Fleabane	*Conyza bonariensis*	1, 2, 5, 6
Red-flowered Mallow	*Modiola caroliniana*	1, 2, 3, 5, 6, 7, 8, 9

Common Name	Scientific Name	Zone
Chilean Whitlow Wort	*Paronychia brasiliana*	1, 2, 3, 5, 8
Black-berry Nightshade	*Solanum nigrum*	1, 5
Bathurst Burr	*Xanthium spinosum*	5, 6, 7
Common Sowthistle	*Sonchus oleraceus*	1, 2, 3, 5, 6
Capeweed	*Arctotheca calendula*	2, 3, 5, 6, 8
St Johns Wort[2]	*Hypercium perforatum*	2, 3, 5, 8
Dandelion	*Taraxacum officinale*	2, 3, 5, 6, 8
Twiggy Mullein	*Verbascum virgatum*	5
-	*Oxalis thompsoniae*	5
A Finger Grass	*Digitaria spp.*	5
Soft Brome	*Bromus Hordeaceus*	2, 3, 6, 7
Catsear	*Hypochaeris radicata*	1, 2, 3, 5, 6, 7, 8
Maltese Cockspur	*Centaurea melitensis*	2, 8
Vervain	*Salvia verbenaca*	8
Shivery Grass	*Briza minor*	
Wild Oats	*Avena fatua*	7
-	*Onopordum spp.*	7
Winter Grass	*Poa annua*	7
Slender Celery	*Cyclospermum leptohyllum*	2, 3, 6, 8
-	*Cirisium spp.*	6, 8

[2] *This plant should not be sold in parts of NSW* (Department of Primary Industries, 2020)

Common Name	Scientific Name	Zone
-	*Verbascum spp.*	8
Roughtail	*Rostaria pumila*	5, 8
Hop Clover	*Trifolium campestre*	3, 6, 8
-	*Linum spp.*	2, 3, 5, 8
Rough Dog's Tail	*Cynosurus echinatus*	5
Common Peppercress	*Lepidium africanum*	1, 5, 6
St Barnabys Thistle	*Centaurea solstiitalis*	6
Prairie Grass	*Bromus catharticus*	6, 7
Lamb's Tongue	*Plantago lanceolata*	1, 2, 3, 6, 7
Urochloa Grass	*Urochloa panicoides*	6, 7
Goose Grass	*Eleusine tristachya*	1, 2, 3, 6, 7
Purpletop	*Verbena bonariensis*	1, 3, 6
Dwarf Marigold	*Schkuhria pinnata var. abrotanoides*	1, 2, 6, 9
-	*Xanthium spp.*	6
Sheep Sorrel	*Acetosella vulgaris*	6
Subterranean Clover	*Trifolium subterraneum*	2, 3, 6, 8
Stinkgrass	*Eragrostis cilianensis*	1, 6
A Finger Grass	*Digitaria spp.*	6
Common Crowfoot	*Erodium cictuarium*	1, 2, 3, 6, 7, 8
Haresfoot Clover	*Trifolium arvense*	1, 2, 3, 5, 6, 8
Clustered clover	*Trifolium glomeratum*	1, 2, 3, 5, 6, 8, 9
Yellow Suckling Clover	*Trifolium dubium*	2, 3, 5, 6, 8

Common Name	Scientific Name	Zone
Barnyard Grass	*Echinochloa crus-galli*	1, 2, 3, 6, 9
Proliferous Pink	*Ptrorhagia nantteuilii*	1, 2, 3, 5, 6, 7, 8, 9

4. ENVIRONMENTAL ASPECTS AND IMPACTS

The construction and operation phases of the project have the potential to impact biodiversity values at the site in ways that cannot be avoided. This would occur through direct impacts such as habitat clearance, and indirect impacts including shading, weed ingress, soil and water contamination, and generation of excessive dust, light, or noise. Key aspects of the Wollar Solar Farm that could result in impacts to biodiversity have been described in Table 4-1 and were assessed in the BDAR.

Table 4-1 Potential biodiversity impacts as a result of the project

Impact	Frequency	Duration	Consequence
Direct Impacts			
Habitat clearance for permanent and temporary construction facilities (e.g. access tracks, road upgrades to support vehicles)	Regular	Construction	• Direct loss of native flora and fauna habitat including hollow-bearing trees. • Injury and mortality to fauna during clearing of fauna habitat. • Introduction and spread of noxious weeds and pathogens. • Disturbance to fallen timber, dead wood and bush rock.
Removal of habitat features e.g. HBTs	Rare	Construction	• Direct loss of native fauna habitat • Injury and mortality to fauna during clearing of habitat features.
Indirect Impacts			
Inadvertent impacts on adjacent habitat or vegetation	Rare	Construction	• Direct loss of flora and fauna habitat • Injury and mortality to fauna during clearing of fauna habitat and habitat trees • Disturbance to stags, fallen timber and bush rock • Increased edge effects.
Reduced viability of adjacent habitat due to edge effects	Constant	Operational	• Further degradation of TECs • Loss of native flora and fauna habitat.
Reduced viability of adjacent habitat due to noise, dust or light spill	Rare	Construction Operation	• May alter fauna activities and/or movements • Loss of foraging or breeding habitat • Inhibit the function of plant species, soils and dams
Transport of weeds and pathogens from the site to adjacent vegetation	Irregular	Construction Operation	• Degradation of TEC onsite through future weed invasion.

Impact	Frequency	Duration	Consequence
Increased risk of starvation, exposure and loss of shade or shelter	Rare	Construction Operation	• Loss of foraging habitat
Loss of breeding habitats	Constant	Construction	• Loss of potential breeding habitat.
Potential increase in pest animal populations	Regular	Operation	• Solar arrays may provide potential habitat for pest species like rabbits and foxes to take refuge under panels.
Shading impacts on groundcover beneath the arrays	Ongoing	Operation	• Change in species and abundance, in a worst case leading to bare areas susceptible to erosion or weed ingress.
Bush rock removal and disturbance	One off	Construction	• Loss of potential breeding habitat

5. WORK SCHEDULES

5.1. CONSTRUCTION AND OPERATION ACTIVITIES

Table 5-1 describes the potential disturbance and mitigation measures associated with different construction phases of the project. Table 5-2 describes the potential disturbance and mitigation measures during operational phases. Note that there can be multiple phases within the different stages of the development (per Section 1.3.1).

Table 5-1 Schedule of construction works

Project phase	Potential disturbance	Key actions and mitigation	Performance target
Construction Works	• Disturbance to native groundcover from vehicle movements. • Disturbance and removal of fauna habitat including woody debris. • Spread of weeds. • Collision with wildlife causing injury or death • Spills from vehicles, plant, and storage facilities. • Pollution of waterways or native vegetation.	• Prior to the commencement of work, a physical vegetation clearing boundary at the approved clearing limit is to be clearly demarcated and implemented (exclusion zone). The delineation of such a boundary should include the use of temporary fencing, flagging tape, para-webbing etc. Buffer zones required around Riparian zones for 4th order waterways will also be demarcated using temporary fencing. • No works would occur inside the exclusion zones. • Stockpiling materials and equipment and parking vehicles will be avoided within the dripline (extent of foliage cover) of any native tree. • Stockpiles and storage will occur only on designated direct disturbance areas. • Wash and inspect plant and vehicles as per Vehicle Hygiene Procedure. • Pre-clearing surveys will be carried out by an ecologist and will include general fauna	• No disturbance to biodiversity outside the approved construction footprint. • Minimise disturbance to biodiversity in the proposal site. • Retain existing native riparian vegetation to the greatest extent possible in an undamaged and unaltered condition. • Protect exclusion zones (areas outside proposal site) from adverse impacts during construction. • Weeds (where weeds exceed 10% of the groundcover) and pests are controlled. • Speed limits will be enforced. • No native fauna mortalities during construction. • No works causing light or noise impacts occurring near exclusion zones at night.

Project phase	Potential disturbance	Key actions and mitigation	Performance target
		surveys, general tree hollow inspections and dam/waterway inspections. Habitat trees to be retained will be clearly marked with flagging tape. • Hollow-bearing trees within the development site would be cleared between October and January to avoid Gang-gang Cockatoo breeding. • If clearing within this period cannot be achieved, pre-clearing surveys of hollows and nests would be undertaken to ensure individual animals are not impacted. No clearing of any tree supporting an active nest of Gang-gang Cockatoos would occur as per the commitments in the BDAR. • Include awareness training in site inductions regarding site speed limits. Site speed limits to be enforced. • Avoid night works as to avoid disturbance to nocturnal fauna, particularly threatened nocturnal fauna. • Direct lights away from vegetation. • Noise-emitting plant will be oriented so that noise will be directed away from exclusion zones wherever possible. • When not in use, vehicles and plant will not be left idling near exclusion zones but will be switched off whenever possible. • Install and maintain erosion and sediment controls according to best practice, e.g. Managing Urban Stormwater: Soils and Construction (Landcom 2004)	

Project phase	Potential disturbance	Key actions and mitigation	Performance target
Road Upgrades (Stage 1) ***Note: completed***	• See Potential Disturbances listed for "Construction Works"	• See Key actions and mitigations listed for "Construction Works"	• See performance targets listed for "Construction Works"
Construction site set up (stages 2 & 3)	• See Potential Disturbances listed for "Construction Works" • Disturbance of native fauna by light or noise at night.	• See Key actions and mitigations listed for "Construction Works" • Where night works are undertaken, work must not take place within 100 m of exclusion zones.	• See performance targets listed for "Construction Works"
Internal access construction (stages 2 & 3)	• See Potential Disturbances listed for "Construction Works"	• See Key actions and mitigations listed for "Construction Works" • Stockpiling and storage of materials and machinery occur only on designated direct disturbance areas. • Refuelling of plant and equipment, chemical storage and decanting off site or at least 50 m away from farm dams and waterways in impervious bunds. • Dry and wet spill kits are readily available and staff are trained in how to deploy them	• See performance targets listed for "Construction Works" • No pollution or siltation of aquatic ecosystems, wetlands, endangered ecological communities or threatened species habitat.
Construction of solar farm infrastructure (stages 2 & 3)	• See Potential Disturbances listed for "Construction Works"	• See Key actions and mitigations listed for "Construction Works" • Ground disturbance permit procedure implemented before any clearing activity. • Vegetation Clearance Procedure implemented for vegetation removal. • Record clearing and ground disturbance via spatial mapping.	• See performance targets listed for "Construction Works" • Weed abundance in exclusion zones surveyed seasonally during construction and used as basis for implementing seasonal targeted weed control measures in each zone. • Weed abundance surveyed and potential new incursions recorded seasonally

Project phase	Potential disturbance	Key actions and mitigation	Performance target
		• Awareness training provided during site inductions and toolbox talks to minimise unnecessary disturbance in footprint – emphasising importance of native habitat and the way in which the operation could disturb native fauna. • Machinery, trucks and equipment restricted to designated parking areas. • Topsoil salvaged where possible within the approved disturbance area and stockpiled for beneficial reuse in the enhancement or the rehabilitation of the site, as per the Weed Management Procedure (section 7.5.1). • Refuelling of plant and equipment, chemical storage and decanting off site or at least 50 m away from farm dams in impervious bunds. • Dry and wet spill kits are readily available.	during construction. Strategic and integrated targeted weed control measures implemented to control weed infestations. • Targeted weed control measures implemented for any seasonal weed to prevent propagule spread. • No pollution or siltation of aquatic ecosystems, wetlands, endangered ecological communities or threatened species habitat.
Removal of temporary construction equipment (stages 2 & 3)	• See Potential Disturbances listed for "Construction Works" • Disturbance to existing native fauna from lights and noise. • Disturbance of groundcover from stockpiles.	• Machinery, trucks and equipment restricted to designated parking areas. No parking on roadside vegetation allowable. • Stockpiles and storage of materials and machinery avoids the dripline (extent of foliage cover) of any native tree. • Stockpiles and storage occur only on designated direct disturbance areas. • Lighting directed away from vegetation. • Plant and vehicles will be inspected and washed as per Traffic Management Procedure. • Install and maintain ERSED controls.	• Weeds (where weeds exceed 10% of the groundcover) and pests are controlled. • Speed limits enforced. • No native fauna mortalities during construction. • No pollution or siltation of aquatic ecosystems, wetlands, endangered ecological communities or threatened species habitat. • Protect exclusion zones from adverse impacts during construction.

Project phase	Potential disturbance	Key actions and mitigation	Performance target
Revegetation (stages 2 & 3)	• Loss of groundcover • Spread of weeds	• Ground cover of the site restored as soon as practicable, but within 3 months of completing any construction or upgrades, using suitable species. • Ground cover restored and maintained with appropriate perennial species as much as practical. • Weeds managed within ground cover.	• All disturbed areas not required for the operation of the solar farm rehabilitated. • Revegetation of disturbed areas meets targets in the Ground Cover Management Plan • Native species used for revegetation where practicable. • KPI for weed cover - <10% in groundcover areas.

Table 5-2 Schedule of operational works

Project phase	Potential disturbance	Key actions and mitigation	Performance target
Operation and Maintenance (stage 1) ***Note: stage complete***	• Loss of groundcover. • Spread of weeds • Decline in vegetation condition of exclusion zones.	• Mid-Western Regional Council will be handed back control of the roads • Mid-Western Regional Council will maintain the road in accordance with their internal procedures	• Groundcover, weed management and vegetation maintained to a standard similar to equivalent Council road reserves in the area
Operation and Maintenance (stages 2 & 3)	• Loss of groundcover from shading impacts. • Spread of weeds. • Disturbance to native groundcover from vehicle movements. • Collision with wildlife causing injury or death.	• Maintain ground cover with appropriate perennial species. • Manage weeds within ground cover. • Manage weeds within exclusion zones. • Vehicles inspected and washed as per Vehicle Hygiene Procedure. • Machinery, trucks and equipment restricted to designated parking areas. No parking on roadside vegetation will occur.	• Revegetation of disturbed areas meets targets in the Ground Cover Management Plan • No disturbance to biodiversity outside the approved operational footprint. • Minimise disturbance to biodiversity in the project area. • No native fauna mortality or injury during operation.

Project phase	Potential disturbance	Key actions and mitigation	Performance target
	• Disturbance of native fauna by light or noise at night. • Decline in vegetation condition of exclusion zones.	• Include awareness training in site inductions regarding site speed limits. • Site speed limits enforced. • Night works avoided. • Where night works cannot be avoided, work must not take place within 100 m of exclusion zones and should avoid breeding seasons. • Direct lights away from vegetation. • Noise-emitting plant oriented so that noise will be directed away from exclusion zones wherever possible. • When not in use, vehicles and plant not left idling near exclusion zones, but switched off whenever possible.	• No pollution or siltation of aquatic ecosystems, wetlands, endangered ecological communities or threatened species habitat. • Maintain or improve the baseline vegetation condition class of exclusion zones throughout the operation period. • Survey and map weed abundance in exclusion zones annually during operation and use as basis for implementing annual targeted weed control measures in each zone. • No increase in weed abundance in exclusion zones from baseline levels at end of operation period. • Annually survey and map weed distribution across the project site and use to implement targeted weed control measures. • Demonstrate reduced weed distribution annually by at least 50% in mapped infestation areas. • Targeted weed control measures to be implemented for any seasonal weed outbreaks within a year of discovery. • No increase in distribution of weeds from baseline in the project site at end of operation period. • No new invasive weeds recorded in project area compared to baseline surveys at end of operation period.

6. ENVIRONMENTAL MANAGEMENT ZONES

The Project was broken down into the following zones for the purposes of biodiversity management[3]:

1. Zone 1 (PCT 1303 in good condition)
2. Zone 2 (PCT 1303 derived grassland)
3. Zone 3 (cultivated land in low condition)
4. Zone 4 & 7 (cultivated land/substation)
5. Zone 5 (PCT 281 in good condition).
6. Zone 6 (PCT 281 derived grassland)
7. Zone 8 (PCT 1610 good condition)
8. Zone 9 (PCT 1610 (cleared, low condition)

These zones are described below and their location is shown on Figure 6-1 and Figure 6-2. These zones are referred to in the management protocols and procedures described in Section 7 and summarised in Section 6.1.

6.1. MANAGEMENT ZONES

Zone 1 - PCT 1303 White Box – Grey Gum

This zone totals an area of direct impact for the Solar Farm of 16.82ha. This woodland is a TEC under EPBC and BC Act.

Additional assessment undertaken as part of the modification (NGH Pty Ltd, 2020) as shown in Figure 6-3, identified the modification would occur in zone 1 as well as within exotic vegetation. The updated credit calculations produced an increase in ecosystem credits but no change to species credits. The modification generates an additional 10 ecosystem credits.

Zone 2 - PCT 1303 Derived Native Grassland

This zone totals an area of direct impact for the Solar Farm of 102.70ha. This woodland is a TEC under EPBC and BC Act.

Zone 3 - PCT 1303 Cultivated Low Condition

This zone totals an area of direct impact for the Solar Farm of 110.70ha. Though degraded, still classified as a TEC under the BC Act.

Zone 4 – Cultivated Land (exotic)

This zone totals an area of direct impact for the Solar Farm and road upgrades of 12.81ha. There is zero area of indirect impact.

Zone 5 – PCT 281 Box Gum Woodland

This zone is in good condition, totalling an area of direct impact for the Solar Farm and road upgrades of 7.99ha. There is zero area of indirect impact. This zone generates ecosystem credits.

[3] Note: The substation and area labelled ‘exotic’ (shaded pink) in Figure 6-1 were not assessed under the BAM for the BDAR, and as such this area totalling approximately 52 hectares is not included in the Management Zones.

Zone 6 – PCT 281 Derived Native Grassland

This zone is in moderate condition, totalling an area of direct impact for the Solar Farm and road upgrades of 102.73ha. There is zero area of indirect impact.

Zone 7 - PCT 281 Exotic Groundcover

This zone totals an area of direct impact for the Solar Farm of 31.64ha. There is zero area of indirect impact.

Zone 8 – PCT 1610 White Box – Black Cypress

This zone is in good condition, totalling an area of direct impact for the Solar Farm and road upgrades of 0.14ha. There is zero area of indirect impact. This zone generates ecosystem credits.

Zone 9 – PCT 1610 White Box – Black Cypress

This zone is in low condition, totalling an area of direct impact for the Solar Farm and road upgrades of 27.1ha. There is zero area of indirect impact.

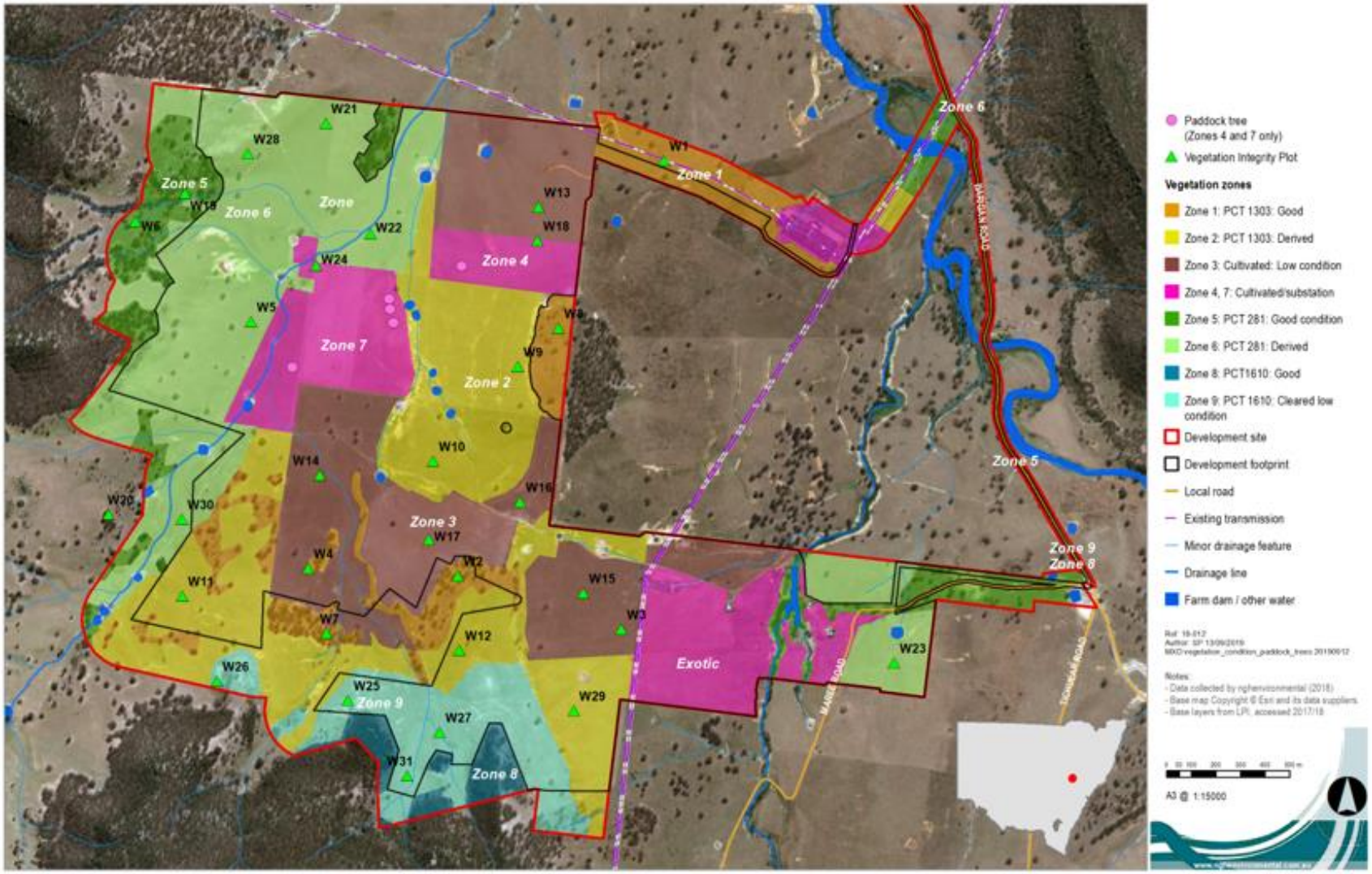


Figure 6-1 Vegetation zones, PCTs and representative vegetation integrity plots for development site (Map 1)

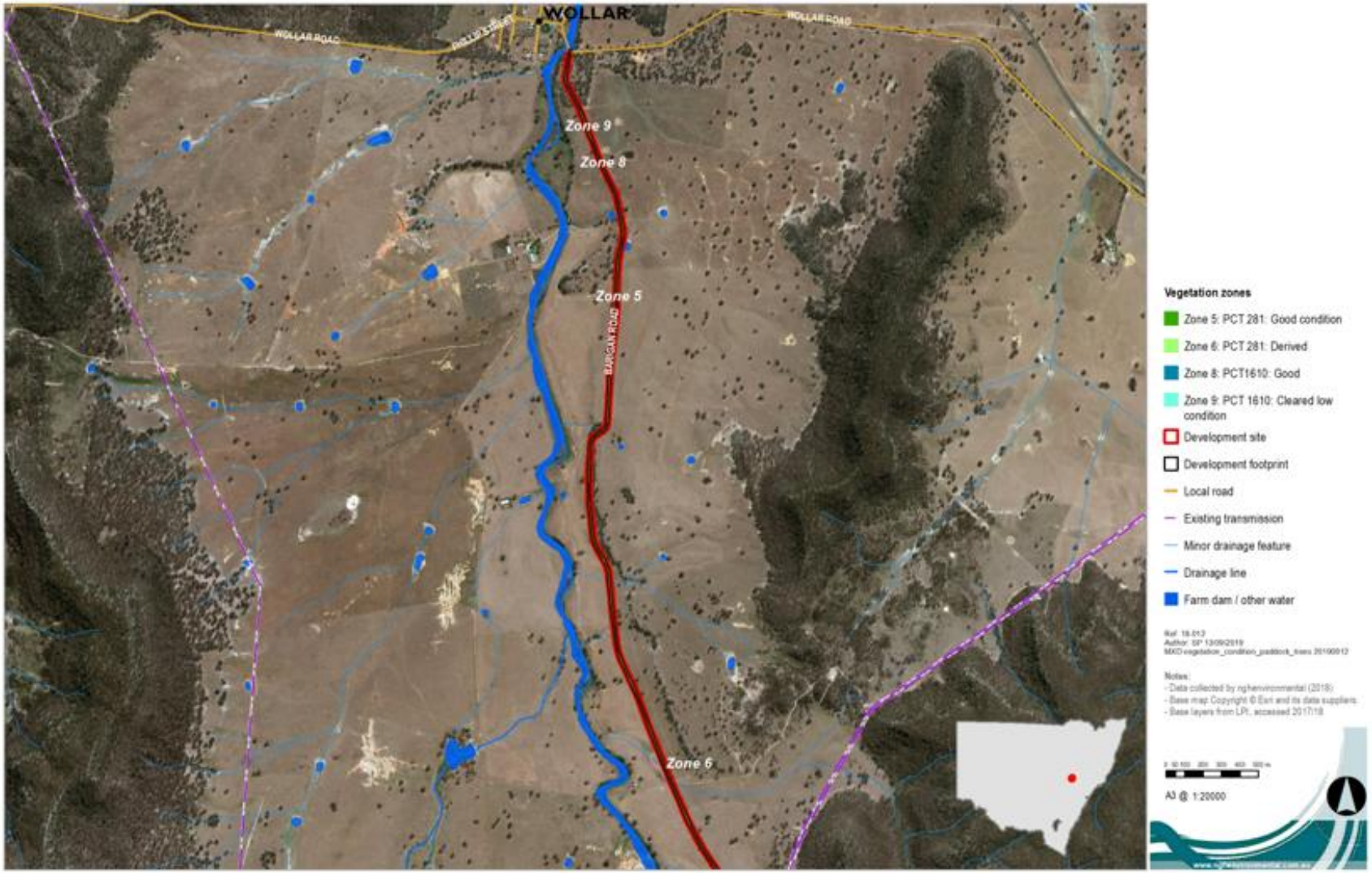


Figure 6-2 Vegetation zones, PCTs and representative vegetation integrity plots for development site (Map 2)

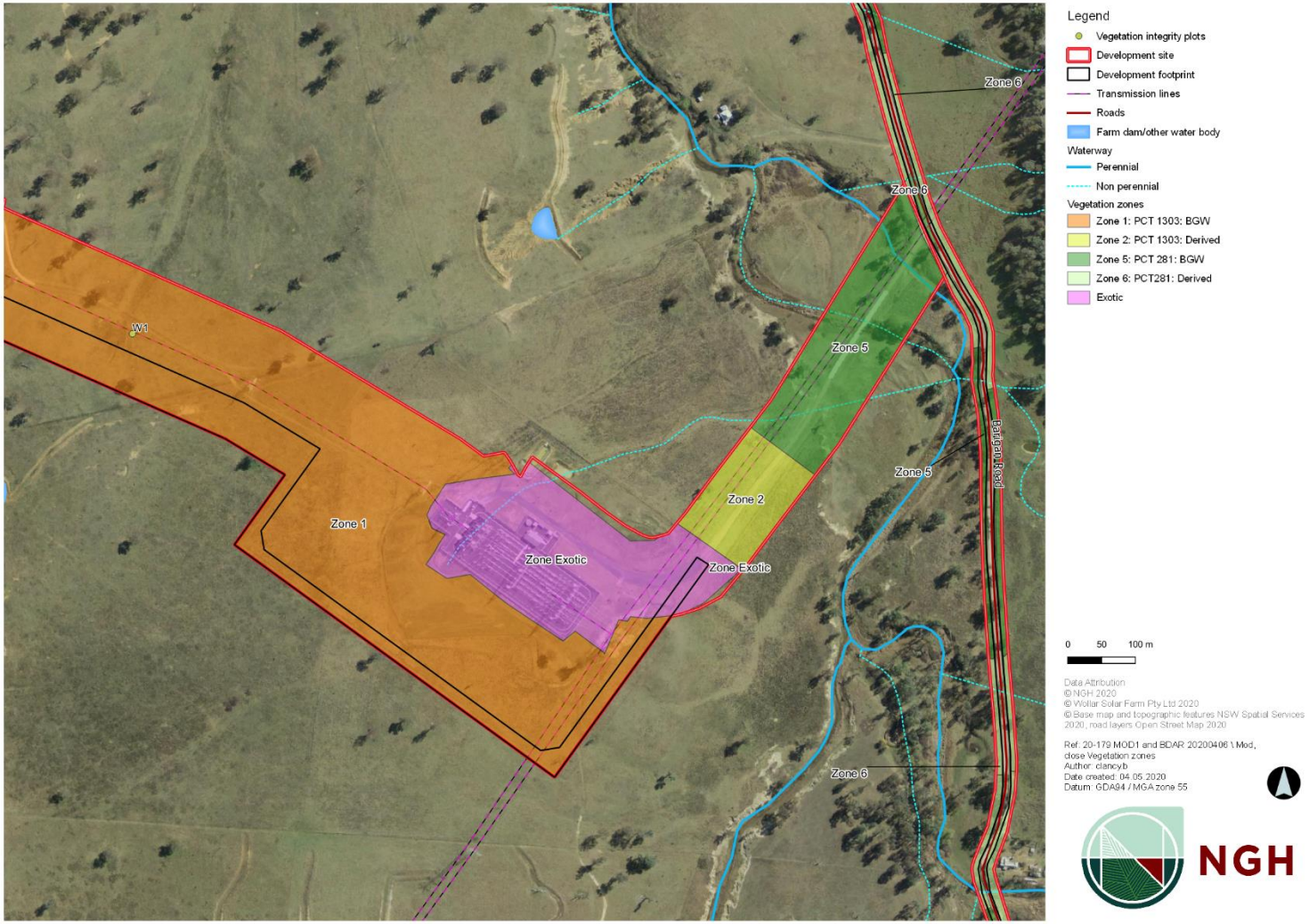


Figure 6-3 Surveyed vegetation zone boundaries under the modification

7. ENVIRONMENTAL MANAGEMENT PROTOCOLS AND PROCEDURES

The following protocols and procedures have been developed to manage the impacts of the project on biodiversity. Table 7-1 below summarises the phase of the project to which the protocol/procedure applies. Note: at the time of update 3.2 to the BMP, stages 1 and 2 have been completed, stage 3 is underway and stage 4 will not be undertaken. Reference to stage 4 actions have been removed.

Table 7-1 Summary of protocols and their applicability to stages of the development.

Protocol	Construction	Stage	Operation	Stage
7.1 Ground Disturbance Protocol	*Yes*	*1, 2, 3*	*NA*	*N/A*
7.2 Vegetation Clearance Protocol	*Yes*	*1, 2, 3*	*NA*	*N/A*
7.3 Re-use of Resources Protocol	*Yes*	*1, 2, 3*	*NA*	*N/A*
7.4 Threatened Species Finds Procedure	*Yes*	*1, 2, 3*	*Yes*	*2 & 3*
7.5 Weed and Pest Management Protocol	*Yes*	*1, 2, 3*	*Yes*	*2 & 3*
7.6 Vehicle Hygiene Protocol	*Yes*	*1, 2, 3*	*Yes*	*2 & 3*
7.7 Vegetation Constraints Management Protocol	*Yes*	*1, 2, 3*	*Yes*	*2 & 3*
7.8 Noise, Light and Dust Management	*Yes*	*1, 2, 3*	*Yes*	*2 & 3*
Appendix A Groundcover Management Plan	*Yes*	*1, 2, 3*	*Yes*	*2 & 3*

Each of these protocols/procedures is described in detail in this section below (and Appendix A).

Risks to fauna from vehicle collision have also been identified however this is managed through the implementation of speed limits which is covered in the project's Traffic Management Plan and will be included in the EPC's Safety Plan. Monitoring of fauna fatalities has been included as part of this BMP in Section 9 with appropriate triggers and responses included.

Table 8-1 provides a summary of the key performance criteria for the protocols and procedures detailed in this BMP and triggers for corrective actions. The actions to be implemented should the trigger arise are also described.

7.1. GROUND DISTURBANCE PROTOCOL

A ground disturbance permit process will be implemented during construction of road upgrades. The ground disturbance permit process is integral to communicate the distinction between vegetation protection areas and the ground disturbance footprints in which construction contractors will be working. This process is also vital to enable the construction contractor to track and control vegetation clearing on a daily, weekly, and monthly basis.

The ground disturbance permit process is managed by the Health, Safety, Environment and Quality Control (HSEQ) Manager or equivalent and is summarised below.

- Contractors are informed in their contract and site induction that all ground disturbing activities require them to obtain a ground disturbance permit prior to undertaking the work.
- The ground disturbance permit must be submitted to the HSEQ Manager before the work is undertaken.
- The HSEQ Manager will compare the proposed ground disturbance area to the project road upgrade footprint detailed in the approved detailed design.
- A pre-clearing survey (Section 7.2.2) will be conducted prior to confirm the location and extent of the proposed clearing and confirm this is within the assessed area.
- The HSEQ Manager will either issue the permit unamended or contact the contractor for further clarification.
- Once the permit has been issued, the construction contractor may undertake ground works as per their contract.
- Once the work has been completed (date specified in the permit), the HSEQ Manager will inspect the site, request any additional clean up or remediation activities and set a follow-up inspection date for these additional activities, and only sign-off that the conditions of the permit have been met. This will include as a minimum, temporary groundcover to prevent erosion and reduce the potential for weed invasion.
- The HSEQ Manager will then record the disturbed area as part of a running total disturbed area for the Project.

An example of the ground disturbance permit form is provided in Appendix B.1

7.2. VEGETATION CLEARANCE PROCEDURE

The vegetation clearance procedure will be implemented for vegetation clearance during construction.

7.2.1. Monitoring Total Clearing Footprint

Vegetation clearance is only permitted in the areas identified in the BDAR 2019. Any additional clearance required will first require a project modification.

Prior to vegetation clearing, the HSEQ Manager will digitally capture and display clearance boundaries within the site. Survey teams and GIS databases will be used to inform and record vegetation clearing and site rehabilitation.

The cumulative amount of vegetation cleared will be progressively monitored by the HSEQ Manager. Prior to undertaking any vegetation clearing, this value will be compared to the total approved area to be cleared.

Demarcation of the development footprint is the responsibility of the construction contractor and will be determined by them. This will assist to minimise clearing and avoid unnecessary disturbance of vegetation in the project site. Typical measures will include:

- Use of temporary fencing (preferred)
- Flag tape or rope (if this option is used it should be inspected weekly to ensure it has not been damaged by plant or inclement weather and any that has should be repaired).

7.2.2. Pre-clearing Surveys

Pre-clearing surveys will be carried out by an Ecologist prior to any vegetation clearing. The following pre-clearing surveys will be carried out when habitat trees are to be removed, including hollow-bearing trees and other woody vegetation:

- Identifying any potential breeding/roosting habitat

- Recording number, location and type of tree hollows present for use during hollow-bearing tree removal
- Clearly marking habitat trees with flagging tape and demarcating area to be cleared
- Remove any hollow bearing trees outside of Spring and Gang-gang Cockatoo breeding season (i.e. between October and January). If clearing outside of this period cannot be achieved, pre-clearing surveys would be undertaken to ensure no impacts to fauna would occur.

The results of these surveys will be provided to site staff (including equipment operators) involved in vegetation clearing, through site inductions, toolbox talks, and targeted training (Section 9.2), as well as through the issuing of ground clearance permits (Section 7.1). This will assist to avoid unnecessary clearing and minimise disturbance of vegetation.

7.2.3. General Process

When undertaking vegetation clearing, the process shown in Figure 7-1 will be followed to minimise the area of disturbance and the amount of vegetation to be cleared.

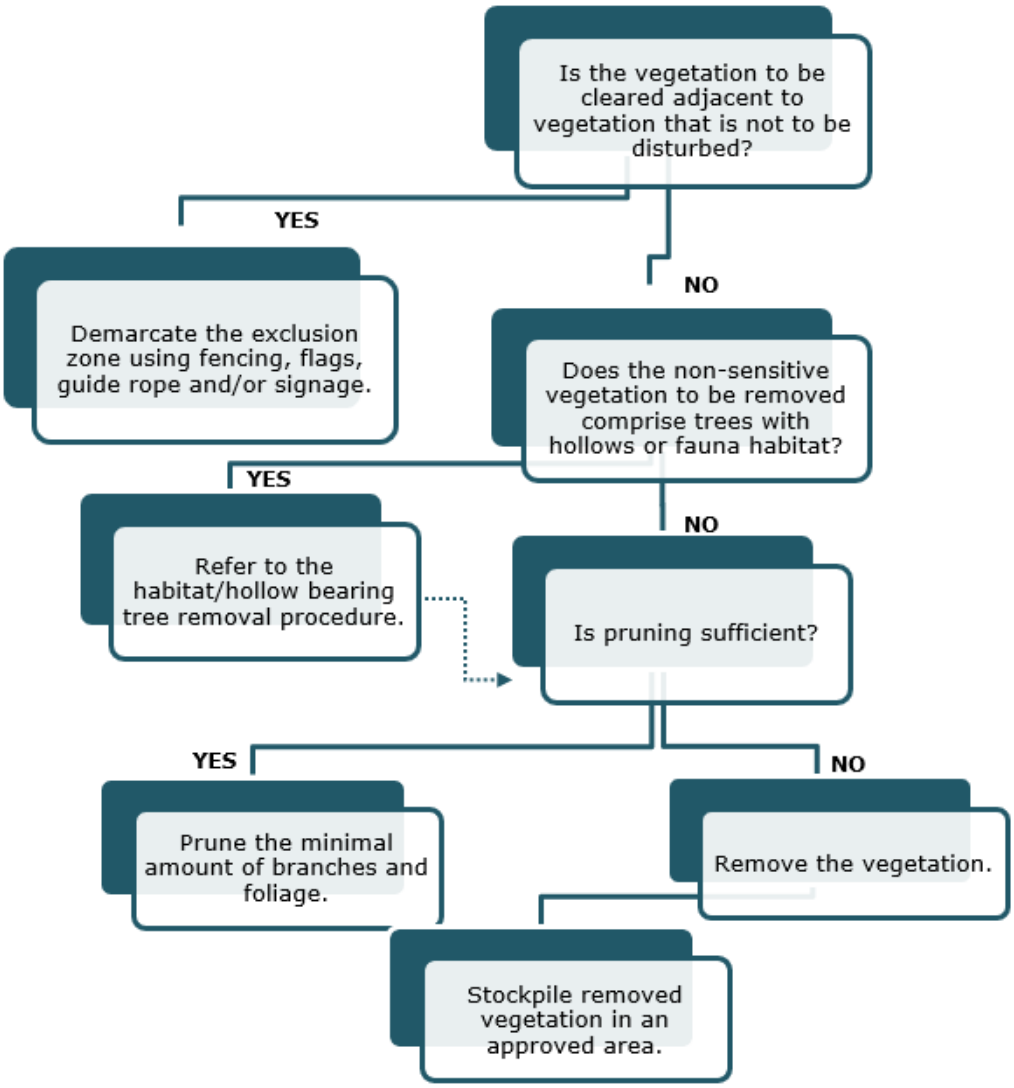


Figure 7-1 Vegetation clearance protocol

7.2.4. Clearing Near Exclusion Zones

Exclusion zones containing vegetation must be protected from any project impacts. Prior to construction commencing, vegetation in these areas will be protected by exclusion fencing and signage (e.g. Figure 7-2 and Figure 7-3). These areas will be communicated to site staff (including equipment operators) through site inductions, toolbox talks and targeted training prior to works taking place in the vicinity. A vegetation exclusion zone will be established between vegetation constraints and protective fencing (no closer than the dripline of the vegetation) to ensure that vegetation constraints are not impacted accidentally. Additional exclusion fencing will define the boundary between vegetation to be removed and vegetation to be retained. Vegetation removal in these areas will be conducted with chainsaws rather than machinery to minimise clearing and avoid unnecessary disturbance.

Figure 7-2 Example of exclusion zone signage

Figure 7-3 Example of exclusion zone fencing

Following any vegetation clearing in the vicinity of a biodiversity constraint which is not to be impacted, the HSEQ Manager will conduct an inspection of the area to confirm that the constraint has not been impacted.

7.2.5. Lopping, Pruning and Trimming Procedure

Heavy machinery will not be used for pruning or trimming; this will minimise clearing and avoid unnecessary disturbance to vegetation. Appropriate tools to use are loppers, chain saws and vehicle mounted saws.

In the first instance, hollow bearing limbs will be retained. If this is not possible the hollow bearing limb will be inspected by the Contractor Ecologist / suitably qualified expert and placed in adjacent undisturbed vegetation to provide fauna habitat. If an adjacent area is not suitable, the ecologist will provide advice on placement of the hollow bearing limb. Tree limbs are to be removed using the three-cut method as shown below in
Figure 7-4

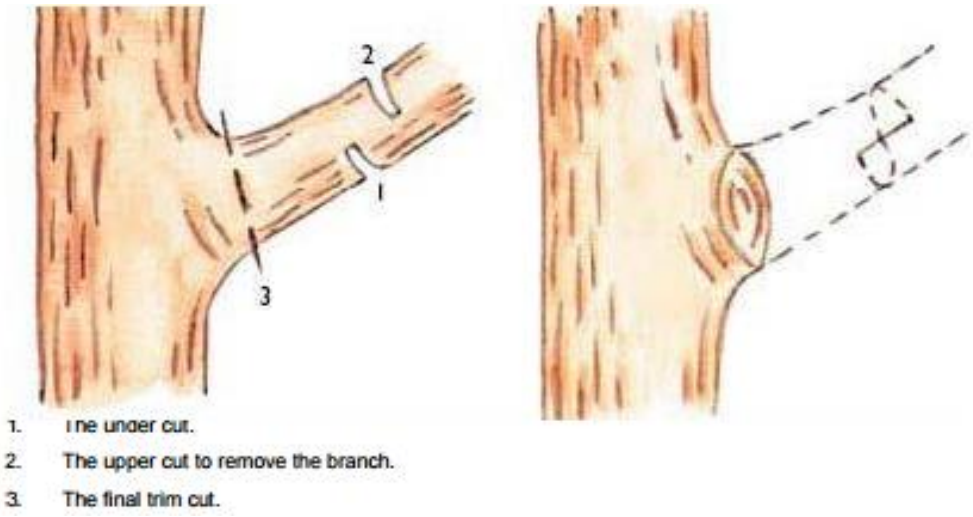


Figure 7-4 Three-cut method of removing branches

7.2.6. Hollow Bearing Tree Removal Procedure

Hollow-bearing trees are an important habitat feature for a variety of native animals such as possums, gliders, birds and bats. Before clearing any hollow-bearing or habitat trees, it is important to consider if animals are present. Hollow-bearing trees would not be removed during Spring, when breeding is at it's peak for most species. This will avoid unnecessary disturbance. If clearing outside of this period cannot be achieved, pre-clearing surveys would be undertaken to ensure no impacts to fauna would occur. Appropriate relocation areas for all potential species of hollow-dependent fauna should be identified by an ecologist prior to HBT removal (uninjured fauna only, that can't relocate on their own or where there is no suitable habitat nearby).The following procedure (Figure 7-5) is a guide to give animals an opportunity to escape a hollow-bearing tree prior to it being removed.

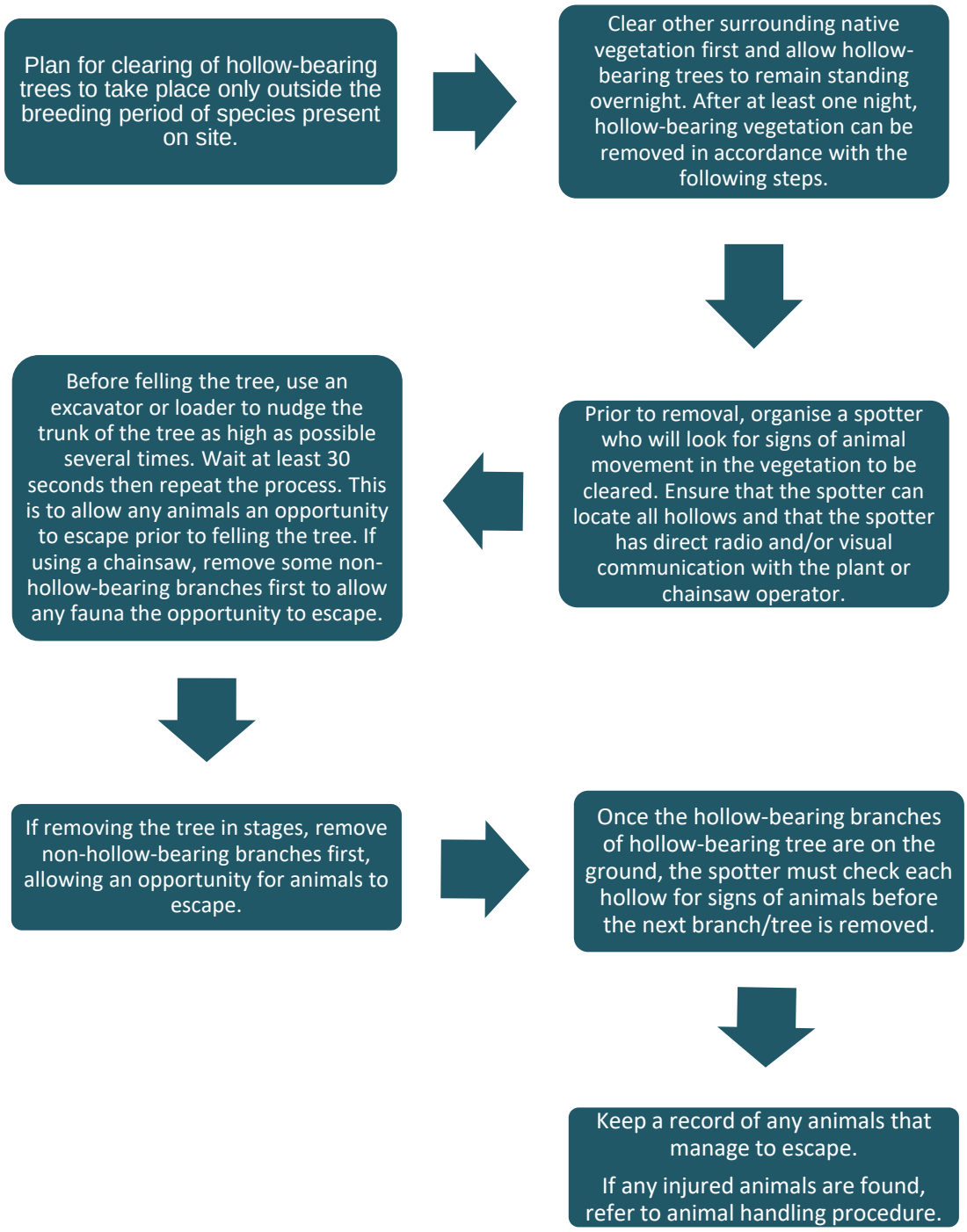


Figure 7-5 Hollow bearing tree removal procedure

7.2.7. Removal of Trees Outside the Approved Clearing Limits

The approved clearing limit is the line between the vegetation to be removed and the vegetation to be retained. It will be shown on all design plans as required. Some construction activities will require tree removal or trimming that has not been included in the design.

Where additional impacts to trees are required, the following process will be followed:

1. The Site Manager will notify the HSEQ Manager of the location and need for the tree impact via the ground disturbance permit process
2. Alternatives to removing the tree will be investigated as the first step of this stage to minimise clearing and disturbance. The HSEQ Manager will assess that the tree (or other vegetation type) is not heritage listed, part of an EEC, a habitat tree, nominated for retention or protected under relevant legislation and is legally able to be removed and/or trimmed.
3. The HSEQ Manager will consult an ecologist if hollows or fissures are suspected.
4. The HSEQ Manager will consult a heritage specialist if heritage significance is suspected.
5. The Supervisor will await written confirmation from the HSEQ Manager prior to restarting works around the tree(s).

7.3. RE-USE OF RESOURCES

7.3.1. Re-use of Coarse Woody Debris (CWD)

Within the solar farm area felled timber from greater than 200 mm and less than 600 mm in diameter will be used as CWD for habitat enhancement and to maximise the salvage of resources within the disturbance area for beneficial reuse. CWD can be used to enhance habitat values in existing vegetation and rehabilitated areas including derived native grassland (either in offset areas or areas adjoining impacted areas). CWD can provide:

- Habitat for micro-invertebrates.
- Habitat for macro-invertebrates.
- Habitat for vertebrates using fallen timber for shelter, e.g. skinks, geckoes, dunnarts.
- Habitat for vertebrates using fallen timber for foraging, e.g. treecreepers, robins.
- A source of nutrients, microorganisms for native vegetation.
- Increased habitat complexity.

CWD will be placed as discrete logs rather than in piles to reduce fire risk and potential for use as shelter by feral animals such as foxes and rabbits. The distribution density of CWD must take into account existing fallen timber. Removal, transportation, and placement of CWD will be carried out in a manner that minimises disturbance to native vegetation, including the canopy, trees, shrubs, standing dead timber, fallen timber, and groundcover, as well as topsoil.

Felled timber greater than 600 mm in diameter (primarily tree trunks) will be used as CWD where practicable or left on site where it is too large to transport.

Felled timber between 10 and 200 mm in diameter will be chipped and used for disturbed area rehabilitation.

Where timber is felled within road reserves it may need to be removed in accordance with the requirements of the responsible road authority The local Council could be consulted about the potential for CWD required to be removed to be relocated to a nearby bushland reserve/ecological restoration area.

7.3.2. Re-use of Rocks

Rocks greater than 300 mm diameter at their widest point removed during construction will be retained and relocated to areas on the advice of an Ecologist. Removal, transportation, and placement of rocks will be carried out in a manner that minimises disturbance to vegetation constraints, including the canopy, trees, shrubs, standing dead timber, fallen timber, and groundcover, as well as topsoil.

7.3.3. Re-use of Soil Resources

Topsoil will be salvaged where possible within the approved disturbance area and stockpiled for beneficial reuse in the enhancement or rehabilitation of the site, as per the Weed Management Procedure (Section 7.5).

Stockpiles and storage of materials and machinery will avoid the dripline (extent of foliage cover) of any native tree and erosion control measures such as sandbagging around the edge of stockpiles should be implemented to avoid run-off/sedimentation in any adjacent exclusion areas.

7.4. THREATENED SPECIES FINDS PROCEDURES

The threatened species finds procedure will be implemented whenever a threatened species is unexpectedly found throughout construction and operation across the development footprint.

Any nests found in habitat features to be removed during construction will be inspected by an Ecologist to determine whether fauna are using the nest, and whether relocation of the fauna and the nest to an adjacent area is viable.

As a general principle, any native animals found with the construction area will be avoided. Fauna will only be handled by a qualified ecologist or wildlife carer with relevant skills and experience (e.g. snake handling), and only when absolutely necessary.

Should threatened fauna, or suspected threatened fauna, be encountered, the procedure outlined in Figure 7-6 will be followed. If capture is required by an Ecologist a procedure is provided below as guidance.

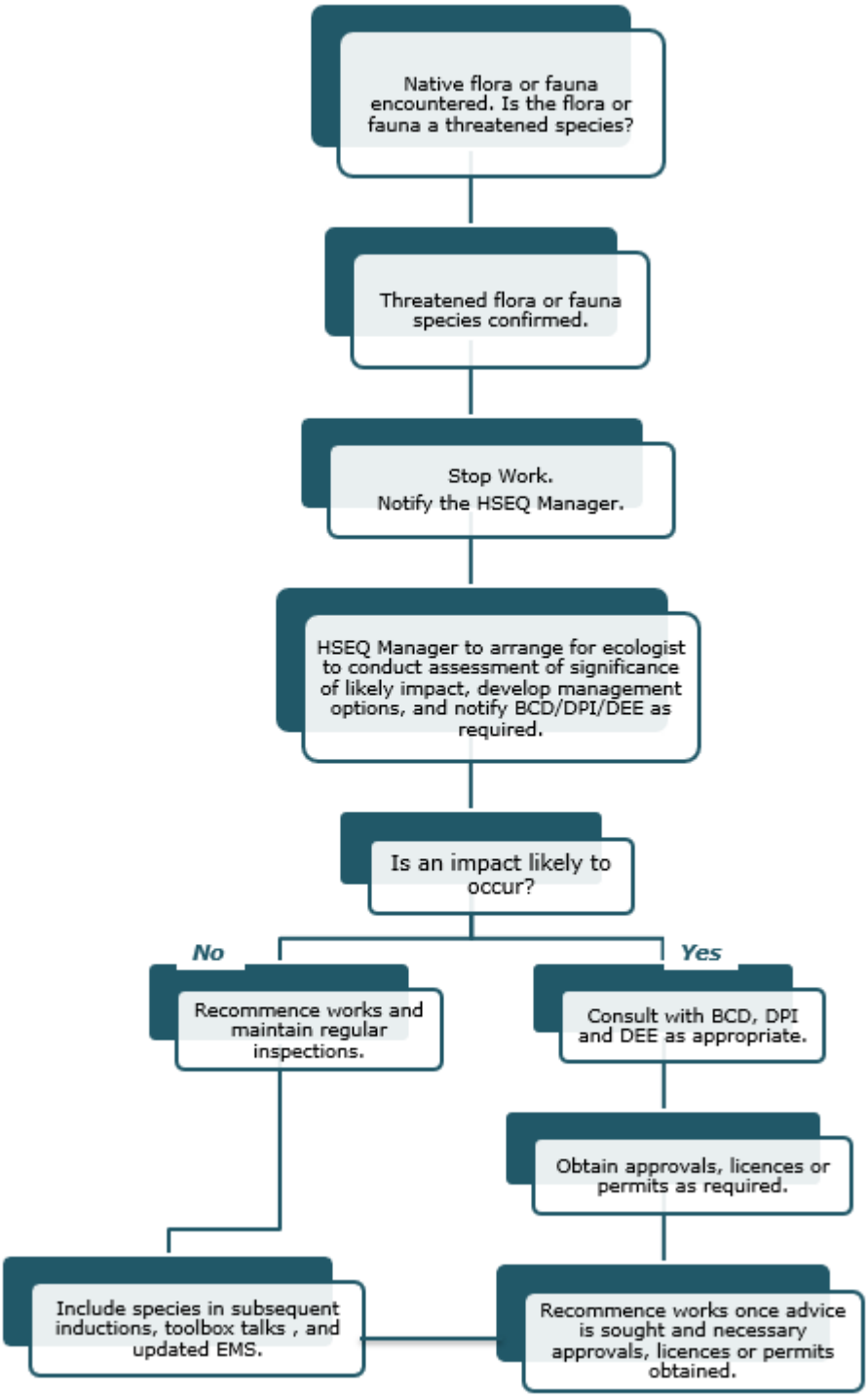


Figure 7-6 Threatened species finds protocol

Fauna Relocation Procedure (to be completed by an Ecologist)

Step 1

Notify the local WIRES branch of potential need of assistance prior to works commencing in case they have volunteers who can be on standby. Remove any threat to the animal that could cause or exacerbate an injury.

Step 2

Use appropriate equipment and measures to capture the animal. This may include:

- Frogs: disposable gloves, disinfectant on hands and equipment between animals, disposable plastic bags (one per animal, one use only).
- Mammals and birds: gloves, cloth bags/cotton pillow slips, up-to-date Australian Bat Lyssavirus vaccinations (for microbats), extendable net.

Step 3

Contain the animal to minimise stress using towels to cover them. Gently place the animal in a holding box specifically designed for holding the species (i.e. cotton bag for microbats, mesh cage for large mammals e.g. possums, soft lined enclosure for birds or hard cage for parrots). Cotton pillowslips may be used to cover mammals, or mammals may be placed inside them. Boxes will be placed in a quiet, safe, dark location (not in a vehicle unless temperature is constantly monitored). Do not give the animal food or water. If there are dependent young separated from their parents make sure they are kept warm.

Step 5

Call WIRES on 1300 556 686, who will provide advice on what to do until a trained WIRES rescuer can come to take the animal away. If you cannot contact WIRES, contact either Gulgong Veterinary Surgery (02 6374 1160) or Mudgee Vet Hospital (02 6372 2105).

Step 6

Release fauna into similar habitats, as near as possible to their capture location. Day-active fauna will be released during the day of capture. Night-active fauna will be released at or after dusk. Arboreal (tree-dwelling) fauna will be slowly released from their bag onto the trunk of a tree, with bats and gliders placed on a tree with rough or peeling bark and hollows. Hollow dependent fauna will require a species-specific nest box to be placed where they are released as temporary accommodation until they relocate to a site of their choosing.

Step 7

Details of fauna captured and relocated will be recorded in a threatened species finds register (Appendix B.2). Any injury or death of a threatened species will be reported to the HSEQ Manager.

7.5. WEED AND PEST MANAGEMENT PROTOCOL

Weeds and pests will be controlled on the solar farm site throughout construction and operation. The Site Manager or HSEQ Manager will also initiate collaboration with adjoining landholders to control animal pests and weeds that may traverse property boundaries. These initial communications will inform collaborative pest and weed management measures during construction and operation.

7.5.1. Weed Management Procedure

Weeds in this BMP are defined as non-native flora species.

Work for the Project has the potential to spread weeds through the movements of heavy machinery and light vehicles during construction, and the movements of light vehicles during operation.

Weeds will be controlled through:

- An adaptive management approach whereby management actions will be adjusted to optimise the groundcover growth addressing on-site observations.
- For more intensive infestations of weeds, the use of selective herbicides may be warranted to prevent seed set and promote weed control. The advice of an ecologist and agronomist will be sought to advise on the control of weed infestations.

A detailed weed management procedure is provided below.

Weed Inspection

During construction, the HSEQ Manager will do the following weed inspections:

- Survey weed distribution across the project site monthly
- Survey weed abundance in exclusion zones monthly.
- Targeted weed inspections prior to clearing and grubbing in the affected area.
- Survey weed distribution and abundance where a previous weed infestation has been identified.

During operation, Mid-Western Regional Council were to implement their own procedures and monitoring programs for weed inspection for Stage 1 works.

Proponent would undertake a follow up inspection 6 months after the completion of the road upgrades to assess weed growth and any new infestations.

Infestations of invasive weeds will be mapped with GPS, including noting the species and degree of infestation, and capturing an image for monitoring purposes. Data collected from inspections will be used as a basis for implementing seasonal targeted weed control measures.

Weed Treatment

During construction of the project, weed control will be based on data collected from survey and inspections of the project site and of exclusion zones. Targeted weed control measures for any recorded weed outbreaks will be implemented within a fortnight of discovery. The aims of construction weed treatment include:

- Apply weed treatments to all mapped invasive weed infestation areas.
- Reduction in invasive weed distribution by at least 50% in mapped infestation area.
- No more than 10% of groundcover to be weeds in zones 1, 2, 5, 6 and 8 (no increase in baseline conditions). Zones 3, 4, 7 and 9 where existing baseline conditions of baseline vegetation is more than 10% weed groundcover would not be left in a worse condition than that prior to construction.

A general guide to weed control and management is presented above. More detailed information, including herbicide types and application rates, can be sought from the Contractor Ecologist or from the WeedWise website (http://weeds.dpi.nsw.gov.au/). Consultation with Local Land Services (LLS) will also be undertaken to ensure a coordinated approach with other landholders in the area.

The introduction and spread of weeds via vehicles and plant will be controlled by the Vehicle Hygiene Procedure provided in section 7.6.

Herbicide Application Record

Herbicide application will only be carried out by authorised personnel (i.e. ChemCert accreditation – AQF 3) in accordance with SafeWork requirements.

Herbicides will only be applied in accordance with the Safety Data Sheet (SDS) for that product.

A Herbicide Application Record (Appendix B.2) will be completed and public notifications made in accordance with relevant legislation, where herbicides are to be used in areas that could be accessed by members of the public.

Follow-up Inspection

The HSEQ Manager will ensure that a follow-up inspection is undertaken of identified weed infestation sites to ensure treatment was successful.

Weed Disposal

Where invasive weed areas are disturbed by construction activities, weeds and topsoil that may contain weed propagules will be removed and disposed of appropriately.

Where weeds cannot be effectively destroyed prior to topsoil stripping, weed contaminated topsoil will be isolated and either encapsulated by deep burying, or disposed of at an approved offsite licensed facility as directed by the HSEQ Manager. Disposal of weeds should adhere to any special requirements as identified under the *Biosecurity Act 2015* and Regulation and the Regional Strategic Weed Management Plan.

Ongoing Management and Monitoring

Monitoring of weed infestations will occur as part of the routine environmental inspections throughout construction to determine effectiveness of management controls. The presence of any weeds and the necessary management actions will be noted on the Environmental Inspection Checklist (included in the EMS). Please note any occurrences of pathogens such as Myrtle Rust and Phytophthora would be monitored, treated, and reported as required.

7.5.2. Pest Animal Management Procedure

No animal pest species requiring specific control measures were recorded during site surveys. However, some may be present at the site. Monitoring of animal pests and signs of their activity will occur as part of routine inspections during construction, and operation. A suitably qualified person will traverse the site to identify if vertebrate pests are present, including the following species as a minimum:

- European Rabbit
- European Hare
- Red Fox
- Feral Cat

The following data would be recorded and used to determine the need for pest animal control measures:

- Number and location of any tracks, traces or sightings
- Whether the level of activity is negligible, minimal, moderate or high.

If any are identified that are required to be controlled, the appropriate management actions listed at https://www.dpi.nsw.gov.au/biosecurity/vertebrate-pests/pest-animals-in-nsw will be implemented, and noted on the Environmental Inspection Checklist.

Pesticide Application Record

As with herbicide applications, pesticides will only be administered by authorised personnel with ChemCert accreditation – AQF 3 and in accordance label instructions. A Pesticide Application Record (Appendix B.4) will be completed and public notifications made in accordance with relevant legislation, where pesticides are to be used in areas that could be accessed by members of the public. Only pesticides registered for use near water may be used near any waterways.

7.6. VEHICLE HYGIENE PROCEDURE

7.6.1. Vehicle Plant and Equipment Movement

Vehicle hygiene procedures will be implemented for any vehicle that enters the development site during construction which is likely to come into contact with the natural ground or weeds. NSW DPE Saving Our Species Hygiene guidelines - *Protocols to protect priority biodiversity areas in NSW from Phytophthora*

cinnamomi, myrtle rust, amphibian chytrid fungus and invasive plants should be used to guide these activities. The procedures include:

- Inspection upon arrivals in laydown area.
- Removal of dirt and/or plant matter from newly arrived vehicles at a designated washdown area by trained site personnel.
- Washing and inspection prior to vehicles being given the all clear to enter indirect disturbance areas.
- Inspection and washing after leaving indirect disturbance areas and prior to leaving the site.
- Inspections and washdowns will be recorded on a Vehicle Hygiene Register. An example is shown in Appendix B.5 .

Any water from the washdown area will be managed in accordance with the ESCP.

7.7. VEGETATION CONSTRAINT MANAGEMENT

7.7.1. Management Areas

Exclusion zones outside the approved disturbance areas will be managed throughout construction and operation to protect them from any impacts from the project.

The aim of vegetation constraint management is for the condition of this vegetation to be maintained or improved during the lifetime of the project.

The following target has been established:

- Maintain or improve the condition of vegetation in exclusion zones throughout construction and operation of the project including vegetation connectivity.

7.7.2. Management Actions

Vegetation Constraints

Exclusion zones will be demarcated prior to clearing in accordance with the Vegetation Clearance Procedure (Section 7.2), at no closer than the dripline around terrestrial exclusion zones. These zones will be demarcated to ensure that vegetation is not impacted accidentally. This may consist of star pickets at 4 to 5 m intervals with a strand of plain wire and flagging tape. The location of exclusion areas will be communicated to site staff (including equipment operators) through site inductions, toolbox talks and targeted training prior to works taking place in the vicinity.

Indirect impacts on vegetation constraints will be reduced by:

- Avoiding vehicle or plant access within exclusion zones.
- Where night works cannot be avoided, work must not take place within 100 m of exclusion zones.
- Directing lights away from exclusion zones.
- Noise-emitting plant will be oriented so that noise will be directed away from exclusion zones.
- When not in use, vehicles and plant will not be left idling near exclusion zones but will be switched off whenever possible.
- Reducing the use of machinery and vehicles within areas of EEC where possible (noting that solar farm infrastructure will cover the majority of the Development Footprint). In areas where clearing is required under existing overhead transmission lines should be undertaken using chainsaws where possible. Once access tracks are establish these should be utilised to traverse the site as much as possible.

Weed Management

There is a risk of weed encroachment during construction and operation from infested areas into exclusion zones, and potentially from exclusion zones into disturbed areas following groundcover rehabilitation. To manage these risks, weed management as described in Section 7.5 will include monitoring exclusion zones and implementing weed control measures as required throughout construction and operation.

Weeds in the exclusion zones will be controlled in accordance with the Weed Management Procedure (Section 7.5).

Response to Decline in Condition

If a quantitative assessment of vegetation constraint condition determines the need for an additional management response, actions may include but are not limited to:

- Erect permanent fencing to exclude stock and human/vehicle access.
- Targeted weed or pest control.
- Groundcover rehabilitation and shrub/tree plantings for habitat enhancement.

Fauna Connectivity

Maintain connectivity of vegetation to be retained, this will involve the installation of fences with no barbed wire on the top strand and/or the use of fauna crossing structures to enable arboreal fauna movement across roadways.

7.7.3. Noise, Light and Dust Management

Construction will avoid night work where possible. If night works are required lights will be directed away from vegetation. The EMS will detail further noise and light controls. Adaptive dust monitoring programs will be detailed in the EMS.

7.7.4. Riparian Zones around 4th Order Waterways

For Stage 3 construction works a 40m buffer zone from the bank of the waterway will be demarcated (per Section 7.2.1) to protect the riparian vegetation around the two 4th order stream under the Strahler System, within the development footprint (Wollar Creek and Spring Flat Creek). The EPC contractor will be responsible for demarcating this area.

Construction within the buffer zone will be avoided with the exception of the construction of crossings for the internal access roads and for the installation of underground cables. If Stage 4 of the development is undertaken the existing crossing over Wollar Creek will be upgraded. The design and construction of the waterway crossings (in the form of bridges or culverts) will need to consider the requirements of the following publications:

- Why do fish need to cross the road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003).
- Policy and Guidelines for Fish Friendly Waterway Crossings (NSW DPI, 2003).
- Guidelines for Watercourse Crossings on Waterfront Land (NSW DPI, 2012).
- Guidelines for Laying Pipes and Cable in Watercourses on Waterfront Land (NSW DPI, 2012).

8. PERFORMANCE CRITERIA, TRIGGERS AND RESPONSES

Table 8-1 below provides a summary of the key performance criteria and triggers for corrective actions. The actions to be implemented should the trigger arise are also described. This combined with the monitoring described in Section 9.3 forms the Trigger, Action Response Plan (TARP) for the Project. The monitoring triggers have been used to inform the triggers for protocols and procedures that require monitoring in Table 8-1.

Table 8-1 Summary of performance criteria, triggers for actions and responses for environmental management protocols associated with the project

Management Protocol	Performance Criteria	Risk of not achieving performance criteria	Trigger for additional actions	Action Proposed
Ground disturbance protocol (section 7.1)	• Ground disturbance permit process implemented prior to construction. • Remediation activities completed and conditions of the permit met. • Final disturbed area recorded.	Low – Standard construction procedure that contractor will be familiar with.	• Permit not obtained. • Remediation activities not completed. • Final disturbance area not recorded.	• Escalate matters above the HSEQ Manager to ensure compliance with this BMP.
Vegetation clearance procedure (section 7.2)	• No more than 463.28ha of vegetation impact within management zones (16.82ha zone 1, 102.3ha zone 2, 110.7ha zone 3, 12.81 zone 4, 7.99ha zone 5, 102.8ha zone 6, 31.64ha zone 7, 0.14ha zone 8 and 27.1ha zone 9). • Pre-clearance surveys conducted. • No impacts on exclusion zones. • Establishing ground cover as soon as possible to prevent erosion and weed invasion (groundcover to achieve seed set of at least 80% cover).	Low – Clearing area will be clearly demarcated prior to clearing commencing. Pre-clearance requirements are detailed in this BMP. Exclusion areas will be clearly identified.	• Pre-clearance surveys not completed. • Clearing outside of approved clearing areas. • Clearing of trees not identified for removal.	• Clearing works will not commence until required surveys are completed. • If clearing occurs outside of marked clearing areas or of marked trees, works will cease immediately and advice sought from BCD as to whether further assessment/approval requirements are applicable.

Management Protocol	Performance Criteria	Risk of not achieving performance criteria	Trigger for additional actions	Action Proposed
Re-use of resources protocol (section 7.3)	• Coarse Woody Debris, Rocks and Topsoil (as described in Section 6.1) removed during construction are retained. • Retained resources are relocated appropriately into exclusion zones for habitat.	Low – Standard construction practice.	• Resources stockpiled and not relocated.	• Resources to be relocated immediately under the Guidance of a Ecologist to ensure minimal damage to the exclusion zone.
Unplanned Threatened Species Finds Procedure (section 7.4)	• Threatened Species Finds Procedure followed if threatened species found. • No harm to threatened species.	Moderate – Not all personnel on site will have the skill to be able to identify threatened species.	• Threatened species found to be present (living or dead) that was not previously identified.	• Prepare and implement an education program for personnel working on site to increase awareness of threatened species that may be encountered.
Weed and Pest Management Protocol (section 7.5).	• A general reduction in the abundance of weeds in exclusion zones during the operation period, with groundcover to be less than 10% weeds in appropriate zones as per section 7.5.1. • New invasive weeds detected in proposal site are controlled during operation as per the weed management procedure (7.5.1). • Pest animal populations maintained at a low level of activity.	Low to moderate – Weed abundance is highly dependent on seasonal conditions and the amount of seed stored within the seed bank. Similarly, Pest animal abundance is seasonally variable and influenced by external factors such as management by adjacent landholders. However, weeds and pests are manageable with appropriate	• Presence of weeds detected during monitoring. • New weed species on site detected during monitoring. • Moderate or High levels of observed pest animal activity.	• Eliminate weed species as soon as practicable in accordance with recommended control methods and timing. • Increase targeted weed or pest animal control measures (Section 7.5). • Seek additional advice from Local Land Services and adhere to recommendations.

Management Protocol	Performance Criteria	Risk of not achieving performance criteria	Trigger for additional actions	Action Proposed
		treatment applied in a coordinated approach by trained personnel.		
Vehicle Hygiene Procedure (section 7.6)	• Vehicle hygiene procedures implemented for all vehicles.	Low – Standard site procedure.	• Vehicle hygiene procedures not being implemented.	• To be raised with HSQE managemen on site. Ensure it is included in site inductions, toolbox talks etc and that staff responsible are implementing th procedure.
Vegetation Constraint Management (section 7.7)	• Maintain or improve the condition of vegetation in exclusion zones throughout construction and operation of the project. • Quarterly surveys of weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. • A general reduction in weed abundance in exclusion zones throughout the operational period, with groundcover to be less than 10% weeds in appropriate zones.	Moderate – Condition of vegetation in general is highly dependent on climatic conditions and is variable from year to year. Active management measures can be implemented to improve the condition of vegetation in exclusion zones with a reasonable degree of confidence of success.	• Decline in exclusion area condition as evidenced by monitoring. • Weed abundance not decreasing within exclusion zones. • Moderate to high pest animal activity recorded in exclusion zones.	• Investigation into reason for decline by suitable qualified person(s). Recommendations following investigation to be followed which may include but not be limited to: • Erect permanent fencing to exclude stock and human/vehicle access. • Targeted weed or pest control. • Groundcover rehabilitation and shrub/tree plantings for habitat enhancement.
Groundcover management (Appendix A)	• Rehabilitate all disturbed areas not required for the operation of the roads. • Revegetation of disturbed areas will have 70% ground cover over 90% of disturbed areas within 12 months of establishment and maintained	Moderate – Condition of groundcover will be dependent on climatic conditions and will also be affected by other	• Groundcover below 70% cover of 90% of disturbed areas. • Weed coverage greater than 10% in zones 1,2,5,6 or 8.	• Additional watering of seeded areas. • Weeds controlled where required. • Treat soil conditions such as compaction, frequency of traffic movements, low seedbank storage,

Management Protocol	Performance Criteria	Risk of not achieving performance criteria	Trigger for additional actions	Action Proposed
	throughout operation until contract completion. • Native species will be used for revegetation wherever practicable in areas identified as native grassland as well as exotic vegetation. • Targeted weed control measures will be implemented if weed cover exceeds 10% of groundcover in appropriate zones or if weeds are detected in appropriate zones. • Native species will be used for revegetation where practicable in areas identified as native grassland as well as exotic vegetation. • Failed vegetation patches greater than 5 m^2 will be revegetated. • Scours greater than 50 mm deep and 100 m long will be revegetated. • Ground cover will achieve seed set across at least 80% of area in 12 months.	management measures such as weed treatment. Success of sowing and seed set will also be dependent on climatic conditions and other variables.	• Presence of priority weeds. • Failed vegetation patches greater than 5 m^2. • Scours greater than 50 mm deep and 100 m long • Ground seed set below 80% of area after 12 months.	lack of soil moisture and nutrient imbalance. • Seek additional advice from an agronomist if seed set is not occurring.

9. COMPLIANCE MANAGEMENT

9.1. ROLES AND RESPONSIBILITIES

The Project Team's organisational structure and overall roles and responsibilities are outlined in the EMS. The Environmental Management Team includes the roles and responsibilities identified in Table 9-1 below.

Table 9-1 Roles and responsibilities – Environmental Management Team

Role	Responsibility	Authority
Contractor Project Manager	• Ensure resources are made available to enable works to comply with EMS and other environmental management requirements. • Ensure that all procedures are followed adequately. • Ensure appropriate approvals and licences are held. • Ensure all staff and contractors are aware of environmental compliance requirements and environmental controls. • Responsible for reporting pollution incidents.	• Order Stop-work for an activity that may cause material or environmental harm. • Release of environmental hold points, if required.
Contractor Health Safety and Environment and Quality Manager (HSEQ)	• Maintaining all environmental management documents. • Identifying where environmental measures are not meeting the targets and where improvements can be achieved. • Monitoring and reporting environmental compliance. • Reviewing Project environmental documents. • Reporting of pollution incidents.	• Recommend Stop-work for an activity that may cause material or environmental harm. • Release of environmental hold points, if required.
Contractor Site Manager	• Responsible for the implementation of environmental management plans. • Responsible for the induction of staff and contractors. • Responsible for all aspects of the worksite including the coordination and management of all staff and contractors.	• Order Stop-work if any items in the EMS are in danger of breach. • Approve and accept waste disposal methods requested by staff or contractors. • Approve minor changes to environmental sub-plans, including Erosion and Sediment Control Plans (ESCP).

Role	Responsibility	Authority
	• Undertake routine environmental site inspection. • Maintaining environmental records. • Receiving plant, materials and chemicals and ensuring all items are appropriately stored. • Responsible for addressing corrective actions arising from Environmental Inspections.	
Contractor Ecologist	• Supervise works being undertaken in environmentally sensitive areas. • Undertake pre-clearing surveys. • Provide advice where necessary	• Recommend Stop-work for an activity that may cause environmental harm.
All project staff: • Project Manager/Site Superintendent • Proponent and Contractor senior management • Technical Team	• Ensure contractors are working in accordance with the requirements of the EMS, as required under the EPC contract. • Undertake site visits during construction to monitor compliance with EMS requirements. • Report and raise any issues that arise that may have an environmental impact. • Report and raise the discovery of any artefacts, Aboriginal relics or places and cease work until the matter has been addressed.	• Report any issues that may have the potential to cause material or environmental harm. • Report any incidents or near-misses that may impact on the environment or breach conditions set-out in this EMS.

9.2. TRAINING

Employees, contractors and utility staff working on site will undergo site induction training relating to biodiversity issues. Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in biodiversity management, including vegetation clearing which will include information on the outcomes of pre-clearing surveys, constraints mapping, and digitally-captured clearance boundaries (Section 7.2). Targeted training would address the requirements of the legislative requirements (Section 2.1), and all conditions and commitments relating to biodiversity (Section 2.1.2, Section 2.1.3 and Section 8). Further details regarding staff induction and training are outlined in the EMS.

It will be emphasised to staff during toolbox talks and training that appropriate fauna management onsite is critical to the project. This includes:

- Pre clearance surveys and hollow bearing tree clearing protocols

- Driving carefully onsite and adhering to site speed limits
- Appropriate handling of fauna if required.
- Threatened species finds reporting.

9.3. MONITORING AND INSPECTION

Regular monitoring and inspections will be undertaken during construction and operation. The tables below include monitoring and inspection requirements during construction and operation (Table 9-2), with the trigger and response columns contributing to the TARP for the project.

Table 9-2 Monitoring and inspection requirements during construction and operation.

Requirement	Timing	Responsibility	Trigger for additional action	Response proposed
CONSTRUCTION				
Pre-clearing inspections including checking for roosting/breeding habitat, recording tree hollows, marking habitat trees, demarcating area to be cleared, and targeted bat surveys between June and January.	Before vegetation clearing.	HSEQ Manager/Contractor Ecologist	Pre-clearing surveys not carried out or not in all areas required	Supplementary surveys undertaken
Progressive monitoring of the cumulative amount of vegetation cleared (Section 7.2.1), including inspecting exclusion zones to confirm that they have not been disturbed (Section 7.2.4). Prior to undertaking any vegetation clearing, this value will be compared to the total approved area to be cleared.	Before and after all vegetation clearing.	HSEQ Manager	Clearing outside approved clearing limits	HSEQ Manager to manage incident as required by EMS and relevant legislation/ approvals
Monitoring of high disturbance areas, groundcover, exclusion zones and boundary fence lines.	During site inspections undertaken during construction (at least monthly).	Contractor Site Manager	Damaged exclusion fencing or signage Storage or infrastructure underneath tree driplines.	Exclusion fencing/ signage replaced

Requirement	Timing	Responsibility	Trigger for additional action	Response proposed
Details of resource re-use placement	Recorded as it occurs.	Contractor Site Manager	Resources stacked, not distributed	Resources to be moved under direction of an Ecologist
Inspection of waterways.	During site inspections undertaken during construction (at least monthly).	HSEQ Manager	Evidence of siltation or pollution	Rehabilitate waterway and review spill procedures. Report where necessary.
A review of any fauna killed or injured on site. Threatened fauna mortalities will be reported to BCD and deaths of any birds from contact with fences or solar panels will be recorded. Fauna relocations due to vegetation clearing will be recorded.	During site inspections undertaken during construction (at least monthly).	HSEQ Manager	Presence of injured or deceased fauna	Report where necessary, record details of incident.
Weed and pest survey and mapping across project site (Section 7.5).	During site inspections undertaken during construction (at least monthly).	Contractor Site Manager	10% non native ground cover, or Presence of priority weeds, or New weed species on site.	Implement targeted weed and pest control measures (Section 7.5).
Quantitative assessment of condition of vegetation constraints.	Immediately following completion of construction.	HSEQ Manager	Vegetation condition declining	Investigation into reasons for decline by suitable qualified person(s) and adherence to recommendations.
Repetitive BAM plot monitoring (to meet NSW requirements of assessing vegetation condition) within Zone 2 and Zone 6 to determine if there is an adverse impact on the persistence of DNG	Completed in the same season annually for three years	BAM-accredited ecologist (contractor)	If the comparison of the data of the subsequent repeated BAM plots to the initial BAM plots (that were undertaken prior to construction) demonstrates a	Increase BAM plot repeat surveys to every six months for the remainder of the three-year period.

Requirement	Timing	Responsibility	Trigger for additional action	Response proposed
			25% decline in the species diversity of native groundcover species and an incursion of High Threat Weed (HTE) species not recorded in the initial BAM plots.	Weeds controlled where required. Treat soil conditions such as compaction, frequency of traffic movements, low seedbank storage, lack of soil moisture and nutrient imbalance.
Groundcover monitoring, including:	Fortnightly for first six months after establishment. 6 months after establishment.	Contractor Site Manager	Groundcover below 70% cover of 90% of disturbed areas (not including rocky areas where groundcover is not possible). Groundcover seed set below 80% of area. Presence of weeds	Bare patches greater than 5 m^2 will be recultivated and revegetated. Additional watering of seeded areas. Weeds controlled where required. Treat soil conditions such as compaction, frequency of traffic movements, low seedbank storage, lack of soil moisture and nutrient imbalance.
OPERATION				
Monitoring of high disturbance areas, groundcover, exclusion zones and boundary fence lines, including:	Annually throughout operation	Operations Site Manager		
A review of any fauna killed or injured on site. Threatened fauna mortalities will be reported to BCD and deaths of any birds from contact with fences or solar panels will be recorded.	Annually throughout operation	Operations Site Manager	Presence of injured or dead animals	Report where necessary, record details of incident

Requirement	Timing	Responsibility	Trigger for additional action	Response proposed
Areas of priority weeds across project site will be mapped and controlled on a seasonal basis (Section 7.5).	Before spring, annually throughout operation	Operations Site Manager	Presence of priority weeds	Targeted weed control measures (Section 7.5)

A suitably qualified person will walk over the site to identify if vertebrate pests are present.
• The following data would be recorded and used to determine the need for pest animal control measures:
  ○ Number and location of any tracks, traces or sightings
  ○ Whether the level of activity is negligible, minimal, moderate or high
	Annually throughout operation (August)	Operations Site Manager	Moderate or High levels of observed feral animal activity	Targeted pest animal control measures (Section 7.5.2)

Groundcover monitoring, including: • Grass cover would be monitored via a site walkover	Fortnightly for first six months during establishment. 6 months after establishment. Annually during operation (spring).	Operations Site Manager	Groundcover below 70% of 90% of disturbed areas. Groundcover seed set below 80% of area. Presence of priority weeds. Groundcover exceeding 10% weeds.	Bare patches greater than 5 m^2 will be recultivated and revegetated. Additional watering of seeded areas. Weeds controlled where required. Treat soil conditions such as compaction, frequency of traffic movements, low seedbank storage, lack of soil moisture and nutrient imbalance.

9.4. INCIDENT MANAGEMENT

All incidents will be managed in accordance with the incident response procedures contained in the EMS.

9.5. AUDITING

Audit requirements are detailed in the EMS.

9.6. REPORTING

Reporting requirements and responsibilities are outlined in the EMS.

10. REVIEW AND IMPROVEMENT

10.1. CONTINUOUS IMPROVEMENT

Continuous improvement of this BMP will be achieved by the ongoing evaluation of performance against the BMP environmental policies, objectives and targets to identify opportunities for improvement.

- The continuous improvement process will be designed to:
    - Identify areas of opportunity for improvement of environmental management and performance.
    - Determine the cause or causes of non-conformances and deficiencies.
    - Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
    - Verify the effectiveness of the corrective and preventative actions.
    - Document any changes in procedures resulting from process improvement.
    - Make comparisons with objectives and targets.

Review procedures are contained in the EMS.

10.2. BMP UPDATE AND AMENDMENT

This BMP may need to be revised if the construction program, scope of work, or work methods change, if the work methods are found to be ineffective, or if directed by the Proponent. This will occur as needed and in accordance with the process outlined in the EMS.

A copy of the updated BMP and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure identified in the EMS.

10.2.1. BMP update September 2021 (version 2)

This BMP was updated to reflect the changes from the modification application (NGH Pty Ltd, 2020). The approved modification resulted in a minor additional impact on Stage 2 vegetation (0.32 ha) regarding access and a minor increase in offset obligation.

10.2.2. BMP updated September 2023 (version 3)

This BMP was updated as the Wollar Solar Farm biodiversity stewardship site application to offset biodiversity impacts for Wollar Solar Farm was rejected by the Biodiversity Conservation Trust due to a portion of the site being subject to a grazing lease agreement with the landowner. The majority of the NSW credit obligation was paid into the Biodiversity Conservation Fund, with remaining credits purchased from a Carbonvision Pty Ltd and retired, resulting in Wollar Solar Farm meeting their NSW credit obligation. However, Zone 2 (PCT 1303 White Box - Grey Gum - Kurrajong grassy woodland on slopes of the northern Capertee Valley, Sydney Basin Bioregion 1303_Derived Native GL) and Zone 6 (PCT 281_Derived Native GL White Box - Grey Gum - Kurrajong grassy woodland on slopes of the northern Capertee Valley) Sydney Basin Bioregion although associated with NSW BC Act. met the condition threshold for the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived native grassland Critically Endangered Ecological Community (CEEC) and generated an offset under the EPBC Act. DCCEEW have allowed that the offset obligation for Zone 2 and 6 is assessed at the end of a 3 year period.

10.3. DOCUMENT CONTROL

Document control procedures are outlined in the EMS.

11. REFERENCES

Amber. (2019). *Wollar Solar Farm - Traffic Impact Assessment.*

Department of Primary Industries. (2020). Retrieved from NSW WeedWise: https://weeds.dpi.nsw.gov.au/

DPIE. (2020). *Wollar Solar Farm - Modification 2.* Department of Planning, Industry & Environment.

DPIE. (2020). *Wollar Solar Farm Modification 2.* Department of Planning, Industry and Environment.

NGH. (2022). *Modification Application - Wollar Solar Farm.* NGH Pty Ltd.

NGH Consulting. (2022). *Modification Application: Wollar Solar Farm.*

NGH Environmental. (2019). *Amendment Report - Wollar Solar Farm.*

NGH Environmental. (2019). *Environmental Impact Assessment - Wollar Solar Farm.*

NGH Environmental. (2020). *Submissions Report Wollar Solar Farm.*

NGH Pty Ltd. (2020). *Modification Application - Wollar Solar Farm Access Road Relocation and Subdivision.*

APPENDIX A GROUNDCOVER MANAGEMENT PLAN

A.1 INTRODUCTION

This Groundcover Management Plan has been planned to address the requirements of the relevant conditions and commitments listed in the project Conditions of Consent (CoC) from the NSW Minister for Planning (bold points in Table 11-1). Specifically:

Table 11-1 conditions of consent relevant to the GCMP

Schedule 3 condition 11 ***The Applicant must maintain the agricultural land capability of the site, including:*** *(c)* ***establishing the ground cover of the site within 3 months following completion of any construction or upgrading;*** *(d)* ***properly maintaining the ground cover with appropriate perennial species and weed management; and*** *(e)* ***maintaining grazing within the development footprint, where practicable,*** ***unless the Planning Secretary agrees otherwise in writing.***
Schedule 3 condition 14 *Prior to commencing the development, the Applicant must prepare a Biodiversity Management Plan for the development in consultation with BCD, and to the satisfaction of the Planning Secretary in writing. This plan must:* ***c)*** *include a description of the measures that would be implemented for:* ***ix.*** *protecting vegetation and fauna habitat outside the approved disturbance areas;* ***x.*** ***managing the remnant vegetation and fauna habitat on site;*** ***xi.*** ***minimising clearing and avoiding unnecessary disturbance of vegetation that is associated with the construction and operation of the development;*** *xii.* *minimising the impacts to fauna on site and implementing fauna management protocols;* *xiii.* *avoiding the removal of hollow-bearing trees during spring to avoid the main breeding period for hollow-dependent fauna;* ***xiv.*** ***rehabilitating and revegetating temporary disturbance areas with species that are endemic to the area;*** *xv.* *maximising the salvage of vegetative and soil resources within the approved disturbance area for beneficial reuse in the enhancement or the rehabilitation of the site; and* ***xvi.*** ***controlling weeds, feral pests and pathogens; and*** ***d)*** ***include details of who will be responsible for monitoring, reviewing and implementing the plan, and timeframes for completion of actions.***

The overarching objective of this plan is to stabilise the soil surface, protecting it from erosion, weed infestation and a loss of soil capability. Secondly, it aims to retain as much of the existing native ground cover component as possible, attempting to assist with long-term resilience and has great biodiversity benefits. This plan:

- Provide guidance that will assist to minimise impacts and thereby avoid extensive rehabilitation actions
- Provide clear triggers for action, regarding the need for actions

- Provide strategies that can be used to develop and maintain a resilient groundcover that will persist for the operational life of the project

It is relevant to both the construction and operation period of the project, with the timing of actions summarised in Table 11-2. It is noted that conditions will vary over the long lifetime of this project. The triggers set may need consideration of external factors, such as drought, and attention to adaptive management to meet the plan's objectives.

Table 11-2 Applicability of groundcover management activities.

	Construction	Operation
REHABILITATION TRIGGERS	**Temporary disturbance**	**Under panels**
	Exclusion zones	
GROUNDCOVER ESTABLISHMENT ACTIONS	**Ripping**	N/A
	Sowing	N/A
	Hydromulching/hydroseeding	N/A
	Fertiliser	N/A
	Drains and batters	N/A
GROUNDCOVER MAINTENANCE ACTIONS	**Monitoring**	
	Maintenance	
	Weed control	

A.2 GUIDANCE TO MINIMISE IMPACTS

General triggers for actions are provided in section A.3, however, it is noted that different areas will respond differently to disturbance and rehabilitation actions and this should be considered in planning works and rehabilitation strategies onsite.

Generally, the soils present on the Wollar Solar Farm site are poorly to imperfectly drained with low to moderate fertility, highly alkaline subsoils and low plant available water holding capacity. They are subject to waterlogging. Adaptive management should be employed in response to the results obtained.

The following hierarchy of actions are to be considered to minimise the rehabilitation actions required for the project.

Table 11-3 Priorities for reducing impacts on existing groundcover.

	Comments
Consider existing biodiversity values	
Exclusion zones	**These areas are in good condition and have good biodiversity values. They should be protected from all impacts and rehabilitation actions, where required, should be planned very carefully to manage potential for indirect adverse impacts. It is an assumption of the consent that no project impacts will occur in these areas.**
Under panel areas	**Where perennial native cover exists, this should be protected as much as possible to preserve stability and seed source for the operational phase of the project. The less impact that occurs in these areas, the less work will be required in re-establishing and maintaining cover.**
In areas with more native species composition	As above, where perennial native cover exists, this should be protected. These equate to the following zones; • **Zone 1 – PCT 1303 White Box – Grey Gum** (mix of native and exotic groundcovers) • **Zone 2 – PCT 1303 Derived Native Grassland** (mix of native and exotic groundcovers) • **Zone 3 – PCT 1303 Cultivated Low Condition** (dominated by Red Grass (***Bothriochloa macra***) with mix of exotic and native groundcover) • **Zone 5 – PCT 281 Box Gum Woodland** (diverse mix of native and exotic groundcovers) • **Zone 6 – PCT 281 Derived Native Grassland** (mix of native and exotic groundcovers) • **Zone 8 – PCT 1610 White Box – Black Cypress** (mix of native and exotic groundcovers) • **Zone 9 – PCT 1610 White Box – Black Cypress** (mix of native and exotic groundcovers) **Locations of these vegetation zones are shown in Figure 11-1 and Figure 11-2.**
Consider existing soil values	
Waterlogging	The majority of soils on the site are classified as moderation risk of waterlogging. Resulting soil compaction will make soil conditions poorer, in terms of supporting plant growth. Works in waterlogged areas should be minimised.
Salinity	The majority of soils on site are classified as 'non-sodic' and the risk of salt build-up is low. However, there were some sodic soils identified from soil survey (McMahon 2019) (Appendix D) which may pose higher risk of salt build up and discharge. This can affect plant growth. Species selection and maintenance actions may need specific input from an agronomist.

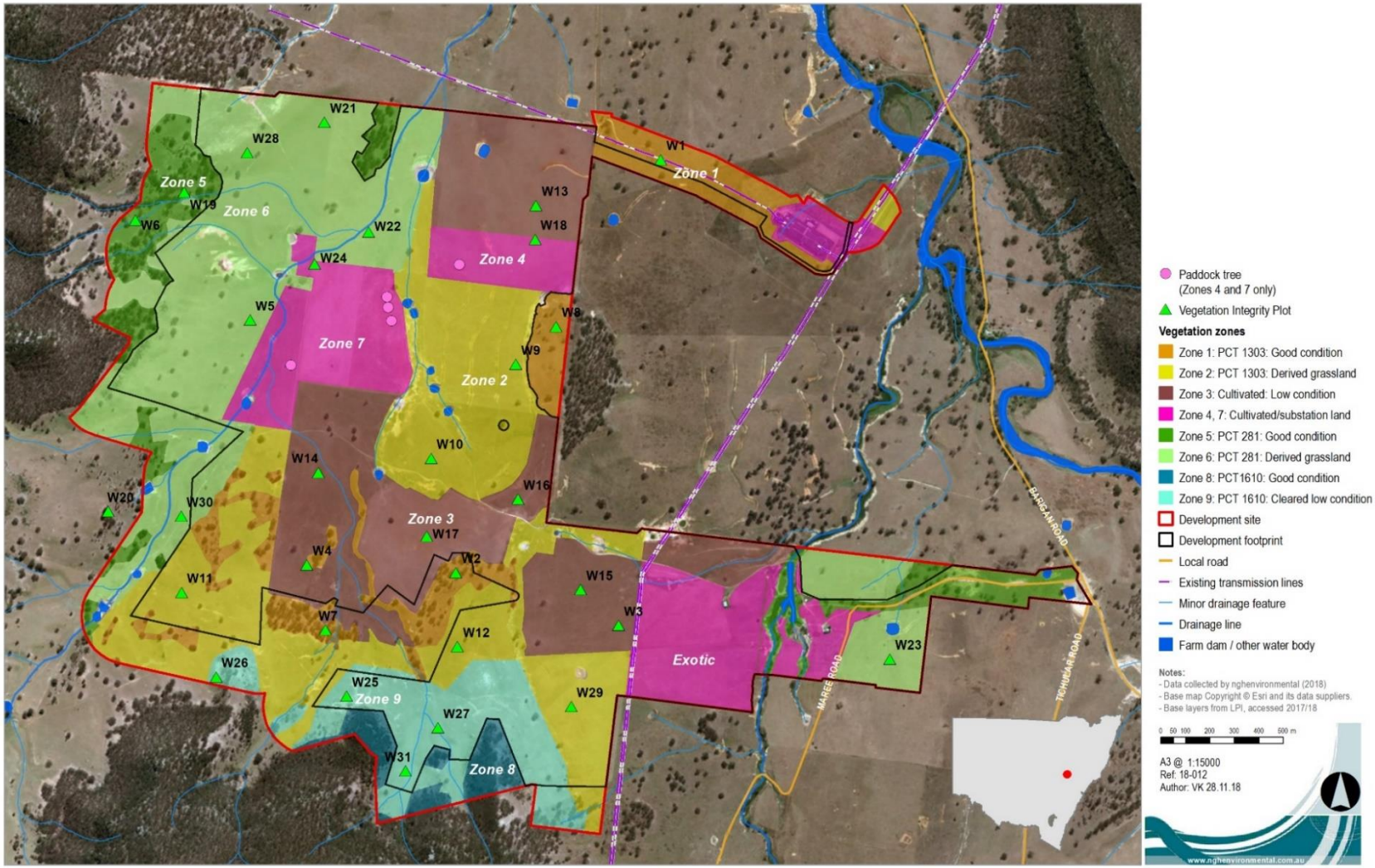


Figure 11-1 Vegetation Zones (Map 1 of 2)

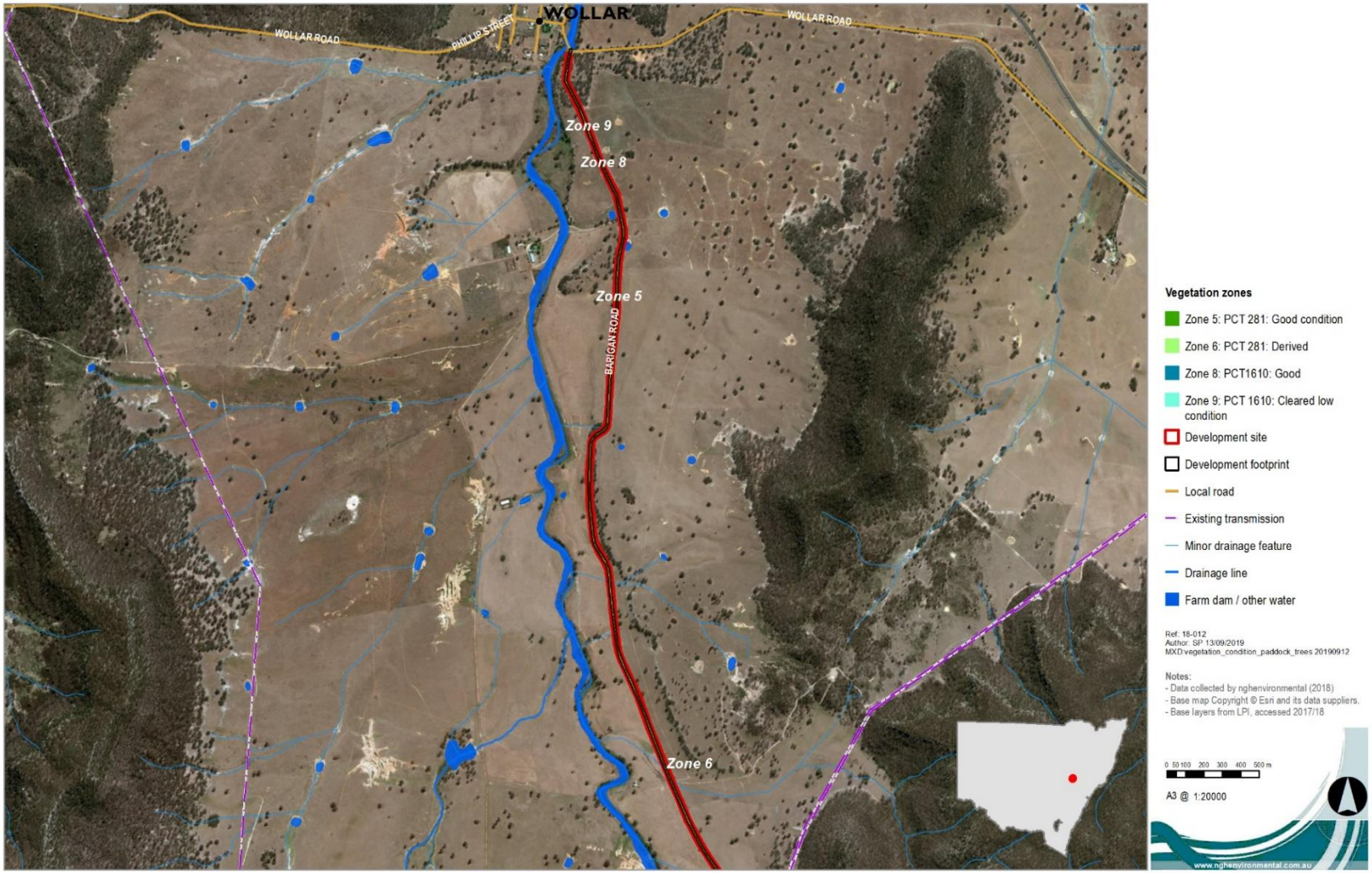


Figure 11-2 Vegetation Zones (Map 2 of 2)

A.3 REHABILITATION TRIGGERS FOR ACTION

A3.1 Temporary disturbance areas

Areas temporarily disturbed for the Project will need to be rehabilitated and revegetated as soon as practicable. Temporarily disturbed areas may include:

- Grassland mowed for piling installation.
- Temporary tracks and batters for permanent tracks
- Construction laydown areas.
- Cable trenches.

The aim of the rehabilitation and revegetation is to stabilise disturbed areas and to return it to a condition that is similar to its pre-disturbance state, meaning that native groundcover comprising vegetation plant communities are returned to these locations. In some areas where poor or no groundcover existed prior to the development (for example rocky or heavily eroded areas) it may not be possible to achieve the targets.

The following targets have been established:

- Rehabilitate all disturbed areas not required for the operation of the solar farm.
- Revegetation of disturbed areas will have 70% ground cover over 90% of disturbed areas within 12 months of establishment and maintained throughout operation until contract completion:
    - Failed vegetation patches greater than 5 m^2 will be revegetated.
    - Ground cover will achieve seed set across at least 80% of area.
    - Native species, including those endemic to the area, will be used for revegetation in areas identified as native grassland as well as exotic vegetation.
- Revegetation of disturbed areas will have 70% ground cover over 90% of disturbed areas within 12 months of establishment or corrective actions would be implemented:
    - Failed vegetation patches greater than 5 m^2 will be revegetated.
    - Scours greater than 50 mm deep and 100 m long will be revegetated.
    - Targeted weed control measures will be implemented if weed cover exceeds 10% of groundcover or if priority weeds are detected.
    - Ground cover will achieve seed set across at least 80% of area.
    - Native species will be used for revegetation with species selected from the respective derived PCTs.

A3.2 Areas under solar panels

Areas which will be under solar panels during operation of the Project will need to be rehabilitated and revegetated as soon as practicable. The aim of the rehabilitation and revegetation of these areas is to maintain and establish a perennial native pasture underneath the panels. In some areas where poor or no groundcover existed prior to the development (for example rocky or heavily eroded areas) it may not be possible to achieve the targets.

The following targets have been established:

- Establish perennial native pasture under solar panels prior to completion of construction.
- Revegetation of areas under solar panels will have 70% ground cover over 90% of disturbed areas within 12 months of establishment and maintained throughout operation until contract completion:
    - Failed vegetation patches greater than 5 m^2 will be revegetated.
    - Ground cover will achieve seed set across at least 80% of area.
    - Native species will be used for revegetation wherever practicable in areas identified as native grassland as well as exotic vegetation.

A.4 GROUNDCOVER ESTABLISHMENT

The following methods will be used, where necessary, in establishing or improving native perennial groundcover where required to meet the targets set out in A.2. This may be in temporary disturbance areas, areas to be protected from impacts (exclusion zones) or in areas that will be under the solar array (ideally, prior to the installation of panels). This will ensure a more resilient groundcover better able to resist weed ingress and erosion in the long term.

Not all methods will be used, the condition of the area to be rehabilitated will determine which are required to reach the target condition. Where groundcover is already at 70% over 90% of a disturbed area, revegetation works may not be necessary. However, weed management strategies described in Section 7.5 may be required if exotic weed populations are greater than 10%.

Due to climatic conditions (evaporation rates), native grassland establishment is best attempted over late autumn, winter or early spring. Wet summers are also able to maintain established perennial pasture growth in summer active species. Summer rainfall is less reliable than summer evaporation, and as such revegetation is also less reliable. Rehabilitation and revegetation will therefore commence in late summer/early autumn as temperatures decrease and evaporation rates fall.

A4.1 Ripping and topsoiling

Topsoil will be replaced on all areas from where it has been removed. Prior to the application of topsoil, compacted areas will be tined or ripped to a depth of 150 mm to loosen the surface. Areas that are not compacted will not be ripped in order to reduce soil disturbance.

Topsoil should be replaced over the surfaces, to achieve a similar depth as prior to removal (targeting 30 cm where the amount of retained topsoil from the site permits). The topsoil must be free of rocks and sticks greater than 10 mm in diameter or 500 mm in length. If the surface sets hard after rain, harrow the topsoil prior to sowing seed.

Spray any undesirable grass/weed growth on topsoil stockpiles with a knockdown herbicide before spreading topsoil. More than one application of herbicide may be required. Apply the last application of herbicide not less than 4 weeks before spreading the topsoil or as per manufacturer’s instructions.

A4.2 Broadcast sowing

Undertake sowing using either:

a) A tractor drawn seed drill to place seed at a depth of 5 mm or less; or
b) A spreader followed immediately by a single pass with an unweighted diamond harrow.
c) By hand, where machinery would be a hindrance.

Where safe to do so, tractor passes with the seed drill or harrow will follow the finished surface contours. Distribute seed and fertiliser evenly over the areas to be sown at the rates specified below. Apply fertiliser concurrently with the seeding operation.

Calibrate the drill and monitor the seed and fertiliser application rates to ensure an even distribution over the areas sown, in accordance with the rates nominated. Maintain records of measurements and calculations to determine actual distribution rates for areas treated.

Dry sowing native species on small areas where machinery would be a hindrance can be achieved by mixing seed to sand at a ratio of 1:10 and spreading across the area by hand.

In areas with an existing native-dominated groundcover, the ground surface will not be disturbed before sowing unless deemed necessary by an agronomist.

A4.3 Hydromulching and hydroseeding

Carry out hydromulching / hydroseeding within 5 – 10 days of completed soil preparation or, if delayed by the weather conditions as soon as conditions permit.

Continuously agitate the slurry of seed, fertiliser, binder (60 kg/ha Guar gum), mulch, and water (35 kilolitres (kL)/ha) to maintain a uniform consistency during application. Apply the sprayed slurry uniformly over the whole surface, ensuring that all surfaces are sprayed from two directions to ensure complete coverage. Within 48 hours of application, the sprayed hydromulch layer must have a minimum thickness at any location of 5 mm when using sugar cane mulch, or 2 mm when using wood fibre or shredded paper.

Where straw (5 tonnes (t)/ha) is used for mulch, apply the straw mulch uniformly using a purpose-made blower unit. Incorporate the emulsion (bitumen) as a spray into the air stream of the mulch blower or apply it in a separate operation within 12 hours from the application of straw mulch. Within 48 hours of application, the straw mulch layer must have a minimum thickness at any location of 25 mm.

Do not apply hydroseeding/hydromulching and straw mulching if:

- Winds exceed 15 km/hr.
- Temperatures exceed 37^{o}C.
- The surface is water-logged.
- During rain periods or when rain appears imminent.

A4.4 Native grass sowing

The soils on the site are poorly to imperfectly drained with low to moderate fertility, highly alkaline subsoils and low plant available water holding capacity. Plant species need be selected that are adapted to these conditions.

A mixture of native pasture species will be used to minimise the risk of exotic weeds encroaching into exclusion zones. Only those which are likely to occur in the PCTs identified in the project area will be used. Care will be taken to ensure sufficient plant densities. Component groundcover species from either PCT 1303, PCT 281 or PCT 1610 as appropriate will be used for any direct seeding of bare ground triggering corrective action targets. Exact species and seeding rates for this Project will be determined in consultation with the district agronomist and landholder to determine what is most appropriate for the property.

Exotic species may be selected either as a cover crop or to provide long-term stability, where native vegetation is not meeting stability objectives.

A4.5 Sowing and fertiliser rate

The soils on the site are poorly to imperfectly drained with low to moderate fertility, highly alkaline subsoils and low plant available water holding capacity. The sandy surface and pale subsurface layers (where present) generally mean that nutrient content is low in these soils, as is their ability to hold onto nutrients.

Addition of gypsum may be required to alleviate dispersion risk. Increasing organic matter content with composted organics will improve fertility, assist nutrient retention and improve moisture holding capacity of these soils.

Fertiliser additions should be divided up into regular smaller applications during the growing season to limit leaching of nutrients. Dense subsoil material significantly restricts plant root extension into the subsoil. Stabilisation and revegetation targets and timeframes should be decided with reference to IECA (2008) guidelines.

Where necessary, apply pelletised poultry manure to be applied at a rate of around 250 kg/ha. Alternatively, apply Granulock® S (or similar: 16% nitrogen, 16.7% phosphorous, 12% sulphur) at around 150 kg/ha.

Consult with the district agronomist and landowner to determine pasture type and fertiliser rates suitable for each site.

A4.6 Open drains and batters steeper than 2:1

Lay the runs of the organic fibre mesh (jute mesh) along the direction of water flow or down the steep batter. In drains, slot the upstream end of the mesh into a trench 150 mm wide by 150 mm deep and pin the mesh to the base of the trench at 200 mm centres. Backfill the trench with soil and compact by foot. Lay the mesh taut and even over the soil surface without any air pockets, but do not stretch it. Overlap adjacent runs of mesh by 100 mm with the higher run overlapping the lower.

Pin the mesh along the sides of each run at 500 mm centres and along the middle of each run at 1 m centres. End overlaps must be 150 mm wide with the higher end overlapping the start of the lower and pinned at 200 mm centres.

Hydroseed or hand seed areas prior to jute matting. Spray a slow-setting anionic bitumen emulsion over the meshed surface at a rate of 0.8 to 1.0 litres (L) of undiluted residual bitumen emulsion per square metre.

A.5 GROUNDCOVER MAINTENANCE

A5.1 Groundcover monitoring

Groundcover will be monitored on a fortnightly basis for the first six months after establishment, every 6 months after establishment and annually during operation. Ground cover will be monitored using 1m x 1m quadrats placed within all treated locations to ensure cover does not fall below 70% and at 30 random locations within the development footprint. Any grazing stock would be removed from the affected area if cover falls below threshold levels and additional planting undertaken if there is no response within the following monitoring events. Including:

- Bare patches greater than 5 m^2 will be recultivated and revegetated
- Additional watering of seeded areas
- Weeds controlled where required e.g. where groundcover exceeds 10% weeds.
- Treat soil conditions such as compaction, frequency of traffic movements, low seedbank storage, lack of soil moisture and nutrient imbalance

A5.2 Vegetation integrity monitoring for Zone 2 and Zone 6

Originally, a biodiversity stewardship site (BSS) was planned to offset the biodiversity impacts for Wollar Solar Farm, including areas of DNG generating offsets under the EPBC Act. Ultimately the BSS application was rejected. Due to this outcome, the Commonwealth Department of Climate Change, Environment, Energy

and Water (DCCEEW) was consulted[4] [5] [6] on how to update the BMP and Commonwealth Offset Strategy for these areas of DNG (Zone 2 and Zone 6).

DCCEEW will assess the BMP against the requirements of the NSW development consent and consider that monitoring will need to show the impact has not had an overall adverse impact on the persistence of the derived native grassland (DNG). At the end of the three-year period, it will need to be outlined if the project has or has not had an overall adverse impact on the condition and persistence of the DNG (in terms of the original condition of the site and how the impact has affected DNG). A methodology for re-quantifying of impacts is required so assessment is consistent with current NSW requirements; if the Minister assesses that there has been an adverse impact, DCCEEW will require the credits be retired under the NSW BOS.

The groundcover monitoring methodology above (Appendix A5.1) would provide a non-biased and representative data set of the groundcover composition over the three years, but NGH assumes this monitoring methodology would not meet the assessment requirements under the NSW BAM 2020. To meet BAM requirements, NGH proposes additional monitoring methodology is implemented by replicating some of the existing vegetation integrity (BAM) plots that were completed within DNG areas generating offsets under the EPBC Act within the development footprint (DF) during the BDAR assessment for the EIS. NGH proposes that this replication occur once a year within the same season for three years, with replication commencing this year.

The initial BAM plots were completed before the project commenced, with four of the eleven plots located within the PV array DF.

i. Six (6) BAM plots completed for Zone 2 with 2 plots completed within the PV array areas (PCT 1303)

ii. Six (6) BAM plots completed for Zone 6 with 2 plots completed within the PV array areas (PCT 281)

The amount of plots undertaken for Zone 2 and Zone 6 meet the BAM 2020 requirements (Table 3, Section 4.3.4 of the BAM 2020).

Updating the monitoring methodology for these two zones will record an annual dataset prior to project commencement, during project development and at the end of the three-year period. This data can then be entered into the BAM-C and the vegetation integrity scores can be compared to see if there has been an adverse impact.

A5.3 Maintenance

All revegetated areas will be maintained after all sowing is complete throughout operation until contract completion. Proponent will direct where and when to water areas, by means of a fine spray, which causes minimal disturbance to seeded areas.

Dead vegetation will be cleared from areas showing poor growth or damage and all lost topsoil replaced. The area will then be recultivated and reseeded. Weeds will be controlled where required with herbicide or hand removal.

[4] 14 March 2023 a letter was sent to DCCEEW explaining that the BSS application has been rejected and seeking the Department's advice regarding the EPBC DNG generating offsets

[5] 25 May 2023 DCCEEW representatives (Will Egan and Kimberley Glover) met with Brooke Marshall and James Van Den Broek (NGH) to discuss options for these offsets

[6] 25 July and 2 August email between Rachael Buzio and Will Egan seeking clarification on a monitoring methodology of these areas that is in accordance with the BAM 2020

APPENDIX B TYPICAL SAMPLE REGISTERS

B.1 SAMPLE GROUND DISTRUBANCE PERMIT

Project: Wollar Solar Farm **Project No:**

Requested By:

Habitat Clearing Start Date: **Expected Completion Date:**

HABITAT CLEARING LOCATIONS – ATTACH DRAWINGS / SKETCHES IF NECESSARY

Location	Comments
This section to be completed by Contractor Ecologist and HSEQ Manager for clearing of trees, logs, rocky features, and other habitat features, with reference to constraints mapping.	
Has the limit of clearing been clearly delineated?	☐ Yes ☐ No
All trees / vegetation / habitat to be retained identified and exclusion zones fenced off?	☐ Yes ☐ No
State how identified:	
Have habitat trees been identified and appropriately marked?	☐ Yes ☐ No ☐ N/A
State how identified:	
Are specific targeted surveys required?	☐ Yes ☐ No
State how survey was completed, including results:	

Is there a risk of weed infestation or spread?	☐ Yes ☐ No
Are any animals present? **(If *Yes*, relocation required)**	☐ Yes ☐ No
Are any active nests/burrows present? **(If *Yes*, relocation required)**	☐ Yes ☐ No
If soil disturbance is to occur, has an Erosion and Sediment Control Plan been created, and have these controls been installed?	☐ Yes ☐ No
Following clearing works is planting required to stabilise the soil and prevent weed invasion? This is a requirement unless approved by the HSEQ	☐ Yes ☐ No
Have relevant workers been given toolbox talks on limit of clearing, fauna handling procedures and any other SHE Controls?	☐ Yes ☐ No
Can habitat features be re-used for habitat enhancement?	☐ Yes ☐ No
Can the habitat feature be re-used immediately?	☐ Yes ☐ No
If not re-used immediately, where will it be stockpiled*?	

Comments:

APPROVALS

Inspection completed by Contractor Ecologist (if required): **Date:**

Contractor Ecologist Signature Required

Approval by HSEQ Manager: **Date:**

HSEQ Manager Signature Required

* Stockpiles must not be placed within the dripline (extent of foliage cover) of any native tree.

SIGN-OFF (ONCE WORKS COMPLETED)

Have the conditions of the permit been met? **Date:**

HSEQ Manager Signature Required

B.2 SAMPLE THREATENED SPECIES REGISTER

Date	Species	Location and time captured	Location and time released	Behaviour and condition on release	Details of any injuries/ death	Contact details of vet/wildlife handler if transferred to their care

B.3 SAMPLE HERBICIDE APPLICATION RECORD

NSW GOVERNMENT | Industry & Investment

Location, Applicator, Date of Application

Property/Holding: (residential address)					Date:
Applicator's Full Name:			Owner (if not applicator):		
Address:			Address:		
		Phone:			Phone:
Mobile:	Fax:	Email:	Mobile:	Fax:	Email:
Sensitive Areas (including distances, buffers): N / W / Treated Area / E / S			Comments (including risk control measures for sensitive areas):		

Host/Pest

Paddock Number/Name:	Paddock Area:	Order of Paddocks Sprayed:
Crop/Situation:	Type of Animals:	
Crop/Pasture Variety:	Age/Growth Stage:	
Growth Stage:	Mob/Paddock/Shed:	
Pest/Disease/Weed:	Animals — Number Treated:	
	Pest Density/Incidence: Heavy ❑ Medium ❑ Light ❑	

Application Data

Full Label Product Name:		Rate/Dose:	Water Rate L/ha:	
Permit No.:	Expiry Date:	Additives/Wetters:		
Total L or kg:	WHP:	ESI*:	Date Suitable for Sale:	
Equipment Type:		Nozzle Type:	Nozzle Angle:	Pressure:
Date Last Calibrated:	Water Quality (pH or description):			

Weather

Showers ❑ Overcast ❑ Light Cloud ❑ Clear Sky ❑

Rainfall (24 hours before and after)
Before: mm During: mm After: mm

Time (show time in this column)	Temperature °C	Relative Humidity (%)	Wind Speed	Direction	Variability (e.g. gusting)
Start					
Finish					

Comments:

* When using herbicides in mixtures with fungicides and insecticides, an ESI may apply to the non-herbicide component of the mixture.

B.4 SAMPLE PESTICIDE APPLICATION RECORD

Pesticide Application Record Sheet

NSW GOVERNMENT Industry & Investment

Location, Applicator, Date of Application

Property/Holding: (residential address)					Date:
Applicator's Full Name:			Owner (if not applicator):		
Address:			Address:		
		Phone:			Phone:
Mobile:	Fax:	Email:	Mobile:	Fax:	Email:
Sensitive Areas (including distances, buffers): N / W Treated Area E / S			Comments (including risk control measures for sensitive areas):		

Host/Pest

Paddock Number/Name:	Paddock Area:	Order of Paddocks Sprayed:
Crop/Situation:	Type of Animals:	
Crop/Pasture Variety:	Age/Growth Stage:	
Growth Stage:	Mob/Paddock/Shed:	
Pest/Disease/Weed:	Animals — Number Treated:	
	Pest Density/Incidence: Heavy ❑ Medium ❑ Light ❑	

Application Data

Full Label Product Name:		Rate/Dose:	Water Rate L/ha:	
Permit No.:	Expiry Date:	Additives/Wetters:		
Total L or kg:	WHP:	ESI*:	Date Suitable for Sale:	
Equipment Type:		Nozzle Type:	Nozzle Angle:	Pressure:
Date Last Calibrated:	Water Quality (pH or description):			

Weather

Showers ❑ Overcast ❑ Light Cloud ❑ Clear Sky ❑

Rainfall (24 hours before and after)
Before: mm During: mm After: mm

Time (show time in this column)	Temperature °C	Relative Humidity (%)	Wind Speed	Direction	Variability (e.g. gusting)
Start					
Finish					

Comments:

* When using herbicides in mixtures with fungicides and insecticides, an ESI may apply to the non-herbicide component of the mixture.

B.5 SAMPLE VEHICLE HYGIENE REGISTER

Date	Time in	Vehicle type	Destination	Driver name	Driver contact no.	Driver registration	Entrance wash (Y/N)	Exit wash (Y/N)	Time out	Inspection staff initials

APPENDIX C AGENCY INPUT ON BMP

C.1 BIODIVERSITY CONSERVATION DIVISION COMMENTS ON DRAFT

Our ref: DOC20/409481
Senders ref: 20-070

Ainslee Roser
Environmental Consultant
NGH Consulting
ainslee.r@nghconsulting.com.au

Dear Ainslee,

Wollar Solar Farm - Biodiversity Management Plan

Thank you for your email dated 28 May 2020 to the Biodiversity and Conservation Division (BCD) requesting review of the revised Wollar Solar Farm Biodiversity Management Plan (BMP).

BCD has reviewed the revised BMP and accompanying Groundcover Management Plan.

Successful management plans include tailored, quantitative performance measures and targets, completion criteria, monitoring and trigger points for corrective action which adhere to the SMART principles (specific, measurable, achievable, realistic, timely). The BMP generally adheres to these principles although it would be improved with the inclusion of clear quantitative triggers in Table 8.1.

It is noted that a target of weed cover exceeding 10% of groundcover is used in the Groundcover Management Plan. This is included as a performance criterion for groundcover management in Table 8-1 and for weeds across the project site during construction in Table 9-2. However, this is not clearly articulated in some sections of Table 8-1, for example on page 56 where performance is stated as "*A general reduction in the abundance of weeds in exclusion zones during the operation period*". It is also noted that only priority weeds are included in the operational stage in Table 9-2. A weed cover of less than 10% of groundcover should be consistently referred to as a target throughout the BMP.

In order to facilitate the finalisation of the Wollar Solar Farm BMP, BCD recommends:

- Table 8.1 be updated with clear quantitative performance criteria and triggers for additional actions; and
- Weed cover targets are consistent throughout the BMP.

Should you require further clarification on the items above please contact David Geering, Senior Conservation Planning Officer, via david.geering@environment.nsw.gov.au or 02 6883 5335.

Yours sincerely

Samantha Wynn
Senior Team Leader Planning - North West
Biodiversity and Conservation Division

4 June 2020

APPENDIX D SOIL SURVEY REPORT

SOIL SURVEY REPORT

PROPOSED
WOLAR SOLAR FARM

MAY 2019

DM McMahon Pty Ltd
6 Jones St (PO Box 6118)
East Wagga Wagga NSW 2650
t (02) **6931 0510** **www.dmmcmahon.com.au**

SOIL SURVEY REPORT

PROPOSED WOLLAR SOLAR FARM

May 2019

Project brief

At the request of Louiza Ramone of NGH Environmental Pty Ltd, soil sampling, analysis and reporting was carried out to assess the site in April 2019 for a proposed solar farm. The document provides information about the site and soil conditions from field observations and laboratory analysis.

Site identification

Address: 96 Maree Road, Tichular & 1066 Barigan Road, Barigan NSW.
Real property description: Lot 1 (DP 650653), Lots 10 & 11 (DP 1090027), Lot 7303 (DP 1139558) & Lots 22 – 27, 30, 45, 46, 51, 60 – 63, 69, 75 – 80, 92, 105 – 107 & 153 (DP 755430).
Centre co-ordinate: 776826E 6409385N MGA GDA z55
Property size: (investigated area) 465 ha approximately
Owner: Terry and Gail Marksell
Local Council Area: Mid-Western Regional Council
Present use: Broadacre Agriculture
Development Application Reference: N/A
Report identification: 5818

Certification

Name	Signed	Date	Revision Number
David McMahon CEnvP BAppSc SA GradDip WRM MEnvMgmt		20/05/19	00

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Attachments

DM McMahon Pty Ltd 6 Jones St (PO Box 6118) Wagga Wagga NSW 2650
t (02) **6931 0510** **www.dmmcmahon.com.au**

1.0 Introduction

The report presents the results of a soil survey carried out by DM McMahon Pty Ltd (McMahon) for the proposed Wollar Solar Farm near Wollar, NSW.

The soil and land survey were commissioned by Louiza Romane of NGH Environmental Pty Ltd and was undertaken in general accordance with the provided scope of works as can be seen in **Section 3**. Zach Bradley of McMahon conducted a soil survey on 15 April 2019 using standard soil surveying techniques. The survey was carried out utilising an excavator to expose the soil profile to a depth of approximately 1.5 metres. Sampling and classification of in situ soils was carried out as per the Australian Soil and Land Survey Field Handbook (2009) and The Australian Soil Classification (ASC) (Isbell, 1996). Density of investigation pits was determined via Guidelines for Surveying Soil and Land Resources (2008) where selection of a 'Moderately High (Detailed)' intensity level was deemed appropriate for satisfying the objectives for detailed project planning.

2.0 Site characteristics

A desktop review and investigation of the topography, hydrology, soil, lithology, geology and hydrogeology of the site has been undertaken and are as follows.

2.1 Topography

The site is located over the Munghorn 1:25 000 Topographic Map (Sheets 8833-2S) at an elevation range of approximately 400m to 470m AHD. The landform of the site consists of gently inclined to steep slopes with open drainage lines and depressions forming the foot slopes to the surrounding mountains. Two large open drainages known as Spring Flat and Wollar Creeks, run parallel through the site towards the north north-east. Numerous smaller open depressions and drainage lines feed into the creeks from both sides from the surrounding ranges.

2.2 Vegetation

The site is currently used for broad acre agriculture, predominantly grazing including some areas of broadleaf cover crops. At the time of the soil survey, the majority of the site was covered with annual and perennial dry grasses with a few paddocks sown to pasture. Some broadleaf weed species such as thistles and burrs were present on site but were not prevalent, weed species were usually concentrated to the steeper slopes and around drainages. There are established eucalypt trees scattered throughout the property, mostly in clumps and along the drainages, depressions or property boundaries. A more detailed assessment of vegetation present can be seen in the NGH Environmental Impact Statement (NGH Environmental, 2019) for the site.

2.3 Weather

The mean rainfall for the Mudgee Airport AWS weather station (35km away) is approximately 663.2 mm per annum. The wettest months are December, November and January; with rainfall favouring the summer months. The mean maximum temperatures range from 1.4 ºC in July to 31.0 ºC in January and mean minimum temperatures range from 1.1 ºC in July to 16.1 ºC in January. Historical records retrieved from the Mudgee Airport AWS 062101 weather station (Bureau of Meteorology, 2019).

2.4 Hydrology

The site is located within the Goulburn River catchment with open drainages including Spring Flat Creek and Wollar Creek. Wollar Creek is fed by Spring Creek, Barigan Creek, Dry Creek and Brokers Creek, and runs NNE through the property parallel to Spring Flat Creek. Spring Flat Creek drains into Wollar Creek 1km north of the site. Wollar Creek drains into the Goulburn River which

meanders east through the Goulburn River National Park before draining into the Hunter River. The Hunter River terminates at the Fullerton Cove and Newcastle Harbor inlets which connect to the South Pacific Ocean. Upwards of 20 farm dams are present across the site, holding varying volumes of water, in varying condition and usually located along drainage and creek lines.

2.5 Soil & landform

The site lies with the mapping unit Barigan Creek (**bc**) from the Soil Landscapes of the Dubbo 1:250 000 Sheet, Murphy and Lawrie (1998). The mapping unit **bc** is described as:

Topography is lower slopes of sandstone plateaux escarpments, low undulating rises and creek flats. Horizontal beds of sandstone outcrop as benches. Elevations vary from 360 m - 470 m above sea level. Slopes between 2 - 10%. Local relief varies between 10 - 30 m. Stream channels are tributaries to larger streams.

Common soils are Yellow Podzolic Soils (Dy2.31; Dy2.41; Dy2.41) on lower slopes and along drainage lines. Red Podzolic Soils (Dr2.21) on higher colluvial slopes, benches and rises.

Limitations include high erosion hazard under cropping or where there is low surface cover; salinity in localised areas in drainage depressions.

2.6 Geology & lithology

The site geology forms part of the broader Sydney Basin with the associated geological units including the Illawarra Coal Measures and the Shoalhaven Group. Parent rock includes Permian sedimentary forms of shale, sandstone, conglomerate, chert, coal and torbanite, siltstone, sandstone, red-brown and green mudstone. In-situ colluvial and alluvial parent material also occupy the site.

2.7 Hydrogeology

From the Geoscience Australia hydrogeology dataset, the groundwater beneath the site is described as porous, extensive aquifers of low to moderate productivity over the south western extent of the site; and fractured or fissured, extensive aquifers of low to moderate productivity over the north eastern extent of the site.

3.0 Investigation scope of works

The specifications for the site investigation and soil survey are as follows, **Table 1**:

Table 1: *Scope of works*

Item	Description	Description
1.	Where available, review provided plans and other general related documents to gain a comprehensive understanding of the proposed project.	-
2.	Undertake a desktop study of local landform, geological, lithological & hydrogeological conditions.	See **Section 2.0**
3.	Conduct Dial Before You Dig search.	-
4.	Carry out field investigations by reference to Guidelines for Surveying Soil and Land Resources (2008) & AS1726:1993 Geotechnical Site Investigations.	25 pits in total. Samples of topsoils - A (A1, A2); and subsoils - B (B1, B2) and C horizons were taken when present to adequately classify soils as per the Australian Soil Classification (ASC).
5.	Analyse soils in situ and at NATA accredited laboratory to AS/RMS methods.	8 x representative samples for topsoil analysis – pH, EC, nutrient and cation status. 16 x representative samples for subsoil analysis – pH, EC, dispersion.
6.	Generate laboratory reports and review results.	-
7.	Compile results in report detailing methodology, desktop study, physical conditions, field work results, test locations, bore logs, in-situ test results, laboratory results and discussion.	-
8.	Recommendations for erosion control and prevention measures and management recommendations for earthworks.	-

4.0 Results

4.1 Field survey

A soil survey was conducted on 15 April 2019 using standard soil surveying techniques and a map of the investigated site and investigation pit locations can be seen as follows, **Figure 1**.

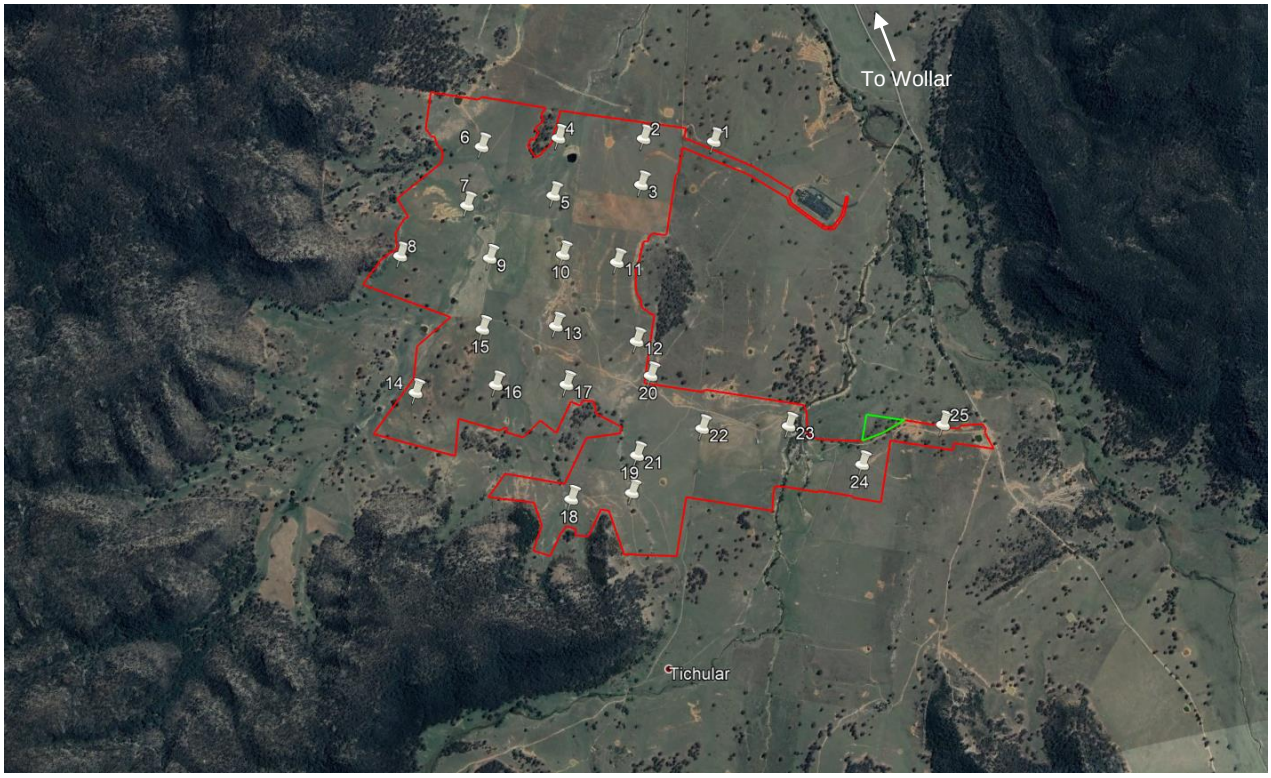

Figure 1: *Soil survey investigation pit locations with* ***Development Footprint*** *and* ***Potential Expansion Area.***

Sampling and classification of in situ soils was carried out as per the Australian Soil and Land Survey Field Handbook (2009) and The Australian Soil Classification, (Isbell, 1996). Density of investigation pits was determined via Guidelines for Surveying Soil and Land Resources (2008) where selection of a 'Moderately High (Detailed)' intensity level was deemed appropriate for satisfying the objectives for detailed project planning. Soils encountered were typical of the locale, generally falling into reconnaissance survey classes. Slight variations in profiles exist due to remnant parent formations, drainage plains and the complex soil sequences that are associated with such. Soil moisture contents varied between soil types but were generally found to be moderately moist to dry in the topsoil and subsoil and usually drier with depth. Free groundwater was not encountered to the investigated depth.

4.2 Typical soil profiles

Soils can be classified into a typical soil profile across the site as per the Australian Soil Classification (ASC) system (Isbell, 1996). Representative photographs from profiles examined on site can be seen below with a brief description of the profile characteristics. All soil pits investigated were located on managed agricultural lands. Field soil log sheets can be seen attached. Descriptions of the typical soil type encountered; Chromosols can be seen as follows.

4.2.2 Chromosols

Chromosols have a strong texture contrast between A and B horizons. There is a clear or abrupt textural B horizon in which the upper portion of the horizon (0.2m) is not strongly acid and not sodic. These soils are the most commonly encountered soils under agricultural use in Australia.

Figure 2:*Typical Chromosol profiles encountered on site*

Topsoil

Brown fine silty clay loams (darker, peaty soils with higher water content in the lower lying drainage areas), granular. pH (1:5 soil/water) 5.5 – 7.9 in the A horizon; to 10-40cm (average of 20cm) depth. Pronounced A2 horizon on the flatter low-lying areas. High organic matter at the time of investigation. Clear to diffuse boundary to subsoils as described below.

Subsoils

Moderately massive or polyhedral well developed structures across the majority of site with parent rock encountered within 1.5m on the higher elevated areas. Hues vary across the site with combination of yellow, red, grey and black encountered across different landforms in the B and C horizons (where encountered). Significant mottling occurred across the entire extent of the site, usually in the lower B horizon or C horizon. Texture included mainly medium to heavy clays with some sandy clays in areas of significantly weathered underlying parent material.

4.3 Laboratory analysis

Eight representative topsoil samples were obtained and analysed at a NATA accredited laboratory for the establishment of baseline soil data that may be referred to and used in preparation of a site decommissioning plan. Laboratory COA can be found in the attachments and topsoil soil parameters can be seen summarised in **Table 2**. 12 subsoil samples were also analysed for pH and EC, and tested for dispersion, **Table 3**.

4.3.1 Topsoil analysis

4.3.1.1 pH & Electrical Conductivity

Topsoil pH (1:5 soil/water) ranged from 5.5 – 7.9 and can be classed as ‘Moderately Alkaline’(8.4-7.9); ‘Neutral’ (7.3-6.6); ‘Slightly acid’ (6.5-6.1); and ‘Strongly acid’ (5.5-5.1) (Bruce & Rayment,

1982). Electrical Conductivity (EC) ranged from 0.04 to 0.18 dS/m and therefore the salinity rating was 'very low' (Agriculture Victoria, 2011).

4.3.1.2 Cation Exchange Capacity, Exchangeable Sodium Percentage & Dispersion

Cation Exchange Capacity (CEC) ranges from 4.5 to 12.8 cmol (+)/kg. CEC of the soils is rated by Hazelton and Murphy (2007), as 'moderate' (12-25), 'low' (6 – 12) and 'very low' (<6). Exchangeable Sodium Percentage (ESP) ranges from <1% to 10%. Soils are classified as 'non-sodic' when the ESP is <6%; and may be sodic and susceptible to dispersion if >6% (Agriculture Victoria, 2011).

4.3.1.3 Colwell Phosphorus and Phosphorus Buffering Index

Colwell P (plant available phosphorus) ranges from <5 to 16mg/kg, which is classed as 'very low' to 'moderate' (Hazelton and Murphy, 2007). Phosphorus Buffering Index (PBI) ranged from 35 to 97 and can be classed from 'low' (71-140), 'very low' (36-70), to 'very very low'(15-35) (Agriculture Victoria, 2011).

4.3.1.4 Calcium: Magnesium Ratio

Ca:Mg ratio ideally should be at least 2:1. Higher calcium contents are acceptable however higher magnesium content may result in soil dispersion (Agriculture Victoria, 2011). Ca:Mg determined for topsoils returned results ranging from 0.8 – 5.4.

4.3.1.5 Soil infiltration rates and water holding capacity

Water holding capacity is variable across the site with topsoils determined as moderate based on available water by percentage (24%) and have a moderate permanent wilting point (~16%). Water holding capacity for subsoils is lower due to a higher clay content which has a lower available water percentage (13%) and higher permanent wilting point (34%) but can also be classed as moderate (Hazleton & Murphy 2007).

Topsoil infiltration based on texture and degree of structure for weakly pedal clay loams is inferred to be around 5-20mm per hour. This is given a low to very low rating for saturated hydraulic conductivity, meaning poor infiltration may lead to overland flow and erosion on slopes (Hazleton & Murphy 2007). Infiltration in subsoils is rated to be low to moderate with a permeability of 2.5-50mm per hour. Subsoils may have poor infiltration leading to overland flow and erosion on slopes especially very steep slopes (Hunt & Gilkes 1992).

5.0 Summary of test results

Please see next page.

Table 2: *Topsoil - Results of laboratory testing*

Parameter	Units	Sample Identification							
		1, 2, 3, 5	4, 6, 7, 18	8, 15, 16, 21	9, 10, 11, 12, 14	13	17, 20, 22	19	23, 24, 25
pH (1:5 Water)	pH unit	6.6	6.7	6.9	6.6	7.9	6.2	6.2	5.5
pH (1:5 CaCl2)	pH unit	5.6	5.6	6.6	5.7	7.0	5.2	5.1	4.7
Electrical Conductivity	dS/m	0.04	0.04	0.18	0.09	0.12	0.06	0.04	0.07
Chloride	mg/kg	<10	<10	<10	34	51	26	<10	18
Nitrate Nitrogen	mg/kg	2	3	9	2	1	1	1	20
Ammonium Nitrogen	mg/kg	2	2	2	2	<1	3	2	6
Phosphorus (Colwell)	mg/kg	<5	<5	6	<5	<5	5	<5	16
PBI	-	46	42	74	74	97	74	39	35
Sulphur (KCl40)	mg/kg	<1	<1	3	23	22	7	2	6
CEC	cmol(+)/kg	7.0	10.2	12.8	8.1	9.0	7.9	7.5	4.5
Calcium (Amm-acet.)	cmol(+)/kg	4.7	7.8	9.8	4.1	3.2	3.4	4.9	3.0
Magnesium (Amm-acet.)	cmol(+)/kg	1.2	1.5	1.8	2.8	4.2	3.4	1.6	0.8
Sodium (Amm-acet.)	cmol(+)/kg	<0.02	<0.02	<0.02	0.4	0.90	0.18	<0.02	0.04
Potassium (Amm-acet.)	cmol(+)/kg	0.95	0.95	1.20	0.75	0.75	0.90	0.96	0.59
Available Potassium	mg/kg	370	370	460	290	290	350	380	230
Aluminium (KCl)	cmol(+)/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aluminium % Cations	%	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium % Cations	%	68.0	76.0	77.0	51.0	36.0	43.0	65.0	67.0
Magnesium % Cations	%	17.0	14.0	14.0	35.0	46.0	43.0	22.0	19.0
Sodium % Cations (ESP)	%	<1.00	<1.00	<1.00	5.00	10.00	2.20	<1.00	0.97
Potassium % Cations	%	14.00	9.30	9.30	9.30	8.30	11.00	13.00	13.00
Cal/Mag Ratio	-	3.9	5.2	5.4	1.5	0.8	1.0	3.1	3.6

Table 3: *Subsoil - Results of laboratory testing*

Pit/Sample	Horizon	pH (1:5 soil/water)	Electrical Conductivity	Dispersion[+]
Units	**-**	**-**	**µS/cm**	**-**
1/2	B	6.9	0.04	P
2/2	B1	7.0	0.03	*
4/2	B1	7.0	0.02	C
5/2	A2	6.7	0.06	*
6/2	A2	7.0	0.01	*
8/2	B	6.8	0.01	*
10/2	B1	7.2	0.33	*
11/2	B	7.4	0.04	*
13/2	B	7.2	0.45	*
14/2	A2	7.4	0.02	*
15/2	B1	7.1	0.03	N
18/2	B1	7.8	0.05	*
20/2	B	5.6	0.01	N
21/2	B	6.7	0.03	P
23/2	B	6.5	0.01	P
25/2	B	6.7	0.16	N

[+]Dispersion testing results were rated N, P or C being Nil, Partial or Complete dispersion.

** Denotes slaking but no dispersion.*

6.0 Comments and recommendations

The discussion and recommendations provided below are based on field observations and testing at discrete locations.

6.1 Potential limitations

Potential landscape limitations have been summarised below, **Table 4**.

Table 4: *Potential landscape limitation assessment*

Soil Type	Erosion Hazard	Salinity Risk	Acid Soil	Waterlogging Risk	Acid Sulphate Soils	Infrastructure
Chromosol	LOW	LOW	NO	MODERATE	NO	LOW

As follows is the soil landscape map (eSpade, 2019) which has been generally validated by the soil survey through laboratory and field techniques. As such, management practices can be grouped into management classes of the 'Barigan Creek' (**bc**) Soil Landscape with Chromosols being represented across the site, **Figure 3**. This report identifies management practices for units in **Section 6.5** below.

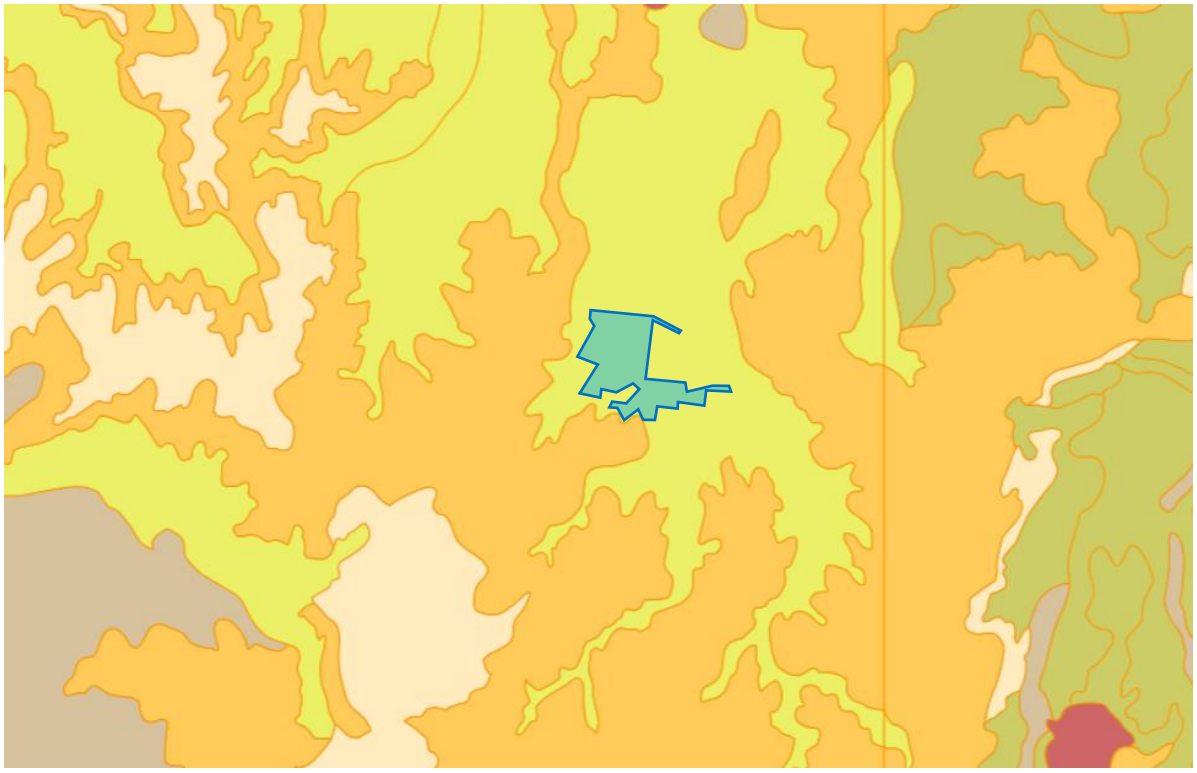

Figure 3: *Digital Atlas of Australian Soils mapping units with site overlay (**Barigan Creek**, **Lees Pinch**, and **Growee**)*

6.2 Erosion control

To mitigate the occurrence of erosion the following primary principles should be adhered to, particularly throughout the construction period of the project. Best Management Practices (BMPs) should be employed where applicable to further reduce the risk of potential erosion and sediment control.

- Integrate project design with any site constraints.
- Preserve and stabilise drainageways.
- Minimise the extent and duration of disturbance.
- Control stormwater flows onto, through and from the site in stable drainage structures.
- Install perimeter controls.
- Stabilise disturbed areas promptly.
- Protect steep slopes.
- Employ the use of sediment control measures to prevent off and on-site damage.
- Protect inlets, storm drain outlets and culverts.
- Provide access and general construction controls.
- Inspect and maintain sediment and erosion control measures regularly.

The risk of erosion on site due to construction activities is considered moderate due to the variable relief and generally low salinity and sodicity of topsoils and subsoils. Excavation of subsoils should be limited where possible, and excavated subsoils should be stockpiled and contained to avoid potential dispersion and sediment transfer. Ground cover around the structures should be maintained where possible. Maintenance of ground cover will also aid in the prevention of topsoil losses from runoff erosion. Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Volume 2A & 2C (DECC, 2008) should be consulted further in the development of an Erosion and Sediment Control Plan (ESCP).

6.3 Acid sulphate soils

'Acid sulphate soils' is the common name given to naturally occurring soils containing iron sulphides. Exposure of the sulphides present in these soils to oxygen from drainage or excavation will lead to the generation of sulphuric acid. Field pH of these soils in their undisturbed state is generally pH 4 or less.

Landscape characteristics such as; the dominance of mangroves, reeds, rushes and other marine/estuarine or swamp-tolerant vegetation, low lying areas, back swamps or scalded areas of coastal estuaries and floodplains and sulphurous smell following rain after prolonged dry periods (Stone *et al*, 1998) after soil disturbance were not observed. There was no evidence of a jarositic horizon or jarosite precipitates or coatings on any root channels or cracks in the soil.

From the soil survey conducted, it has been assessed that acid sulphate soils are not present on site.

6.4 Potential impacts on salinity, groundwater resources and hydrology

Current operational procedures include pastures and grazing. Associated water features across the investigated area include upwards of 25 dams and various open drainage channels and depressions including Wollar Creek. There are no registered groundwater bores on site and one registered bore within 1km of the site boundary. Most of the paddocks on the higher ground had maintained ground cover at the time of the investigation. Given the majority of soils on site are classified as 'non-sodic' and are of low salinity, the risk of salt build-up in discharge areas is low. However, there were some sodic soils identified from the

analysis (BH13) which may pose higher risk of salt build up and discharge. Changing direction of surface waters and any run-on should be avoided as local changes in the water regime are likely to further mobilise any salts stored in the soil. Deep rooted vegetation should be maintained where present and established where absent, ground clearing should be minimised.

6.5 Soil characteristics and management responses

6.5.2 Chromosols

Table 5: *Chromosol characteristics and management responses.*

Soil property	Behaviour of soil to activity or environment	Management responses/measures
Soil surface		
These soils generally have a moderate to weak structure in the surface with a firm to hard setting surface condition.	A firm to hard setting surface will generally have poor initial infiltration resulting in a large proportion of water running off causing erosion.	Surface infiltration rate can be increased through the incorporation of composted organic matter and by maintaining vegetative cover.
	A hard setting surface will also cause poor germination and seedling emergence.	Soil structure and moisture holding capacity can be improved through the incorporation of composted organic matter leading to better seedling establishment.
	A sandy to loamy surface with poor structure can have low soil strength causing trafficability issues.	Trafficability of these soils may be difficult when wet, however the use of gravel road surfaces may improve site access.
	If sandy to loamy surface soil with poor structure and low soil strength is overworked or excessively trafficked there is a high potential to generate dust.	Limit traffic and do not disturb unless necessary to avoid destruction of the limited soil structure. Construct gravel roads on site and limit access off these roads. Consider the use of stabilisation products.
Expansive clays		
These soils contain little to no expansive clays.	-	-
Clay subsoils		
These soils contain non-sodic, slightly acidic to slightly alkaline clay subsoils that may be mottled.	These soils have imperfect drainage and lower landscape positions and can stay wet for extended periods of time. Subsoil permeability is moderate.	Subsoil material is unsuitable for use on the soil surface and should be adequately covered with topsoil. Appropriate drainage design and materials (i.e. sand and gravel) can improve site access for construction. Depending on subsoil structure, plant roots are generally able to extend into the subsoil material without restriction. Gypsum additions can be used to assist structure improvement where required.

Soil property	Behaviour of soil to activity or environment	Management responses/measures
Dispersion		
These soils are generally non-dispersive;	Although not generally dispersive, these soils are still susceptible to rill, sheet and stream bank erosion.	Maintain cover to reduce sheet and rill erosion. Stream bank erosion managed by maintaining vegetative cover and encouraging plants with fibrous root systems. Do not concentrate water flow unless using appropriate erosion and sediment control treatments. Erosion and sediment controls may need to be installed to manage drainage, erosion and prevent movement of sediment off-site.
Salinity		
These soils can have high salt levels (depending on parent material and landscape practices) particularly on lower slopes.	High salt levels will affect plant growth and will also impact water quality if leached or washed off.	If irrigating salty soils, maintain a leaching profile to reduce salt levels (salinity management handbook (DERM 2011) contains thresholds for different plants). Treat salty soils as dispersive soils, even if field testing results are negative, because salt can mask dispersion.
	Salt can cause scalding, erosion and damage to infrastructure.	Discharge salinity expressions can be managed by reducing water inputs and by increasing soil water use at the site or upslope if possible. Soil amelioration with gypsum and planting salt tolerant species may assist scald areas.
Fertility		
These soils generally have a low to moderate fertility.	The sandy surface and pale subsurface layers (where present) generally mean that nutrient content is low in these soils, as is their ability to hold onto nutrients.	Fertiliser additions may improve plant growth, particularly nitrogen, phosphorus, and potassium. To limit leaching/loss of nutrients, specific fertiliser rates should be divided up into regular smaller applications during the growing season, rather than one single application. Increasing organic matter content with composted organics will improve the fertility and assist nutrient retention in these soils.

Soil property	Behaviour of soil to activity or environment	Management responses/measures
Revegetation		
These soils are poorly to imperfectly drained with low to moderate fertility, highly alkaline subsoils and low plant available water holding capacity.	Plant species need be selected that are adapted to these conditions.	Addition of gypsum may be required to alleviate dispersion risk. Increasing organic matter content with composted organics will improve fertility, assist nutrient retention and improve moisture holding capacity of these soils. Relieve any compaction present and ensure adequate fertility for quick establishment. These soils will require frequent, low volume watering due to the dense subsoils. Protect surface with mulch material to reduce raindrop induced crusted or hard setting surface. Fertiliser additions should be divided up into regular smaller applications during the growing season to limit leaching of nutrients. Dense subsoil material significantly restricts plant root extension into the subsoil. Stabilisation and revegetation targets and timeframes should be in accordance with IECA (2008) guidelines.
Soil handling		
Some of these soils have very salty and/ or dispersive subsoils and potentially dusty topsoil.	The objective of soil handling is to minimise off site impacts and maximise the productive capacity of the soil on site consistent with the intended use.	Topsoil stripping should maximise available reserves and should avoid mixing with alkaline, salty and/or sodic subsoils – a simple survey of the site is recommended. Topsoil and subsoil stockpiles should be kept separate. Reinstate soil in the order they were removed (i.e. deeper subsoil below upper subsoil). Final placement of dispersive materials should be covered with adequate topsoil material to protect from erosion. Installation of erosion and sediment control structures may be required where soil is exposed. Trafficability of these soils may be difficult when wet, the use of gravel road surfaces may improve site access. Minimise the handling of topsoil material and ensure traffic is concentrated on constructed road surfaces.

7.0 Notes relating to results

Groundwater

No free groundwater was encountered during the investigation. A groundwater table or seepage may be present at other times and fluctuations in groundwater levels and seepage could occur due to rainfall, changes in temperature and other factors.

Test pit logging

The information supplied in the log sheets is based on a visual and tactile assessment with consideration given to field conditions at the time of testing. The log sheets can include inferred data based on the experience of the consultant as well as factual data from in situ testing.

8.0 Disclaimer

The information contained in this report has been extracted from field and laboratory sources believed to be reliable and accurate. DM McMahon Pty Ltd will not assume any responsibility for the misinterpretation of information supplied in this report. The accuracy and reliability of recommendations identified in this report need to be evaluated with due care according to individual circumstances. It should be noted that the recommendations and findings in this report are based solely upon the said site location and the ground level conditions at the time of testing. The results of the said investigations undertaken are an overall representation of the conditions encountered. The properties of the soil within the location may change due to variations in ground conditions outside of the tested area. The author has no control or liability over site variability that may warrant further investigation that may lead to significant design changes.

9.0 References

Agriculture Victoria (2011). Understanding soil tests – pastures. <http://agriculture.vic.gov.au/agriculture/farm-management/soil-and-water/soils/understanding-soil-tests-pastures>

Bureau of Meteorology (2019). Climate Statistics for Australian locations - Mudgee Airport. <http://www.bom.gov.au/climate/averages/tables/cw_062101.shtml>

Bureau of Rural Sciences after Commonwealth Scientific and Industrial Research Organisation (1991), *Digital Atlas of Australian Soils.*

Bruce, R. C., and Rayment, G. E. (1982). Analytical methods and interpretations used by the Agricultural Chemistry Branch for Soil and Land Use Surveys. Queensland Department of Primary Industries. Bulletin QB8 (2004), Indooroopilly, Queensland.

DERM. (2011). Salinity management handbook (2nd ed.). Queensland, Australia: Department of Environment and Resource Management.

Department of Primary Industries Office of Water (2019). NSW Government. <http://allwaterdata.water.nsw.gov.au/water.stm>

Geeves GW, Craze B and Hamilton GJ 2007. Soil physical properties. In 'Soils – their properties and management'. 3rd edn. (Eds Charman PEV and Murphy BW) pp. 168-191 Oxford University Press Melbourne.

Geology information: Copyright Commonwealth of Australia (MDBC) 1999

Hazelton P and Murphy B 2007. Interpreting Soil Test Results, What do All the Numbers Mean?. NSW Department of Natural Resources, CSIRO Publishing, Collingwood Vic, Australia.

International Erosion Control Association (IECA) 2008. Best Practice Erosion and Sediment Control. Books 1 – 3.

Ipswich City Council. (Undated). Soil Management Guidelines. Ipswich City Council (www. ipswich.qld.gov.au).

Isbell, R. F. (1996). Australian Soil and Land Survey Handbook-The Australian Soil Classification, CSIRO Publishing, Collingwood Vic, Australia.

Isbell, R.F. (1996) The Australian Soil Classification (ASC). CSIRO Publishing, Melbourne.

McKenzie, N. J., Grundy, M. J., Webster, R., Ringrose-Voase, A. J., 2008. Guidelines for Surveying Soil and Land Resources, 2nd Ed. CSIRO Publishing, Collingwood Vic, Australia.

Metson, A. J. (1961). Methods of chemical analysis for soil survey samples. Soil Bureau Bulletin No. 12, New Zealand Department of Scientific and Industrial Research, pp. 168-175. Wellington, New Zealand.

Murphy BW and Lawrie JM, 1998, Soil Landscapes of the Dubbo 1:250,000 Sheet, NSW Department of Land and Water Conservation, Sydney.

National Committee on Soil and Terrain (Australia) (2009). Australian Soil and Land Survey Field Handbook, 3rd Ed. CSIRO Publishing, Collingwood Vic, Australia.

NSW Agriculture (2000). Understanding Soil pH. <https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0003/167187/soil-ph.pdf>

Standards Australia AS 1726 – 2017 Geotechnical Site Investigations.

Standards Australia AS 3798 – 2007 Guidelines on earthworks for commercial and residential developments.

Stone, Y., Ahern, C. R., and Blunden, B. (1998). Acid Sulfate Soil Manual 1998. Acid Sulfate Soil Management Committee, Wollongbar, NSW, Australia.

Strahler, A. N. (1952), "Hypsometric (area-altitude) analysis of erosional topology", Geological Society of America Bulletin 63 (11): 1117–1142.

10.0 Attachments

Attachment	Details
A. Log sheets	5 pages
B. Laboratory reports	16 pages

McMahon EARTH SCIENCE

SOIL SURVEY FIELD SHEET

Job No: 5339
Project: Wollar Solar Farm
Site: Wollar Solar Farm

Site Identity	Sample	Co-ordinates MGA GDA94 z55	Layer	Layer Top (m)	Layer Bottom (m)	Horizon	Boundary	Colour	Munsell Code	Texture	Moisture	Consistence	Mottles	Mottle Type	Structure	Coarse Fragments	Fragment Size (mm)	Fragment (%)	Comments
1	1/1	777077 E	1	0.0	0.20	A	-	-B	5YR 3/3	ZCL	D	4	-	-	SB	-	-	-	
	1/2	6410438 N	2	0.20	0.80	B	C	BR	2.5YR 4/6	MC	T	5	-	-	M	-	-	-	
	1/3		3	0.80	1.50	C	D	GY	10YR 6/6	HC	D	6	2	R, D	M	Y	<100	40	
2	2/1	776629 E	1	0.00	0.20	A	-	-B	5YR 3/3	ZCL	D	4	-	-	SB	-	-	-	
	2/2	6410470 N	2	0.20	0.60	B1	C	+R	2.5YR 3/6	MC	M	5	-	-	M	-	-	-	
	2/3		3	0.60	1.20	B2	G	BY	10YR 4/4	MC	M	6	-	R, G	M	-	-	-	
	2/4		4	1.20	1.50	C	D	BY	10YR 4/5	HC	D	6	-	G, D	M	Y	<50	10	
3	3/1	776605 E	1	0.00	0.20	A	-	RB	7.5YR 3/4	FSCL	T	4	-	-	SB	-	-	-	
	3/2	6410176 N	2	0.20	0.50	B1	C	+R	2.5YR 3/6	MC	M	5	-	-	M	-	-	-	
	3/3		3	0.50	1.20	B2	G	RY	10YR 4/6	HC	D	6	-	G, D	M	-	-	-	
	3/4		4	1.20	1.50	C	D	GY	10YR 6/6	HC	D	6	-	G, D	PH	Y	<30	10	
4	4/1	776086 E	1	0.00	0.20	A1	-	+B	5YR 3/1	FSCL	T	4	-	-	SB	-	-	-	
	4/2	6410490 N	2	0.20	0.50	A2	C	-B	5YR3/3	ZC	D	3	-	-	M	-	-	-	
	4/3		3	0.50	0.80	B1	C	GB	10YR 4/2	HC	T	6	-	Y, R	PH	-	-	-	
	4/4		4	0.80	1.50	B2	D	GBL	7.5YR 4/1	HC	D	6	-	Y, R	PH	Y	<10	<5	
5	5/1	776044 E	1	0.00	0.40	A	-	GB	10YR 4/2	ZCL	D	4	-	-	M	-	-	-	
	5/2	6410126 N	2	0.40	1.00	B1	C	Y	10YR 6/6	HC	T	6	-	G, Y	M	-	-	-	
	5/3		3	1.00	1.50	B2	D	YG	10YR 5/3	HC	D	6	-	R, Y, D	M	Y	<10	<5	

McMahon EARTH SCIENCE

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Site: Wollar Solar Farm

Site Identity	Sample	Co-ordinates MGA GDA94 z55	Layer	Layer Top (m)	Layer Bottom (m)	Horizon	Boundary	Colour	Munsell Code	Texture	Moisture	Consistence	Mottles	Mottle Type	Structure	Coarse Fragments	Fragment Size (mm)	Fragment (%)	Comments
6	6/1	775597 E	1	0.00	0.40	A1	-	BR	7.5YR 3/3	FSCL	T	4	-	-	G	-	-	-	
	6/2	6410445 N	2	0.40	1.00	A2	C	GY	2.5YR 3/1	MC	D	5	-	-	M	-	-	-	
	6/3		3	1.00	1.50	B	D	Bl	2.5YR 5/4	HC	D	6	-	G,B	PH	Y	<20	<5	
7	7/1	775494 E	1	0.00	0.40	A	-	B	7.5YR 3/3	FZCL	T	4	-	-	G	-	-	-	
	7/2	6410076 N	2	0.40	0.60	B1	C	RY	10YR 4/6	LMC	D	5	-	R, G	M	-	-	-	
	7/3		3	0.60	0.80	B2	C	GR	7.5YR 4/6	HC	T	6	-	Y	PH	-	-	-	
	7/4		4	0.80	1.50	C	D	G	2.5YR 5/3	HC	T	6	-	RY	PH	Y	<10	<5	
8	8/1	775065 E	1	0.00	0.20	A	-	B	7.5YR 3/3	FZCL	D	3	-	-	G	Y	<50	10	
	8/2	6409764 N	2	0.20	0.60	B	C	BR	2.5YR4/6	MC	M	5	-	B	M	-	-	-	
	8/3		3	0.60	0.80	C	D	YG	10YR5/3	HC	D	5	-	R, B	M	Y	<20	10	
9	9/1	775629 E	1	0.00	0.20	A	-	-B	5YR 3/3	ZCL	D	4	-	-	G	-	-	-	
	9/2	6409738 N	2	0.20	1.00	B	C	BY	10YR4/4	SCL	M	5	-	G, R	M	-	-	-	
	9/3		3	1.00	1.50	C	D	YG	10YR 5/3	LC	T	5	-	R, D, C	M	-	-	-	
10	10/1	776095 E	1	0.00	0.10	A	-	YB	7.5YR 4/4	FZCL	T	3	-	-	G	-	-	-	
	10/2	6409748 N	2	0.10	0.40	B1	C	+B	5YR 3/3	CL	M	3	-	-	G	-	-	-	
	10/3		3	0.40	0.60	B2	C	G	2.5YR 3/3	MC	M	5	-	R, Y	M	-	-	-	
	10/4		4	0.60	1.50	C	D	RY	10YR 4/6	HC	T	6	-	G	M	-	-	-	

McMahon EARTH SCIENCE

SOIL SURVEY FIELD SHEET

Job No:	5339
Project:	Wollar Solar Farm
Site:	Wollar Solar Farm

Site Identity	Sample	Co-ordinates MGA GDA94 z55	Layer	Layer Top (m)	Layer Bottom (m)	Horizon	Boundary	Colour	Munsell Code	Texture	Moisture	Consistence	Mottles	Mottle Type	Structure	Coarse Fragments	Fragment Size (mm)	Fragment (%)	Comments
11	11/1	776438 E	1	0.00	0.10	A	-	-B	5YR 3/3	ZCL	D	4	-	-	G	-	-	-	
	11/2	6409688 N	2	0.10	0.50	B	C	BY	10YR 4/4	HC	T	5	-	R	M	-	-	-	
	11/3		3	0.50	1.50	C	D	GY	7.5YR 4/6	LC	D	6	-	G, Y, B	PH	Y	<10	10	
12	12/1	776549 E	1	0.00	0.10	A	-	YB	7.5YR 4/4	FZCL	T	3	-	-	G	-	-	-	
	12/2	6409184 N	2	0.10	0.40	B	C	BY	10YR 4/4	MC	D	5	-	-	M	-	-	-	
	12/3		3	0.40	0.80	C	D	G	2.5YR 5/3	HC	T	5	Y	R	PL	Y	<100	20	
13	13/1	776039 E	1	0.00	0.10	A1	-	RB	7.5YR 3/4	FZCL	D	3	-	-	G	-	-	-	
	13/2	6409296 N	2	0.10	0.30	A2	D	R	2.5YR 4/8	HC	D	5	Y	G	M	-	-	-	
	13/3		3	0.30	1.00	B	D	GR	7.5YR 4/6	HC	D	5	-	-	PH	-	-	-	
	13/4		4	1.00	1.50	C	D	R	2.5YR 4/8	CS	D	5	-	GY	PH	Y	<20	10	
14	14/1	775138 E	1	0.00	0.10	A1	-	-B	5YR 3/3	FZCL	D	3	-	-	G	-	-	-	
	14/2	6408900 N	2	0.10	0.30	A2	C	GY	10YR 6/6	ZL	D	5	-	-	G	-	-	-	
	14/3		3	0.30	1.00	B	C	GR	7.5YR 4/6	HC	D	5	-	-	PH	-	-	-	
	14/4		4	1.00	1.50	C	D	R	2.5YR 4/8	CS	D	5	-	GY	PH	Y	<20	10	
15	15/1	775568 E	1	0.0	0.20	A	-	RY	10YR 4/6	ZCL	D	3	-	-	SB	-	-	-	
	15/2	6409288 N	2	0.20	0.60	B1	C	R	2.5YR 4/8	HC	T	5	-	-	M	-	-	-	
	15/3		3	0.60	1.00	B2	C	Y	10YR 6/6	MC	D	6	Y	R, W	M	Y	<10	80	
	15/4		4	1.00	1.50	C	D	W	2.5YR 7/2	HC	D	6	Y	Y, R	P	Y	<100	90	

McMahon EARTH SCIENCE

SOIL SURVEY FIELD SHEET

Job No:	5339
Project:	Wollar Solar Farm
Site:	Wollar Solar Farm

Site Identity	Sample	Co-ordinates MGA GDA94 z55	Layer	Layer Top (m)	Layer Bottom (m)	Horizon	Boundary	Colour	Munsell Code	Texture	Moisture	Consistence	Mottles	Mottle Type	Structure	Coarse Fragments	Fragment Size (mm)	Fragment (%)	Comments
16	16/1	775648 E	1	0.00	0.30	A	-	+B	5YR 3/1	ZCL	D	6	Y	Y,W	G	Y	<200	5	
	16/2	6408934 N	2	0.30	0.50	B	C	BY	10YR 4/4	HC	D	5	Y	B, W	PH	Y	<20	80	
	16/3		3	0.50	1.50	C	C	W	2.5YR 7/2	LC	T	6	Y	R	M	-	-	-	
17	17/1	776097 E	1	0.00	0.20	A	-	RB	7.5YR 4/4	FZCL	D	3	-	-	G	-	-	-	
	17/2	6408923 N	2	0.20	0.60	B	C	R	10YR 4/4	HC	T	4	Y	G	M	-	-	-	
	17/3		3	0.60	1.00	C	D	RY	2.5YR 5/3	MC	D	6	Y	G, W	PL	-	-	-	
	17/4		4	1.00	1.70	D	D	G	2.5YR 5/4	HC	T	6	Y	Y	PL	-	-	-	
18	18/1	776109 E	1	0.00	0.40	A2	-	-B	5YR 3/3	FZCL	D	3	-	-	G	-	-	-	
	18/2	6408201 N	2	0.40	0.60	B1	D	B	7.5YR3/3	ZCL	T	4	Y	W	M	-	-	-	
	18/3		3	0.60	1.50	B2	D	B	7.5YR3/4	MC	T	5	Y	YRW	M	Y	<20	5	
19	19/1	776493 E	1	0.00	0.10	A	-	B	7.5YR 3/3	ZCL	D	4	-	-	G	-	-	-	
	19/2	6408238 N	2	0.10	0.40	B	C	BR	2.5YR 4/6	MC	T	5	Y	YW	M	-	-	-	
	19/3		3	0.40	0.70	-	D	B	7.5YR 3/3	HC	T	6	-	-	PH	-	-	-	
20	20/1	776632 E	1	0.00	0.10	A	-	B	7.5YR 3/3	FZCL	T	3	-	-	G	-	-	-	
	20/2	6408910 N	2	0.10	0.30	B	C	YR	5YR 5/6	MC	M	4	Y	G	M	-	-	-	
	20/3		3	0.30	0.60	C	D	G	2.5YR 5/4	HC	M	5	Y	RY	M	Y	<10	<5	
21	21/1	776532 E	1	0.00	0.10	A	-	B	7.5YR 3/3	FZCL	T	3	-	-	G	-	-	-	
	21/2	6408465 N	2	0.10	0.40	B	C	YR	5YR 5/6	MC	T	5	Y	BGY	M	-	-	-	
	21/3		3	0.40	0.80	C	D	G	2.5YR 5/4	HC	D	6	Y	YRG	M	Y	<10	<5	

McMahon EARTH SCIENCE

SOIL SURVEY FIELD SHEET

Job No:	5339
Project:	Wollar Solar Farm
Site:	Wollar Solar Farm

Site Identity	Sample	Co-ordinates MGA GDA94 z55	Layer	Layer Top (m)	Layer Bottom (m)	Horizon	Boundary	Colour	Munsell Code	Texture	Moisture	Consistence	Mottles	Mottle Type	Structure	Coarse Fragments	Fragment Size (mm)	Fragment (%)	Comments
22	22/1	776951 E	1	0.00	0.20	A	-	B	7.5YR 3/3	FZCL	M	3	-	-	G	-	-	-	
	22/2	6408623 N	2	0.30	1.20	B1	C	R	2.5YR 4/8	HC	M	5	Y	Y	M	-	-	-	
	22/3		3	0.50	1.50	B2	D	YR	5YR 5/6	MC	T	6	Y	B, Y, G	M	Y	<10	<5	
23	23/1	777503 E	1	0.00	0.30	A	-	B	7.5YR 3/3	FZCL	M	3	-	-	G	-	-	-	
	23/2	6408674 N	2	0.30	1.00	B	C	GY	10YR 6/6	MC	T	6	Y	R	M	Y	<20	<5	
	23/3		3	1.00	1.50	C	D	G	2.5YR 3/3	HC	D	6	Y	Y, R, W	M	-	-	-	
24	24/1	777964 E	1	0.00	0.10	A	-	+B	5YR 3/1	FZCL	T	3	-	-	G	-	-	-	
	24/2	6408366 N	2	0.10	0.60	B	C	B	7.5YR 3/3	ZCL	D	4	-	-	G	-	-	-	
	24/3		3	0.60	1.50	C	D	BG	5YR 4/2	MC	D	6	-	-	M	-	-	-	
25	25/1	778484 E	1	0.00	0.20	A	-	YB	7.5YR 4/4	ZCL	D	4	-	-	M	-	-	-	
	25/2	6408605 N	2	0.20	0.60	B	C	BR	5YR 5/6	HC	D	5	Y	YW	M	-	-	-	
	25/3		3	0.60	0.70	C	D	G	ROCK	-	D	-	-	-	-	Y	<100	<90	

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Nutrient Advantage Advice® Nutrient Report

DM McMahon Ptv Ltd
PO BOX 6118

WAGGA WAGGA
NSW 2650

Report Print Date: 01/05/2019
Agent/Dealer:
Advisor/Contact: D M MCMAHON PTY LTD
Phone: 02 6931 0510
Purchase Order No: WALLAR 5818

Grower Name : D M MCMAHON PTY LTD
Sample No: 022019385
Paddock Name: WALLAR 5818
Sample Name: SAMPLES 1 2 3 5
Sample Depth (cm): 0 **To** 10

Nearest Town: WAGGA NORTH
Test Code: E11
Sample Type: Soil
Sampling Date: 29/04/2019

Analyte / Assay	Units	Value
pH (1:5 Water)		6.6
pH (1:5 CaCl2)		5.6
Electrical Conductivity (1:5 water)	dS/m	0.04
Chloride	mg/kg	<10
Nitrate Nitrogen	mg/kg	2
Ammonium Nitrogen	mg/kg	2
Phosphorus (Colwell)	mg/kg	<5
Phosphorus Buffer Index		46
Sulphur (KCl40)	mg/kg	<1
Cation Exch. Cap. (CEC)	cmol(+)/kg	7.0
Calcium (Amm-acet.)	cmol(+)/kg	4.7
Magnesium (Amm-acet.)	cmol(+)/kg	1.2
Sodium (Amm-acet.)	cmol(+)/kg	<0.02
Potassium (Amm-acet.)	cmol(+)/kg	0.95
Available Potassium	mg/kg	370
Aluminium (KCl)	cmol(+)/kg	0.1
Aluminium % of Cations	%	1.5
Calcium % of Cations	%	68.0
Magnesium % of Cations	%	17.0
Sodium % of Cations (ESP)	%	<1.00
Potassium % of Cations	%	14.00
Calcium/Magnesium Ratio		3.9

Analyses conducted by **Nutrient Advantage Laboratory Services**
8 South Road, Werribee VIC 3030
NATA Accreditation No: 11958
Tel: 1800 803 453
Certificate of Analysis is available upon request.
Email: lab.feedback@incitecpivot.com.au

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Grower Name :	D M MCMAHON PTY LTD	**Nearest Town:**	WAGGA NORTH
Sample No:	022019385	**Test Code:**	E11
Paddock Name:	WALLAR 5818	**Sample Type:**	Soil
Sample Name:	SAMPLES 1 2 3 5	**Sampling Date:**	29/04/2019
Sample Depth (cm):	0 **To** 10		

The results reported pertain only to the sample submitted.
Analyses performed on soil dried at 40 degrees Celsius and ground to <2mm (excluding moisture assay)
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NSW 2650

Report Print Date: 01/05/2019
Agent/Dealer:
Advisor/Contact: D M MCMAHON PTY LTD
Phone: 02 6931 0510
Purchase Order No: WALLAR 5818

Grower Name : D M MCMAHON PTY LTD
Sample No: 022019386
Paddock Name: WALLAR 5818
Sample Name: SAMPLES 4 6 7 18
Sample Depth (cm): 0 **To** 10

Nearest Town: WAGGA NORTH
Test Code: E11
Sample Type: Soil
Sampling Date: 29/04/2019

Analyte / Assay	Units	Value
pH (1:5 Water)		6.7
pH (1:5 CaCl2)		5.6
Electrical Conductivity (1:5 water)	dS/m	0.04
Chloride	mg/kg	<10
Nitrate Nitrogen	mg/kg	3
Ammonium Nitrogen	mg/kg	2
Phosphorus (Colwell)	mg/kg	<5
Phosphorus Buffer Index		42
Sulphur (KCl40)	mg/kg	<1
Cation Exch. Cap. (CEC)	cmol(+)/kg	10.2
Calcium (Amm-acet.)	cmol(+)/kg	7.8
Magnesium (Amm-acet.)	cmol(+)/kg	1.5
Sodium (Amm-acet.)	cmol(+)/kg	<0.02
Potassium (Amm-acet.)	cmol(+)/kg	0.95
Available Potassium	mg/kg	370
Aluminium (KCl)	cmol(+)/kg	<0.1
Aluminium % of Cations	%	<1.0
Calcium % of Cations	%	76.0
Magnesium % of Cations	%	14.0
Sodium % of Cations (ESP)	%	<1.00
Potassium % of Cations	%	9.30
Calcium/Magnesium Ratio		5.2

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Grower Name :	D M MCMAHON PTY LTD	**Nearest Town:**	WAGGA NORTH
Sample No:	022019386	**Test Code:**	E11
Paddock Name:	WALLAR 5818	**Sample Type:**	Soil
Sample Name:	SAMPLES 4 6 7 18	**Sampling Date:**	29/04/2019
Sample Depth (cm):	0 **To** 10		

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Analyses performed on soil dried at 40 degrees Celsius and ground to <2mm (excluding moisture assay)
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Report Print Date: 01/05/2019
Agent/Dealer:
Advisor/Contact: D M MCMAHON PTY LTD
Phone: 02 6931 0510
Purchase Order No: WALLAR 5818

Grower Name : D M MCMAHON PTY LTD
Sample No: 022019387
Paddock Name: WALLAR 5818
Sample Name: SAMPLES 8 15 16 21
Sample Depth (cm): 0 **To** 10

Nearest Town: WAGGA NORTH
Test Code: E11
Sample Type: Soil
Sampling Date: 29/04/2019

Analyte / Assay	Units	Value
pH (1:5 Water)		6.9
pH (1:5 CaCl2)		6.6
Electrical Conductivity (1:5 water)	dS/m	0.18
Chloride	mg/kg	<10
Nitrate Nitrogen	mg/kg	9
Ammonium Nitrogen	mg/kg	2
Phosphorus (Colwell)	mg/kg	6
Phosphorus Buffer Index		74
Sulphur (KCl40)	mg/kg	3
Cation Exch. Cap. (CEC)	cmol(+)/kg	12.8
Calcium (Amm-acet.)	cmol(+)/kg	9.8
Magnesium (Amm-acet.)	cmol(+)/kg	1.8
Sodium (Amm-acet.)	cmol(+)/kg	<0.02
Potassium (Amm-acet.)	cmol(+)/kg	1.20
Available Potassium	mg/kg	460
Aluminium (KCl)	cmol(+)/kg	<0.1
Aluminium % of Cations	%	<1.0
Calcium % of Cations	%	77.0
Magnesium % of Cations	%	14.0
Sodium % of Cations (ESP)	%	<1.00
Potassium % of Cations	%	9.30
Calcium/Magnesium Ratio		5.4

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Grower Name :	D M MCMAHON PTY LTD	**Nearest Town:**	WAGGA NORTH
Sample No:	022019387	**Test Code:**	E11
Paddock Name:	WALLAR 5818	**Sample Type:**	Soil
Sample Name:	SAMPLES 8 15 16 21	**Sampling Date:**	29/04/2019
Sample Depth (cm):	0 **To** 10		

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Report Print Date: 01/05/2019
Agent/Dealer:
Advisor/Contact: D M MCMAHON PTY LTD
Phone: 02 6931 0510
Purchase Order No: WALLAR 5818

Grower Name : D M MCMAHON PTY LTD
Sample No: 022019388
Paddock Name: WALLAR 5818
Sample Name: SAMPLES 9 10 11 12 14
Sample Depth (cm): 0 **To** 10

Nearest Town: WAGGA NORTH
Test Code: E11
Sample Type: Soil
Sampling Date: 29/04/2019

Analyte / Assay	Units	Value
pH (1:5 Water)		6.6
pH (1:5 CaCl2)		5.7
Electrical Conductivity (1:5 water)	dS/m	0.09
Chloride	mg/kg	34
Nitrate Nitrogen	mg/kg	2
Ammonium Nitrogen	mg/kg	2
Phosphorus (Colwell)	mg/kg	<5
Phosphorus Buffer Index		74
Sulphur (KCl40)	mg/kg	23
Cation Exch. Cap. (CEC)	cmol(+)/kg	8.1
Calcium (Amm-acet.)	cmol(+)/kg	4.1
Magnesium (Amm-acet.)	cmol(+)/kg	2.8
Sodium (Amm-acet.)	cmol(+)/kg	0.40
Potassium (Amm-acet.)	cmol(+)/kg	0.75
Available Potassium	mg/kg	290
Aluminium (KCl)	cmol(+)/kg	<0.1
Aluminium % of Cations	%	<1.0
Calcium % of Cations	%	51.0
Magnesium % of Cations	%	35.0
Sodium % of Cations (ESP)	%	5.00
Potassium % of Cations	%	9.30
Calcium/Magnesium Ratio		1.5

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Grower Name :	D M MCMAHON PTY LTD	**Nearest Town:**	WAGGA NORTH
Sample No:	022019388	**Test Code:**	E11
Paddock Name:	WALLAR 5818	**Sample Type:**	Soil
Sample Name:	SAMPLES 9 10 11 12 14	**Sampling Date:**	29/04/2019
Sample Depth (cm):	0 **To** 10		

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Report Print Date: 01/05/2019
Agent/Dealer:
Advisor/Contact: D M MCMAHON PTY LTD
Phone: 02 6931 0510
Purchase Order No: WALLAR 5818

Grower Name : D M MCMAHON PTY LTD
Sample No: 022019389
Paddock Name: WALLAR 5818
Sample Name: SAMPLE 13
Sample Depth (cm): 0 **To** 10

Nearest Town: WAGGA NORTH
Test Code: E11
Sample Type: Soil
Sampling Date: 29/04/2019

Analyte / Assay	Units	Value
pH (1:5 Water)		7.9
pH (1:5 CaCl2)		7.0
Electrical Conductivity (1:5 water)	dS/m	0.12
Chloride	mg/kg	51
Nitrate Nitrogen	mg/kg	1
Ammonium Nitrogen	mg/kg	<1
Phosphorus (Colwell)	mg/kg	<5
Phosphorus Buffer Index		97
Sulphur (KCl40)	mg/kg	22
Cation Exch. Cap. (CEC)	cmol(+)/kg	9.0
Calcium (Amm-acet.)	cmol(+)/kg	3.2
Magnesium (Amm-acet.)	cmol(+)/kg	4.2
Sodium (Amm-acet.)	cmol(+)/kg	0.90
Potassium (Amm-acet.)	cmol(+)/kg	0.75
Available Potassium	mg/kg	290
Aluminium (KCl)	cmol(+)/kg	<0.1
Aluminium % of Cations	%	<1.0
Calcium % of Cations	%	36.0
Magnesium % of Cations	%	46.0
Sodium % of Cations (ESP)	%	10.00
Potassium % of Cations	%	8.30
Calcium/Magnesium Ratio		0.8

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Grower Name :	D M MCMAHON PTY LTD	**Nearest Town:**	WAGGA NORTH
Sample No:	022019389	**Test Code:**	E11
Paddock Name:	WALLAR 5818	**Sample Type:**	Soil
Sample Name:	SAMPLE 13	**Sampling Date:**	29/04/2019
Sample Depth (cm):	0 **To** 10		

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Analyses performed on soil dried at 40 degrees Celsius and ground to <2mm (excluding moisture assay)
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Report Print Date: 01/05/2019
Agent/Dealer:
Advisor/Contact: D M MCMAHON PTY LTD
Phone: 02 6931 0510
Purchase Order No: WALLAR 5818

Grower Name : D M MCMAHON PTY LTD
Sample No: 022019390
Paddock Name: WALLAR 5818
Sample Name: SAMPLES 17 20 22
Sample Depth (cm): 0 **To** 10

Nearest Town: WAGGA NORTH
Test Code: E11
Sample Type: Soil
Sampling Date: 29/04/2019

Analyte / Assay	Units	Value
pH (1:5 Water)		6.2
pH (1:5 CaCl2)		5.2
Electrical Conductivity (1:5 water)	dS/m	0.06
Chloride	mg/kg	26
Nitrate Nitrogen	mg/kg	1
Ammonium Nitrogen	mg/kg	3
Phosphorus (Colwell)	mg/kg	5
Phosphorus Buffer Index		74
Sulphur (KCl40)	mg/kg	7
Cation Exch. Cap. (CEC)	cmol(+)/kg	7.9
Calcium (Amm-acet.)	cmol(+)/kg	3.4
Magnesium (Amm-acet.)	cmol(+)/kg	3.4
Sodium (Amm-acet.)	cmol(+)/kg	0.18
Potassium (Amm-acet.)	cmol(+)/kg	0.90
Available Potassium	mg/kg	350
Aluminium (KCl)	cmol(+)/kg	<0.1
Aluminium % of Cations	%	<1.0
Calcium % of Cations	%	43.0
Magnesium % of Cations	%	43.0
Sodium % of Cations (ESP)	%	2.20
Potassium % of Cations	%	11.00
Calcium/Magnesium Ratio		1.0

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Grower Name :	D M MCMAHON PTY LTD	**Nearest Town:**	WAGGA NORTH
Sample No:	022019390	**Test Code:**	E11
Paddock Name:	WALLAR 5818	**Sample Type:**	Soil
Sample Name:	SAMPLES 17 20 22	**Sampling Date:**	29/04/2019
Sample Depth (cm):	0 **To** 10		

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NSW 2650

Report Print Date: 01/05/2019
Agent/Dealer:
Advisor/Contact: D M MCMAHON PTY LTD
Phone: 02 6931 0510
Purchase Order No: WALLAR 5818

Grower Name : D M MCMAHON PTY LTD
Sample No: 022019391
Paddock Name: WALLAR 5818
Sample Name: SAMPLE 19
Sample Depth (cm): 0 **To** 10

Nearest Town: WAGGA NORTH
Test Code: E11
Sample Type: Soil
Sampling Date: 29/04/2019

Analyte / Assay	Units	Value
pH (1:5 Water)		6.2
pH (1:5 CaCl2)		5.1
Electrical Conductivity (1:5 water)	dS/m	0.04
Chloride	mg/kg	<10
Nitrate Nitrogen	mg/kg	1
Ammonium Nitrogen	mg/kg	2
Phosphorus (Colwell)	mg/kg	<5
Phosphorus Buffer Index		39
Sulphur (KCl40)	mg/kg	2
Cation Exch. Cap. (CEC)	cmol(+)/kg	7.5
Calcium (Amm-acet.)	cmol(+)/kg	4.9
Magnesium (Amm-acet.)	cmol(+)/kg	1.6
Sodium (Amm-acet.)	cmol(+)/kg	<0.02
Potassium (Amm-acet.)	cmol(+)/kg	0.96
Available Potassium	mg/kg	380
Aluminium (KCl)	cmol(+)/kg	<0.1
Aluminium % of Cations	%	<1.0
Calcium % of Cations	%	65.0
Magnesium % of Cations	%	22.0
Sodium % of Cations (ESP)	%	<1.00
Potassium % of Cations	%	13.00
Calcium/Magnesium Ratio		3.1

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Grower Name :	D M MCMAHON PTY LTD	**Nearest Town:**	WAGGA NORTH
Sample No:	022019391	**Test Code:**	E11
Paddock Name:	WALLAR 5818	**Sample Type:**	Soil
Sample Name:	SAMPLE 19	**Sampling Date:**	29/04/2019
Sample Depth (cm):	0 **To** 10		

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Analyses performed on soil dried at 40 degrees Celsius and ground to <2mm (excluding moisture assay)
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WAGGA WAGGA
NSW 2650

Report Print Date: 01/05/2019
Agent/Dealer:
Advisor/Contact: D M MCMAHON PTY LTD
Phone: 02 6931 0510
Purchase Order No: WALLAR 5818

Grower Name : D M MCMAHON PTY LTD
Sample No: 022019392
Paddock Name: WALLAR 5818
Sample Name: SAMPLES 23 24 25
Sample Depth (cm): 0 **To** 10

Nearest Town: WAGGA NORTH
Test Code: E11
Sample Type: Soil
Sampling Date: 29/04/2019

Analyte / Assay	Units	Value
pH (1:5 Water)		5.5
pH (1:5 CaCl2)		4.7
Electrical Conductivity (1:5 water)	dS/m	0.07
Chloride	mg/kg	18
Nitrate Nitrogen	mg/kg	20
Ammonium Nitrogen	mg/kg	6
Phosphorus (Colwell)	mg/kg	16
Phosphorus Buffer Index		35
Sulphur (KCl40)	mg/kg	6
Cation Exch. Cap. (CEC)	cmol(+)/kg	4.5
Calcium (Amm-acet.)	cmol(+)/kg	3.0
Magnesium (Amm-acet.)	cmol(+)/kg	0.8
Sodium (Amm-acet.)	cmol(+)/kg	0.04
Potassium (Amm-acet.)	cmol(+)/kg	0.59
Available Potassium	mg/kg	230
Aluminium (KCl)	cmol(+)/kg	<0.1
Aluminium % of Cations	%	<1.0
Calcium % of Cations	%	67.0
Magnesium % of Cations	%	19.0
Sodium % of Cations (ESP)	%	0.97
Potassium % of Cations	%	13.00
Calcium/Magnesium Ratio		3.6

Analyses conducted by **Nutrient Advantage Laboratory Services**
8 South Road, Werribee VIC 3030
NATA Accreditation No: 11958
Tel: 1800 803 453
Certificate of Analysis is available upon request.
Email: lab.feedback@incitecpivot.com.au

Nutrient Advantage®

Nutrient Advantage Advice® Nutrient Report

Grower Name :	D M MCMAHON PTY LTD	**Nearest Town:**	WAGGA NORTH
Sample No:	022019392	**Test Code:**	E11
Paddock Name:	WALLAR 5818	**Sample Type:**	Soil
Sample Name:	SAMPLES 23 24 25	**Sampling Date:**	29/04/2019
Sample Depth (cm):	0 **To** 10		

The results reported pertain only to the sample submitted.
Analyses performed on soil dried at 40 degrees Celsius and ground to <2mm (excluding moisture assay)
* One or more components of this test are below their detection limit. The value used is indicative only.

APPENDIX E AGENCY APPROVAL OF BMP

Planning, Industry & Environment

Mr Bruce Howard
Wollar Solar Development Pty Ltd
Level 21 Suite 3 1
York Street
SYDNEY NSW 2000

16/07/2020

Dear Bruce

Wollar Solar Farm (SSD 9254)
Biodiversity Management Plan

I refer to the Biodiversity Management Plan (BMP) which was submitted to the Department as required under condition 14 of Schedule 3 of the SSD 9254 for the Wollar Solar Farm.

The Department has carefully reviewed the document and is that the plan generally meets the requirements of the condition.

Accordingly, the Planning Secretary has approved the *Wollar Solar Farm Biodiversity Management Plan* (Revision 1.1, dated 12 June 2020). Please ensure that the approved plan is placed on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact May Patterson on 02 8275 1190 or may.patterson@planning.nsw.gov.au.

Yours sincerely

Nicole Brewer
Director
Energy Assessments

As nominee of the Planning Secretary

APPENDIX F NSW CREDIT RETIREMENT

17 January 2023

WSD_DPE_026

Wollar Solar Development Pty Ltd
ABN 88 621 969 266
Level 21, 1 York Street
Sydney, NSW 2000

Andy Nixey
Team Leader, Energy Assessments
Department of Planning and Environment

Dear Andy

Development Consent SSD-9254 - Wollar Solar Farm
RE: Schedule 3 Condition 13 Retirement of Biodiversity Credits

With reference to Condition 13 of Schedule 3 and our previous correspondence WSD_DPIE_004, I write to confirm achievement of this Condition of the Development Consent.

Appendix A of this letter is the Credit Retirement Form confirming retirement of 721 credits of PCT ID 266, the equivalent of PCT ID 1303 and PCT IS 281. These were the final credits to be retired which have been achieved with completion of our purchase through CarbonVision Pty Ltd and retirement via approval from the Offset Programs, Environment, and Heritage Group of the Department of Planning and Environment (DPE).

Appendix C confirms the credits previously retired with the NSW Biodiversity Conservation Trust. In totality, this equates to all credits from Tables 1 and 2 of Condition 13 of Schedule 3 now successfully retired.

As per prior correspondences, we have already recognised this matter as non-compliance and the Department has been notified as such. We appreciate the Department's patience in this matter as we have attempted to expedite this matter.

Please contact me on the details below if the DPE wishes to discuss or clarify any information or detail regarding this matter.

Yours Sincerely,

Stuart Miller

Project Manager
Wollar Solar Development
Mobile: 0410 493 783
Stuart.Miller@bjeiaustralia.com

APPENDIX A – Credit Retirement Report confirming retirement of 721 PCT ID 266 credits

Credit retirement report

Approved Date	11/01/2024
Transaction number	CT-2809
Case Number	00045322

Credit holder details

Credit holder (s)

ID	Name
C-015869	WOLLAR SOLAR DEVELOPMENT PTY LTD

Reason For Retiring	For the purpose of complying with a requirement to retire biodiversity credits of a planning approval or a vegetation clearing approval
Reference number	SSD-9254 and EPBC 2018/8258
Address of Obligation	96 Maree Road, Tichular NSW 2850
Local government area	Mid-Western Regional
Date of obligation to retire	24/02/2020

Ecosystem Credits

Source BSA ID	Source BOAMS ID	Source Credit Holding ID	Credit ID	Number of credits	PCT Name	PCT ID	Offset trading group	Vegetation class	Vegetation Formation	IBRA Subregion	Hollow Bearing Trees
BS0020	00035098	CH-406	CR-29312	721	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	266	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern	Western Slopes Grassy Woodlands	Grassy Woodlands	Hill End	Yes (including artificial)

							Highlands, NSW South Western Slopes, South East Corner and Ri				

Species Credits

Source BSA ID	Source BOAMS ID	Source Credit Holding ID	Credit ID	Number of credits	Species ID	Scientific Name	Common Name

The retirement of a biodiversity credit is registered on the BOS Public Register in the Transactions register. Section 6.30 Biodiversity Conservation Regulation 2017 provides that retirement of a biodiversity credit is to be conclusively presumed if the retirement is recorded in the public register. The public register of biodiversity offset credits provides further information about biodiversity credit holdings and biodiversity credit trading activity. To view this information, please visit the Biodiversity Offset Scheme Public Registers.

This information is only current as of the date of provision and may not reflect subsequent legislative, policy or procedural changes.

Environment and Heritage Group, Department of Planning and Environment, Locked Bag 5022, Parramatta NSW 2124. Phone: 1300 361 967 (environment and national parks enquiries); email: info@environment.nsw.gov.au; website: www.environment.nsw.gov.au

APPENDIX B – Correspondence confirming PCT ID 266 equivalence with PSCT ID 1303 and PCT ID 281

From: James van den Broek
To: Duncan Upton
Subject: RE: Wollar offset credits
Date: Thursday, 19 January 2023 1:55:06 PM
Attachments: image002.png
image003.png
image004.png
623e7df5-f467-49ff-a808-a9c0d6eb39d9.png

Hi Duncan,

Hope you're enjoying the cruise. I've had a couple of ecologists look at your question regarding offset credits and have the following response for you.

The purchase of 721 credits for PCT 266 will equate to 479 credits for PCT 1303 plus 242 credits of PCT 281 under the like-for-like rules. This is confirmed by the PCT to Offset Trading Group lookup tool.

Existing approvals and associated biodiversity credits remain valid and continue to operate under the offset rules.

Biodiversity credits based on the old PCTs can trade with biodiversity credits from either the old or new PCTs in accordance with the offset rules.

Hopefully this is the information you are after. Let me know if you have any further questions.

Cheers,
JAMES VAN DEN BROEK
SENIOR PROJECT MANAGER

T. 02 4929 2301 **D.** 02 4917 3976 **M.** 0435 295 502
E. james.vdb@nghconsulting.com.au
Level 1, 31-33 Beaumont St
Hamilton NSW 2303

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WWW.NGHCONSULTING.COM.AU

NGH acknowledges that we work on the traditional lands of First Nations people across Australia and recognises the enduring connection to the land. We pay our respects to elders, past present and emerging.

From: Duncan Upton <duncan.upton@bjceaustralia.com>
Sent: Wednesday, 18 January 2023 5:47 PM
To: James van den Broek <james.vdb@nghconsulting.com.au>
Subject: Wollar offset credits

Hi James,

We are getting close to executing a contract to purchase the biodiversity credits required in our development consent. (We want to purchase 479 credits of PCT1303 and 242 credits of PCT281) See page 11 of our development consent.
https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9254-MOD-3%2120220823T235957.267%20GMT

Can you please confirm if the credits in the below table would meet the requirements of our development consent?

	Credit 1
BOAMS Credit Holding ID	
BOAMS Credit ID	CR-5908
BOAMS Parent Case ID	Click or tap here to enter text.
Plant Community Type Name	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
Plant Community Type ID	266
Offset Trading Group	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
Hollow Bearing Trees	Yes
IBRA subregion	Hill End
Credits transferred (no.)	721
Price per credit (excluding GST)	
Remaining credits	

Can you provide a response by Friday?
I think this should be an easy question for an expert.
I note that the BAM Biodiversity Credit Report for the Wollar Solar Farm provides “like-for-like” options for the required credits (see page 284 and 285) which suggests the offsets will meet the consent requirements.
https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9254%2120190321T011726.296%20GMT

Cheers,

Duncan Upton
Project Manager

京能集团 BJEI Australia
Beijing Energy International (Australia) Holding Pty Ltd
Suite 3, Level 21, 1 York Street
Sydney NSW 2000 Australia
Mobile Tel: +61 499 770 768
Email: Duncan.Upton@bjceaustralia.com

APPENDIX C – Correspondence with DPE WSD_DPIE_004 confirming prior credit retirement

Wollar Solar

Wollar Solar Development Pty Ltd
ABN 88 621 969 266
Level 21, 1 York Street
Sydney, NSW 2000

Department of Planning, Industry and Environment
Compliance Branch
Submitted via Major Projects website portal

10 January 2022

Dear Sir/Madam

WSD_DPIE_004 - Wollar Solar Farm Development Consent SSD 9254 - Non-Compliance Notification

Wollar Solar Development Pty Ltd (**WSD**) is the proponent of the Wollar Solar Farm which is subject to development consent number SSD 9254 granted on 24 February 2020 (**Development Consent**).

The purpose of this letter is to formally notify the Department of Planning, Industry and Environment (**Department**), as required by condition 8 of Schedule 4 of the Development Consent, of a non-compliance with the timing of the offsets required for the Wollar Solar Farm under condition 13 of Schedule 3 of the Development Consent (**Condition 13**).

Condition 13

Condition 13 relevantly provides as follows:

Biodiversity Offsets

13. Prior to commencing development under this consent, the Applicant must retire biodiversity credits of a number and class specified in Table 1 and Table 2 below, to the satisfaction of BCD, unless the Secretary agrees otherwise in writing.

The retirement of these credits must be carried out in accordance with the *NSW Biodiversity Offsets Scheme* and can be achieved by:

(a) acquiring or retiring 'biodiversity credits' within the meaning of the *Biodiversity Conservation Act 2016*;
(b) making payments into an offset fund that has been developed by the NSW Government; or
(c) funding a biodiversity conservation action that benefits the entity impacted and is listed in the ancillary rules of the biodiversity offset scheme.

Table 1: Ecosystem Credit Requirements

Vegetation Community	PCT ID	Credits Required
White Box - Grey Gum - Kurrajong grassy woodland on slopes of the northern Capertee Valley, Sydney Basin Bioregion	1303	479
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	281	242
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	1610	2

Table 2: Species Credit Requirements

Species Credit Species	Credits Required
Austfeld's Wattle (*Acacia ausfeldii*)	34
Bush Stone-curlew (*Burhinus grallarius*)	34
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	67
Large-eared Pied Bat (*Chalinolobus dwyeri*)	50
Commersonia procumbens	2
Large-leafed Monotaxis (*Monotaxis macrophylla*)	34
Barking Owl (*Ninox connivens*)	16
Powerful Owl (*Ninox strenua*)	16
Squirrel Glider (*Petaurus norfolcensis*)	34
Brush-tailed Phascogale (*Phascogale tapoatafa*)	13
Koala (*Phascolarctos cinereus*)	34
Masked Owl (*Tyto novaehollandiae*)	16

Note: Any residual impact on EPBC Act listed threatened species and ecological communities must be offset in accordance with an offset process endorsed by DAWE.

Context

WSD has proactively and transparently engaged with the Department on an ongoing basis in relation to the biodiversity credits required under Condition 13. In particular:

- By letter dated 20th June 2020, WSD wrote to the Department and:
    1. confirmed that it intended to secure the biodiversity credits required by Condition 13 by entering into a Biodiversity Stewardship Agreement over additional land owned by WSD in the vicinity of the Wollar Solar Farm; and
    2. sought the Planning Secretary's agreement to extend the timing for the retirement of the biodiversity credits required under Condition 13 until 31 December 2021 so as to enable sufficient time for this to occur.
- By letter dated 31 July 2020, the Department confirmed to WSD that the Planning Secretary agreed to extend the date for retirement of the biodiversity credits required under Condition 13 to 31 December 2021 subject to WSD:
    1. providing a status report to the Department on the outcome of the field work and a preliminary analysis of the Biodiversity Stewardship Agreement by 31 December 2020;
    2. applying for a Biodiversity Stewardship Agreement and uploading all relevant supporting documents to the Biodiversity Offsets and Agreement Management System by 30 April 2021; and
    3. retiring any residual credits negotiated through the market and/or pay residual obligations to the Biodiversity Conservation Fund by 31 December 2021.

    This letter accordingly operated to extend the date for retiring the offsets required by Condition 13 until 31 December 2021 (**Condition 13 Timeframe**).
- On 31 December 2020, WSD provided a status report to the Department on the outcome of the field work and a preliminary analysis of the Biodiversity Stewardship Agreement. This confirmed that:
    1. the Biodiversity Stewardship Agreement was expected to be able to provide the ecosystem credits and certain of the species credits required by condition 13; and
    2. the remaining species credits would need to be separately secured.
- On 28 April 2021 WSD wrote to the Department and confirmed that:
    1. it had taken extensive steps towards finalising the Biodiversity Stewardship Agreement application and all relevant supporting documents; but
    2. some additional investigations were required to finalise the Biodiversity Stewardship Assessment Report (**BSAR**) being:
        - remodelling credit outcomes to allow some grazing under restrictions (i.e., visual cues and seasonal restrictions);
        - documentation of the grazing restrictions in the BSAR, including consideration of fencing on the Total Fund Deposit calculations; and
        - client and landowner consultation to ensure the outcomes are satisfactory to all parties; and

3. sought a 6 week extension to the 30 April 2021 deadline specified in the Department's letter of 31 July 2020 to lodge the application for the Biodiversity Stewardship Agreement and upload the relevant supporting documents to the Biodiversity Offsets and Agreement Management System. No extension was sought by WSD to the Condition 13 Timeframe at this time.

- By letter dated 24 May 2021, the Department:
  1. confirmed to WSD that it approved the extension of time to lodge the application for a Biodiversity Stewardship Agreement and upload relevant supporting documents to the Biodiversity Offsets and Agreement Management System to 11 June 2021; and
  2. requested that additional information also be provided on 11 June 2021 regarding how WSD proposed to satisfy the species credit requirements and consultation with the exploration licence holder and the Mining, Exploration and Geoscience Division of the Department.
- On 11 June 2021, WSD:
  1. lodged its application for a Biodiversity Stewardship Agreement and uploaded a number of supporting documents to the Biodiversity Offsets and Agreement Management System; and
  2. provided the Department with the additional information requested in its letter of 24 May 2021.
- Following this, the Biodiversity Conservation Trust (**BCT**) requested additional information in relation to the Biodiversity Stewardship Agreement and further supporting documents between October and December 2021.
- In light of the additional information and further supporting documents requested by BCT, WSD wrote to the Department on 22 November 2021 and requested an extension to the Condition 13 Timeframe until mid-2022 (**Extension Request**). WSD followed up with the Department in relation to the Extension Request on 9 December 2021 and 14 December 2021. WSD and the Department ultimately met on 20 December 2021 to discuss the Extension Request. At this meeting, it was indicated that the Department was not minded to grant the Extension Request but no final confirmation was provided by the Department in this regard. Accordingly, WSD:
  1. followed up with the Department seeking confirming of its decision on the Extension Request on 23 December 2021 and 24 December 2021; and
  2. provided the Department with additional information regarding its ongoing efforts to comply with the Condition 13 Timeframe on 21 December 2021, 22 December 2021 and 10 January 2022.
- On 14 December 2021, WSD submitted an application to BCT to make payments into the Biodiversity Conservation Fund for all species credits required under Condition 13 with the exception of:
  - those for the Large-eared Pied Bat and the Koala which will be covered by the proposed Biodiversity Stewardship Agreement
  - Those relating to five species that, since the Project Approval had been issued, had been found to not exist at the site (Squirrel Glider, Bush Stone Curlew, Masked Owl, Barking Owl, and Powerful Owl).

- Following discussion with the Department on 20 December, on 22 December WSD submitted an application to BCT to make payments into the Biodiversity Conservation Fund for the species credits for the five species found not to exist at the site.
- Both payments for Species Credits were finalised by WSD, following the provision of an invoice from BCT, on 7 January 2022. Remittance slips for the payments were subsequently provided to DPIE. Accordingly, WSD satisfied the requirements of Condition 13 in relation to all species credits required by Condition 13, with the exception of those for the Large-eared Pied Bat and the Koala, on 7 January 2022.
- The additional information requested by BCT in relation to the Biodiversity Stewardship Agreement application was provided by submitting a revised application for a Biodiversity Stewardship Agreement and further supporting documents to the Biodiversity Offsets and Agreement Management System on 22 December 2021. The only outstanding information still required by BCT to support WSD's Biodiversity Stewardship Agreement application is details of the bank account to be used by WSD for the purpose of the Biodiversity Stewardship Agreement. In order to open the required bank account, a number of internal and external approvals were required. These have now been obtained and it is expected that the bank account will be able to be opened and details provided to BCT within 7 days (17th January 2022).
- On 10 January 2021, WSD received an email from the Department stating that:

  > *We acknowledge the actions undertaken by [WSD] following the meeting. However, the Department's position on your request for an additional extension as communicated in the meeting held on the 20th December 2021 remains unchanged, and no further extension will be granted.*
  >
  > *Given this, the Department now considers you to be non-compliant with the Development Consent and that you should report this to the Department's Compliance branch via the Major Projects portal as required by the Consent (including at condition 8 of Schedule 4).*

Non-Compliance with Timing Requirements under Condition 13

In line with the Department's email of 10 January 2021, WSD formally notifies the Department that a non-compliance with Condition 13 has occurred in that the biodiversity credits required by Condition 13 were not able to be retired by the Condition 13 Timeframe.

Action Being Taken to Resolve

WSD sincerely regrets the unavoidable delays which have occurred in retiring the biodiversity credits required by Condition 13.

As outlined above, WSD satisfied the requirements of Condition 13 in relation to all species credits required by Condition 13 (with the exception of those for the Large-eared Pied Bat and the Koala) on 7 January 2021.

WSD remains fully committed to retiring the remaining biodiversity credits required by Condition 13 as soon as possible. However, the remaining biodiversity credits required by Condition 13 cannot be finalised until such time as:

- WSD's pending application for a Biodiversity Stewardship Agreement is approved by the BCT;
- the Biodiversity Stewardship Agreement is executed by BCT; and
- the credits under the Biodiversity Stewardship Agreement are registered.

Unfortunately, the timing for these actions is outside of WSD's control. However, WSD will continue to follow up with BCT to try and expedite this process as much as possible.

Please contact me on the contact details below should the Department wish for any further information.

Yours sincerely,

Duncan Upton
Project Manager
Wollar Solar Development
Mobile: 0499 770 768
duncan.upton@bjceaustralia.com

APPENDIX A – SECTION 6.33 CERTIFICATES

Statement confirming payment into the Biodiversity Conservation Fund for an offset obligation

Pursuant to section 6.33 of the *Biodiversity Conservation Act 2016*, the NSW Biodiversity Conservation Trust confirms that the following payments have been made into the Biodiversity Conservation Fund under section 6.30(1) of the Act to satisfy an obligation to retire biodiversity credits.

Payment made by:	Wollar Solar Development Pty Ltd
Date received:	07 January 2022
NSW statutory obligation reference[1]	SSD 9254
Commonwealth EPBC Act controlled action reference (if applicable)[2]	N/A
BCT Reference	BCF292

Biodiversity credit retirement obligations satisfied by payment to the Biodiversity Conservation Fund:

Biodiversity credit type	**Offset trading group**	**EPBC Act Controlled Action offset obligation (Y / N)**	**Number of credits**	**Cost per credit (Exc. GST)**	**Total payment per credit type (Exc. GST)**
20061 - *Acacia ausfeldii* (Ausfeld's Wattle)	*Acacia ausfeldii* (Ausfeld's Wattle)	No	34	$145.88	$4,960.08
10975 - *Callocephalon fimbriatum* (Gang-gan Cockatoo)	*Callocephalon fimbriatum* (Gang-gang Cockatoo)	No	67	$639.60	$42,853.42
10735 - *Commersonia procumbens* (Commersonia procumbens)	*Commersonia procumbens* (Commersonia procumbens)	No	2	$271.47	$542.93
10541 - *Monotaxis macrophylla* (Large-leafed Monotaxis)	*Monotaxis macrophylla* (Large-leafed Monotaxis)	No	34	$184.41	$6,269.90
10613 - *Phascogale tapoatafa* (Brush-tailed Phascogale)	*Phascogale tapoatafa* (Brush-tailed Phascogale)	No	13	$639.60	$8,314.84
Total (Exc. GST)					$62, 941.17
GST					$6,294.12
Total (Inc. GST)					$69,235.29

[1]This refers to either; a development application number for a development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (**EP&A Act**), a State significant infrastructure approval under the previous Part 5.1 (now Part 5, Division 5.2) of the EP&A Act, a decision of a determining authority to carry out or approve the carrying out of an activity under Part 5 of the EP&A Act, or a biobank statement number or biodiversity certification number.

[2] This refers to a controlled action under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* for which a biodiversity offset obligation has been met through payment into the BCF.

Emily McCosker 10 January 2022

Director Strategy & Finance

Statement confirming payment into the Biodiversity Conservation Fund for an offset obligation

Pursuant to section 6.33 of the *Biodiversity Conservation Act 2016*, the NSW Biodiversity Conservation Trust confirms that the following payments have been made into the Biodiversity Conservation Fund under section 6.30(1) of the Act to satisfy an obligation to retire biodiversity credits.

Payment made by:	Wollar Solar Development Pty Ltd
Date received:	07 January 2022
NSW statutory obligation reference[1]	SSD 9254
Commonwealth EPBC Act controlled action reference (if applicable)[2]	N/A
BCT Reference	BCF300

Biodiversity credit retirement obligations satisfied by payment to the Biodiversity Conservation Fund:

Biodiversity credit type	**Offset trading group**	**EPBC Act Controlled Action offset obligation (Y / N)**	**Number of credits**	**Cost per credit (Exc. GST)**	**Total payment per credit type (Exc. GST)**
10113 - *Burhinus grallarius* (Bush Stone-curlew)	*Burhinus grallarius* (Bush Stone-curlew)	No	34	$454.10	$15,439.49
10561 - *Ninox connivens* (Barking Owl)	*Ninox connivens* (Barking Owl)	No	16	$288.82	$4,621.09
10562 - *Ninox strenua* (Powerful Owl)	*Ninox strenua* (Powerful Owl)	No	16	$639.60	$10,233.65
10604 - *Petaurus norfolcensis* (Squirrel Glider)	*Petaurus norfolcensis* (Squirrel Glider)	No	34	$677.71	$23,041.98
10820 - *Tyto novaehollandiae* (Masked Owl)	*Tyto novaehollandiae* (Masked Owl)	No	16	$639.60	$10,233.65
Total (Exc. GST)					$63,569.86
GST					$6,356.99
Total (Inc. GST)					$69,926.85

[1]This refers to either; a development application number for a development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (**EP&A Act**), a State significant infrastructure approval under the previous Part 5.1 (now Part 5, Division 5.2) of the EP&A Act, a decision of a determining authority to carry out or approve the carrying out of an activity under Part 5 of the EP&A Act, or a biobank statement number or biodiversity certification number.

[2] This refers to a controlled action under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* for which a biodiversity offset obligation has been met through payment into the BCF.

Emily McCosker 10 January 2022

Director Strategy & Finance

APPENDIX G COMMONWEALTH OFFSET STRATEGY

Commonwealth Offset Strategy

Wollar Solar Farm

December 2023

Project Number: 20-423

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Document verification

Project Title:	Wollar Solar Farm
Project Number:	20-423
Project File Name:	20-423 Wollar Solar Farm Offset Strategy v4.0

Revision	Date	Prepared by	Reviewed by	Approved by
V2	26/03/2020	Brooke Marshall		Brooke Marshall
Addendum (v1)	08/04/2021	Brooke Marshall		Brooke Marshall
V3	15/10/2021	Brooke Marshall		Brooke Marshall
V3.1	19/11/2021	Giorginna Xu – reformatted	Brooke Marshall	Brooke Marshall
V3.2	05/05/22	Jared Graham-Higgs (addressing further comments by W. Egan DAWE)	Brooke Marshall	Brooke Marshall`
V4.0	24/07/2023	Rachael Buzio, Julie Gooding (addressing comments from Will Egan, Assessment Officer, DCCEEW, regarding Commonwealth offset requirements)	Rebecca Phyland	Rebecca Phyland
V4.1	12/03/24	Gillian Young (reviewing updates from Stuart Miller (BJEI Aust)		
V4.2	17/04/24	Bianca Heinze (remove BMP from appendices)		

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Wagga Wagga NSW 2650
T. (02) 6971 9696

GOLD COAST
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(PO Box 466 Tugun QLD 4224)
T. (07) 3129 7633

WODONGA
Unit 2, 83 Hume Street
(PO Box 506) Wodonga VIC 3690
T. (02) 6067 2533

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Figures

Tables

Appendices

Glossary

BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically Endangered Ecological Community
CEMP	Construction environmental management plan
Cwth	Commonwealth
DAWE	Department of Agriculture, Water and the Environment (Cwth) (formerly DoEE)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (formerly DAWE)
DPE	Department of Planning and Environment (NSW) (formerly DPIE)
DPIE	Department of Planning, Industry and Environment (NSW) (former)
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EIA	Environmental impact assessment
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
MNES	Matters of National Environmental Significance under the EPBC Act (*c.f.*)
PCT	Plant Community Type
SSD	State Significant Development

1. Introduction

1.1 Purpose of this document

Commonwealth approval of the Wollar Solar Farm was received on 6 July 2020 (refer Appendix A). The Commonwealth approval requires offsets for specific Matters of National Environmental Significance (MNES) including the preparation of an offset strategy to show how the project will meet its Commonwealth offset liability (Condition 4) and provisions for re-quantifying of impacts following three years of operation (Condition 5)

In March and November 2021, DAWE (Now DCCEEW) provided advice in how the strategy should be structured to explicitly address the Commonwealth conditions of consent. Further advice was provided by DCCEEW in November 2023, following a change in strategy of fulfilling the commonwealth credit obligation after a Biodiversity Stewardship application was deemed unviable. This document provides an update to the Commonwealth Biodiversity Strategy for Wollar Solar Farm and is submitted to satisfy Condition 4 of the project's Commonwealth approval.

1.2 Project description and status

The approved Wollar Solar Farm is a State Significant Development in NSW. It involves the construction, operation and decommissioning of a ground-mounted PV solar array. The subject land is approximately 900ha and solar farm and associated infrastructure will occupy around half the area (463ha). Approximately 290MW (AC) of renewable energy would be generated and supplied directly to the national electricity grid. This would provide enough clean, renewable energy for about 104,926 average NSW homes while displacing approximately 515,564 metric tons of carbon dioxide annually.

Commonwealth approval was obtained on 6 July 2020. The Commonwealth conditions of approval (Condition 4) stipulated an offset strategy must be prepared and submitted to address impacts to Derived Native Grassland not covered by the NSW Development Consent, within six months of commencement of the action. NSW Development consent was obtained on 23 August 2022 following three modification applications.

The project is being constructed in four stages. The status as of December 2023 is:

- Stage 1 – Road upgrades/maintenance works on Barigan Road as required for use of the Northern Access is complete
- Stage 2 – Construction of the Northern Access between Barigan Road and the Solar Farm site is complete
- Stage 3a – Construction of the substation is complete
- Stage 3b – Construction of the main Solar Farm including piled foundations, solar panels and ancillary infrastructure is in progress
- Stage 4 - Road upgrades/maintenance works on Barigan Road and Maree Road as required for the Southern Access Option is not currently progressing. Note that this stage may not be required to be undertaken for the project.

The approved general layout from the NSW approval is shown overleaf in Figure 1-1.

The project is expected to be complete in the second half of 2024.

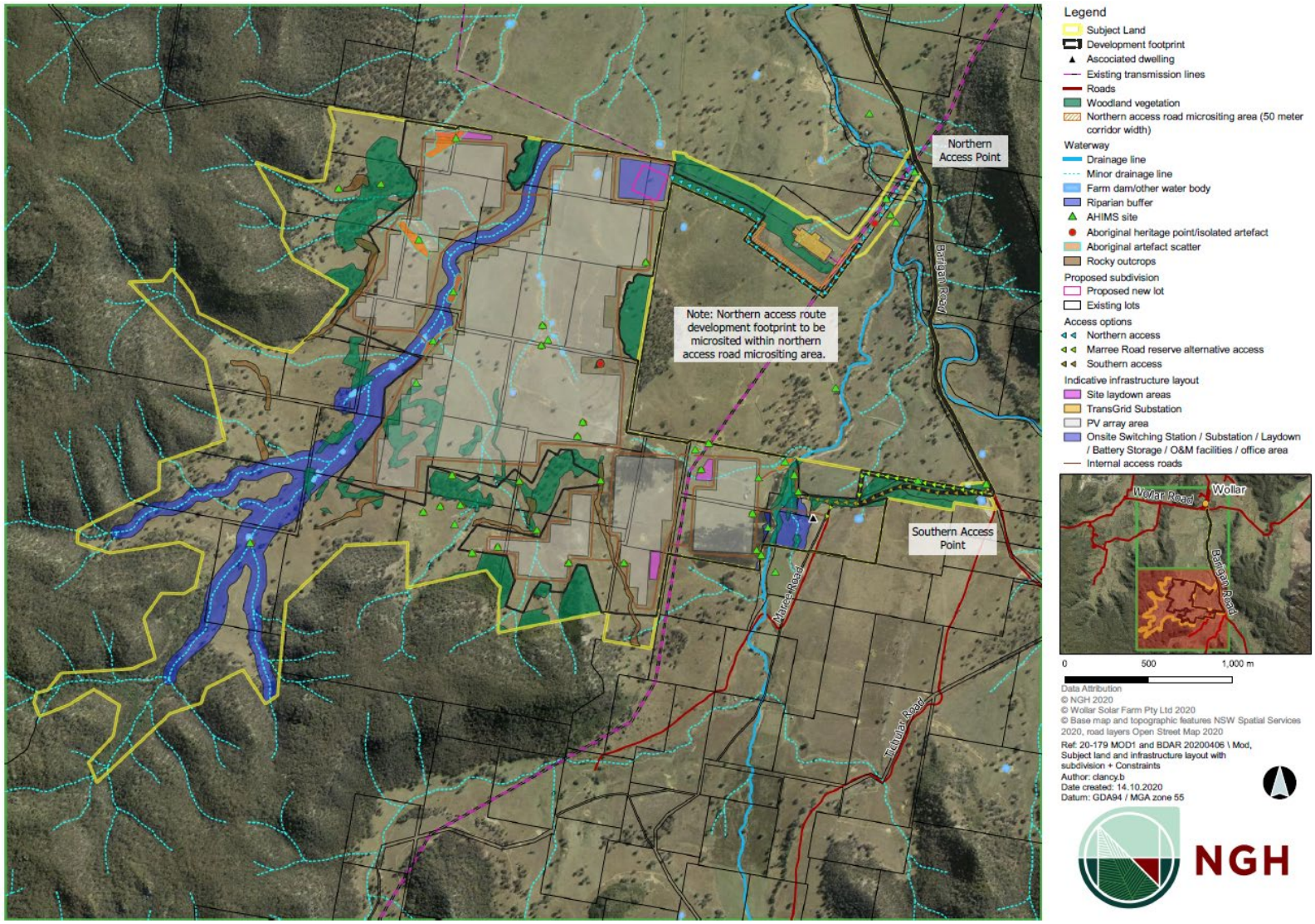


Figure 1-1 Approved general layout

2. Commonwealth Offset strategy

All Commonwealth offset obligations had been planned be met by the Wollar Biodiversity Stewardship Site Agreement (BSA), set up under the NSW *Biodiversity Conservation Act 2016*. However, the biodiversity stewardship application was subsequently rejected by the BCT.

Due to this, an alternative strategy has been developed to secure the commonwealth offset obligations.

This Offset Strategy V4.0 supersedes Offset Strategy version 3.2 and now incorporates;

- monitoring of the Commonwealth Derived Native Grassland (DNG) following three years of operation of Wollar Solar Farm, to determine if adverse impacts have occurred to the DNG. If adverse impacts have occurred, credit liability would be re quantified subject to approval from the Federal Minister.
- The offset strategy to be adjusted based on the re-quantification of DNG impacts following approval from the minister
- Re-quantified impacts to the DNG will be offset via direct credit purchase off the NSW biodiversity credit market

An account of the prior reports and correspondence relevant to updating the offset strategy is set out in Table 1-1.

Section 2.1 – 2.5 sets out the:

- Impacts generating offsets and offset requirement
- Monitoring methodology for re-quantifying of impacts
- Details and timing for credit retirement

Table 2-1 *Reports relevant to meeting the project's Commonwealth offset liability.*

Document	Date	Comment	Location
Commonwealth Offset strategy v4.0	13/12/23	Updated to address Commonwealth recommendations.	This document.
Email correspondence between DCCEEW and NGH	2/08/2023 And 25/07/2023	Advising and clarifying how to meet the offset requirements for the Commonwealth offset liability	Appendix C.1
Letter to DCCEEW from Wollar Solar Development (proponent).	03/04/2023	Update on the status of offsets under approval EPBC 2018/8258, specifically to Conditions 3 to 7.	Appendix C.2
Commonwealth Offset strategy v3.2	02/05/22	Updated to address Commonwealth recommendations.	Superseded Document.
Commonwealth Offset strategy v2	26/03/2020	Prepared to inform the conditions of consent addressing Commonwealth offset liability.	Superseded Document. Appendix D of this document.
Commonwealth offset strategy addendum v1	08/04/2021	Provided after consultation with DAWE to document further field surveys in March 2021 which more accurately defined the extent of MNES onsite and resultant Commonwealth offset liability.	Superseded document. Appendix EAppendix E of this document.
Biodiversity Management Plan v3.2	Nov 2023	Addressing NSW and Commonwealth matters, for construction and operation. V1.0 endorsed by NSW DPIE on 16/07/2020.BMP updated following modification 1 in December 2023. V3.1 Awaiting endorsement.	Stand-alone document

Document	Date	Comment	Location
Biodiversity Stewardship Site Assessment Report (BSSAR)	11/06/2021	BSSAR Included sufficient credits to meet Commonwealth offset liability and lodged with BCT however was not endorsed by BCT due to a grazing lease.	Superseded document

2.1 Impacts generating offsets

Offsets to account for the clearing of native vegetation for the Wollar Solar Farm Development are a requirement of both the NSW and Commonwealth conditions of consent. Schedule 13 of the Wollar Solar Farm NSW Consolidated conditions of consent determines the following ecosystem credits are required (Table 2-1). The commonwealth approval (condition 3) stipulates that these credits must be retired under the NSW Biodiversity Offset scheme.

Table 2-2 Clearing requiring offsets occurs in the following Plant Community Types (PCTs)

Plant Community Type	Requirement to Offset	Credits Required
PCT 1303 'White Box - Grey Gum - Kurrajong grassy woodland on slopes of the northern Capertee Valley, Sydney Basin Bioregion' (Box Gum Woodland)	NSW and Commonwealth offset requirement	479
PCT 281 'Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion' (Box Gum Woodland)	NSW and Commonwealth offset requirement	242
PCT 1610 'White Box - Black Cypress Pine shrubby woodland of the Western Slopes'.	NSW offset requirement only	2

These credits have been purchased on the NSW Biodiversity Credit Market from a third party and have been retired through the Biodiversity Conservation Trust in January 2024.

Several species credit species also generate offsets but are not relevant to the Commonwealth offset requirement.

Further areas of Box-gum Woodland Derived Native Grassland meeting the Commonwealth Critically Endangered Community (CEEC) were present within the project site. These areas, although considered degraded, met the condition thresholds of the Commonwealth CEEC including greater than 50% perennial native species cover and greater than 12 native forb species with at least one important species. However, these areas did not meet the condition thresholds under the BAM, recording Vegetation Integrity (VI) scores less than 12. No credits were generated under the NSW Biodiversity Offset Scheme. These areas must be offset under Commonwealth offset process endorsed by DCCEEW.

The actual area of Box Gum Woodland Derived Native Grassland meeting the Commonwealth Critically Endangered Ecological Community (CEEC) was reduced as documented in the *Wollar Solar Farm: Commonwealth biodiversity offset strategy addendum V1* (issued to DAWE on 8 April 2021). The final impact areas requiring offsets by the Commonwealth approval are shown in Table 2-1.

Table 2-3 Impacts generating Commonwealth offsets

Zone	PCT and condition	Requirement to offset	Impact area (ha)
2	PCT 1303 Derived grassland moderate condition	Commonwealth only, see condition of consent 4	102.70
6	PCT 281 Derived grassland moderate condition		102.73

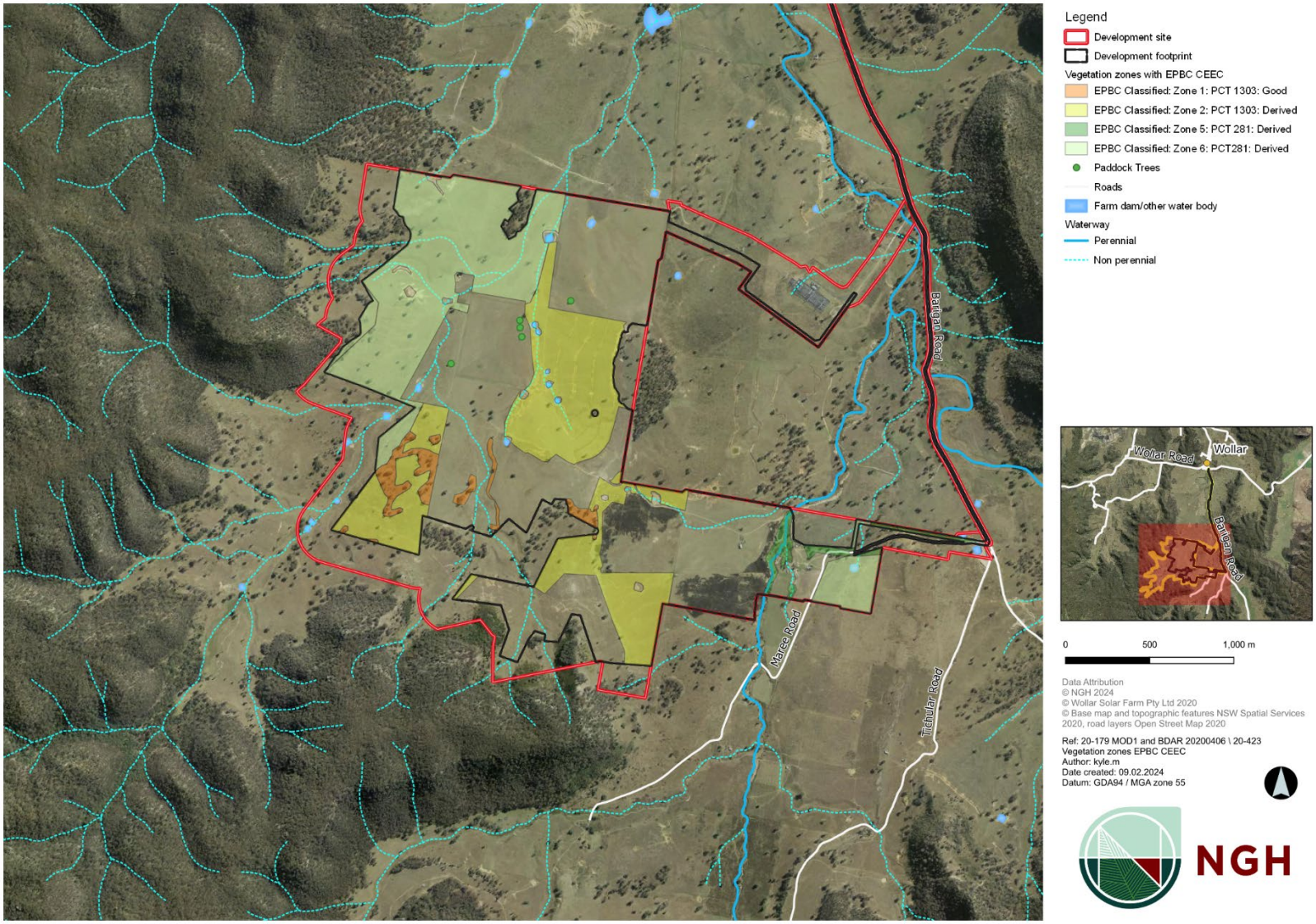


Figure 2-1 Impact zones generating Commonwealth offset requirements

2.2 Offset requirement 'like for like' breakdown

The NSW Biodiversity Assessment Method (BAM) was used to ensure the requisite like-for-like ecosystem credit requirement.

A summary of the vegetation generating offsets under both the BC and EPBC Acts (as calculated in the Biodiversity Development Assessment Report (BDAR) and Commonwealth offset strategy addendum v1) using Equation 1 of the BAM is provided in Table 2-3. NSW species credit obligations are not included in this summary and are not relevant to the Commonwealth offset obligations.

Table 2-4 Commonwealth Credit requirement summary

	BDAR Zone	PCT	Formation	Condition	Area	Credits generated from clearing
NSW consent	1	1303	Woodland	High	16.82	**478**
	5	281	Woodland	High	7.99	**238**
	Paddock trees	281	Trees	NA		**4**
	Paddock trees	1303	Trees	NA		**1**
Additional for CW consent	2	1303	Derived grassland	Moderate	102.70	**131**
	6	281	Derived grassland	Moderate	102.73	**524**

Note: PCTs 1303 and 281 are interchangeable for the purpose of the offsetting under the NSW Biodiversity Conservation Act.

2.3 Re-quantifying of Impacts

Credits will be re-quantified following three years of operation in accordance with Commonwealth Condition 5A. The methodology for re-quantifying impacts to DNG will be consistent with NSW requirements as credits will be retired under the NSW Biodiversity Offset Scheme. The methodology for monitoring of the condition of DNG has been documented in the Wollar BMP. The monitoring methodology has been summarised in section 4.2 of this document.

An assessment of whether the impact has or not had an overall adverse impact on the condition and persistence of DNG, dependent on the original condition of the site will be undertaken using Vegetation Integrity (VI)Scores calculated from the original BAM plots in the Wollar Solar Farm BDAR compared to VI scores following three years of operation. DCCEEW will be notified that impacts have been re-quantified, and documentation will be provided of new assessments of DNG

condition. This assessment will be determined by DCCEEW as to whether impacts should be re-quantified.

Following re-quantifying impacts to DNG, an updated biodiversity offset strategy will be resubmitted.

2.4 Credit Retirement

All Commonwealth offset obligations were to be met by the Wollar Stewardship Site, set up under the NSW *Biodiversity Conservation Act 2016*. The Biodiversity Stewardship Site Assessment was lodged with the BCT (11/06/2021) and showed the site would generate a surplus of 695 credits for PCTs 1303 / 281 (these PCTs are interchangeable for offsetting purposes under the BC Act). A resubmission was made in by December 31, 2021, addressing matters raised by BCT. Unfortunately, the application was denied by NSW BCT due to a grazing lease on the Stewardship Site.

Consequently, Commonwealth credit obligations required, following a re-quantification of impacts, will be purchased from the NSW Biodiversity Credit Market. PCT 1303 and PCT 281 are part of the Offset Trading Group: *White Box – Yellow Box – Blakely's red Gum Grassy Woodland* (Table 2-4) and there are currently 3095 credits available for purchase within this trading group. If no like-for-like credits are available from the NSW credit market at the time of retirement, the credit obligation will be paid into the Biodiversity Conservation Trust Fund. Appendix F presents the NSW credit retirement.

Table 2-5 Like-for-like credit options

Zone	PCT and condition	Credit Obligation	Offset Trading Group	Containing HBT	Like-for-like PCTS	IBRA Subregions
2	PCT 1303 Derived grassland moderate condition	131	*White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregion*	No	74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 506, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589,	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.

Zone	PCT and condition	Credit Obligation	Offset Trading Group	Containing HBT	Like-for-like PCTS	IBRA Subregions
6	PCT 281 Derived grassland moderate condition	524	*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregion*	No	590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1601, 1606, 1608, 1611, 1691, 1693, 1695, 1698	

2.5 Timing

Credits will be retired following re-quantifying of impacts to DNG, following three years of operation, in accordance with condition 5A.

3. Conditions of Approval

3.1 Part A – Conditions specific to the action

In the following table, the Commonwealth conditions relevant to the offset strategy are addressed explicitly. Other comments are provided where relevant.

Table 3-1 *Conditions of consent status*

Condition Number	Condition Text	NGH Response
1	The approval holder must not clear outside of the area identified as 'development footprint' on the map 'General Layout of Development' at Appendix 1 of the NSW Development Consent.	The NSW consolidated consent provides the current development footprint; attached as Appendix B.
2	The approval holder must not clear more than: a. **229.6ha** of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (critically endangered), comprising of: i. **24.5**ha occurring as woodland; ii. **205.1**ha occurring as Derived Native Grassland b. 24.6ha of foraging habitat for the Regent Honeyeater (*Anthochaera phrygia*) (critically endangered) corresponding to 2a.i and 0.1ha of WhiteBox – Black Cyprus Pine shrubby woodland; within the area identified as 'development footprint' on the map 'General Layout of Development' at Appendix 1 of the NSW	Noted. BMP stipulates clearing thresholds of 229.9ha and outlines vegetation clearing procedure (described in section 4.1 of this report).

<table>
<tr><th>Condition Number</th><th>Condition Text</th><th>NGH Response</th></tr>
<tr><td></td><td>Development Consent.</td><td></td></tr>
<tr><td>3</td><td>To compensate for impacts to protected matters, the approval holder must comply with Condition 13 of Schedule 3 of the NSW Development Consent to retire biodiversity credits of the specified number and class for the following vegetation communities that relate to the protected matters (Box Gum Grassy Woodland and Regent Honeyeater habitat):
<table>
<tr><th>Vegetation community</th><th>PCT</th></tr>
<tr><td>White Box - Grey Gum - Kurrajong grassy woodland on slopes of thenorthern Capertee Valley, Sydney Basin Bioregion</td><td>1303</td></tr>
<tr><td>Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western SlopesBioregion and Brigalow Belt South Bioregion</td><td>281</td></tr>
<tr><td>White Box - Black Cypress Pine shrubby woodland of the Western Slopes</td><td>1601</td></tr>
</table></td><td>Noted, NSW credit obligation has been met through purchase of credits off the NSW credit market and retired in December 2023.</td></tr>
<tr><td>4</td><td>To compensate for impacts to the Derived Native Grassland that are not covered by the NSW Development Consent, the approval holder must, within 6 months of commencement of the action, submit an offset strategy for approval by the Minister. If approved, the offset strategy must be implemented.

The offset strategy must include details of:
a. The proposed offset package, including offset site(s) to</td><td>a) The proposed offset package

Commonwealth offset obligations are proposed to be met by purchasing and retiring like-for-like credits off the NSW biodiversity credit market.

b) Measures for the long-term management

Biodiversity credits purchased off the NSW credit market will be managed in perpetuity for biodiversity improvement. Credits</td></tr>
</table>

Condition Number	Condition Text	NGH Response
	compensate for the loss of up to 205.1ha of Derived Native Grassland; b. Measures for the long-term management and improvement of Box Grassy Gum Woodland on the offset site(s); the current quality of protected matters on the offset site, and time- bound completion criteria and performance targets. c. How the offset package either: i. Meets the requisite like-for-like ecosystem credit requirement, where the like- for-like ecosystem credits generated at the offset site are calculated using the BAM, and the number of like-for-like ecosystem credits required is calculated using Equation 1 of the BAM; or ii. Provides a suitable gain calculated using the EPBC offsets assessment guide. d. The timeframe and legal mechanism for securing the offset site(s). This may include a plan for staging the delivery of offsets sites corresponding to the actual quantity and timing of impacts the action.	purchased will form part of a BSSAR which will include measures for the long-term management and improvement of Box Grassy Gum Woodland on the offset site, and time- bound completion criteria and performance targets. c) How the offset package meets the requisite like-for-like ecosystem credit requirement. The NSW BAM was used to ensure the requisite like-for-like ecosystem credit requirement. Refer to breakdown in Section 2 of this document. d) The timeframe and legal mechanism. Credits will be retired following re-quantifying of impacts to DNG, following three years of operation, and approval by DCCEEW.
5	The offset strategy may include provisions for: a. The impacts of the action on Derived Native Grassland to be re-quantified after three years of operation, based on the results of monitoring data. The monitoring data must be collected in accordance with a monitoring methodology and monitoring criteria setout in a Biodiversity Management Plan approved by the	Noted. The monitoring methodology is included in Section 4.2 and Appendix A, SectionA.5.2 of the Biodiversity Management Plan. If this adjustment is sought, the BMP would be submitted separately for DECCEW endorsement, prior to solar farm commissioning.

Condition Number	Condition Text	NGH Response
	Minister. b. The offset package to be adjusted based on the re-quantification of impacts, subject to further written approval from the Minister, if the monitoring data shows that the action has not adversely impacts on the overall condition and persistence of the Derived Native Grassland.	Monitoring would occur once a year for three years, following commissioning of the Wollar Solar Farm.
6	The approval holder must comply with Condition 14 of Schedule 3 the NSW Development Consent, for the preparation and implementation of a Biodiversity Management Plan [BMP], as it relates to the avoidance and mitigation of impacts to protected matters.	This offset strategy is appended to the BMP. Relevant sections of the BMP is summarised in Section 4 of this document (so that the Offset Strategy may be a stand-alone plan also). It was endorsed by NSW DPIE on 16/07/20, then updated to reflect the access changes consented in Modification 1 and following consultation with DCCEEW. BMP v.3.1 was finalised in December 2023 It includes avoidance and mitigation of impacts for protected matters (Box-Gum Woodland BGW and Regent Honeyeater habitat). These matters are represented by zones 1, 2, 5, 6 and 8 in the plan.
7	Within 20 business days of completing the requirements of Condition 3, the approval holder must provide the Department with evidence of when and how the like-for-like ecosystem credits were retired.	NSW credits have been retired 11th January 2024. Credit retirement report is provided in Appendix G.

4. Management measures and actions on the development site

The BMP prepared to address Condition 14 of Schedule 3 the NSW Development Consent is summarised below. The BMP addresses construction and operational impacts at the Wollar solar farm development site. It was endorsed by NSW DPIE on 16 July 20, then updated to reflect the access changes consented in Modification 1 and following consultation with DCCEEW. The most recent version is v3.1, January 2024. The BMP includes avoidance and mitigation of impacts for protected matters (Box-Gum Woodland BGW and Regent Honeyeater habitat). These matters are represented by zones 1, 2, 5, 6 and 8 in the plan.

4.1 Management

Measures for the short-term management of Box Grassy Gum Woodland and Regent Honeyeater are fully detailed in the BMP, and include management protocols such as:

- Ground Disturbance Protocol
    - A ground disturbance permit process will be implemented during construction of road upgrades. The ground disturbance permit process is integral to communicate the distinction between vegetation protection areas and the ground disturbance footprints in which construction contractors will be working. This process is also vital to enable the construction contractor to track and control vegetation clearing on a daily, weekly, and monthly basis.
- Vegetation Clearance Protocol
    - The vegetation clearance procedure will be implemented for vegetation clearance during construction.
    - Vegetation clearance is only permitted in the areas identified in the BDAR. Any additional clearance required will first require a project modification.
    - Prior to vegetation clearing, the Health, Safety, Environment and Quality Control (HSEQ) Manager will digitally capture and display clearance boundaries within the site. Survey teams and GIS databases will be used to inform and record vegetation clearing and site rehabilitation.
    - The cumulative amount of vegetation cleared will be progressively monitored by the HSEQ Manager. Prior to undertaking any vegetation clearing, this value will be compared to the total approved area to be cleared.
    - Demarcation of the development footprint is the responsibility of the construction contractor and will be determined by them. Typical measures will include:
        - Use of temporary fencing
        - Flag tape or rope
    - Pre-clearing surveys will be carried out by an Ecologist prior to any vegetation clearing. The following pre- clearing surveys will be carried out when habitat trees are to be removed, including hollow-bearing trees and other woody vegetation.
    - Exclusion zones containing vegetation must be protected from any project impacts. Prior to construction commencing, vegetation in these areas will be protected by exclusion fencing and signage. These areas will be communicated to site staff (including equipment operators) through site inductions, toolbox talks and targeted

training prior to works taking place in the vicinity. A vegetation exclusion zone will be established between vegetation constraints and protective fencing (no closer than the dripline of the vegetation) to ensure that vegetation constraints are not impacted accidentally. Additional exclusion fencing will define the boundary between vegetation to be removed and vegetation to be retained. Vegetation removal in these areas will be conducted with chainsaws rather than machinery to ensure minimal disturbance.

- Vegetation Constraints Management Protocol
  - Exclusion zones outside the approved disturbance areas will be managed throughout construction and operation to protect them from any impacts from the project.
  - The aim being to maintain or improve the condition of vegetation in exclusion zones throughout construction and operation of the project including vegetation connectivity.
  - Indirect impacts on vegetation constraints will be reduced by:
    - Avoiding vehicle or plant access within exclusion zones.
    - Where night works cannot be avoided, work must not take place within 100 m of exclusion zones.
    - Directing lights away from exclusion zones.
    - Noise-emitting plant will be oriented so that noise will be directed away from exclusion zones.
    - When not in use, vehicles and plant will not be left idling near exclusion zones but will be switched off whenever possible.
    - Reducing the use of machinery and vehicles within areas of TEC where possible (noting that solar farm infrastructure will cover the majority of the Development Footprint). In areas where clearing is required under existing overhead transmission lines, this should be undertaken using chainsaws where possible. Once access tracks are established these should be utilised to traverse the site as much as possible.
- The following Management protocols will be used to enhance and maintain the habitat subject to any direct or indirect disturbance.
  - Re-use of Resources Protocol
  - Threatened Species Finds Procedure
  - Weed and Pest Management Protocol
  - Vehicle Hygiene Protocol
  - Vegetation Constraints Management Protocol
  - Noise, Light and Dust Management

4.2 Monitoring

The development footprint will be monitored in accordance with a Ground Cover Management Plan, primarily to ensure that erosion and weeds are managed at the development footprint. The monitoring methodology is included in Appendix A of the BMP. It addresses BCD requirements and is endorsed by DPIE. Key elements include;

Groundcover will be monitored in disturbed areas on a fortnightly basis for the first six months after re-establishment of ground cover during construction, every 6 months after establishment and annually during operation. Ground cover will be monitored using 1m x 1m quadrats placed within all treated locations to ensure cover does not fall below 70% and at 30 random locations within the

development footprint. Any grazing stock would be removed from the affected area if cover falls below threshold levels and additional planting undertaken if there is no response within the following monitoring events. Including:

- Bare patches greater than 5 m^2 will be recultivated and revegetated with endemic plant species.
- Additional watering of seeded areas.
- Weeds controlled where required e.g. where groundcover exceeds 10% weeds.
- Treat soil conditions such as compaction, frequency of traffic movements, low seedbank storage, lack of soil moisture and nutrient imbalance.

The groundcover monitoring methodology above would provide a non-biased and representative data set of the groundcover composition over the three years, but NGH assumes this monitoring methodology would not meet the assessment requirements under the NSW BAM 2020.

To meet BAM requirements, NGH proposes additional monitoring methodology is implemented by replicating some of the existing vegetation integrity (BAM) plots that were completed within DNG areas generating offsets under the EPBC Act within the development footprint (DF) during the BDAR assessment for the EIS. NGH proposes that this replication occur once a year within the same season for three years, with replication commencing 2024.

The initial BAM plots were completed before the project commenced, with four of the twelve plots located within the solar panel array areas. These are;

i. Six BAM plots completed for Zone 2 with 2 plots completed within the solar panel array areas (PCT 1303)

ii. Six BAM plots completed for Zone 6 with 2 plots completed within the solar panel array areas (PCT 281)

The number of plots undertaken for Zone 2 and Zone 6 meets the BAM 2020 requirements (Table 3, Section 4.3.4 of the BAM 2020).

Updating the monitoring methodology for these two zones will record an annual dataset prior to project commencement, during project development and at the end of the three-year period. This data can then be entered into the BAM-C and the vegetation integrity scores would be compared to see if there has been an adverse impact.

DCCEEW will assess the BMP against the requirements of the NSW development consent and consider that monitoring will need to show the impact has not had an overall adverse impact on the persistence of the derived native grassland (DNG). At the end of the three-year period, it will need to be outlined if the project has or has not had an overall adverse impact on the condition and persistence of the DNG (in terms of the original condition of the site and how the impact has affected DNG). A methodology for re-quantifying of impacts is required so assessment is consistent with current NSW requirements; if the Minister assesses that there has been an adverse impact, DCCEEW will require the credits be retired under the NSW BOS.

Appendix A Commonwealth approval

Australian Government
Department of Agriculture, Water and the Environment

APPROVAL

Wollar Solar Farm, 7km South of Wollar, NSW (EPBC 2018/8258)

This decision is made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999 (Cth).* Note that section 134(1A) of the **EPBC Act** applies to this approval, which provides in general terms that if the approval holder authorises another person to undertake any part of the action, the approval holder must take all reasonable steps to ensure that the other person is informed of any conditions attached to this approval, and that the other person complies with any such condition.

Details

Person to whom the approval is granted (approval holder)	Wollar Solar Development Pty Ltd
ACN or ABN of approval holder	88 621 969 266
Action	To construct a solar farm in Wollar, NSW [See EPBC Act referral 2018/8258], subject to the variation of the action accepted by the Minister under section 156B on 23 December 2019.

Approval decision

My decisions on whether or not to approve the taking of the action for the purposes of each controlling provision for the action are as follows.

Controlling Provisions

Listed Threatened Species and Communities	
Section 18	Approve
Section 18A	Approve

Period for which the approval has effect

This approval has effect until 31 December 2038

Decision-maker

Name and position	Louise Vickery Assistant Secretary Environment Approvals and Wildlife Trade Branch
Signature	Louise Vickery
Date of decision	6 / 7 /2020

Conditions of approval

This approval is subject to the conditions under the EPBC Act as set out in ANNEXURE A.

ANNEXURE A – CONDITIONS OF APPROVAL

Part A – Conditions specific to the action

1. The approval holder must not **clear** outside of the area identified as 'development footprint' on the map 'General Layout of Development' at Appendix 1 of the NSW **Development Consent**.
2. The approval holder must not **clear** more than:
    a. 229.6 ha of **White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland** (critically endangered), comprising of:
        i. 24.5 ha occurring as woodland;
        ii. 205.1 ha occurring as **Derived Native Grassland**
    b. 24.6 ha of foraging habitat for the **Regent Honeyeater** (*Anthochaera phrygia*) (critically endangered) corresponding to 2a.i and 0.1 ha of White Box – Black Cyprus Pine shrubby woodland;

    within the area identified as as 'development footprint' on the map 'General Layout of Development' at Appendix 1 of the NSW **Development Consent.**
3. To compensate for impacts to **protected matters**, the approval holder must comply with Condition 13 of Schedule 3 of the NSW **Development Consent** to **retire** biodiversity credits of the specified number and class for the following vegetation communities that relate to the **protected matters (Box Gum Grassy Woodland and Regent Honeyeater habitat)**:

Vegetation community	PCT
White Box - Grey Gum - Kurrajong grassy woodland on slopes of the northern Capertee Valley, Sydney Basin Bioregion	1303
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	281
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	1601

4. To compensate for impacts to the **Derived Native Grassland** that are not covered by the NSW **Development Consent**, the approval holder must, within 6 months of **commencement of the action**, submit an **offset strategy** for approval by the **Minister**. If approved, the **offset strategy** must be implemented.

    The **offset strategy** must include details of:

    a. The proposed offset package, including **offset site(s)** to compensate for the loss of up to 205.1 ha of **Derived Native Grassland**;
    b. Measures for the long term management and improvement of **Box Grassy Gum Woodland** on the **offset site**(s); the current quality of **protected matters** on the **offset site**, and time- bound completion criteria and performance targets.
    c. How the **offset** package either:
        i. Meets the requisite **like-for-like ecosystem credit** requirement, where the **like- for-like ecosystem credits** generated at the **offset site** are calculated

using the **BAM**, and the number of **like-for-like ecosystem credits** required is calculated using **Equation 1 of the BAM**; or

ii. Provides a suitable gain calculated using the **EPBC offsets assessment guide**.

d. The timeframe and legal mechanism for securing the **offset site**(s). This may include a plan for staging the delivery of **offsets site**s corresponding to the actual quantity and timing of impacts the action.

5. The **offset strategy** may include provisions for:

   a. The impacts of the action on **Derived Native Grassland** to be re-quantified after three years of operation, based on the results of monitoring data. The monitoring data must be collected in accordance with a monitoring methodology and monitoring criteria set out in a Biodiversity Management Plan approved by the **Minister**.

   b. The offset package to be adjusted based on the re-quantification of impacts, subject to further written approval from the **Minister**, if the monitoring data shows that the action has not advsersely impacts on the overall condition and persistence of the Dervied Native Grassland.

6. The approval holder must comply with Condition 14 of Schedule 3 the NSW **Development Consent**, for the preparation and implementation of a Biodiversity Management Plan, as it relates to the avoidance and mitigation of impacts to **protected matters**.

7. Within 20 **business days** of completing the requirements of Condition 3, the approval holder must provide the **Department** with **evidence** of when and how the **like-for-like ecosystem credits** were **retired.**

Part B – Standard administrative conditions

Notification of date of commencement of the action

8. The approval holder must notify the **Department** in writing of the date of **commencement of the action** within 10 **business days** after the date of **commencement of the action.**

9. If the **commencement of the action** does not occur within 5 years from the date of this approval, then the approval holder must not **commence the action** without the prior written agreement of the **Minister**.

Compliance records

10. The approval holder must maintain accurate and complete **compliance records**.

11. If the **Department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **Department** within the timeframe specified in the request.

Note: **Compliance records** may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the **Department**'s website or through the general media.

Annual compliance reporting

12. The approval holder must prepare a **compliance report** for each 12 month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The approval holder must:

a. publish each **compliance report** on the **website** within 60 **business days** following the relevant 12 month period;

b. notify the **Department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within five **business days** of the date of publication;

c. keep all **compliance reports** publicly available on the **website** until this approval expires;

d. exclude or redact **sensitive ecological data** from **compliance reports** published on the **website**; and

e. where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication.

Note: **Compliance reports** may be published on the **Department**'s website.

Reporting non-compliance

13. The approval holder must notify the **Department** in writing of any: **incident;** non-compliance with the conditions; or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than two **business days** after becoming aware of the **incident** or non-compliance. The notification must specify:

    a. any condition which is or may be in breach;

    b. a short description of the **incident** and/or non-compliance; and

    c. the location (including co-ordinates), date, and time of the **incident** and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.

14. The approval holder must provide to the **Department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying:

    a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;

    b. the potential impacts of the **incident** or non-compliance; and

    c. the method and timing of any remedial action that will be undertaken by the approval holder.

Completion of the action

15. Within 30 days after the **completion of the action**, the approval holder must notify the **Department** in writing and provide **completion data**.

Part C - Definitions

In these conditions, except where contrary intention is expressed, the following definitions are used:

BAM (Biodiversity Assessment Method) means the biodiversity assessment method established under the *Biodiversity Conservation Act 2016* (NSW) for the purpose of assessing the impact of actions on threatened species and threatened ecological communities, and their habitats.

BAM Equation 1 means Equation 1 as specified in the **BAM** to determine the number of **like-for-like ecosystem? credits** required for the impact on vegetation that is a Threatened Ecological Community or contains listed threatened species habitat**.**

Biodiversity Conservation Fund has the meaning given under the *Biodiversity Conservation Act 2016* (NSW).

Box Gum Grassy Woodland means the **White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland** ecological community listed as critically endangered under the **EPBC Act**.

Business day means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.

Clearing/clearance/clear means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning of vegetation (but not including weeds – see the *Australian weeds strategy 2017 to 2027* for further guidance).

Commencement of the action means the first instance of any specified activity associated with the action including **clearance** and **construction**. **Commencement of the action** does not include minor physical disturbance necessary to:

i. undertake pre-clearance surveys or monitoring programs;

ii. install signage and /or temporary fencing to prevent unapproved use of the project area;

iii. protect environmental and property assets from fire, weeds and pests, including use of existing surface access tracks; and

iv. install temporary site facilities for persons undertaking pre-commencement activities so long as these are located where they have no impact on the **protected matters**.

Completion data means an environmental report and spatial data clearly detailing how the conditions of this approval have been met. The **Department's** preferred spatial data format is **shapefile**.

Completion of the action means the time at which all approval conditions (except condition 12) have been fully met.

Compliance records means all documentation or other material in whatever form required to demonstrate compliance with the conditions of approval in the approval holder's possession or that are within the approval holder's power to obtain lawfully.

Compliance reports means written reports:

i. providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions;

ii. consistent with the **Department's** *Annual Compliance Report Guidelines* (2014); and

iii. include a **shapefile** of any **clearance** of any **protected matters**, or their habitat, undertaken within the relevant 12 month period.

Construction means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground

(including pile driving); the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; road and intersection work or other services work, but excluding the installation of temporary fences and signage.

Department means the Australian Government agency responsible for administering the **EPBC Act**.

Derived Native Grassland means the grassy component of the **Box Gum Grassy Woodland** within the ecological community as a single intermixed entity (PCT's involved in this project: 1303 and 281);

Development consent means the document recording the approval for the Wollar Solar Farm (SSD 9254) under the NSW *Environmental Planning and Assessment Act 1979*, approved by the delegate of the NSW Minister for Planning and Public Spaces on 24 February 2020, as modified from time to time.

Environmental Offsets Policy means the **EPBC Act** *Environmental Offsets Policy* (2012, or subsequent published revisions).

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC offsets assessment guide is a tool that has been developed for expert users in the department to assess the suitability of offset proposals. The guide is also available to proponents to assist with planning and estimating future offset requirements.

Evidence means documentation from the relevant authority showing that the **like-for-like credits** have been **retired**.

Incident means any event which has the potential to, or does, impact on one or more **protected matter(s)**.

Like-for-like ecosystem credits has the meaning given under the *Biodiversity Conservation Act 2016* (NSW).

Minister means the Australian Government Minister administering the **EPBC Act** including any delegate thereof.

Offset information means the information requirements specified in Attachments B.

Offset site means an area of land protected and managed to improve its habitat quality to compensate for unavoidable impacts on **protected matters** as a result of the action.

Offset strategy means a detailed proposal for providing one or more offset sites or other offsets in accordance with the **Environmental Offsets Policy**.

Plans refer to any method of thinking out acts and purposes beforehand in regards to the proposed action or any acitivities involved.

Protected matter(s) means: **Box Gum Grassy Woodland** and the **Regent Honeyeater**, listed under the **EPBC Act.**

Regent Honeyeater means the species *Anthochaera phrygia* listed as critically endangered under the **EPBC Act**.

Regent Honeyeater habitat means woodland and forest containing the key eucalypt species preferred by **Regent Honeyeaters** where the species may occur, and any known **Regent Honeyeater** foraging habitat. A list of key eucalypt species is given in the *National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia),* which is available on the **Department**'s website. (PCT's involved in this project: 1303, 281 and 1610);

Retire/retired/retirement – means to change the status of a credit such that the credit can no longer be bought or sold (*Biodiversity Conservation Act 2016* (NSW)).

Sensitive ecological data means data as defined in the Australian Government Department of the Environment (2016) *Sensitive Ecological Data – Access and Management Policy.*

Shapefile means location and attribute information of the action provided in an Esri shapefile format. Shapefiles must contain '.shp', '.shx' , '.dbf' files and a '.prj' file that specifies the projection/geographic coordinate system used. Shapefiles must also include an '.xml' metadata file that describes the shapefile for discovery and identification purposes**.**

Website means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

Appendix B NSW modified approval

Development Consent

Section 4.38 of the *Environmental Planning & Assessment Act 1979*

As delegate of the Minister for Planning and Public Spaces, I approve the development application referred to in Schedule 1, subject to the conditions in Schedules 2 to 4.

These conditions are required to:

- prevent and/or minimise any adverse environmental impacts of the development;
- set standards and performance measures for acceptable environmental performance; and
- provide for the ongoing environmental management of the development.

Mike Young
Executive Director
Energy, Resources and Compliance

Sydney 2022

The Department has prepared a consolidated version of the consent which is intended to include all modifications to the original determination instrument.

The consolidated version of the consent has been prepared by the Department with all due care. This consolidated version is intended to aid the consent holder by combining all consents relating to the original determination instrument but it does not relieve a consent holder of its obligation to be aware of and fully comply with all consent obligations as they are set out in the legal instruments, including the original determination instrument and all subsequent modification instruments.

SCHEDULE 1

Application Number:	SSD 9254
Applicant:	Wollar Solar Development Pty Ltd
Consent Authority:	Minister for Planning and Public Spaces
Land:	See Appendix 2
Development:	Wollar Solar Farm

SUMMARY OF MODIFICATIONS

Application Number	Determination Date	Decider	Modification Description
SSD-9254-Mod 1	Withdrawn		Realignment of site access and subdivision for the substation
SSD-9254-Mod 2	12 November 2020	Director	Site Access and Subdivision
SSD-9254-Mod 3	23 August 2022	Director	Changes to vehicle movement and increase in panel height

TABLE OF CONTENTS

DEFINITIONS

Aboriginal stakeholders	Aboriginal stakeholders registered for cultural heritage consultation for the development
Ancillary infrastructure	All project infrastructure with the exception of solar panels, including but not limited to collector substations, switching stations, permanent offices, battery storage and site compounds, electricity transmission lines and internal roads
Applicant	Wollar Solar Development Pty Ltd, or any person who seeks to carry out the development approved under this consent
AV/B-Double	An articulated vehicle that has a combined Gross Vehicle Mass or Aggregate Trailer Mass of up to 62.5 tonnes
Battery storage	Large scale energy storage system
BCD	Biodiversity and Conservation Division
Cessation of operations	Operation of the development has ceased for a continuous period of 12 months
Conditions of this consent	Conditions contained in Schedules 1 to 4 inclusive
Construction	The construction of the development, including but not limited to, the carrying out of any earthworks on site and the construction of solar panels and any ancillary infrastructure (but excludes road upgrades or maintenance works to the public road network and associated temporary construction facilities, building/road dilapidation surveys, installation of fencing, artefact survey and/or salvage, overhead line safety marking and geotechnical drilling and/or surveying)
Council	Mid-Western Regional Council
Decommissioning	The removal of solar panels and ancillary infrastructure and/or rehabilitation of the site
Department	Department of Planning and Environment
Development	The development as described in the EIS
Development footprint	The area within the site on which the components of the project will be constructed (shown in Appendix 1)
DAWE	Commonwealth Department of Agriculture, Water and the Environment administering the EPBC Act (formerly Department of Environment and Energy)
DPIE Water	Water Group within the Department
EIS	The Environmental Impact Statement for Wollar Solar Farm dated March 2019 as modified by: • the Submissions Report dated October 2019 and, the Amendment Report dated October 2019, email titled Voluntary Contribution from Wollar Solar Development Pty Ltd for local road network maintenance, dated 11 October 2019 and additional information memorandum dated 22 January 2020; and • *Wollar Solar Farm Modification Application Report* dated August 2020. • Modification Application: Wollar Solar Farm Modification Report, dated 17 June 2022; and • Wollar Solar Farm Modification 3 Submissions Report, dated 5 August 2022.
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Feasible	Feasible relates to engineering considerations and what is practical to build or implement
FRNSW	Fire and Rescue NSW
Heritage NSW	Heritage NSW within Department of Premier and Cabinet
Heritage item	An item as defined under the *Heritage Act 1977* and/or an Aboriginal Object or Aboriginal Place as defined under the *National Parks and Wildlife Act 1974*
Incident	A set of circumstances that causes or threatens to cause material harm to the environment
Material harm	Is harm that: • involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial; or • results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment
Medium and/or heavy rigid vehicle	A vehicle that has a combined Gross Vehicle Mass or Aggregate Trailer Mass of up to 30.0 tonnes and a maximum length of up to 12.5 metres

Minister	Minister for Planning and Public Spaces, or delegate
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the development
Non-compliance	An occurrence, set of circumstances or development that is a breach of this consent but is not an incident
Operation	The operation of the development, but does not include commissioning, trials of equipment or the use of temporary facilities
Over-dimensional vehicle	Over-mass and/or over-size/length vehicles
Planning Secretary	Secretary of the Department, or nominee
POEO Act	*Protection of the Environment Operations Act 1997*
Public infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, irrigation channels, drainage channels
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The restoration of land disturbed by the development to a good condition, to ensure it is safe, stable and non-polluting
RFS	Rural Fire Service
Site	As shown in Appendix 1 and listed in Appendix 2
Temporary facilities	Temporary facilities used for the construction, upgrading and/or decommissioning of the development, including but not limited to temporary site offices and compounds, materials storage compounds, maintenance workshops, material stockpiles, laydown areas and parking spaces
TfNSW	Transport for NSW
Upgrading	The augmentation and/or replacement of solar panels and ancillary infrastructure on site (excluding maintenance)
Vehicle movement	One vehicle entering and leaving the site

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In meeting the specific environmental performance criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, upgrading or decommissioning of the development.

TERMS OF CONSENT

2. The Applicant must carry out the development:
   (a) generally in accordance with the EIS; and
   (b) in accordance with the conditions of this consent.

   Note: The general layout of the development is shown in Appendix 1.

3. If there is any inconsistency between the above documents, the most recent document must prevail to the extent of the inconsistency. However, the conditions of this consent must prevail to the extent of any inconsistency.

4. The Applicant must comply with any requirement/s of the Planning Secretary arising from the Department's assessment of:
   (a) any strategies, plans or correspondence that are submitted in accordance with this consent;
   (b) any reports, reviews or audits commissioned by the Department regarding compliance with this consent; and
   (c) the implementation of any actions or measures contained in these documents.

UPGRADING OF SOLAR PANELS AND ANCILLARY INFRASTRUCTURE

5. The Applicant may upgrade the solar panels and ancillary infrastructure on site provided these upgrades remain within the approved development footprint of the site and in accordance with the conditions of this consent. Prior to carrying out any such upgrades, the Applicant must provide revised layout plans and project details of the development to the Planning Secretary incorporating the proposed upgrades.

STRUCTURAL ADEQUACY

6. The Applicant must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the *Building Code of Australia.*

   Notes:
   - *Under Part 6 of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the development.*
   - *Part 8 of the EP&A Regulation sets out the requirements for the certification of the development.*

DEMOLITION

7. The Applicant must ensure that all demolition work on site is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

PROTECTION OF PUBLIC INFRASTRUCTURE

8. Unless the Applicant and the applicable authority agree otherwise, the Applicant must:
   (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and
   (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.

This condition does not apply to the upgrade and maintenance of the road network, which is expressly provided for in the conditions of this consent.

OPERATION OF PLANT AND EQUIPMENT

9. The Applicant must ensure that all plant and equipment used on site, or in connection with the development, is:
   (a) maintained in a proper and efficient condition; and
   (b) operated in a proper and efficient manner.

SUBDIVISION

10. The Applicant may subdivide the site to create one new allotment, as identified in the figure in Appendix 6 and in accordance with the requirements of the EP&A Act and EP&A Regulation.

Notes:
- *Under Part 6 of the EP&A Act, the Applicant is required to obtain a subdivision certificate for a plan of subdivision.*
- *Division 4 of Part 8 of the EP&A Regulation sets out the application requirements for subdivision certificates.*

SCHEDULE 3
ENVIRONMENTAL CONDITIONS – GENERAL

TRANSPORT

Over-Dimensional and Heavy Vehicle Restrictions

1. The Applicant must ensure that the:
   (a) development does not generate more than:
   - a combined total of up to 72 medium, heavy rigid vehicle and/or AV/B-double movements a day during construction, upgrading and decommissioning, with a maximum of 36 AV/B-double vehicle movements a day.
   - 60 over-dimensional vehicle movements during construction, upgrading and decommissioning; and;
   - 7 AV/B-Double, medium and/or heavy rigid vehicle movements a day during operations;

   on the public road network;
   (b) length of any vehicles (excluding over-dimensional vehicles) used for the development does not exceed 26 metres,

   unless the Planning Secretary agrees otherwise in writing.

2. The Applicant must keep accurate records of the number of over-dimensional vehicles, AV/B-Double vehicles, medium and/or heavy entering or leaving the site each day for the duration of the project.

Access Routes

3. All over-dimensional and AV/B-Double vehicles (with the exception of the two over-dimensional vehicles associated with the transport of the transformers) associated with the development must travel to and from the site via:
   (a) Golden Highway, Ulan Road, Ulan-Wollar Road, Barigan Street, Maitland Street, Wollar Road and Barigan Road; and/or
   (b) Castlereagh Highway, Ulan Road, Ulan-Wollar Road, Barigan Street, Maitland Street, Wollar Road and Barigan Road as identified in the figure in Appendix 3;

3A. The two over-dimensional vehicles associated with the transport of the transformers must travel to and from the site via Golden Highway, Castlereagh highway, Old Mill Road, Rouse Street, Station Street, Cope Road, Robinson Street, Mackay Street, Main Street, Ulan Road, Ulan-Wollar Road, Barigan Street, Maitland Street, Wollar Road and Barigan Road as identified in the figure in Appendix 3

Note: The Applicant is required to obtain relevant permits under the Heavy Vehicle National Law (NSW) for the use of over-dimensional vehicles on the road network.

4. All medium and/or heavy rigid vehicles and shuttle buses associated with the development must travel to and from the site via the routes detailed in condition 3 of Schedule 3 to this consent, and/or via:
   (a) Cope Road, Ulan Road, Ulan-Wollar Road, Barigan Street, Maitland Street, Wollar Road and Barigan Road; and/or
   (b) Castlereagh Highway, Ulan Road, Wollar Road, Phillip Street, Maitland Street, Wollar Road and Barigan Road;

   as identified in the figure in Appendix 3.

Preferred Site Access Points

5. All over-dimensional, AV/B-Double, medium and/or heavy rigid vehicles and shuttle buses associated with the development must enter and exit the site via the approved northern site access point on Barigan Road, as identified in the figure in Appendix 1.

6. All light vehicles associated with the development must enter and exit the site via the approved northern site access point and/or southern site access option 1 on Barigan Road, as identified in the figure in Appendix 1.

Alternate Site Access Point

7. If the Applicant cannot secure access to the preferred site access points detailed in conditions 5 and 6 of Schedule 3 to this consent, all vehicles associated with the development must enter and exit the site via the approved site access point on Maree Road (southern access option 2), as identified in the figure in Appendix 1.

Road Upgrades

8. Prior to commencing construction, the Applicant must implement the road upgrades identified in Appendix 4, unless the Planning Secretary agrees otherwise in writing. These upgrades must be carried out to the satisfaction of the relevant roads authority.

Operating Conditions

9. The Applicant must ensure:
   (a) the internal roads are constructed as all-weather roads;
   (b) there is sufficient parking on site for all vehicles, and no parking occurs on the public road network in the vicinity of the site;
   (c) the capacity of the existing roadside drainage network is not reduced;
   (d) all vehicles are loaded and unloaded on site, and enter and leave the site in a forward direction; and
   (e) development-related vehicles leaving the site are in a clean condition to minimise dirt being tracked onto the sealed public road network.

Traffic Management Plan

10. Prior to commencing the development, the Applicant must prepare a Traffic Management Plan for the development in consultation with TfNSW, Council, Ulan, Moolarben and Wilpinjong mines and to the satisfaction of the Planning Secretary in writing. This plan must include:
   (a) details of the transport route to be used for all development-related traffic;
   (b) details of the road upgrade works required by condition 8 of Schedule 3 to this consent;
   (c) a protocol for undertaking independent dilapidation surveys to assess the:
      - existing condition of Ulan-Wollar Road, Wollar Road, Phillip Street, Barigan Street, Maitland Street, Barigan Road and Maree Road prior to construction, upgrading or decommissioning activities; and
      - condition of Ulan-Wollar Road, Wollar Road, Phillip Street, Barigan Street, Maitland Street, Barigan Road and Maree Road following construction, upgrading or decommissioning activities;
   (d) a protocol for the repair of Ulan-Wollar Road, Wollar Road, Phillip Street, Barigan Street, Maitland Street, Barigan Road and Maree Road if dilapidation surveys identify these roads to be damaged during construction, upgrading or decommissioning works;
   (e) details of the measures that would be implemented to minimise traffic impacts during construction, upgrading or decommissioning works, including:
      - temporary traffic controls, including detours and signage;
      - notifying the local community about project-related traffic impacts;
      - procedures for receiving and addressing complaints from the community about development-related traffic;
      - minimising potential cumulative traffic impacts with other projects in the area, including the Ulan Coal Mine, Moolarben Coal Mine and Wilpinjong Coal Mine during construction, upgrading or decommissioning works ;
      - minimising potential for conflict with school buses, other road users and rail services as far as practicable (measures also required during operation of the project);
      - minimising dirt tracked onto the public road network from development-related traffic;
      - details of the employee shuttle bus service, including pick-up and drop-off points and associated parking arrangements for construction workers, and measures to ensure employee use of this service;
      - scheduling of haulage vehicle movements to minimise convoy length or platoons;
      - responding to local climate conditions that may affect road safety such as fog, dust and wet weather;
      - responding to any emergency repair or maintenance requirements; and
      - a traffic management system for managing over-dimensional vehicles;
   (f) a driver's code of conduct that addresses:
      - travelling speeds;
      - driver fatigue;
      - procedures to ensure that drivers adhere to the designated transport routes; and
      - procedures to ensure that drivers implement safe driving practices;
   (g) a program to ensure drivers working on the development receive suitable training on the code of conduct and any other relevant obligations under the Traffic Management Plan; and
   (h) a flood response plan detailing procedures and options for safe access to and from the site in the event of flooding.

   Following the Planning Secretary's approval, the Applicant must implement the Traffic Management Plan.

LAND MANAGEMENT

11. The Applicant must maintain the agricultural land capability of the site, including:
    (a) establishing the ground cover of the site within 3 months following completion of any construction or upgrading;
    (b) properly maintaining the ground cover with appropriate perennial species and weed management; and
    (c) maintaining grazing within the development footprint, where practicable,
    unless the Planning Secretary agrees otherwise in writing.

BIODIVERSITY

Vegetation Clearance

12. The Applicant must not clear any native vegetation or fauna habitat located outside the approved disturbance areas described in the EIS.

Biodiversity Offsets

13. Prior to commencing development under this consent, the Applicant must retire biodiversity credits of a number and class specified in Table 1 and Table 2 below, to the satisfaction of BCD, unless the Planning Secretary agrees otherwise in writing.

    The retirement of these credits must be carried out in accordance with the *NSW Biodiversity Offsets Scheme* and can be achieved by:
    (a) acquiring or retiring 'biodiversity credits' within the meaning of the *Biodiversity Conservation Act 2016;*
    (b) making payments into an offset fund that has been developed by the NSW Government; or
    (c) funding a biodiversity conservation action that benefits the entity impacted and is listed in the ancillary rules of the biodiversity offset scheme.

Table 1: *Ecosystem Credit Requirements*

Vegetation Community	***PCT ID***	***Credits Required***
White Box - Grey Gum - Kurrajong grassy woodland on slopes of the northern Capertee Valley, Sydney Basin Bioregion	1303	479
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	281	242
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	1610	2

Table 2: *Species Credit Requirements*

Species Credit Species	***Credits Required***
Austfeld's Wattle (*Acacia ausfeldii*)	34
Bush Stone-curlew (*Burhinus grallarius*)	34
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	67
Large-eared Pied Bat (*Chalinolobus dwyeri*)	50
Commersonia procumbens	2
Large-leafed Monotaxis (*Monotaxis macrophylla*)	34
Barking Owl (*Ninox connivens*)	16
Powerful Owl (*Ninox strenua*)	16
Squirrel Glider (*Petaurus norfolcensis*)	34
Brush-tailed Phascogale (*Phascogale tapoatafa*)	13
Koala (*Phascolarctos cinereus*)	34
Masked Owl (*Tyto novaehollandiae*)	16

Note: Any residual impact on EPBC Act listed threatened species and ecological communities must be offset in accordance with an offset process endorsed by DAWE.

Biodiversity Management Plan

14. Prior to commencing the development, the Applicant must prepare a Biodiversity Management Plan for the development in consultation with BCD, and to the satisfaction of the Planning Secretary in writing. This plan must:
    (a) include a description of the measures that would be implemented for:
        - protecting vegetation and fauna habitat outside the approved disturbance areas;
        - managing the remnant vegetation and fauna habitat on site;
        - minimising clearing and avoiding unnecessary disturbance of vegetation that is associated with the construction and operation of the development;
        - minimising the impacts to fauna on site and implementing fauna management protocols;

- avoiding the removal of hollow-bearing trees during spring to avoid the main breeding period for hollow-dependent fauna;
- rehabilitating and revegetating temporary disturbance areas with species that are endemic to the area;
- maximising the salvage of vegetative and soil resources within the approved disturbance area for beneficial reuse in the enhancement or the rehabilitation of the site; and
- controlling weeds, feral pests and pathogens; and

(b) include details of who would be responsible for monitoring, reviewing and implementing the plan, and timeframes for completion of actions.

Following the Planning Secretary's approval, the Applicant must implement the Biodiversity Management Plan.

Note: If the biodiversity credits are retired via a Biodiversity Stewardship Agreement, then the Biodiversity Management Plan does not need to include any of the matters that are covered under the Biodiversity Stewardship Agreement.

AMENITY

Construction, Upgrading and Decommissioning Hours

15. Unless the Planning Secretary agrees otherwise in writing, the Applicant may only undertake construction, upgrading or decommissioning activities on site between:
    (a) 7 am to 6 pm Monday to Friday;
    (b) 8 am to 1 pm Saturdays; and
    (c) at no time on Sundays and NSW public holidays.

    The following construction, upgrading or decommissioning activities may be undertaken outside these hours without the approval of the Planning Secretary:
    - activities that are inaudible at non-associated receivers;
    - the delivery of materials as requested by the NSW Police Force or other authorities for safety reasons; or
    - emergency work to avoid the loss of life, property and/or material harm to the environment.

Noise

16. The Applicant must minimise the noise generated by any construction, upgrading or decommissioning activities on site in accordance with the best practice requirements outlined in the *Interim Construction Noise Guideline* (DECC, 2009), or its latest version.

Dust

17. The Applicant must minimise the dust generated by the development.

Visual

18. The Applicant must:
    (a) minimise the off-site visual impacts of the development, including the potential for any glare or reflection;
    (b) ensure the visual appearance of all ancillary infrastructure (including paint colours) blends in as far as possible with the surrounding landscape; and
    (c) not mount any advertising signs or logos on site, except where this is required for identification or safety purposes.

Lighting

19. The Applicant must:
    (a) minimise the off-site lighting impacts of the development; and
    (b) ensure that any external lighting associated with the development:
        - is installed as low intensity lighting (except where required for safety or emergency purposes);
        - does not shine above the horizontal; and
        - complies with *Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting*, or its latest version.

HERITAGE

Protection of Heritage Items

20. The Applicant must ensure the development does not cause any direct or indirect impacts on the Aboriginal heritage items identified in Table 1 of Appendix 5 or located outside the approved development footprint.

Prior to carrying out any development that could directly or indirectly impact the heritage items identified in Table 2 of Appendix 5, the Applicant must salvage and relocate the item/s that would be impacted to a suitable alternative location, in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010), or its latest version.

Note: The location of the Aboriginal heritage items referred to in this condition are shown in the figure in Appendix 5.

Heritage Management Plan

21. Prior to commencing construction, the Applicant must prepare a Heritage Management Plan for the development to the satisfaction of the Planning Secretary in writing. This plan must:
    (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary in writing;
    (b) be prepared in consultation with Heritage NSW and Aboriginal Stakeholders;
    (c) include a description of the measures that would be implemented for:
        - protecting the Aboriginal heritage items identified in Table 1 of Appendix 5 or outside the approved development footprint, including fencing off the Aboriginal heritage items prior to commencing construction;
        - salvaging and relocating the Aboriginal heritage items located within the approved development footprint, as identified in Table 2 of Appendix 5;
        - a contingency plan and reporting procedure if:
            - previously unidentified heritage items are found; or
            - Aboriginal skeletal material is discovered;
        - ensuring workers on site receive suitable heritage inductions prior to carrying out any development on site, and that records are kept of these inductions; and
        - ongoing consultation with Aboriginal stakeholders during the implementation of the plan; and
    (d) include a program to monitor and report on the effectiveness of these measures and any heritage impacts of the project.

Following the Planning Secretary's approval, the Applicant must implement the Heritage Management Plan.

SOIL AND WATER

Water Supply

22. The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply.

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain the necessary water licences for the development.

Water Pollution

23. The Applicant must ensure that the development does not cause any water pollution, as defined under Section 120 of the POEO Act.

Operating Conditions

24. The Applicant must:
    (a) ensure the solar panels and ancillary infrastructure (including security fencing) are designed, constructed and maintained to reduce impacts on localised flooding and groundwater at the site;
    (b) minimise any soil erosion associated with the construction, upgrading or decommissioning of the development in accordance with the relevant requirements in the *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) manual, or its latest version;
    (c) ensure the solar panels and ancillary infrastructure are designed, constructed and maintained to avoid causing any erosion on site; and
    (d) ensure all works are undertaken in accordance with the following, unless DPIE Water agrees otherwise:
        - *Guidelines for Controlled Activities on Waterfront Land* (NRAR, 2018), or its latest version; and
        - *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (2004), or its latest version.

HAZARDS

Fire Safety Study

25. Prior to commencing construction of the battery storage facility, unless the Planning Secretary agrees otherwise in writing, the Applicant must prepare a Fire Safety Study for the development in consultation with FRNSW and RFS, and to the satisfaction of the Planning Secretary in writing. The study must:
    (a) be consistent with the:
        - Department's *Hazardous Industry Planning Advisory Paper No. 2 'Fire Safety Study'* guideline; and
        - NSW Government's *Best Practice Guidelines for Contaminated Water Retention and Treatment Systems*; and
    (b) describe the final design of the battery storage facility.

    Following the Planning Secretary's approval, the Applicant must implement the measures described in the Fire Safety Study.

Storage and Handling of Dangerous Goods

26. The Applicant must store and handle all chemicals, fuels and oils used on-site in accordance with:
    (a) the requirements of all relevant Australian Standards; and
    (b) the NSW EPA's *Storing and Handling of Liquids: Environmental Protection – Participants Handbook* if the chemicals are liquids.

    In the event of an inconsistency between the requirements listed from (a) to (b) above, the most stringent requirement must prevail to the extent of the inconsistency.

Operating Conditions

27. The Applicant must:
    (a) minimise the fire risks of the development, including managing vegetation fuel loads on-site;
    (b) ensure that the development:
        - includes at least a 10 metre defendable space around the perimeter of the solar array area and battery storage facility that permits unobstructed vehicle access;
        - manages the defendable space and solar array areas as an Asset Protection Zone;
        - complies with the relevant asset protection requirements in the RFS's *Planning for Bushfire Protection 2006 (or equivalent)* and *Standards for Asset Protection Zones*;
        - includes an Asset Protection Zone that is wholly contained within the development footprint;
        - is suitably equipped to respond to any fires on site including provision of a 20,000 litre water supply tank fitted with a 65 mm Storz fitting and a FRNSW compatible suction connection located adjacent to the internal access road;
    (c) assist the RFS and emergency services as much as practicable if there is a fire in the vicinity of the site; and
    (d) notify the relevant local emergency management committee following construction of the development, and prior to commencing operations.

Emergency Plan

28. Prior to commissioning operations, the Applicant must develop and implement a comprehensive Emergency Plan and detailed emergency procedures for the development, to the satisfaction of FRNSW and the RFS. The Applicant must keep two copies of the plan on-site in a prominent position adjacent to the site entry points at all times. The plan must:
    (a) be consistent with the Department's *Hazardous Industry Planning Advisory Paper No. 1, 'Emergency Planning'*;
    (b) identify the fire risks and controls of the development; and
    (c) include procedures that would be implemented if there is a fire on-site or in the vicinity of the site.

    Following approval, the Applicant must implement the Emergency Plan.

WASTE

29. The Applicant must:
    (a) minimise the waste generated by the development;
    (b) classify all waste generated on site in accordance with the EPA's *Waste Classification Guidelines 2014* (or its latest version)*;*
    (c) store and handle all waste on site in accordance with its classification;
    (d) not receive or dispose of any waste on site; and

(e) remove all waste from the site as soon as practicable, and ensure it is sent to an appropriately licensed waste facility for disposal.

ACCOMMODATION AND EMPLOYMENT STRATEGY

30. Prior to commencing construction, the Applicant must prepare an Accommodation and Employment Strategy for the development in consultation with Council, and to the satisfaction of the Planning Secretary in writing. This strategy must:
    (a) propose measures to ensure there is sufficient accommodation for the workforce associated with the development;
    (b) consider the cumulative impacts associated with other State significant development projects in the area, including nearby mines;
    (c) investigate options for prioritising the employment of local workers for the construction and operation of the development, where feasible; and
    (d) include a program to monitor and review the effectiveness of the strategy over the life of the development, including regular monitoring and review during construction.

    Following the Planning Secretary's approval, the Applicant must implement the Accommodation and Employment Strategy.

DECOMMISSIONING AND REHABILITATION

31. Within 18 months of the cessation of operations, unless the Planning Secretary agrees otherwise in writing, the Applicant must rehabilitate the site to the satisfaction of the Planning Secretary in writing. This rehabilitation must comply with the objectives in Table 3.

Table 3: Rehabilitation Objectives

Feature	***Objective***
Site	• Safe, stable and non-polluting • Minimise the visual impact of any above ground ancillary infrastructure agreed to be retained for an alternative use
Solar farm infrastructure	• To be decommissioned and removed, unless the Planning Secretary agrees otherwise
Land use	• Restore land capability to pre-existing use
Community	• Ensure public safety

SCHEDULE 4
ENVIRONMENTAL MANAGEMENT AND REPORTING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. Prior to commencing the development, the Applicant must prepare an Environmental Management Strategy for the development to the satisfaction of the Planning Secretary in writing. This strategy must:
   (a) provide the strategic framework for environmental management of the development;
   (b) identify the statutory approvals that apply to the development;
   (c) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development;
   (d) describe the procedures that would be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
      - receive, handle, respond to, and record complaints;
      - resolve any disputes that may arise;
      - respond to any non-compliance;
      - respond to emergencies; and
   (e) include:
      - references to any plans approved under the conditions of this consent; and
      - a clear plan depicting all the monitoring to be carried out in relation to the development.

   Following the Planning Secretary's approval, the Applicant must implement the Environmental Management Strategy.

Revision of Strategies, Plans and Programs

2. The Applicant must:
   (a) update the strategies, plans or programs required under this consent to the satisfaction of the Planning Secretary prior to carrying out any upgrading or decommissioning activities on site; and
   (b) review and, if necessary, revise the strategies, plans or programs required under this consent to the satisfaction of the Planning Secretary within 1 month of the:
      - submission of an incident report under condition 7 of Schedule 4;
      - submission of an audit report under condition 9 of Schedule 4; or
      - any modification to the conditions of this consent.

Updating and Staging of Strategies, Plans or Programs

3. With the approval of the Planning Secretary in writing, the Applicant may submit any strategy, plan or program required by this consent on a progressive basis.

   To ensure the strategies, plans or programs under the conditions of this consent are updated on a regular basis, the Applicant may at any time submit revised strategies, plans or programs to the Secretary for approval.

   With the agreement of the Planning Secretary in writing, the Applicant may prepare any revised strategy, plan or program without undertaking consultation with all the parties referred to under the relevant condition of this consent.

   Notes:
   - *While any strategy, plan or program may be submitted on a progressive basis, the Applicant must ensure that all development being carried out on site is covered by suitable strategies, plans or programs at all times.*
   - *If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.*

NOTIFICATIONS

Notification of Department

4. Prior to commencing the construction, operations, upgrading or decommissioning of the development or the cessation of operations, the Applicant must notify the Department in writing via the Major Projects website portal of the date of commencement, or cessation, of the relevant phase.

If any of these phases of the development are to be staged, then the Applicant must notify the Department in writing prior to commencing the relevant stage, and clearly identify the development that would be carried out during the relevant stage.

Final Layout Plans

5. Prior to commencing construction, the Applicant must submit detailed plans of the final layout of the development to the Planning Secretary, including details on the siting of solar panels and ancillary infrastructure, via the Major Projects website.

Work as Executed Plans

6. Prior to commencing operations, or following the upgrades of any solar panels or ancillary infrastructure, the Applicant must submit work as executed plans of the development to the Planning Secretary, via the Major Projects website.

Incident Notification

7. The Planning Secretary must be notified in writing via the Major Projects website portal immediately after the Applicant becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development if it has one),and set out the location and nature of the incident.

Non-Compliance Notification

8. The Planning Secretary must be notified in writing via the Major Projects website portal within 7 days after the Applicant becomes aware of any non-compliance with the conditions of this consent. The notification must identify the development and the application number for it, set out the condition of consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been done, or will be, undertaken to address the non-compliance.

INDEPENDENT ENVIRONMENTAL AUDIT

9. The Applicant must commission and pay the full cost of Independent Environmental Audits of the development. The audits must:
   (a) be prepared in accordance with the relevant *Independent Audit Post Approval* requirements (DPE 2020);
   (b) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary in writing;
   (c) be prepared, unless otherwise agreed with the Planning Secretary in writing:
      - within 3 months of commencing construction;
      - within 3 months of commencement of operations; and
      - as directed by the Planning Secretary ;
   (d) be carried out in consultation with the relevant agencies;
   (e) assess whether the development complies with the relevant requirements in this consent, and any strategy, plan or program required under this consent; and
   (f) recommend appropriate measures or actions to improve the environmental performance of the development and any strategy, plan or program required under this consent.

   Within 3 months of commencing an Independent Environmental Audit, or unless otherwise agreed by the Planning Secretary in writing, a copy of the audit report must be submitted to the Planning Secretary, and any other NSW agency that requests it, together with a response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations.

   The recommendations of the Independent Environmental Audit must be implemented to the satisfaction of the Planning Secretary , confirmed in writing.

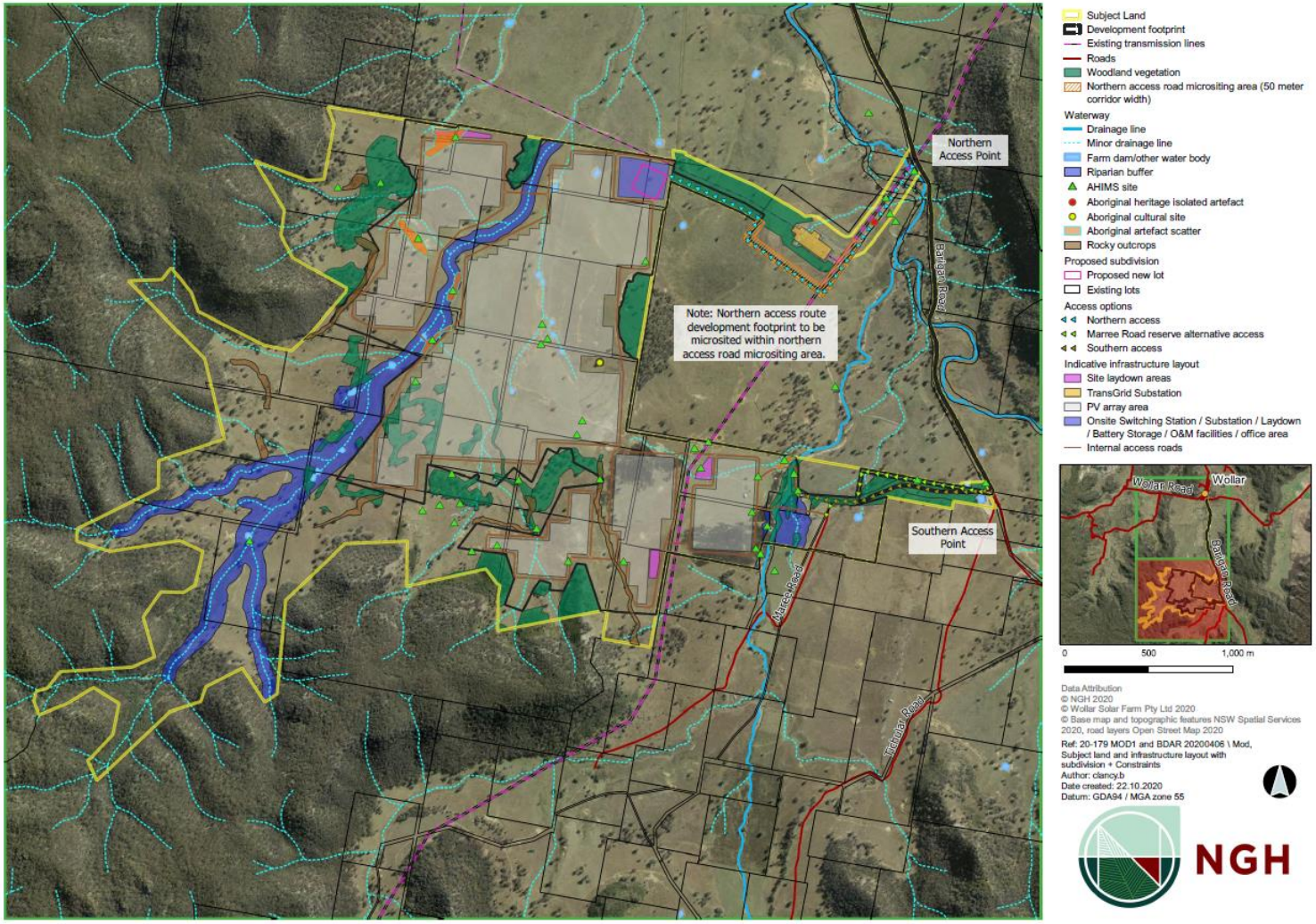
ACCESS TO INFORMATION

10. The Applicant must:
   (a) make the following information publicly available on its website as relevant to the stage of the development:
      - the EIS;
      - the final layout plans for the development;
      - current statutory approvals for the development;

- approved strategies, plans or programs required under the conditions of this consent;
- the proposed staging plans for the development if the construction, operation or decommissioning of the development is to be staged;
- how complaints about the development can be made;
- a complaints register;
- compliance reports;
- any independent environmental audit, and the Applicant's response to the recommendations in any audit; and
- any other matter required by the Planning Secretary ; and

(b) keep this information up to date, to the satisfaction of the Planning Secretary.

APPENDIX 1
GENERAL LAYOUT OF DEVELOPMENT

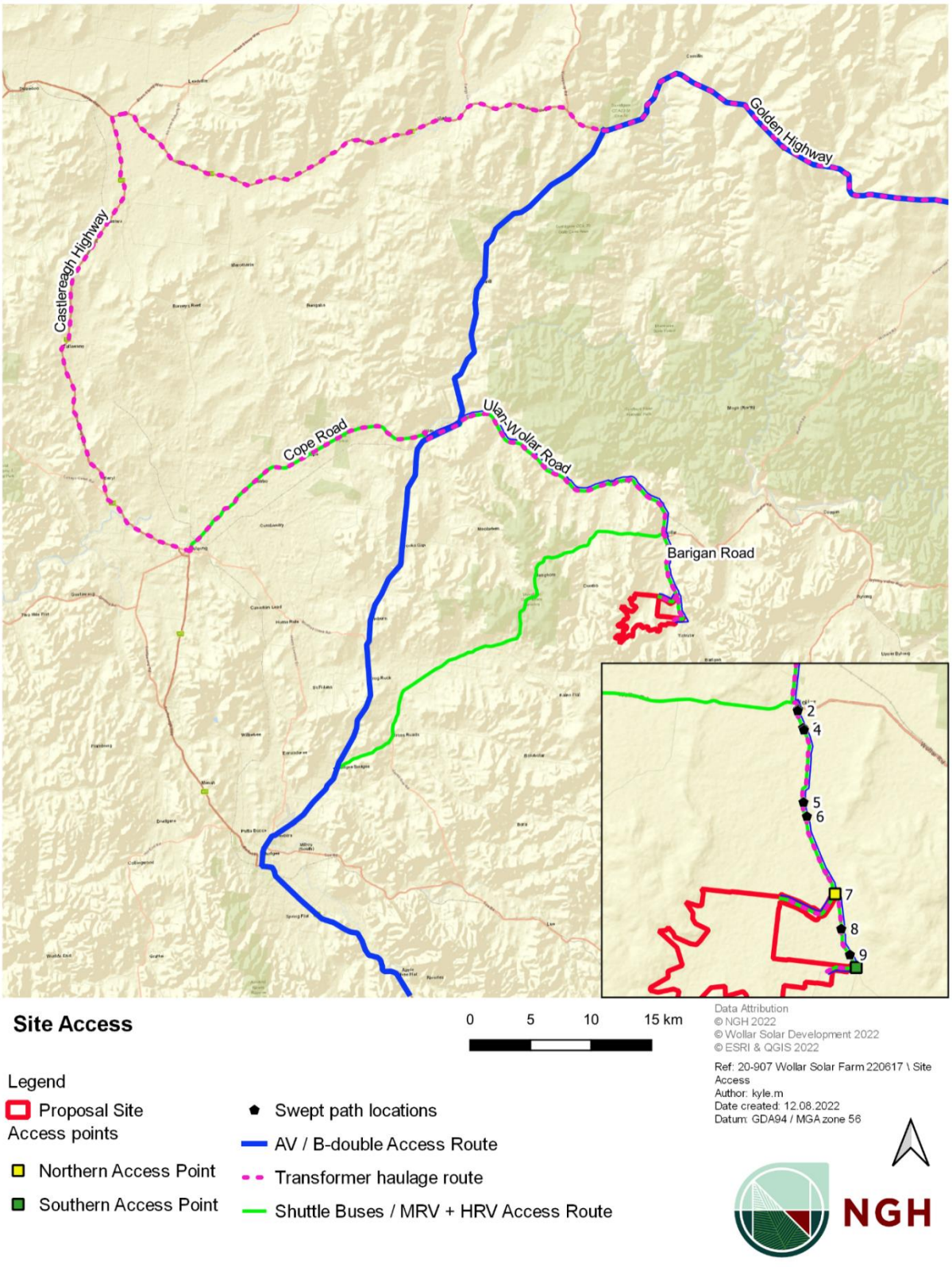


APPENDIX 2
SCHEDULE OF LAND

Project Site			
Lot	**Deposited Plan**	**Lot**	**Deposited Plan**
1	650653	76	755430
22	755430	77	755430
23	755430	78	755430
24	755430	79	755430
25	755430	80	755430
27	755430	84	755430
30	755430	92	755430
45	755430	105	755430
46	755430	106	755430
49	755430	107	755430
50	755430	119	755430
51	755430	152	755430
60	755430	153	755430
61	755430	154	755430
62	755430	1	1090027
63	755430	2	1090027
69	755430	4	1090027
70	755430	6	1090027
71	755430	7	1090027
72	755430	8	1090027
73	755430	10	1090027
74	755430	11	1090027
75	755430	7303	1139558
Barigan Road			
Lot	**Deposited Plan**	**Lot**	**Deposited Plan**
6	131083	34	755455
8	131083	35	755455
11	131083	40	755455
13	131083	41	755455
31	755430	62	755455
33	755430	65	755455
34	755430	87	755455
41	755430	131	755455
84	755430	136	755455
134	755430	61A	755455
137	755430	7006	1024130
29	755455	7001	1055786
30	755455	9	1090027
31	755455	11	1090027
32	755455	7011	1116440
33	755455	-	-

Note: The project site will also be taken to include any Crown land and road reserves contained within the project site

APPENDIX 3
SITE ACCESS



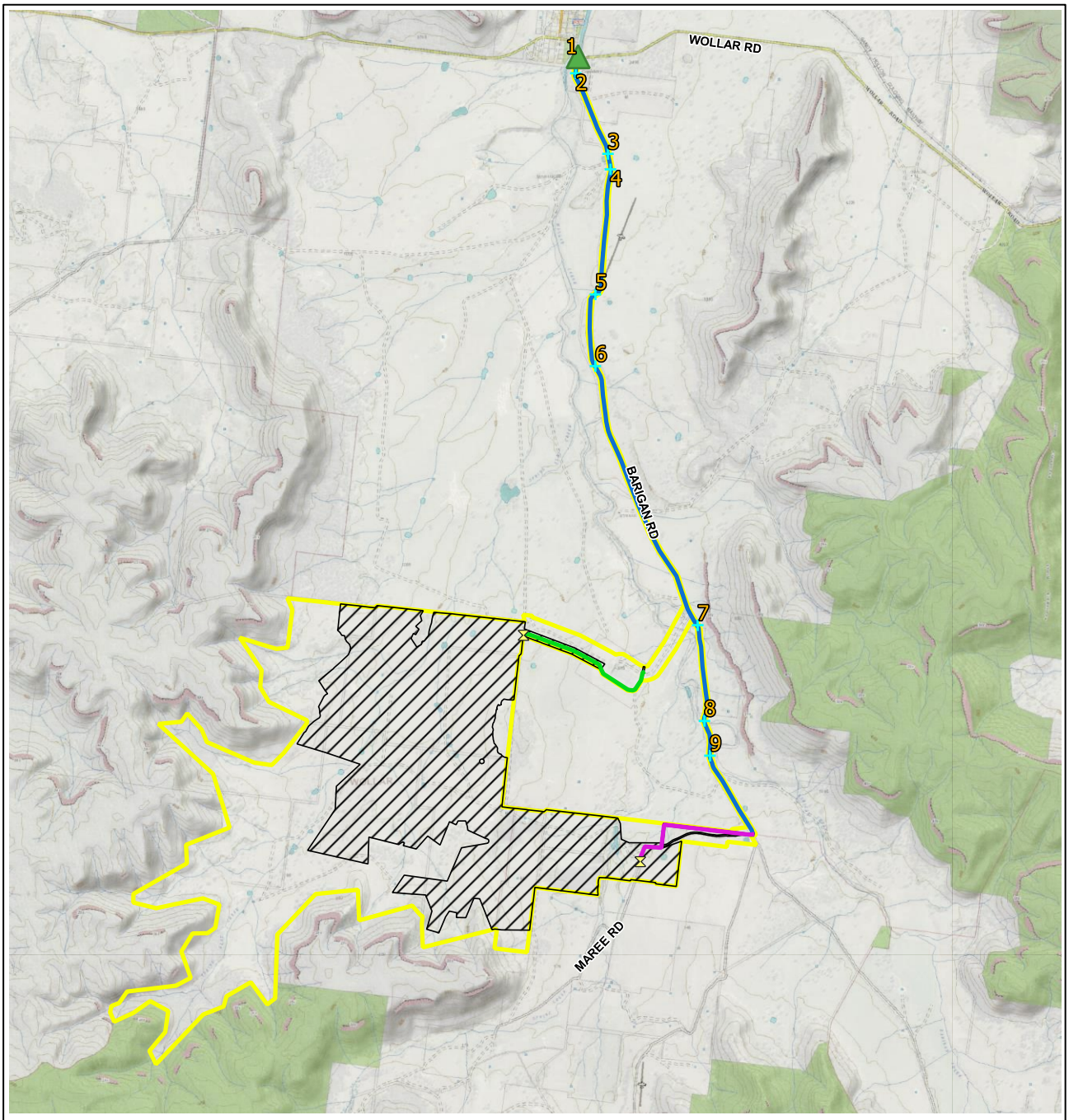
APPENDIX 4
ROAD UPGRADES

Road	*Location* [1]	*Upgrade Requirements* [1]	*Timing*
Wollar Road and Barigan Road	Intersection	Basic Right (BAR) turn and Basic Left (BAL) turn treatments for the largest vehicle accessing the site (excluding over-dimensional vehicles)	Prior to construction
Barigan Road	Between Wollar Road and the northern site access point	Seal to a width of 7 m with 1 m unsealed shoulders (total carriageway 9 m), with the exception of locations 1 to 6 which require upgrading in accordance with the figures below	
	Between the northern site access point and southern site access point	Seal to a width of 7 m with 1 m unsealed shoulders (total carriageway 9 m, with the exception of locations 7 to 9 which require upgrading in accordance with the figures below [2]	
	Northern site access point [3]	Rural Property Access Type	
	Southern site access point		
Southern access option 2 (Maree Road road reserve)	From its intersection with Barigan Road, for a distance of approximately 1.2 km	Gravel (unsealed) to a width of 7 m [2]	

[1] Refer to the figures in Appendix 4 for the location and further details of the road upgrades.

[2] These upgrades are only required if the alternate site access option detailed in condition 7 of Schedule 3 of this consent is used.

[3] A rural property access treatment is only required if the preferred site access option detailed in conditions 5 and 6 of Schedule 3 of this consent is used.



0 1 2 km

Data Attribution
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© Wollar Solar Development 2019
© Basemap Courtesy NSW LPI 2019

Road Upgrades

Legend

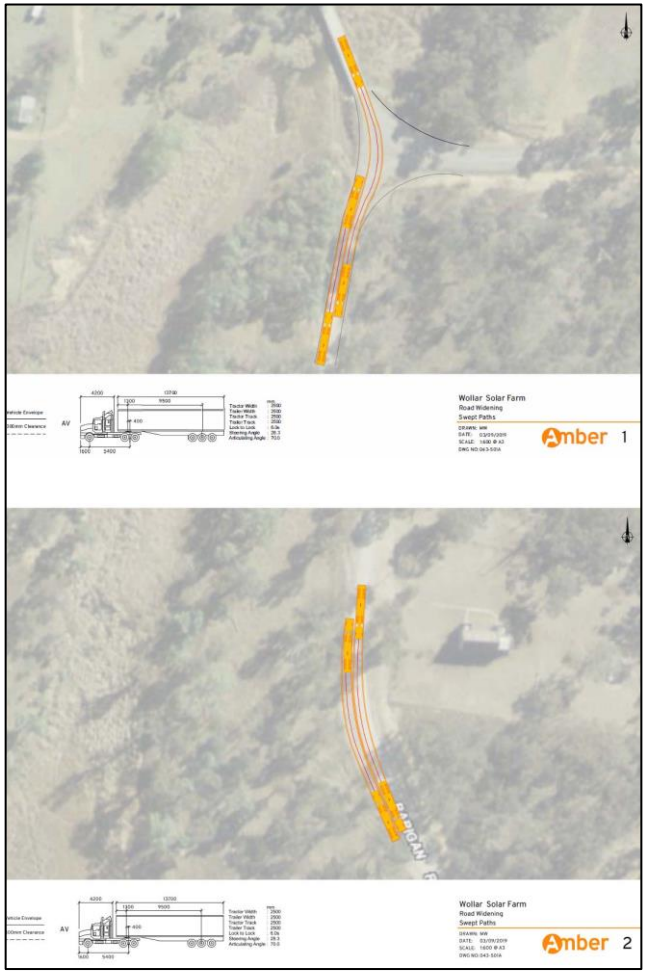
- Proposal Site
- Development Footprint
- Swept Path Locations (1-9 Refer figure below)

Road Upgrades

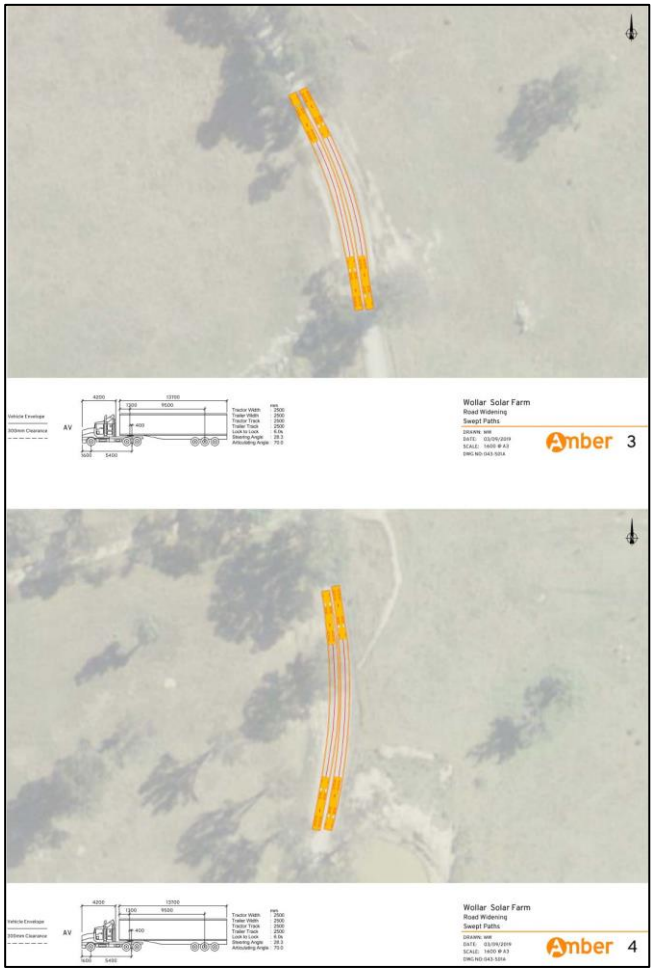
- Barigan Rd - Widen and seal to 7m and widen at nine identified section in accordance with swept paths
- Lot 1 & 11 DP1090027 (Northern access) - Construct gravel (unsealed) carriageway within potential easement
- Maree Rd road reserve (Southern access option 2) - Construct gravel (unsealed) carriageway to a width of 7m within road reserve
- Intersection Upgrade - Dependant On Road Safety Audit Outcome

Ref: 18-012 New Wollar Solar Farm workspace 190827 \ Road Upgrades
Author: Vitaly.K
Date created: 17.01.2020
Datum: GDA94 / MGA zone 56

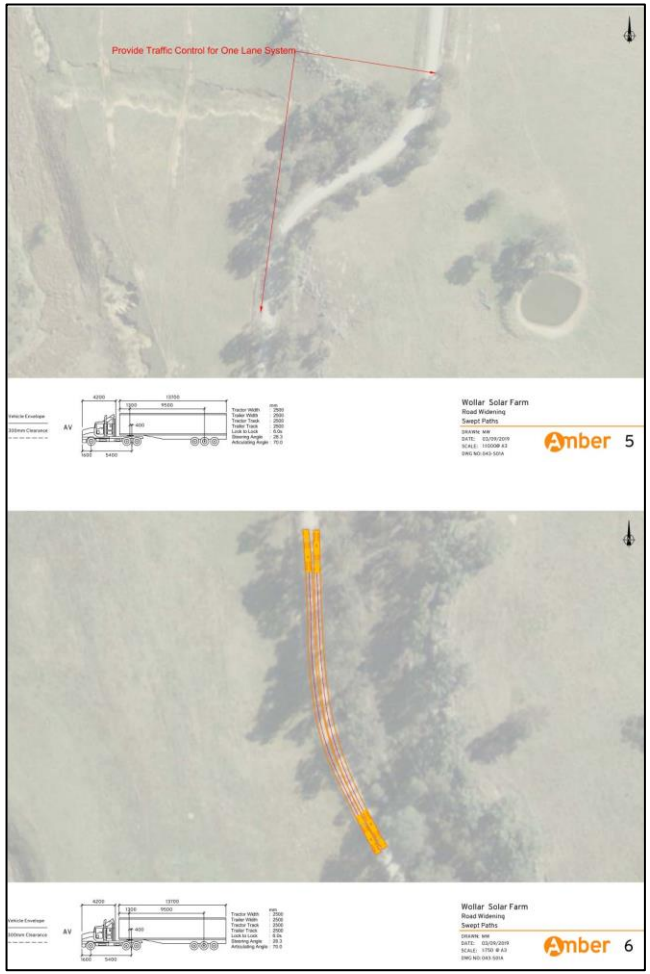
NGH


Wollar Solar Farm
Road Widening
Swept Paths
Amber 1

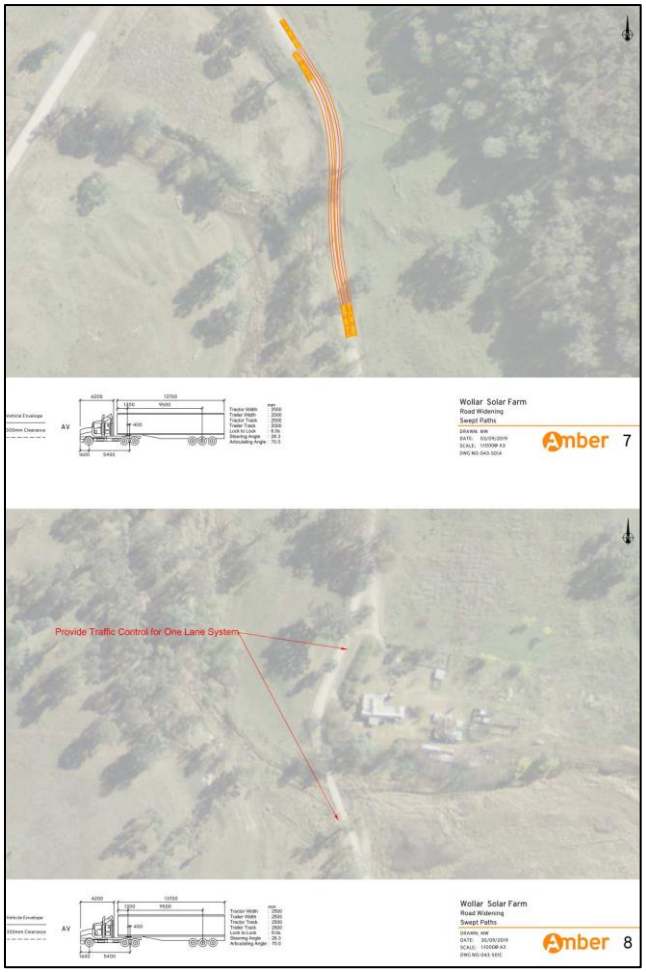
Wollar Solar Farm
Road Widening
Swept Paths
Amber 2


Wollar Solar Farm
Road Widening
Swept Paths
Amber 3

Wollar Solar Farm
Road Widening
Swept Paths
Amber 4


Provide Traffic Control for One Lane System
Wollar Solar Farm
Road Widening
Swept Paths
Amber 5

Wollar Solar Farm
Road Widening
Swept Paths
Amber 6


Provide Traffic Control for One Lane System
Wollar Solar Farm
Road Widening
Swept Paths
Amber 7
Wollar Solar Farm
Road Widening
Swept Paths
Amber 8


Wollar Solar Farm
Road Widening
Swept Paths
Amber 9

APPENDIX 5
ABORIGINAL HERITAGE ITEMS

Table 1: Aboriginal heritage items – avoid impacts

*Item**	
Wollar SF AFT 6	Wollar SF IF25
Wollar SF IF8	Wollar SF GDG 1
Wollar SF IF9	Wollar SF ST 1
Wollar SF IF10	Wollar SF ST 2
Wollar SF IF11	Wollar SF Cultural Site 1
Wollar SF IF12	Wollar Creek 1
Wollar SF IF14	Wollar Creek 2
Wollar SF IF21	-

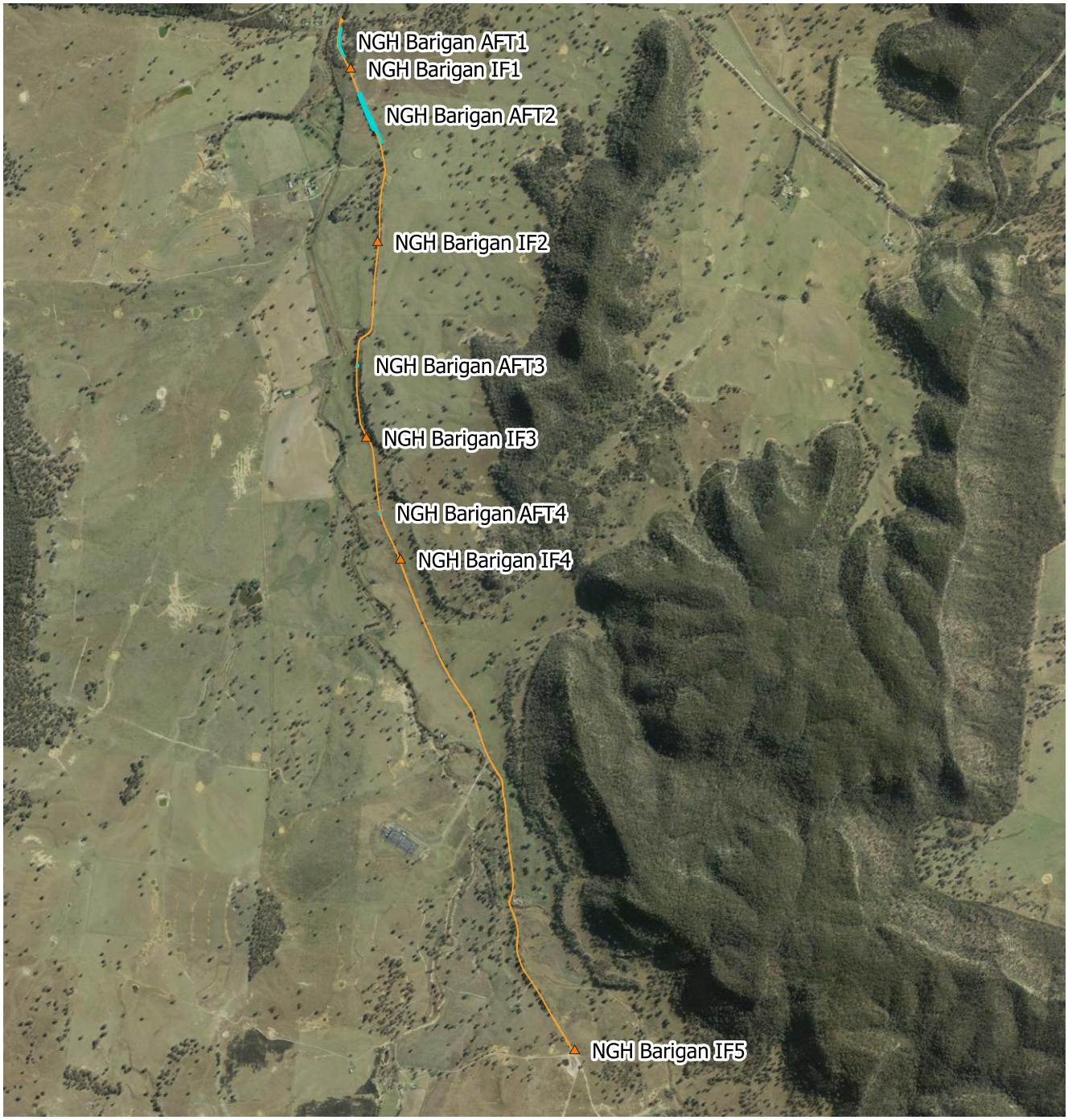
** Refer to the Figure in this Appendix to identify items*

Table 2: Aboriginal heritage items – surface collection salvage

Item	
Wollar SF AFT 1	Wollar SF IF15
Wollar SF AFT 2	Wollar SF IF16
Wollar SF AFT 3	Wollar SF IF17
Wollar SF AFT 4	Wollar SF IF18
Wollar SF AFT 5	Wollar SF IF19
Wollar SF AFT 7	Wollar SF IF20
Wollar SF AFT 8	Wollar SF IF22
Wollar SF AFT 9	Wollar SF IF23
Wollar SF AFT 10	Wollar SF IF24
Wollar SF AFT 11	Wollar SF IF26
Wollar SF AFT 12	NGH Barigan AFT 1
Wollar SF IF1	NGH Barigan AFT 2
Wollar SF IF2	NGH Barigan AFT 3
Wollar SF IF3	NGH Barigan AFT 4
Wollar SF IF4	NGH Barigan IF 1
Wollar SF IF5	NGH Barigan IF 2
Wollar SF IF6	NGH Barigan IF 3
Wollar SF IF7	NGH Barigan IF 4
Wollar SF IF13	NGH Barigan IF 5

** Only items located within the development footprint are to be salvaged (refer to the Figure in this Appendix to identify it).*


Legend
Project footprint
Northern access road micrositing area
Modification heritage study area
EIS heritage study area
Aboriginal Artefact Scatter
AHIMS site: AHIMS ID indicated for all sites, Wollar SF survey ID indicated for sites recorded during field work for the Wollar SF project
Isolated artefact, recorded during Modification Report addendum ACHA
Aboriginal cultural site recorded during Wollar SF EIS ACHA, not registered to AHIMS
Roads
Waterway
Minor drainage line
Drainage line
Farm dam / other water body
Data Attribution
© NGH 2020
© Wollar Solar Farm Pty Ltd 2020
© DFSI 2020
Ref: 20-179_HeritageWorkspace_20200330
\ AHIMS and Previously Identified Sites
Author: C. Bowman
Date created: 03.11.2020
Datum: GDA94 / MGA zone 55
0
0.5
1 km
NGH
Wollar Creek
Spring Flat Creek
Bardan Road
Maree Road
Tichular Road
36-3-0076
36-3-0335
36-3-0336
36-3-3406 Wollar SF IF25
Wollar SF IF26
36-3-0075
36-3-3379 Wollar SF AFT1
36-3-3391 Wollar SF IF1
36-3-3392 Wollar SF IF2
36-3-3380 Wollar SF AFT2
36-3-3393 Wollar SF IF3
36-3-3381 Wollar SF AFT3
36-3-3394 Wollar SF IF4
36-3-3382 Wollar SF AFT4
36-3-3385 Wollar SF AFT7
36-3-3383 Wollar SF AFT5
36-3-3395 Wollar SF IF5
Wollar Solar ST2
36-3-3389 Wollar SF AFT11
36-3-3388 Wollar SF AFT10
36-3-0668
36-3-3396 Wollar SF IF6
36-3-3397 Wollar SF IF7
36-3-3409 Wollar SF IF22
36-3-3398 Wollar SF IF8
36-3-3386 Wollar SF AFT8
36-3-3413 Wollar SF IF18
36-3-3400 Wollar SF IF10
36-3-3436 Wollar SF Cultural Site 1
36-3-3405 Wollar SF GDG1
36-3-3390 Wollar SF AFT12
36-3-3407 Wollar SF IF24
36-3-3408 Wollar SF IF23
36-3-3414 Wollar SF IF17
36-3-3399 Wollar SF IF9
36-3-3401 Wollar SF IF11
36-3-3417 Wollar SF IF14
36-3-3412 Wollar SF IF19
36-3-3387 Wollar SF AFT9
36-3-3404 Wollar SF ST1
36-3-3403 Wollar SF IF13
36-3-3384 Wollar SF AFT6
36-3-3410 Wollar SF IF21
36-3-3411 Wollar SF IF20
36-3-3415 Wollar SF IF16
36-3-3402 Wollar SF IF12
36-3-3416 Wollar SF IF15
36-3-0077



Barigan Road Field Results

0 0.5 1 km

Data Attribution
© NGH 2020
© Wollar Solar Development 2020
© Basemaps Courtesy NSW LPI 2020

Legend

- Barigan Road Study Area
- Isolated Artefacts
- Artefact Scatter

Ref: 18-012 Wollar All maps combined 190912 \ Barigan Rd Field Results
Author: lewis.t
Date created: 15.01.2020
Datum: GDA94 / MGA zone 56

NGH

APPENDIX 6
SUBDIVISION PLAN

Appendix C Consultation

C.1 Email correspondence

From:	James van den Broek
To:	Julie Gooding
Subject:	FW: Wollar solar farm Commonwealth offsets [SEC=OFFICIAL]
Date:	Wednesday, 13 December 2023 4:22:47 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png image012.png

---

2/8 & 25/7

James van den Broek
Senior Project Manager

m: 0435 295 502 p: 02 4917 3976
e. james.vdb@nghconsulting.com.au
a. level 1, 31-33 Beaumont St, Hamilton, NSW 2303
w. nghconsulting.com.au | Our commitment to reconciliation

From: Egan, Will <Will.Egan@dcceew.gov.au>
Sent: Wednesday, August 2, 2023 2:05 PM
To: Rachael Buzio <rachael.b@nghconsulting.com.au>
Cc: Duncan Upton <duncan.upton@bjeiaustralia.com>; James van den Broek <james.vdb@nghconsulting.com.au>; Brooke Marshall <brooke.m@nghconsulting.com.au>; Glover, Kimberly <Kimberly.Glover@dcceew.gov.au>; Stuart Miller <stuart.miller@bjeiaustralia.com>
Subject: RE: Wollar solar farm Commonwealth offsets [SEC=OFFICIAL]

Hi Rachael – Thanks for reaching out.

Please see responses below.

Cheers
Will Egan
Assessment Officer

Post Approvals
Ngunnawal Country, John Gorton Building, King Edward Terrace, Parkes ACT 2600 Australia
Department of Climate Change, Energy, the Environment and Water
E Will.egan@dcceew.gov.au

From: Rachael Buzio <rachael.b@nghconsulting.com.au>
Sent: Tuesday, July 25, 2023 10:04 AM
To: Egan, Will <Will.Egan@dcceew.gov.au>; Egan, William <William.Egan@environment.gov.au>
Cc: Duncan Upton <duncan.upton@bjeiaustralia.com>; James van den Broek <james.vdb@nghconsulting.com.au>; Brooke Marshall <brooke.m@nghconsulting.com.au>; Glover, Kimberly <Kimberly.Glover@dcceew.gov.au>; Stuart Miller <stuart.miller@bjeiaustralia.com>
Subject: RE: Wollar solar farm Commonwealth offsets [SEC=OFFICIAL]

Hi Will,

I hope you're well and having a great week.

I'm in the middle of updating the Wollar BMP and I just wanted to check a few things with you before I progress with the rest of the updates.

Regarding your comments:

1. ***"The Department will assess the BMP against the requirements of the NSW development consent but considering that monitoring will need to show the impact has not had an overall adverse impact on the persistence of the derived native grassland (DNG). Include a methodology for re-quantifying of impacts:***
    a. ***Assessment consistent with current NSW requirements – Due to credits being retired under the NSW BOS"***

        Given the current monitoring methodology* in the BMP (Appendix A - 5.1) does not, as I understand it, meet the assessment requirements under the NSW BOS/BAM. To meet BAM requirements, I propose the monitoring methodology be updated to replicate existing vegetation integrity (BAM) plots that were completed within the development footprint (DF), located within DNG areas generating offsets under the EPBC Act and that this replication occur once a year for the first 3 years (so replication commencing this year).

        This will also provide a higher quality monitoring dataset, given the BAM plots were completed before the project commenced, with 4 of the 11 plots located within the PV array DF.

        I reviewed the GIS data and there are:

        i. Six (6) BAM plots completed for Zone 2 with 2 plots completed within the PV array areas (PCT 1303)
        ii. Six (6) BAM plots completed for Zone 6 with 2 plots completed within the PV array areas (PCT 281)

        The amount of plots undertaken for Zone 2 and Zone 6 meet the BAM 2020 requirements (Table 3, Section 4.3.4). I think it would be apt to check this update in monitoring methodology is acceptable to NSW BCS as well?

        Thanks for bringing this to my attention. Consistency with current NSW requirements is only recommended due to the use of their credit retirement system. If NSW sees a better approach and can weigh in on the pathway forward, then it would be valuable to bring them in the loop.

    b. ***"Outlining why the impact has not had an overall adverse impact on the condition and persistence of DNG – this will need to speak to the original condition of the***

site and how the impact has affected DNG."

Using existing BAM plot data and comparing it to the yearly monitoring data should meet this requirement.

Noted. Please keep in mind determining if there has been an overall impact on the condition and persistence of DNG is ultimate a decision that will be made by the Minister/delegate.

An alternative/additional option would be to see if the BCT and DCCEEW could collaborate to assess how to pay the credit obligation into the Biodiversity Conservation Fund given these areas do not currently generate credits in the BAM-C and were manually calculated for the EPBC DNG in Zones 2 and 6 using equation 1 in the BAM (details in table below). I note that this collaboration would be required in the future, dependent on what the monitoring data shows after the 3 year period. Agreed, at the end of the 3-year period DCCEEW are happy to have these discussions with BCT.

Zone details	Credits generated using equation 1 from the BAM
Zone 2 - PCT 1303 Formation: Derived grassland Condition: Moderate Area: 102.70 hectares	131
Zone 6 - PCT 281 Formation: Derived grassland Condition: Moderate Area: 102.73 hectares	524

**Ground cover will be monitored using 1m x 1m quadrats placed within all treated locations to ensure cover does not fall below 70% and at 30 random locations within the development footprint (from Appendix A-5.1 in the BMP (and section 4.2 of the Wollar Solar Farm Offset Strategy).*

Thanks for your time Will, I look forward to your response.

Best regards,

Rachael

Rachael Buzio (she/her)
Senior Ecologist

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Please note I do not work Fridays

From: Egan, Will <Will.Egan@dcceew.gov.au>
Sent: Wednesday, June 28, 2023 1:31 PM
To: Egan, Will <Will.Egan@dcceew.gov.au>; James van den Broek <james.vdb@nghconsulting.com.au>; Brooke Marshall

<brooke.m@nghconsulting.com.au>; Egan, William <William.Egan@environment.gov.au>
Cc: Duncan Upton <duncan.upton@bjeiaustralia.com>; Rachael Buzio <rachael.b@nghconsulting.com.au>; Glover, Kimberly <Kimberly.Glover@dcceew.gov.au>; Stuart Miller <stuart.miller@bjeiaustralia.com>
Subject: RE: Wollar solar farm Commonwealth offsets [SEC=OFFICIAL]

Hi James

Once again, thanks for your patience on this one. After some internal discussion we consider the following approach to be reasonable.

First, the Biodiversity Management Plan (BMP) is submitted for assessment and approval - subject to a cost recovery fee of $2,690. The Department will assess the BMP against the requirements of the NSW development consent but considering that monitoring will need to show the impact has not had an overall adverse impact on the persistence of the derived native grassland (DNG), the Department may also take into account relevant approved conservation advices, recovery plans, and threat abatement plans.

If the Minister approves the BMP, then the Offset Strategy, with the methodology for re-quantifying impacts, will need to be submitted for assessment and approval - subject to cost recovery fee of $2,690. The strategy needs to detail the current offset site where credits are being purchased/retired (addressing condition 4b), the current credit requirements, and the methodology for re-quantifying impacts. Consider the following approach:

- Detailing where credits will be retired and number of current credits to be retired.
- Detailing when credits will be retired - doesn't need to be an actual date, instead it could be after a milestone. This must be following at least 3 years of operation (in accordance with condition 5a) and for the potential re-quantifying of impacts.
- Include a methodology for re-quantifying of impacts. Eg:
    - Assessment consistent with current NSW requirements – Due to credits being retired under the NSW BOS.
    - Notifying the department that impacts have been re-quantified and providing a document comparing both assessments.
    - Outlining why the impact has not had an overall adverse impact on the condition and persistence of DNG – this will need to speak to the original condition of the site and how the impact has affected DNG.

The Department will then assess and determine if impacts should be re-quantified.

If the Department is satisfied that the impacts should re-quantified, the offset strategy needs to be resubmitted following the updated credit retirement requirement - Subject to an administration cost recovery fee of $710.

Please take into consideration that requests made to Post Approvals are experiencing long turnaround times in some cases exceeding several months.

Happy to discuss further over Teams.

Cheers
Will Egan
Assessment Officer

Post Approvals
Ngunnawal Country, John Gorton Building, King Edward Terrace, Parkes ACT 2600 Australia
Department of Climate Change, Energy, the Environment and Water
E Will.egan@dcceew.gov.au

DCCEEW.gov.au ABN 63 573 932 849

From: Egan, Will <Will.Egan@dcceew.gov.au>
Sent: Monday, June 19, 2023 1:34 PM
To: James van den Broek <james.vdb@nghconsulting.com.au>; Brooke Marshall <brooke.m@nghconsulting.com.au>; Egan, William <William.Egan@environment.gov.au>
Cc: Duncan Upton <duncan.upton@bjeiaustralia.com>; Rachael Buzio <rachael.b@nghconsulting.com.au>; Glover, Kimberly <Kimberly.Glover@dcceew.gov.au>; Stuart Miller <stuart.miller@bjeiaustralia.com>
Subject: RE: Wollar solar farm Commonwealth offsets [SEC=OFFICIAL]

Hi James

Thanks for your patience with this – Kimberly and I are still discussing condition 5a internally. I am aiming to get guidance to you asap.

Thanks for the update regarding the BMP – in all scenarios, getting it approved will be the first step.

Cheers
Will Egan
Assessment Officer

Post Approvals
Ngunnawal Country, John Gorton Building, King Edward Terrace, Parkes ACT 2600 Australia
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Acknowledgement of Country
Our department recognises the First Peoples of this nation and their ongoing connection to culture and country. We acknowledge First Nations Peoples as the Traditional Owners, Custodians and Lore Keepers of the world's oldest living culture and pay respects to their Elders past, present and emerging

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From: James van den Broek <james.vdb@nghconsulting.com.au>
Sent: Monday, June 19, 2023 12:56 PM
To: Egan, Will <Will.Egan@dcceew.gov.au>; Brooke Marshall

<brooke.m@nghconsulting.com.au>; Egan, William <William.Egan@environment.gov.au>
Cc: Duncan Upton <duncan.upton@bjeiaustralia.com>; Rachael Buzio <rachael.b@nghconsulting.com.au>; Glover, Kimberly <Kimberly.Glover@dcceew.gov.au>; Stuart Miller <stuart.miller@bjeiaustralia.com>
Subject: RE: Wollar solar farm Commonwealth offsets [SEC=OFFICIAL]

Hi Will and Kimberly,

I hope you have been well.

I am checking in to see where you are at with your internal discussions regarding condition 5a regarding the Wollar Solar Farm.

We will be looking at submitting the BMP for the Minister's approval in the coming weeks.

Cheers,

James van den Broek
Senior Project Manager

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From: Egan, Will <Will.Egan@dcceew.gov.au>
Sent: Thursday, May 25, 2023 3:07 PM
To: Brooke Marshall <brooke.m@nghconsulting.com.au>; Egan, William <William.Egan@environment.gov.au>
Cc: Duncan Upton <duncan.upton@bjeiaustralia.com>; James van den Broek <james.vdb@nghconsulting.com.au>; Rachael Buzio <rachael.b@nghconsulting.com.au>; Glover, Kimberly <Kimberly.Glover@dcceew.gov.au>
Subject: RE: Wollar solar farm Commonwealth offsets [SEC=OFFICIAL]

Hi Brooke

Thanks for meeting with us today. I have cc'd in Kimberly.

Yes, please submit the BMP for the Minister's approval and once we have provided further clarification around condition 5a the Offset Strategy can be re-submitted for assessment as well.

Cheers
Will Egan
Assessment Officer

Post Approvals
Ngunnawal Country, John Gorton Building, King Edward Terrace, Parkes ACT 2600
Australia
Department of Climate Change, Energy, the Environment and Water
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Acknowledgement of Country
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From: Brooke Marshall <brooke.m@nghconsulting.com.au>
Sent: Thursday, May 25, 2023 2:58 PM
To: Egan, William <William.Egan@environment.gov.au>
Cc: Duncan Upton <duncan.upton@bjeiaustralia.com>; James van den Broek <james.vdb@nghconsulting.com.au>; Rachael Buzio <rachael.b@nghconsulting.com.au>
Subject: Wollar solar farm Commonwealth offsets

Hi Wil
Thanks for your time, sorry I don't have Kimberley's email if you could forward this.

As we discussed, the offset strategy we had previously submitted limits our options to stewardship for the Commonwealth credits.
We would like to make this more flexible

1. to better set out how and when credits would be requantified prior to discharging the obligation
2. to allow for also paying out or purchasing requisite credits under the NSW Biodiversity Offset Scheme, if these provide a better Project outcome

As I understand, we should now:

- provide the Biodiversity management plan including monitoring methods, for ministers approval
- provide an updated offset strategy making the changes above, for ministers approval

We will await your further clarifications prior to updating the strategy.
Cheers, Brooke

Brooke Marshall
Principal Environmental Planner – Renewable Energy Assessments

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C.2 Letter to DCCEEW

3 April 2023

Wollar Solar Development Pty Ltd
ABN 88 621 969 266
Level 21, 1 York Street
Sydney, NSW 2000

Will Egan
Assessment Officer
Environmental Approvals Division | Post Approvals
Department of Climate Change, Energy, the Environment and Water
E william.egan@environment.gov.au

Dear Will

WSD_DCCEW_001 - Re: Wollar Solar Farm – Biodiversity Offsets Update

The following summary has been prepared to provide the Department of Climate Change, Energy, the Environment and Water (**DCCEEW**) with an update regarding the status of the offsets under approval EPBC 2018/8258 (**EPBC Approval**) granted under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**) the Wollar Solar Farm (**Project**)**.**

We refer specifically to Conditions 3 to 7 of the EPBC Approval, which set out the offset requirements under the EPBC Approval for the Project. In summary:

- As previously discussed with DCCEEW, the Project is being constructed in stages as follows:
  1. Stage 1 – construction of the public road upgrades to Barigan Road commenced in August 2020 and are now complete;
  2. Stage 2 - construction of the Northern access road commenced in August 2021 and is now complete;
  3. Stage 3A - construction of the substation commenced in November 2021;
  4. Stage 3B - construction on the main solar farm site recently commenced on 20 February 2023; and
  5. Stage 4 - alternative access via Maree Road – not currently proposed to be carried out.
- As previously discussed with DCCEEW, there was an unavoidable delay in securing the offsets required by condition 3 of the EPBC Approval (which incorporates the offset requirements under Condition 13 of Schedule 3 of the NSW Development Consent) owing to the inability to progress the Biodiversity Stewardship Agreement (**BSA**) which was initially proposed to secure all offsets for the Project. However, Wollar Solar Development Pty Ltd (**WSD**) has now resolved this issue by contracting to purchase all credits required by Condition 13 of Schedule 3 of the NSW Development Consent directly from a third party. Accordingly WSD currently expects to be able

to formally retire these credits in April 2023. WSD will provide DCCEEW with evidence of the credit surrender within 20 business days of it occurring, as required by condition 7 of the EPBC Approval.

- The fact that the BSA was unable to be progressed in line with initial timeframes means that an update is required to the offset strategy currently approved by condition 4 of the EPBC Approval (copy **attached** for ease of reference) to compensate for the impacts to the Derived Native Grassland that are not covered by the NSW Development Consent.
- We are currently preparing, and will shortly provide for approval, an updated offset strategy for the impacts to the Derived Native Grassland which will, as expressly contemplated by condition 5 of the EPBC Approval, make provision for:
    1. the impacts of the action on Derived Native Grassland to be re-quantified after three years of operation, based on the results of monitoring data collected in accordance with a monitoring methodology and monitoring criteria set out in a Biodiversity Management Plan approved by the Minister; and
    2. the offset package to be adjusted based on the re-quantification of impacts, subject to further written approval from the Minister, if the monitoring data shows that the action has not adversely impacts on the overall condition and persistence of the Derived Native Grassland.

    Accordingly, the updated offset strategy will provide for the Derived Native Grassland offsets to be secured via either:

    1. credits generated under a BSA (in line with the current approved offset strategy but potentially over a smaller subset of the currently proposed site seeing the remaining credits required have already been separately secured); or
    2. direct credit purchase of these credits (using the NSW Biodiversity Offset Scheme) following re-quantification of the Project impacts after three years of operation.

Please refer to the further information in the annexure for further details.

We look forward to discussing the DCCEEW's thoughts on this matter. Please let us know a suitable time to meet and if you require any additional information prior to our discussion.

Yours sincerely,

Duncan Upton

Duncan Upton
Project Manager
0499 768 770

Background

Conditions 3 to 7 of the EPBC Approval set out the offset requirements for the Project and relevantly provide that:

3. *To compensate for impacts to protected matters, the approval holder must comply with Condition 13 of Schedule 3 of the NSW Development Consent to retire biodiversity credits of the specified number and class for the following vegetation communities that relate to the protected matters (Box Gum Grassy Woodland and Regent Honeyeater habitat):*

Vegetation community	***PCT***
White Box - Grey Gum - Kurrajong grassy woodland on slopes of the northern Capertee Valley, Sydney Basin Bioregion	*1303*
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	*281*
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	*1610*

4. *To compensate for impacts to the Derived Native Grassland that are not covered by the NSW Development Consent, the approval holder must, within 6 months of commencement of the action, submit an offset strategy for approval by the Minister. If approved, the offset strategy must be implemented.*

   The offset strategy must include details of:

   a. *The proposed offset package, including offset site(s) to compensate for the loss of up to 205.1 ha of Derived Native Grassland;*

   b. *Measures for the long term management and improvement of Box Grassy Gum Woodland on the offset site(s); the current quality of protected matters on the offset site, and time- bound completion criteria and performance targets.*

   c. *How the offset package either:*

      i. *Meets the requisite like-for-like ecosystem credit requirement, where the like- for-like ecosystem credits generated at the offset site are calculated using the BAM, and the number of like-for-like ecosystem credits required is calculated using Equation 1 of the BAM; or*

      ii. *Provides a suitable gain calculated using the EPBC offsets assessment guide.*

5. *The offset strategy may include provisions for:*

   a. *The impacts of the action on Derived Native Grassland to be re-quantified after three years of operation, based on the results of monitoring data. The monitoring data must be collected in accordance with a monitoring methodology and monitoring criteria set out in a Biodiversity Management Plan approved by the Minister.*

   b. *The offset package to be adjusted based on the re-quantification of impacts, subject to further written approval from the Minister, if the monitoring data shows that the action has not adversely impacts on the overall condition and persistence of the Derived Native Grassland.*

6. *The approval holder must comply with Condition 14 of Schedule 3 the NSW Development Consent, for the preparation and implementation of a Biodiversity Management Plan, as it relates to the avoidance and mitigation of impacts to protected matters.*

7. *Within 20 business days of completing the requirements of Condition 3, the approval holder must provide the Department with evidence of when and how the like-for-like ecosystem credits were retired.*

As noted by condition 3 of the EPBC Approval, the Project is also approved under the *Environmental Planning and Assessment 1979* (NSW) (**EP&A Act**) under State significant development consent SSD-9254 granted on 24 February 2020 (as modified), referred to in the EPBC Approval as the **NSW Development Consent**.

Condition 13 of Schedule 3 to the NSW Development Consent requires that, *'unless the Planning Secretary agrees otherwise in writing',* the credits described in Condition 3 of the EPBC Approval be retired *'prior to commencing development under this consent'* (**State Offset Condition**).

As previously discussed with DCCEEW in light of the unavoidable delays in securing a BSA over the proposed offset site (see below for further details):

- WSD was granted an extension under the State Offset Condition by the Secretary for Planning until 31 December 2021; and
- while no further formal extensions have been granted under the State Offset Condition, WSD has:
  1. formally notified the DPE of these delays and the consequent non-compliance with the timing requirements under the State Offset Condition as required by Condition 8 of Schedule 4 to the NSW Development Consent on 10 January 2022;
  2. continued to keep the DPE updated on its progress in complying with the State Offset Condition on an ongoing basis; and
  3. has now secured offsets required under the State Offset Condition prior to commencing construction of Stage 3B being the main solar farm for the following:

Table 1: *Ecosystem Credit Requirements*

Vegetation Community	*PCT ID*	*Credits Required*	*Secured?*
White Box - Grey Gum - Kurrajong grassy woodland on slopes of the northern Capertee Valley, Sydney Basin Bioregion	1303	479	Yes
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	281	242	*Yes*
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	1610	2	In Progress

Table 2: *Species Credit Requirements*

Species Credit Species	*Credits Required*	*Secured?*
Austfeld's Wattle (*Acacia ausfeldii*)	34	Yes
Bush Stone-curlew (*Burhinus grallarius*)	34	Yes
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	67	Yes
Large-eared Pied Bat (*Chalinolobus dwyeri*)	50	In Progress
Commersonia procumbens	2	Yes
Large-leafed Monotaxis (*Monotaxis macrophylla*)	34	Yes
Barking Owl (*Ninox connivens*)	16	Yes
Powerful Owl (*Ninox strenua*)	16	Yes
Squirrel Glider (*Petaurus norfolcensis*)	34	Yes
Brush-tailed Phascogale (*Phascogale tapoatafa*)	13	Yes
Koala (*Phascolarctos cinereus*)	34	In Progress
Masked Owl (*Tyto novaehollandiae*)	16	Yes

WSD recognises that these delays have also impacted on the timing of its compliance with condition 3 of the EPBC Approval (which incorporates the offset requirements under Condition 13 of Schedule 3 of the NSW Development Consent) and apologises for this issue.

Delays in Procuring Offsets Required under State Offset Condition

WSD originally intended to procure the State Offsets by way of a BSA over land immediately adjacent to the Project, referred to as the **Wollar Stewardship Site**. As outlined in earlier updates to DCCEEW, the proposed BSA was materially progressed including via completing:

- discussions with the holders of exploration license PEL456 which overlaps with the Wollar Stewardship Site to confirm that their operations would not impact on the Wollar Stewardship Site;
- detailed field investigations over the Wollar Stewardship Site, including seasonal surveys, during 2020 and 2021 to confirm the credits able to be generated from the site and their suitability to address the requirements of the EPBC Approval and the NSW Development Consent;
- a detailed:
  1. Biodiversity Stewardship Site Assessment Report;
  2. Management Plan; and
  3. calculations of the required Total Fund Deposit,

  were prepared in 2020-2021 to support an application for a BSA;
- negotiations with the owner of the Wollar Stewardship Site were progressed including preparing a detailed agreement to formalise arrangements for the BSA and subsequent transfer of the credits with the owner of the Wollar Stewardship Site; and
- the application for a BSA over the Wollar Stewardship Site was lodged with the NSW Biodiversity Conservation Trust (**BCT**) in December 2021.

However, as DCCEEW would be aware, the NSW Biodiversity Conservation Trust (**BCT**) imposes stringent requirements on the creation of a BSA. The BCT's assessment of the application for a BSA to be entered into in relation to the Wollar Stewardship Site caused significant delays for the following reasons:

- the BCT requested an inspection of the Wollar Stewardship Site in late March 2022;
- as a result of this site inspection, the BCT requested updates to each of the:
  1. Biodiversity Stewardship Site Assessment Report;
  2. Management Plan; and
  3. Total Fund Deposit calculations; and
- the BCT ultimately advised on 27/05/2022that it was not possible for managed grazing of the Wollar Stewardship Site to take place under any BSA Management Plan.

BCT's decision that it was not possible for managed grazing of the Wollar Stewardship Site to take place under any BSA Management Plan ultimately resulted in the decision being taken to secure the biodiversity credits required under Condition 13 of Schedule 3 to the NSW Development Consent by an alternative mechanism. This was required as:

- existing negotiated agreements which remained in effect require grazing to continue until 16 March 2024; and
- breaching this agreement would expose WSD to potential legal action.

Accordingly, to avoid any further delay and enable the biodiversity credits required under Condition 13 of Schedule 3 to the NSW Development Consent to be secured in advance of commencing the construction of Stage 3B, being the main solar farm, WSD elected to contract to purchase all credits required by Condition 13 of Schedule 3 of the NSW Development Consent directly from a third party. While this:

- is a less cost effective method of achieving compliance with the State Offset Condition than the proposed BSA; and
- does not address the Derived Native Grassland offsets required under condition 4 of the EPBC Approval,

BCT's position meant that it became the only available option to secure the offsets required under the State Offset Condition (compliance with which is also reflected in condition 3 of the EPBC Approval) in advance of construction of the main solar farm as part of Stage 3B.

Accordingly, WSD currently expects to be able to formally retire all credits required under the State Offset Condition and condition 3 of the EPBC Approval by the end of April 2023. WSD will provide DCCEEW with evidence of the credit surrender within 20 business days of it occurring as required by condition 7 of the EPBC Approval.

NGH notes that a number of its clients have experienced similar significant delays in being able to entering into BSAs owing to similar systemic issues. This is causing material issues for NSW projects where the Biodiversity Offsets Threshold under the BC Act is exceeded. As a result of these delays, in recent years NGH has regularly had to:

- as is the case for the Project, approach the DPE seeking extensions for compliance dates for offset conditions imposed by NSW planning approvals for a variety of projects; and
- on one occasion, been forced to seek Ministerial intervention for another NSW project.

Proposed Updates to the Offset Strategy For Derived Native Grassland Impacts under Condition 4 of the EPBC Approval

In consideration of the extensive delays in generating offsets under a BSA over the Wollar Stewardship Site, we are currently preparing, and will shortly provide for approval, an updated offset strategy for the impacts to the Derived Native Grassland which will, as expressly contemplated by condition 5 of the EPBC Approval, make provision for:

- the impacts of the action on Derived Native Grassland to be re-quantified after three years of operation, based on the results of monitoring data collected in accordance with a monitoring methodology and monitoring criteria set out in a Biodiversity Management Plan approved by the Minister; and
- the offset package to be adjusted based on the re-quantification of impacts, subject to further written approval from the Minister, if the monitoring data shows that the action has not adversely impacts on the overall condition and persistence of the Derived Native Grassland.

Accordingly, the updated offset strategy will provide for the Derived Native Grassland offsets to be secured via either:

- credits generated under a BSA over some or all of the Wollar Stewardship Site (noting that grazing will cease from 16 March 2024, enabling a BSA to be entered into which addresses BCT's requirements but the whole of the site may not be required given that the remaining credit requirements have now been separately secured) – see figure 2-1 below for details; or
- further credit purchases,

and retired following re-quantification of the Project impacts after three years of operation.

We look forward to discussing the DCCEEW's thoughts on this matter including:

- the proposed updated offset strategy updates to the offset strategy under condition 4 of the EPBC Approval; and
- the monitoring methodology and monitoring criteria to be included in the Biodiversity Management Plan to be approved by the Minister which will be utilised to determine re-quantification of the impacts of the action on Derived Native Grassland following three years of Project operation.

Resources

Excerpts from Wollar Solar Farm Offset Strategy V3.2

Credits generated by clearing: all stages 1-4

	BDAR v3 breakdown					
	BDAR Zone	PCT	Formation	Condition	Area	Credits generated from clearing (BDAR v 3) breakdown
NSW consent	1	1303	Woodland	High	16.82	478
	5	281	Woodland	High	7.99	238
	8	1610	Forest	Moderate	0.14	2
	Paddock trees	281	Trees	NA		4
	Paddock trees	1303	Trees	NA		1
Additional for CW consent	2	1303	Derived grassland	Moderate	102.70	131
	6	281	Derived grassland	moderate	102.73	524

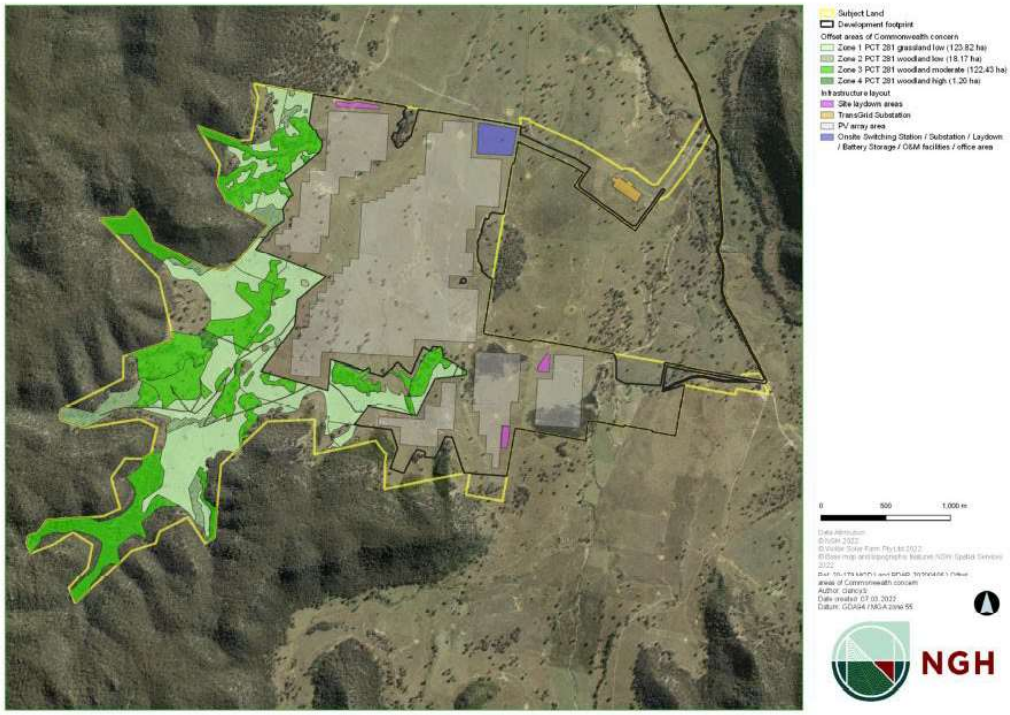


Figure 2-1 Offset areas generating Commonwealth offsets: zones 1-4.

Appendix D Commonwealth offset strategy v2 March 2020

26 March 2020

Katie Lowe
Dept. Agriculture, Water and Environment (DAWE)
Katie.lowe@environment.gov.au

CC Bruce Howard
Wollar Solar Farm Pty Ltd.

Dear Katie

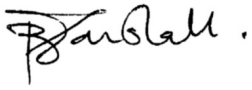
Re: Wollar Solar Farm: Commonwealth biodiversity offsets strategy v2

As discussed in our meeting of 20 March, 2020, with Dept. Agriculture, Water and Environment (DAWE), NGH have investigated the implications of using the NSW Biodiversity Assessment Methodology (BAM) to determine and secure offsets for Commonwealth matters namely, Box Gum Woodland Critically Endangered Ecological Community (CEEC; treed and derived grassland forms; Zones 1, 2, 5, 6 and 8 as documented in the Biodiversity Development Assessment Report; BDAR v2; NGH 2019). The investigation (NGH letter report, dated 17 March 2020), undertaken for Wollar Solar Farm Pty Ltd, was provided prior to DAWE for the meeting.

NGH now propose an offset strategy that could be conditioned to meet the Commonwealth EPBC offset requirements and so that the project aligns as much as possible with the NSW approval, while not providing unwarranted additional costs to the project. Please find below a strategy for:

1. Zones proposed to offset using the NSW Biodiversity Offset Scheme (BOS) in its entirety, to satisfy Commonwealth requirements.
2. Zones proposed to calculate offsets in accordance with the NSW BAM to meet Commonwealth requirements, but be secured in an alternative format.
3. Consideration of proposed project and offset staging.
4. Consideration of credit 'discounts' for shading impacts, where merited.
5. Proposed condition wording, for consideration by DAWE.

If you have any questions, please contact me on (02) 6492 8303. I would be pleased to discuss this project with you further. Yours sincerely,



Brooke Marshall | Manager, NSW SE & ACT
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ZONES 1 AND 5

Zones 1 and 5 require offsets under both NSW and Commonwealth legislation. NGH believe offsets calculated and secured using the NSW BOS are appropriate for these zones as follows:

1. Using the NSW BAM to demonstrate sufficient credits can be found at an offset site.
2. Assessment and establishment of formal stewardship sites for these areas, to be administered by NSW Biodiversity Conservation Trust (BCT).

Zone ID	PCT	Vegetation Type and Condition	Offset Trading Group under the NSW BOS	**Credits**
1	1303	Woodland (moderate)	White Box Yellow Box Blakely's Red Gum Woodland	468
5	281	Woodland (moderate)	White Box Yellow Box Blakely's Red Gum Woodland	238

ZONES 2 AND 6

Zones 2 and 6 do not generate credits under the NSW BOS due to their vegetation integrity scores being below 15. Floristic plots undertaken in these zones show not all areas within these zones meet the Commonwealth criteria (refer to previous letter of advice). Accepting some variation is expected within zones, as the intention is to offset Commonwealth listed vegetation , NGH proposes:

1. Refining these zone boundaries based specifically on the CEEC criteria, using existing plot data and further site inspection, were warranted. This would reduce the area of these zones, excluding areas that are not Commonwealth listed. Credits for the updated zones would be determined using Equation 1 of the BAM operational manual [1].
2. Using the BAM (Stewardship site assessment) calculator to demonstrate sufficient credits can be found at an offset site. It is noted that the NSW method allows more flexibility in site selection as well as the ability to generate more offset site credits per ha from active management commitments, reducing the size of the offset site required.
3. As these zones do not generate credits under the NSW BOS, calculation of Total Fund Deposits for these areas and administration by Biodiversity Conservation Trust (BCT) of a formal biodiversity stewardship site is not proposed. NGH would use the same management plan templates used for the NSW BOS stewardship sites and ensure adequate protection in perpetuity through a NSW Conservation Agreement. The agreement can be stipulated to be in perpetuity. The active management requirements would be funded by WSF.

[1] This must be done manually as the BAM calculator (Development site) does not show credits for zones with Vegetation integrity scores below 15 for vegetation associated with Threatened Ecological Communities.

Zone ID	PCT	Vegetation Type and Condition	Offset Trading Group under the NSW BOS	Credits	Comments
2	1303	Derived grassland (moderate)	White Box Yellow Box Blakely's Red Gum Woodland	481	4 of the 6 plots do not meet CEEC criteria
6	281	Derived grassland (moderate to low)	White Box Yellow Box Blakely's Red Gum Woodland	612	1 of the 6 plots do not meet the CEEC criteria

STAGING MODEL

The Wollar Solar Farm is likely to be developed in stages. For example:

1. Upgrade of Barrigan Road.
2. Solar Farm development site and main site access (maybe separated into two stages).
3. South access road construction, if required.

The Wollar Solar Farm is proposed to be developed in three stages. The southern access route (Stage 3) may never be developed; it was included in the assessment to provide certainty of access given the tenure arrangements for the preferred northern access road were still under negotiation. As such, it is proposed that offsets could also occur sequentially, in accordance with the project's stages. The dates for these stages cannot be predicted reliably at this time.

Table **Error! No text of specified style in document.**-1 details proposed offsets that would be secured to account for credits associated with each stage. Note, percentages are indicative and would be calculated specifically for the approval but demonstrate the implications for the project of funding the solar farm and southern access offsets, in advance of the development commencing and biodiversity impacts occurring.

Table **Error! No text of specified style in document.**-1 Credits associated with proposed development stages

Stage	Zone	Proportional of zone in this stage	Credits generated
1			**109**
	Zone 1	0%	0
	Zone 2	0%	0
	Zone 5	20%	48
	Zone 6	10%	61
2			**1534**
	Zone 1	90%	420
	Zone 2	100%	481

Stage	Zone	Proportional of zone in this stage	Credits generated
	Zone 5	60%	143
	Zone 6	80%	490
3			**157**
	Zone 1	10%	48
	Zone 2	0%	0
	Zone 5	20%	48
	Zone 6	10%	61

SHADING DISCOUNTS

It is acknowledged that there is uncertainty surrounding shading impacts of solar farms in Australia. The biodiversity assessment for the project notes that shading may not impact adversely on the overall condition and persistence of grassland vegetation. The Wollar Solar Farm commits to extensive operational ground cover management and monitoring and as such, it is proposed to link the offset requirements to the results of this monitoring using shading discounts.

This has been undertaken successfully in NSW for the Darlington Point Solar Farm whereby, 50% of the grassland impacts were only required to be offset if strict monitoring criteria were not met after 2 years of management. This provides appropriate incentives for the project to manage proactively and better reflects the level of impact actually generated by shading, in comparison to 100% vegetation removal.

It is proposed that, for offsetting of derived grasslands in Stage 2 - Wollar Solar Farm development, 50% of credits (Zone 2 - 240.5 credits and Zone 6 - 245 credits) be offset prior to construction of this stage and 50% of credits (Zone 2 - 240.5 credits and Zone 6 - 245 credits) required to be offset if monitoring criteria are not met after 2 years of operational monitoring. The Biodiversity Management Plan for the project will set out these criteria and govern implementation.

PROPOSED CONDITIONS

NGH proposes the following offset condition wording for DAWE's consideration, to align as much as possible with the NSW approval, while not providing unwarranted additional costs to this significant renewable energy project.

- *Require the proponent to meet the offset obligations as set out in NSW CoC [insert condition reference]*
- *Additionally, prepare and implement an offset strategy that demonstrates:*
    - *areas that meet CEEC criteria <u>but are not</u> captured by the NSW offsets, will be;*

        - *quantified in terms of NSW BAM credits, using equation 1 of the BAM* [2]
        - *secured in an offset site(s) that generate the requisite credits, using the BAM* [3]
        - *managed in accordance with a management plan to ensure that assumptions made in the BAM calculation of credits are converted to auditable actions.*
    - *the offset will be secured via an in perpetuity NSW Conservation Agreement attached to the land title.*
    - *a staging plan, as it relates to CEEC offsets, if impacts from the development are staged.*
    - *sufficient evidence of expected under-panel shading impacts, to warrant a 50% discount for derived native grassland areas, should monitoring criteria, as set out in an operational Biodiversity Management Plan, be met after 2 years of operational monitoring.*

[2] This must be done manually as the BAM calculator (Development site) does not show credits for these zones.
[3] This can be done using the BAM calculator (Stewardship site) as this allows for degraded areas and rewards active management, as is proposed.

Appendix E Commonwealth offset strategy addendum April 2021

8 April 2021

Emily Wheatley
Dept. Agriculture, Water and Environment (DAWE)
Emily.Wheatley@awe.gov.au

CC Tim Mead
Beijing Jingneng Clean Energy (Australia)

Dear Emily

Re: Wollar Solar Farm: Commonwealth biodiversity offset strategy addendum V1

Thank you for meeting to discuss our progress in satisfying the Commonwealth conditions of consent relating to offsets for this project.

Commonwealth approval of the Wollar Solar Farm was received on 6 July 2020. The approval requires offsets for specific Matters of National Environmental Significance, including the preparation of an offset strategy to be submitted within 6 months of commencement of the action. An offset strategy was provided prior to consent (26 March 2020, Version 2) and will be updated to explicitly address the Commonwealth conditions of consent.

This letter report provides the results of recent field investigations which updates the areas of Derived Native Grassland (Zones 2 and 6) meeting the criteria for CEEC BGW and that requires offsets under existing Commonwealth Conditions of Consent. March 2021 field work aimed to more accurately delineate areas of CEEC. No changes to the project's impact areas are proposed, but based on the new field plot data, a reduced impact on MNES is now verified. As the delineation of Derived Native Grassland previously overestimated areas that met the Commonwealth Box Gum Woodland status, this document justifies, through further survey, that reduced impacts and therefore reduced offsets are required for these Zones.

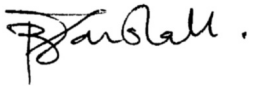
As per our existing offset strategy, the project still proposes to:

> Comply with Condition 13 of Schedule 3 of the NSW Development Consent to retire biodiversity credits of the specified number and class for the following vegetation communities that relate to the protected matters (Box Gum Grassy Woodland and Regent Honeyeater habitat). This meets Condition 3 of 'EPBC 2018/8258'. These equate to Zones 1 and 5 in the project's biodiversity assessment, approved as NSW Major Project https://www.planningportal.nsw.gov.au/major-projects/project/39801.
>
> Additionally, retire credits that relate to Derived Native Grassland (Zones 2 and 6) which are proposed to be offset in accordance with NSW BAM equation 1, as stipulated in Condition 4ci of 'EPBC 2018/8258'. This document now specifies the credits that relate to these areas, using the results of further field work undertaken in 2021.

A Stewardship site investigation is currently underway and will demonstrate that credits generated for Commonwealth MNES will be met and retired at the site.

If you have any questions, please contact me on (02) 6492 8303. I would be pleased to discuss this project with you further.

Yours sincerely,



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1 ZONES 2 AND 6

1.1 Background

Zones 2 and 6 (Derived Native Grassland) do not generate credits under the NSW Biodiversity Offset Scheme due to their vegetation integrity scores being below 15. However, some of Zone 2 and Zone 6 areas met the Commonwealth criteria for BGW CEEC. The offset strategy submitted (Version 2) indicated not all areas of Zones 2 and 6 were CEEC Box Gum Woodland under EPBC.

Extracted from Offset Strategy v2:

Zone ID	PCT	Vegetation Type and Condition	Offset Trading Group under the NSW BOS	Credits	Comments
2	1303	Derived grassland (moderate)	White Box Yellow Box Blakely's Red Gum Woodland	481	4 of the 6 plots do not meet CEEC criteria
6	281	Derived grassland (moderate to low)	White Box Yellow Box Blakely's Red Gum Woodland	612	1 of the 6 plots do not meet the CEEC criteria

As a precautionary measure, delineation of CEEC was done assuming all of Zone 2 and Zone 6 met CEEC criteria. CEEC delineation was reported in the project's biodiversity assessment, approved as NSW Major Project https://www.planningportal.nsw.gov.au/major-projects/project/39801. However as per the Offset Strategy V2 further investigation and site assessment of the Wollar Solar Farm development footprint was proposed to clarify which areas inside Zones 2 and 6 would meet the CEEC criteria, and hence require offsetting under the Commonwealth. The methods of the updated CEEC delineation and results are shown below.

1.2 Methodology

A site survey was conducted on the 3rd and 4th of March 2021 to verify which areas within vegetation Zones 2 and 6 would meet the criteria for CEEC BGW and thus generate credits under the EPBC Act. This timing is appropriate for Box Gum Woodland surveys as per EPBC policy statement (https://www.environment.gov.au/system/files/resources/be2ff840-7e59-48b0-9eb5-4ad003d01481/files/box-gum.pdf .Only the solar farm vegetation was investigated. It is noted that Zone 2 and 6 vegetation also occurs on the access track to the site in very small areas.

A total of six additional botanical plots were undertaken to collect plant composition and structure data over an area of 0.1 ha in a 20 x 50m Plot. This allowed for accurate species cover and count data collected within the minimum patch size condition thresholds as per the EPBC policy statement.

Plots collected were analysed in relation to the Commonwealth Box Gum Woodland status and areas that did not meet the criteria were excluded based on the existing plot data that confirmed areas of CEEC reported in the Biodiversity Assessment, with new plots conducted in areas that were thought not to meet the CEEC criteria based on data collected for the Biodiversity Assessment.

Following data analysis of each of the 6 new plots against the criteria for EPBC listed Box Gum Woodland, a revised area for Zone 2 and Zone 6 was mapped. Equation 1 from BAM 2020 was then applied to the adjusted areas to recalculate Commonwealth offsets (Figure 1-1) for Derived Native Grasslands meeting CEEC criteria for Zone 2 and Zone 6.

Figure 1-1 *Equation 1 taken from BAM 2020:*

Equation 1 **Determine the number of ecosystem credits required for the impact on vegetation that is a TEC, contains threatened species habitat, or is any other PCT**

$$\text{Ecosystem credits required for each vegetation zone} = \sum_{i=1}^{n} (\Delta\text{VI Loss} \times BRW \times area) \times 0.25$$

where:

i = the i^{th} vegetation zone on land directly impacted by the proposal

ΔVI Loss = the change (loss) in the vegetation integrity score of a vegetation zone at the development site as determined by Equation 27

BRW = means the biodiversity risk weighting applied to the vegetation zone. The biodiversity risk weighting for a TEC or a PCT containing threatened species habitat is based on the sensitivity to loss class of the TEC/PCT and the highest sensitivity to gain class of the predicted threatened species. For a PCT or TEC not associated with threatened species habitat, the sensitivity to loss class for the PCT or TEC is used with the low sensitivity gain class

area = the area in hectares of the vegetation zone

1.3 Results

Of the six additional plots collected, only one plot met the Commonwealth criteria for CEEC BGW Derived Grassland. This was Plot 4 and as such the polygons representing Zones 2 and 6 were modified to better reflect the areas meeting the CEEC Box Gum Woodland.

Table 1-1 below compares original vegetation Zone areas from the latest Biodiversity Development Assessment Report (BDAR Ver 3.1) to adjusted areas following recent site assessment for Zones 2 and 6. These “confirmed Commonwealth CEEC areas” shown in Table 1-1 were used to generate credits for CEEC BGW using Equation 1 from the BAM, as shown in Table 1-2.

Table 1-1 Updated areas for vegetation Zones 2 & 6 confirmed to require offsets under the EPBC Act

Vegetation Zone (BDAR Ver 3.1)	Vegetation Zone areas (BDAR Ver 3.1)	Confirmed Commonwealth CEEC Area (ha) March 2021
2	102.3	27.8
6	102.8	92.7

Table 1-2 Adjusted BGW Derived Grassland Credits required under the Commonwealth

Zone ID	PCT	Updated area of Zone	Vegetation Type and Condition	Previous credit requirement (Offset Strategy v2)	Adjusted Credits	Comments
2	1303	27.8	Derived grassland (moderate)	481	131[1]	2 of 3 additional 20 x 50m plots inside Zone 2 do not meet CEEC criteria for this Zone meaning a reduction in Zone 2 area
6	281	92.7	Derived grassland (moderate to low)	612	524 [2]	3 of 3 additional 20 x 50m plots do not meet CEEC criteria for Zone 6 meaning a reduction in Zone 6 area

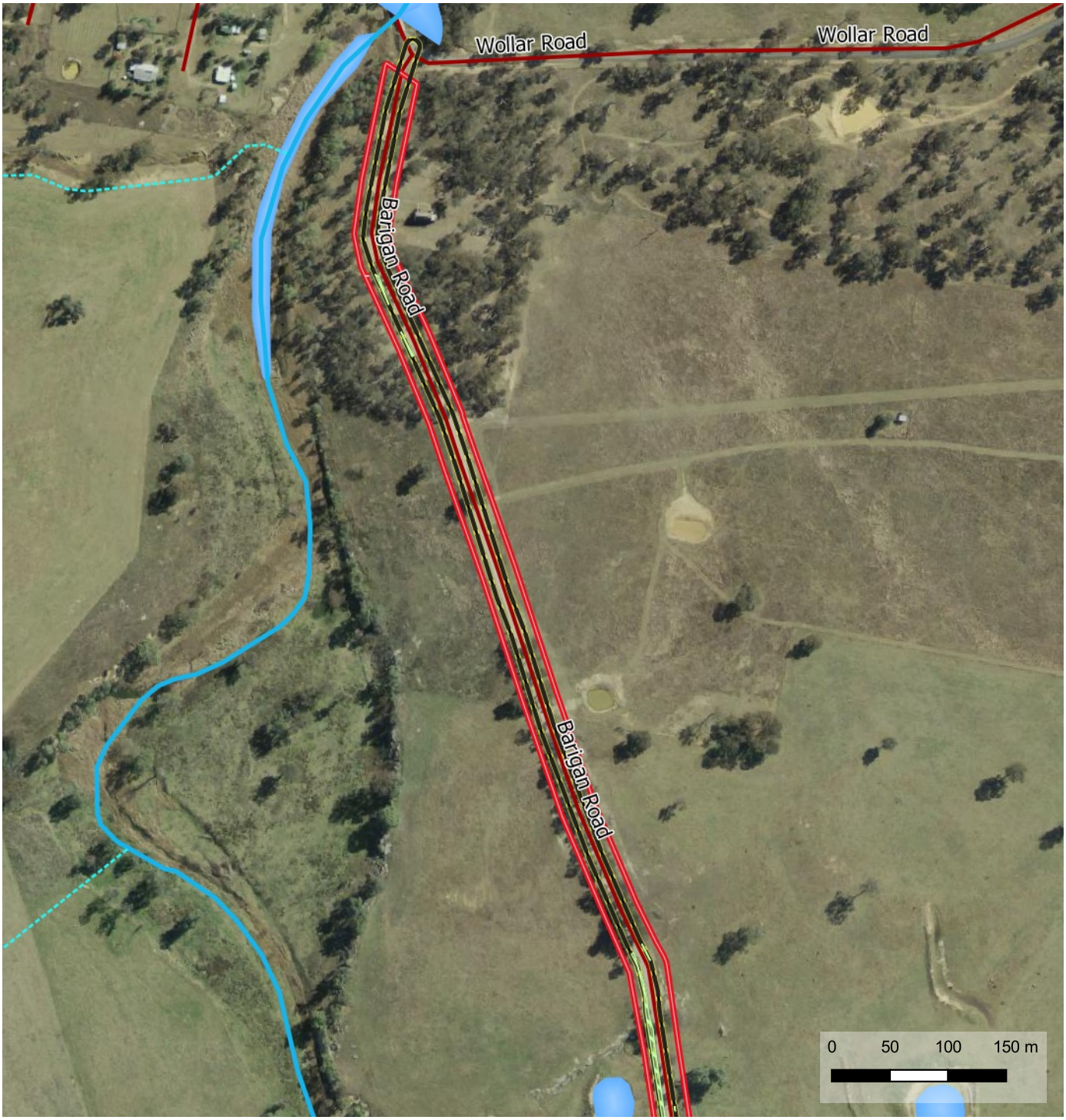
[1] Sum of Zone 2 plots (9.4 x 2 x 27.8) x 0.25 = 131 Commonwealth Ecosystem credits
[2] Sum of Zone 6 plots (11.3 x 2 x 92.7) x 0.25 = 524 Commonwealth Ecosystem credits

1.4 Conclusion and way forward

1. NGH have now reduced areas of vegetation Zones 2 and 6 within the proposed solar farm site based specifically on the CEEC criteria, using existing and new plot data from a suitably timed floristic survey. A map reflecting the latest areas confirmed as CEEC BGW Derived Grassland is presented in Attachment 1. Both vegetation Zones 2 and 6 are now smaller to omit those areas which do not meet BGW CEEC criteria.
2. Credits for the updated impact areas of Zones 2 and 6 have been revised using Equation 1 of the BAM operational manual to update the credits required to be retired in each zone.
3. A Stewardship site investigation is currently underway and will demonstrate that credits generated for Commonwealth MNES will be met and retired at the site. The assessment is expected to be completed in April 2021 and current results show that sufficient credits are generated within the proposed stewardship site for MNES. It is noted that, as allowed under the BAM, more offset site credits per ha will result from active management commitments, reducing the size of the offset site required.
4. An offset strategy to address the Commonwealth conditions of consent explicitly is currently being prepared.

Attachments

1. Map set showing changes in Box Gum Woodland CEEC mapped within development site (note changes made only to the solar farm site, not any access track work offsite).
2. Plot data from March 2021 field surveys.



Map EPBC CEEC vegetation zones
Map 1 of 9

- Development site
- Subject land
- Development footprint
- Roads
- Farm dam/ other water body

Waterway
- Perennial
- Non perennial

Updated Vegetation zones with EPBC CEEC
- EPBC CEEC Classified: Zone 6: PCT281: Derived

Ref: 20-179 MOD1 and BDAR 20200406 \ 20-423 Vegetation zones EPBC CEEC road alignment
Author: clancy.b
Date created: 08.04.2021
Datum: GDA94 / MGA zone 55

NGH

Map EPBC CEEC vegetation zones
Map 2 of 9

- Development site
- Subject land
- Development footprint
- Roads
- Farm dam/ other water body

Waterway

- Perennial

Updated Vegetation zones with EPBC CEEC

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Ref: 20-179 MOD1 and BDAR 20200406 \ 20-423 Vegetation zones EPBC CEEC road alignment
Author: clancy.b
Date created: 08.04.2021
Datum: GDA94 / MGA zone 55

NGH

Map EPBC CEEC vegetation zones
Map 3 of 9

- Development site
- Subject land
- Development footprint
- Roads
- Farm dam/ other water body

Waterway
- Perennial
- Non perennial

Updated Vegetation zones with EPBC CEEC
- EPBC CEEC Classified: Zone 6: PCT281: Derived

Ref: 20-179 MOD1 and BDAR 20200406 \ 20-423 Vegetation zones EPBC CEEC road alignment
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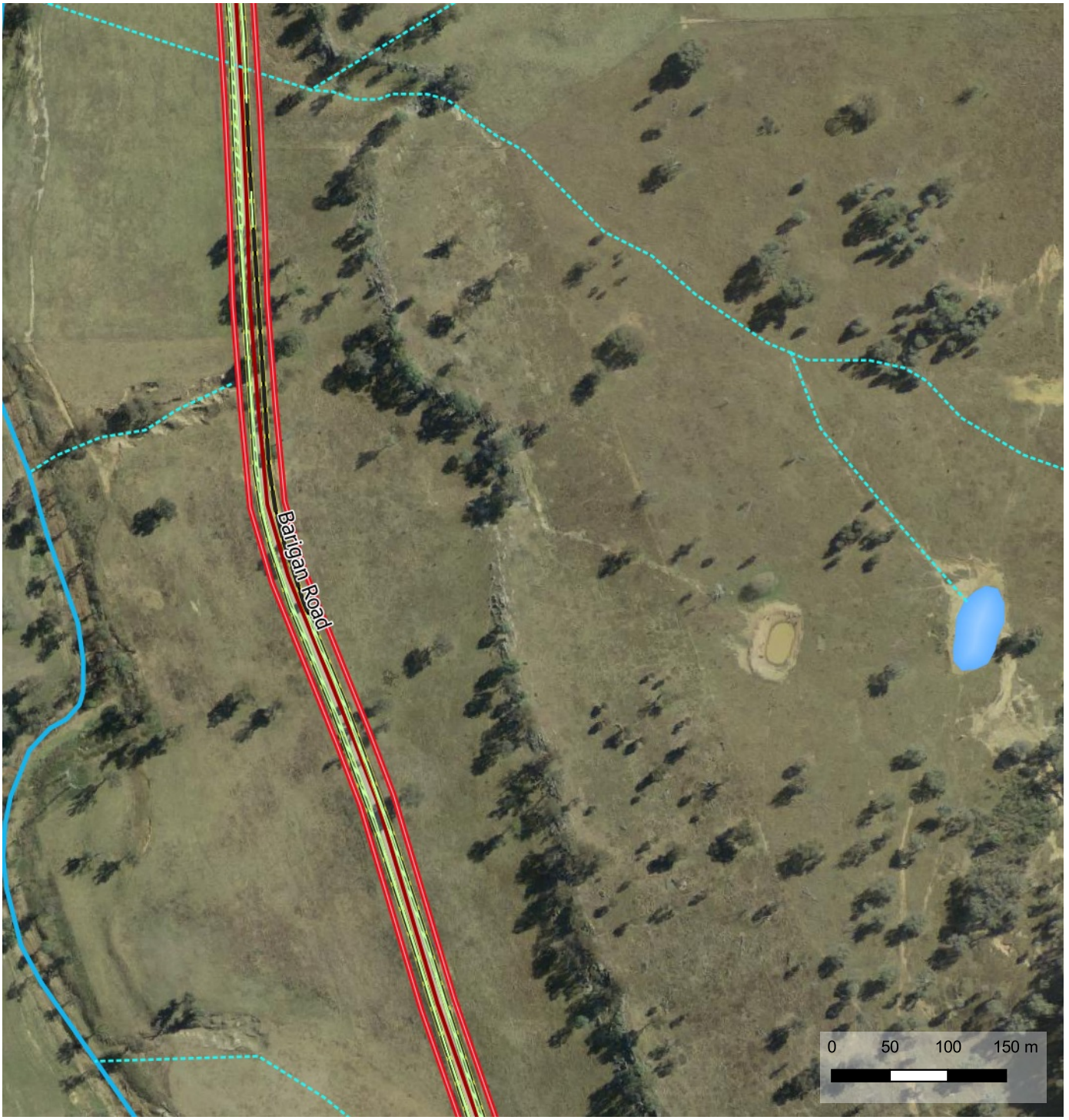

Map EPBC CEEC vegetation zones
Map 4 of 9

- Development site
- Subject land
- Development footprint
- Roads
- Farm dam/ other water body

Waterway
- Perennial
- Non perennial

Updated Vegetation zones with EPBC CEEC
- EPBC CEEC Classified: Zone 6: PCT281: Derived

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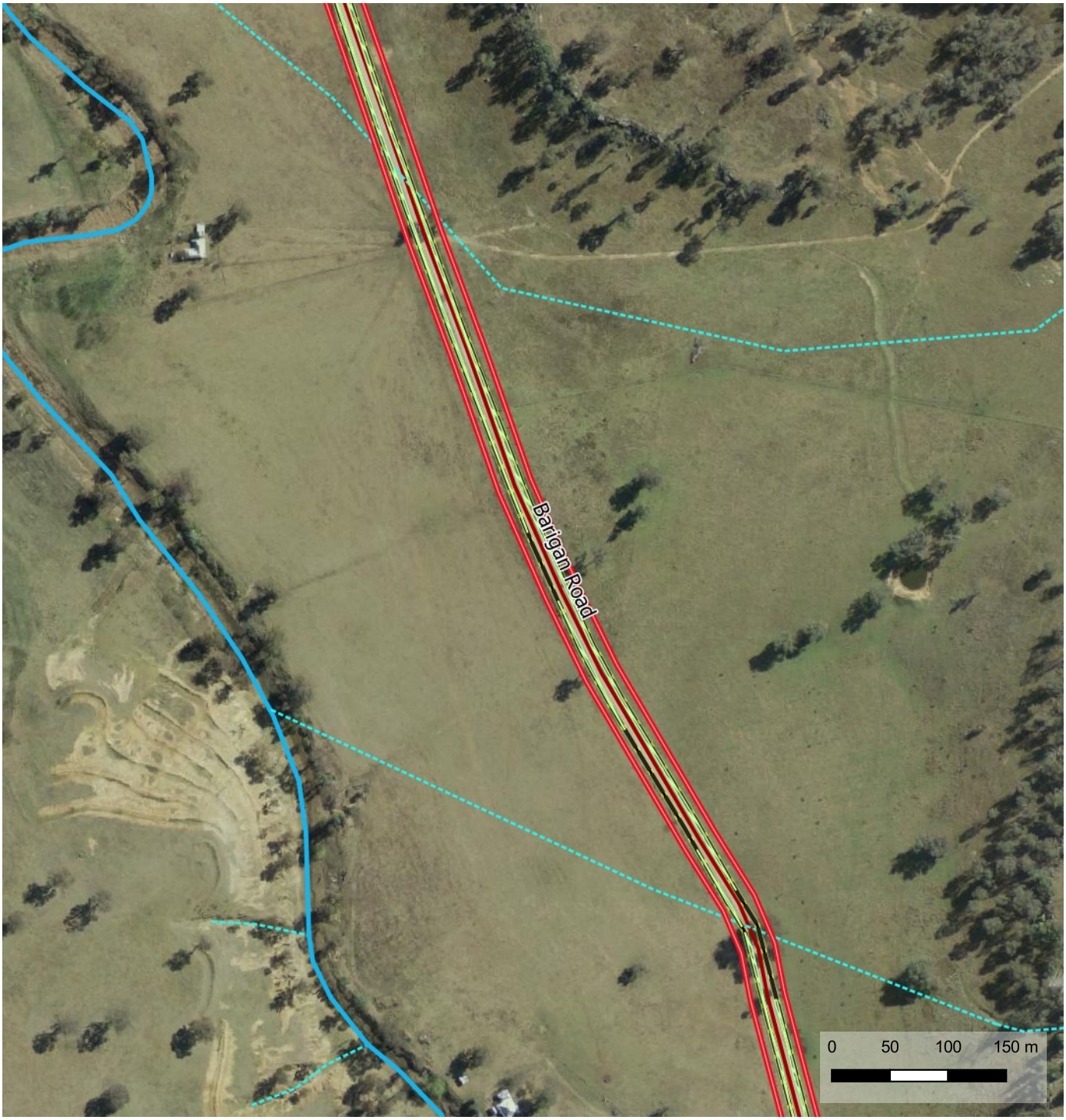

Map EPBC CEEC vegetation zones
Map 5 of 9

- Development site
- Subject land
- Development footprint
- Roads

Waterway
- Perennial
- Non perennial

Updated Vegetation zones with EPBC CEEC
- EPBC CEEC Classified: Zone 6: PCT281: Derived

Ref: 20-179 MOD1 and BDAR 20200406 \ 20-423 Vegetation zones EPBC CEEC road alignment
Author: clancy.b
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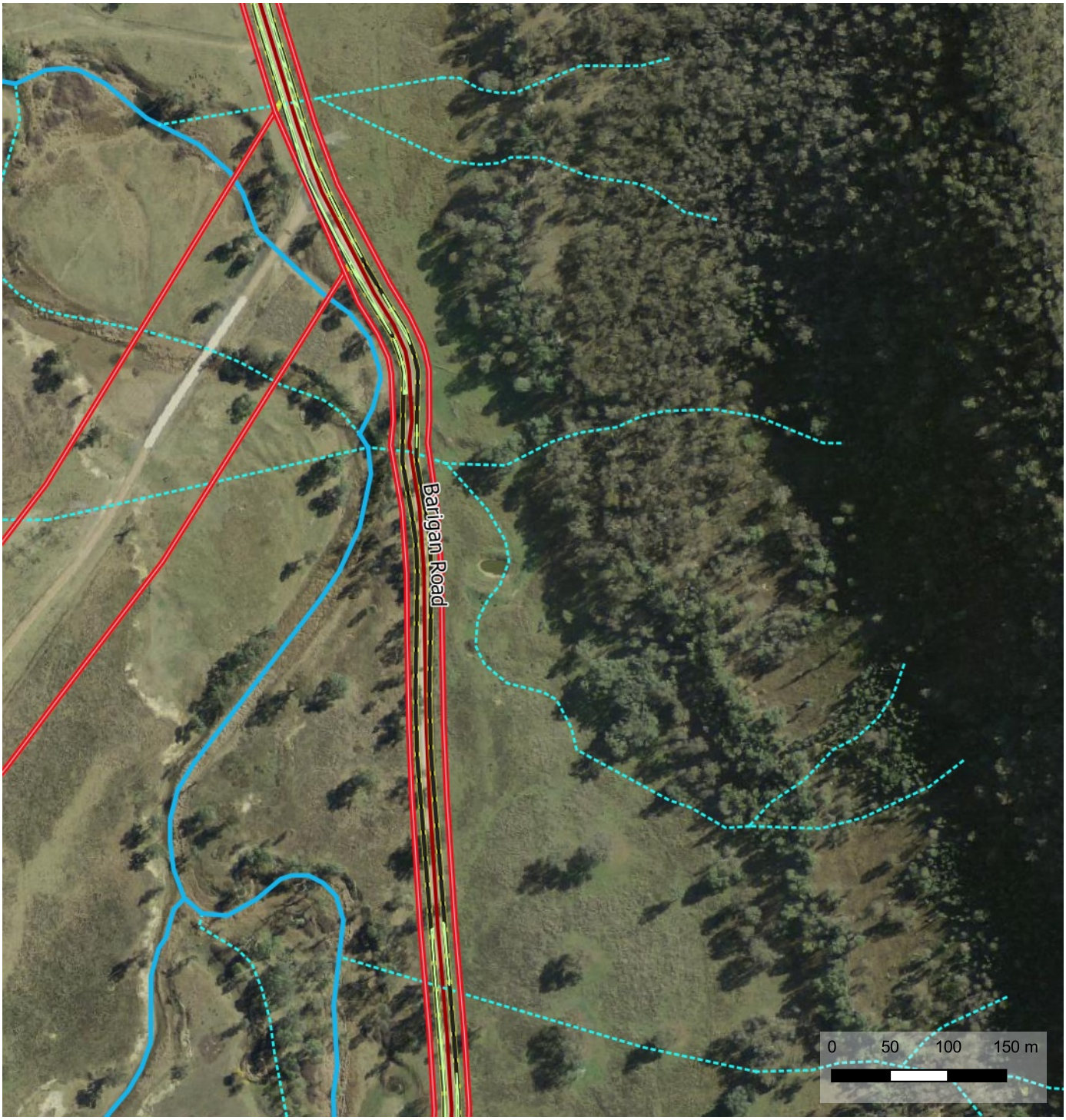

Map EPBC CEEC vegetation zones
Map 6 of 9

- Development site
- Subject land
- Development footprint
- Roads

Waterway
- Perennial
- Non perennial

Updated Vegetation zones with EPBC CEEC
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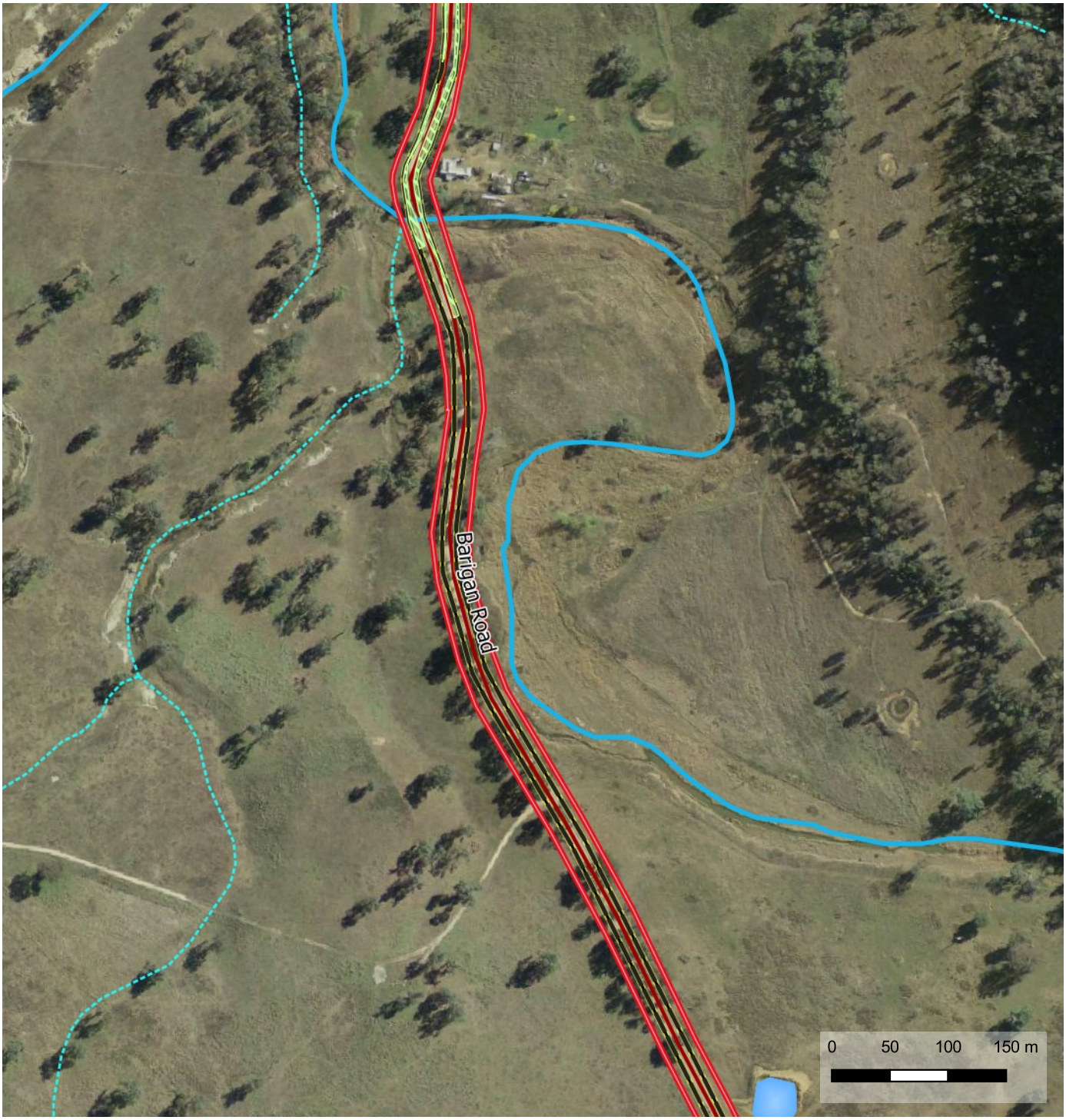

Map EPBC CEEC vegetation zones
Map 7 of 9

- Development site
- Subject land
- Development footprint
- Roads
- Farm dam/ other water body

Waterway
- Perennial
- Non perennial

Updated Vegetation zones with EPBC CEEC
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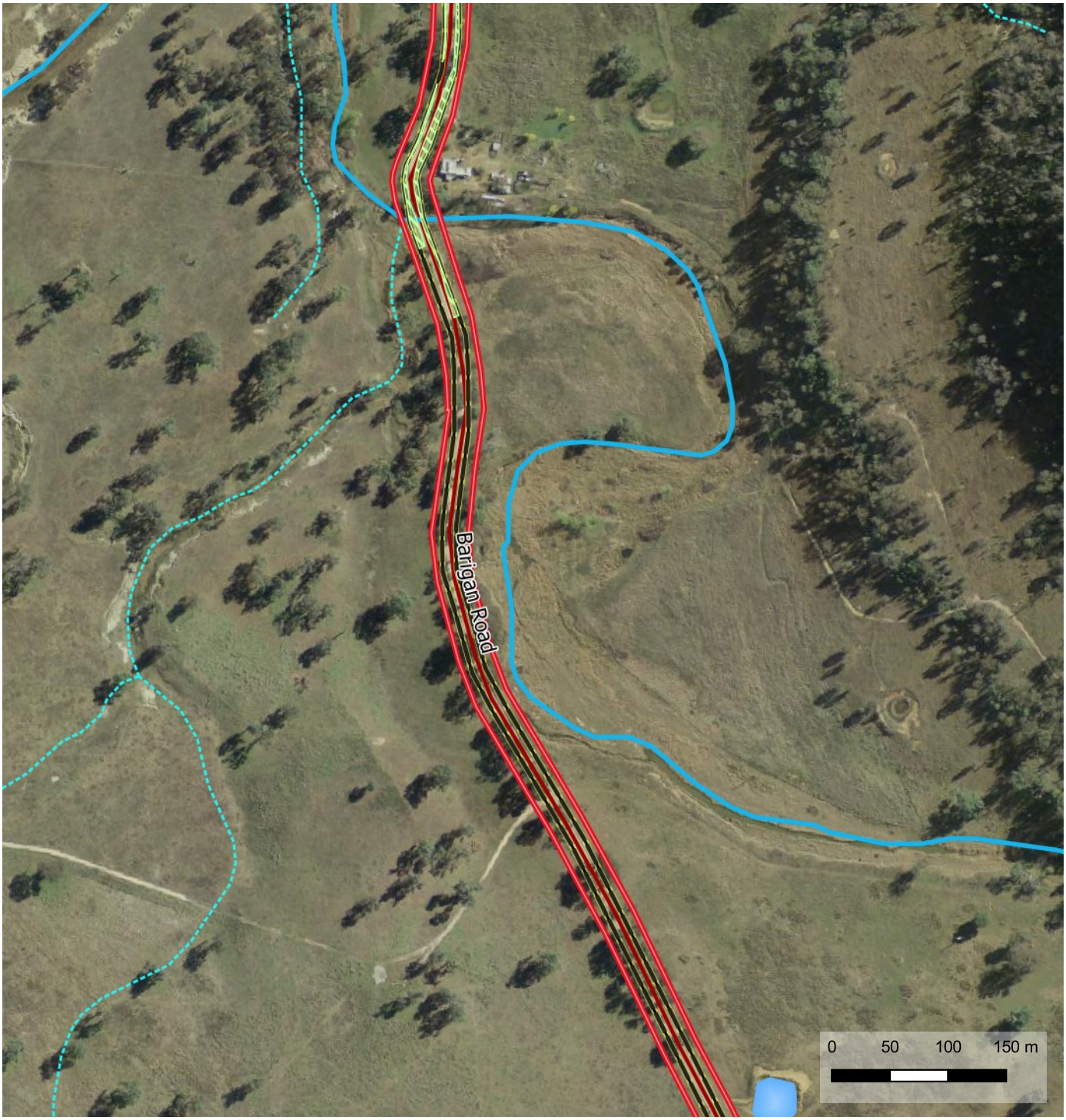

Map EPBC CEEC vegetation zones
Map 8 of 9

- Development site
- Subject land
- Development footprint
- Roads
- Farm dam/ other water body

Waterway
- Perennial
- Non perennial

Updated Vegetation zones with EPBC CEEC
- EPBC CEEC Classified: Zone 6: PCT281: Derived

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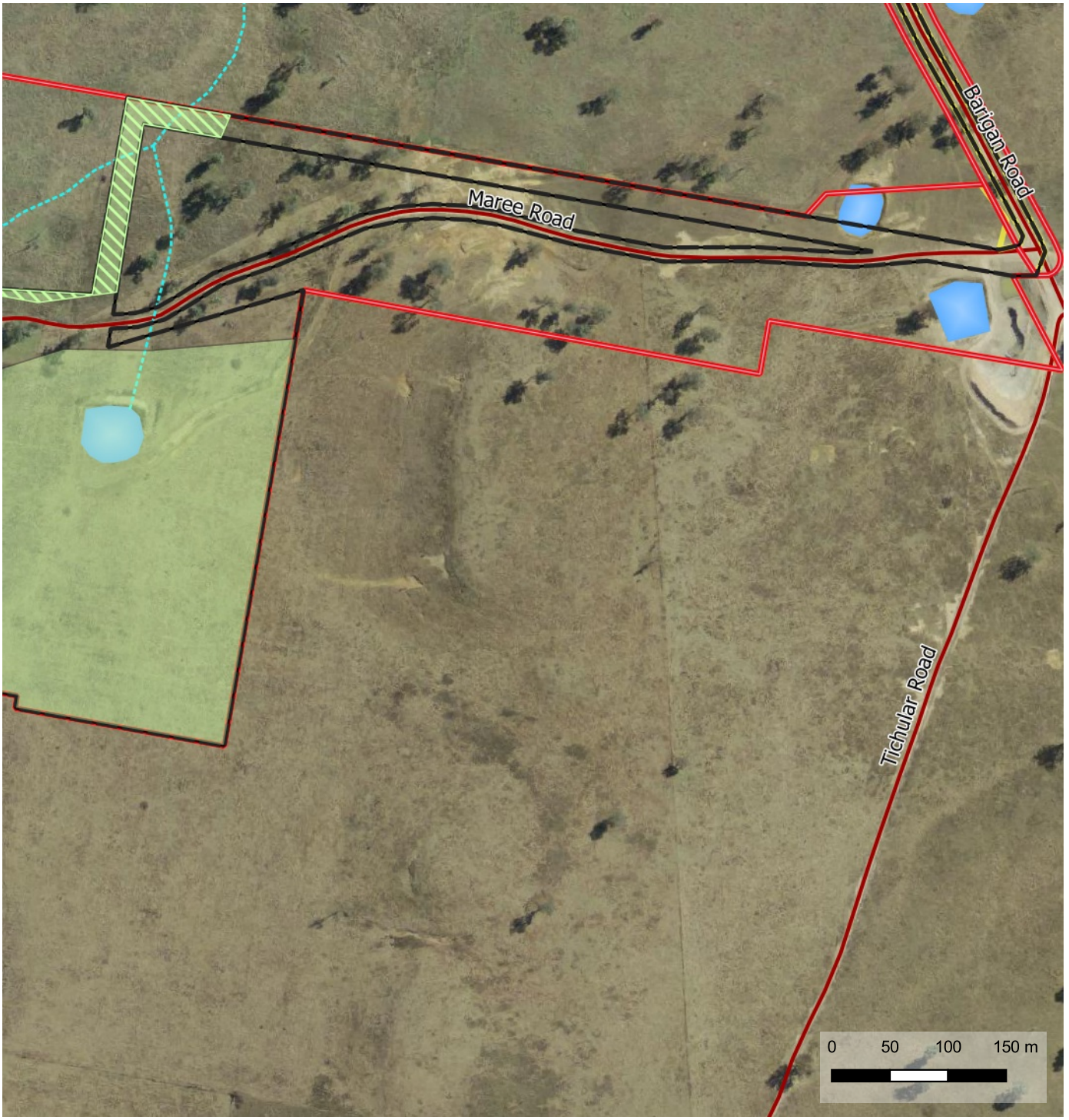


Map EPBC CEEC vegetation zones
Map 9 of 9

- Development site
- Subject land
- Development footprint
- Roads
- Farm dam/ other water body

Waterway

- Non perennial

Updated Vegetation zones with EPBC CEEC

- EPBC CEEC Classified: Zone 6: PCT281: Derived

Ref: 20-179 MOD1 and BDAR 20200406 \ 20-423 Vegetation zones EPBC CEEC road alignment
Author: clancy.b
Date created: 08.04.2021
Datum: GDA94 / MGA zone 55

NGH

Legend

- Development site
- Development footprint

Updated Vegetation zones with EPBC CEEC

- EPBC CEEC Classified: Zone 2: PCT 1303: Derived
- EPBC CEEC Classified: Zone 6: PCT281: Derived

Previous vegetation zones with EPBC CEEC

- EPBC Classified: Zone 2: PCT 1303: Derived
- EPBC Classified: Zone 6: PCT281: Derived
- Roads
- Farm dam/other water body

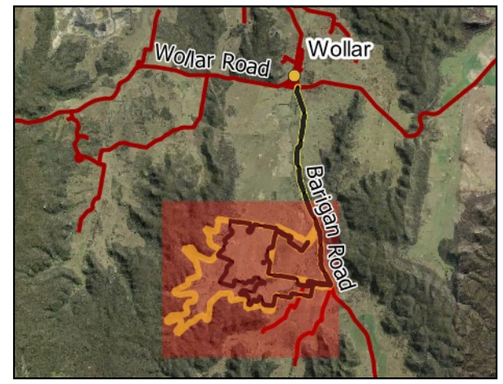
Waterway

- Perennial
- Non perennial

Barigan Road

Maree Road

Tichular Road



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Ref: 20-179 MOD1 and BDAR 20200406 \ 20-423
Vegetation zones EPBC CEEC
Author: clancy.b
Date created: 08.04.2021
Datum: GDA94 / MGA zone 55

NGH

BAM Site Field Survey								
Project:	20 179 wollar ceec	**Plot Identifier**	plot 2	**Pic 20x20**	9729	**Pic 20x50**		
Survey date:	4th march 21		**Compass Orientation (head of 20x20 plot)**				180	
Recorders	GYoung		**PCT:**					
GPS Easting	776157	**GPS Northing**	6409277		**Datum**	gda	**Zone**	55
Landform			**Soils**			**Drainage & Slope**		
Morphology	lower valley slope		**Soil Texture**	clay		**Slope**	3 degrees	
LandF Element			**Soil Colour**	orange		**Aspect**	329	**nw**
LandF Pattern			**Soil Depth**			**Drainage**	well drained	
Microrelief			**Geology**	sandstone		**Watercourses**	100m west	

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing	3	o	
Cultivation	3	o	
Soil erosion	0		
Firewood	0		
Grazing	2	r	cattle
Fire Damage	0		
Storm Damage	0		
Weediness	2		saffron
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

cattle grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees inside plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

feral pigs observed

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Swainsona unable to ID to species

Dominant Species outside Plot	**E microcarpa**

FUNCTION

Function attributes for	plot 2

BAM Attribute (20x20m plot)

	Stratum	Sum
	Tree (TG)	**0**
	Shrub (SG)	**0**
	Forb (FG)	**10**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	2%		9730
	15m	1%		9731
	25m	0%	**1.8%**	9732

Count of Native Richness	Grass & grasslike (GG)	9
	Fern (EG)	1
	Other (OG)	2
	TOTAL	22

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.1
	Grass & grasslike (GG)	61.2
	Fern (EG)	0.1
	Other (OG)	0.4
	TOTAL Native	62.8
	TOTAL 'HTE'	25.2

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

no trees no timber

ceec plot 20x50m floristics

	35m	1%		9733
	45m	5%		9734
Bare ground cover	5m	0%		
	15m	3%		
	25m	0%	1.0%	
	35m	2%		
	45m	0%		
Cryptogam cover	5m	0%		
	15m	0%		
	25m	0%	0.0%	
	35m	0%		
	45m	0%		
Rock Cover	5m	0%		
	15m	0%		
	25m	0%	0.0%	
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for plot 2

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
conv angu	*Convolvulus angustissim*		Convolvulacea	0.1	30		Other (OG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.3	500		Other (OG)	No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	0.2	200		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	25	5000		Grass & grasslike (GG)	No	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	25	5000		Grass & grasslike (GG)	No	
digi brow	*Digitaria brownii*	Cotton Panic Grass	Poaceae	0.1	30		Grass & grasslike (GG)	No	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.1	15		Grass & grasslike (GG)	No	

erag alve	*Eragrostis alveiformis*		Poaceae	0.2	150		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.5	500		Grass & grasslike (GG)	No	
pasp vagi	*Paspalum vaginatum*	Salt-water Couch	Poaceae	0.1	1		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	10	3000		Grass & grasslike (GG)	No	
calo lapp	*Calotis lappulacea*	Yellow Burr-daisy	Asteraceae	0.2	400		Forb (FG)	No	
chry apic	*Chrysocephalum apicula*	Common Everlasting	Asteraceae	0.1	1		Forb (FG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulace	0.1	5		Forb (FG)	No	
linu marg	*Linum marginale*	Native Flax	Linaceae	0.1	1		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	10		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	3		Forb (FG)	No	
sals aust	*Salsola australis*		Chenopodiace	0.1	1		Forb (FG)	No	
sole domi	*Solenogyne dominii*		Asteraceae	0.1	4		Forb (FG)	No	
swai	*Swainsona spp.*		Fabaceae (Fa	0.1	1		Forb (FG)	No	
vitt cune	*Vittadinia cuneata*	A Fuzzweed	Asteraceae	0.1	10		Forb (FG)	No	
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	3		Fern (EG)	No	
cart lana	*Carthamus lanatus*	Saffron Thistle	Asteraceae	25	3000	*		HTE	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	5	*		No	
chon junc	*Chondrilla juncea*	Skeleton Weed	Asteraceae	0.2	200	*		No	
cycl lept	*Cyclospermum leptophyl*	Slender Celery	Apiaceae	0.1	15	*		No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.1	25	*		No	
hype perf	*Hypericum perforatum*	St. Johns Wort	Clusiaceae	0.1	10	*		HTE	
kick elat	*Kickxia elatine*	Pointed Toadflax	Scrophulariac	0.1	1	*		No	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	2	*		No	
lysi arve	*Lysimachia arvensis*	Scarlet Pimpernel	Myrsinaceae	0.1	1	*		No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.1	1	*		HTE	
seta parv	*Setaria parviflora*		Poaceae	0.1	5	*		No	
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	0.1	4	*		No	
trif angu	*Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae (Fa	0.2	500	*		No	
verb bona	*Verbena bonariensis*	Purpletop	Verbenaceae	0.1	20	*		No	

BAM Site Field Survey								
Project:	20 179 wollar ceec	**Plot Identifier**	plot 3	**Pic 20x20**	9735	**Pic 20x50**		
Survey date:	4th mar 21		**Compass Orientation (head of 20x20 plot)**				305	nw
Recorders	GYoung		**PCT:**					
GPS Easting	776223	**GPS Northing**	6408502		**Datum**	gda	**Zone**	55
Landform			**Soils**			**Drainage & Slope**		
Morphology	lower slope		**Soil Texture**	clay		**Slope**	4 degrees	
LandF Element			**Soil Colour**	grey orange		**Aspect**	305	**nw**
LandF Pattern			**Soil Depth**			**Drainage**	well drained	
Microrelief			**Geology**	shale		**Watercourses**	none	

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing	3	o	
Cultivation	2	o	
Soil erosion	0		
Firewood	0		
Grazing	2	nr	cattle
Fire Damage	0		
Storm Damage	0		
Weediness	2		saffron
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

grazing cattle

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

just weedy

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**E blakelyi**

FUNCTION

Function attributes for	plot 3

BAM Attribute (20x20m plot)		
	Stratum	**Sum**
	Tree (TG)	**0**
	Shrub (SG)	**3**
	Forb (FG)	**6**

BAM Attributes (1 x 1m Plots)				
	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	2%		9736
	15m	1%		9737
	25m	0%	0.8%	9738

Count of Native Richness	Grass & grasslike (GG)	17
	Fern (EG)	1
	Other (OG)	2
	TOTAL	29

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0.3
	Forb (FG)	0.7
	Grass & grasslike (GG)	78
	Fern (EG)	0.1
	Other (OG)	0.6
	TOTAL Native	79.7
	TOTAL 'HTE'	18.2

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

no trees no timber

ceec plot 20x50m floristics

	35m	1%		9739
	45m	0%		9740
Bare ground cover	5m	0%		
	15m	0%		
	25m	0%	1.0%	
	35m	5%		
	45m	0%		
Cryptogam cover	5m	0%		
	15m	0%		
	25m	0%	0.0%	
	35m	0%		
	45m	0%		
Rock Cover	5m	1%		
	15m	0%		
	25m	0%	0.2%	
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for plot 3

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
davi geni	*Daviesia genistifolia*	Broom Bitter Pea	Fabaceae (Fab	0.1	1		Shrub (SG)	No	
pime curv	*Pimelea curviflora*	Rice Flower	Thymelaeacea	0.1	1		Shrub (SG)	No	
pime lini	*Pimelea linifolia*	Slender Rice Flower	Thymelaeacea	0.1	1		Shrub (SG)	No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	1		Other (OG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.5	2000		Other (OG)	No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	5	300		Grass & grasslike (GG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	0.1	3		Grass & grasslike (GG)	No	

both macr	*Bothriochloa macra*	Red Grass	Poaceae	25	5000		Grass & grasslike (GG)	No	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	20	4000		Grass & grasslike (GG)	No	
chlo vent	*Chloris ventricosa*	Tall Chloris	Poaceae	0.2	150		Grass & grasslike (GG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	0.1	2		Grass & grasslike (GG)	No	
dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	3		Grass & grasslike (GG)	No	
digi brow	*Digitaria brownii*	Cotton Panic Grass	Poaceae	0.1	50		Grass & grasslike (GG)	No	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
erag alve	*Eragrostis alveiformis*		Poaceae	0.5	150		Grass & grasslike (GG)	No	
junc fili	*Juncus filicaulis*		Juncaceae	0.1	1		Grass & grasslike (GG)	No	
loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	8	3000		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	0.1	2		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.5	200		Grass & grasslike (GG)	No	
ryti caes	*Rytidosperma caespitosu*	Ringed Wallaby Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	3	300		Grass & grasslike (GG)	No	
them tria	*Themeda triandra*		Poaceae	15	1500		Grass & grasslike (GG)	No	
calo cune	*Calotis cuneata*	Mountain Burr-Daisy	Asteraceae	0.1	5		Forb (FG)	No	
calo lapp	*Calotis lappulacea*	Yellow Burr-daisy	Asteraceae	0.2	250		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	1		Forb (FG)	No	
vitt cune	*Vittadinia cuneata*	A Fuzzweed	Asteraceae	0.1	25		Forb (FG)	No	
vitt muel	*Vittadinia muelleri*	A Fuzzweed	Asteraceae	0.1	2		Forb (FG)	No	
zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Fab	0.1	50		Forb (FG)	No	
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	5		Fern (EG)	No	
cart lana	*Carthamus lanatus*	Saffron Thistle	Asteraceae	18	2000	*		HTE	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	3	*		No	
hype perf	*Hypericum perforatum*	St. Johns Wort	Clusiaceae	0.1	1	*		HTE	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	1	*		No	
lysi arve	*Lysimachia arvensis*	Scarlet Pimpernel	Myrsinaceae	0.1	1	*		No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.1	1	*		HTE	
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.1	1	*		No	
seta parv	*Setaria parviflora*		Poaceae	0.1	2	*		No	
verb bona	*Verbena bonariensis*	Purpletop	Verbenaceae	0.1	5	*		No	

BAM Site Field Survey								
Project:	20 179 wollar ceec	**Plot Identifier**	plot 4	**Pic 20x20**	9723	**Pic 20x50**		
Survey date:	4th march 21		**Compass Orientation (head of 20x20 plot)**				167	s
Recorders	GYoung		**PCT:**					
GPS Easting	775480	**GPS Northing**	6409332		**Datum**	gda	**Zone**	55
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing	3	o	
Cultivation	2	o	
Soil erosion	0		
Firewood	0		
Grazing	1	r	cattle
Fire Damage	1	o	surrounding trees
Storm Damage	0		
Weediness	2	o	saffron
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

grazing cattle

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees in plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

weeds saffron

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**E microcarpa, E albens**

FUNCTION

Function attributes for	plot 4

BAM Attribute (20x20m plot)		
	Stratum	**Sum**
	Tree (TG)	**0**
	Shrub (SG)	**0**
	Forb (FG)	**7**

BAM Attributes (1 x 1m Plots)				
	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	1%		9724
	15m	1%		9725
	25m	0%	0.6%	9726

Count of Native Richness	Grass & grasslike (GG)	15
	Fern (EG)	1
	Other (OG)	3
	TOTAL	26

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.6
	Grass & grasslike (GG)	45.8
	Fern (EG)	0.1
	Other (OG)	0.5
	TOTAL Native	48
	TOTAL 'HTE'	45.2

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

no trees no timber

ceec plot 20x50m floristics

	35m	1%		9727
	45m	0%		9728
Bare ground cover	5m	0%		
	15m	0%		
	25m	0%	0.0%	
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%		
	15m	0%		
	25m	0%	0.0%	
	35m	0%		
	45m	0%		
Rock Cover	5m	0%		
	15m	0%		
	25m	0%	0.0%	
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for plot 4

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
conv angu	*Convolvulus angustissim*		Convolvulacea	0.1	1		Other (OG)	No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.2	1500		Other (OG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.2	2000		Other (OG)	No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	5	2000		Grass & grasslike (GG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	0.1	2		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.1	30		Grass & grasslike (GG)	No	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	25	1500		Grass & grasslike (GG)	No	

digi brow	*Digitaria brownii*	Cotton Panic Grass	Poaceae	0.5	200		Grass & grasslike (GG)	No	
erag alve	*Eragrostis alveiformis*		Poaceae	10	3000		Grass & grasslike (GG)	No	
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	0.1	20		Grass & grasslike (GG)	No	
loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	0.1	5		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	400		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.5	300		Grass & grasslike (GG)	No	
ryti race	*Rytidosperma racemosu*	Wallaby Grass	Poaceae	0.1	5		Grass & grasslike (GG)	No	
scho vali	*Schoenoplectus validus*		Cyperaceae	0.1	10		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	2	500		Grass & grasslike (GG)	No	
them tria	*Themeda triandra*		Poaceae	0.1	5		Grass & grasslike (GG)	No	
calo lapp	*Calotis lappulacea*	Yellow Burr-daisy	Asteraceae	0.1	50		Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	30		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.5	500		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.2	200		Forb (FG)	No	
sida corr	*Sida corrugata*	Corrugated Sida	Malvaceae	0.1	1		Forb (FG)	No	
vitt cune	*Vittadinia cuneata*	A Fuzzweed	Asteraceae	0.1	3		Forb (FG)	No	
zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Fab	0.5	2500		Forb (FG)	No	
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	2		Fern (EG)	No	
cart lana	*Carthamus lanatus*	Saffron Thistle	Asteraceae	45	5000	*		HTE	
cent sols	*Centaurea solstitialis*	St Barnabys Thistle	Asteraceae	5	1500	*		No	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	1	*		No	
chon junc	*Chondrilla juncea*	Skeleton Weed	Asteraceae	0.1	1	*		No	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	10	*		No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.1	20	*		No	
hype perf	*Hypericum perforatum*	St. Johns Wort	Clusiaceae	0.1	30	*		HTE	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	1	*		No	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	1	*		No	
lysi arve	*Lysimachia arvensis*	Scarlet Pimpernel	Myrsinaceae	0.1	1	*		No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.1	1	*		HTE	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	5	*		No	
verb bona	*Verbena bonariensis*	Purpletop	Verbenaceae	0.1	3	*		No	

BAM Site Field Survey								
Project:	20 179 wollar ceec	**Plot Identifier**	plot 5	**Pic 20x20**	9741	**Pic 20x50**		
Survey date:	4th march 21		**Compass Orientation (head of 20x20 plot)**				21	n
Recorders	GYoung		**PCT:**					
GPS Easting	777982	**GPS Northing**	6408353		**Datum**	gda	**Zone**	55
Landform			**Soils**			**Drainage & Slope**		
Morphology	flat		**Soil Texture**	clay		**Slope**	2 dehgrees	
LandF Element	valley flat near dam seep		**Soil Colour**	light orange		**Aspect**	293	**nw**
LandF Pattern			**Soil Depth**			**Drainage**	moderate	
Microrelief			**Geology**			**Watercourses**	just west of plot	

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing	3	o	
Cultivation	3	o	
Soil erosion	0		
Firewood	0		
Grazing	3	r	cattle
Fire Damage	0		
Storm Damage	0		
Weediness	3		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

cattle grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

weeds verbena bonariensis

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**Angophora floribunda**

FUNCTION

Function attributes for	plot 5

BAM Attribute (20x20m plot)		
	Stratum	**Sum**
	Tree (TG)	**0**
	Shrub (SG)	**0**
	Forb (FG)	**7**

BAM Attributes (1 x 1m Plots)				
	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	10%		9742
	15m	15%		9743
	25m	15%	**21.0%**	9744

Count of Native Richness	Grass & grasslike (GG)	9
	Fern (EG)	0
	Other (OG)	1
	TOTAL	17

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.1
	Grass & grasslike (GG)	24
	Fern (EG)	0
	Other (OG)	0.5
	TOTAL Native	25.6
	TOTAL 'HTE'	0.5

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm **no trees no logs**
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m **ceec plot 20x50m floristics**

	35m	50%		9745
	45m	15%		9746
Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for plot 5

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.5	2000		Other (OG)	No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	0.5	150		Grass & grasslike (GG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	0.5	100		Grass & grasslike (GG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.2	20		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	2	200		Grass & grasslike (GG)	No	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	20	2000		Grass & grasslike (GG)	No	
digi brow	*Digitaria brownii*	Cotton Panic Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	

erag alve	*Eragrostis alveiformis*		Poaceae	0.5	50		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	0.1	3		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1	1		Grass & grasslike (GG)	No	
boer domi	*Boerhavia dominii*	Tarvine	Nyctaginacea	0.1	100		Forb (FG)	No	
calo lapp	*Calotis lappulacea*	Yellow Burr-daisy	Asteraceae	0.1	10		Forb (FG)	No	
cham drum	*Chamaesyce drummondi*	Caustic Weed	Euphorbiacea	0.1	5		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.5	200		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	3		Forb (FG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	1		Forb (FG)	No	
tric elat	*Tricoryne elatior*	Yellow Autumn-lily	Anthericaceae	0.1	2		Forb (FG)	No	
cart lana	*Carthamus lanatus*	Saffron Thistle	Asteraceae	0.2	50	*		HTE	
chon junc	*Chondrilla juncea*	Skeleton Weed	Asteraceae	0.5	200	*		No	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	4	*		No	
cusc camp	*Cuscuta campestris*	Golden Dodder	Convolvulacea	0.1	1	*		HTE	
ehrh caly	*Ehrharta calycina*	Perennial Veldtgrass	Poaceae	0.1	1	*		HTE	
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	1	*		No	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.2	200	*		No	
lysi arve	*Lysimachia arvensis*	Scarlet Pimpernel	Myrsinaceae	0.1	30	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	20	*		No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.1	2	*		HTE	
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	0.1	50	*		No	
verb bona	*Verbena bonariensis*	Purpletop	Verbenaceae	50	5000	*		No	

BAM Site Field Survey								
Project:	20 179 wollar ceec	**Plot Identifier**	plot 6	**Pic 20x20**	9717	**Pic 20x50**		
Survey date:	4th march 21		**Compass Orientation (head of 20x20 plot)**				240	sw
Recorders	GYoung		**PCT:**					
GPS Easting	775242	**GPS Northing**	6409463		**Datum**	gda	**Zone**	55
Landform			**Soils**			**Drainage & Slope**		
Morphology	valley floor		**Soil Texture**	clay		**Slope**	flat	
LandF Element			**Soil Colour**	brown orange		**Aspect**	na	
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing	3		
Cultivation	2	o	
Soil erosion	0		
Firewood	0		
Grazing	2	r	cows
Fire Damage	2	o	
Storm Damage			burnt tree 30m away
Weediness	3	r	saffron thistle
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

grazing cattle

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees in plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**Angophora floribunda**

FUNCTION

Function attributes for	plot 6

BAM Attribute (20x20m plot)		
	Stratum	**Sum**
	Tree (TG)	**0**
	Shrub (SG)	**0**
	Forb (FG)	**6**

BAM Attributes (1 x 1m Plots)				
	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%		9718
	15m	2%		9719
	25m	0%	**0.4%**	9720

Count of Native Richness	Grass & grasslike (GG)	16
	Fern (EG)	1
	Other (OG)	2
	TOTAL	25

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	20.7
	Grass & grasslike (GG)	48.8
	Fern (EG)	0.1
	Other (OG)	3
	TOTAL Native	72.6
	TOTAL 'HTE'	21

	35m	0%		9721
	45m	0%		9722
Bare ground cover	5m	0%	0.2%	
	15m	1%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm **no trees no logs**
0.5%=1.4x1.4m
1%=2×2m
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25%=10×10m **ceec plot 20x50m floristics**

COMPOSITION & STRUCTURE

Species recorded for plot 6

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	2.5	1500		Other (OG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.5	500		Other (OG)	No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	10	1500		Grass & grasslike (GG)	No	
aust dens	*Austrostipa densiflora*	Foxtail Speargrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.2	200		Grass & grasslike (GG)	No	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.1	20		Grass & grasslike (GG)	No	

dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	10		Grass & grasslike (GG)	No	
digi brow	*Digitaria brownii*	Cotton Panic Grass	Poaceae	2.5	1500		Grass & grasslike (GG)	No	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.2	200		Grass & grasslike (GG)	No	
ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	0.1	1		Grass & grasslike (GG)	No	
erag alve	*Eragrostis alveiformis*		Poaceae	25	5000		Grass & grasslike (GG)	No	
erag parv	*Eragrostis parviflora*	Weeping Lovegrass	Poaceae	0.1	3		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5	1500		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1	20		Grass & grasslike (GG)	No	
pasp vagi	*Paspalum vaginatum*	Salt-water Couch	Poaceae	0.1	1		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	5	1500		Grass & grasslike (GG)	No	
them tria	*Themeda triandra*		Poaceae	0.1	2		Grass & grasslike (GG)	No	
arth mill	*Arthropodium milleflorul*	Pale Vanilla-lily	Anthericaceae	0.2	200		Forb (FG)	No	
calo lapp	*Calotis lappulacea*	Yellow Burr-daisy	Asteraceae	0.1	20		Forb (FG)	No	
cyno aust	*Cynoglossum australe*		Boraginaceae	0.1	2		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	20	5000		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.2	500		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	1		Fern (EG)	No	
cart lana	*Carthamus lanatus*	Saffron Thistle	Asteraceae	20	5000	*		HTE	
cent sols	*Centaurea solstitialis*	St Barnabys Thistle	Asteraceae	5	1000	*		No	
chon junc	*Chondrilla juncea*	Skeleton Weed	Asteraceae	0.1	1	*		No	
cine lyra	*Cineraria lyratiformis*	African Marigold	Asteraceae	0.1	1	*		No	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	20	*		No	
cycl lept	*Cyclospermum leptophyl*	Slender Celery	Apiaceae	0.1	5	*		No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.1	2	*		No	
gali parv	*Galinsoga parviflora*	Potato Weed	Asteraceae	0.2	100	*		No	
hype perf	*Hypericum perforatum*	St. Johns Wort	Clusiaceae	0.5	500	*		HTE	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	30	*		No	
lysi arve	*Lysimachia arvensis*	Scarlet Pimpernel	Myrsinaceae	0.1	5	*		No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.5	200	*		HTE	
salv verb	*Salvia verbenaca*	Vervain	Lamiaceae	0.1	2	*		No	
seta parv	*Setaria parviflora*		Poaceae	0.1	100	*		No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	4	*		No	
tage minu	*Tagetes minuta*	Stinking Roger	Asteraceae	0.1	8	*		No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	10	*		No	
uroc texa	*Urochloa texana*	Texas Millet	Poaceae	0.1	10	*		No	
verb bona	*Verbena bonariensis*	Purpletop	Verbenaceae	0.1	15	*		No	