advitech

Report

Biodiversity Development Assessment Report

Meppem Quarry

Regional Group Australia

25 September, 2020
Rev 4 (Final)

www.advitech.com.au

advitech environmental

Report Details

Biodiversity Development Assessment Report - Meppem Quarry

Filename: 21458 RGA Meppem Quarry BDAR Rev4.docx

Job #: J0200223 Folder #: F21458

Revision: 4 (Final Issue)

Date: 25 September, 2020

Prepared For

Regional Group Australia

c/. Jim Lawler, GroundworkPlus Pty Ltd

Email: jlawler@groundwork.com.au, Telephone: 07 3871 0411

6 Mayneview Street Milton QLD 4064

PO Box 1779 Milton BC QLD 4064

Prepared By

Advitech Pty Limited t/a **Advitech Environmental**

ABN: 29 003 433 458

Dr Rod Bennison, Lead Environmental Scientist and Biodiversity Accredited Assessor

Email: rod.bennison@advitech.com.au, Telephone: 02 4924 5400

Facsimile: 02 4967 3772, Web: www.advitech.com.au, General Email: mail@advitech.com.au

7 Riverside Drive Mayfield West NSW 2304

PO Box 207 Mayfield NSW 2304

History

Date	Revision	Comments
1 March, 2019	0	Issued for Client Review
10 April, 2019	1, 2	Final Issue
8 July, 2019	3	Revised Final Issue
25 September, 2020	4	Final Issue (Revised Staged Development)

Endorsements

Function	Signature	Name and Title	Date
Certification of the Assessment		Dr Rod Bennison Lead Environmental Scientist and Biodiversity Accredited Assessor (BAAS19023)	25 September, 2020

TABLE OF CONTENTS

APPENDICES

GLOSSARY

Definitions

Cumulative impact	The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
Direct impact	Where an event or circumstance is a direct consequence of the action.
Habitat	An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic component.
Indirect impact	Where a primary action is a substantial cause of a secondary event or circumstance which has an impact on a protected matter.
Matters of NES	A Matter of National Environmental Significance (MNES) protected by a provision of Part 3 of the EPBC Act.
Mitchell landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.
Mitigation	Action to reduce the severity of an impact.
Population	All the individuals that interbreed within a given area.
Proposal area/ Proposal site	The area of land that is directly impacted on by a proposed Major Proposal that is under the EP&A Act, including access roads, and areas used to store construction materials.
Study area	The area directly affected by the development and any additional areas likely to be affected by the development, either directly or indirectly.
Target species	A species that is the focus of a study or intended beneficiary of a conservation action or connectivity measure.

Abbreviations

BBCC	BioBanking Credit Calculator
BC Act	*Biodiversity Conservation Act 2016*
BC Reg	Biodiversity Conservation Regulation 2017
BVT	Biometric Vegetation Type
CEMP	Construction Environmental Management Plan
DAWE	Department of Agriculture, Water and the Environment
DEES	Department of Environment, Energy and Science
DP&E	Department of Planning and Environment
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and the Environment
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Federal)
FBA	Framework for Biodiversity Assessment
FM Act	*Fisheries Management Act 1994*
GDE	Groundwater Dependent Ecosystems
IBRA	Interim Biogeographically Regionalisation of Australia
MNES	Matters of National Environmental Significance
OEH	Office of Environment and Heritage
PCT	Plant Community Type
REF	Review of Environmental Factors
SEARS	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Communities
TSPD	Threatened Species Profile Database
VIS	Vegetation information system

1. INTRODUCTION

Advitech Pty Limited (trading as Advitech Environmental) was engaged by GroundworkPlus Pty Ltd (GroundworkPlus) on behalf of Regional Group Australia (RGA) to undertake a Biodiversity Development Assessment Report (BDAR) for a proposed hard rock quarry at a site located north east of Bellata on land formally identified as Lot 10 DP 751753 and Lot 110 DP 257328. Regional Group Australia propose to operate the quarry for the land owner and proponent, John Meppem.

This BDAR aims to provide an assessment of the biodiversity of the proposed hard rock quarry in accordance with the Biodiversity Assessment Methodology (BAM). The Meppem Quarry development proposal is considered Designated Development under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As such, this BDAR supports the Environment Impact Statement (EIS) completed in accordance with the Secretary's Environmental Assessment Requirements (SEARs) dated 24 August, 2018.

It should be noted that this report was prepared by Advitech Pty Limited and Regional Group Australia ('the customer') in accordance with the scope of work and specific requirements agreed between Advitech and the customer. This report was prepared with background information, terms of reference and assumptions agreed with the customer. The report is not intended for use by any other individual or organisation and as such, Advitech will not accept liability for use of the information contained in this report, other than that which was intended at the time of writing.

1.1 Project Background

The proposed Meppem Quarry is located along Manamoi Road, approximately 10.0 kms north east of the township of Bellata, midway between Narrabri and Moree in northern New South Wales. The proposed quarry lies on Lot 10 DP751753 and Lot 110 DP 257328 within the Moree Plains Local Government Area on land zoned RU1 Primary Production. The lots comprise about 143 hectares, although the footprint of the quarry would be 8.34 hectares, with an additional approximately 1.6 hectares for the access/haul road (see **Figure 1**). The haul road connects to the Newell Highway via Manamoi Road and Boo Boo Road. A water dam is located to the east of the footprint and will be created for the proposed quarry.

The proposal would impact 9.15 ha of existing vegetation. The proposed project exceeds the threshold for clearing under the *Biodiversity Conservation Regulation 2017*, above which the BAM and NSW Biodiversity Offsets Scheme apply.

1.2 Site Description

The locality of the proposal site is considered to be rural in nature, with farming (cropping) making up the predominant land use within the region. It is proposed that the hard rock quarry will extract and process a maximum of 490,000 tonnes per annum over a five year period. The material extracted from the quarry will comprise overburden and hard rock, which will be processed through a mobile crushing and screening plant before being stockpiled. The quarry will produce a number of products suitable for the needs of the Inland Rail Project. Upon completion of supply of material to the project, the area of operation of the quarry would be rehabilitated to a suitable landform for continuing rural activities.

The proposed works would include:

- Construction of a site access/haul road off Manamoi Road through existing cropping land to the proposed extraction area at the base of Black Hill;
- Construction and operation of a new hard rock quarry;
- Preparation of materials (crushing and stockpiling) in a manner required by the Inland Rail project;

- Transport of materials off the property to a rail loading point within the rail corridor; and
- Rehabilitation of the quarry to a suitable landform for continuing rural activities.

The development of the quarry would be staged over three separate areas as shown in **Figure 2.**

Black Hill (an extinct volcanic plug), located at the northern end of the proposal site rises approximately 58 metres above the surrounding basalt plains with a maximum elevation of 358 metres. Vegetation in the study area is sparse, usually consisting of scattered trees often associated with road reserves or drainage lines. At the proposal site, vegetation is limited to the mid-slopes and crest of Black Hill. This vegetation extends further north of the proposal site and covers most of Black Hill, including the footslopes. This patch of vegetation is surrounded by cropping lands and is isolated from other large habitat patches. Vegetation within the proposal area is disturbed, regrowth vine thicket forest with existing tracks through the vegetation associated with the historic agriculture use of the property. A map showing site features including Plant Community Types (PCTs) is provided in **Figure 3.**

The following definitions are used throughout this report to refer to locations in the project area:

- The 'proposal site/area' is the development footprint comprising all areas that would be directly impacted by the works. This includes all areas proposal to vegetation clearing and earthworks;
- The 'study area' includes the proposal site and the areas adjacent to the proposal site that may be indirectly impacted by the proposed works; and
- The 'search area' refers to a 20 km area surrounding the proposal site for the purpose of database searches.

1.3 Secretary's Environmental Assessment Requirements

This report will be appended to an Environmental Impact Statement (EIS) which must comply with the requirements of Clause 6 and 7 of the *Environmental Planning and Assessment Regulation 2000*, and which addresses environmental considerations identified in the Secretary's Environmental Assessment Requirements (SEARs) (EAR 1247) relevant to biodiversity.

The SEARs notes the following requirements for biodiversity assessment including:

- Accurate predictions of any vegetation clearing on site;
- A detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems undertaken in accordance with Sections 7.2 and 7.7 of the *Biodiversity Conservation Act 2016*; and
- A detailed description of the proposed measures to maintain or improve the biodiversity values of the site in the medium to long term, as relevant.

The EIS must also include a number of environmental assessment requirements, as outlined by state agencies, as follows.

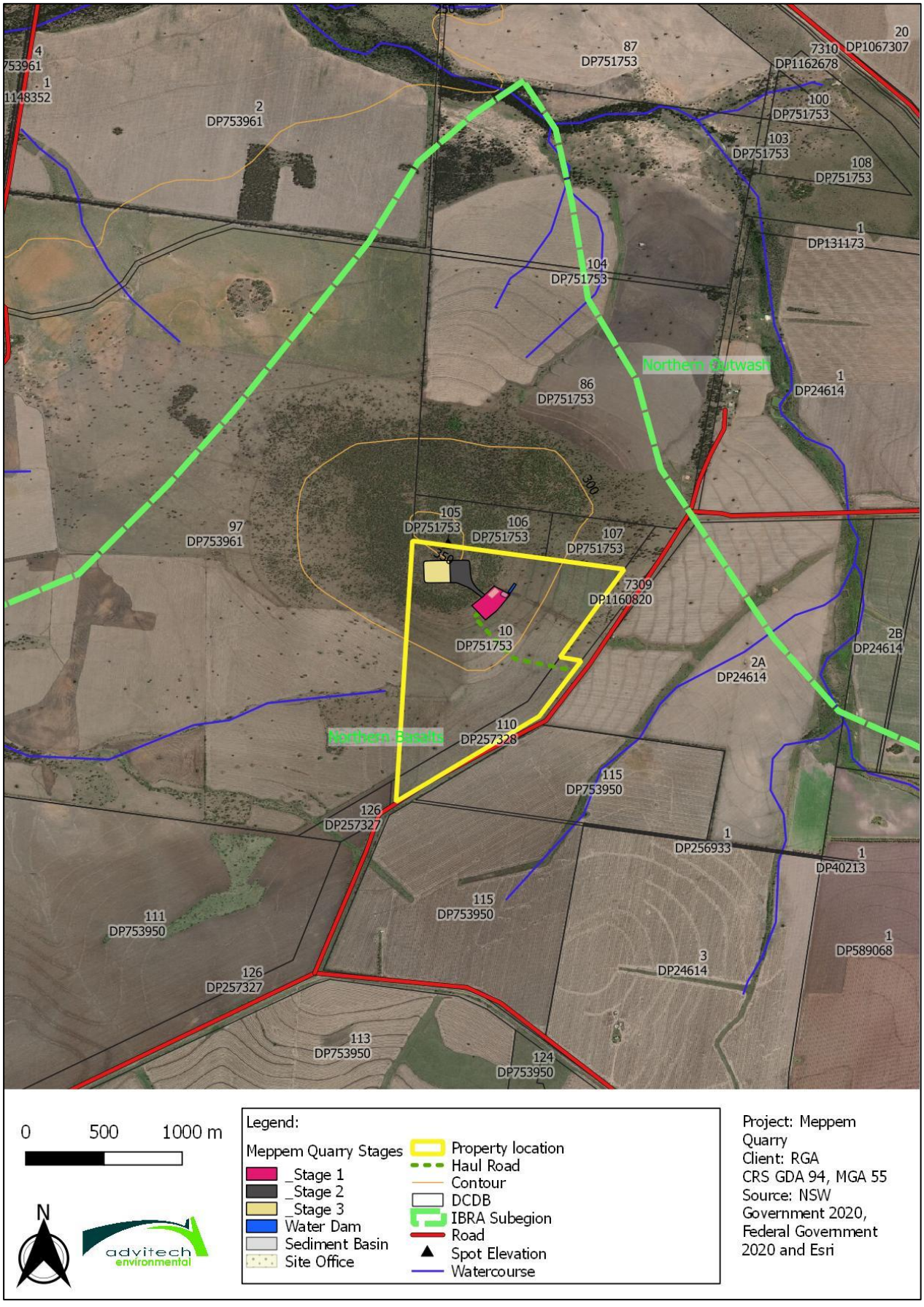


Figure 1: Site Map and insert, IBRA subregion boundaries.

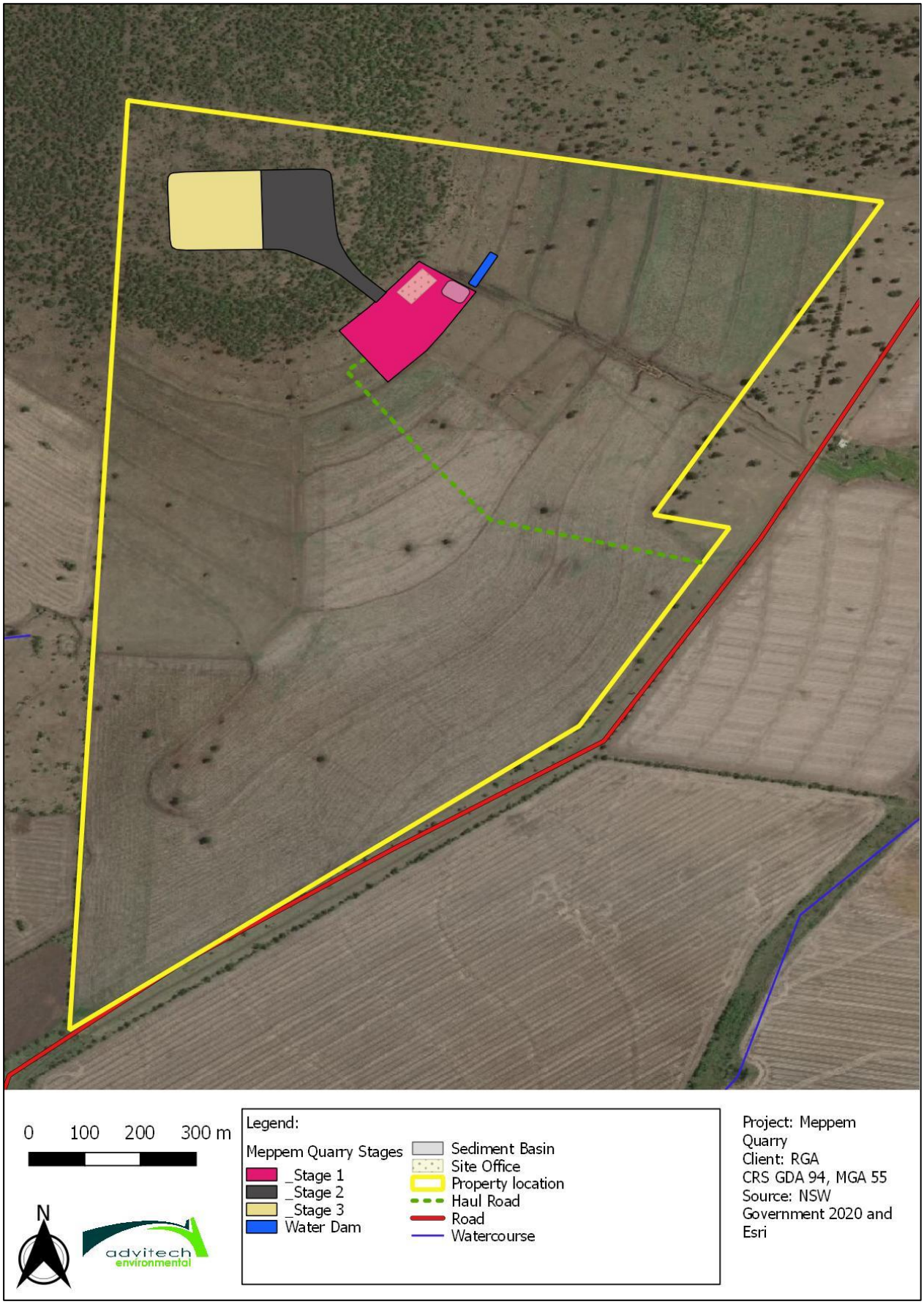


Figure 2: Proposed staging of development.

Figure 3: Location Map showing habitat connectivity and indicative PCTs Mapped (Border Rivers Gwydir / Namoi Region VIS 4467).

The Department of Primary Industries Agriculture notes the following requirements:

- *Include a weed risk assessment outlining the likely plant risks.*
- *Develop a weed response plan to deal with identified risks as well as contingency plans for any failures. Including monitoring and mitigation measures (particularly for any soil stockpiles to be used for future rehabilitation) and adjacent roadsides (to avoid spreading weeds off site).*
- *Develop a pest animal management strategy for possible problem species with emphasis on coordinated group control with neighbours.*

The Office of Environment and Heritage notes the following requirements:

- *The EIS must assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species" for the purposes of Section 7.2 of the Biodiversity Conservation Act 2016 (BC Act), as follows:*

  a. The EIS must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act 2016 and Clause 7.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) by determining whether the proposed development involves:

  i. The clearing of native vegetation exceeds the thresholds listed under Clause 7.23 of the BC Regulation, or

  ii. The clearing of native vegetation, or other action, on land included on the Biodiversity Values Map published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as declared under Section 3.1 of the BC Act).

  b. If the proposal does not trigger any of the criteria in (a) above, then the EIS must determine whether the proposed development is likely to have a significant impact based on 'the test for determining whether proposed development likely to significant affect threatened species or ecological communities' in Section 7.3 of the BC Act.

  c. Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the EIS must justify how the conclusion has been reached.

  d. If the development exceeds the thresholds in (a) or (b), then the EIS must be accompanied by a biodiversity development assessment report (BDAR) prepared in accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.

- *Where development is considered "likely to significantly impact on threatened species" and a Biodiversity Development Assessment Report is required, the following requirements apply:*

  - *Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.*

- *The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.*
- *The BDAR must include details of the measures proposed to address the offset obligation as follows:*
    - *The total number and classes of biodiversity credits required to be retired for the proposal.*
    - *The number and classes of like-for-like biodiversity credits proposed to be retired.*
    - *The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.*
    - *Any proposal to fund a biodiversity conservation action.*
    - *Any proposal to make a payment to the Biodiversity Conservation Fund.*
- *If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.*

- *The BDAR must be prepared by a person accredited to apply the Biodiversity Assessment Method under s6.10 of the Biodiversity Conservation Act 2016.*
- *Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the EIS must include a field survey of the site, conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on the OEH website including the Bionet Atlas, Threatened Species Profile and Bionet Vegetation Classification.*

1.4 Study Aims

This study aims to assess the potential impacts of the proposed works on the biodiversity values of the local area. Specifically, it aims to:

- Address relevant biodiversity requirements as set out in the Secretary's Environmental Assessment Requirements (SEARs);
- Describe the existing environment and assess site biodiversity values;
- Determine whether the proposed development is likely to significant affect threatened species or ecological communities protected under Federal and State legislation;
- Assess all direct and indirect potential impacts and, recommend measures to avoid and minimise any potential impacts on biodiversity values; and
- Determine offset requirements using the BAM calculator.

1.5 Legislative Context

1.5.1 New South Wales Legislation

1.5.1.1 Biodiversity Conservation Act 2016

The proposed project exceeds the threshold for clearing listed under Clause 7.23 of the Biodiversity Conservation Regulation 2017 (BC Reg) (**Table 1.1**). Subsequently, biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must be prepared by an accredited assessor (BC Act, s6.10) and include information in the form detailed in the BC Act (s6.12), BC Reg (s6.8) and Biodiversity Assessment Method (OEH, 2017).

The BAM sets out the requirements for a repeatable and transparent assessment of terrestrial biodiversity values on land in order to:

- identify the biodiversity values on land subject to proposed development;
- determine the impacts of proposed development on biodiversity values; and
- quantify and describe the biodiversity credits required to offset the residual impacts of proposed development on biodiversity values.

Table 1.1: Offset Scheme Thresholds – Vegetation Clearing Area Criteria.

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha, and less than 40 ha	0.5 ha or more
40 ha, and less than 1000 ha	1 ha or more
1000 ha or greater	2 ha or more

1.5.1.2 Environmental Planning and Assessment Act 1979

Development in NSW is subject to the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and its associated regulations and planning instruments. Developments requiring consent, such as the Meppem Quarry proposal, are assessed under Part 4 of the EP&A Act. As the proposed quarry is designated development, the application for development must be accompanied by an environmental impact assessment in the form prescribed by the accompanying regulations, and as stipulated in the SEARs detailed above. Where extractive industries, including quarries, generate more than 30,000 cubic metres per year and or disturb greater than 2.0 ha of land, consent under Schedule 3 (Part 19) of the Environmental Planning and Assessment Regulation 2000 (EP&A Reg) is also required.

1.5.1.1 Local Planning Instruments

Development at the site is regulated under the Moree Plains Shire Council Local Environmental Plan 2011 and the Development Control Plan 2013. These policies determine which development is permissible, prohibited, exempt or complying. As the proposed quarry is on land zoned RU1 Primary Production, an extractive industry located at the proposal site would be permissible with development consent.

1.5.2 Commonwealth Legislation

Under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), referral is required to the Australian Government for proposed actions that have the potential to significantly impact on Matters of National Environmental Significance (MNES) or the environment of Commonwealth land. The assessment of the proposal's impact on MNES and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant MNES or on Commonwealth land. Accordingly, the proposal has not been referred to the Australian Government Department of Agriculture, Water and the Environment (DAWE) under the EPBC Act.

2. METHODOLOGY

This chapter outlines the methods (desktop and field survey investigations) used to determine the biodiversity values of the proposal site.

2.1 Key Personnel

Key personnel responsible for the assessment are detailed in **Table 2.1.**

Table 2.1: Key Personnel.

Name	Role	Experience
Luke Pickett *BEnvSci* *MWldMgt (Habitat)*	Field work and report preparation.	Over 14 years of experience in the environmental and ecological consulting industry. Practicing member of the Ecological Consultants Association of NSW and accredited assessor (BAAS 17100).
Jed Field *BEnvSc&Mgt (Hons.I)*	Field work and report preparation.	Ecologist with 5 years practical experience in ecological restoration and assisting in vegetation surveys.
Dr Rod Bennison *JP BSc MEnvStudies GCPTT PhD FLS*	Document review and certification.	Over 15 years of experience in a consulting environment, with particular expertise in construction management. Practicing member of the Ecological Consultants Association of NSW.

2.2 Database Searches and Literature Reviews

A desktop assessment was undertaken that included searches of databases and a review of literature relevant to the site and local area, particularly:

- NSW Department of Environment, Energy and Science (DEES):
  - Atlas of NSW Wildlife database (licensed) for records of threatened species and endangered ecological communities which have been recorded within a 20 km radius (locality) of the subject site (December, 2018)
  - BioNet Vegetation Classification/Vegetation Information system (VIS) database: http://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx
  - State Vegetation Type Map: Border Rivers Gwydir / Namoi Region Version 2.0. VIS_ID 4467
  - NSW (Mitchell) Landscapes - version 3.1
- Australian Government Department of Agriculture, Water and the Environment (DAWE):
  - Protected Matters Search Tool for Matters of National Environmental Significance (MNES) listed under the EPBC Act within a 20 km radius from the site (December, 2018)
  - Interim Biogeographic Regionalisation for Australia (IBRA) version 7.0
  - Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (Department of the Environment, Water, Heritage and the Arts), 2013 EPBC Act Policy
  - Species Profiles and Threats Database (SPRAT)
- National Atlas of Groundwater Dependent Ecosystems: http://www.bom.gov.au/water/groundwater/gde/index.shtml
- Spatial Information Exchange (SIX) Aerial Imagery for Map production

2.3 Site Assessment

A site assessment was undertaken from 8 to 10 January, 2019, by ecologists Luke Pickett (BAAS17100) and Jed Field.

2.3.1 Flora

A number of sampling techniques were used to ensure the site was adequately sampled. The site was scoped using the 'Random Meander Technique' described by Cropper (1993). This involved walking in a random meander throughout the proposal site, visiting the full range of habitats and recording every plant species observed. Vegetation quadrat and transects were established according to **Section 2.3.2.1** and consistent with the *Biodiversity Assessment Method Operational Manual – Stage 1.* Plant community types (PCTs) (see **Figure 3**), and were determined by comparing the floristic structure and composition of the vegetation on site with vegetation profiles described within the VIS database and community descriptions of endangered ecological communities known to occur in the local area. A list of all plant species recorded during fieldwork is listed in **Appendix I** and BAM site field survey forms in **Appendix II**. The location of the vegetation surveys is shown in **Figure 4**.

2.3.2 Paddock Trees

Paddock Trees were assessed in accordance with Appendix 1 (Streamlined assessment module – clearing paddock trees) of the BAM (2017). Vegetation meets the definition of paddock trees if:

a) the trees located on category 2 land are surrounded by category 1 land on the regulatory maps under the Biodiversity Conservation Act, or
b) the native vegetation that comprises the groundcover is:
    i. less than 50% of the cover of indigenous species of vegetation, and
    ii. not less than 10% of the area is covered with vegetation (whether dead or alive), and
    iii. the assessment is made at the time of year when the proportion of the amount of indigenous vegetation in the area to the amount of non-indigenous vegetation in the area is likely to be at its maximum, and
c) the foliage cover for the tree growth form group is less than 25% of the benchmark for tree cover for the most likely plant community type, or
d) it is a tree located more than 50m away from any living tree that is greater than 20cm DBH and the tree is located on category 2 land that is surrounded by category 1 land; or it is in a group of three (3) or fewer living trees within a distance of 50m of each other, that in turn, are greater than 50m from the next living tree that is greater than 20cm DBH and located on category 2 land that is surrounded by category 1 land.

2.3.2.1 Vegetation Plots

Six plots were used to assess the composition, structure and function components of vegetation integrity. **Table 2.2** shows that only one PCT was identified on site. Around a central 50 m transect, a 20 x 20 metre quadrat was established to record floristic diversity and combined with a 20 x 50 metre quadrat for recording fauna habitat and forest regeneration. Within the 20 x 50 m plot area, five 1.0 m^2 plots were also established to assess groundcover composition.

Data collected within each plot/transect includes:

- Flora diversity and composition;
- Groundcover composition and abundance;
- Vegetation structure (including canopy, sub-canopy, shrub and groundcovers);
- Fauna habitats (including hollow trees, fallen timber);

- Regeneration of canopy species;
- Landscape features (including. slope, gully, and aspect);
- Soil features (including soil type, rocks, organic matter); and
- Geographical coordinates and a photographic record.

Table 2.2: Vegetation plots undertaken.

PCT/ Zone	Patch size (ha)	Ellipsoid area (ha) of impact	Minimum Plots/Transects Required	Plots/Transects Completed
147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion				
Zone 1 -Disturbed thicket, (low to moderate)		5.33	2	3 (Q1-3)
Zone 2 - Intact thicket, (moderate to good condition)		0	0	1 (Q4)
Zone 3 - Disturbed thicket, (low condition)		3.82	2	2 (Q5,6)
TOTAL	291	9.15	4	6

2.3.3 Fauna

Fauna surveys targeted species that may occur within the limited habitat available within the proposal. The sampling methods used to survey fauna habitat within the survey area are detailed below in **Table 2.3.** A list of all fauna species observed during fieldwork is provided in **Appendix III**. The location of targeted fauna surveys is shown in **Figure 1.**

Table 2.3: Fauna surveys conducted.

Fauna Group	Surveys	Methods
Diurnal Birds	Area search	A search was undertaken to identify any birds present. Birds were identified from observations or call identification. A search for nests was also undertaken during the survey.
Herpetofauna	Habitat search	Opportunistic active searches reptiles were undertaken during the survey within suitable habitat (i.e. leaf litter, under rocks).
Microchiropteran Bats	Song Meter recording	Echo-location recording (conducted over two separate nights) targeting microchiropteran bats in a flyway area (see **Figure 3**).
All	Opportunistic sightings	Any opportunistic sightings and indications of fauna on site were recorded.

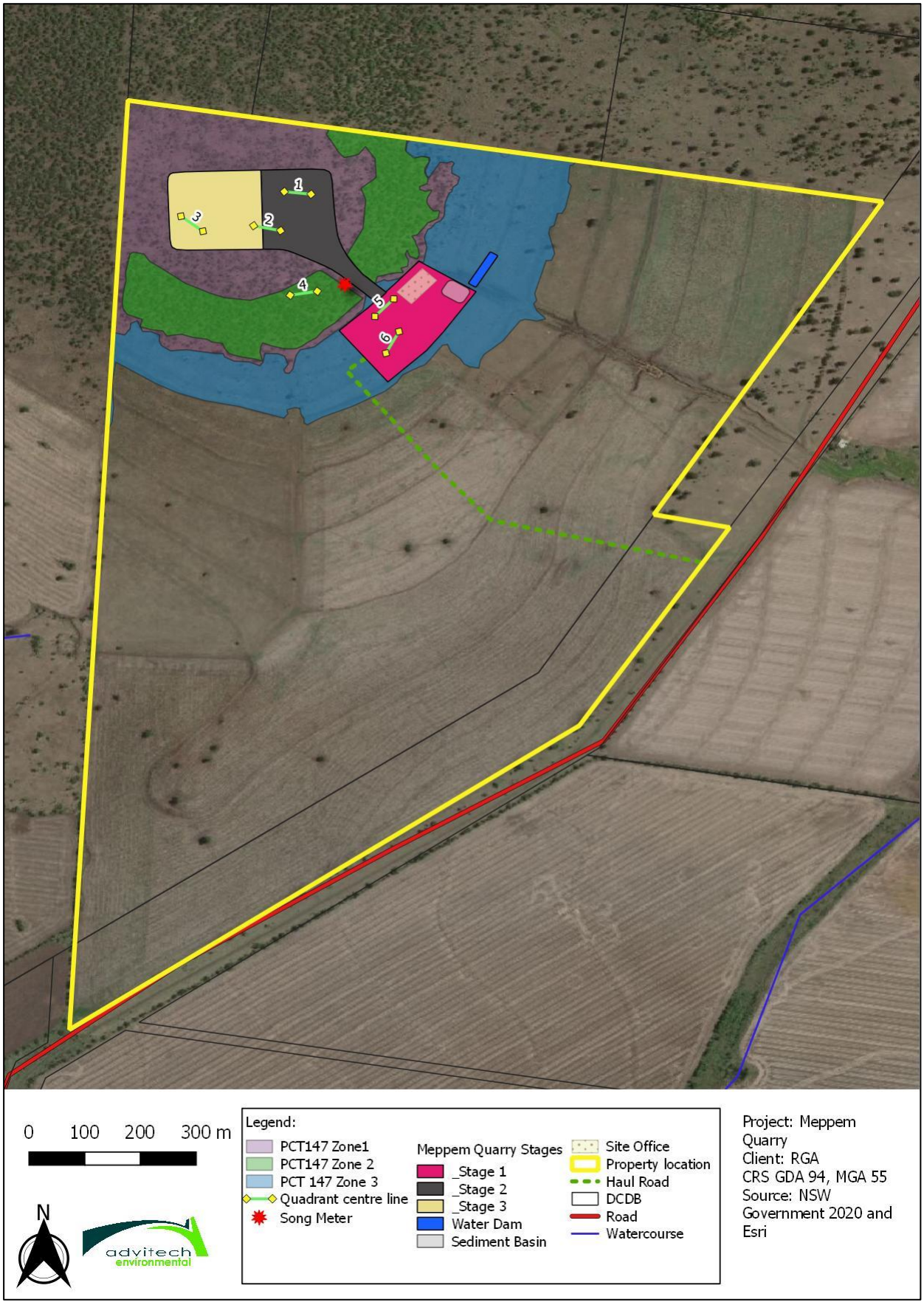


Figure 4: Vegetation zones, plot locations and targeted fauna surveys.

2.4 Threatened species data searches

Three data sources were used to compile a list of threatened species that may potentially occur at the proposal site. They include:

1. BAM calculator list of predicted and candidate species;
2. Atlas of NSW Wildlife database (BioNet) records of threatened species within a 20 km radius (locality) of the subject site; and
3. DAWE Protected Matters Search Tool (PMST).

The BAM calculator may not import all potential threatened species that may occur at the proposal site. BioNet and PMST sources were used to provide a complete list of threatened species recorded in the search area of the proposal site. For each threatened species recorded from Bionet and PMST searches, the habitat suitability of the proposal site was assessed taking into account a number of factors including:

- Structural and floral diversity;
- Occurrence and extent of habitat types in the general vicinity;
- Continuity with similar habitat adjacent to the site, or connection with similar habitat off site by way of corridors;
- Key habitat features such as tree hollows, water bodies, caves and crevices, rocky areas;
- Degree of disturbance and degradation; and
- Topographic features such as aspect and slope.

Each species was assigned with a rating (see **Table 2.4**) based on their likelihood to occur within the proposal site. The habitat assessment is provided in **Appendix IV.**

Table 2.4: Likelihood of occurrence criteria.

Likelihood Rating	Criteria
Known	The species was recorded within the study area during site surveys.
High	It is likely that a species would inhabit or utilise habitat within the proposal site. Criteria for this category may include: ▪ Species recently and/or regularly recorded in contiguous or nearby habitat. ▪ High quality habitat types or resources present within study area. ▪ Species is known or likely to maintain a resident population surrounding the study area. ▪ Species is known or likely to visit during migration or seasonal availability of resources.
Moderate	Potential habitat for a species occurs within the proposal site. Criteria for this category may include: ▪ Species previously recorded in contiguous habitat albeit not recently (>10 years). ▪ Poor quality, depauperate or modified habitat types and/or resources present within study area. ▪ Species has potential to utilise habitat during migration or seasonal availability of resources.

Likelihood Rating	Criteria
	▪ Cryptic flora species with potential habitat available within the proposal site that have not been seasonally targeted by surveys.
Low	It is unlikely that the species inhabits the area and would likely be considered a transient visitor if ever encountered. Criteria for this category may include: ▪ The proposal site or study area lacks specific habitat types or resources required by the species. ▪ The proposal site is beyond the current distribution of the species or is isolated from known populations. ▪ Non cryptic flora species that were found to be absent during targeted surveys. ▪ The proposal site only contains common habitat which would not be considered important for the local survival of a threatened species.
Unlikely	The habitat within proposal site and study area is unsuitable for the species.

2.5 Limitations

The effectiveness of a survey detecting a given species will be influenced by a range of factors. For this type of survey, such limitations are generally related to the short period of time in which the fieldwork was carried out during a single season. Given the small period spent within the study area, the detection of certain species may be limited by:

- Seasonal migration (particularly migratory birds);
- Seasonal flowering periods (some species are cryptic and are unlikely to be detected outside of the known flowering period);
- Seasonal availability of food such as blossoms;
- Weather conditions during the survey period (some species may go through cycles of activity related to specific weather conditions, for example some microchiropteran bats, reptiles and frogs can be inactive during cold weather); and
- Species lifecycle (cycles of activity related to breeding).

These limitations have been overcome by applying the precautionary principle in all cases where the survey methodology or impeded access to the impact area may have given a false negative result. All species have been assessed based on the presence of their habitat and the likely significance of that habitat to a viable local population.

3. LANDSCAPE CONTEXT

In accordance with Section 4.2 of the BAM (OEH, 2017), this chapter identifies the landscape features within the proposal site and the assessment area surrounding the proposal site. **Table 3.1** provides an overview of the landscape context of the study area.

Table 3.1: Environmental context summary.

Attribute	Description
LGA	Moree Plains Shire Council
Local Land Service Division	North-West
Zoning	RU1 (Primary Production)
Catchment	Namoi River
IBRA Bioregion	Brigalow Belt South
IBRA Subregion	Northern Basalts
Characteristic landforms[1]	Undulating low stony hills, long slopes with sandy wash and heavy clays in the valley floors.
Typical Soils [2]	Manamoi (moj): This soil landscape covers footslopes and gently undulating rises to low hills of Tertiary basalt. At the subject site it is restricted to the footslopes of Black Hill. Deep to very deep (>150 cm), moderately well-drained, self-mulching Black Vertosols (Black Earths) on slopes and imperfectly to poorly-drained self-mulching Grey Vertosols (Grey Clays) on lower slopes. Local relief varies 5-50 m with slopes 3-10%. Black Hill (bhw): This soil landscape covers isolated rolling rises of Tertiary basalt caps and stony outcrops. At the subject site it is restricted to Black Hill. Soils are Shallow to moderately deep (<150 cm), well-drained to moderately well-drained Brown, Grey and Black. Local relief varies 10-50 m with slopes 10-25%.
Mitchell Landscape	Kaputar Hill Crest Flows and Sands (Kpf), Bellata Sands (Bsa) and Kaputar Slopes (Kps)
Groundwater Dependent Ecosystems (GDE)	No GDEs are known to occur at the subject site. Waterloo Creek (1km east) and Myall Hollow Creek (2.5 km south) have the potential to support aquatic GDEs including River Red Gum and *Melaleuca* communities.
Rivers and streams	No rivers or streams cross the subject site. Myall Hollow Creek borders the northern border of Lot/Plan 10 DP 751753.
Wetlands	Not applicable
Areas of Geological Significance and Soil Hazards	Not applicable
Areas of Outstanding Biodiversity Value	Not applicable
Nearest DEES park	Moema National Park (17 km south east)

[1] Description from Brigalow Belt South - Northern Basalts subregion (OEH, 2018).

[2] Description from SLAM Soil Landscape Report for Moree Plains v 1.0.1

3.1. Connectivity

Vegetation on Black Hill does not connect to large areas of continuous vegetation in the local landscape. Vegetation on the hill is isolated; however, there is some connectivity to the Waterloo Creek riparian corridor through paddock trees. Paddock trees and tree coverage in road corridors provide 'stepping stones' which help support highly mobile species such as birds that move across the landscape.

This proposal is unlikely to result in any impacts on wildlife movement given the small amount of regrowth vegetation (5.33 ha) in the proposal footprint and retention of vegetation on the mid-slopes within the proposal site.

3.2. Assessing native vegetation cover

Using the Border Rivers Gwydir / Namoi Region (Version 2.0) VIS ID 4467, native vegetation cover on the proposal site and within 1500 m of the outside boundary was considered as per the BAM. The total assessment area is 1699.48 ha, **Table 3.2** shows that six PCTs occur and cover a total area of 317.07 ha. Native vegetation cover was assigned as 26.17% in the BAM calculator.

The assessment area supports farmland areas with non-woody vegetation, some of which has been mapped as Candidate Native Grassland (CNG). Some of this area has been subject to cropping (aerial interpretation) and is not considered native vegetation for this assessment. The remaining CNG areas were included as native non-woody vegetation.

Table 3.2: Vegetation in the 1500 m assessment area.

PCTs in the assessment area	Sum of area (ha)	% of cover
Woody vegetation cover		
27: Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	69.34	4.08
55: Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions	97.78	5.75
56: Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	0.28	0.02
145: Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	0.07	0.00
147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	148.30	8.73
378: Belah - Wilga +/- White Box dry viney scrub woodland the NSW Brigalow Belt South Bioregion	1.30	0.08
Total woody vegetation cover	317.07	18.66%
Non-woody vegetation cover		
Candidate Native Grasslands	127.65	7.51
Total Native Vegetation Cover	444.72	26.17
Not Native	1254.77	73.83
GRAND TOTAL	1699.48	100

3.3. Assessing patch size

The area of intact native vegetation that occurs on the development site and adjoining land that is not part of the development site was calculated. In assessing patch size, as per the BAM, patches of woody vegetation were assessed as separate patches when > 100 m from the next area of moderate to good condition native vegetation. One isolated patch of vegetation was identified on Black Hill with a patch size of 275 ha (see **Figure 2**).

4. NATIVE VEGETATION

This chapter identifies and describes the most likely PCTs and TECs within the proposal site and assesses vegetation integrity based on methods detailed in **Section 2.3.1.**

4.1 Plant community types

One PCT was identified within the proposal site, a description is provided in **Table 4.1.** A full list of species recorded during the field survey is provided in **Appendix I**.

Table 4.1: Description of Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion on site.

DEES PCTID	PCT 147
Estimate of % cleared	83% (based on the VIS classification database)
Area (ha)	9.15 (5.33 ha of vegetation is consistent with listed Endangered TECs)
BC Act Status	Endangered: Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions (Part)
EPBC Act Status	Endangered: Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions (Part)
Vegetation Formation	Rainforests
Vegetation Class	Western Vine Thickets
Identifying features and occurrence on site	This PCT occurs along the midslopes and crest of Black Hill. At the proposal site, the community resembles dry rainforest made up of vines, shrubs and trees. The community occurs in three different condition classes. Zone 1 - Disturbed thicket (low to moderate condition) occurs at the crest of the hill, Zone 2 - Intact thicket (moderate to good condition) occurs at the mid slope of the hill and Zone 3 - Disturbed thicket (low condition) occurs at the base of the hill. Vegetation is primarily regrowth and significantly disturbed through past clearing and ongoing grazing by stock. Low canopy species include *Geijera parviflora* (Wilga), *Ehretia membranifolia* (Peach Bush) and *Notelaea macrocarpa* (Native Olive). Emergent *Eucalyptus populnea* (Bimblebox) and *Casuarina cristata* (Belah) occur infrequently along the midslope of the hill. The shrub stratum includes *Carissa ovata* (Currant Bush) and *Capparis mitchellii* (Wild Orange) while the ground layer consists of various chenopods and grasses including *Enchylaena tomentosa* (Ruby Saltbush) and *Paspalidium gracile* (Slender Panic).
Emergent (to 10m)	*Casuarina cristata* (Belah), *Geijera parviflora* (Wilga), *Notelaea macrocarpa* (Native Olive), *Ehretia membranifolia* (Peach Bush) and *Alectryon oleifolius* (Western Rosewood).
Shrubs (0.5 0-2m)	*Abutilon oxycarpum* (Straggly Lantern-bush), *Spartothamnella juncea* (Bead Bush), *Capparis mitchellii* (Wild Orange) and *Carissa ovata* (Currant Bush).
Goundcover (0-0.5)	*Enchylaena tomentosa* (Ruby Saltbush), *Rhagodia spinescens* (Fragrant Saltbush), *Sclerolaena muricata var. muricata* (Black Rolypoly), *Boerhavia dominii* (Tarvine), *Einadia nutans* (Climbing Saltbush), *Portulaca oleracea* (Purslane), *Aristida leptopoda* (White Speargrass), *Aristida vagans* (Threeawn Speargrass), *Austrostipa*

	verticillata (Slender Bamboo Grass), *Chloris ventricosa* (Tall Chloris), *Emex australis* (Spiny Emex) and *Paspalidium gracile* (Tussock Grass).
Vines	*Parsonsia eucalyptophylla* (Gargaloo), *Marsdenia viridiflora subsp. viridiflora* (Native Pear), *Jasminum lineare* (Desert Jasmine) and *Desmodium varians* (Slender Tick-trefoil).
Weeds	*Lycium ferocissimum* (African Boxthorn) occurs in all condition classes of the PCT; however, it occurs in greater density in exposed areas. Groundcover weeds include *Tribulus terrestris* (Cat-ear), *Malvastrum americanum* (Spiked Malvastrum), *Salvia reflexa* (Mintweed), *Emex australis* (Spiny Emex), *Brassicaceae sp.* and *Asteraceae sp.*
Condition	This community is a disturbed isolated remnant that has been subject to previous clearing and ongoing grazing disturbance. Despite these pressures, the site does hold regeneration potential. For example, saplings of trees were recorded in highly disturbed areas. Three condition classes of vegetation are described: ▪ Zone 1 – Disturbed thicket: Low to moderate condition vegetation occurs on the crest of the hill, a total of 23 native species were recorded in quadrats. Vegetation is regrowth and includes regenerating trees and shrubs and a developed ground layer of forbs, grasses and chenopods. ▪ Zone 2 – Intact thicket: Moderate - good condition vegetation occurs on the midslope of the hill, a total of 21 native species were recorded in quadrats. Vegetation is structurally complex compared to other condition classes with a presence of large trees, dead wood and leaf litter. ▪ Zone 3 – Disturbed thicket: Low condition vegetation occurs at the base of the hill, a total of 19 native species were recorded in quadrats. Native shrubs and trees are sparse, *Casuarina cristata* (Belah) occurs infrequently as a paddock tree. Minor to major weed occurrence was recorded, the highest levels primarily occurring in Zones 1 and 3. Examples of this vegetation type on site is shown in **Photos 1 to 3.**

Photo 1: PCT 147 Zone 1 - Disturbed thicket (low to moderate condition) at the crest of Black Hill.

Photo 2: PCT 147 Zone 2 - Intact thicket (moderate to good condition) on the midslope of Black Hill.

Photo 3: PCT 147 Zone 3 - Disturbed thicket (low condition) at the base of Black Hill.

4.2 Threatened Ecological Communities

PCT 147 is consistent with both the State (BC Act 2016) and Nationally (EPBC Act 1999) listed Endangered TEC: *Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions*. The PCT meets all key characteristics of the EEC listed in **Table 4.2** identified by DEES (OEH, 2010).

Table 4.2: Key characteristics of the Semi-evergreen Vine Thicket EEC.

Diagnostic feature	Comments
Is the site in the Brigalow Belt South or Nandewar bioregions of NSW?	Yes, Brigalow Belt South
Is the vegetation a low dry rainforest or 'scrub' with vines present?	Yes, vines are common and even present in very disturbed areas
Is the site on deep, loamy soils derived from basalt or other volcanic rocks?	Yes, basalt rock
Does the rainforest tree layer contain red olive plum, wilga, native olive or peach bush, often under a taller layer of white box, silver-leaved ironbark, belah, kurrajong and/or white cypress pine?	Yes, Wilga, Native Olive, Peach Bush. Belah and White Cypress Pine are present
Are there any plant species present at the site from those listed as characteristic?	Yes, 10 in total

Only one vegetation zone in the proposal area (Zone 2 - disturbed vegetation along the crest of Black Hill) is considered to be consistent with both of these EECs. Low condition vegetation (Zone 3) located at the base of Black Hill does not meet the EEC description, primarily due to the lack of a tree and intact shrub layer and the ground cover has a high proportion of weed coverage. Key diagnostic species diversity and cover is relatively low compared to the crest of the hill. Assessments of significance for these EECs are provided in **Appendix V**. No other EECs were identified within the proposal site.

4.3 Vegetation Integrity

Six vegetation condition plots were undertaken within the proposal site and the summary of plot data is provided in **Table 4.3**. Plots were randomly positioned within the proposal area using random coordinates generated using geographical information system (GIS) software. Plots were randomly selected in each vegetation zone. The default bearing of each plot was west, this was modified if vehicle trails/ other recent anthropogenic disturbance to vegetation occurred inside plot boundaries or the bearing would result in the plot extending outside the vegetation zone.

Table 4.3: Vegetation integrity scores.

	Composition						Structure						Function				
Plot ID	Tree	Shrub	Grass & grass like	Forb	Fern	Other	Tree	Shrub	Grass & grass like	Forb	Fern	Other	Number of large trees	Litter cover	Total length of fallen logs	Regeneration of stems <5 cm DBH?	Vegetation integrity score & assigned class
Benchmark Value for PCT 147	**5**	**12**	**7**	**8**	**1**	**5**	**64**	**41**	**29**	**4**	**0**	**5**	**6**	**70**	**48**	**Present**	**100**
Plot 1	0	5	3	3	0	2	0	3.9	3	3	0	7.1	0	5	18	Present	20/100 Zone 1 - Disturbed thicket (low to moderate condition)
Plot 2	1	7	2	1	0	2	1	24.1	0.7	0.1	0	0.2	0	19.4	0	Present	
Plot 3	1	7	5	2	0	1	0.6	7.4	0.7	0.3	0	0.1	0	14	1	Present	
Plot 4	1	8	3	4	0	5	0.5	37.8	1.5	4	0	11.2	1	32.5	34	Present	48.1/100 Zone 2 - Intact thicket (moderate to good)
Plot 5	1	3	5	2	0	3	0.1	5.1	1.7	4.1	0	0.7	0	4.4	0	Present	9.8/100 Zone 3 - Disturbed thicket (low condition)
Plot 6	0	2	2	0	0	2	0	0.3	10.1	0	0	0.3	0	4.8	0	Absent	

4.4 Fauna habitat

Fauna habitat resources are present throughout the proposal area, including within the construction footprint. Key habitat features recorded within the proposal site include:

- Trees and shrubs may provide foraging and nesting habitat for a range of birds and reptiles;
- Hollow bearing trees, including paddock trees provide nesting and shelter habitat for birds and microchiropteran bats;
- Fallen timber including hollow logs provide habitat for fauna including invertebrate species dependent on decaying wood;
- Ground cover including leaf litter, grassy tufts, and dead wood may provide habitat and cover for a range of small terrestrial species; and
- Rocks including loose boulders provide shelter for reptiles.

Observations of fauna species recorded during the field survey are contained in **Appendix III.**

4.4.1 Habitat Trees

A total of three hollow bearing trees were recorded within the proposal site **(Table 4.4)**. This estimation does not include all potential habitat trees at the proposal site. No hollow bearing tree was recorded within the proposal footprint.

Table 4.4: Hollow-bearing trees recorded at the proposal site.

Map Ref No.	Inside construction footprint?	GPS location	Species	DBH	Number of hollows/entrance diameter size class		
					Small[1]	Medium[2]	Large[3]
90	N	149.886514 -29.867339	*Eucalyptus populnea*	145	1		
91	N	149.883056 -29.869459	*Casuarina cristata*	55	1		
93	N	149.882967 -29.870778	*Geijera parviflora*	60		1	
Total number of hollows recorded					**2**	**1**	

[1] Small sized hollow openings (i.e. 2-5cm) suitable for species such as microchiropteran bats

[2] Medium sized hollow openings (i.e. 5-15cm) suitable for species such as gliders and possums

[3] Large sized hollow openings (i.e. >15cm) suitable for large birds and owls

4.4.2 Paddock Trees

Table 4.5 shows that a total of 14 paddock trees were identified along the haul road to the base of Black Hill. Eleven of the trees are defined as Class 3 paddock trees. These trees are > 30 cm DBH which is the large tree benchmark of PCT 147 (*Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket*). In addition, two of these trees (nos. 91 and 93) contain hollows (which are marked in **Figure 5**). All but one paddock tree (GPS ref 84) will be retained by the proponent.

Table 4.5: Paddock trees.

GPS ref	Longitude	Latitude	Species	DBH	Class*	Comments
84	149.887801	-29.868138	*Casuarina cristata*	40	3	Tree will be cleared
85	149.887489	-29.868534	*Acacia salicina*	29	2	
91	149.883056	-29.869459	*Casuarina cristata*	55	3	One of the mains stems is dead/ other foliage dying. Cracks and fissures suitable for microbats.
92	149.883215	-29.87072	*Geijera parviflora*	45	3	
93	149.882967	-29.870778	*Geijera parviflora*	60	3	Hollow top, with a medium size hollow (5-15cm)
94	149.883024	-29.870941	*Acacia salicina*	18	1	
95	149.883033	-29.87115	*Casuarina cristata*	60	3	
96	149.882987	-29.871425	*Geijera parviflora*	30	3	
97	149.882967	-29.871434	*Geijera parviflora*	45	3	
98	149.882922	-29.871745	*Ehretia membranifolia*	50	3	
99	149.882919	-29.871762	*Ehretia membranifolia*	14	1	
100	149.882892	-29.872204	*Casuarina cristata*	50	3	
101	149.882858	-29.872388	*Casuarina cristata*	40	3	
102	149.882881	-29.875021	*Callitris glaucophylla*	55	3	

* Paddock tree class assigned by the streamlined assessment module – clearing paddock trees (BAM, 2017):

- Class 1: paddock trees that are ≤20cm DBH.
- Class 2: paddock trees that are ≥20cm DBH and less than the large tree benchmark for the most likely plant community type (PCT 147, trees < 30 cm DBH).
- Class 3: paddock trees that are greater than or equal to the large tree benchmark (> 30 cm DBH) for the most likely plant community type (PCT 147).

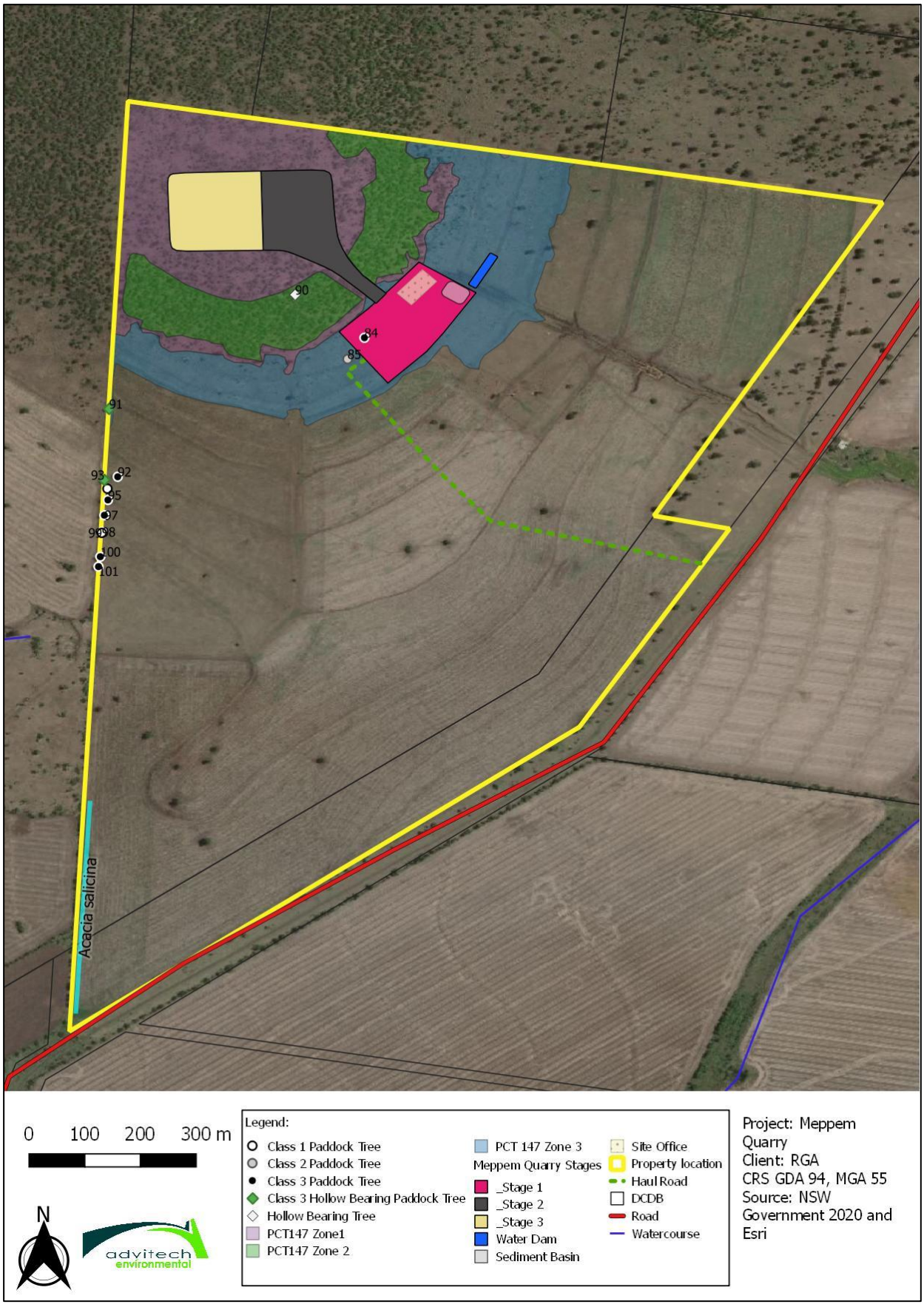


Figure 5: Location of hollow bearing and/or paddock trees recorded within the proposal site.

4.5 Weeds

Two State priority weed species were recorded within the proposal site. The control categories for each of these species are detailed in **Table 4.6**. Priority weeds should be managed in accordance with the *North-West LLS Regional Strategic Management Plan* (2017) and safeguards detailed in **Section 6** to minimise their impact and ensure compliance with the *Biosecurity Act 2015*.

Table 4.6: Priority weeds recorded in proposal area for the North-West LLS region.

Species	State priority	Mandatory Measure[1]	WoNS?[2]	HTE?[3]	Occurrence
Lycium ferocissimum (African boxthorn)	Asset Protection	A person must not, import into the State or sell.	Y	Y	Common, sometimes dense along the haul road and in existing vegetation
Opuntia stricta Prickly Pear	Asset Protection	A person must not, import into the State or sell.	Y	Y	Only a few individuals observed on Black Hill
Xanthium spinosum (Bathurst Burr)	N/A	N/A	N/A	Y	Common in paddock areas and along the proposed haul road

[1] Mandatory Measure (Division 8, Clause 33, *Biosecurity Regulation 2017*)
[2] Weed of National Significance
[3] High Threat Exotic (HTE) cover is assigned in the function attribute of the BAM calculator. A list of HTE is available from: https://www.lmbc.nsw.gov.au/bamcalc

Weeds on site require appropriate controls in order to comply with the *Biosecurity Act 2015*. RGA and any contractors must ensure that all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

5. THREATENED SPECIES

This chapter assesses habitat suitability for threatened species including ecosystem credit species (predicted species) associated with habitat and species credit species (candidate species) associated with the site context. The results of targeted surveys for threatened species are also provided.

5.1 Threatened Species for Assessment

Using six criteria (listed below), the BAM Credit Calculator identified that seven candidate species (species credit species) and 14 predicted species (ecosystem credit species) required consideration for assessment. This preliminary list is generated where all six criterions were met. The calculator maintains assessment species where information for a species was not available for a certain criterion.

The BAM Credit Calculator determined candidate species for assessment based on the following six criteria (BAM, 2017):

1. The distribution of the species includes the IBRA subregion in which the subject land (Northern Basalts IBRA subregion);
2. The study area is within any geographic constraints of the distribution of the species within the IBRA subregion;
3. The species is associated with any of the PCTs identified within the study area;
4. The native vegetation cover within an assessment area including a 1500 m buffer around the study area is equal to or greater than the minimum required for the species;
5. The patch size that each vegetation zone is part of is equal to or greater than the minimum required for that species; and
6. The species is identified as an ecosystem or species credit species in the Threatened Biodiversity Data Collection.

5.1.1 Species Credit Species

Species credit species cannot be confidently predicted by vegetation surrogates and landscape features, however, can be reliably detected by survey (BAM, 2017). These species are assessed according to habitat suitability and are recorded as either present or absent. Species may be recorded as present if detected during field assessment or assumed present (including by expert report). Species credit species were assessed as absent from the proposal site if:

- There were habitat/geographical constraints (generated from the BAM calculator);
- The species was not recorded during site assessment visits (during the specified survey period); or
- If according to BAM Section 6.4.1.17, habitat was assessed as substantially degraded, such that the species is unlikely to utilise the proposal site (or specific vegetation zones).

Table 5.1 outlines the assessment of limitations to determine whether or not species were maintained as candidate species.

Table 5.1: Validation of species credit (candidate) species.

Scientific name Common name	BAM Habitat constraints/ Geographic limitations	Confirmed candidate species?	Species habitat, ecology and justification of candidate species status
FAUNA			
Chalinolobus dwyeri Large-eared Pied Bat	▪ Cliffs ▪ Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.	No	Habitat constraints listed by the BAM calculator. No breeding habitat located within 2 km of the proposal area.
Hieraaetus morphnoides Little Eagle (Breeding)	Nest trees - live (occasionally dead) large old trees within vegetation.	No	No breeding habitat present The Little Eagle requires nest trees - live (occasionally dead) large old trees within vegetation. Paddock trees are known to provide important breeding habitat. Breeding habitat includes the presence of a male and female; or female with nesting material; or an individual on a large stick nest in the top half of the tree canopy. No large stick nests indicative of historical breeding was recorded within the subject site.
Miniopterus schreibersii oceanensis Eastern Bentwing-bat (Breeding)	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding.	No	No breeding habitat present For breeding, the Eastern Bentwing-bat requires a cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding. Impacts on breeding habitat are considered potentially serious and irreversible for this species. This species is dual credit because foraging habitat is broad ranging but breeding habitat is highly specific. No breeding habitat was recorded within the subject site; in addition, this species was not detected on the song meter during a breeding survey month.
Pteropus poliocephalus Grey-headed Flying-fox (Breeding)	Breeding camps.	No	No known local breeding camps The Grey-headed Flying-fox is a dual credit because foraging habitat is broad-ranging but breeding camps are localised. No breeding camps were recorded within the subject site or are known from the local area.
Tyto novaehollandiae Masked Owl (Breeding)	Living or dead trees with hollows greater than 20cm diameter.	No	No breeding habitat present The Masked Owl has a large home range of 500-1000 hectares. In Tasmania and Victoria Masked Owls have been recording nesting in paddock trees. Dead stags are often used for roosting/ breeding habitat. No breeding habitat was recorded within the subject site. The Masked Owl requires large tree hollows (> 20 cm in diameter).

Scientific name Common name	BAM Habitat constraints/ Geographic limitations	Confirmed candidate species?	Species habitat, ecology and justification of candidate species status
Vespadelus troughtoni Eastern Cave Bat	▪ Caves ▪ Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds."	No	Habitat constraints.
FLORA			
Homopholis belsonii Belson's Panic		No	Surveyed in January. Belson's Panic grows under shrubs and trees and tends to prefer slightly modified environments. This species was not recorded during field assessments inside the survey period.

5.1.2 Ecosystem Credit Species

Targeted surveys are not required for ecosystem credit species because the likelihood of occurrence of a species or elements of the species' habitat can be predicted by vegetation surrogates and landscape features (BAM, 2017). The BAM calculator determines biodiversity credits for these species using the vegetation integrity score for each vegetation zone (BAM, 2017). **Table 5.2** lists ecosystem credit species predicted to occur on site. Potential habitat is available for all predicted species; hence, they were maintained as ecosystem credits in the calculator.

Table 5.2: Ecosystem candidate species.

Species	NSW listing status[1] (BC Act)	National listing status[1] (EPBC Act)
FAUNA		
Chalinolobus picatus Little Pied Bat	V	
Chthonicola sagittata Speckled Warbler	V	
Daphoenositta chrysoptera Varied Sittella	V	
Dasyurus maculatus Spotted-tailed Quoll	V	E
Grantiella picta Painted Honeyeater	V	V
Hieraaetus morphnoides Little Eagle (Foraging)	V	
Macropus dorsalis Black-striped Wallaby	E	
Melanodryas cucullata cucullata Hooded Robin (south-eastern form)	V	

Species	NSW listing status[1] (BC Act)	National listing status[1] (EPBC Act)
Miniopterus schreibersii oceanensis Eastern Bentwing-bat (Foraging)	V	
Nyctophilus corbeni Corben's Long-eared Bat	V	V
Pteropus poliocephalus Grey-headed Flying-fox	V	V
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	V	
Stagonopleura guttata Diamond Firetail	V	
Tyto novaehollandiae Masked Owl (Foraging)	V	

[1] E – Endangered; V – Vulnerable

5.2 Threatened Species Search Area Results

Table 5.3 shows that database searches for the proposal site identified 31 threatened species with the potential to occur within the search area (20 km radius around the proposal site). Two out of the seven candidate species were recorded in the search area, including:

- Hieraaetus morphnoides (Little Eagle); and
- Homopholis belsonii (Belson's Panic).

An additional 29 threatened species were identified in the search area results but not on the BAM candidate species list. A habitat assessment determining the likelihood of these species to be impacted by the proposed works is provided in **Appendix IV.** Given habitat and geographic constraints, none of these threatened species were considered likely to occur at the proposal site.

Table 5.3: Threatened species that may occur in the local area.

Scientific Name	Common Name	Status[1]		No. DEES Records[2]	Potential occurrence
		BC Act 2016	EPBC Act 1999		
Plants					
Androcalva procumbens		V	V	0	Low
Cadellia pentastylis	Ooline	V	V	0	Low
Desmodium campylocaulon	Creeping Tick-trefoil	E		4	Low
Dichanthium setosum	Bluegrass	V	V	1	Low
Digitaria porrecta	Finger Panic Grass	E		3	Low
Homopholis belsonii	Belson's Panic	E	V	44	High
Lepidium aschersonii	Spiny Pepper-cress	V	V	1	Low
Philotheca ericifolia			V	0	Low
Swainsona murrayana	Slender Darling-pea	V	V	0	Low
Tylophora linearis		V	E	0	Low
Birds					
Anthochaera phrygia	Regent Honeyeater	CE	CE	0	Low
Callidris ferruginea	Curlew Sandpiper	E	CE	0	Low
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		4	Low
Climacteris picumnus victoriae	Brown Treecreeper	V		1	Low
Daphoenositta chrysoptera	Varied Sittella	V		1	Low

Erythrotriorchis radiatus	Red Goshawk	CE	V	0	Low
Geophaps scripta scripta	Squatter Pigeon (southern)	CE	V	0	Low
Grantiella picta	Painted Honeyeater	V	V	1	Low
Hieraaetus morphnoides	Little Eagle	V		2	Low
Polytelis swainsonii	Superb Parrot	V	V	0	Low
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V		2	Low
Rostratula australis	Australian Painted Snipe	E	E	0	Low
Reptiles					
Anomalopus mackayi	Five-clawed Worm-skink	E	V	2	Low
Aprasia parapulchella	Pink-tailed Worm-lizard	V	V	0	Low
Uvidicolus sphyrurus	Border Thick-tailed Gecko	V	V	0	Low
Mammals					
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	0	Low
Dasyurus maculatus	Spotted-tailed Quoll	V	E	0	Low
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	0	Low
Phascolarctos cinereus	Koala	V	V	1	Low
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	0	Low
Fish					
Maccullochella peelii	Murray Cod		V	0	Low

[1] Status Abbreviations: V – Vulnerable, E – Endangered, CE – Critically Endangered.

[2] Number of DEES wildlife atlas records in selected area Approx. 20km radius [North: -29.77 West: 149.69 East: 150.02 South: -29.98].

5.3 Results of Targeted Field surveys for Threatened/ Candidate Species

No candidate/threatened species were recorded during the field survey.

5.3.1 Survey Effort

A summary of the time spent during fieldwork and the prevailing weather conditions is summarised below in **Table 5.4**. Weather data is recorded from Narrabri Airport (station 054038), located 45 km south of the proposal site.

Table 5.4: Survey dates, times, activities and weather conditions

Date	Time	Activity	Weather*		
			9am °C	3pm °C	Rain mm
08.01.19	07.30-16.30	General site inspection Vegetation survey Overnight echo-location recording Opportunistic searches and sightings	28.4	35.4	0
09.01.19	07.30-16.30	Vegetation survey Diurnal bird search Overnight echo-location recording Opportunistic searches and sightings	27.1	34.1	0
10.01.19	07.30-8.30	Opportunistic searches and sightings	29.4	37.1	0

5.3.2 Flora

It is important to note that during the field survey, the site was very dry, with most herbaceous plants under stress or dying. Site surveys for *Homopholis belsonii* (Belson's Panic) were undertaken during January, the optimal survey period. This species was not recorded in the impact area; however, potential habitat for this species is present on the project site, particularly within the intact vegetation along the mid slope of Black Hill. *Homopholis belsonii* was recorded 5.0 km south of Black Hill on an isolated hill by Advitech (2019) during a floristic survey for a quarry not pursuant to this current assessment. Vegetation along the midslope of Black Hill will not be impacted by this proposal. A list of all plant species recorded during fieldwork is listed in **Appendix I**.

5.3.3 Fauna

No threatened/ candidate fauna species were recorded at the proposal site. A list of all fauna species recorded during fieldwork is listed in **Appendix III**. Targeted searches for all but two potential candidate species, *Tyto novaehollandiae* (Masked Owl) and the Little Eagle (*Hieraaetus morphnoides*), was carried out in the specified survey periods generated by the BAM calculator. Breeding habitat was ruled out for both species. The proposal will not impact any hollow bearing trees with the potential to support large tree hollows that provide breeding habitat for *T. novaehollandiae*. Breeding habitat for *H. morphnoides* was ruled out due to the absence of stick nests within the proposal area.

5.3.3.1 Microchiropteran Bats

Using echo-location over two separate nights, at least seven species of microchiropteran bats were recorded in the proposal area. **Table 5.5** shows that two species with similar call frequencies could not be confidently separated.

Table 5.5: Microchiropteran Bats recorded at the proposal site using echo-location

Scientific name	Common Name	Roosting habitat[1]	Comments
Chalinolobus gouldi	Gould's Wattled Bat	Tree hollows	
Mormopterus sp.3 (undescribed)	Inland Freetail Bat	Tree hollows	
Mormopterus sp.4 (undescribed)	South-Eastern Freetail Bat	Tree hollows	
Nyctophilus sp.		Tree hollows	Possibly *Nyctophilus corbeni*, an ecosystem credit species listed in NSW and Federally as Vulnerable. *Nyctophilus sp.* can't be separated to species level by call (Pennay *et al.,* 2004).
Scotorepens balstoni	Inland Broad-nosed Bat	Tree hollows	
Scotorepens greyii	Little Broad-Nosed Bat	Tree hollows	
Miniopterus schreibersii oceanensis	Eastern Bent-Wing Bat	Caves	Calls of these two species are similar and can't be confidently separated. *Miniopterus schreibersii oceanensis* is an ecosystem credit species listed in NSW as Vulnerable.
Vespadelus vulturnus	Little Forest Bat	Tree hollows	

[1] From Churchill (2008).

5.4 EPBC Act Assessment

No Matters of National Environmental Significance (MNES) are likely to be significantly impacted by the proposal.

5.4.1 Listed threatened species and ecological communities

One EPBC threatened community listed as Endangered (Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions) will be impacted by the proposal. It is unlikely this action constitutes a significant impact given the relatively small area (5.33 ha) of heavily disturbed vegetation within the construction footprint. Low condition quality vegetation (which had a VIS score of 9.8) did not meet the EEC description. A test of significance for impact to this TEC is provided in **Appendix V.**

5.4.2 Migratory Species Protected Under International Agreements

Ten nationally listed migratory terrestrial or wetland bird species were recorded on the DAWE Protected Matters Database (see **Appendix VI**) or are considered to have potential habitat available within 20 km of the project slopes, as listed in **Table 5.6.**

Table 5.6: Listed migratory species with the potential to occur in the local area.

Species name	Common name
Actitis hypoleucos	Common Sandpiper
Apus pacificus	Fork-tailed Swift
Calidris acuminata	Sharp-tailed Sandpiper
Calidris ferruginea	Curlew Sandpiper
Calidris melanotos	Pectoral Sandpiper
Gallinago hardwickii	Latham's Snipe
Hirundapus caudacutus	White-throated Needletail
Motacilla flava	Yellow Wagtail
Myiagra cyanoleuca	Satin Flycatcher
Pandion haliaetus	Osprey

None of the above migratory species were recorded on site during the field survey. The proposed works are unlikely to impact on any area considered to be 'important habitat' for the above migratory species, or likely to impact a significant proportion of a migratory population.

6. IMPACT ASSESTMENT

Using information collected during desktop investigations and site assessments, this chapter assesses potential impacts to ecological values as a result of the proposed works.

6.1 Avoid and Minimise Potential Impacts

This proposal requires access to hard rock resources at Black Hill to provide ballast and other material for the Inland Rail project. The development footprint is located on previously disturbed areas with relatively low condition vegetation. The final footprint has been designed to limit the ecological impact where possible. The proposal avoids impact to relatively good condition vegetation located on the mid slope of Black Hill and the haul road traverses cropping land that is substantially degraded.

The haul road was originally proposed to extend along the western boundary and had potential to impact a small number of paddock trees. The haul road route has now been revised to extend south from the proposed quarry through existing cropping land to Manamoi Road and no paddock trees would be impacted.

6.2 Avoiding and Minimising Prescribed Biodiversity Impacts

The BC Regulation (Division 6.1) identifies actions that are prescribed as impacts to be assessed under the biodiversity offsets scheme, they include:

- *Impacts of development on the following habitat of threatened species or ecological communities:*
  - *Karst, caves, crevices, cliffs and other geological features of significance; or*
  - *Rocks; or*
  - *Human made structures; or*
  - *Non-native vegetation.*
- *Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range;*
- *Impacts of development on movement of threatened species that maintains their lifecycle,*
- *Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development);*
- *Impacts of wind turbine strikes on protected animals; and*
- *Impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.*

There are no occurrences of karst, caves, crevices, cliffs or other geological features of significance at the proposal site. No threatened species or ecological communities that are dependent on these habitat features will be impacted by the proposed works. In addition, there are no known impacts to water quality, water bodies and hydrological processes that sustain threatened species or threatened ecological communities. Wind farm development is not applicable to the proposal. Prescribed impacts that are relevant to the proposal (including; rock removal, habitat connectivity and movement of animals and vehicle strikes) are assessed below.

6.3 Assessment of Direct Impacts

6.3.1 Loss of Vegetation and Habitat

The potential loss of vegetation and habitat associated with each stage of the proposal is summarised in **Table 6.1**. The proposed extraction area would impact two vegetation zones of PCT 147. The proposed haul road extends through cropping land and will not result on impacts to native vegetation.

Table 6.1: Vegetation impacted by each stage of the proposal.

Plant Community Type and Vegetation Zone	Listing		Staged Impacts (ha)			Total Impact (ha)
	BC Act	EPBC Act	Stage 1	Stage 2	Stage 3	
PCT 147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	**E**	**E**				
Zone 1 - Disturbed thicket (VIS = 20; low to moderate condition)			0	2.63	2.7	5.33
Zone 2 - Intact thicket (VIS = 48.1; moderate to good condition)			0	0	0	0
Zone 3 - Disturbed thicket (VIS = 9.8; low condition)			3.75	0.07	0	3.82
	GRAND TOTAL		**3.75**	**2.7**	**2.7**	**9.15**

The proposed construction footprint would impact two vegetation zones, described as low and moderate condition of PCT 147 (**Table 6.1.**). The proposal avoids impacts to PCT 147 in Zone 2 (moderate-good condition) where the community has a much higher vegetation integrity score (48.1/100) compared to 9.8/100 in Zone 3 and 20.0/100 in Zone 1.

A single paddock tree would be removed to accommodate Stage 1 of the proposal.

The proposed haul road route extends south from the proposed quarry to Manamoi Road through existing cropping land and no paddock trees or native vegetation would be impacted.

6.3.2 Habitat Removal

6.3.2.1 Habitat trees

No hollow bearing trees will be cleared by the proposed works.

6.3.2.2 Bush rocks

The proposal will result in the removal of natural surface deposit of rock from areas of native vegetation. Bushrock removal is listed as a key threatening process (KTP) under the BC Act 2016. Bushrock removal may remove or disturb habitat of native species which may find shelter under rocks or use rocks for basking. Database searches for the proposal site identified two threatened reptiles with the potential to occur within the search area that require surface rock, including *Aprasia parapulchella* (Pink-tailed Worm-lizard) and *Uvidicolus sphyrurus* (Border Thick-tailed Gecko). There are no existing records of these cryptic species within 20 km of the proposal site.

6.4 Assessment of Indirect Impacts

Indirect impacts occur when the proposal or activities relating to the construction or operation of the proposal affect native vegetation, threatened ecological communities and threatened species habitat beyond the subject land. Impacts may also result from changes to landuse patterns, such as an increase in vehicular access and human activity on native vegetation, threatened ecological communities and threatened species habitat. **Table 6.2** describes and assesses the impacts of the proposal on native vegetation and habitat beyond the subject site as detailed in Section 9.1.4.2 of the BAM.

Table 6.2: Assessment of indirect impacts on adjacent habitat.

Indirect Impact	Extent and Duration	Threatened species, TECs and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, TECs and their habitats.
(a) inadvertent impacts on adjacent habitat or vegetation.	Edge effects including weed growth and disturbance by vehicles (quarry trucks) may impact retained vegetation around the extraction area.	PCT 147.	These impacts may degrade areas of retained vegetation. Mitigation measures (**Table 6.6**) including weed management and fencing off retained areas of vegetation (where practicable) will help manage these impacts.
(b) reduced viability of adjacent habitat due to edge effects.	As above.	PCT 147.	As above.
(c) reduced viability of adjacent habitat due to noise, dust or light spill.	The quarry activities, including truck movements at the proposal site may exacerbate noise and dust impacts.	PCT 147.	Dust deposition on vegetation may affect plant health through reduced ability to photosynthesis. Noise may also impact fauna that shelter in habitat adjacent to the extraction area.
(d) transport of weeds and pathogens from the site to adjacent vegetation.	The proposal has the potential to introduce or increase weeds occurrence in adjacent habitat.	PCT 147.	This site is already subject to moderate weed infestation. Implementation of weed and pathogen control measures (**Table 6.6**) will help manage these impacts.
(e) increased risk of starvation, exposure and loss of shade or shelter.	The proposal has the potential to impact threatened fauna dependent on habitat within and adjacent to the proposal area.	N/A	Native fauna including birds, reptiles and mammals will lose shade and shelter resources.
(f) loss of breeding habitats.	It is unlikely the proposal would result in the loss of important	N/A	N/A

Indirect Impact	Extent and Duration	Threatened species, TECs and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, TECs and their habitats.
	breeding habitats giving the disturbed nature of the proposal area and surrounds.		
(g) trampling of threatened flora species.	No threatened flora species were identified within the proposal area	N/A	Implementation of management measures (**Table 6.6**) should help prevent trampling in areas where vegetation is retained.
(h) inhibition of nitrogen fixation and increased soil salinity.	The site is already substantially disturbed, and it is unlikely the proposal would further exacerbate these issues.	N/A	N/A
(i) fertiliser drift.	It is unlikely the proposal would further exacerbate these issues.	N/A	N/A
(j) rubbish dumping.	This issue is not likely to affect the subject land.	N/A	N/A
(k) wood collection.	This issue is not likely to affect the subject land.	N/A	N/A
(l) bush rock removal and disturbance.	Assessed as a direct impact in **Section 6.3.2.2.**		
(m) increase in predatory species populations.	It is unlikely that the proposal works will influence or alter predatory populations.	N/A	N/A
(n) increase in 'pest' animal populations.	It is unlikely that the proposal will influence or alter 'pest' species populations. 'Pest' animals have been recorded at the proposal site and are likely present in adjacent habitats.	N/A	N/A

Indirect Impact	Extent and Duration	Threatened species, TECs and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, TECs and their habitats.
(o) increased risk of fire.	The proposal is unlikely to increase the risk of fire in the local area.	N/A	N/A
(p) disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	No specialist breeding or foraging habitat is present in or adjacent to the site.	N/A	N/A

6.4.1 Wildlife Connectivity and Habitat Fragmentation

The removal of vegetation for the proposed works will add to the incremental fragmentation of vegetation within the local area. The vegetation on site is isolated from other habitat areas largely by rural farmland; the proposed removal of vegetation from the site is unlikely to significantly impact any local habitat links.

6.4.2 Injury and Mortality of Fauna

Injury and mortality of fauna could occur during vegetation clearing and vehicle movements across the proposal site. Fauna potentially impacted by vegetation clearing include birds and reptiles that may shelter in vegetation and woody debris. If any habitat trees are impacted, a qualified ecologist will be required to be onsite for trimming or removal of habitat trees. Macropods and birds are particularly susceptible to vehicle strikes. Given limited vegetation cover along the haul road, impacts to fauna crossing the haul road are likely to be avoided through application of site speed limits (40 km/h) and responsible driver behaviour.

6.5 Assessment of Significance

Assessments of Significance (AoS) have been conducted for the following species and are provided in **Appendix V**. **Table 6.3**provides a summary of the outcomes of the assessment of significance under the BC and EPBC Act.

Table 6.3: Assessments of significance summary.

BC Act significance assessments							
Threatened species, or communities	Significance assessment question[1]					Likely significant impact?
	a	b	c	d	e	
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions EEC	X	Y	Y	N	Y	No
EPBC Act significance assessments						
Threatened species, or communities	Important population					Likely significant impact?
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions EEC	N/A					No

Notes: Y= Yes (negative impact), N= No (no or positive impact), X= not applicable.

1. *Significance Assessment Questions as set out in the Biodiversity Conservation Act 2016/ Environmental Planning and Assessment Act 1979.*
   a *in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*
   b *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*
      (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
      (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*
   c *in relation to the habitat of a threatened species, population or ecological community:*
      (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
      (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
      (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,*
   d *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*
   e *Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

6.6 Mitigation and Management Measures

The proposal would follow a number of mitigation measures listed in **Table 6.3**. The proposed measures will assist with minimising the impacts of the project on biodiversity during construction and operation of the quarry.

Table 6.3: Mitigation and management measures.

Impact	Measure	Responsibility
Pre-Construction		
General	A Flora and Fauna Management Plan will be prepared in and implemented as part of the CEMP. It will include, but not be limited to: • Plans showing areas to be cleared and areas to be protected, including exclusion zones and weed management areas; • Pre-clearing survey requirements; • Procedures for unexpected threatened species finds and fauna handling; and Protocols to manage weeds and pathogens.	Contractor
Fauna handling	Before on ground works commence, contact an animal rescue agency/wildlife care group or vet before works start to ensure they are willing and available to be involved in fauna rescue and assist with injured animals. If any fauna handling is required, it must be undertaken by a licenced wildlife carer or ecologist.	Contractor
Vegetation clearing	The limits of clearing including where isolated trees are to be retained within areas of existing native vegetation will be delineated using appropriate signage and barriers, identified on site construction drawings and during construction staff induction.	Contractor

Impact	Measure	Responsibility
Disturbance to fallen timber and dead wood	All woody debris are not to be mulched or chipped but will be re-used on site for habitat improvement. Woody debris will not be dragged but lifted and placed appropriately outside the construction footprint in an adjacent area of project sites to enhance habitat. If long logs are required to be cut to assist relocation, logs must be cut away from hollow ends.	Contractor
Invasion and spread of pathogens and disease	Pathogen control protocols shall be developed and implemented in accordance with the requirements of the *Biosecurity Act 2015*.	Contractor
Invasion and spread of weeds	Weed control protocols shall be developed and implemented as part of the CEMP quarry operation plan. For example, any regeneration of African Boxthorn (e.g. along disturbed edges of the quarry) should be controlled before plants reach maturity and set seed to help control the weeds spread.	Contractor
During operation		
Threatened species protection	If unexpected threatened fauna or flora species are discovered, works must stop immediately until threatened flora or fauna species are reviewed and assessed by ecologists.	Contractor
Fauna protection	Due care should be made by all vehicle operators to take care and avoid any potential collision with fauna, such as macropods (Kangaroos) that may transverse the project site. A site speed limit of 40 km/h should be observed.	Contractor
Management of *Lycium ferocissimum* (African Boxthorn)	African Boxthorn is an aggressive invader of pastures and remnant bushland. The weed may spread vegetatively (including broken root fragments) and through fruit (unripened fruit on cut branches can still ripen and produce seed). Care is to be taken to ensure fragments of the weed are not transferred into any remnant vegetation to prevent the weeds spread. NSW DPI recommend removing or destroying (i.e. burning) all plant material. Use of fire is not recommended to burn plant material without stringent controls to reduce risk of any potential break in fire containment areas.	Contractor
'Pest' Animal monitoring/ control	'Pest' animals such as rodents, foxes, rabbits, wild dogs, feral cats and pigs are controlled on a needs basis.	Contractor
Post operation		
Preparation of a site rehabilitation plan	A rehabilitation plan in accordance with the land manager needs to be prepared prior to quarry shut down.	Contractor

7. IMPACT SUMMARY

This chapter summarises the impact to PCTs and the number of credit classes required for ecosystem and species credits. The BAM Calculator report is provided in **Appendix VII**.

7.1 Impact to Vegetation Integrity

Table 7.1 summarises the impact of the proposal to the vegetation integrity score of each PCT on site.

Table 7.1: Impact to the vegetation integrity score of each Vegetation Zone.

PCT/ Condition Class	Listing		Current score	Future score	Change in score	BRW[1]
	BC	EPBC				
147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion						
Zone 1 - Disturbed thicket, (low to moderate condition)	E	E	20	0	-20	2[2]
Zone 3 - Disturbed thicket (low condition)			9.8	0	-9.8	2[2]

[1] Biodiversity Risk Weighing (for ecosystem credits). 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 further explanation, see Appendix 7 of the BAM (2017).
[2] A BRW of 2 corresponds to High Sensitivity to Potential Gain.

7.2 Ecosystem Credits

The ecosystem credits required to offset the proposal are provided in **Table 7.2**. A total of 54 credits are required to offset the development.

Table 7.2: Ecosystem credits summary.

PCT	Vegetation Z one and Condition Class	Area Impacted	Credits required
147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Zone 1 - Disturbed thicket, (low to moderate condition)	5.33 ha	53
	Zone 2 - Intact thicket, (moderate to good condition)	0	0
	Zone 3 - Disturbed thicket (low condition)	3.82 ha	0
	Paddock trees	1 tree	1
Total		**9.15 ha / 1 tree**	**54**

The following like-for-like offset rules apply for PCT 147:

1. Any PCT associated with the TEC Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions (including PCT's 55, 147, 228, 378, 442, 452, 547, 627, 1124 and 1519);
2. In the IBRA subregions: Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel, or;
3. Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.

7.3 Project Staging

The credit obligation for each stage is summarised in **Table 7.4.**

Table 7.4: Ecosystem and species credits required for each stage.

Ecosystem / Species Type	Credits Required			Total Credits Required
	Stage 1	Stage 2	Stage 3	
147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	1	26	27	54

7.4 Offset

It is understood the credits generated for each stage of the development would be embedded in the project consent (if approved). The proponent would retire the credits associated with each stage prior to any works impacting the associated staged area.

The offsetting requirement for each stage will be achieved by retiring the required credits with the Biodiversity Conservation Trust.

8. CONCLUSION

Through application of the BAM, this BDAR has assessed impacts on biodiversity values including threatened species and threatened ecological communities. The Meppem Quarry; located 10.0 kms north east of the township of Bellata proposes to extract up to 490,000 tonnes of ballast material/ per annum over 5 years for the Inland Rail project.

Field assessments have identified the following PCT will be impacted by the proposal:

- *Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion* (PCT 147)

Three condition classes (vegetation zones) of this PCT were identified at the proposal site. Two vegetation zones (1 and 3) occur inside the proposal area with a combined impact area of 9.15 ha. Vegetation in zone 1 (5.33 ha), located on the crest of Black Hill is consistent with the *Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions* TEC description. This TEC is listed as Endangered under the NSW BC Act (2016) and Federally under the EPBC Act (1999). Low condition vegetation in Zone 3 (which had a VIS score of 9.8) did not meet the EEC description.

The final footprint of the quarry has been designed to limit the ecological impact where possible by avoiding impacts to vegetation zone 2 (good condition vegetation, located on the midslope of Black Hill) and retaining the majority (13/14) of paddock trees located along the haul road or at the base of the extraction area.

The BAM calculator identified a total of seven candidate species (species credit species) and 14 predicted species (ecosystem credit species) required consideration for assessment. No threatened/candidate species were recorded during targeted surveys. Other candidate species were considered unlikely to occur at the proposal site as the site lacked specific habitat requirements or was assessed as substantially degraded such that the species is unlikely to utilise the proposal site.

Key safeguard and management measures identified to minimise and avoid biodiversity impacts include but are not limited to; detail delineation of vegetation clearing limits, relocation of woody debris into remnant habitat and development of protocols/ management plans to control invasion and spread of pathogens and weeds.

A total of 54 ecosystem credits are required to offset impacts to PCT 147 on site. It is understood the credits generated for each stage of the development would be embedded in the project consent (if approved). The credits associated with each stage would be retired with the Biodiversity Conservation Trust prior to any works impacting the associated staged area.

The assessments identified that the proposed development is unlikely to significantly impact on any Matters of National Environment Significance.

9. REFERENCES

Advitech (2019) *Oonoonba/Bellata Quarry Biodiversity Development Assessment Report,* Advitech Group, 7 Riverside Drive Mayfield West, NSW 2304.

Auld, B.A. and Medd, R.W. (1996). *Weeds: An Illustrated Botanical Guide to the Weeds of Australia.* Inkata Press, Sydney.

Barker, J., Grigg, G.C. and Tyler, M.J. (1995). *A Field Guide to Australian Frogs*. Surrey, Beatty & Sons, New South Wales.

Churchill, S. (2008). *Australian Bats*. Reed New Holland, Sydney.

Commonwealth of Australia (2013). Matters of National Environmental Significance Significant impact guidelines 1.1 *Environment Protection and Biodiversity Conservation Act 1999*

Cropper, S. (1993). *Management of Endangered Plants*. CSIRO Publications, East Melbourne.

Cunningham, G.M., Mulham, W.E., Milthorpe, P.L. and Leigh, J.H. (2011). Plants of Western New South Wales (Soil Conservation Service, Sydney).

Department of Environment and Climate Change (2007). *Threatened species assessment guidelines: the assessment of significance*. NSW, Sydney South.

Department of Primary Industries (2013). *Grasses of the NSW Slopes and Adjacent Plains*. Tocal College, Paterson NSW.

Harden, G (1991-2000). *Flora of New South Wales. Vols 1-4.* NSW University Press.

NSW Department of Environment and Conservation (2004). *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities. Working Draft*.

Office of Environment and Heritage (OEH) (2010), *Semi-evergreen Vine Thicket EEC guidelines.* NSW, Sydney South.

Office of Environment and Heritage OEH (2015), *Atlas of NSW Wildlife Database.* Licenced database accessed December 2018

Office of Environment and Heritage OEH (2017). *Biodiversity Assessment Method*. NSW Office of Environment and Heritage, Sydney.

Office of Environment and Heritage OEH (2018). *Threatened Species Profiles website*. http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/index.aspx Accessed: February, 2018.

Office of Environment and Heritage OEH (2018). *Brigalow Belt South Subregions website.* https://www.environment.nsw.gov.au/bioregions/BrigalowBeltSouth-Subregions.htm Accessed: December 2018.

Office of Environment and Heritage OEH (2019). *Biodiversity Assessment Calculator*. https://www.lmbc.nsw.gov.au/bamcalc. Accessed: January 2019.

Pennay, M., B. Law, and L. Reinhold. (2004). *Bat Calls of New South Wales*. NSW Department of Environment and Conservation.

Richardson, F., Richardson, R. & Sheppard, R. (2011). *Weeds of the South-East – An Identification Guide for Australia*. WeedInfo, Victoria.

Robinson, L. (2003). *Field Guide to the Native Plants of Sydney* (3rd edn.). Kangaroo Press Pty. Ltd., New South Wales.

Simpson, K. & Day, N. (2010). *Field Guide to the Birds of Australia.* Penguin Publishing, Camberwell Victoria.

Van Dyck, S., Gynther, I. & Baker, A. (Eds) (2013). *Field Companion to The Mammals of Australia*. New Holland Publishing, Sydney.

Triggs, B. (1996). *Tracks, Scats and Other Traces - A Field Guide to Australian Mammals*, Oxford University Press, Melbourne.

Umwelt (2017), *Australian Rail Track Corporation Inland Rail Narrabri to North Start EIS, Vol 1 – Main Report*.

Wilson, S. and Swan, G. (2010). *A Complete Guide to the Reptiles of Australia.* New Holland Publishing, Sydney, New South Wales.

Appendix I

Flora Species List

Flora Species List

The following is a list of all flora species recorded within the site. It should be noted that such a list cannot be considered comprehensive, but rather indicative of the flora. A period of some years is often required to identify all species present in an area, particularly for cryptic or seasonally detectable species (such as orchids, some grasses and grass-like herbs).

Table 1: Plant species recorded

Family	Scientific Name	BAM Growth Form Code[1]	Exotic	COMMON NAME	Quadrat 1	2	3	4	5	6	MEANDER
Apocynaceae	*Carissa ovata*	L		Currant Bush	1			1			
	Marsdenia pleiadenia	V					1				
	Marsdenia viridiflora subsp. viridiflora	L		Native Pear				1		1	
	Parsonsia eucalyptophylla	L		Gargaloo	1	1		1	1		
Asteraceae	*Asteraceae sp.*		1		1						
	Vittadinia cuneata	F		Fuzzweed				1			
Boraginaceae	*Brassicaceae sp.*		1		1	1	1			1	
Brassicaceae	*Ehretia membranifolia*	S		Peach Bush	1	1	1	1			
Cactaceae	*Opuntia stricta*		1	Prickly Pear						1	
Capparaceae	*Apophyllum anomalum*	S		Warrior Bush							1
	Capparis lasiantha	L		Nepine						1	
	Capparis mitchellii	S		Wild oranage				1			
Casuarinaceae	*Casuarina cristata*	T		Belah							1
Chenopodiaceae	*Chenopodium species*	G				1	1				
	Einadia nutans	F		Climbing Saltbush	1			1			
	Enchylaena tomentosa	C		Ruby Saltbush	1	1	1	1	1	1	
	Rhagodia spinescens	C		Fragrant Saltbush	1	1	1	1			
	Salsola australis	S			1	1	1				
	Sclerolaena diacantha	G								1	
	Sclerolaena muricata var. muricata	C		Black Rolypoly	1	1	1		1		

Family	Scientific Name	BAM Growth Form Code[1]	Exotic	COMMON NAME	Quadrat 1	2	3	4	5	6	MEANDER
Cucurbitaceae	*Cucumis melo*		1	Melon			1		1	1	
Cupressaceae	*Callitris glaucophylla*	T		White Cypress Pine							1
Fabaceae	*Acacia salicina*	T		Cooba							1
	Desmodium varians	L		Slender Tick-trefoil					1		
	Indigofera sp.	F					1				
	Medicago sp.		1		1				1		
	Trifolium sp.		1	Clover			1				
Lamiaceae	*Salvia reflexa*		1	Mintweed	1		1				
	Spartothamnella juncea	S		Bead Bush				1			
Loranthaceae	*Amyema cambagei*	M									1
	Amyema quandang	M									1
Malvaceae	*Abutilon oxycarpum*	S		Straggly Lantern-bush		1	1	1	1		
	Malvastrum americanum		1	Spiked Malvastrum	1	1	1	1	1		
Myrtaceae	*Eucalyptus populnea subsp. bimbil*	T		Bimble Box							1
Nyctaginaceae	*Boerhavia dominii*	F		Tarvine				1	1		
Oleaceae	*Jasminum lineare*	L		Desert Jasmine		1		1	1		
	Notelaea microcarpa	T		Olive				1	1		
Poaceae	*Aristida leptopoda*	G		White Speargrass						1	1
	Aristida ramosa	G		Purple Wiregrass							1
	Aristida vagans	G		Threeawn Speargrass			1		1		
	Austrostipa scabra	G		Speargrass			1				
	Austrostipa verticillata	G		Slender Bamboo Grass		1	1	1	1		
	Chloris ventricosa	G		Tall Chloris					1		
	Cynodon dactylon	D		Common Couch				1			
	Dichanthium sericeum	G		Queensland Bluegrass	1						
	Eragrostis sp.	G			1						

Appendix II

BAM Site Survey Forms

7 Riverside Drive, Mayfield West NSW 2304 AUSTRALIA
Email mail@advitech.com.au Web www.advitech.com.au PO Box 207 Mayfield NSW 2304
Advitech Pty Limited t/a Advitech Environmental ABN 29 003 433 458 P 02 4924 5400 F 02 4967 3772

advitech environmental

BAM Site Field Survey Form

400 m² plot: Sheet 1 of 6

Date:	8 / 1 / 19	Survey Name	Plot Identifier	Recorders
Job #:		Meppem	Plot 1	LP, JF
Folder #:	15822			

GF Code	Top 3 native species in each growth form group: Full species name mandatory. All other native and exotic species: Full species name where practicable.	N, E or HTE	Cover	Abund	Stratum	Voucher
	1. Geijera parviflora (Wilga)	N	1.5	1		
	2. Ehretia (Peach Bush)	N	2	20		
	3. Box thorn - Lycium ferocissimum	HTE?	1	10		
	4. Carissia ovata (Twin Spines)	N	7	4?		
	5. Tribulus - Cat head - Tribulus terrestris	E	20			
	6. Parsonsia eucalyptophylla	N	0.1			
	7. Cathead Saltbush (ID) Emex australis	E	0.1	5		
	8. Mint (ID) - Salvia reflexa	E	0.2			
	9. Saltbush (Blue) (ID) ~~[illegible]~~ (Rhagodia ~~[illegible]~~	N	0.1	1	spinescens	
	10. Saltbush (Blue) linear leaves small flower (ID) -	N	0.2	-- Salsola australis		
	11. Ruby Saltbush - Enchylaena tomentosa	N	0.[illegible]			
	12. Grass (ID) - small panicum ? Paspalidium gracile	N	0.[illegible]			
	13. 3 spine saltbush (ID) (Sclerana) Sclerolaena muricata	N	0.1		muricata	
	14. Einada like (ID) - Einadia nutans	N	0.1			
	15. ~~Grass (ID) Paspalum like Paspalidium~~ ?	~~N?~~	~~0.1~~			
	16. Brassicace, White Flower (ID) ?	E	0.1			
	17. Asteraceae - (ID) Exotic	E	0.1			
	18. ~~[illegible]~~ ~~[illegible]~~ (~~[illegible]~~) Heliotropium amplexicaule	E	0.5			
	19. Pigface ID - Portulaca oleracea (Purslane)	N	0.1			
	20. Medicago sp.	E	0.1			
	21. Eragrostis sp. ID - No ID.	N	0.1			
	22.					
	23.					
	24.					
	25.					
	26.					
	27.					
	28.					
	29.					
	30.					
	31.					
	32.					
	33.					
	34.					
	35.					
	36.					
	37.					
	38.					
	39.					
	40.					

GF Code: see Growth Form definitions in Appendix 1. GF - circle code if 'top 3'. N: native, E: exotic, HTE: high threat exotic.
Cover: 0.1, 0.2, 0.3, ... 10, 15, 20, ... 100% (foliage cover). Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ...1000, ...
***Note:** 0.1% cover represents an area of approx. 63 x 63 cm or a circle about 71 cm across, 0.5% = 1.4 x 1.4 m, 1% = 2 x 2 m, 25% = 10 x 10 m.*

BAM Site Field Survey Form

Site Sheet: No. __ of __

		Survey Name	Zone ID	Recorders L.P.J.F			
Date	8 / 1 / 19	Meppem	POOR CLASS				
Zone	Datum	Plot ID	Q.1	Plot dimensions	20×50	Photo #	
55	GDA94						
Easting	Northing	IBRA region	BBS	Midline bearing from 0 m	275°		
778860	6692619						
Vegetation Class		W. Vine thickets				Confidence: H M L	
Plant Community Type		147		EEC: Y		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	0
	Shrubs	5
	Grasses etc.	3
	Forbs	3
	Ferns	–
	Other	2
Sum of Cover of native vascular plants by growth form group	Trees	–
	Shrubs	3.9
	Grasses etc.	0.4
	Forbs	0.4
	Ferns	–
	Other	7.1
High Threat Weed cover		1

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm		
20 – 29 cm		
10 – 19 cm	✓ coilga	
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	18	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	1	1	1	20	2	89	30	70	50	50						20	40	20	20	20
Average of the 5 subplots	5					56.8										24				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type	Hill top	Landform Element		Landform Pattern		Microrelief	
Lithology	Basalt Rock	Soil Surface Texture	Loam	Soil Colour	Black	Soil Depth	20cm
Slope	5°-10°	Aspect	SE	Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	2	NR	
Cultivation (inc. pasture)			
Soil erosion	1	R	Exposed Soil
Firewood / CWD removal			
Grazing (identify native/stock)	3	R	Dry Cattle Dung - Shrubs heavily grazed
Fire damage			
Storm damage			
Weediness	2	R	Box Thorn common
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

7 Riverside Drive, Mayfield West NSW 2304 AUSTRALIA
Email mail@advitech.com.au Web www.advitech.com.au PO Box 207 Mayfield NSW 2304
Advitech Pty Limited t/a Advitech Environmental ABN 29 003 433 458 P 02 4924 5400 F 02 4967 3772

advitech environmental

BAM Site Field Survey Form

400 m² plot: Sheet 2 of 6

Date:	8 / 1 / 19	Survey Name	Plot Identifier	Recorders
Job #:		Meppen	Plot 2	LP, JF
Folder #:	15822			

GF Code	Top 3 native species in each growth form group: Full species name mandatory. All other native and exotic species: Full species name where practicable.	N, E or HTE	Cover	Abund	Stratum	Voucher
	1 Ektetia Peach Bush	N	20	60+		
	2 Wilga Geijera parviflora	N	3	1		
	3 ? (ID) - Alectryon oleifolius	N	1	2		
	4 Ruby Saltbush Enchylaena tomentosa	N	0.1			
	5 ? (ID) Abutilon oxycarpum	N	0.1			
	6 Saltbush ([illegible] leaves) (blue) (ID)	N	0.7		Rhagodia spinescens	
	7 Salt Bush (many seeds) (ID) - Chenopodium sp	N?	0.1			
	8 Parsonsia eucalyptophylla	N	0.1			
	9 Box Thorn	HTE	0.2	8		
	10 Brassicaceae (same as plot 1) ?	E	0.1			
	11 Sclerolaena 5 spines - Sclerolaena muricata	N	0.1	5		
	12 Austrostipa - Bamboo Grass (ID) verticillata	N	0.2	20		
	13 Trifoliate leaf - ? (ID) Jasminum lineare	N	0.1	5		
	14 Tribulus (cat head) Tribulus terrestris	E	10			
	15 Camiaceae - not smell, also plot 1 - Malvastrum	E	0.1	50+	americanum	
	16 Saltbush ribbed stems - Salsola australis	N	0.1	10		
	17 Small panicum (plot 1) (ID) Paspalidium gracile	N	0.5	50		
	18		0.1	2		
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1. GF - circle code if 'top 3'. N: native, E: exotic, HTE: high threat exotic.
Cover: 0.1, 0.2, 0.3, ... 10, 15, 20, ... 100% (foliage cover). Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ...1000, ...
Note: 0.1% cover represents an area of approx. 63 x 63 cm or a circle about 71 cm across, 0.5% = 1.4 x 1.4 m, 1% = 2 x 2 m, 25% = 10 x 10 m.

BAM Site Field Survey Form

Site Sheet: No. __ of __

		Survey Name	Zone ID	Recorders			
Date	8 1 19	Meppom	Poor class	L.P, J.F			
Zone 55	Datum GDA94	Plot ID	Q2	Plot dimensions	20x50	Photo #	
Easting 733804	Northing 6692595	IBRA region	BBS	Midline bearing from 0 m	275°		
Vegetation Class		W. Vine Thicket				Confidence: (H) M L	
Plant Community Type		147		EEC: Y		Confidence: (H) M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	1
	Shrubs	7
	Grasses etc.	2
	Forbs	1
	Ferns	-
	Other	2
Sum of Cover of native vascular plants by growth form group	Trees	1
	Shrubs	24.1
	Grasses etc.	0.7
	Forbs	0.1
	Ferns	-
	Other	0.2
High Threat Weed cover		0.2

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm		
20 – 29 cm		
10 – 19 cm	✓ Wilga Alphaya	
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	2	20	5	50	20	60	50	65	35	60						35	25	20	20	20
Average of the 5 subplots	19.4					54										24				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology	Basalt	Soil Surface Texture	Loam	Soil Colour	Black	Soil Depth	>20
Slope	0-5°	Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	2	NR	Low/No occurrence of large stems
Cultivation (inc. pasture)			
Soil erosion	1	R	Dark soil
Firewood / CWD removal			
Grazing (identify native/stock)	3	R	Grazed shrubs + Groundcover - Cattle dung
Fire damage			
Storm damage			
Weediness	1		Some Bare Ground
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

7 Riverside Drive, Mayfield West NSW 2304 AUSTRALIA
Email mail@advitech.com.au Web www.advitech.com.au PO Box 207 Mayfield NSW 2304
Advitech Pty Limited t/a Advitech Environmental ABN 29 003 433 458 P 02 4924 5400 F 02 4967 3772

advitech environmental

BAM Site Field Survey Form

400 m² plot: Sheet 3 of 6

Date:	8/1/19	Survey Name	Plot Identifier	Recorders
Job #:		Meppen	Plot 3 - ~~[illegible]~~ Poor	LP, JF
Folder #:	15822			

GF Code	Top 3 native species in each growth form group: Full species name mandatory. All other native and exotic species: Full species name where practicable.	N, E or HTE	Cover	Abund	Stratum	Voucher
	1. Wilga Geijera parviflora	N	0.8	2		
	2. Peach Bush - Ehretia	N	6	30 r		
	3. Shrub / Milky Sap (ID) - ? Marsdenia pleiadenia	N/?	0.1			
	4. Lamiaceae - (ID) - No smell Malvastrum americ.	E	0.1			
	5. Small Panicum (same as plots 1&2) (ID)	N	0.3	Paspalidium	gracile	
	6. ~~Atalaya~~ ? (ID) Western Rosewood - Alectryon oleifolius	N	0.6	2		
	7. Tribulus - Cat Head Tribulus terrestris	E	20	100 T		
	8. Ruby Saltbush Enchylaena tomentosa	N	0.5			
	9. Mint (strong odour) (ID) Salvia reflexa	E	0.1			
	10. Stipa sp. Austrostipa ~~[illegible]~~ scabra	N	0.1	1		
	11. Saltbush (many seeds) Chenopodium sp	E?	0.8			
	12. Salt Sp[illegible] (Whited stems) - Salsola australis	N	0.2			
	13. ~~Grass~~ - Malvaceae Abutilon oxycarpum	N	0.1			
	14. Sclerolaena saltbush 3 spines muricata	N	0.2			
	15. Brassicaceae	E	0.1			
	16. Purple Fabaceae (ID) Indigofera sp.	N	0.1			
	17. Trifoliate Clover (ID)	E	0.1			
	18. Cucurbitaceae ? (ID) Cucumis melo	E	0.1			
	19. Austrostipa (ID - plot 2) verticillata	N	0.1			
	20. Box Thorn	E	0.5			
	21. 3 awn grass (ID) Aristida vagans	N	0.1			
	22. Saltbush hastate blue leaves (ID)	N	0.2	Rhagodia		
	23. Small Wallaby Grass (ID) A. bipartita	N	0.1	~~[illegible]~~		
	24. Rytidosperma bipartitum					
	25.					
	26.					
	27.					
	28.					
	29.					
	30.					
	31.					
	32.					
	33.					
	34.					
	35.					
	36.					
	37.					
	38.					
	39.					
	40.					

GF Code: see Growth Form definitions in Appendix 1. GF - circle code if 'top 3'. N: native, E: exotic, HTE: high threat exotic.
Cover: 0.1, 0.2, 0.3, ... 10, 15, 20, ... 100% (foliage cover). Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ...1000, ...
Note: *0.1% cover represents an area of approx. 63 x 63 cm or a circle about 71 cm across, 0.5% = 1.4 x 1.4 m, 1% = 2 x 2 m, 25% = 10 x 10 m.*

Grey Butcherbird

BAM Site Field Survey Form

Site Sheet: No. __ of __

		Survey Name	Zone ID	Recorders			
Date	9/11/19	Meppen	Poor	LP, JF			
Zone	Datum	Plot ID	Q3	Plot dimensions	20x50	Photo #	
55	GDA94						
Easting	Northing	IBRA region	BBS	Midline bearing from 0 m	50°		
778664	6692547						
Vegetation Class		W. Vine Thickets				Confidence: H M L	
Plant Community Type		147		EEC: Y		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	1
	Shrubs	7
	Grasses etc.	4
	Forbs	2
	Ferns	0
	Other	01
Sum of Cover of native vascular plants by growth form group	Trees	0.6
	Shrubs	7.48
	Grasses etc.	0.4
	Forbs	0.3
	Ferns	0
	Other	0.1
High Threat Weed cover		0.5

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm		
20 – 29 cm		
10 – 19 cm	✓	
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	1m	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	10	10	20	15	15	60	70	65	40	60						15	20	15	50	25
Average of the 5 subplots	14					59										25				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	2	NR	
Cultivation (inc. pasture)			
Soil erosion	1	R	
Firewood / CWD removal			
Grazing (identify native/stock)	3	R	
Fire damage			
Storm damage			
Weediness	2	R	
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

7 Riverside Drive, Mayfield West NSW 2304 AUSTRALIA
Email mail@advitech.com.au Web www.advitech.com.au PO Box 207 Mayfield NSW 2304
Advitech Pty Limited t/a Advitech Environmental ABN 29 003 433 458 P 02 4924 5400 F 02 4967 3772

advitech environmental

BAM Site Field Survey Form

400 m² plot: Sheet 4 of 6

Date:	9 / 1 / 18	Survey Name	Plot Identifier	Recorders
Job #:		Meppen	Plot 4 – Good Cond.	CP, JF
Folder #:	15822			

GF Code	Top 3 native species in each growth form group: Full species name mandatory. All other native and exotic species: Full species name where practicable.	N, E or HTE	Cover	Abund	Stratum	Voucher
	1. Capparis / Alectryon? – Peach Bush	N	10	30		
	2. Geijera parviflora – wilga	N	2	10		
	3. Jasminum lineare	N	0.5	10+		
	4. Notelaea microcarpa	N	0.5	10 – heavily grazed		
	5. Carissa spinarum (ovata)	N	10	5 – single clump		
	6. Paspalidium gracile	N	0.5	50+		
	7. [illegible] – Abutilon ? (ID) A. oxycarpum	N	0.5			
	8. Dead Bush – Sporth Thorn ... juncea	N	0.3	10		
	9. Parsonsia eucalyptophylla	N	0.3	10		
	10. [illegible] (ID) Marsdenia viridiflora	N	0.1			
	11. Box Thorn	HTE	0.1	6		
	12. Capparis mitchellii	N	0.2	2		
	13. Ruby Saltbush Enchylaena tomentosa	N	0.5	20		
	14. Panicum sp.	N	0.1	1		
	15. Vittadinia cuneata	N	0.1	3		
	16. Weed (ID) (thistle like) Vine Milk sap?	N	0.5	5+ Marsdenia pleiadenia		
	17. [illegible] ? (ID) 2. Purple Flower – Boerhavia dominii	N	0.1			
	18. Aristida / Enteropogon? verticillata	N	0.5			
	19. Weed – Malvaceae Malvastrum americanum	E	0.1			
	20. Couch [illegible] Cynodon dactylon	N	0.5			
	21. Tribulus terrestris	E	0.1			
	22. Pigface / Purslane Portulaca oleracea	N	0.1	1		
	23. Einadia nutans	N	0.1	3		
	24. Rhagodia spinescens	N	0.5	10		
	25. Solanaceae nightshade (ID) Solanum parvifolium	N	0.1	1		
	26.					
	27.					
	28.					
	29.					
	30.					
	31.					
	32.					
	33.					
	34.					
	35.					
	36.					
	37.					
	38.					
	39.					
	40.					

GF Code: see Growth Form definitions in Appendix 1. GF - circle code if 'top 3'. N: native, E: exotic, HTE: high threat exotic.
Cover: 0.1, 0.2, 0.3, ... 10, 15, 20, ... 100% (foliage cover). Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ...1000, ...
Note: 0.1% cover represents an area of approx. 63 x 63 cm or a circle about 71 cm across, 0.5% = 1.4 x 1.4 m, 1% = 2 x 2 m, 25% = 10 x 10 m.

BAM Site Field Survey Form

Site Sheet: No. __ of __

		Survey Name	Zone ID	Recorders			
Date	9 / 1 / 18		Good	L.P, J.F			
Zone	Datum	Plot ID	Q4	Plot dimensions	50 x 20	Photo #	
55	GDA94						
Easting	Northing	IBRA region	BGS	Midline bearing from 0 m	250 SW		
778866	6692418						
Vegetation Class		Western Vine Thicket				Confidence: (H) M L	
Plant Community Type		147		EEC: Y		Confidence: (H) M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	1
	Shrubs	8
	Grasses etc.	3
	Forbs	4
	Ferns	-
	Other	~~4~~ 5
Sum of Cover of native vascular plants by growth form group	Trees	0.5
	Shrubs	37.8
	Grasses etc.	1.5
	Forbs	4
	Ferns	-
	Other	~~10.5~~ 11.2
High Threat Weed cover		1

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	✓1 Bimble Box	1
50 – 79 cm		
30 – 49 cm	✓ ~~1~~	
20 – 29 cm	✓	
10 – 19 cm	✓	
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	34m	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	30	50	40	2	40	0	20	25	10	20	~~20~~	5	2			70	30	25	5	30
Average of the 5 subplots	32.5					15					1.4					48				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	2	NR	
Cultivation (inc. pasture)			
Soil erosion	1	R	
Firewood / CWD removal			
Grazing (identify native/stock)	3	R	Cow dung
Fire damage			
Storm damage			
Weediness	1	R	
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

7 Riverside Drive, Mayfield West NSW 2304 AUSTRALIA
Email mail@advitech.com.au Web www.advitech.com.au PO Box 207 Mayfield NSW 2304
Advitech Pty Limited t/a Advitech Environmental ABN 29 003 433 458 P 02 4924 5400 F 02 4967 3772

advitech environmental

BAM Site Field Survey Form

400 m² plot: Sheet 5 of 6

Date:	9/1/19	Survey Name	Plot Identifier	Recorders
Job #:		Meppen	Plot 5	LP, JF
Folder #:	15822		Low Condition	

GF Code	Top 3 native species in each growth form group: Full species name mandatory. All other native and exotic species: Full species name where practicable.	N, E or HTE	Cover	Abund	Stratum	Voucher
	1. Notelaea Microcarpa	N	0.1	2		
	2. Boxthorn	HTE	10			
	3. Desmodium (ID) varians	N	0.1			
	4. Paspalidium gracile	N	0.5			
	5. Sclerolaena muricata	N	5			
	6. Weed (Malvaceae) (ID) Malvastrum americanum	E	0.5	50		
	7. Jasminum lineare	N	0.5	50+		
	8. Tribulus terrestris	E	30			
	9. ~~[illegible]~~ Purple flower - Boerhavia dominii	N	4	50+		
	10. Austrostipa verticillata	N	~~[illegible]~~	0.5		
	11. Ruby Saltbush - Enchylaena tomentosa	N	1			
	12. Cucurbitaceae (V) (ID) Cucumis melo	E	0.1			
	13. 3 awn grass Aristida vagans	N	0.5			
	14. Thistle (Purple)	E	0.1			
	15. Aster. ~~[illegible]~~ burr head (ID)	N ?	0.1			
	16. Pavonia - Abutilon (ID) A. oxycarpum	N	0.1			
	17. Pig face Portulaca oleracea	N	0.1	10		
	18. Parsonsia eucalyptophylla	N	0.1	5		
	19. Chloris vent. ? (ID) ventricosa	N	0.1			
	20. Saltbush burr (ID) - Emex australis	E	0.1	1		
	21. Clover (ID) Medicago sp.	E	0.1			
	22. Wallaby Grass Austrodanthonia bipartita	N	0.1	(Rytidosperma)		
	23.					
	24.					
	25.					
	26.					
	27.					
	28.					
	29.					
	30.					
	31.					
	32.					
	33.					
	34.					
	35.					
	36.					
	37.					
	38.					
	39.					
	40.					

GF Code: see Growth Form definitions in Appendix 1. GF - circle code if 'top 3'. N: native, E: exotic, HTE: high threat exotic.
Cover: 0.1, 0.2, 0.3, ... 10, 15, 20, ... 100% (foliage cover). Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ...1000, ...
Note: *0.1% cover represents an area of approx. 63 x 63 cm or a circle about 71 cm across, 0.5% = 1.4 x 1.4 m, 1% = 2 x 2 m, 25% = 10 x 10 m.*

BAM Site Field Survey Form

Site Sheet: No. __ of __

		Survey Name	Zone ID	Recorders			
Date	9/1/19	Meppem	Poor (Very)	L.P, J.F			
Zone	Datum	Plot ID	QS	Plot dimensions	20x50	Photo #	
Easting	Northing	IBRA region	BBS	Midline bearing from 0 m	220°		
Vegetation Class		W. Vine Thicket				Confidence: H M L	
Plant Community Type		147		EEC: N		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	1
	Shrubs	83
	Grasses etc.	5
	Forbs	2
	Ferns	-
	Other	3
Sum of Cover of native vascular plants by growth form group	Trees	0.1
	Shrubs	5.7
	Grasses etc.	1.7
	Forbs	4.1
	Ferns	-
	Other	0.7
High Threat Weed cover		10

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm		
20 – 29 cm		
10 – 19 cm	✓	
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	2 10 2 3 5	60 66 75 75 75	- - - - -	30 30 25 20 20
Average of the 5 subplots	4.4	70.2		25

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology	Basalt	Soil Surface Texture	loam	Soil Colour	black	Soil Depth	>20cm
Slope	5-10°	Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	3		
Cultivation (inc. pasture)			
Soil erosion	1		
Firewood / CWD removal			
Grazing (identify native/stock)	3		
Fire damage			
Storm damage			
Weediness	2		
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

7 Riverside Drive, Mayfield West NSW 2304 AUSTRALIA
Email mail@advitech.com.au Web www.advitech.com.au PO Box 207 Mayfield NSW 2304
Advitech Pty Limited t/a Advitech Environmental ABN 29 003 433 458 P 02 4924 5400 F 02 4967 3772

advitech environmental

BAM Site Field Survey Form

400 m² plot: Sheet 6 of 6

Date:	31/1/2019	Survey Name	Plot Identifier	Recorders
Job #:		Meppen Quarry Block 44	Plot 6 Low. Cond.	CP JF
Folder #:	15922			

GF Code	Top 3 native species in each growth form group: Full species name mandatory. All other native and exotic species: Full species name where practicable.	N, E or HTE	Cover	Abund	Stratum	Voucher
	1. Aristida leptopoda	N	10	>100		
	2. Tribulus terrestris	E	8	>50		
	3. Sclerolaena divaricata	N	0.2	10		
	4. Box thorn Lycium ferocissimum	HTE	0.2	3		
	5. Opuntia (Prickly pear)	HTE	0.1	1		
	6. Capparis lasiantha	N	0.1	1		
	7. [redacted] Panicum sp. (S)		0.1	2		(Photo)
	8. Brassicaceae sp. (S)	E	0.1			
	9. Marsdenia viral. foliis	N	0.1	1		
	10. [redacted] Helen. (sp) Cucumis Melo (weed)	E	0.1	1		
	11. Ruby Daltbush Enchylaena tomentosa	N	0.1	1		
	12.					
	13.					
	14.					
	15.					
	16.					
	17. One green colour (Panicum decompositum)	N				
	18.					
	19.					
	20.					
	21.					
	22.					
	23.					
	24.					
	25.					
	26.					
	27.					
	28.					
	29.					
	30.					
	31.					
	32.					
	33.					
	34.					
	35.					
	36					
	37.					
	38.					
	39.					
	40.					

GF Code: see Growth Form definitions in Appendix 1. GF - circle code if 'top 3'. N: native, E: exotic, HTE: high threat exotic.
Cover: 0.1, 0.2, 0.3, ... 10, 15, 20, ... 100% (foliage cover). Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ...1000, ...
Note: 0.1% cover represents an area of approx. 63 x 63 cm or a circle about 71 cm across, 0.5% = 1.4 x 1.4 m, 1% = 2 x 2 m, 25% = 10 x 10 m.

BAM Site Field Survey Form

Site Sheet: No. __ of __

Survey Name	Zone ID	Recorders
Meppem	Basearea	J.F, L.P.

Date	31/1/18	**Plot ID**	6 (poor)	**Plot dimensions**	20x50	**Photo #**	
Zone: 55	Datum: GDA94						
Easting: 778986	Northing: 6692288	**IBRA region**	BBS	**Midline bearing from 0 m**	0° North	(GPS ref 213)	

Vegetation Class	W. Vine Thickets	Confidence: H M (L)
Plant Community Type	147.	EEC: N / Confidence: H M (L)

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	0
	Shrubs	2
	Grasses etc.	2
	Forbs	0
	Ferns	0
	Other	2
Sum of Cover of native vascular plants by growth form group	Trees	0
	Shrubs	0.3
	Grasses etc.	10.1
	Forbs	0
	Ferns	0
	Other	0.3
High Threat Weed cover		0

BAM Attribute (1000 m² plot)		
DBH	**# Tree Stems Count**	**# Stems with Hollows**
80 + cm		
50 – 79 cm		
30 – 49 cm		
20 – 29 cm		
10 – 19 cm		
5 – 9 cm		
< 5 cm	Nil	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	Nil	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	2	5	5	8	4	90	80	89	85	90	0	0	0	0	0	6	10	6	6	7
Average of the 5 subplots	4.8					86.8					0					7				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology	Basalt	Soil Surface Texture	Loam	Soil Colour	Black	Soil Depth	220cm
Slope	10-15	Aspect	SE	Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	3		
Cultivation (inc. pasture)			
Soil erosion	1		
Firewood / CWD removal			
Grazing (identify native/stock)	3		
Fire damage			
Storm damage			
Weediness	2		
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Family	Scientific Name	BAM Growth Form Code[1]	Exotic	COMMON NAME	Quadrat 1	2	3	4	5	6	MEANDER
	Panicum decompositum	G								1	
	Paspalidium gracile	G		Slender Panic	1	1	1	1	1		
	Rytidosperma bipartitum	G		Wallaby Grass			1		1		
Polygonaceae	*Emex australis*		1	Spiny Emex	1				1		
Portulacaceae	*Portulaca oleracea*	F		Purslane	1			1	1		
Rutaceae	*Geijera parviflora*	S		Wilga	1	1	1	1			
Sapindaceae	*Alectryon oleifolius*	T		Western Rosewood		1	1				
Solanaceae	*Lycium ferocissimum*		1	African boxthorn	1	1	1	1	1	1	
	Solanum parvifolium subsp. parvifolium	S						1			
Viscaceae	*Korthalsella rubra*	M									1
Zygophyllaceae	*Tribulus terrestris*		1	Cat-ear	1	1	1	1	1	1	

[1] BAM Growth Form: S (Shrub), F (Forb), T (Tree), C (Chenopod), L (Vine), V (Sedge), K (Epiphyte), G (Tussock Grass), D (Other Grass), H (Hummock Grass) and E (Fern and fern allies).

Appendix III

Fauna Species List

Fauna Species List

The following is a list of all fauna species recorded within the site during the survey period.

Observation Type:

O – Observed	**B** - Burnt	**F** - Tracks/scratchings
T - Trapped or netted	**H** - Hair, feathers, or skin	**Y** - Bone or teeth
R - Road kill	**P** - Scat	**D** - Dog kill
W - Heard call	**C** - Cat kill	**Z** - In raptor/owl pellet
V - Fox kill	**E** - Nest/roost	**K** - Dead
M - Miscellaneous	**X** - In scat	**U** – Bat Recording

Notes

? – Indicates a species identified without certainty or to a Genus level only.

* – Indicates an introduced species.

	Scientific Name	Common Name	BC Act	EPBC Act	Obs Type
BIRDS					
Family Acanthizidae					
	Acanthiza nana	Yellow Thornbill			O
Family Accipitridae					
	Aquila audax	Wedge-tailed Eagle			O
Family Artamidae					
	Cracticus nigrogularis	Pied Butcherbird			O
	Gymnorhina tibicen	Australian Magpie			O
Family Cacatuidae					
	Cacatua sanguinea	Little Corella			O
	Eolophus roseicapilla	Galah			O
Family Casuariidae					
	Dromaius novaehollandiae	Emu			E
Family Corvidae					
	Corvus coronoides	Australian Raven			O
Family Falconidae					
	Falco cenchroides	Australian Kestrel			O
Family Meliphagidae					
	Acanthagenys rufogularis	Spiny-checked Honeyeater			
	Manorina melanocephala	Noisy Miner			O
Family Monarchidae					
	Grallina cyanoleuca	Magpie-lark			O
Family Psittaculidae					
	Northiella haematogaster	Blue Bonnet			O
Family Rhipiduridae					
	Rhipidura leucophrys	Willie Wagtail			O

	Scientific Name	Common Name	BC Act	EPBC Act	Obs Type
Reptiles					
Family Scincidae					
	Cryptoblepharus australis	Inland Snake-eyed Skink			O

	Scientific Name	Common Name	BC Act	EPBC Act	Obs Type
MAMMALS					
Family Leporidae					
	Lepus capensis	Brown Hare			O
Family Macropodidae					
	Macropus giganteus	Eastern Grey Kangaroo			O
	Macropus robustus	Common Wallaroo			O
Family Molossidae					
	Mormopterus sp. 3 (undescribed)	Inland Freetail Bat			U
	Mormopterus sp. 4 (undescribed)	South-eastern Freetail Bat			U
Family Vespertilionidae					
	Chalinolobus gouldii	Gould's Wattled Bat			U
	Nyctophilus sp.				U
	Scotorepens balstoni	Inland Broad nosed Bat			U
	Scotorepens greyii	Little Broad-Nosed Bat			U

Appendix IV

Habitat Assessment for Threatened Species

Habitat assessment

Likelihood of occurrence criteria

Likelihood	Criteria
Recorded	The species was observed in the study area during the current survey.
High	It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (ie. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (ie. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10km). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (ie. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent from the study area.

Note 1: Number of DEES wildlife atlas records in selected area Approx. 10km radius [North: -29.82 West: 149.83 East: 149.93 South: -29.92]

Habitat assessment table

Species	Listing		Habitat Description and Locally Known Populations	Number of records[1]	Likelihood of Occurrence/ Impact
	BC Act	EPBC Act			
Flora					
Androcalva procumbens Synonyms: *Commersonia procumbens*	V	V	This prostrate shrub is endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but also in the Pilliga and Nymagee areas. Grows in sandy sites, often along roadsides. Recorded in *Eucalyptus dealbata* and *Eucalyptus sideroxylon.*	0	Low This species was not recorded during field investigation. Suitable habitat was not identified in the subject area.

Species	Listing		Habitat Description and Locally Known Populations	Number of records[1]	Likelihood of Occurrence/ Impact
	BC Act	EPBC Act			
Cadellia pentastylis Ooline	V	V	In NSW, Ooloine, a medium-sized spreading tree occurs along the western edge of the North West Slopes from north of Gunnedah to west of Tenterfield. The natural range is from 24ºS to 30ºS in the 500 to 750 mm per annum rainfall belt. Ooline occurs on low- to medium-nutrient soils of sandy clay or clayey consistencies.	0	Low This species was not recorded during field investigation.
Desmodium campylocaulon Creeping Tick-trefoil	E		In NSW this erect perennial forb occurs chiefly in the Collarenebri and Moree districts in the north-western plains of NSW. It is confined to clay soils, usually with *Astrebla* and *Iseilema* species.	4	Low This species was not recorded during field investigation.
Dichanthium setosum Bluegrass	V	V	In NSW, Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW and is associated with heavy basaltic black soils and red-brown loams with clay subsoil. It is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture.	1	Low This species was not recorded during field investigation. Suitable habitat was not identified in the subject area.
Digitaria porrecta Finger Panic Grass	E		In NSW this tufted grass is found on the North West Slopes and Plains, from near Moree south to Tambar Springs and from Tamworth to Coonabarabran. The most frequently recorded associated tree species are *Eucalyptus albens* and *Acacia pendula*.	3	Low This species was not recorded during field investigation.
Lepidium aschersonii Spiny Pepper-cress	V	V	Erect perennial herb occurring in the marginal central-western slopes and north-western plains regions of NSW. Found on ridges of gilgai clays dominated by Brigalow (*Acacia harpophylla*), Belah (*Casuarina cristata*), Buloke (*Allocasuarina luehmanii*) and Grey Box (*Eucalyptus microcarpa*).	2	Low This species was not recorded during field investigation. Marginal habitat is present in the study area.
Philotheca ericifolia	V	V	Grows chiefly in dry sclerophyll forest and heath on damp sandy flats and gullies in the upper Hunter Valley and Pilliga to Peak Hill district. NSW subdivisions: CT, CWS, NWP.	0	Low This species was not recorded during field investigations. Lack of suitable habitat.
Swainsona murrayana Slender Darling-pea	V	V	This forb is found throughout inland NSW on clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, black box and grassland	0	Low This species was not recorded during field investigation. Marginal habitat is present in the study area.

Species	Listing		Habitat Description and Locally Known Populations	Number of records[1]	Likelihood of Occurrence/ Impact
	BC Act	EPBC Act			
			communities on level plains, floodplains and depressions and is often found with *Maireana* species.		
Tylophora linearis	V	E	Grows in dry scrubland that may have a eucalypt, *Callitris glaucophylla* and/or *Allocasuarina luehmannii* overtopping the scrub, in the Barraba, Mendooran, Temora and West Wyalong districts. NSW subdivisions: NWS, CWS, NWP, Other Australian states: Qld.	0	Low This species was not recorded during field investigations. Suitable habitat is absent from the study area.
Birds					
Anthochaera phrygia Regent Honeyeater	E	CE	Inhabits eucalypt open forests and woodlands, predominantly box-ironbark types, but also Spotted Gum and Swamp Mahogany on the coast. The species also inhabits River She-oak gallery forest with *Amyema cambagei* (Needle-leaf Mistletoe). It is estimated that the NSW population of Regent Honeyeaters may now be fewer than 250 mature individuals.	0	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.
Callidris ferruginea Curlew Sandpiper	E	CE	Occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	0	Low This species is unlikely to occur given the lack of suitable wetlands at the project site.
Calyptorhynchus lathami Glossy Black-Cockatoo	V		The Glossy Black-Cockatoo is uncommon although in inland NSW widespread inland in the southern tablelands and central western plains of NSW. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta*, and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations.	4	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	V		Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great	1	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.

Species	Listing		Habitat Description and Locally Known Populations	Number of records[1]	Likelihood of Occurrence/ Impact
	BC Act	EPBC Act			
			Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. Usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging.		
Varied Sittella *Daphoenositta chrysoptera*	V		Distribution of the Varied Sittella in NSW is nearly continuous from the coast to the far west. The bird inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. The bird builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	1	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.
Erythrotriorchis radiates Red Goshawk	CE	V	Species is very rare in NSW, extending south to about 30°S, with most records north of this, in the Clarence River Catchment, and a few around the lower Richmond and Tweed Rivers. Prefers a mosaic of vegetation types, and is often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers.	0	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.
Geophaps scripta scripta Squatter Pigeon (southern)	CE	V	In NSW this medium-sized ground-dwelling pigeon is found in the North West Slopes extending down to the Liverpool Plains and Dubbo. The pigeon is found in grassy woodlands and plains, preferring sandy areas and usually close to water.	0	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.
Grantiella picta Painted Honeyeater	V	V	Nomadic and occurs at low densities throughout its range. The greatest concentrations are from the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests.	1	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.

Species	Listing		Habitat Description and Locally Known Populations	Number of records[1]	Likelihood of Occurrence/ Impact
	BC Act	EPBC Act			
Polytelis swainsonii Superb Parrot	E	CE	The Superb Parrot is found throughout eastern inland NSW. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest.	0	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.
Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis*	V		In NSW, eastern sub-species of the Grey-crowned Babbler occurs on the western slopes of the Great Dividing Range. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. It builds and maintains several conspicuous, dome-shaped stick nests about the size of a football.	2	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.
Rostratula australis Australian Painted Snipe	E	E	Most records are from the south east, particularly the Murray Darling Basin. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	0	Low This species is unlikely to occur given the lack of suitable wetlands at the project site.
Mammals					
Chalinolobus dwyeri Large-eared Pied Bat	V	V	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW.	0	Low Habitat in the form of cliffs or caves not found in the subject area. Occurrence records are from the south-western corner of Deriah Aboriginal Area.
Dasyurus maculatus Spotted-tailed Quoll	V	E	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites with basking and latrine sites often nearby.	0	Low Low quality / common habitat present. May rarely hunt or rest within proposal site but not considered important habitat for this species. No potential den sites were observed on site.
Nyctophilus corbeni Corben's Long-eared Bat	V	V	Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	0	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species.

Species	Listing		Habitat Description and Locally Known Populations	Number of records[1]	Likelihood of Occurrence/ Impact
	BC Act	EPBC Act			
Phascolarctos cinereus Koala	V	V	Inhabits eucalypt woodland and forest containing suitable food trees. Key food trees in the local area include *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus microcorys* (Tallowwood) and *Eucalyptus punctata* (Grey Gum).	1	Low There is one record from the township of Bellata. There is no vegetation connectivity to continuous or large isolated patches of vegetation to the proposal site. One koala feed tree, *Eucalyptus populnea* occurs in low density at the proposal site
Pteropus poliocephalus Grey-headed Flying fox	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	0	Low Low quality / common habitat present. May forage or rest within proposal site but not considered important habitat for this species. No roosting areas were observed on site.
Reptiles					
Anomalopus mackayi Five-clawed Worm-skink	E	V	Patchy distribution on the North West Slopes and Plains of north-east NSW. Close to or on the lower slopes of slight rises in grassy White Box woodland on moist black soils, and River Red Gum-Coolibah-Bimble Box woodland on deep cracking loose clay soils. May also occur in grassland areas and open paddocks with scattered trees. The worm-skink lives in deep soil cracks, coming close to the surface under fallen timber and litter, especially partially buried logs.	2	Low This species was not recorded during field investigations. Marginal habitat is present for this species throughout the subject site.
Aprasia parapulchella Pink-tailed Worm-lizard	V	V	In NSW this Legless Lizard is known from the Central and Southern Tablelands, and the South Western Slopes. Inhabits sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo Grass. Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks.	0	Low This species was not recorded during field investigations. Marginal habitat is present for this species throughout the subject site.
Uvidicolus sphyrurus Border Thick-tailed Gecko	V	V	Found only on the tablelands and slopes of northern NSW. Most common in the granite country of the New England Tablelands. Occurs at sites ranging from 500 to 1100 m elevation. Populations are mostly fragmented, with over 50 discrete sites currently known that are separated by at least 2 km. Favours forest and woodland areas with boulders, rock slabs, fallen timber and deep leaf litter.	0	Low This species was not recorded during field investigations. Marginal habitat is present for this species throughout the subject site.

Species	Listing		Habitat Description and Locally Known Populations	Number of records[1]	Likelihood of Occurrence/ Impact
	BC Act	EPBC Act			
			Occupied sites often have a dense tree canopy that helps create a sparse understorey.		
Fish					
Maccullochella peelii Murray Cod		V	The Murray Cod occurs naturally in the waterways of the Murray-Darling Basin and is known to live in a wide range of warm water habitats that range from clear, rocky streams to slow flowing turbid rivers and billabongs.	0	Low Habitat not present.

[1] Status Abbreviations: V – Vulnerable, E – Endangered, CE – Critically Endangered.

[2] Number of DEES wildlife atlas records in selected area Approx. 10km radius [North: -29.77 West: 149.69 East: 150.02 South: -29.98].

Appendix V

Assessments of Significance

Considerations under Section 7.3 of the BC Act 2016 (Five-Part Test)

Endangered Ecological Communities and threatened species that have the potential to be impacted by the proposed works have been assessed under the guidelines of Section 7.3 of the Biodiversity Conservation Act (2016) and this is provided below in the form of a five-part testF

a) **In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

N/A

b) **In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**
   i. **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
   ii. **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.**

The native vegetation located on Black Hill was consistent with the EEC, *Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions*. The proposed quarry works have the potential to impact about 5.33 ha of this community. 3.82 ha of low condition vegetation (which has a current VIS score of 9.8) did not meet the EEC description.

Within 1500 m buffer area surrounding the proposal site, this represents (according to the State Vegetation Type Map):

- Approximately 3.59% (/ 148.30 ha) impact to vegetation mapped as PCT 147 (the associated PCT), or
- Approximately 3.56% (/ 149.60 ha) impact to vegetation mapped as associated (not partially subset of) with the EEC Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions. This includes PCT 378.

It is unlikely that the proposed works would substantially modify the composition of the EEC, although there is potential for edge effects to impact relatively good condition vegetation to be retained by the proposal. Whilst the proposal will contribute to the decline of this EEC in the local area, the relatively minor extent of vegetation removal (3.56 % of the local extent) is not likely to place the local occurrence of this EEC at risk of extinction.

c) **In relation to the habitat of a threatened species, population or ecological community:**

   i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**

The proposed development would impact approximately 3.56% or 5.33 ha of moderate condition vegetation of this EEC within 1500 m of the proposal site (according to calculations made using the State Vegetation Type Map). Within the proposal site, relatively good condition vegetation is retained. The extent of the EEC consists of a single habitat patch in the assessment area. Hence, the majority of vegetation mapped on Black Hill (the habitat patch) is retained.

ii. **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**

The proposal site is isolated by rural land uses and not connected (through canopy cover) to continuous patches of vegetation. The proposed works may result in minor impacts on site habitat links (by clearing habitat on the crest of Black Hill at the proposal site, including provision of a haul road from the base of Black Hill) but are unlikely to substantially increase fragmentation of this EEC in the local area. No habitat will become isolated from the proposed development.

iii. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.**

The proposed development footprint of the quarry is unlikely to impact habitat important for the long-term survival of this EEC in the local area. 3.56% of the patch of the EEC on Black Hill, in moderate-low condition (a VIS of 20.0 was calculated using BAM-C) will be impacted. No old growth or good/high condition vegetation will be impacted.

d) **Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).**

No declared area of outstanding biodiversity value would be impacted by the proposed works.

e) **Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.**

The 'Key Threatening Processes' currently listed under Schedule 3 of the BC Act which are relevant to the project are listed below:

- Clearing of native vegetation;
- Removal of dead wood and dead trees;
- Infection of native plants by *Phytophthora cinnamomi*; and
- Invasion of native plant communities by exotic perennial grasses.

Where relevant, mitigation measures for the proposed works will be implemented to minimise the impact of these key threatening processes. Given the minor nature of the works, the project is unlikely to significantly exacerbate the impact of these KTPs in the local area.

Conclusion

Based on the considerations above, the proposed works are unlikely to have a significant impact on any threatened species, population or EEC such that a local population is placed at risk of extinction

Considerations under the EPBC Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires approval of the Commonwealth Minister representing the Department of the Environment, for actions that may have a significant impact on Matters of National Environmental Significance (MNES). The EPBC Act also requires Commonwealth approval for certain actions on Commonwealth land.

MNES protected under the EPBC Act include:

- World Heritage properties;
- National Heritage places;
- RAMSAR wetlands of international importance;
- Threatened species or ecological communities listed in the EPBC Act;
- Migratory species listed in the EPBC Act;
- The Great Barrier Reef Marine Park;
- Commonwealth marine environment; and
- Nuclear actions.

With regard to flora and fauna, the only MNES relevant to the study area are nationally listed threatened species and migratory species. The DAWE Protected Matters search for the site is provided in **Appendix VI**. An assessment has been made to determine whether or not the proposal will have or is likely to have a significant impact on these MNES and is provided below.

One endangered ecological community *Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions* was recorded within the proposal site. This EEC has been assessed below in accordance with the *Matters of National Environmental Significance: Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999*.

No other EECs or threatened species were recorded within the proposal site. Other species assessed were considered to have low potential of occurring within in the study area and no further assessment under the provisions of the EPBC Act is warranted for these species

EPBC Act Assessment of Significance – Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions EEC

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- **reduce the extent of an ecological community**

The EEC occurs on an isolated patch on Black Hill and covers 148.30 ha (according to the State Vegetation Type Map). Out of the 149.60 ha, only 3.56% or 5.33 of moderate-low condition vegetation of this EEC will be impacted to accommodate the proposed Meppem quarry. Relatively good condition vegetation (as determined through BAM survey) will be avoided by the proposal. The proposed works are unlikely to substantially reduce the extent of this EEC in the local area.

- **fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines**

The proposal site is isolated by rural land uses and not connected (through canopy cover) to continuous patches of vegetation. The proposed works may result in minor impacts on site habitat links (by clearing

habitat on the crest of Black Hill at the proposal site, including provision of a haul road from the base of Black Hill) but are unlikely to substantially increase fragmentation of this EEC in the local area. No habitat will become isolated from the proposed development.

- **adversely affect habitat critical to the survival of an ecological community**

The proposal does not affect any critical habitat identified on the EPBC register. Vegetation in the proposal area is in poor condition, resembles a regrowth forest and does not provide significant habitat essential to the survival of the EEC or long-term maintenance of the EEC. There is currently no approved recovery plan for the EEC.

- **modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns**

The minor extent of the proposed work (isolated to a previously disturbed area of the EEC at the proposal site) is unlikely to modify or destroy abiotic factors necessary for this EECs survival in the local area.

- **cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting**

The nature of the proposed work is unlikely to cause a substantial change in the species composition of the EEC vegetation recorded within the study area. The development may have a minor impact on the EEC at the patch scale by increasing edge effects. The functionality of the habitat patch will not be significantly affected as existing old growth and intact (high condition vegetation) areas would be avoided.

- **cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:**
  - **assisting invasive species, that are harmful to the listed ecological community, to become established, or**
  - **causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.**

Recommendations regarding the management of weeds are provided in **Section 6** of the BDAR. Provided safeguards regarding weed management are implemented, the proposed works are unlikely to result in increased weed incursion or management detrimental to the adjacent EEC vegetation.

- **interfere with the recovery of an ecological community.**

The proposed works will have a minor impact on the recovery of this EEC on Black Hill by impacting 5.33 ha of regrowth vegetation with a high potential to gain (improve in integrity) if reserved and managed for conservation purposes. The proposal is considered unlikely to substantially interfere with the recovery of this EEC given the relative scale of the proposal and retention of the EEC in areas directly adjacent the proposal area.

Migratory Species Protected Under International Agreements

Ten nationally listed migratory terrestrial or wetland bird species were recorded on the DAWE Protected Matters Database (see **Appendix VI**) or are considered to have potential habitat available within 20 kms of the project slopes, as listed below.

Listed migratory species with the potential to occur in the local area

Species name	Common name
Actitis hypoleucos	Common Sandpiper
Apus pacificus	Fork-tailed Swift
Calidris acuminata	Sharp-tailed Sandpiper
Calidris ferruginea	Curlew Sandpiper
Calidris melanotos	Pectoral Sandpiper
Gallinago hardwickii	Latham's Snipe
Hirundapus caudacutus	White-throated Needletail
Motacilla flava	Yellow Wagtail
Myiagra cyanoleuca	Satin Flycatcher
Pandion haliaetus	Osprey

None of the above migratory species were recorded on site during the field survey. The proposed works are unlikely to impact on any area considered to be 'important habitat' for the above migratory species, or likely to impact a significant proportion of a migratory population.

Appendix VI

Matters of National Environmental Significance Search

Australian Government
Department of the Environment and Energy

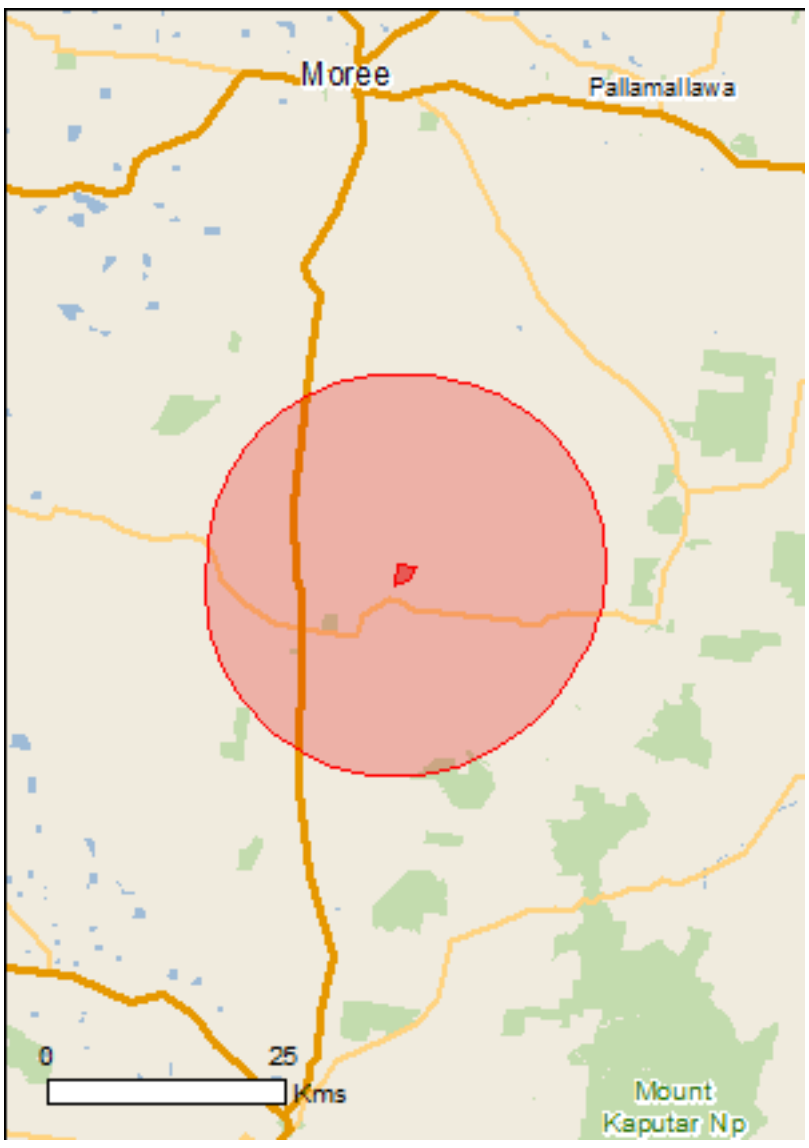
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

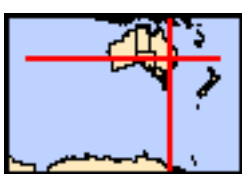
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 21/01/19 12:54:45



Coordinates
Buffer: 20.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	27
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	27
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	900 - 1000km upstream
Riverland	900 - 1000km upstream
The coorong, and lakes alexandrina and albert wetland	1100 - 1200km

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community likely to occur within area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Androcalva procumbens [87153]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
Homopholis belsonii Belson's Panic [2406]	Vulnerable	Species or species habitat likely to occur within area
Lepidium aschersonii Spiny Pepper-cress [10976]	Vulnerable	Species or species habitat likely to occur within area
Philotheca ericifolia [64942]	Vulnerable	Species or species habitat likely to occur within area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Tylophora linearis [55231]	Endangered	Species or species habitat may occur within area
Reptiles		

Name	Status	Type of Presence
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat known to occur within area
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Uvidicolus sphyrurus Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Australian Telecommunications Corporation
Commonwealth Land - Commonwealth Trading Bank of Australia

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Moema	NSW

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-29.863572 149.883357,-29.864837 149.900352,-29.875704 149.892541,-29.881286 149.882156,-29.863646 149.883357,-29.863572 149.883357

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix VII

BAM Credit Summary

STAGE 1

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00013875/BAAS17100/20/00021942

Assessment name
Meppem Quarry Stage 1

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Report Created
24/09/2020

BAM Data version *
30

Assessor Number
BAAS19023

Assessment Type
Part 4 Developments (General)

BAM Case Status
Finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Assessment Revision
0

Date Finalised
24/09/2020

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	147_Zone3_Poor	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Zone3_Poor	3.75	2	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013875/BAAS17100/20/00021942	Meppem Quarry Stage 1	20/08/2020
Assessor Name	Report Created	BAM Data version *
Rod Bennison	24/09/2020	30
Assessor Number	Assessment Type	BAM Case Status
BAAS19023	Part 4 Developments (General)	Finalised
	Assessment Revision	Date Finalised
	0	24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black-striped Wallaby	Macropus dorsalis	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Diamond Firetail	Stagonopleura guttata	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

Little Eagle	Hieraaetus morphnoides	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Little Pied Bat	Chalinolobus picatus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Varied Sittella	Daphoenositta chrysoptera	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

BAM Candidate Species Report

Proposal Details

Assessment Id 00013875/BAAS17100/20/00021942	Proposal Name Meppem Quarry Stage 1	BAM data last updated * 20/08/2020
Assessor Name Rod Bennison	Report Created 24/09/2020	BAM Data version * 30
Assessor Number BAAS19023	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
	Assessment Revision 0	Date Finalised 24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Homopholis belsonii Belson's Panic	No (surveyed)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

List of Species Not On Site

Name
Chalinolobus dwyeri Large-eared Pied Bat
Tyto novaehollandiae Masked Owl
Vespadelus troughtoni Eastern Cave Bat
Hieraaetus morphnoides Little Eagle
Miniopterus orianae oceanensis Large Bent-winged Bat
Pteropus poliocephalus Grey-headed Flying-fox

BAM Credit Summary Report

Proposal Details

Assessment Id
00013875/BAAS17100/20/00021942

Proposal Name
Meppem Quarry Stage 1

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Report Created
24/09/2020

BAM Data version *
30

Assessor Number
BAAS19023

BAM Case Status
Finalised

Date Finalised
24/09/2020

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion								
1	147_Zone3_Poor	9.8	3.8	0.25	High Sensitivity to Potential Gain	2.00		0
							Subtotal	**0**
							Total	**0**

BAM Credit Summary Report

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013875/BAAS17100/20/00021942	Meppem Quarry Stage 1	20/08/2020
Assessor Name	Assessor Number	BAM Data version *
Rod Bennison	BAAS19023	30
Proponent Names	Report Created	BAM Case Status
John Meppem	24/09/2020	Finalised
Assessment Revision	Assessment Type	Date Finalised
0	Part 4 Developments (General)	24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Nil

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Like for like)

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	Number of credits to be retired
147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	3.8	0.00

147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions This includes PCT's: 55, 147, 228, 378, 442, 452, 547, 627, 1124, 1519	-	No	Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

No Species Credit Data

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00013875/BAAS17100/20/00021942

Proposal Name
Meppem Quarry Stage 1

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Assessor Number
BAAS19023

BAM Data version *
30

Proponent Name(s)
John Meppem

Report Created
24/09/2020

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

Date Finalised
24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Nil

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Variations)

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	Number of credits to be retired
147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	3.8	0.00

147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions This includes PCT's: 55, 147, 228, 378, 442, 452, 547, 627, 1124, 1519	-	No	Northern Basalts,Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	HBT	IBRA region

	Rainforests	Tier 3 or higher	No	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Biodiversity payment summary report

Assessment Id	Payment data version	Assessment Revision	Report created
00013875/BAAS17100/20/00021942	68	0	24/09/2020

Assessor Name	Assessor Number	Proposal Name	BAM Case Status
Rod Bennison	BAAS19023	Meppem Quarry Stage 1	Finalised

Assessment Type	Date Finalised
Part 4 Developments (General)	24/09/2020

PCT list

Price calculated	PCT common name	Credits
Yes	**147 -** Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	0

Species list

Price calculated	Species	Credits

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Biodiversity payment summary report

IBRA sub region	PCT common name	Threat status	Offset trading group	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Northern Basalts	**147 -** Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Yes	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	18.37%	$286.68	1.8297	$8,770.31	0	$0.00

Subtotal (excl. GST)	**$0.00**
GST	**$0.00**
Total ecosystem credits (incl. GST)	**$0.00**

Species credits for threatened species

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price

No species available

Biodiversity payment summary report

Grand total	**Contact BCT for pricing**

Biodiversity payment summary report

Paddock Tree Report

Proposal Details

Assessment Id
00013875/BAAS17100/20/00022040

Assessment name
Meppem Quarry Stage 1

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Report Created
24/09/2020

BAM Data version *
30

Assessor Number
BAAS19023

BAM Case Status
Finalised

Date Finalised
24/09/2020

Assessment Revision
0

Assessment Type
Paddock Trees

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Paddock Trees

PCT code	PCT name	No. of trees	Species	DBHOB Category	Contain hollows	Class	Assessment required
147	Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	1	Casuarina cristata	> 30cm	False	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013875/BAAS17100/20/00022040	Meppem Quarry Stage 1	20/08/2020
Assessor Name	Report Created	BAM Data version *
Rod Bennison	24/09/2020	30
Assessor Number	BAM Case Status	Date Finalised
BAAS19023	Finalised	24/09/2020
Assessment Revision	Assessment Type	
0	Paddock Trees	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name
Dusky Woodswallow	Artamus cyanopterus cyanopterus
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata
Little Eagle	Hieraaetus morphnoides
Little Pied Bat	Chalinolobus picatus
Masked Owl	Tyto novaehollandiae
Painted Honeyeater	Grantiella picta
Speckled Warbler	Chthonicola sagittata
Varied Sittella	Daphoenositta chrysoptera
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013875/BAAS17100/20/00022040	Meppem Quarry Stage 1	20/08/2020
Assessor Name	Report Created	BAM Data version *
Rod Bennison	24/09/2020	30
Assessor Number	BAM Case Status	Date Finalised
BAAS19023	Finalised	24/09/2020
Assessment Revision	Assessment Type	
0	Paddock Trees	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Paddock Trees Credit Requirement

Class	Contains hollows	Number of trees	Ecosystem credits
147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion			
3	False	1.0	1
			1
			1

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00013875/BAAS17100/20/00022040

Assessor Name
Rod Bennison

Proponent Names
John Meppem ,

Assessment Revision
0

Proposal Name
Meppem Quarry Stage 1

Assessor Number
BAAS19023

Report Created
24/09/2020

Assessment Type
Paddock Trees

BAM data last updated *
20/08/2020

BAM Data version *
30

Date Finalised
24/09/2020

BAM Case Status
Finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Like for like)

Ecosystem Credit Summary

PCT	TEC	Credits
147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	1.00

Credit classes for 147	**Like-for-like options**			
	TEC	Trading group	HBT	IBRA region
	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	-	No	Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00013875/BAAS17100/20/00022040

Assessor Name
Rod Bennison

Proponent Name(s)
John Meppem ,

Assessment Revision
0

BAM Case Status
Finalised

Proposal Name
Meppem Quarry Stage 1

Assessor Number
BAAS19023

Report Created
24/09/2020

Assessment Type
Paddock Trees

BAM data last updated *
20/08/2020

BAM Data version *
30

Date Finalised
24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Variations)

Ecosystem Credit Summary

PCT	TEC	Credits
147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	1.00

Credit classes for 147

Like-for-like options

TEC	Trading group	HBT	IBRA region
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	-	No	Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	HBT	IBRA region
Rainforests	Tier 3	No	

Biodiversity payment summary report

Assessment Id	Payment data version	Assessment Revision	Report created
00013875/BAAS17100/20/00022040	68	0	24/09/2020

Assessor Name	Assessor Number	Proposal Name	BAM Case Status
Rod Bennison	BAAS19023	Meppem Quarry Stage 1	Finalised

Assessment Type	Date Finalised
Paddock Trees	24/09/2020

PCT list

Include	PCT common name	Credits
Yes	**147 -** Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	1

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

IBRA sub region	PCT common name	Baseline price	Dynamic coefficient	Market coefficient	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Northern Basalts	**147 -** Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	$3,439.38	0.83888870	1.44198700	18.37%	$286.68	1.8297	$8,770.31	1	$8,770.31

Subtotal (excl. GST) **$8,770.31**

Biodiversity payment summary report

GST	**$877.03**
Total credits (incl. GST)	**$9,647.34**

STAGE 2

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00013875/BAAS17100/20/00021944

Assessment name
Meppem Quarry

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Report Created
24/09/2020

BAM Data version *
30

Assessor Number
BAAS19023

Assessment Type
Part 4 Developments (General)

BAM Case Status
Finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Assessment Revision
0

Date Finalised
24/09/2020

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	147_Zone_1_Poor_Moderate	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Zone_1_Poor_Moderate	2.63	2	

2	147_Zone3_Poor	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Zone3_Poor	0.07	1	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013875/BAAS17100/20/00021944	Meppem Quarry	20/08/2020
Assessor Name	Report Created	BAM Data version *
Rod Bennison	24/09/2020	30
Assessor Number	Assessment Type	BAM Case Status
BAAS19023	Part 4 Developments (General)	Finalised
	Assessment Revision	Date Finalised
	0	24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black-striped Wallaby	Macropus dorsalis	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Diamond Firetail	Stagonopleura guttata	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

Little Eagle	Hieraaetus morphnoides	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Little Pied Bat	Chalinolobus picatus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Varied Sittella	Daphoenositta chrysoptera	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

BAM Candidate Species Report

Proposal Details

Assessment Id 00013875/BAAS17100/20/00021944	Proposal Name Meppem Quarry	BAM data last updated * 20/08/2020
Assessor Name Rod Bennison	Report Created 24/09/2020	BAM Data version * 30
Assessor Number BAAS19023	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
	Assessment Revision 0	Date Finalised 24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Homopholis belsonii Belson's Panic	No (surveyed)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

List of Species Not On Site

Name
Chalinolobus dwyeri Large-eared Pied Bat
Tyto novaehollandiae Masked Owl
Vespadelus troughtoni Eastern Cave Bat
Hieraaetus morphnoides Little Eagle
Miniopterus orianae oceanensis Large Bent-winged Bat
Pteropus poliocephalus Grey-headed Flying-fox

BAM Credit Summary Report

Proposal Details

Assessment Id
00013875/BAAS17100/20/00021944

Proposal Name
Meppem Quarry

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Report Created
24/09/2020

BAM Data version *
30

Assessor Number
BAAS19023

BAM Case Status
Finalised

Date Finalised
24/09/2020

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion								
1	147_Zone_1_Poor_Moderate	20.1	2.6	0.25	High Sensitivity to Potential Gain	2.00		26

2	147_Zone3_Poor	9.8	0.07	0.25	High Sensitivity to Potential Gain	2.00		0
							Subtotal	**26**
							Total	**26**

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00013875/BAAS17100/20/00021944

Proposal Name
Meppem Quarry

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Assessor Number
BAAS19023

BAM Data version *
30

Proponent Names
John Meppem

Report Created
24/09/2020

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

Date Finalised
24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Nil

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Like for like)

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	Number of credits to be retired
147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	2.7	26.00

147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions This includes PCT's: 55, 147, 228, 378, 442, 452, 547, 627, 1124, 1519	-	No	Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

No Species Credit Data

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00013875/BAAS17100/20/00021944

Proposal Name
Meppem Quarry

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Assessor Number
BAAS19023

BAM Data version *
30

Proponent Name(s)
John Meppem

Report Created
24/09/2020

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

Date Finalised
24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Nil

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Variations)

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	Number of credits to be retired
147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	2.7	26.00

147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions This includes PCT's: 55, 147, 228, 378, 442, 452, 547, 627, 1124, 1519	-	No	Northern Basalts,Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	HBT	IBRA region

	Rainforests	Tier 3 or higher	No	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Biodiversity payment summary report

Assessment Id	Payment data version	Assessment Revision	Report created
00013875/BAAS17100/20/00021944	68	0	24/09/2020

Assessor Name	Assessor Number	Proposal Name	BAM Case Status
Rod Bennison	BAAS19023	Meppem Quarry	Finalised

Assessment Type	Date Finalised
Part 4 Developments (General)	24/09/2020

PCT list

Price calculated	PCT common name	Credits
Yes	**147 -** Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	26

Species list

Price calculated	Species	Credits

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Biodiversity payment summary report

IBRA sub region	PCT common name	Threat status	Offset trading group	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Northern Basalts	**147 -** Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Yes	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	18.37%	$286.68	1.8297	$8,770.31	26	$228,028.14

Subtotal (excl. GST)	**$228,028.14**
GST	**$22,802.81**
Total ecosystem credits (incl. GST)	**$250,830.95**

Species credits for threatened species

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price

No species available

Biodiversity payment summary report

Grand total	**$250,830.95**

Biodiversity payment summary report

STAGE 3

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00013875/BAAS17100/20/00022041

Assessment name
Meppem Quarry Stage 3

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Report Created
24/09/2020

BAM Data version *
30

Assessor Number
BAAS19023

Assessment Type
Part 4 Developments (General)

BAM Case Status
Finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Assessment Revision
0

Date Finalised
24/09/2020

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	147_Zone_1_Poor_Moderate	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Zone_1_Poor_Moderate	2.7	2	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013875/BAAS17100/20/00022041	Meppem Quarry Stage 3	20/08/2020
Assessor Name	Report Created	BAM Data version *
Rod Bennison	24/09/2020	30
Assessor Number	Assessment Type	BAM Case Status
BAAS19023	Part 4 Developments (General)	Finalised
	Assessment Revision	Date Finalised
	0	24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black-striped Wallaby	Macropus dorsalis	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Diamond Firetail	Stagonopleura guttata	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

Little Eagle	Hieraaetus morphnoides	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Little Pied Bat	Chalinolobus picatus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Varied Sittella	Daphoenositta chrysoptera	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

BAM Candidate Species Report

Proposal Details

Assessment Id 00013875/BAAS17100/20/00022041	Proposal Name Meppem Quarry Stage 3	BAM data last updated * 20/08/2020
Assessor Name Rod Bennison	Report Created 24/09/2020	BAM Data version * 30
Assessor Number BAAS19023	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
	Assessment Revision 0	Date Finalised 24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Homopholis belsonii Belson's Panic	No (surveyed)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

List of Species Not On Site

Name
Chalinolobus dwyeri Large-eared Pied Bat
Tyto novaehollandiae Masked Owl
Vespadelus troughtoni Eastern Cave Bat
Hieraaetus morphnoides Little Eagle
Miniopterus orianae oceanensis Large Bent-winged Bat
Pteropus poliocephalus Grey-headed Flying-fox

BAM Credit Summary Report

Proposal Details

Assessment Id
00013875/BAAS17100/20/00022041

Proposal Name
Meppem Quarry Stage 3

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Report Created
24/09/2020

BAM Data version *
30

Assessor Number
BAAS19023

BAM Case Status
Finalised

Date Finalised
24/09/2020

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion								
1	147_Zone_1_Poor_Moderate	20.1	2.7	0.25	High Sensitivity to Potential Gain	2.00		27
							Subtotal	**27**
							Total	**27**

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00013875/BAAS17100/20/00022041

Proposal Name
Meppem Quarry Stage 3

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Assessor Number
BAAS19023

BAM Data version *
30

Proponent Names
John Meppem

Report Created
24/09/2020

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

Date Finalised
24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Nil

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Like for like)

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	Number of credits to be retired
147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	2.7	27.00

147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions This includes PCT's: 55, 147, 228, 378, 442, 452, 547, 627, 1124, 1519	-	No	Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

No Species Credit Data

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00013875/BAAS17100/20/00022041

Proposal Name
Meppem Quarry Stage 3

BAM data last updated *
20/08/2020

Assessor Name
Rod Bennison

Assessor Number
BAAS19023

BAM Data version *
30

Proponent Name(s)
John Meppem

Report Created
24/09/2020

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

Date Finalised
24/09/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Nil

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Variations)

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	Number of credits to be retired
147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	2.7	27.00

147-Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions This includes PCT's: 55, 147, 228, 378, 442, 452, 547, 627, 1124, 1519	-	No	Northern Basalts,Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	HBT	IBRA region

	Rainforests	Tier 3 or higher	No	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Biodiversity payment summary report

Assessment Id	Payment data version	Assessment Revision	Report created
00013875/BAAS17100/20/00022041	68	0	24/09/2020

Assessor Name	Assessor Number	Proposal Name	BAM Case Status
Rod Bennison	BAAS19023	Meppem Quarry Stage 3	Finalised

Assessment Type	Date Finalised
Part 4 Developments (General)	24/09/2020

PCT list

Price calculated	PCT common name	Credits
Yes	**147 -** Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	27

Species list

Price calculated	Species	Credits

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Biodiversity payment summary report

Biodiversity payment summary report

IBRA sub region	PCT common name	Threat status	Offset trading group	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Northern Basalts	**147 -** Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Yes	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	18.37%	$286.68	1.8297	$8,770.31	27	$236,798.45

Subtotal (excl. GST)	**$236,798.45**
GST	**$23,679.84**
Total ecosystem credits (incl. GST)	**$260,478.30**

Species credits for threatened species

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price

No species available

Grand total	**$260,478.30**