PROJECT CHINA STONE

Attachment J Redacted Biodiversity Offset Strategy (EIS Appendix H)

PROJECT CHINA STONE

BIODIVERSITY OFFSET STRATEGY

COMMERCIAL IN CONFIDENCE

INFORMATION HAS BEEN REDACTED

Prepared by:

HANSEN BAILEY
Level 15, 215 Adelaide Street
Brisbane QLD 4000

14 July 2017

For:

MacMines Austasia Pty Ltd
Suite 17, Level 9, 320 Adelaide Street
Brisbane QLD 4000

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PROJECT CHINA STONE
BIODIVERSITY OFFSET STRATEGY

for
MacMines Austasia Pty Ltd

1 INTRODUCTION

1.1 BACKGROUND

Project China Stone (the project) involves the construction and operation of a large-scale coal mine on a greenfield site in Central Queensland. The project site (the area that will ultimately form the Mining Leases (MLs) for the project) is remote, being located approximately 270 km south of Townsville and 300 km west of Mackay at the northern end of the Galilee Basin (Figure 1). The project proponent is MacMines Austasia Pty Ltd.

The project site comprises approximately 20,000 ha of well vegetated land, with low-lying scrub in the south and east and a densely vegetated ridgeline, known as 'Darkies Range', running north to south through the western portion of the site.

The mine will produce up to approximately 55 million tonnes per annum of Run of Mine thermal coal. Coal will be mined using both open cut and underground mining methods. Open cut mining operations will involve multiple draglines and truck and shovel pre-stripping. Underground mining will involve up to three operating longwalls. Coal will be washed and processed on site and product coal will be transported from site by rail. It is anticipated that mine construction will commence in 2016 and the mine life will be in the order of 50 years.

The majority of the mine infrastructure will be located in the eastern portion of the project site. Infrastructure will include coal handling and preparation plants, stockpiles, conveyors, rail loop and train loading facilities, workshops, dams, tailings storage facilities and a power station. A workforce accommodation village and private airstrip will also be located in the eastern part of the project site.

1.2 PURPOSE AND STRUCTURE OF THIS REPORT

Commonwealth and Queensland legislation is in place to protect and manage Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES), respectively. Environmental offsets are actions taken to counterbalance residual, significant impacts on matters of environmental significance (e.g. MNES or MSES). Offsets are used as a last resort in instances where an action will give rise to residual, significant impacts, even after the application of management measures.

An Environmental Impact Statement (EIS) has been prepared for the project that contains a Terrestrial Ecology Report and an Aquatic Ecology and Stygofauna Report. These reports assess the project's potential impacts on MNES and MSES. The reports conclude that the project will give rise to a number of residual, significant impacts that will require offsets. This Biodiversity Offset Strategy documents the offsets that are proposed to be provided for the project.

This document has been split into two main parts:

- Part A: Describes the offset requirements under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Part B: Describes the offset requirements under Queensland Legislation.

Part A and Part B are each structured as follows:

- Legislative framework - describes the legislative framework in regards to offset requirements;
- Project offset requirements - provides a summary of the offset requirements for the project that were identified in the EIS;
- Delivery of offsets - outlines the process that must be undertaken for the delivery of offsets;
- Potential offset properties - provides details on the properties identified as potential offset properties; and
- Conclusion - provides detail as to the suitability of these properties to provide offsets in relation to the project.

This document should be treated as confidential.

PART A
OFFSETS UNDER THE EPBC ACT

2 LEGISLATIVE FRAMEWORK

2.1 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

2.1.1 Overview

The EPBC Act is the Commonwealth government's principal piece of environmental legislation, and is administered by the Commonwealth Department of the Environment (DotE). It is designed to protect national environmental assets (i.e. MNES), which include threatened species of flora and fauna, threatened ecological communities (TECs), migratory species as well as other protected matters.

Any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES is termed a Controlled Action and is subject to assessment under the EPBC Act.

2.1.2 Project EPBC Act Referral

The project was declared a Controlled Action on 30 October 2014 and the Controlling Provisions are listed threatened species and communities; listed migratory species; and a water resource, in relation to coal seam gas development and large coal mining development.

2.1.3 EPBC Act Environmental Offsets Policy

The *EPBC Act Environmental Offsets Policy* (EPBC Act Offsets Policy) (Commonwealth Department of Sustainability, Environment, Water, Population and Communities [SEWPaC] [now the DotE] 2012) came into force in October 2012 and provides guidance on the role of offsets in environmental impact assessments. The EPBC Act Offsets Policy sets out the requirements for offsets to compensate for residual, significant impacts on MNES.

The EPBC Act Offsets Policy relates to all protected matters under the EPBC Act and has five key aims:

- To ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act;
- To provide proponents, the community and other stakeholders with greater certainty and guidance on how offsets are determined and when they may be considered under the EPBC Act;

- To deliver improved environmental outcomes by consistently applying the policy;
- To outline the appropriate nature and scale of offsets and how they are determined; and
- To provide guidance on acceptable delivery mechanisms for offsets.

The EPBC Act Offsets Policy acknowledges that avoidance and mitigation measures are still the primary strategies for managing the potential impact of a proposed action. The focus of an offset is to compensate for any residual, significant impact after avoidance and mitigation steps have been taken.

According to the policy, an offsets package is a "*suite of actions that a proponent undertakes in order to compensate for the residual significant impact of a project"* (SEWPaC 2012). It can comprise a combination of direct offsets and other compensatory measures.

Direct offsets (generally land based offsets) are those actions that provide a measurable conservation gain for an impacted protected matter. Direct offsets are an essential component of a suitable offsets package. A minimum of 90% of the offset requirements for any given impact must be met through direct offsets. Other compensatory measures are those actions that do not directly offset the impacts on the protected matter, but are anticipated to lead to benefits for the impacted protected matter, for example funding for research or educational programs (SEWPaC 2012).

The EPBC Act Offsets Calculator has been developed to provide guidance on the suitability of the proposed offsets and size of offset required. Use of the calculator requires detailed information about the quality of the vegetation in the area to be impacted and in the proposed offset area. Further information on the EPBC Act Offsets Calculator is presented in Section 3.3.

3 PROJECT OFFSET REQUIREMENTS

3.1 OVERVIEW OF IMPACT ASSESSMENT

The EIS Terrestrial Ecology Report and EIS Aquatic Ecology and Stygofauna Report assess the potential impacts of the project on MNES and describe residual, significant impacts that require offsets.

These reports explain that the project has been designed, where possible, to avoid, manage and mitigate adverse impacts on MNES. There is limited flexibility in locating the open cut pit, given that its location is constrained by the location of the coal resource. There are, however, a number of mitigation and management measures proposed to minimise impacts on MNES. These are described in detail in the EIS Terrestrial Ecology Report and EIS Aquatic Ecology and Stygofauna Report and include:

- Implementation of procedures to minimise clearing impacts, including implementation of the following procedures:
  - Delineating the limits of clearing and marking this area clearly on plans and on the ground;
  - Undertaking construction adjacent to drainage lines only when flows have ceased within the drainage lines;
  - Not disturbing vegetation beyond the identified clearing areas; and
  - Undertaking vegetation clearing sequentially and in accordance with the proponent's Permit to Disturb process.
- Pre-clearance surveys, including the presence of a Spotter Catcher to supervise clearing and rescue any injured animals;
- Conservation and management of vegetation within the project site, but beyond the project's clearing footprint. This vegetation will be managed for conservation outcomes;
- Subsidence crack rehabilitation program to repair subsidence cracks. Monitoring will be undertaken to ensure that vegetation in affected areas re-establishes to be consistent with the pre-disturbance vegetation communities;
- The installation of minor remedial drainage earthworks to prevent ponding in subsided areas;
- Progressive rehabilitation of areas cleared for mining purposes; and
- Preparation of management and monitoring plans.

3.2 PROJECT OFFSET REQUIREMENTS

Clearing for the development of the open cut mining area and the construction of mine infrastructure is predicted to give rise to residual, significant impacts on three threatened fauna species listed as MNES under the EPBC Act, and offsets are proposed to be provided for this impact. Table 1 provides a summary of the impacts that require offsets.

Table 1
Proposed Clearing of High Value Habitat for Threatened Fauna Species

Fauna Species	EPBC Act Status	Area in the Project Site (ha)	Area Cleared – Mining and Infrastructure (ha)	Area Cleared – Remedial Drains (ha)
Squatter Pigeon (southern subspecies) (*Geophaps scripta scripta*)	Vulnerable	3,440	1,436	3
Black-throated Finch (white-rumped subspecies) (*Poephila cincta cincta*)	Endangered	7,066	4,434	9
Koala (*Phascolarctos cinereus*)	Vulnerable	6,878	3,246	0.4

3.2.1 Squatter Pigeon (southern subspecies)

The Squatter Pigeon (southern subspecies) is listed as Vulnerable under the EPBC Act. This species was recorded from several locations in the project site.

Habitat modelling was undertaken for the Squatter Pigeon (southern subspecies) and is detailed in the EIS Terrestrial Ecology Report. High value habitat for this species was considered to be potential breeding habitat, and was mapped to include all areas within 1 km of permanent water sources. For the purposes of this modelling, "permanent water" was taken to include areas that were recorded as containing water during the EIS flora and fauna surveys in October 2012 and/or October 2013. October is towards the end of the dry season and shortly before the onset of the wet season in the Desert Uplands Bioregion (in which the project is located) (Figure 1), and therefore any remnant pools that were recorded during the October surveys have been considered in this assessment to be relatively permanent. These remnant pools would, however, dry up during an extended drought, given that they are reliant on ephemeral surface water.

Areas of potential high value habitat are located in the southern part of the project site where lower-lying, flat, grassy woodland areas with nearby water occur and in the northern-central upland areas of the project site where similar habitats are present. Based on the habitat modelling conducted for this species, the project will clear 1,439 ha high value habitat for the Squatter Pigeon (southern subspecies) (i.e. 1,436 ha for mining and infrastructure plus 3 ha for minor remedial drainage earthworks).

3.2.2 Black-throated Finch (white-rumped subspecies)

The Black-throated Finch (white-rumped subspecies) is listed as Endangered under the EPBC Act. This species was recorded from several locations in the southern portion of the project site.

Habitat modelling was undertaken for the Black-throated Finch (white-rumped subspecies) and is detailed in the EIS Terrestrial Ecology Report. High value habitat for this species was based on the presence of suitable Regional Ecosystems (REs). Suitable REs comprised REs listed in the National Recovery Plan for this species (New South Wales Department of Environment and Climate Change [DECC] and Queensland Parks and Wildlife Service 2007). The following REs are listed in the National Recovery Plan (New South Wales DECC and Queensland Parks and Wildlife Service 2007), and those REs that are present in the project site have been marked with an asterisk (*):

- *RE 10.3.6: *Eucalyptus brownii* open woodland on alluvial plains;
- RE 10.3.9: *Eucalyptus white*i open woodland on sandy alluvial fans;
- RE 10.3.13: *Melaleuca fluviatilis* and/or *Eucalyptus camaldulensis* woodland along watercourses;
- RE 10.3.28: *Eucalyptus melanophloia* or *E. crebra* open woodland on sandy alluvial fans;
- RE 10.4.8: *Dichanthium sericeum* and/or *Astrebla* spp. and/or *Panicum laevinode* tussock grassland on Cainozoic lake beds;
- *RE 10.5.1: *Eucalyptus similis* and/or *Corymbia brachycarpa* and/or *C. setosa* low open woodland to open woodland on sand plains;
- *RE 10.5.5: *Eucalyptus melanophloia* open woodland on sand plains; and
- *RE 10.7.11: *Eucalyptus melanophloia* low open-woodland on ferricrete.

This list was further expanded to include one additional RE (RE 10.3.28), in which this species was recorded during field surveys undertaken for the Carmichael Coal Mine and Rail Project. All vegetation polygons that contained these REs were included, even if the suitable RE only comprised a component of a mixed polygon.

Areas comprising high value habitat for this species are considered to comprise RE types that are suitable for the Black-throated Finch (white-rumped subspecies), and are located within 3 km from permanent water sources. The Black-throated Finch (white-rumped subspecies) has the requirement to drink daily and therefore its foraging range is restricted to the distance that it can fly to water. This species is known to be able to fly up to 3 km daily (Commonwealth Department of the Environment, Water, Heritage and the Arts [DEWHA] 2009) and therefore REs that provide potential habitat for this species and that are within 3 km of permanent water sources have been mapped as potential high value habitat.

The definition of permanent water is provided in the preceding section on the Squatter Pigeon (southern subspecies).

Based on the habitat modelling conducted for this species, the project will clear 4,443 ha of high value habitat for Black-throated Finch (white-rumped subspecies) (i.e. 4,434 ha for mining and infrastructure plus 9 ha for minor remedial drainage earthworks).

3.2.3 Koala

The Koala is listed as Vulnerable under the EPBC Act. This species was recorded from one location in the southern portion of project site.

Habitat modelling was undertaken for the Koala and is detailed in the EIS Terrestrial Ecology Report. High value habitat for this species was based on the presence of primary food trees. Primary food trees were based on the *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (herein referred to as the "draft Koala Guideline") (DotE [2013] and Melzer *et al*. [2014]). Primary food trees within the project site comprised River Red Gums (*Eucalyptus camaldulensis*) and Forest Red Gums (*E. tereticornis*). Melzer *et al*. (2014) identified that River Red Gum and Coolibah (*E. coolabah*) were the most frequently consumed tree species by the Koala in the Desert Upland Bioregion. No Coolibah were recorded within the project site. A 1 km buffer was placed around areas that contained these two tree species and these areas were modelled as high value habitat.

Based on the habitat modelling conducted for this species, the project will clear 3,246 ha high value habitat for the Koala.

3.3 ESTIMATE OF REQUIRED OFFSET AREA

The EPBC Act Offsets Assessment Guide (EPBC Act Offsets Calculator) has been developed to provide guidance on the suitability of the proposed offsets and size of offset required. Use of the calculator requires detailed information about the quality of the vegetation in the proposed offset area, and this information will only be available following a field survey of the offset area. The EPBC Act Offsets Calculator will therefore be used to confirm the size of the required offset once the offset property has been confirmed and arrangements have been made to access the property for the purpose of undertaking field surveys.

This Biodiversity Offset Strategy does, however, identify a number of proposed offset properties and confirms (based on desktop mapping) that these properties have large areas of potential habitat available. The exact size of the offset will, however, only be determined once field survey work has been undertaken and the EPBC Act Offsets Calculator has been used. This future work will be described in an Offset Management Plan (Section 4.4).

3.4 STAGING OF PROPOSED OFFSETS

Offsets are required as a result of impacts due to clearing of land for the construction of mine infrastructure and open cut mining. Open cut mining will be undertaken progressively, over a 30 year period and the associated clearing will also be undertaken progressively. The proponent therefore intends providing offsets in a staged manner, with offsets for infrastructure and the first five years of mining provided initially, and offsets for later years of mining being provided progressively. The Offset Management Plan for the project (Section 4.4) will describe the proposed staging of offsets.

4 DELIVERY OF OFFSETS

4.1 INTRODUCTION

This section describes the approach that has been adopted for providing offsets. The proponent has considered direct offsets and other compensatory methods and these are discussed in Sections 4.2 and 4.3, respectively. Section 4.4 describes the Offset Management Plan that will be prepared for the project, while Section 4.5 describes the mechanisms used to legally secure offsets. The surveys proposed to be undertaken within the proposed offset properties; management of offsets; and monitoring and reporting that will occur within the proposed offset properties is described in Sections 4.6 to 4.8.

4.2 DIRECT OFFSETS

As described in Section 2.1.3, direct offsets are those actions that provide a measurable conservation gain for an impacted protected matter. MacMines is proposing to offset the loss of high value habitat for the species listed in Table 1, through securing and managing direct, land based offsets. Direct, land based offsets can comprise properties owned by the proponent or third party properties.

4.2.1 Properties Owned by the Proponent

The proponent does not currently own any properties that can be used as an offset for the project. Third party properties have therefore been investigated for offsets (Section 4.2.2).

4.2.2 Third Party Properties

The proponent has located a number of properties that contain potential habitat for the species listed in Table 1 and would appear to be suitable offset properties. These properties are described in detail in Section 5.

4.2.3 Galilee Basin Offset Strategy

In selecting properties to use as offsets, and based on the advice of the Queensland Department of Environment and Heritage Protection (EHP), the proponent has favoured properties identified in the *Galilee Basin Offset Strategy* (EHP, 2013) (GBOS). The GBOS was developed by the EHP in August 2013, with the specific purpose of providing a resource to help proponents locate suitable offset properties within strategic conservation hubs and corridors of the Northern Brigalow Belt and Desert Uplands Bioregions.

In developing the GBOS, the EHP identified properties within these two bioregions that form a strategic footprint that contains state significant values and provides landscape connectivity. The GBOS properties were selected to ensure that key areas are protected in order to contribute to the long term conservation outcomes for these bioregions.

As stated in the GBOS, the rationale for the strategic footprint is to:

- Protect the most significant areas of remnant habitats;
- Ensure these areas remain connected;
- Identify areas that could be acquired and managed for the protected area estate (conservation park);
- Identify non-remnant areas which can serve as viable offsets to enhance connectivity or enhance significant remnants as buffers;
- Provide opportunities for landholders to raise income from offset management; and
- Provide streamlined approvals for proponents requiring offsets.

The GBOS properties are classified into three priority categories, as follows:

- *Priority 1 – Conservation hubs:* Areas that contain high levels of conservation value, and have the lowest risk of future development through mining;
- *Priority 2 – Key north-south and east-west linkages:* Key connections or corridors providing important linkages across the bioregions; and
- *Priority 3 – Remaining properties within the strategic footprint:* Properties providing important linkages between the conservation hub areas.

The project is located within the Desert Uplands Bioregion and the GBOS therefore provides a useful basis for identifying potential offset properties for the project. The proponent has identified four potential offset properties for the project, all of which are GBOS properties. These are discussed further in Section 5.

4.3 OTHER COMPENSATORY METHODS

As described in Section 2.1.3, other compensatory measures are those actions that do not directly offset the impacts on the protected matter. The use of other compensatory measures is not currently proposed as part of this offset strategy, given that it is considered feasible to secure direct offsets for the project. However, in the event that the project approval conditions (either state approvals or the EPBC Act approval) require actions that constitute other compensatory measures (e.g. contribution to research programs), this would reduce the amount of direct offsets required. It is noted that the EPBC Act Offset Policy requires that direct offsets comprise at least 90% of the offset package.

4.4 OFFSET MANAGEMENT PLAN

Section 5 describes the potential offset properties that are being investigated by the proponent. It confirms that these properties provide large areas of potential habitat (more than ten times the area that is proposed to be cleared). There is still further work to be undertaken on these properties, including field surveys to characterise the condition of vegetation and identify suitable management measures. Consistent with the approach adopted in recent EPBC Act approvals, this future work will be documented in an Offset Management Plan. The plan will be prepared and submitted to DotE for approval once approval under the EPBC Act has been obtained prior to construction. This plan will include details such as:

- A detailed baseline description of offset areas, including surveys undertaken and condition of habitat for EPBC Act listed threatened species;
- The way in which the offset areas provide connectivity with other habitats and biodiversity corridors;
- Performance and completion criteria for evaluating the management of the offset area, and criteria for triggering remedial action (if necessary);
- A description of the management measures that will be implemented for the protection of EPBC Act listed threatened species and their habitat, including a discussion of how measures proposed are consistent with the measures in relevant conservation advice, recovery plans and threat abatement plans;
- A program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria; and
- A timeline for when actions identified in the Offset Management Plan will be implemented for the offset area (including staging of offsets) and the proposed legal mechanism for securing the offset.

A high level overview of the mechanism to secure offsets; field surveys; management measures; and monitoring and reporting of offset properties is provided in Sections 4.5 to 4.8. Further detail will be provided in the Offset Management Plan.

The offsets for the first stage of the project will be legally secured within two years of DotE's approval of the Offset Management Plan. The proposed timing for subsequent stages will be described in the Offset Management Plan.

4.5 MECHANISM TO LEGALLY SECURE OFFSETS

As a general guide, the best legal mechanisms for protecting land are mechanisms that are intended to be permanent (lasting forever) and are secure (that is, they are difficult to change or alter) (SEWPaC 2012). These two elements are important because they mean that land set aside as an offset will continue to provide a secure benefit to the impacted protected matter.

Legal mechanisms, such as conservation covenants, exist in each state and territory to enable the protection of land that is set aside for environmental purposes on a permanent or long-term basis.

All direct offset sites will be secured using one of the legally binding mechanisms that are available in Queensland to ensure the protection of the offset and implementation of the Offset Management Plan. Legally binding mechanisms relevant to Queensland are detailed in the *Environmental Offsets Act 2014* (EO Act) and include an area of land that is either an environmental offset protection area, an area of high nature conservation value under the Queensland *Vegetation Management Act 1999* (VM Act) or another area prescribed under regulation. However, the area is only a legally secured offset area if the area is subject to a delivery or management plan or agreement (however described) to achieve a conservation outcome.

4.6 DETAILED FIELD SURVEYS

Detailed field surveys of the offset areas are required to be undertaken to characterise the quality of the vegetation and habitat, and to identify potential management strategies. These field surveys can only be undertaken once the proponent has entered into formal access agreements with the relevant landowners. The field surveys are proposed to be undertaken once approval under the EPBC Act has been obtained for the project and the field survey results will be documented in the Offset Management Plan (Section 4.4).

Although field surveys have not yet been undertaken, the desktop mapping of potential offset properties has indicated that there are large areas of potential habitat available on the proposed offset properties. In addition, [redacted]. It could therefore be anticipated that the condition of vegetation on these potential offset properties would be similar to the vegetation surveyed as part of the EIS flora and fauna studies. In particular, the vegetation on the potential offset property will have been subject to similar pressures from grazing and bushfire.

The recently published *Guide to Determining Terrestrial Habitat Quality* (EHP 2014a) will be consulted before the potential offset property/properties are surveyed.

4.7 MANAGEMENT OF OFFSETS

As indicated in Section 4.4, a detailed Offset Management Plan will be developed for the proposed offset areas and will be approved by the Minister for DotE. The Offset Management Plan will also require approval under Queensland legislation (Section 7).

Offsets will be managed using methods such as:

- Management/exclusion of grazing to achieve conservation outcomes;
- Exclusion of cultivation;
- Weed management;
- Fire management;
- Feral pest management; and
- Detailed monitoring and reporting.

The provision of fauna watering points will also be considered.

4.8 MONITORING AND REPORTING

Regular monitoring and reporting on the progress of the offset area/s will be provided to the regulator. The Offset Management Plan will describe the proposed monitoring and reporting program. It is anticipated that biennial photo point monitoring will be conducted. Weed monitoring will be conducted annually by the land manager.

5 POTENTIAL OFFSET PROPERTIES

5.1 INTRODUCTION

The proponent has identified four potential properties for the provision of offsets for the project ("potential offset properties"). The identified properties are shown on Figure 1. The potential offset properties:

- Are located within the Desert Uplands Bioregion (the same bioregion as the project);
- Are GBOS properties (Figure 1). [redacted];
- Are mostly dominated by remnant vegetation (based on published Queensland government RE mapping [Queensland Herbarium 2014]); and

- Are identified through the EPBC Act Protected Matters Search Tool as being in areas where Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala habitat is known to occur (Appendix A).

The areas of habitat available on these properties are well in excess of the project's anticipated offset requirements. The anticipated offset requirements are an approximation of the offsets that will be required for the project and are based on the offset requirements for recent project approvals. As a result, the majority of properties will individually fulfil all of the offset requirement for the project. The proponent intends making use of a single property or, potentially, two properties to provide offsets for the project. The potential offset properties that will be selected for the provision of offsets will be confirmed when the Offset Management Plan is prepared.

As noted in the property descriptions (Sections 5.3 to 5.6), there are no production permits such as MLs or Mining Lease Applications (MLAs) on any of the potential offset properties. [redacted]

Table 2 provides a summary of the potential offset properties.

Table 2
Areas of Potential Habitat for Threatened Fauna Species within the Potential Offset Properties

Property						GBOS Priority	Potential Habitat (ha)		
ID	Lot	Plan	Name	Size (ha)	Owner / Lessee		Squatter Pigeon	Black-throated Finch	Koala
A	[redacted]						66,645	65,560	14,900
B	[redacted]						41,087	40,680	5,290
C	[redacted]						55,420	53,590	26,300
	[redacted]								
D	[redacted]						25,805	25,750	7,270

* [redacted].

5.2 HABITAT MODELLING METHODOLOGY

The habitat modelling that was undertaken for the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala within the project site is described in Section 3.2. As described in Section 3.2, this habitat modelling was based on RE types as well as habitat features used by these species.

The habitat modelling of the potential offset properties has been based on RE types. The same REs that were used to map high value habitat within the project site have also been used to map potential habitat for these species within the potential offset properties. As per the habitat modelling that was conducted for the project site, all mixed polygons containing suitable REs were included, even if the suitable REs only comprised a component of a mixed polygon. Appendix B details the REs that comprise potential habitat for the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala on each property. The potential offset properties will be surveyed for specific habitat features such as permanent water sources when field surveys are undertaken (Section 4.6).

5.3 PROPERTY A – [redacted]

5.3.1 Property Overview

[redacted] property located [redacted] The primary land use is grazing with several reservoirs/dams located on the property. Two un-named roads are located within the property (Figure 2).

The property is [redacted].

The property is not covered by any production permits such as MLs, MLAs or petroleum licences (PLs). However, parts of the property are overlain by Exploration Permits for Petroleum (EPM) and several Exploration Permits for Coal (EPC).

5.3.2 Offset Potential

[redacted] has a high offset potential, as it contains:

- 66,645 ha of potential Squatter Pigeon (southern subspecies) habitat (Figure 3);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Squatter Pigeon (southern subspecies) or Squatter Pigeon (southern subspecies) habitat is known to occur within the area (Appendix A);
- 65,560 ha of potential Black-throated Finch (white-rumped subspecies) habitat (Figure 4);
- The EPBC Act Protected Matters search Tool report for the property indicates that the Black-throated Finch (white-rumped subspecies) or Black-throated Finch (white-rumped subspecies) habitat is known to occur within the area (Appendix A);
- 14,900 ha of potential Koala habitat (Figure 5);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Koala or Koala habitat is known to occur within the area (Appendix A); and

- Watercourses mapped by the Queensland government on the vegetation management watercourse map, comprising mostly watercourses mapped as moderate as well as one watercourse within the property mapped as high in accordance with the Department of Agriculture and Fisheries (DAF) mapping which classifies all waterways in Queensland in relation to the level of risk that waterway barrier works could pose to fish movement and fish communities (DAF 2014).

5.3.3 Other Biodiversity Values

[redacted] runs along the [redacted] part of the property (Figure 2). One [redacted], namely [redacted], is also present within the [redacted] part of the property (Figure 2). There are numerous smaller ephemeral drainage lines traversing the property. Several government mapped wetlands occur on the property (Figure 2).

5.3.4 Vegetation Communities

The entire property ([redacted] ha) comprises remnant vegetation (Figure 6). The dominant remnant vegetation within the property is Least Concern RE 10.5.1a *Eucalyptus similis* open woodland on sand plains.

The other main remnant vegetation communities on the property include:

- Least Concern RE 10.3.10x1 *Corymbia plana* on lake dune;
- Least Concern RE 10.5.5a *Eucalyptus melanophloia* open woodland on sand plains;
- Least Concern RE 10.7.7a *Melaleuca tamariscina* and/or *Acacia leptostachya* and/or *Thryptomene parviflora* and sometimes *Calytrix microcoma* open shrubland to shrubland on feericrete;
- Least Concern RE 10.10.1b *Acacia catenulata* low woodland on sandstone ranges; and
- Least Concern RE 10.10.5a *Corymbia trachyphloia* with *C. lamprophylla* open woodland on sandstone ranges.

5.4 PROPERTY B – [redacted]

5.4.1 Property Overview

[redacted] property located [redacted]. The primary land use is grazing with several reservoirs/dams located on the property. One [redacted], [redacted], is located within the property (Figure 7).

The property is [redacted].

The property is not covered by any production permits such as MLs, MLAs or PLs. However, the property is overlain by several exploration permits for coal.

5.4.2 Offset Potential

[redacted] has a high offset potential, as it contains:

- 41,087 ha of potential Squatter Pigeon (southern subspecies) habitat (Figure 8);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Squatter Pigeon (southern subspecies) or Squatter Pigeon (southern subspecies) habitat is known to occur within the area (Appendix A);
- 40,680 ha of potential Black-throated Finch (white-rumped subspecies) habitat (Figure 9);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Black-throated Finch (white-rumped subspecies) or Black-throated Finch (white-rumped subspecies) habitat is known to occur within the area (Appendix A);
- 5,290 ha of potential Koala habitat (Figure 10);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Koala or Koala habitat is known to occur within the area (Appendix A); and
- Watercourses mapped by the Queensland government on the vegetation management watercourse map, comprising mostly watercourses mapped as moderate as well as one watercourse within the property mapped as high in accordance with the DAF mapping which classifies all waterways in Queensland in relation to the level of risk that waterway barrier works could pose to fish movement and fish communities (DAF 2014).

5.4.3 Other Biodiversity Values

No significant waterways traverse the property. There are, however, numerous smaller ephemeral drainage lines traversing the property. Several government mapped wetlands occur on the property (Figure 7).

5.4.4 Vegetation Communities

The entire property ([redacted] ha) comprises remnant vegetation (Figure 11). The dominant remnant vegetation within the property is Least Concern RE 10.5.1b *Corymbia brachycarpa* open woodland on sand plains.

The other main remnant vegetation communities on the property include:

- Least Concern RE 10.5.1a *Eucalyptus similis* open woodland on sand plains;

- Least Concern RE 10.7.3b *Acacia shirleyi* woodland on scarps;
- Least Concern RE 10.7.3d *Acacia shirleyi* woodland on red soil above scarps; and
- Least Concern RE 10.7.7a *Melaleuca tamariscina* and/or *Acacia leptostachya* and/or *Thryptomene parviflora* and sometimes *Calytrix microcoma* open shrubland to shrubland on feericrete.

5.5 PROPERTY C – [redacted]

5.5.1 Property Overview

[redacted] property that [redacted]. This property overview describes the section of the property that is being proposed for offsets [redacted]. This section of the property comprises [redacted] ha. The primary land use is grazing with several reservoirs/dams located on the property. No major roads traverse the property (Figure 12).

The property is [redacted].

The section of the [redacted] property proposed for offsets is not covered by any production permits such as MLs, MLAs or PLs. However, the entire property is overlain by several EPCs.

5.5.2 Offset Potential

The section of the [redacted] property proposed for offsets has a high offset potential, as it contains:

- 55,420 ha of potential Squatter Pigeon (southern subspecies) habitat (Figure 13);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Squatter Pigeon (southern subspecies) or Squatter Pigeon (southern subspecies) habitat is known to occur within the area (Appendix A);
- 53,590 ha of potential Black-throated Finch (white-rumped subspecies) habitat (Figure 14);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Black-throated Finch (white-rumped subspecies) or Black-throated Finch (white-rumped subspecies) habitat is known to occur within the area (Appendix A);
- 26,300 ha of potential Koala habitat (Figure 15);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Koala or Koala habitat is known to occur within the area (Appendix A);
- Nearby records of the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala, [redacted];

- 10,080 ha of Of Concern RE 10.10.3 *Eucalyptus drepanophylla* open woodland on sandstone ranges; and
- Watercourses mapped by the Queensland government on the vegetation management watercourse map, comprising mostly watercourses mapped as moderate as well as one watercourse within the section of the [redacted] property proposed for offsets mapped as major in accordance with the DAF mapping which classifies all waterways in Queensland in relation to the level of risk that waterway barrier works could pose to fish movement and fish communities (DAF 2014).

5.5.3 Other Biodiversity Values

[redacted] traverse the section of the [redacted] property proposed for offsets, namely [redacted]). There are numerous smaller ephemeral drainage lines traversing the section of the [redacted] property proposed for offsets. Several government mapped wetlands occur on the section of the [redacted] property proposed for offsets (Figure 12).

5.5.4 Vegetation Communities

The section of the [redacted] property proposed for offsets contains [redacted] ha of remnant vegetation (Figure 16). The dominant remnant vegetation within the section of the [redacted] property proposed for offsets is Least Concern RE 10.5.1a *Eucalyptus similis* open woodland on sand plains.

The other main remnant vegetation communities on the section of the [redacted] property proposed for offsets include:

- Least Concern RE 10.5.5a *Eucalyptus melanophloia* open woodland on sand plains;
- Of Concern RE 10.10.3 *Eucalyptus drepanophylla* open woodland on sandstone ranges;
- Endangered RE 11.3.1 *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains (i.e. endangered Brigalow TEC);
- Of Concern RE 11.4.6 *Acacia cambagei* woodland on Cainozoic clay plains; and
- Endangered RE 11.4.8 *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains (i.e. endangered Brigalow TEC).

The areas of non-remnant vegetation, classified as category X on the Regulated Vegetation Management Map for the section of the [redacted], are found mostly in the [redacted] areas of the property (Figure 16).

5.6 PROPERTY D – [redacted]

5.6.1 Property Overview

[redacted] property [redacted] (Figures 1 and 17). This property overview describes the section of the property that is being proposed for offsets ([redacted]). This section of the property comprises [redacted] ha. The primary land use is grazing with several reservoirs/dams located on the property (Figure 17). No major roads traverse the property.

The property is [redacted].

The section of the [redacted] property proposed for offsets is not covered by any production permits such as MLs, MLAs or PLs. However, the property is overlain by several EPCs.

5.6.2 Offset Potential

The section of the [redacted] property proposed for offsets has a high offset potential, as it contains:

- 25,805 ha of potential Squatter Pigeon (southern subspecies) habitat (Figure 18);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Squatter Pigeon (southern subspecies) or Squatter Pigeon (southern subspecies) habitat is known to occur within the area (Appendix A);
- 25,750 ha of potential Black-throated Finch (white-rumped subspecies) habitat (Figure 19);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Black-throated Finch (white-rumped subspecies) or Black-throated Finch (white-rumped subspecies) habitat is known to occur within the area (Appendix A);
- 7,270 ha of potential Koala habitat (Figure 20);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Koala or Koala habitat is known to occur within the area (Appendix A);
- Nearby records of the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala, [redacted]; and
- Watercourses mapped by the Queensland government on the vegetation management watercourse map, comprising mostly watercourses mapped as moderate as well as one watercourse within the section of the [redacted] property proposed for offsets mapped as major in accordance with the DAF mapping which classifies all waterways in Queensland in relation to the level of risk that waterway barrier works could pose to fish movement and fish communities (DAF 2014).

5.6.3 Other Biodiversity Values

[redacted] and [redacted] traverse the [redacted] of the section of the [redacted] property proposed for offsets and [redacted] runs along a section of the [redacted] (Figure 17). There are numerous smaller ephemeral drainage lines traversing the section of the [redacted] property proposed for offsets. Several government mapped wetlands occur on the section of the [redacted] property proposed for offsets (Figure 17).

5.6.4 Vegetation Communities

The section of the [redacted] property proposed for offsets contains [redacted] ha of remnant vegetation (Figure 21). The dominant remnant vegetation within the section of the [redacted] property proposed for offsets is Least Concern RE 10.3.6a *Eucalyptus brownii* open woodland on alluvial plains.

The other main remnant vegetation communities on the section of the [redacted] property proposed for offsets include:

- Least Concern RE 10.3.28a *Eucalyptus melanophloia* open woodland on sandy alluvial fans;
- Least Concern RE 10.5.1a *Eucalyptus similis* open woodland on sand plains;
- Least Concern RE 10.5.4b *Eucalyptus crebra* open woodland on sand plains;
- Least Concern RE 10.5.5a *Eucalyptus melanophloia* open woodland on sand plains; and
- Of Concern RE 11.4.6 *Acacia cambagei* woodland on Cainozoic clay plains.

The areas of non-remnant vegetation, classified as category X on the Regulated Vegetation Management Map for the section of the [redacted] property, are found mostly in the [redacted] and [redacted] areas of the property (Figure 21).

6 CONCLUSION

The proponent has identified four properties with high offset potential given that they contain large areas of potential habitat for the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala.

A total of 188,957 ha of potential habitat for the Squatter Pigeon (southern subspecies) has been identified from the four potential offsets properties, against the 1,439 ha of high value habitat for this species that is proposed to be cleared for the project.

A total of 185,580 ha of potential habitat for the Black-throated Finch (white-rumped subspecies) has been identified from the four potential offsets properties, against the 4,443 ha of high value habitat for this species that is proposed to be cleared for the project.

A total of 53,760 ha of potential habitat for the Koala has been identified from the four potential offsets properties, against the 3,246 ha of high value habitat for this species that is proposed to be cleared for the project.

All potential offset properties have been identified in the GBOS.

Once EPBC approval has been obtained for the project, the proponent will enter into formal discussions with the owners of the potential offset properties in order to obtain agreement to undertake field surveys. This will enable the Offset Management Plan to be prepared.

The Offset Management Plan will include details of the management methods that will be put in place for the offset properties to achieve appropriate conservation outcomes, such as the management of grazing pressures, pests, weeds and fire. The Offset Management Plan will also describe the agreed monitoring and reporting procedures for the offset properties to ensure regulatory compliance.

PART B
OFFSETS UNDER QUEENSLAND LEGISLATION

7 LEGISLATIVE FRAMEWORK

7.1 QUEENSLAND GOVERNMENT ENVIRONMENTAL OFFSETS POLICY

7.1.1 Overview

Queensland recently passed the EO Act along with the *Environmental Offsets Regulation 2014* (EO Regulation). The *Queensland Environmental Offsets Policy* (QEOP) (EHP 2014b) came into force on 1 July 2014 and was subsequently updated on 19 December 2014. The EO Act, EO Regulation and QEOP comprise the Queensland Environmental Offsets Framework. According to this framework, it is necessary to provide offsets for any significant, residual impacts on MSES. These are described in detail in Sections 7.1.2 and 7.1.3.

7.1.2 Queensland Environmental Offsets Act 2014 and Environmental Offsets Regulation 2014

Under section 14 of the EO Act, offsets are required if the prescribed activity will, or is likely to have a significant, residual impact on the prescribed environment. Significant residual impacts are defined under section 8 of the EO Act as follows:

> *(1) Generally, a **significant residual impact** is an adverse impact, whether direct or indirect, of a prescribed activity on all or part of a prescribed environmental matter that—*
>
> *(a) remains, or will or is likely to remain, (whether temporarily or permanently) despite on-site mitigation measures for the prescribed activity; and*
>
> *(b) is, or will or is likely to be, significant*

The EO Regulation prescribes a number of MSES that are potentially relevant to the project. These include:

- Regulated vegetation including:
  - Endangered or of concern REs;
  - REs that intersect wetlands shown on the vegetation management wetlands map;
  - Essential habitat as shown on the essential habitat map; and
  - REs that are within a defined distance from the banks of a watercourse as shown on the vegetation management watercourse map.
- Connectivity areas that contain remnant vegetation;

- Wetlands and watercourses including:
  - Wetlands in wetland protection areas or with a high ecological significance; and
  - A wetland or watercourse in high ecological value waters.
- A designated precinct in a strategic environmental area;
- Protected wildlife habitats including:
  - High risk areas on the flora survey trigger maps that contain endangered or vulnerable plants;
  - Areas that contain endangered or vulnerable plants that are not shown as high risk areas on the flora survey trigger map;
  - Non-juvenile koala habitat trees in areas within the South East Queensland Koala Conservation State Planning Regulatory Provisions; and
  - Habitat for an animal that is endangered or vulnerable or the following special least concern species: Koala, Short-beaked Echidna and Platypus.
- Protected areas (such as National Parks);
- Highly protected zones of State marine parks;
- Fish habitat areas;
- Waterways providing for fish passage;
- Marine plants; and
- Legally secured offset areas.

Offsets are only required in the event that significant, residual impacts are predicted. The EHP published a guideline to further define the concept of a significant residual impact for individual MSES in December 2014. This guideline was used in the assessment of whether the project would have a significant residual impact on any MSES. The offset requirements for the project are discussed in Section 3.

7.1.3 Queensland Environmental Offsets Policy

The QEOP states that an environmental offset must meet the following seven offset principles:

1. Offsets will not replace or undermine existing environmental standards or regulatory requirements, or be used to allow development in areas otherwise prohibited through legislation or policy.
2. Environmental impacts must first be avoided, then minimised, before considering the use of offsets for any remaining impact.
3. Offsets must achieve a *conservation outcome* that achieves an equivalent environmental outcome.
4. Offsets must provide environmental values as similar as possible to those being lost.

5. Offset provision must minimise the time-lag between the impact and delivery of the offset.
6. Offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values.
7. Where legal security is required, offsets must be legally secured for the duration of the impact on the *prescribed environmental matter*.

The Queensland Environmental Offsets Framework allows for offsets to take the form of one or a combination of the following three delivery options:

1 Financial settlement offset – whereby offset cost is determined in accordance with the EHP Financial Settlement Offset Calculation Methodology;

2 Proponent-driven offset – a proponent-prepared offset package primarily consisting of a:

- Land-based offset – Land-based offsets are to meet requirements of the EHP Land-based Offsets Multiplier Calculator. Habitat quality for impact and offset sites is to be determined via rapid assessment (habitat quality factors pre-determined by the EHP) or via alternative habitat factor scores through the undertaking of a habitat quality analysis in accordance with the EHP (2014a) *Guide to Determining Terrestrial Habitat Quality*; and
- Direct Benefit Management Plan – an offset which offers conservation gains via priority management actions that address threats to the prescribed environmental matter that is subject to the given offset condition; and

3 Combination of financial settlement and proponent-driven offset.

The QEOP has identified Strategic Offset Investment Corridors which are areas where land may be suitable for management activities that provide a benefit to environmental matters likely to be impacted by development.

8 PROJECT OFFSET REQUIREMENTS

8.1 IMPACT ASSESSMENT

The project has been designed, where possible, to avoid, manage and mitigate adverse impacts on MSES. Mitigation and management measures proposed for the project are described in Section 3.1.

Appendix C contains a full list of MSES as per Schedule 2 of the EO Regulation. It describes whether the MSES occur on the project site, and the potential for the project to give rise to significant, residual impacts on the MSES. Appendix C concludes that there is a potential that the project will give rise to a significant, residual impact on the following MSES:

- Of concern vegetation. Clearing of approximately 24 ha of RE 10.10.3 *Eucalyptus drepanophylla* open-woodland on sandstone ranges for the purposes of open cut mining and the construction of mine infrastructure.
- Vegetation along ephemeral drainage lines. Clearing of approximately 359 ha of vegetation comprising 23 REs as per the vegetation management watercourse map for the purposes of open cut mining and the construction of mine infrastructure.
- The Squatter Pigeon (southern subspecies). Approximately 1,436 ha of high value habitat for this species is proposed to be cleared for the purposes of open cut mining and the construction of mine infrastructure. A further 3 ha of high value habitat may be cleared for the construction of minor remedial drainage earthworks in subsided areas (although it is noted that the exact location and design of drains is still to be confirmed).
- The Black-throated Finch (white-rumped subspecies). Approximately 4,434 ha of high value habitat for this species is proposed to be cleared for the purposes of open cut mining and the construction of mine infrastructure. A further 9 ha of high value habitat may be cleared for the construction of minor remedial drainage earthworks in subsided areas (although it is noted that the exact location and design of drains is still to be confirmed).
- The Koala. Approximately 3,246 ha of high value habitat for this species is proposed to be cleared for the purposes of open cut mining and the construction of mine infrastructure. A further 0.4 ha of high value habitat may be cleared for the construction of minor remedial drainage earthworks in subsided areas (although it is noted that the exact location and design of drains is still to be confirmed).

The three fauna species listed above (i.e. Squatter Pigeon [southern subspecies], Black-throated Finch [white-rumped subspecies] and Koala) are also listed under the EPBC Act, and are considered further in Part A of this Biodiversity Offset Strategy. In addition, Part A of this Biodiversity Offset Strategy also lists the RE types present within the proposed offset

properties (including the presence of RE 10.10.3) as well as watercourses mapped by the Queensland government on the vegetation management watercourse map. The QEOP were used in undertaking the assessment of whether the potential impact of the project on these MSES is considered to be a significant, residual impact (and hence that offsets are required).

The offset requirements for MSES that are not listed as MNES (i.e. clearing of RE 10.10.3 and clearing of vegetation as per the vegetation management watercourse map) will be fulfilled through the provision of offsets that are required for the threatened species described in Part A. In particular:

- One of the offset properties described in Section 5.5 contains RE 10.10.3; and
- All the properties contain watercourses as mapped on the vegetation management watercourses map (and large areas of remnant vegetation surrounding watercourses).

The EHP has mapped a HES wetland as occurring in the northern portion of the project site (described in detail in the EIS Aquatic Ecology and Stygofauna Report). It will be necessary to provide offsets under the EO Regulation in the event of the project giving rise to significant, residual impacts on the wetland. The need for offsets will be determined prior to any subsidence of the wetland and based on detailed mine planning and subsidence predictions for the area. Even minor changes in the existing mine plan could significantly alter the nature and extent of currently predicted impacts on the wetland. Further detail will be provided in the Offset Management Plan (Section 4.4).

In conclusion, the offsets that have been identified for the project, at this stage, are for significant, residual impacts on of concern vegetation; vegetation along ephemeral drainage lines; and three threatened fauna species (Squatter Pigeon [southern subspecies], Black-throated Finch [white-rumped subspecies] and the Koala). The three fauna species are all listed under the EPBC Act, in addition to being MSES. Offsets are, therefore, required to be provided in accordance with the EPBC Act Offset Policy (SEWPaC 2012). Section 15 of the EO Act removes the ability for the State government to impose an offset condition in relation to a *prescribed activity*, if a Commonwealth decision has already been made in relation to the same, or substantially the same activity, *prescribed environmental matter* and area of impact. EPBC Act offsets are discussed in Part A.

9 REFERENCES

DAF (2014) *Queensland Waterways for Waterway Barrier Works.*

DECC (NSW), and Queensland Parks and Wildlife Service (2007) *National recovery plan for the black-throated finch southern subspecies Poephila cincta cincta*.

DEWHA (2009) *Significant Impact Guidelines for the endangered Black-throated Finch (southern) (Poephila cincta cincta).*

DotE (2013) *Draft EPBC Act Referral guidelines for the Vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory*.

EHP (2013) *Galilee Basin Offsets Strategy*.

EHP (2014a) *Guide to Determining Terrestrial Habitat Quality. A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy*. Version 1.1, December 2014.

EHP (2014b) *Queensland Environmental Offsets Policy (Version 1.1) December 2014.*

Environmental Offsets Act 2014 (Qld).

Environmental Offsets Regulation 2014 (Qld).

Environment Protection and Biodiversity Conservation Act 1999 (Cth).

Environmental Protection Regulation 2008 (Qld).

Environmental Protection (Water) Policy 2009 (Qld).

Fisheries Act 1994 (Qld).

Land Act 1994 (Qld).

Marine Parks Act 2004 (Qld).

Melzer, A., Cristescu, R., Ellis, W., FizGibbon, S. and Manno, G. (2014) The habitat and diet of koalas (*Phascolarctos cinereus*) in Queensland. *Australian Mammalogy* 36: 189-199.

Nature Conservation Act 1992 (Qld).

Nature Conservation (Wildlife Management) Regulation 2006 (Qld).

Queensland Herbarium (2014) *Regional Ecosystem Description Database (REDD). Version 8.1 (November 2014) (DSITIA: Brisbane).*

SEWPAC (2012) *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*. Department of Sustainability, Environment, Water, Population and Communities, Canberra.

Sustainable Planning Act 2009 (Qld).

Vegetation Management Act 1999 (Qld).

Wild Rivers Act 2005 (Qld).

* * *

for
HANSEN BAILEY

Laura Knowles
Principal Environmental Scientist

Peter Hansen
Director

FIGURES

Figures 1 – 21 have been redacted as they contain commercial in confidence information

APPENDIX A

EPBC Act Protected Matters Search Tool Results

Appendix A has been redacted as it contains commercial in confidence information

APPENDIX B

Regional Ecosystems used to Map Fauna Species Potential Habitat within the Potential Offset Properties

Table B.1
Regional Ecosystems used to Map Fauna Species Potential Habitat

Regional Ecosystem	Squatter Pigeon (southern subspecies)	Black-throated Finch (white-rumped subspecies)	Koala
RE 10.3.6	✓	✓	-
RE 10.3.9	✓	✓	-
RE 10.3.13	✓	✓	✓
RE 10.3.14	✓	-	✓
RE 10.3.15	✓	-	✓
RE 10.3.17b	✓	-	✓
RE 10.4.8	✓	✓	-
RE 10.5.1	✓	✓	-
RE 10.5.5	✓	✓	-
RE 10.7.7	✓	✓	-
RE 10.7.11	✓	✓	-
RE 10.3.28	✓	✓	-

APPENDIX C

Matters of State Environmental Significance

Table C.1
Matters of State Environmental Significance in the Project Site

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
Regulated Vegetation				
The prescribed regional ecosystems that are endangered regional ecosystems comprise a MSES.	**Endangered regional ecosystem** means a RE declared to be an endangered regional ecosystem under section 22LA of the VM Act.	No Endangered REs listed under the VM Act have been recorded or are likely to occur within the project site.	Not applicable.	Not applicable.
The prescribed regional ecosystems that are of concern regional ecosystems comprise a MSES.	**Of concern regional ecosystem** means a RE declared to be an of concern regional ecosystem under section 22LB of the VM Act.	RE 10.10.3: *Eucalyptus drepanophylla* open-woodland on sandstone ranges is an open Eucalyptus woodland, which is listed as Of Concern under the VM Act. Approximately 271 ha of RE 10.10.3 is found on the project site.	Approximately 24 ha of RE 10.10.3 will be cleared for the purposes of open cut mining and the construction of mine infrastructure. No additional areas would be cleared for the construction of minor remedial drainage earthworks in subsided areas. There will also be disturbance of this community as a result of the subsidence crack rehabilitation program, but this disturbance is small scale and	In accordance with the EHP's (2014b) *Significant Residual Impacts Guideline*, the project will result in a significant residual impact on RE 10.10.3 within the Study Area. One potential offset property [redacted], contains 10,080 ha of RE 10.10.3. This property is described in detail in Section 5.5.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
			temporary and would not give rise to significant, residual impacts.	
A prescribed regional ecosystem is a MSES if it is— • a regional ecosystem that intersects with an area shown as a wetland on the vegetation management wetlands map (to the extent of the intersection); or • an area of essential habitat on the essential habitat map for an animal that is endangered wildlife or vulnerable wildlife or a plant that is endangered wildlife or vulnerable wildlife.	The **regulated vegetation management map** is the map certified by the chief executive as the regulated vegetation management map for a part of the State and showing the vegetation category areas for the part under section 20AA of the VM Act.	One area within the project site is shown on the regulated vegetation management map that intersects with an area shown as a wetland on the vegetation management wetlands map. This area has also been mapped by the EHP as a HES wetland and is discussed in detail below.	This area has also been mapped by the EHP as a HES wetland and is discussed in detail below.	This area has also been mapped by the EHP as a HES wetland and is discussed in detail below.
	The **essential habitat map** is a map certified by the chief executive as the essential habitat map for the State and showing, for the State, areas the chief executive reasonably believes are areas of essential habitat for protected wildlife under section 20AC(1) of the VM Act.	No essential habitat as per the EHP's essential habitat map has been mapped within the project site.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
A prescribed regional ecosystem is a MSES to the extent the ecosystem is located within a defined distance from the defining banks of a relevant watercourse. However, to the extent a prescribed regional ecosystem is located within an urban area, it is not a MSES.	**Defined distance** for a regional ecosystem, means a distance identified in the environmental offsets policy as the relevant distance from the defining banks of a relevant watercourse. **Relevant watercourse** means a watercourse identified on the vegetation management watercourse map. The **vegetation management watercourse map** is the map certified by the chief executive as the vegetation management watercourse map showing particular watercourses for the State under section 20AB of the VM Act.	Relevant watercourses as per the vegetation management watercourse map have been assessed within the project site and are described in the EIS Terrestrial Ecology Report. Defined distances for the REs on the banks of the watercourses have been applied.	Approximately 359 ha of vegetation comprising 23 REs as per the vegetation management watercourse map will be cleared as a result of the project.	In accordance with the EHP's (2014b) *Significant Residual Impacts Guideline*, offsets are required if more than 2 ha sparse vegetation is cleared. The project will therefore have a significant residual impact on vegetation along drainage lines. As described in the QEOP, offsets must be of the same broad vegetation group as the impacted RE, within the same bioregion and associated with a watercourse. The offsets that will be provided for other MSES (i.e. the Squatter Pigeon [southern subspecies], Black-throated Finch [white-rumped subspecies] and the Koala) will also address any significant, residual impacts on this MSES, given that the offsets involve securing and conserving large areas of woodland vegetation. In addition, the potential offset areas contain watercourses as mapped on the vegetation management watercourses map (and

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
				large areas of remnant vegetation surrounding watercourses). The potential offset properties proposed for the project are described in detail in Section 5.
Connectivity Areas				
This section applies to a prescribed regional ecosystem: • to the extent the ecosystem contains remnant vegetation; and • if the ecosystem contains an area of land that is required for ecosystem functioning (a connectivity area). The prescribed regional ecosystem is a MSES if the administering agency is satisfied, having had regard to criteria in the environmental offsets policy about connectivity areas, that: • the connectivity area is of sufficient size or	Remnant vegetation means vegetation forming the predominant canopy of the vegetation: • covering more than 50% of the undisturbed predominant canopy; and • averaging more than 70% of the vegetation's undisturbed height; and • composed of species characteristic of the vegetation's undisturbed predominant canopy.	The entire project site has been mapped as remnant vegetation. Biodiversity Planning Assessment mapping for the project site indicates that the entire project site is classified as State Biodiversity Significance, and that the majority of the project site, with the exception of the north-east and north-west corners, is considered to be within a State Biodiversity Corridor.	The project will not have a significant, residual impact on connectivity areas given the management of remaining vegetation on-site and the large gap (which contains remnant vegetation) that will remain between the proposed Carmichael Coal Mine site and the project. In addition, EHP's LFC Tool determined that the project would not result in a significant residual impact on local or regional connectivity and therefore offsets for connectivity are not required for the project.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
configured in a way that maintains ecosystem functioning; and • the prescribed regional ecosystem will remain despite a threatening process within the meaning of the *Nature Conservation Act 1992.* However, to the extent a prescribed regional ecosystem is located within an urban area, it is not a MSES.				
Wetlands and watercourses				
Each of the following matters is a MSES— • a wetland— -in a wetland protection area; or • of high ecological significance shown on the Map of referable wetlands;	**Wetland** means an area shown as a wetland on the Map of referable wetlands. **Wetland protection area** means an area shown as a wetland protection area on the Map of referable wetlands. **Map of referable wetlands** means the 'Map of referable wetlands', a document approved by the chief executive on 4 November 2011 and published by the	The Map of Referable Wetlands shows that there is one HES wetland (with an associated 500 m trigger area) (termed the northern seasonal wetland) located in the north of the project site.	The northern seasonal wetland will not be cleared as a result of the project. However, the area will be impacted as a result of subsidence. The potential impacts of the project on the northern seasonal wetland are described in detail in the EIS Aquatic Ecology and Stygofauna Report.	Subsidence impacts on the northern seasonal wetland may cause a significant, residual impact to this HES wetland. The EHP is currently preparing guidance material to assist proponents to determine whether impacts are considered to be significant (and hence require offsets). Any need for offsets will be determined after further survey and assessment work has been completed.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
	department, as amended from time to time by the chief executive under section 144D of the *Environmental Protection Regulation 2008*.		Further survey and assessment work will be undertaken based on the detailed mine plan. This future work will determine whether the project will give rise to a significant, residual impact and hence whether offsets are required.	
• a wetland or watercourse in high ecological value waters.	**Wetland** means an area shown as a wetland on the Map of referable wetlands. **Watercourse** is defined in schedule 12, part 1, section 8 of the *Environmental Protection Regulation 2008* and is: • a river, creek or stream in which water flows permanently or intermittently— -in a natural channel, whether artificially improved or not; or -in an artificial channel that has	No wetlands or watercourses in high ecological value waters have been recorded within the project site.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
	changed the course of the watercourse. • A watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water. **High ecological value waters** means waters in which the biological integrity of the water is effectively unmodified or highly valued under schedule 2 of the *Environmental Protection (Water) Policy 2009*.			
High preservation areas of wild river areas				
A part of a wild river area described as a high preservation area in the wild river declaration for the area is a matter of State environmental significance. However, to the extent a wild river area described as a high preservation area is in an urban area, it is not a matter of State environmental significance.	**Wild river area**s see the *Wild Rivers Act 2005*. **Wild river declaration** see the *Wild Rivers Act 2005.*	The project site does not contain any high preservation areas in a wild river declaration.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
Protected Wildlife Habitat				
An area that is shown as a high risk area on the flora survey trigger map and that contains plants that are endangered wildlife or vulnerable wildlife is a MSES.	**Flora survey trigger map** means the map held by the EHP under section 247 of the *Nature Conservation (Wildlife Management) Regulation 2006*.	The flora survey trigger map has not identified any high risk areas that contain plants that are endangered wildlife or vulnerable wildlife within the project site.	Not applicable.	Not applicable.
An area that is not shown as a high risk area on the flora survey trigger map, to the extent that the area contains plants that are endangered wildlife or vulnerable wildlife is a MSES.	**Flora survey trigger map** means the map held by the EHP under section 247 of the *Nature Conservation (Wildlife Management) Regulation 2006*.	No threatened flora species listed as Endangered or Vulnerable under the NC Act have been recorded or are likely to occur within the project site.	Not applicable.	Not applicable.
A non-juvenile koala habitat tree located in an area shown as bushland habitat, high value rehabilitation habitat or medium value rehabilitation habitat on the map called 'Map of Assessable Development Area Koala Habitat Values' that applies under the South East Queensland Koala Conservation State Planning Regulatory	**Koala habitat tree** means a tree of any of the following genera— • Angophora; • Corymbia; • Eucalyptus; • Lophostemon; • Melaleuca. **Non-juvenile koala habitat tree** means a koala habitat tree that— • is more than 4 m high; or	No areas within the project site have been mapped as bushland habitat, high value rehabilitation habitat or medium value rehabilitation habitat on the map called 'Map of Assessable Development Area Koala Habitat Values' that applies under the South East Queensland Koala Conservation State Planning Regulatory Provisions.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
Provisions is a MSES.	• has a trunk with a circumference of more than 31.5 cm at 1.3 m above the ground. **South East Queensland Koala Conservation State Planning Regulatory Provisions** means the document called the '*South East Queensland Koala Conservation State Planning Regulatory Provisions'*, dated May 2010 and published on the website of the department in which the *Sustainable Planning Act 2009* is administered.			
A habitat for an animal that is endangered wildlife or vulnerable wildlife or a special least concern animal is a MSES.	Examples of habitat include an area of land used by an animal for foraging, roosting, nesting or breeding **Special least concern animal** means the following animals that are least concern wildlife under the NC Act: • a Koala (Phascolarctos cinereus); • an echidna (Tachyglossus	Four fauna species listed as threatened or Special Least Concern under the NC Act have been recorded within the project site, namely: • Squatter Pigeon (southern subspecies) (*Geophaps scripta scripta*) (listed as Vulnerable under the NC Act); • Black-throated Finch (white-rumped subspecies) (*Poephila cincta cincta*) (listed as Endangered	Please refer to Part A for a discussion of the Squatter Pigeon (southern subspecies); Black-throated Finch (white-rumped subspecies); and Koala, given that these species are also MNES and are addressed in this section. The Short-beaked Echidna has been recorded within the project site. However, as assessed in the EIS Terrestrial	Offsets are required under the EO Act for the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala. The potential offset properties selected to offset any significant residual impacts on these species are discussed in Section 5.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
	aculeatus); • a platypus (Ornithorhynchus anatinus).	under the NC Act); • Koala (*Phascolarctos cinereus*) (listed as Special Least Concern under the NC Act); and • Short-beaked Echidna (*Tachyglossus aculeatus*) (listed as Special Least Concern under the NC Act).	Ecology Report, the project is unlikely to have a significant residual impact on this species and offsets are therefore not proposed for this species.	
Protected Areas				
A protected area is a MSES.	A coordinated conservation area under the *Nature Conservation Act 1992* is excluded by the *Environmental Offsets Act 2014*, definition protected area.	No protected areas are within the project site.	Not applicable.	Not applicable.
Highly protected zones of State marine parks				
A highly protected area of a relevant Queensland marine park is a MSES.	**Highly protected area** means: • a zone classified, under the *Marine Parks Act 2004*, as a conservation park zone, marine national park zone or preservation zone; or • another area prescribed	No highly protected areas of a relevant Queensland marine park are within the project site. The project site is located approximately 280 km from the Queensland coast.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
	under a regulation or zoning plan, under the *Marine Parks Act 2004*, as a highly protected area. **Relevant Queensland marine park** means any of the following marine parks declared under the *Marine Parks Act 2004:* • the Great Barrier Reef Coast Marine Park; • the Moreton Bay Marine Park; • the Great Sandy Marine Park. **Zone**, for a marine park, see the *Marine Parks Act 2004*, schedule.			
Fish habitat areas				
An area declared under the *Fisheries Act 1994* to be a fish habitat area is a MSES.	The *Fisheries Act 1994* details areas to be declared as a fish habitat area.	No declaration of fish habitat has been made for the project site.	Not applicable.	Not applicable.
Waterway providing for fish passage				
Any part of a waterway providing for passage of fish and not located within an urban area is a matter of	**Fish** means fish regulated under the *Fisheries Act 1994*. **Passage**, for fish, means the	The majority of waterways in the project site are mapped as being green (low risk of impact) or amber (moderate	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
State environmental significance only if the construction, installation or modification of waterway barrier works carried out under an authority will limit the passage of fish along the waterway.	natural movement patterns of fish species required to maintain the biological integrity of the species. **Waterway** includes a river, creek, stream, watercourse or inlet of the sea. **Waterway barrier works** means a dam, weir or other barrier across a waterway.	risk of impact). The EIS Aquatic Ecology and Stygofauna Report concludes that the project is not predicted to give rise to any significant impacts on fish passage.		
Marine plants				
A marine plant within the meaning of the *Fisheries Act 1994* is a MSES. However, a marine plant is not a MSES if the plant is in an urban area.	Section 8 of the *Fisheries Act 1994* defines a marine plant as: • plant (a "tidal plant") that usually grows on, or adjacent to, tidal land, whether it is living, dead, standing or fallen; • material of a tidal plant, or other plant material on tidal land; • a plant, or material of a plant, prescribed under a regulation or management plan to be a marine plant.	No marine plants were recorded within the project site.	Not applicable.	Not applicable.
Legally secured offset areas				

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
A legally secured offset area is a MSES.	A **legally secured offset area** is an area of land the subject of a covenant under the *Land Act 1994.*	There are no offset areas present within the project site.	Not applicable.	Not applicable.