



BHP Billiton Mitsubishi Alliance

# Caval Ridge Mine

## Offset Management Plan





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## Document Control

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## Table of Contents

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<b>Document Control</b>	<b>Table of Contents</b>	<b>2</b>
<b>List of Tables</b>		<b>5</b>
<b>Abbreviations</b>		<b>6</b>
<b>1.0 Introduction</b>		<b>7</b>
1.1 Caval Ridge Mine and Buffel Village		7
<b>2.0 Legislative Requirements</b>		<b>8</b>
2.1 Commonwealth Government approval conditions		8
2.2 Queensland Government approval conditions		10
<b>3.0 Purpose and Objectives of this plan</b>		<b>11</b>
<b>4.0 Roles and Responsibilities</b>		<b>12</b>
<b>5.0 Vegetation Impacts and Offset Requirements</b>		<b>13</b>
<b>6.0 Description of Offset Areas</b>		<b>15</b>
6.1 Commitment to maintain or provide (if required) alternative offsets		15
6.2 Norwich Park		16
6.2.1 Location		16
6.2.2 Vegetation offset		16
6.2.3 Conservation benefits of the offset		16
6.2.4 Other offset areas at Norwich Park		17
6.2.5 Nature Refuge Agreement		17
6.2.6 Habitat values		18
6.2.7 Existing threats to biodiversity		19
6.3 Balmoral		21
6.3.1 Site description/location		21
6.3.2 Vegetation		21
6.3.3 Habitat values		24
6.3.4 Existing threats to biodiversity		24
6.3.5 Conservation benefits of the offset		25
6.3.6 Regenerative capacity		25
6.4 Blackwater		27
6.4.1 Site description		27





6.4.2	Vegetation .....	27
6.4.3	Habitat values .....	28
6.4.4	Existing threats to biodiversity .....	28
6.4.5	Conservation benefits of the offset .....	29
<b>7.0</b>	<b>Management Actions .....</b>	<b>30</b>
7.1	Management Zones .....	30
7.1.1	Management Zone 1 .....	32
7.1.2	Management Zone 2 .....	33
7.1.3	Management Zone 3 .....	34
7.1.4	Management Zone 4 .....	36
7.2	Pest plant management .....	37
7.2.1	General Strategies .....	37
7.2.2	Specific Measures—Weed Management .....	37
7.3	Pest animal management .....	39
7.4	Infrastructure and access requirements .....	39
7.5	Grazing .....	40
7.6	Erosion .....	41
7.7	Fire management .....	41
7.8	Balmoral BOA revegetation management .....	44
<b>8.0</b>	<b>Management – Performance, Monitoring and Reporting .....</b>	<b>45</b>
8.1	Performance criteria .....	45
8.2	Monitoring program .....	47
8.2.1	Monitoring Balmoral BOA grassland .....	48
8.2.2	Monitoring grazing .....	49
8.2.3	Monitoring sedimentation and erosion .....	49
8.3	Reporting .....	49
8.4	Review of Biodiversity Offset Management Plan .....	49
8.5	Risk Analysis .....	50
<b>9.0</b>	<b>Information sources .....</b>	<b>51</b>
	<b>Appendix 1 – EPBC Act Approval Conditions .....</b>	<b>53</b>
	<b>Appendix 2 – Coordinator General’s Conditions .....</b>	<b>54</b>
	<b>Appendix 3 – Norwich Park Nature Refuge Agreement .....</b>	<b>55</b>
	<b>Appendix 4 – Balmoral Grassland Restoration Program .....</b>	<b>56</b>
	<b>Appendix 5 – Figures .....</b>	<b>66</b>





## List of Tables

Table 1: EPBC Act Approval Conditions relevant to this Offset Management Plan.....	9
Table 2: Coordinator General's Conditions relevant to this Offset Management Plan.....	10
Table 3: Roles and Responsibilities.....	12
Table 4: Proposed Biodiversity Offsets for the Caval Ridge Project.....	14
Table 5: Norwich Park Nature Refuge Offset Allocations.....	17
Table 6: Balmoral grassland patch sizes.....	21
Table 7: Remnant RE's recorded at the Balmoral BOA.....	22
Table 8: REs recorded at the Blackwater BOA.....	27
Table 9: Management Zone Criteria.....	30
Table 10: Summary Offset Area Management Zones and Associated RE Vegetation Type.....	31
Table 11: Declared plants previously observed within Caval Ridge Mine Biodiversity Offset Areas and recommended control methods.....	38
Table 12: Fire Management Guidelines.....	42
Table 13: Performance Criteria for Management Actions.....	45
Table 14: Risk Analysis.....	50





## Abbreviations

ABBREVIATION	DESCRIPTION
BOA	Biodiversity Offset Area
BOMP	Biodiversity Offset Management Plan
BMA	BHP Billiton Mitsubishi Alliance
Bluegrass EEC	Bluegrass ( <i>Dichanthium</i> spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) Endangered Ecological Community, now included within the "Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin" Endangered Ecological Community.
Brigalow EEC	Term used to collectively refer to all vegetation that meets the definition of the Brigalow ( <i>Acacia harpophylla</i> dominant and co-dominant) Endangered Ecological Community under the EPBC Act. This definition encompasses a number of Queensland Regional Ecosystems, including 11.4.3, 11.4.8 and 11.4.9.
BVG	Broad Vegetation Group
DEHP	Queensland Department of Environment and Resource Management
DotE	Commonwealth Department of the Environment. Formerly known as the Department of Sustainability, Environment, Water, Population and Communities.
EEC	Endangered Ecological Community, as defined under the EPBC Act.
EIS	Environmental Impact Statement
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
HVR	High Value Regrowth
LPA	Queensland <i>Lands Protection (Pest and Stock Route Management) Act 2002</i>
ML	Mining Lease
NCA	Queensland <i>Nature Conservation Act 1992</i>
NPNR	Norwich Park Nature Refuge
RE	Regional Ecosystem. REs are vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil
VM Act	Queensland <i>Vegetation Management Act 1999</i>



## 1.0 Introduction

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This Biodiversity Offset Management Plan (BOMP) addresses the provision and management of vegetation offsets for Caval Ridge Mine and Buffel Village as approved and required under both Queensland and Commonwealth legislation.

### 1.1 Caval Ridge Mine and Buffel Village

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Caval Ridge Mine is a new multi-seam open cut coal mine. The Mine is located in the Bowen Basin in Central Queensland, approximately 160 kilometres south west of Mackay and 15 kilometres south of Moranbah (Refer to **Figure 1**).

To support the construction and operation of the mine, BMA will build a workers accommodation village approximately 15 km south of Moranbah on land adjacent to the Caval Ridge Mine lease. The village site has been highly modified through historical land-use, which has included extensive vegetation clearing. The area contains open woodland to shrubland, with minor weed infestation and grazing disturbances.

Construction activities commenced at Caval Ridge Mine and Buffel Village in early-2012, with mining operations scheduled to commence in late-2014. The Mine has been subject to an assessment and approval process under Commonwealth and Queensland legislation.

The Environmental Impact Statement (EIS) and subsequent Change Request 1 (Buffel Village) identified two Endangered Ecological Communities (EECs) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and eight significant Regional Ecosystems (REs) under the Queensland *Vegetation Management Act 1999* (VM Act) that will be impacted by the construction and operation of the mine and village.

Commonwealth approval for the Mine under the EPBC Act was granted on 18 March 2011 by the Department of Sustainability, Environment, Water, Population and Communities (DotE). Relevant conditions of approval are detailed in Section 2.2.

Queensland approval under the *State Development and Public Works Organisational Act 1971* (SDPWO Act) was granted by the Queensland Coordinator General in August 2010 and February 2011 (Buffel Village). Relevant conditions of approval are detailed in Section 2.3

This Offset Management Plan (the Plan) has been prepared to meet the requirements of relevant conditions under both the Commonwealth and Queensland approvals. Biodiversity offsets for the Mine and Village are being provided through a combination of properties at Norwich Park, Balmoral and Blackwater.



## 2.0 Legislative Requirements

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The environmental assessment and approval process undertaken for both Queensland and Commonwealth legislation prescribed a number of conditions on the project. The relevant conditions relating to vegetation offsets are detailed below in **Table 1** (Commonwealth) and **Table 2** (Queensland).

### 2.1 Commonwealth Government approval conditions

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The Mine and village will impact the “Brigalow *Acacia harpophylla* dominant and co-dominant” EEC and the “Bluegrass (*Dichanthium* spp) dominant grasslands of the Brigalow Belt Bioregions (North and South)” EEC (which is now included within the “Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin” EEC).

Offset areas and management principles within this Plan have been designed to meet the requirements of the Commonwealth and Queensland Government’s approval conditions for the Caval Ridge Mine and Buffel Village. Commonwealth approval for the Project, under the EPBC Act, was granted in March 2011.

The key condition relating to offsets is Condition 2 of the EPBC Act approval (**Table 1**) which sets out the offset requirements that must be met prior to commencement of operations (excluding specified early works) as well as providing the relevant section within this document that covers each condition.

Additionally, condition 8 of the EPBC Act approval outlines the requirements and mechanisms for amending this plan and will be consulted if any change to this plan is required. A full copy of the EPBC Act Approval conditions is included at **Appendix 1**.

The EPBC Act approval conditions refer to the ‘Gregory Crinum Offset Area’. This property has subsequently been re-named as ‘Balmoral’ and is referred to throughout this plan as Balmoral in order to reduce any confusion or incorrect association with the Gregory Crinum Mine.





**Table 1: EPBC Act Approval Conditions relevant to this Offset Management Plan**

Conditions of Approval – Caval Ridge Coal Mine (EPBC 2008/4417)		Plan Relevant Section
<b>Condition 2</b>	To offset the impacts to the “Brigalow ( <i>Acacia harpophylla</i> dominant and co-dominant)” endangered ecological community and the “Bluegrass ( <i>Dichanthium</i> spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) endangered ecological community, (now included within the “Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin” endangered ecological community), the person taking the action must, before commencement of operations (excluding early works), obtain the Minister’s approval of an Offset Management Plan for the Norwich Park Nature Refuge and the Gregory Crinum Offset Area. This plan must include:	
	a. Management actions to: <ul style="list-style-type: none"> <li>i. Protect and enhance no less than 126 hectares of the Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) ecological community in the Norwich Park Nature Refuge, within areas identified in the map at Appendix 1 (of the approval conditions); and</li> <li>ii. Protect and enhance 733.3 hectares of Bluegrass (<i>Dichanthium</i> spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) ecological community in the Gregory Crinum Offset Area, within the areas identified in the map at Appendix 2 (of the approval conditions).</li> </ul>	Section 7.0
	b. The desired outcomes/objectives of implementing the plan	Section 3.0
	c. Details of the Norwich Park Nature Refuge, including a clear definition of the location and boundaries of the Norwich Park Nature Refuge, through maps and/or textual descriptions as well as an accompanying <i>shapefile</i> ;	Section 6.2
	d. Details of the Gregory Crinum Offset Area, including a clear definition of the location and boundaries of the Gregory Crinum Offset Area, through maps and/or textual descriptions as well as an accompanying <i>shapefile</i> ;	Section 6.3
	e. Management actions that are proposed to protect offset areas and to enhance the extent and condition of the Brigalow ( <i>Acacia harpophylla</i> dominant and co-dominant) ecological community and Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin ecological community habitat values including weed control, fire management, erosion and sediment control, management of livestock and restrictions on access;	Section 7.0 (7.1 to 7.8)
	f. Management actions for the long-term protection of the established Brigalow ( <i>Acacia harpophylla</i> dominant and co-dominant) ecological community and Bluegrass ( <i>Dichanthium</i> spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) ecological community;	Section 7.1.3 to 7.1.4
	g. The timing, responsibilities and performance criteria for such actions;	Section 8.0 and Table 13
	h. The development and implementation of a monitoring program for enhancing the offset areas;	Section 8.2
	i. A process to report to the Department the management actions undertaken in the offset areas and the outcome of those actions, including the identifying any need for improved management. For the five years after the commencement of operations (excluding early works) reports are to be submitted annually on or before the anniversary of the commencement of operations (excluding early works). Subsequently reports are to be submitted every fifth year on or before the anniversary of the commencement of operations (excluding early works);	Section 8.3
	j. A description of potential risks to successful management and rehabilitation in the offset areas, and a description of the contingency measures that would be implemented to mitigate these risks; and	Section 6.1 and Section 8.5
k. Details of parties responsible for monitoring, reviewing and implementing the plan	Section 8.1, 8.2 and 8.4	



## 2.2 Queensland Government approval conditions

Offset management principles within this Plan have also been designed to meet the requirements of the Queensland Government's approval conditions for the Project. State approval for the mine, under the SDPWO Act was granted by the Queensland Coordinator General in August 2010. Coordinator General's approval of the village was granted in February 2011 as a result of a change request. The Coordinator General's conditions relating to offsetting the loss of REs are detailed in **Table 2**. A full copy of the Coordinator General's conditions is included at **Appendix 2**.

**Table 2: Coordinator General's Conditions relevant to this Offset Management Plan**

3. Flora and Fauna	Relevant Section
(a) The proponent must provide an 'Offset Strategy' for approval by DEHP and the Coordinator-General and the Commonwealth Department of Environment, Water Heritage and the Arts (DEWHA) before the commencement of mining operations. The Strategy must provide for and include, but not necessarily be limited to the following:	-
(i) the minimum area of each Regional Ecosystem (RE) to be secured by the proponent in offset arrangements for the CRM as shown in Table 3.1, but the Commonwealth Department of Environment Water Heritage and the Arts (DEWHA) may specify larger areas of each of these Endangered Ecological Communities (EECs) offsets and DEHP may specify larger areas of each 'endangered' or 'of concern' RE offsets where their respective statutory authorities allow this	Table 4
(ii) all proposed offset lands for the CRM shown on maps which, to avoid the risk of double-counting, delineate areas of vegetation in each proposed offset area attributable to each phase of the BBCG project	N/A
(iii) an assessment of the extent and condition of the native vegetation proposed to be used as offset areas based upon ground truthing	Section 6.0
(iv) the management of offset lands to exclude grazing or other development, except when required by law to provide access to resource tenure holders	Section 7.0 and Table 13
(v) the management of offset lands so as to encourage regeneration and regrowth of the relevant native vegetation to attain remnant or other protected status within 20 years or prior to the surrender of the EA for the CRM, whichever is sooner	Section 7.0 and Table 13
(vi) annual reporting to DEHP, by a suitably qualified third party acceptable to DEHP, on activities at the offset area and its progress towards remnant or other protected area status	Section 7.8 and 8.0
(vii) a commitment that if at any time before the EA for the CRM is surrendered, any of the offset lands are to be cleared, or if the proponent relinquishes management of the offset lands or applies to surrender the EA for the CRM before the offset attains remnant status, the proponent must:	-
A, establish an alternative offset of equal or greater size and quality and of the same or similar Res	Section 6.1
B, if alternative offset lands cannot be found before clearing takes place or within six months of the proponent ceasing to manage the land or the date of the surrender application, the proponent will provide a monetary contribution to Ecofund Queensland's environmental trust or equivalent offset broker that could be used to purchase land to be added to the protected estate and which will include any ongoing management costs until the environmental authority for the CRM is surrendered	Section 6.1
C, make payment for any residual risk of rehabilitation of the offset area at the time of surrender, with the amount of the monetary contribution, management costs and residual risk determined by DEHP in consultation with the offset broker.	Section 6.1
(viii) the offset of the 31.5 hectares of forest red gum / river red gum: <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland (RE 11.3.25) cleared for the CRM to a ratio of not less than 1:2 by:	-
A, protecting and managing the 'major vegetation group' (MVG) on the proposed Blackwater offset area, comprising three REs 11.3.2/11.3.25/11.3.4, which includes approximately 115.8 hectares of RE 11.3.25, or	Section 5.0
B, replanting 63 hectares of land on or adjacent to the CRM site with plant species consistent with this RE prior to the commencement of operation of the CRM, and subsequently ensuring the subsequent survival of those plantings; protecting the replanted land through a legally binding mechanism; and managing that replanted land with the aim of it attaining remnant status within 20 years of replanting, or	Section 5.0
C, use the services of an offset broker such as Ecofund Queensland or other third party to establish an alternative planting to meet the same requirements as under (vii)A on a different site to be approved by DEHP.	Section 5.0



## 3.0 Purpose and Objectives of this plan

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This OMP has been prepared to describe the management actions that will be undertaken to provide a net environmental gain to offset the impacts on vegetation communities occurring from the development of the Caval Ridge Mine Project.

To protect, enhance and improve the conservation outcome of vegetation communities and other environmental values impacted by the Project, three offset areas have been identified and management actions developed to protect and enhance the environment within these areas. This Plan details the remnant and regrowth vegetation that will be protected and improved as offset areas; and describes the management strategies and monitoring that will be implemented to assist with the conservation and long term protection of the offsets.



## 4.0 Roles and Responsibilities

This Plan is being implemented and managed by the BMA Caval Ridge Coal Mine Project Manager (or their delegate) and the Caval Ridge Coal Mine Environmental Representatives as detailed in **Table 3**.

**Table 3: Roles and Responsibilities**

Title	Company	Roles and Responsibilities
Project Manager	BMA	Responsible for providing adequate resources and direction for the implementation of the Offset Management Plan.
Environmental Representatives	BMA	Responsible for coordinating the day to day implementation of the Offset Management Plan in consultation with the relevant Government Departments.  Shall ensure that personnel involved in the implementation, monitoring and review of the values and activities in the Offset Management Plan are suitably qualified to perform the task(s).
Ecology specialists	Suitably qualified and experienced contractor or consultant	Responsible for providing expertise in relation to the management and conservation of flora and fauna (including their habitat) within the offset areas.



## 5.0 Vegetation Impacts and Offset Requirements

The *Caval Ridge Environment Impact Statement (EIS)* identified two ‘Endangered’ EECs and a total of eight REs ‘Of Concern’ that will be impacted by the proposed action. A summary of impacts and offsets is shown in **Table 4**.

Further detail on the impacts and mitigation measures are detailed in the Caval Ridge EIS (BMA 2009).

The offset areas have been calculated in accordance with the requirements of Commonwealth and State approval conditions. In all instances the higher prescribed jurisdictional requirement has been met.

For EPBC Act listed ecological communities, specific offset area amounts were prescribed in the EPBC Act approval. Being:

- ▶ 126 hectares of the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community in the Norwich Park Nature Refuge; and
- ▶ 733.3 hectares of Bluegrass (*Dichanthium* spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) ecological community in the Balmoral property (Gregory Crinum Offset Area). The 733.3 ha will comprise of 383.3 ha of remnant grassland and 350 ha of degraded grasslands for restoration.

Regional Ecosystem offset areas (non EPBC Act listed) are based on the offset ratios outlined in the Coordinator General's report for the Caval Ridge EIS. These are:

- ▶ RE status of ‘Least Concern’ - no offsets required
- ▶ RE status of ‘Of Concern’ - ratio of 1:2
- ▶ RE status of ‘Endangered’ – ratio of 1:3

A single exception to the above was stipulated in Coordinator General's Condition 3.a) (viii) which stated that:

*“the offset of the 31.5 hectares of forest red gum / river red gum: Eucalyptus tereticornis or E. camaldulensis woodland (RE 11.3.25) cleared for the CRM to a ratio of not less than 1:2 by:*

- A. *protecting and managing the ‘major vegetation group’ (MVG) on the proposed Blackwater offset area, comprising three REs 11.3.2/11.3.25/11.3.4, which includes approximately 115.8 hectares of RE 11.3.25, or*
- B. *replanting 63 hectares of land on or adjacent to the CRM site with plant species consistent with this RE prior to the commencement of operation of the CRM, and subsequently ensuring the subsequent survival of those plantings; protecting the replanted land through a legally binding mechanism; and managing that replanted land with the aim of it attaining remnant status within 20 years of replanting, or*
- C. *use the services of an offset broker such as Ecofund Queensland or other third party to establish an alternative planting to meet the same requirements as under (vii)A on a different site to be approved by DEHP”*

Option “A” has been selected in order to meet this condition.



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# Caval Ridge Mine Offset Management Plan



**Table 4: Proposed Biodiversity Offsets for the Caval Ridge Project**

EPBC Act Ecological community	Broad vegetation group	RE	Project	EPBC Act status	Queensland biodiversity status	Area impacted (ha)	EPBC Act offset required (ha)	Queensland offset required (ha)	Offset (ha)		
									Balmoral	Blackwater	Norwich Park
Not listed	<i>Eucalyptus populnea</i> or <i>E. melanophloia</i> (or <i>E. whitei</i> ) dry woodlands on sandplains or depositional plains	11.3.2	Mine	-	Of Concern	108.3	-	225.6	-	225.6	-
		11.4.2	Mine	-	Of Concern	4.5	-	-	-	(RE 11.3.2)	-
Not listed	<i>Eucalyptus</i> spp. dominated open-forest and woodlands drainage lines and alluvial plains.	11.3.25	Mine	-	Of Concern	31.5	-	115.8	-	115.8 (RE 11.3.2/11.3.25/11.3.4)	-
		11.4.3	Village	Endangered	Endangered	4.6	13.8	13.8	-	-	140 <sup>1</sup>
Brigalow ( <i>Acacia harpophylla</i> dominant and co dominant)	<i>Acacia harpophylla</i> sometimes with <i>Casuarina cristata</i> open-forests to woodlands on heavy clay soils.	11.4.8	Mine	Endangered	Endangered	8.2	126	61.8	-	-	(HVR RE 11.4.9)
		11.4.9	Mine	Endangered	Endangered	12.4	-	-	-	-	-
Not listed		11.7.1	Village	Endangered	Endangered	13.1	-	26.4	-	-	-
Natural grasslands of the Queensland central highlands and northern Fitzroy basin	<i>Astrelba, Dichanthium</i> tussock grasslands  (Degraded grasslands to be restored)	11.8.11	Mine	Endangered	Of Concern	124.6	383.3	373.8	383.3	383.3 (RE 11.8.11)	-
		-	Mine	Endangered	Of Concern	-	350	-	350	-	-

<sup>1</sup> A total of 140 hectares has been set aside as the Offset for Caval Ridge Mine as this is consistent with an earlier offset commitment made by BMA during the assessment process even though this amount exceeds the stipulated approval requirements.



## 6.0 Description of Offset Areas

Three properties owned by BHP Coal and its joint venture partners have been identified that provide suitable offsets for impacts on Queensland and Commonwealth listed vegetation communities, these are:

- ▶ the Norwich Park Nature Refuge
- ▶ Balmoral, a property adjacent to BMA Gregory Crinum Mine (previously referred to as the Gregory Crinum Offset Area); and
- ▶ an area adjacent to BMA Blackwater Mine (referred to herein as Blackwater).

The locations of these three offset areas are shown in **Figure 1**. Descriptions of each of the offset areas and management strategies for the three areas follow.

The **Norwich Park Nature Refuge** is located 80 km south east of the Caval Ridge Mine and is situated within the same sub-bioregion. This site is a strategic offset area for BMA and provides conservation outcomes for the Brigalow EEC (including REs 11.4.7, 11.4.8, and 11.4.9) for a number of mine projects including to date Caval Ridge, Daunia and Norwich Park (East Pit) mines.

The **Balmoral** property is located 110km south of the Caval Ridge Mine and is situated within the same bioregion. This area provides current and future conservation opportunities for a range of vegetation communities and in particular the 'Natural grasslands of the Queensland central highlands and northern Fitzroy basin EEC (analogous to RE 11.8.11). The property includes large areas of continuous 'good quality' remnant grassland (383 ha) and importantly significant areas (350 ha) of degraded former grassland areas that can be rehabilitated so as to increase the overall area of grassland. This area also provides offset opportunities for 'Of Concern' REs 11.3.2 and 11.3.25.

The **Blackwater** property is located 195 km south east of the Caval Ridge Mine and is situated within the same sub-bioregion as the Caval Ridge Mine. This area provides the best strategic offset for the 'Of Concern' vegetation community *Eucalyptus populnea* woodland on alluvial plains (RE 11.3.2). The remnant vegetation on the Blackwater BOA contributes 262 ha of RE 11.3.2 towards the offset requirements of the Caval Ridge Mine project.

All offset areas will be actively managed to protect and enhance the EECs and habitat values present.

## 6.1 Commitment to maintain or provide (if required) alternative offsets.

In line with the Coordinator General's condition 3. a) (vii) BMA has committed that if at any time before the EA for the CRM is surrendered, any of the offset lands are to be cleared, or if BMA relinquishes management of the offset lands or applies to surrender the EA for the CRM before the offset attains remnant status, BMA will:

- ▶ establish an alternative offset of equal or greater size and quality and of the same or similar REs; or
- ▶ if alternative offset lands cannot be found before clearing takes place or within six months of the proponent ceasing to manage the land or the date of the surrender application, the proponent will provide a monetary contribution to Ecofund Queensland's environmental trust or equivalent offset broker that could be used to purchase land to be added to the protected estate and which will include any ongoing management costs until the environmental authority for the CRM is surrendered; and
- ▶ make payment for any residual risk of rehabilitation of the offset area at the time of surrender, with the amount of the monetary contribution, management costs and residual risk determined by DEHP in consultation with the offset broker.



## 6.2 Norwich Park

### 6.2.1 Location

The Norwich Park Nature Refuge (NPNR) is located on land owned by BHP Coal Pty Ltd and others, and is located 80 km south-east of the Caval Ridge Mine adjacent to the Norwich Park Mine (**Figure 1**). NPNR covers approximately 1087 ha in area (see NRA **Appendix 3**) of which within is 1078 ha of mapped REs (being a mix of remnant and non-remnant vegetation). NPNR is a key strategic offset for BMA and provides an important regional conservation area for the Brigalow EEC.

Overall, the reserve contains over 400 ha of either remnant or high value regrowth (HVR) Brigalow.

NPNR has been set up under a Nature Refuge Agreement and in addition to fulfilling offset requirements for the Caval Ridge Mine project it will also provide offsets for the Daunia and Norwich Park (East Pit) Mines. There are many benefits to managing the offsets requirements for these three projects at the same site, including the protection and management of one large consolidated area of high value vegetation and improving connectivity.

### 6.2.2 Vegetation offset

Four REs listed as endangered under the VM Act were identified in the Norwich Park Nature Refuge, being 11.4.7, 11.4.8, 11.4.9 and 11.4.13, the first three of which are analogous to the Brigalow EEC. **Figures 2a and 2b** show the vegetation communities present within the Norwich Park Nature Refuge.

Within the Norwich Park Nature Refuge several patches of varying age/condition Brigalow Regrowth are present, of these areas, the patches identified **Red (Figure 2a)** and marked with a '3' (**Figure 2b**) are 'Brigalow regrowth' areas totalling 244.5 ha. Figure 2b is replicated from the EPBC Approval and is based on identical data used for **Figure 2a**. The only essential difference between the **Figures 2a and 2b** is that **Figure 2a** is, for ease of reference, based on different colours for different vegetation types rather than the number-based identifications used in **Figure 2b**.

The identified regrowth areas are considered currently suitable for EPBC offsetting needs. Accordingly, a contiguous area (depicted in **Figure 3**) of 140 ha of high value regrowth (HVR) Brigalow TEC (RE11.4.9), within the total identified Brigalow Regrowth areas, has been allocated to the Caval Ridge Coal Mine offset.

Additionally, state requirements for impacts to listed RE's 11.4.3, 11.4.8 and 11.7.1 are to be offset using HVR Brigalow (RE 11.4.9) which falls within the same broad vegetation group (BVG), being BVG 25a (1M).

The total area of 140 ha is larger than the area required for both the EPBC Act approval (condition 2 - 126 ha) and the area of offsets required under the Coordinator General's conditions (which require an offset area of 102 ha – for both Mine and Village - for REs 11.4.3, 11.4.8, 11.4.9 and 11.7.1 or similar from BVG 25a). As a result, this area is suitable for use for both purposes. The balance of the 244.5 ha (i.e. 104.5 ha being 244.5 ha minus the 140 ha depicted in **Figure 3**) may be utilised for future offsets for other BMA operations should any be required going forward. That is, following the allocation of the above 140 ha of HVR Brigalow regrowth to Caval Ridge Mine offsets a total of 104.5 ha remains for any potential future offset needs.

**Table 4** above outlines vegetation communities to be impacted at Caval Ridge Mine/Village and offset at the NPNR. **Figure 2** shows the relevant REs and the HVR Brigalow EEC areas at NPNR.

### 6.2.3 Conservation benefits of the offset





The proposed offset will contribute towards a net environmental gain through the protection and management of 140 ha of Brigalow EEC high value regrowth. This regrowth vegetation will in time (estimated at 10-15 years) reach a mature remnant condition further contributing to the protection and recovery of this EEC and the of concern RE 11.4.9.

The 140 ha is interspersed between areas of existing remnant Brigalow EEC areas totalling 173.7 ha. This combined area of managed and protected vegetation is a significant conservation gain and provides a range of habitat and conservation values.

The proposed offset area is also important in a regional context. The NPNR includes a waterway, Back Creek, and contributes to a habitat corridor through the region (URS 2010a). The area contains high value regrowth, based on species diversity, tree canopy cover, native perennial grass cover, provision of habitat and recruitment of woody native perennial species.

The NPNR will be managed as a single offset area. Managing the offset requirements for a number of projects under the same Nature Refuge Agreement maximizes the biodiversity gains and increases long term viability for this community.

## 6.2.4 Other offset areas at Norwich Park

The Norwich Park Nature Refuge is a key strategic offset for BMA and provides an important regional conservation area for the Brigalow EEC. Overall, the reserve contains over 400 ha of either remnant or high value regrowth Brigalow. **Figure 2** shows the vegetation types within the Norwich Park Nature Reserve.

This offset area has been set up under a Nature Refuge Agreement and currently provides approved offset outcomes for the Caval Ridge, Daunia and Norwich Park (East Pit) Mines.

**Table 5** provides a breakdown of the current offset allocations within the Norwich Park Nature Refuge.

**Table 5: Norwich Park Nature Refuge Offset Allocations**

Brigalow EEC	Available area (ha)	Offset Allocations (ha)			Unallocated Brigalow Offset areas (ha)
		Norwich Park East Pit	Daunia	Caval Ridge	
Remnant (11.4.7, 11.4.8, 11.4.9)	173.7	80	88.8	-	4.9
Regrowth (11.4.9)	244.5	-	-	140	104.5

The vegetation mosaic within the NPNR, as shown in **Figure 2**, makes it difficult to present a map showing the different project offset allocations. Accordingly, BMA is managing the whole of NPNR as a single unit with consistent and complementary management measures across the whole Refuge.

To ensure the allocation of offsets meets with regulator (DotE and DEHP) requirements and that vegetation areas are only utilised as offsets for a single project, BMA will maintain a data record of offset allocations within the NPNR (as per **Table 5** above). A similar system will be implemented for BMA's other strategic offset areas including Blackwater and Balmoral.

## 6.2.5 Nature Refuge Agreement





The Norwich Park offset area has been secured under a Nature Refuge Agreement approved by Queensland Minister on 24 July 2010. A Nature Refuge Agreement is a voluntary agreement between a landholder and the Queensland Government that acknowledges a commitment to manage and preserve land with significant conservation values while allowing compatible and sustainable land uses to continue.

A Nature Refuge is a class of protected area under the *Nature Conservation Act 1992* (NCA), and a Nature Refuge Agreement is a legally binding contract with conditions designed to ensure that the values contained within the Nature Refuge are managed appropriately today and into the future. A Nature Refuge Agreement is perpetual on freehold land, attached to the land title, and binds successive owners. A perpetual agreement ensures that the good land management practices and restoration work will be continued into the future.

Nature Refuge Agreements over leasehold lands are for the duration of the lease and bind successive leaseholders. It should be noted that the twenty (20) year term of the Norwich Park Nature Refuge Agreement expires in 2030. Accordingly, where required BMA will seek to extend (no later than 2025) the Nature Refuge Agreement should mining (at Caval Ridge) or rehabilitation/management (at Norwich Park) still not have reached completion status.

The environmental benefits of a Nature Refuge include:

- ▶ The Nature Refuge becomes part of a network of protected areas contributing to the conservation and protection of biodiversity in Queensland;
- ▶ Combines protection with ecologically sustainable use of the land;
- ▶ Protects the property's conservation value for future generations;
- ▶ Is tailored to suit the landholder and the management needs of the property; and
- ▶ Involves DEHP in providing conservation management advice.

A significant amount of work was undertaken to establish the Nature Refuge Agreement at Norwich Park Mine. There have been a number of meetings with BMA and DEHP to discuss the development of the Nature Refuge Area and to ensure that the conditions in the Nature Refuge Agreement are relevant. This has included site visits by DEHP staff to inspect and provide advice for the ongoing management of the area. The signed agreement is included at Appendix 3.

Following the July 2010 approval of the Nature Refuge Agreement, efforts to manage the site habitat values and proposed actions have been targeted at those existing threats outlined in **Section 6.2.7**. To date, the Nature Refuge Area boundary fencing has been completed which has enabled the exclusion of grazing pressures. In addition, management of flora and fauna pest species (weeds and in particular feral pigs) has been implemented.

## 6.2.6 Habitat values

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The Norwich Park Nature Refuge provides the best strategic offset for the 'Endangered' EEC Brigalow (*Acacia harpophylla*) dominant and co dominant woodland (including REs 11.4.7, 11.4.8 and 11.4.9). 140 ha of Brigalow High Value Regrowth (HVR) have been identified as an appropriate offset. Securing this regrowth area will provide valuable connectivity to the existing areas of remnant Brigalow within and adjacent to the site.

The area currently displays relatively moderate values for supporting a range of fauna. Historic pastoral activities such as clearing and grazing have reduced the quantity and quality of remnant vegetation on the site. The presence of a range of exotic plant species, especially *Parthenium hysterophorus* (Parthenium) and *Pennisetum ciliare* (Buffel grass) have further reduced habitat values. However, observations of fauna during surveys (URS 2010a) and the presence of a range of microhabitat features indicate that the area



sustains populations of a range of vertebrate fauna. There are also indications that conservation significant species, such as the ornamental snake (*Denisonia maculata*) and yakka skink (*Egernia rugosa*) (known to be sensitive to disturbance), may be present based upon conditions and characteristics observed including suitable woodland and soil qualities. Microhabitat observed that would serve to support faunal populations include:

- ▶ Tree hollows;
- ▶ Dense groundcover;
- ▶ Cracking clays;
- ▶ Fallen timber;
- ▶ Shrubby thickets; and
- ▶ Temporary water sources.

## 6.2.7 Existing threats to biodiversity

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A number of threats to biodiversity have been identified on the offset area and are described below. Management recommendations for these threats are presented in **Section 7**.

### Exotic flora and fauna

Ten species of exotic flora were detected during surveys (URS 2010a). The dominant exotic species across the area is Buffel grass, introduced to the region to provide pasture for cattle.

Two of the exotic species present on the area, Velvety tree pear and Parthenium, are Class 2 Declared weeds under the *Lands Protection (Pest and Stock Route Management) Act 2002* (LPA). Parthenium is posing the greatest threat to biodiversity and ecological functionality at the NPNR. Large areas of Parthenium were present on the site, especially in the south-east within RE 11.4.13. The largest continuous infestation is approximately 13.3 ha. Elsewhere on the site Parthenium is sparsely scattered within most vegetation communities (URS 2010a).

Velvety tree pear is sparsely scattered throughout the area and is not posing a serious threat at this stage (URS 2010a).

A number of exotic fauna species have also been recorded across the NPNR. Survey observations in the past indicated that feral pigs have been present and have generated considerable disturbance to the favoured Gilgai areas in the NPNR.

### Grazing

The NPNR features two paddocks separated by a fence in the southern third of the property. The northern paddock has been grazed sporadically for short durations, while the southern paddock is grazed in a relatively heavy fashion year-round. The variation in grazing intensities is evident in that groundcover density, diversity and height was noticeably reduced in the southern paddock.

Grazing can be a beneficial management tool if managed correctly. Where Buffel grass has been identified as present in the NPNR, an absence of or too few cattle (i.e. reduced grazing levels) can result in the species dominating the ground layer to the exclusion of native species (URS 2010a).

### Uncontrolled fire

Uncontrolled fire is also a threatening process for the area. Recent fires adjacent to and within the NPNR caused a loss of mature and regrowth vegetation (URS 2010a). A fire in the northern part of the area in 2009 was restricted to a small area adjacent to the offset and was extinguished relatively quickly. However, a fire in the eastern portion of the area in 2003 was a greater size and intensity, causing the loss





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## Caval Ridge Mine Offset Management Plan



of the majority of Brigalow canopy in the area and reducing what would have been a regrowth community nearing remnant status to a regenerating low shrubby regrowth community.

### **Erosion**

While significant erosion is largely absent from the area, some erosion associated with cattle is present along Back Creek in the south, where cattle gain access to waterholes. Minor undercutting of banks within Back Creek is also present.





## 6.3 Balmoral

### 6.3.1 Site description/location

The Balmoral Biodiversity Offset Area (BOA) is located 110 km south of the Caval Ridge Mine, within the northern Brigalow Belt bioregion (**Figure 1**). The land is immediately adjacent to BMA’s Gregory Crinum Mine. The total BOA covers 5,360 ha and contains a mix of remnant and non-remnant vegetation, including both woodland and grassland communities (**Figure 5**).

The area is currently used for continuous grazing and broad acre cropping. The permanent Crinum-Expedition Creek system traverses the property in the central north section and a number of minor ephemeral streams are present in the eastern and central portions of the area.

This area provides an appropriate offset for the Natural Grasslands EEC as it includes large areas of continuous good quality remnant grassland (383.3 ha) and large areas (350 ha) of degraded grassland (previously mapped by DEHP) that has potential for restoration and rehabilitation. The full extent of the remnant grassland area will be secured as an offset for the Caval Ridge Coal Mine project. The 350 ha of degraded grassland will also be secured and rehabilitated over time to further increase the area of ecological community under conservation management. The relevant grassland offset areas are shown in **Figure 6**.

A number of State listed REs are also present and may be utilised to offset impacts from other BMA projects in the future. The offset areas, and potentially surrounding areas, will be secured, conserved and managed under a suitably approved mechanism in similar manner to the Norwich Park Nature Refuge.

### 6.3.2 Vegetation

A total of 181 species from 69 plant families were recorded from the Balmoral BOA during the current (ELA 2012) and previous studies (URS 2010b). Of the 181 species observed, only 27 (15%) were exotic. Fourteen remnant REs and six regrowth communities were identified on the Balmoral area (**Table 7**). Three EPBCA listed Endangered Ecological Communities (EECs) were found to occur within the Balmoral BOA, namely:

- ▶ Natural Grasslands EEC
- ▶ Brigalow EEC
- ▶ Semi-evergreen Vine Thickets of the Brigalow Belt (North and South) and Nandewar Bioregions

Importantly, the area contains 383.3 ha of remnant bluegrass grasslands (RE 11.8.11) which are included in the *Natural grasslands of the Queensland central highlands and northern Fitzroy Basin EEC*. The remnant grassland areas are broken into three large blocks and several scattered minor areas. **Table 6** identifies the various patch sizes of grassland and restoration (degraded grassland) areas at Balmoral.

**Table 6: Balmoral grassland patch sizes**

Remnant Grasslands (ha)			Degraded Grasslands (ha)		
Eastern Area	Central Area	SW Area	Eastern Area	Central Area	SW Area
50.6 ha	20.3 ha	9.6 ha	-	43.3	137.0 ha
13 ha	230.2 ha	6.6 ha	-	-	62.5 ha
24.6 ha	23.6 ha	0.8 ha	-	-	107.2 ha
-	-	4 ha	-	-	-





Vegetation condition assessments carried out on site indicate that the remnant native grasslands are in a Moderate/High to High condition with very high ecological resilience (ELA 2012).

The area contains areas of degraded grasslands that are suitable for rehabilitation. These areas have been selected based on DEHP pre-clearing RE mapping and the potential for increasing connectivity with existing remnant grassland.

**Table 7: Remnant RE's recorded at the Balmoral BOA**

Re Code	VMA Status	EPBCA Status	VMA Condition	Redd Short Description (Queensland Herbarium 2011)	Remnant Area (Ha)	Regrowth Area (Ha)	Total Area (Ha)	Notes
11.3.2	Of concern		Remnant and Regrowth	<i>Eucalyptus populnea</i> woodland on alluvial plains	17.1	13.3	30.4	
11.3.3/11.3.2/11.3.37	Of concern		Remnant	<i>Eucalyptus coolabah</i> woodland on alluvial plains	15.9	-	15.9	Not field validated
11.3.4	Of concern		Remnant	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains	15.1	-	15.1	
11.4.8	Endangered		Remnant and Regrowth	<i>Eucalyptus cambageana</i> woodland to open-forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains	54.7	24.9	79.6	
11.4.9	Endangered	Endangered	Remnant and Regrowth	<i>Acacia harpophylla</i> shrubby open-forest to woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	191.4	260	451.4	
11.5.3	Least concern		Remnant and Regrowth	<i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> on Cainozoic sandplains/remnant surfaces	5.3	5.4	10.7	
11.8.11	Of concern	Endangered	Remnant	<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks	388.4	-	388.4	
11.8.5	Least concern		Remnant and Regrowth	<i>Eucalyptus orgadophila</i> open-woodland on Cainozoic igneous rocks	257.2	110.6	367.8	
11.8.5/11.3.11	Endangered	Endangered	Remnant	<i>Eucalyptus orgadophila</i> open-	44.0	-	44.0	





Re Code	VMA Status	EPBCA Status	VMA Condition	Redd Short Description (Queensland Herbarium 2011)	Remnant Area (Ha)	Regrowth Area (Ha)	Total Area (Ha)	Notes
				woodland on Cainozoic igneous rocks / Semi-evergreen vine thicket on alluvial plains				
11.9.1/11.10.12	Endangered		Remnant	<i>Acacia harpophylla-Eucalyptus cambageana</i> open-forest to woodland on fine-grained sedimentary rocks	156.8	-	156.8	Not field validated
11.10.7/11.10.1	Least concern		Remnant	<i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks	20.9	-	20.9	Not field validated
11.10.1	Least concern		Remnant	<i>Corymbia citriodora</i> open-forest on coarse-grained sedimentary rocks	3.0	-	3.0	Not field validated
11.10.12	Least concern		Remnant and Regrowth	<i>Eucalyptus populnea</i> woodland on medium to coarse-grained sedimentary rocks	15.2	197.3	212.5	
11.10.12/11.10.7	Least concern		Remnant	<i>Eucalyptus populnea</i> woodland on medium to coarse-grained sedimentary rocks	11.1	-	11.1	Not field validated
<b>Total</b>					1,196.1	611.5	1,807.6	
Other units	N/A	N/A	N/A	N/A	-	-	3,556	
<b>Total</b>							<b>5,363.6</b>	





### 6.3.3 Habitat values

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Two threatened flora species have previously been found in the locality. These are *Dichanthium queenslandicum* (King Bluegrass) and *Digitaria porrecta* (Finger Panic Grass) whilst *Dichanthium setosum* is expected to occur.

No targeted native or introduced fauna surveys have been undertaken in the Balmoral BOA; however, surveys have been undertaken in the adjoining GCM lease. Field surveys within the GCM lease determined the presence of 28 mammal species, 41 reptiles, 17 amphibians and 145 birds (Austecology 2009). The Balmoral BOA provides a range of fauna habitat values including small to large tree hollows, fallen timber, permanent and temporary water sources, structural vegetation diversity (grasslands, grassy woodlands, shrubby woodlands and low forest/scrub), flowering trees and shrubs and cracking clays and is likely to support a similar fauna assemblage to the GCM lease.

Five rare and threatened fauna species have been previously recorded in the adjoining GCM lease, namely Brigalow Scaly-foot (*Paradelma orientalis*), Koala (*Phascolarctos cinereus*), Little Pied Bat (*Chalinolobus picatus*), Rough Frog (*Cyclorana verrucosa*) and Squatter Pigeon (*Geophaps scripta scripta*). Considering the proximity to the GCM lease and similar habitats present, all these species and potentially several others are considered likely to occur in the Balmoral BOA (ELA 2012).

In addition to rare and threatened fauna species, there are a variety of birds which are listed as migratory under the EPBC Act which are known or may occur within the Balmoral BOA.

### 6.3.4 Existing threats to biodiversity

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There are a number of potential onsite threats to biodiversity, which will be addressed through appropriate management, details of which can be found in **Section 7**.

#### Exotic flora

Twenty seven (27) species of exotic flora were identified during field surveys (ELA 2011). Sixteen of these are considered to be environmental weeds. Environmental weeds are those that pose a risk to biodiversity by invading and altering the composition of native vegetation communities

Four of these weed species, *Bryophyllum daigremontianum* (Mother-of-thousands), *Opuntia stricta* (Prickly Pear), *Opuntia tomentosa* (Velvety tree pear), and Parthenium, are Class 2 Declared weeds under the Queensland LPA. Many of the environmental weeds observed within the Balmoral BOA occur as isolated individuals and are not presently posing a significant risk to biodiversity. Despite their lower priority, many of these species are Class 2 declared plants and need to be managed as part of the overall management of the Balmoral BOA.

There are two environmental weed species which are likely to be affecting the biodiversity of the Balmoral BOA, namely Buffel Grass and Parthenium.

#### Grazing

The Balmoral BOA is currently leased to farmers and is being continually grazed. Modification to existing grazing regimes is likely to have the largest positive effect on biodiversity within Balmoral BOA, with grazing contributing to the spread and encouragement of environmental weeds through habitat degradation, trampling and browsing on native species.





## Fire

Fires are not to be lit in any of the Management Zones of the Balmoral BOA for purposes other than ecological burning for conservation. Note: this excludes areas which are currently subject to routine agricultural practices (i.e. Sorghum cropping). Fires lit in these areas are required to be managed and contained to minimise impacts on adjoining remnant vegetation.

The recommended season, intensity and frequency for ecological burns for each regional ecosystem at the Balmoral BOA is outlined in **Table 12**

## Erosion

Significant active erosion is largely absent. Levels of erosion are at a level where targeted management is unwarranted. However management of grazing activity within the Balmoral' BOA and reducing stock access to steep slopes and riparian areas will improve the stability of soils and prevent further erosion.

### 6.3.5 Conservation benefits of the offset

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The Balmoral BOA offers a number of conservation benefits. It is likely to provide habitat for a range of rare and threatened fauna species and contains populations of at least two threatened flora species. The location of the Balmoral BOA provides connectivity between remnant grassland and woodland on neighbouring properties, thereby extending the habitat range and serving as a wildlife refuge. The riparian vegetation onsite provides habitat corridors and will contribute to the maintenance of water quality.

The areas containing native grassland have equivalent or higher conservation value to the area proposed for clearing at the Caval Ridge Mine project. Based on the field survey the condition of the grassland was 'Good Quality' (DotE method) and 'Mod/High to High' using the BioCondition assessment framework (Eyre *et. al.* 2010). The proposed grassland offset, particularly with the proposed restoration of a further 350 ha, will extend a patch of remnant vegetation in the landscape increasing its ability to sustain viable populations of native flora and fauna.

### 6.3.6 Regenerative capacity

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The Commonwealth EPBC Act approval for the Caval Ridge Mine (2008/4417) specifies that BMA must 'Protect and enhance 733.3 hectares of Bluegrass (*Dichanthium* spp.) dominant grasslands of the Brigalow Belt Bioregions (North and South) ecological community in the Gregory Crinum Offset Area'. As stated previously this EEC in the Balmoral BOA has now been included in the 'Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin' EEC.

The Caval Ridge Mine Offset Management Plan (BMA 2011) identifies that of the 733.3 ha offset required, 383.3 ha is remnant *Dichanthium sericeum* grassland (RE 11.8.11) with an additional 350 ha of degraded grasslands specified for restoration. The remnant grassland (RE 11.8.11) and proposed *Dichanthium sericeum* grassland restoration are shown on **Figure 6**.

The objectives of the *Dichanthium sericeum* grassland restoration plan are to:

- ▶ Re-establish 350 ha of native grassland (equivalent to RE 11.8.11) in the Balmoral BOA
- ▶ Prescribe practices required for the ongoing management of the restored grasslands
- ▶ Develop an appropriate monitoring program

BMA are continuing to investigate the option of utilising alternative areas of remnant grassland for use as offsets. If such areas are located they would be used in preference to grassland rehabilitation where practicable.





The remnant grassland areas on site are broken into a number of larger blocks and some scattered minor areas (**Table 6**). The selection of areas for rehabilitation are based upon DEHP pre-clearing RE mapping and potential for increasing connectivity of existing remnant grassland and other native vegetative communities. The DEHP pre-clearing mapping shows that a significant section of the area previously supported grasslands (RE 11.8.11) prior to clearing.

Due to the extensive scale of the proposed restoration (350 ha), a number of trials are recommended to determine the most effective methods for re-establishment of native grassland under the specific conditions present at the Balmoral BOA (ELA 2012). The trials will aim to determine the most effective methods for seed collection, seed sowing, weed control, and establishment and maintenance of native vegetation.





## 6.4 Blackwater

### 6.4.1 Site description

Blackwater Mine is located 24 km south of the town of Blackwater and 315 km west of Gladstone (**Figure 1**). The Blackwater BOA is located immediately to the west of the Blackwater Mine and covers approximately 800 ha adjacent to Amaroo State Forest. The majority of the area supports remnant vegetation and has been historically impacted by selective clearing and grazing.

An ephemeral waterway traverses the area running from north to south. The eastern portion of the area is dominated by an alluvial plain. The western portion of the area is undulating and features iron-stone 'jump-ups' or steep slopes (URS 2010c).

This area will provide a high quality offset for:

- ▶ the total required area of 225.6 ha of the 'Of Concern' vegetation community *Eucalyptus populnea* woodland on alluvial plains (RE 11.3.2); and
- ▶ the offset for the forest red gum / river red gum: *Eucalyptus tereticornis* or *E. camaldulensis* woodland (RE 11.3.25) of 115.8 ha.

The offset area will be secured and conserved under a Nature Refuge Agreement in similar manner to the Norwich Park Nature Refuge.

### 6.4.2 Vegetation

Six (6) REs were described and mapped in the study area (**Figure 7**). **Table 8** provides a summary of vegetation communities present on the site.

No conservation significant flora species were recorded during the field work, however, given the moderate to good condition of the area; it would be possible that the offset is able to sustain populations of conservation significant flora species.

**Table 8: REs recorded at the Blackwater BOA**

Threatened Ecological community	Broad Vegetation Group (BVG)	RE	RE Short Description	Areas available for offset (ha)
Not listed	<i>Eucalyptus populnea</i> or <i>E. melanophloia</i> (or <i>E. whitei</i> ) dry woodlands to open-woodlands on sandplains or depositional plains	11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	262.8
Not listed	<i>Eucalyptus</i> spp. dominated open-forest and woodlands drainage lines and alluvial plains	11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains	148.7
Brigalow ( <i>Acacia harpophylla</i> dominant and co dominant)	<i>Acacia harpophylla</i> sometimes with <i>Casuarina cristata</i> open-forests to woodlands on heavy clay	11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains	36.5
		11.4.9	<i>Acacia harpophylla</i> shrubby open forest to	6.8





Threatened Ecological community	Broad Vegetation Group (BVG)	RE	RE Short Description	Areas available for offset (ha)
	soils		woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	
Not listed	Dry eucalypt woodlands to open-woodlands primarily on sandplains or depositional plains	11.5.9	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains/remnant surfaces.	220.3
Not listed	<i>Acacia</i> spp. on residuals. Species include <i>A. stowardii</i> , <i>A. shirleyi</i> , <i>A. microsperma</i> , <i>A. catenulata</i> , <i>Acacia rhodoxylon</i>	11.7.2	<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	126.2

### 6.4.3 Habitat values

The area currently displays relatively moderate to good values for supporting a range of fauna (URS 2010c). Historic land use activities such as selective clearing and grazing have reduced the quality of remnant vegetation on the area. The presence of a range of exotic plant species, especially Parthenium and Buffel grass have further reduced habitat values. However a range of fauna and microhabitats that would support fauna have been observed within the area, including:

- ▶ Tree hollows;
- ▶ Dense groundcover;
- ▶ Fallen timber;
- ▶ Shrubby thickets; and
- ▶ Temporary water sources.

### 6.4.4 Existing threats to biodiversity

As indicated above, there are a number of threats to biodiversity on the Blackwater BOA that will require specific management actions.

#### Exotic flora

Seventeen species of exotic flora were identified during field surveys, three of which, Velvety pear tree, *Eriocereus martini* (Harrisia cactus) and Parthenium are listed as declared weeds under the Queensland LPA. Parthenium was present as a dense infestation along the creek in the north of the area and surrounding the dam near the centre of the offset area.

The dominant exotic species on site is Buffel grass, which was introduced as a pasture species for cattle.

#### Grazing

The Blackwater BOA has been grazed sporadically. No significant signs of overgrazing were observed however natural regeneration was noted to be generally low.

#### Fire

There are indications of a recent fire within the area. The event was natural, isolated and of low severity. The site of the fire was in ironstone jump-up vegetation (RE 11.7.2) in the south west of the property.





### Erosion

Significant active erosion is largely absent from the area. Minor undercutting of banks was observed along the ephemeral creeks. Levels of erosion are largely at a level where targeted management is unwarranted. However, ongoing monitoring is recommended (URS 2010c).

### 6.4.5 Conservation benefits of the offset

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The Blackwater offset will contribute towards a net environmental gain through the protection and management of 225.6 ha of the 'Of Concern' vegetation community *Eucalyptus populnea* woodland on alluvial plains (RE 11.3.2); and 115.8 ha of forest red gum / river red gum: *Eucalyptus tereticornis* or *E. camaldulensis* woodland.

Additionally the area is bordered on three sides by Amaroo State Forest which comprises 14,000 ha of mostly remnant vegetation. As this offset is contiguous with existing protected remnant vegetation, its capacity to sustain viable populations of native flora and fauna is increased. The area also contains waterways and drainage areas and therefore contributes to maintenance of water quality.





## 7.0 Management Actions

In order to manage the offset areas, REs across the three offset areas have been divided into 4 specific management zones. REs with similar management requirements have been combined in order to provide managers with objectives and action requirements for each zone. Where there are indicators for specific management actions on a particular area, these have been identified. Implementation of the management actions is the responsibility of BMA.

### 7.1 Management Zones

This section describes the management zones for the three offset areas and sets the strategic management objectives and actions for each zone. Management zones have been classified based on vegetation type, condition, weed abundance and ecological resilience recorded during vegetation mapping validation by ELA (2012) and URS (2010a, 2010b, 2010c).

Ecological resilience may be defined as the capacity of native vegetation to recover from disturbance. Resilience was categorised as follows and is summarised in **Table 9**:

- ▶ Very High resilience – sufficient native vegetation remaining in situ to enable the natural regeneration of native vegetation. Low levels of management are required to facilitate recovery.
- ▶ High resilience – primarily native vegetation is present. Low to moderate levels of management are required to maintain and improve biodiversity
- ▶ Moderate resilience – native species present in the overstorey and modified understorey with majority exotic species. Active management is required to address species composition and structural diversity
- ▶ Low resilience – little native vegetation is present and the overstorey has been removed or remains only as isolated paddock trees. A significant level of active management is required to facilitate recovery
- ▶ Very low to no resilience - Native vegetation is extremely limited or non-existent. Little trace of original habitat remains and extensive rehabilitation would be required.

**Table 9: Management Zone Criteria**

Management Zone	Ecological Resilience
1	Very High
2	High
3	Moderate
4	Low
5	Very low – none

Taking into account the ecological resilience of the known REs each vegetation type is assigned a management zone which has been summarised in **Table 10**.





**Table 10: Summary Offset Area Management Zones and Associated RE Vegetation Type**

Offset Area	Management Zone 1	Management Zone 2	Management Zone 3	Management Zone 4
Norwich	-	11.4.7, 11.4.8, 11.4.9, 11.4.13	Brigalow regrowth (non-remnant 11.4.9)	Low shrubby Brigalow regrowth and Mixed Acacia regrowth (non-remnant 11.4.9)
Blackwater	11.3.4, 11.7.2	11.4.8, 11.4.9	11.3.2, 11.5.9	
Balmoral	11.8.11, 11.8.5, 11.10.12, 11.4.9	11.3.2, 11.3.3/11.3.2/11.3.3 7, 11.3.4, 11.4.8, 11.4.9, 11.5.3, 11.8.11, 11.8.5, 11.8.5/11.3.11, 11.9.1/11.10.12, 11.10.07/11.10.1, 11.10.1, 11.10.12/11.10.7 11.8.11	11.4.8, 11.4.9, 11.5.3, 11.8.11, 11.8.5, 11.10.12-	Highly degraded/early regrowth 11.8.5, 11.4.9, 11.8.5.





## 7.1.1 Management Zone 1

Management Zone 1 – Very High resilience	
<b>Objective</b>	The primary management objective in this zone is to maintain structural and species diversity, remove threats to biodiversity, and implement ongoing monitoring of condition to detect changes in vegetation condition to inform adaptive management procedures
<b>Regional Ecosystems</b>	11.3.4, 11.7.2, 11.8.11, 11.8.5, 11.10.12, 11.4.9
<b>Offset Areas Involved</b>	Balmoral, Blackwater
<b>Management Issues</b>	
<b>Environmental weeds</b>	The highest level of threat in this zone is from Parthenium and Buffel Grass. Significant infestations of Parthenium and Buffel Grass surround this management zone in disturbed pasture and disused cropping areas.
<b>Introduced fauna</b>	The highest level of threat in this zone is associated with the presence of cattle and horses.
<b>Grazing impacts</b>	Grazing impacts include spread and encouragement of Parthenium and Buffel Grass through habitat degradation, trampling and browsing of native species
<b>Management Actions</b>	
<b>Grazing exclusion</b> Timing: before 2015	Grazing exclusion is recommended to promote understorey recovery, reduce competition for food with native fauna and reduce further habitat degradation.
<b>Weed Control</b> Timing: 2014 - 2015	Minor weed control and ongoing monitoring to compliment adjacent areas.
<b>Feral Animals</b> Timing: 2014 & ongoing	Minor feral animal management (Feral Cat, Rabbit, European Red Fox). Develop and implement vertebrate pest management program in consultation with adjacent landholders.
<b>Human disturbance</b> Timing: before 2015	Manage human disturbance by providing appropriate signage (and compliance checks) to prevent unauthorised entry/use.
<b>Retain dead timber</b> Timing: 2014 & ongoing	Retain standing and fallen dead timber (prevent fire wood collection) to protect fauna habitat







## 7.1.2 Management Zone 2

Management Zone 2 – High resilience	
<b>Objective</b>	The primary management objectives in this zone are to improve native species richness, initially through passive regeneration assisted by removal and treatment of threats, followed by active regeneration if required. The high resilience of the vegetation in this zone should enable natural regeneration in structural and species diversity to improve fauna habitat capacity over time
<b>Regional Ecosystems</b>	11.3.2, 11.3.3/11.3.2/11.3.37, 11.3.4, 11.4.8, 11.4.9, 11.5.3, 11.8.11, 11.8.5, 11.8.5/11.3.11, 11.9.1/11.10.12, 11.10.07/11.10.1, 11.10.1, 11.10.12/11.10.7 11.4.7, 11.4.8, 11.4.9, 11.4.13
<b>Offset Areas</b>	Balmoral, Blackwater, Norwich Nature Refuge
<b>Management Issues</b>	
<b>Environmental weeds</b>	The highest level of threat in this zone is from Buffel Grass, which is able to invade many of the less resilient vegetation remnants
<b>Introduced fauna</b>	Cattle, Feral Cat, Cane Toad, Rabbit, Feral Pig, European Red Fox
<b>Grazing impacts</b>	Grazing impacts in this zone are generally low to moderate. Grazing may spread and encourage the establishment of Buffel Grass and Parthenium through habitat degradation, trampling and browsing of native species
<b>Management Actions</b>	
<b>Grazing exclusion</b> Timing: 2014 - 2020	Reduce grazing intensity to light and intermittent. Following an immediate reduction in grazing intensity, grazing is to be gradually excluded in this zone over the next 1 to 5 years to facilitate overstorey regeneration. Grazing removal is to be timed to coincide with maximum native ground cover (typically associated with seasonal rains in mid-late summer) and minimum exotic species dominance of ground cover to avoid interim deterioration of condition. Grazing removal should also be timed to knock down exotic species when they are actively growing (and before the flower), removing grazing prior to native grasses flowering and setting seed. Grazing is to be excluded from riparian zones.
<b>Weed Control</b> Timing: 2014 - 2015	Minor weed control and ongoing monitoring to compliment adjacent areas.
<b>Feral Animals</b> Timing: 2014 & ongoing	Minor feral animal management (Feral Cat, Rabbit, European Red Fox). Develop and implement vertebrate pest management program in consultation with adjacent landholders.
<b>Human disturbance</b> Timing: 2014	Manage human disturbance by providing appropriate signage (and compliance checks) to prevent unauthorised entry/use.
<b>Retain dead timber</b> Timing: 2014 & ongoing	Retain standing and fallen dead timber (prevent fire wood collection) to protect fauna habitat





## 7.1.3 Management Zone 3

### Management Zone 3 – Moderate resilience

<b>Objective</b>	The management objective in this zone is to maintain and improve biodiversity values and prevent further degradation.
<b>Regional Ecosystems</b>	11.3.2, 11.4.8, 11.5.9, 11.4.9, 11.5.3, 11.8.11, 11.8.5, 11.10.12, and Brigalow regrowth (Non remnant 11.4.9 at Norwich NR)
<b>Offset Areas</b>	Blackwater, Norwich Nature Refuge

#### Management Issues

<b>Environmental weeds</b>	The highest level of threat to biodiversity in this zone is from Buffel Grass which is often the dominant understory species in these vegetation types. Parthenium weed is also an issue within the Brigalow regrowth at Norwich NR.
<b>Introduced fauna</b>	The vegetation within these habitat types generally experiences moderate to heavy grazing impacts. It is also likely to contain populations of Feral Cat, Cane Toad, Rabbit, Feral Pig and Red Fox.
<b>Grazing impacts</b>	The vegetation within these habitat types generally experiences moderate to heavy grazing impacts from cattle.

#### Management Actions

<b>Grazing</b> Timing: 2014 - 2035	Grazing to manage weed infestations and fire hazards in the short to long term beginning in first year following approval. Grazing areas dominated by Buffel grass is required to reduce fuel load and encourage native regeneration. In the longer term (20 years+) grazing may be excluded in this zone to facilitate regeneration. Grazing removal is to be timed to coincide with maximum native ground cover (typically associated with seasonal rains in mid-late summer) and minimum exotic species dominance of ground cover to avoid interim deterioration of condition. This will increase fauna habitat values. Grazing exclusion is recommended to promote understorey recovery, reduce competition for food with native fauna and reduce further habitat degradation. Grazing is to be excluded from riparian zones
<b>Weed Control</b> Timing: 2014 - 2015	Minor weed control and ongoing monitoring to compliment adjacent areas. Identification of weeds (beginning in first year following approval) via regular site inspection and communication with surrounding landholders. Mechanical removal and/or the application of approved herbicides to identified weeds. Vehicle access to the offset area shall be restricted to authorised personnel. Employee and contractors are to be briefed on procedures to reduce weed species.
<b>Feral Animals</b> Timing: 2014 & ongoing	Minor feral animal management (Feral Cat, Rabbit, European Red Fox) (beginning in first year following approval). Feral animal management strategies may include, however, will not necessarily be limited to, the destruction of rabbit burrows, removal of rabbit harbour and fox baiting. Develop and implement vertebrate pest management program in consultation with adjacent landholders.
<b>Human disturbance</b> Timing: 2014	Manage human disturbance by providing appropriate signage (and compliance checks) to prevent unauthorised entry/use (beginning in first year following approval).
<b>Retain dead timber</b> Timing: 2014 & ongoing	Retain standing and fallen dead timber (prevent fire wood collection) to protect fauna habitat





## Management Zone 3 – Moderate resilience

### Establish remnant Brigalow EC

Timing: 2014 - 2030

Regrowth Brigalow (*Acacia harpophylla* dominant and co dominant) woodland located at Norwich NR is identified as high value regrowth vegetation containing endangered REs (URS 2010a). URS noted that natural regeneration is already occurring across the Norwich NR, though is being restricted by an inappropriate grazing regime and the presence of dense buffel grass. The aforementioned management actions prescribed for Norwich NR, particularly the control of grazing regimes and targeted weed removal, will improve the condition of the regrowth with the intent of establishing remnant Brigalow EC status within 10 to 15 years. It is anticipated that controlling livestock usage of the offset area will naturally increase flora species diversity and abundance through regeneration and thereby produce habitat resources for native flora and fauna.

Additionally, revegetation works may be conducted where necessary using selected local provenance seed stock in areas where natural regeneration is not occurring. Table 13 further outlines management actions in relation to predetermined performance criteria.

Annual inspection will be conducted within Norwich NR to identify areas which may benefit from selected planting, and whether the regrowth has achieved Remnant Brigalow EC status.

Current ecological condition of the regrowth Brigalow is noted to be of varying condition (URS 2010a). BMA will undertake future vegetation condition monitoring in accordance with the Queensland BioCondition Assessment Framework (Assessment Manual) as required to ensure compliance with the EPBC Act approval. This will allow for comparison with future annual monitoring results that will follow the same framework. Remnant Brigalow identified and surveyed by URS at two locations was given a relative condition score of Moderate-Good. These results are considered relative as benchmark reference sites for the Brigalow community. The two locations are located within Norwich NR and will be used as a condition objective for all Brigalow regrowth areas.





## 7.1.4 Management Zone 4

<b>Management Zone 4 – Low resilience</b>	
<b>Objective</b>	The management objective in this zone is to maintain biodiversity values and prevent further degradation.
<b>Regional Ecosystems</b>	Highly degraded/early regrowth 11.8.5, 11.4.9, 11.8.5 (Balmoral) and Low shrubby Brigalow regrowth (non-remnant 11.4.9) and Mixed Acacia regrowth(non-remnant) (Norwich Nature Refuge 11.4.9)
<b>Offset Areas</b>	Balmoral, Norwich Nature Refuge
<b>Management Issues</b>	
<b>Environmental weeds</b>	The understory vegetation within these this management zone is generally dominated by Buffel Grass and Parthenium.
<b>Introduced fauna</b>	Feral Cat, Cane Toad, Rabbit, Feral Pig and Red Fox.
<b>Grazing impacts</b>	The vegetation within these habitat types generally experiences moderate to heavy grazing impacts from cattle.
<b>Management Actions</b>	
<b>Grazing</b> Timing: 2014 - 2035	Grazing to manage weed infestations and fire hazards in the short to long term. Grazing areas dominated by Buffel grass is required to reduce fuel load and encourage native regeneration. Grazing is to be excluded from riparian zones
<b>Weed Control</b> Timing: 2014 - 2016	Grazing only to manage Buffel Grass. Note that an integrated weed control approach including crash grazing, weed spraying, direct seeding and on-going weed control would be required to remove Buffel Grass. Due to the size of the affected areas, this is not a viable alternative at present but may form part of future adaptive management works.
<b>Feral Animals</b> Timing: 2014 & ongoing	Develop and implement vertebrate pest management program in consultation with adjacent landholders.
<b>Human disturbance</b> Timing: 2014	Manage human disturbance by providing appropriate signage (and compliance checks) to prevent unauthorised entry/use.
<b>Retain dead timber</b> Timing: 2014 & ongoing	Retain standing and fallen dead timber (prevent fire wood collection) to protect fauna habitat





## 7.2 Pest plant management

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### 7.2.1 General Strategies

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The following adaptive management strategies will be implemented:

- ▶ An initial pest plant survey of the offset areas will be conducted on approval of the OMP to map pest plant infestations and native vegetation condition (Norwich NR and Blackwater BOA) including capacity for recovery once weeds are removed;
- ▶ Refine management zones and develop a pest plant management plan for each management zone within 6 months after identification of infestations. This will include identifying goals and priorities, defining high priority control areas and selecting appropriate control methods while meeting statutory requirements for declared weed species;
- ▶ Target high condition vegetation initially with high capacity for recovery when weeds are removed and work towards managing core infestations and preventing their spread. This may include controls on vehicle access to and movement within areas of remnant vegetation, including vehicle hygiene protocols such as the use of vehicle wash-down facilities for vehicles entering and leaving declared pest plant zones;
- ▶ Monitor and evaluate weed management strategies including annual reporting, with a focus on the overall goal of regeneration of native vegetation. Monitoring of the offset areas to identify any new infestations, including any new occurrences of declared pest plants; and
- ▶ The pest plant control program will be reviewed annually. Treatment areas and infestations will be tracked using GIS to ensure effective management is being achieved.

### 7.2.2 Specific Measures—Weed Management

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There are five declared weed species previously observed within the offset areas that require specific management actions. An additional environmental weed; Buffel Grass is an environmental weed that occurs across the three offset areas. Management guidelines for declared and environmental weed species most of concern and currently within the BOAs are listed below and summarised in **Table 11**

#### **Buffel grass**

Buffel Grass was originally introduced as a pasture grass and responds poorly to chemical sprays on a broad scale. Steps to control Buffel grass for biodiversity outcomes should be managed through a combination of spot spraying of small isolated clumps invading previously unaffected areas and grazing regimes. Grazing regimes should be timed to reduce volume after the first rains of the summer when Buffel grass is actively growing. Ongoing monitoring will be undertaken to ensure that Buffel Grass is not grazed lower than around 20 cm above the ground, as the lower quality of the browse beyond this point will result in cattle focussing on native grasses, herbs and seedlings to their detriment.

#### **Parthenium**

Parthenium weed is a class 2 weed under the LPA and as such, the landholder is required to manage this species. Parthenium is known to reduce pasture production potential and cause human and animal health problems (DEEDI, 2009). Once the distribution and scale of Parthenium infestation is known an appropriate management strategy in accordance with statutory requirements can be devised.





### Velvety pear tree

Velvety pear tree is also a Class 2 declared weed under the LPA. It is currently found in low numbers in the offset areas and is not posing a serious threat. Due to the low abundance of this declared weed, eradication of this weed from the BOA may be possible with minimal effort

**Table 11: Declared plants previously observed within Caval Ridge Mine Biodiversity Offset Areas and recommended control methods**

Species	Common Name	Pest Status	Recommended Control Methods (DPI 2012)
<i>Bryophyllum daigremontianum</i>	Mother-of-millions	Class 2 declared	Physical (Hand removal) and chemical control (foliar spray)
<i>Harrisia martinii</i>	Harrisia Cactus	Class 2 declared	Mechanical, fire (burning stockpiles following mechanical removal), biological (e.g. stem boring beetle and mealy bug) and chemical control (foliar spray)
<i>Opuntia stricta</i>	Prickly Pear	Class 2 declared	Physical, biological (e.g. cactoblastis moth) and chemical control (foliar spraying)
<i>Opuntia tomentosa</i>	Velvety Tree Pear	Class 2 declared	As for <i>O. stricta</i>
<i>Parthenium hysterophorus</i>	Parthenium	Class 2 declared	Prevention of spread (e.g. prohibit access to infested areas, hygiene practices and good pasture management practices), chemical control in conjunction with pasture management.  Physical removal is not recommended due to the health hazard associated with allergic reactions.





## 7.3 Pest animal management

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In order to effectively manage the pest animal populations in the offset areas, a pest animal control program will be developed and implemented. The priority management actions will be directed towards an on-going management of foxes, feral pigs, cats and rabbits as per the requirements of the LPA.

To reduce the pressure on native fauna, especially rare and threatened fauna species such as the Ornamental Snake, Squatter Pigeon and potentially the Brigalow Scaly-foot, the following strategies will be implemented for the management/control of pest animals within the offset area:

- ▶ Conduct an initial study to identify the pest animals in the offset areas on approval of the OMP. The survey will include analysis of previous survey results and records;
- ▶ A vertebrate pest control program will be developed in consultation with surrounding land owners and implemented to give direction and detail in regards to the management strategies for pest animals, including;
  - Types of pest animals to be targeted;
  - Methods for the eradication and/or control of declared pest animals in accordance with local management practices and / or DEHP Pest Fact Sheets;
  - Timing of control strategies (i.e. implementation and completion); and
  - Monitoring and field auditing of pest animal occurrence, particularly declared pest animals, to assess the progress and success of the control strategies.
- ▶ The pest animal control program will be reported and reviewed on an annual basis to ensure effective management is being achieved.

## 7.4 Infrastructure and access requirements

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The following strategies will be implemented to assist with the maintenance of the infrastructure within the first year of approval of the OMP for the offset areas:

- ▶ An initial survey of all infrastructure associated with the offset area shall be conducted. "Infrastructure" includes:
  - Fences
  - Gates
  - Security on Gates
  - Existing Tracks (determine which tracks to keep and maintain)
- ▶ From the results of the initial survey, determine the extent of current fencing and in conjunction with the refined management zones mapping, determine what needs to be repaired or is lacking with infrastructure in order to implement stock grazing management:
  - Repair infrastructure or construct infrastructure where deemed necessary; and
  - Develop and implement an infrastructure maintenance program.





## 7.5 Grazing

Grazing management on the offset areas will be conducted to support conservation objectives in a deliberate shift from historical productivity objectives. Grazing by domestic stock reduces food and habitat resources for native animals, however, rotation and light to moderate grazing by stock can be compatible with native grassland management as it may be useful in suppressing some weeds (McIntyre et al 2002) and reducing the biomass of dense grass swards. Weeds such as *Parthenium* are known to be influenced by grazing pressure.

Grazing is to be excluded from Management Zone 1 and gradually excluded from Management Zone 2, with reduced intensity conservation grazing in Management Zone 3. On-going grazing to manage weed infestations and fire hazards is to continue in Management Zone 4. Table 13 further details the timing and location of the specific management zones' grazing regimes.

The most effective way of reducing further degradation and encourage native vegetation regeneration is through exclusion of grazing with stock-proof fencing

It is important to note that the removal of grazing/cultivation, particularly in cultivated or heavily degraded areas, may have negative effects, such as increased weed biomass. Cessation of grazing is only of value where there is a moderate to high level of ecological resilience. If grazing is to be excluded from areas with low ecological resilience, then additional management strategies (such as weed control and revegetation) are likely to be required. Monitoring will be required to adequately understand the response of vegetation to grazing and grazing exclusion.

Following the determination of refined management zone mapping (Norwich Park NR and Blackwater BOA) and determination of fencing requirements to exclude and manage grazing pressure, a formal grazing agreement is to be developed in each of the offset areas and implemented, and will detail what is expected from the grazer(s). Any grazing within the offset areas will be in accordance with current best practice guidelines as stated in schedule 4 of the Norwich Park Nature Refuge Agreement 2010. Key conditions of the grazing agreement may include:

1. A minimum pasture biomass to be maintained to prevent overgrazing. The minimum pasture biomass for Bluegrass / Wiregrass should be at least 1750kg/ha, and 2200 kg/ha for Black Spear Grass (as detailed in the Queensland Department of Primary Industries and Fisheries (DPI & F) Standard. Stocking rates may be varied depending on the season to maintain the pasture biomass;
2. Wet season spelling (i.e. no grazing between January and April) may be practiced to allow for the regeneration of perennial grasses (as per DPI & F Grazing Land Management guidelines) and to minimise stock impact on water filled gilgais; and
3. Dry season spelling (i.e. no grazing between July and early November) may be practiced to reduce grazing pressure on regenerating trees and shrubs.





## 7.6 Erosion

Currently, erosion is not a significant issue on any of the offset areas. Minor erosion exists in several places, particularly along waterways. A reduction in grazing pressure will allow these areas to stabilise or at the least prevent further degradation.

Ongoing monitoring will be required to ensure eroded areas do not worsen through natural events such as heavy rainfall and uncontrolled overland flow.

### Balmoral grasslands

Erosion management will initially be critical during the establishment period of grassland on cleared areas. Erosion can be minimised by forward planning to ensure that site preparation is conducted as close as possible to the grassland planting season.

Deep ripping (> 0.5 m) on the contour prior to seeding will increase depression storage of surface water on the slopes and allow a significant quantity of water to be stored before run-off. Between rips, the surface should be ploughed on the contour to create a seed bed and increase surface roughness.

## 7.7 Fire management

Fire management within the three biodiversity offset areas is essential for conserving biodiversity. Inappropriate fire regimes may alter the physical structure and composition of ecological communities.

As per Schedule 4 of the Norwich Park Nature Refuge Agreement a Fire Management Plan must be produced and enacted to maintain the extent of fire sensitive Brigalow communities. A register of fires occurring within the offset areas should also be maintained and able to be viewed by DEHP on request.

The dominance of Buffel Grass within some parts of the offset areas poses a significant fire risk as the rapid increase in biomass after favourable conditions can fuel fires of an increased frequency and / intensity. Buffel Grass also poses a significant risk to the re-establishment of Brigalow through wildfire and suppression (CRC 2008 and DNREAS 2010).

Fires are not to be lit in any of the Management Zones of the offset areas for purposes other than ecological burning for conservation. Fires lit adjacent to biodiversity offset areas as part of routine farming practices are required to be managed and contained to minimise impacts on adjoining remnant vegetation. The recommended season, intensity and frequency for ecological burns for each regional ecosystem at the three BOAs is outlined in **Table 12** (Queensland Herbarium 2011). The following information should be considered as part of any ecological burn regime (Queensland Herbarium 2011):

- ▶ The fire frequency range specified includes conservation and grazing with ecological burns being undertaken towards the end of the specified range to achieve biodiversity outcomes;
- ▶ Ecological burns should only be undertaken under conditions of good soil moisture and when plants are actively growing;
- ▶ Ecological burns should be undertaken in a mosaic across the landscape with not more than 10 to 30% of each vegetation type burnt in any one year;
- ▶ Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires;
- ▶ Low to moderate intensity burns with good soil moisture are necessary to minimise loss of habitat trees; and
- ▶ Buffel Grass invasion will increase risk from fire. High intensity fires will damage canopy species. Grazing may be an option for reducing fuel loads where exotic grasses have invaded





**Table 12: Fire Management Guidelines**

RE Code	Redd Short Description (Queensland Herbarium 2011)	Fire Season	Intensity	Fire Frequency	Biodiversity Offset Area
11.4.7	<i>Eucalyptus populnea</i> with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest to woodland on Cainozoic clay plains	Maintain fire management of surrounding country so that wildfires will be very limited in extent and intensity		Protect from fire	Norwich Park Nature Reserve
11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains	Maintain fire management of surrounding country so that wildfires will be very limited in extent and intensity .		Protect from fire	Norwich Park Nature Reserve/ Blackwater
11.4.9	<i>Acacia harpophylla</i> shrubby open forest to woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	Maintain fire management of surrounding country so that wildfires will be very limited in extent and intensity.		Protect from fire	Norwich Park Nature Reserve/Blackwater
11.4.13	<i>Eucalyptus orgadophylla</i> open woodland on Cainozoic clay plains	Early dry season when there is good soil moisture, with some later fires in the early storm season or after good spring rains	Primarily low to moderate, with occasional high intensity fires	2-7 years	Norwich Park Nature Reserve
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Late wet/dry season when there is good soil moisture. Early storm season or after good spring	Low to moderate	6–10 years	Blackwater





RE Code	Redd Short Description (Queensland Herbarium 2011)	Fire Season	Intensity	Fire Frequency	Biodiversity Offset Area
		rains.			
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains	Late wet/dry season when there is good soil moisture. Early storm season or after good spring rains	Low to moderate	2-7 years	Blackwater
11.5.9	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains/remnant surfaces	Late wet/dry season when there is good soil moisture. Early storm season or after good spring rains	Various	6-15 years	Blackwater
11.7.2	<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	Maintain fire management of surrounding country so that wildfires will be very limited in extent and intensity		>20 years	Blackwater
11.8.11	<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks	Late wet/dry season when there is good soil moisture. Early storm season or after good spring rains	Low to moderate	>5 years	Balmoral





## 7.8 Balmoral BOA revegetation management

The steps outlined below will be implemented as part of the of grassland communities rehabilitation program on the Balmoral BOA. Due to the extensive scale of the proposed restoration (350 ha), a number of trials are recommended to determine the most effective methods for re-establishment of native grassland under the specific conditions present at the Balmoral BOA. The trials will aim to determine the most effective methods for seed collection, weed control, seed sowing, establishment and maintenance. Following the completion of the rehabilitation trials, a report is to be prepared detailing the results of the trial, an analysis of the monitoring results and the identification of a preferred or optimal rehabilitation method. Based on the trials undertaken, the preferred rehabilitation method will be selected for the rehabilitation of the remaining 350 ha of native grassland.

Established *D. sericeum* grasslands should be subject to ongoing monitoring and comparison with control sites within neighbouring remnant grassland communities

Rehabilitation steps to be applied include (but may not be limited to):

- ▶ Site selection;
- ▶ Erosion and drainage control
- ▶ Weed control
- ▶ Initial rehabilitation trials;
- ▶ On site seed collection;
- ▶ Seed sowing;
- ▶ Weed control;
- ▶ Long Term Conservation;
- ▶ Continued monitoring; and
- ▶ Rehabilitation Acceptance Criteria.

Specific detail of the grassland rehabilitation works program and revegetation trials is included in **Appendix 4**. The area to be restored is shown as Restoration Zone 1 in **Figure 5**





## 8.0 Management – Performance, Monitoring and Reporting

As per the reporting requirement identified in the Coordinator General’s and EPBC Act approval conditions for this project, BMA will assess, monitor and report on the performance of the management regimes set out in this OMP.

The performance criteria and objectives for conservation of the NPNR are set out in Schedule 4 of the Norwich Park Nature Refuge Agreement. These objectives have formed the basis for the monitoring and reporting undertaken under this Plan for all three offset areas.

### 8.1 Performance criteria

**Table 13** illustrates the management actions, their timing, expected outcomes and ultimately the performance criteria for each action to be undertaken, or caused to be undertaken, by BMA\*. All management actions will be undertaken at a frequency suitable to ensure that the timing and performance criteria set are met for that action.

\*BMA retains ultimate responsibility for the monitoring and implementation of all management actions.

**Table 13: Performance Criteria for Management Actions**

Management Action	Management Zones	Timing	Expected Outcome	Performance Criteria
Determine the extent of and map current fence lines, gates and other infrastructure within Norwich Park NR and Blackwater BOAs. Determine what infrastructure or infrastructure maintenance is required in conjunction with refined management zone mapping	All Zones	2014 - 2015	Produce refined management zones with clear and specific grazing and infrastructure management plans	Refined management zone mapping and clear plan for grazing management to be included in revised BOMP
Conduct detailed pest plant and vegetation condition survey within Norwich Park NR and Blackwater BOAs	All Zones	2014 - 2015	Refined management zone mapping identification of priority areas for weed management	Refined management zone mapping for Norwich Park NR and Blackwater BOAs and improved weed and grazing management plan
Weed management	All Zones	Within 6 months after identification of any infestations	Reduction in weed cover	All infestations of declared plants managed in accordance with the LPA
A formal grazing agreement is to be developed for each of the offset areas and implemented	All –Grazing removed from management zones 1 and 2	2014 - 2015	Clear plan for grazing management	Clear plan for grazing management to be included in revised BOMP
Erosion and sedimentation control	Management Zones 1 and 2	2014 - 2015	Increased stabilization in riparian zones	Stock excluded, Stock-proof fencing installed, selective plantings and surface water management structures





Management Action	Management Zones	Timing	Expected Outcome	Performance Criteria
				(e.g. silt fences and hay bales) if necessary
Feral animal management	All Zones	2014 and ongoing	Reduction in feral animals	Feral animal control undertaken as per Feral Fauna Control Strategy
Human disturbance	All Zones	2014 and ongoing	Reduction of soil disturbance and disturbance to entire offset areas	Site access restricted to approved personnel, signage installed, no timber clearing or removal
Cessation of grazing and grazing for conservation	Management Zones 1	2014 - 2015	Reduction of fauna resource competition and soil disturbance	Stock excluded, stock-proof fencing installed
	Management Zones 2	2014 - 2019		Stock excluded, stock-proof fencing installed
	Management Zones 3	2014 - 2015		Stocking density reduced for conservation grazing
	Management Zones 4	2014 - 2015		Stocking density set to manage weed infestations (Buffel Grass) and fire hazards
Infrastructure – fencing	Management Zones 1 and 2	2014 - 2019	Stock exclusion	Stock-proof fencing installed
Erosion and sedimentation control	Management Zones 2 and 3	2014 - 2019	Increased vegetation cover on bed and banks	Restore native grass cover to within 50% of reference condition
Infrastructure – tracks and waterway crossings	All Zones	As/where required	Improved access and reduced erosion	Access tracks and waterway crossings formalised to facilitate access, unnecessary tracks are revegetated
Fire management	All Zones	As outlined in Table 12	Improved biodiversity values	Ecological burns undertaken in accordance with fire season, intensity and frequency for each regional ecosystem (Table 12)
Fire management	All Zones	Each year	Improved biodiversity values	Ecological burns undertaken in a mosaic across the landscape with not more than 10 to 30% of each regional ecosystem type burnt in any one year
Cessation of grazing and grazing for conservation	Management Zones 1 and 2	Canopy: 2014 - 2030	Increased native plant diversity	Restore native plant species richness, and native canopy, mid-storey and grass cover to within 70% of reference condition
		Midstorey: 2014 - 2025		
		Groundcover: 2014 - 2015		
	Management Zone 3	Canopy: 20 yrs.		Restore native plant species richness, and native canopy mid-storey to within 70% of reference
		Midstorey: 2014 - 2030		
	Management Zone 4	Canopy: 2014 - 2035		Maintain native species richness and native
		Midstorey: 2014 - 2030		





Management Action	Management Zones	Timing	Expected Outcome	Performance Criteria
				canopy and mid-storey to within 70% of reference condition
Cessation of stock grazing	Managements Zone 3	2014 - 2035	Reduction of fauna resource competition and soil disturbance	Stock excluded
Cessation of stock grazing	Managements Zone 4	2014 - 2030	Reduction of fauna resource competition and soil disturbance	Stock excluded
Retain dead timber	Management Zone 1, 2 and 3	2014 - 2025	Increased fauna habitat complexity	Restore lengths of fallen logs per hectare to within 50% of reference condition
Retain dead timber	Management Zone 4	2014 - 2035	Increased fauna habitat complexity	Restore lengths of fallen logs per hectare to within 10% of reference condition
Revegetation	Balmoral BOA grasslands (Management Zones 2, 3 and 4)	2014 - 2020	Increased native plant diversity	Grassland assessed to be in at least 'Good' condition under the DotE guidelines
<i>Dichanthium sericeum</i> grassland restoration and planting	Balmoral Restoration Zone 1	2014 - 2020		No active erosion and bare ground less than 5% (when assessed within two months of effective rain)
	Balmoral Restoration Zone 1	2014 - 2025		Accepted and re-mapped as remnant by the Queensland Herbarium
Corridor revegetation (Balmoral BOA)	Balmoral BOA Management Zones 2, 3 and 4	Canopy: 2014 - 2035	Increased habitat connectivity	Restore native canopy and mid-storey cover to within 50% of reference condition
		Midstorey: 2014 - 2025		

## 8.2 Monitoring program

A Before-After-Control-Intervention (BACI) design is recommended for condition monitoring to enable comparison of changes in vegetation condition against baseline data collected on site and between sites that are actively managed and sites that are not.

This will measure changes affected by interventions and the variability due to prevailing climatic conditions to provide a more useful management measure of the amount and need for intervention measures. Given the size and length (20+ years) of management and monitoring required an 'adaptive management' technique will be used to provide a suitable level (frequency) of management based on the monitoring outcomes. This adaptive management technique will allow for targeted amendments in the required frequency of management for the specific Management Zone. Management requirements will be adjusted based on monitoring outcomes to ensure all performance Criteria are met and recorded accordingly through the required reporting regime (**Section 8.3**).





Local reference sites must be in similar RE type/condition and not be subject to management interventions. For practical purposes, reference sites may be located within the three offset areas or in adjacent BMA landholdings.

Current ecological conditions in each RE, defined in previous surveys by ELA (2012) and URS (2010, 2010a, 2010b, 2010c), will be used as baseline conditions for comparison purposes in future vegetation condition monitoring. Baseline ecological conditions are available for all sites with the exception of Norwich Park. Norwich Park will be surveyed (likely spring 2014) following approval of this OMP and prior to any management actions being implemented. Surveys will be in line with BioCondition Assessment Framework (Eyre et al. 2011) as required to ensure compliance with the EPBC Act approval.

Flora monitoring plots will be installed in each RE at each offset area proportional to the total amount of vegetation in each RE (e.g. one plot for area <20 ha, two plots >20<100 ha, 3 plots >100 ha etc.). Control sites will be established according to broad vegetation groups (BVG), with at least two monitoring plots in each BVG. It is recommended that future site-based condition attributes are to be recorded at each monitoring site in accordance with BioCondition Assessment Framework (Eyre et al. 2011) to ensure consistency between condition reporting. Attributes used to provide a measure of the terrestrial ecosystem functionality includes:

- ▶ Large trees
- ▶ Tree canopy height
- ▶ Recruitment of canopy species
- ▶ Tree canopy cover (%)
- ▶ Shrub layer cover (%)
- ▶ Coarse woody debris
- ▶ Native plant species richness for four life forms (tree, shrub, grass and forbs)
- ▶ Non-native plant cover
- ▶ Native perennial grass cover (%)
- ▶ Litter cover.

In addition to the standard BioCondition data, it is recommended that full floristic data (species and cover abundance) are recorded at each plot. Permanent marker stakes and fixed photographic monitoring points will be installed.

## **8.2.1 Monitoring Balmoral BOA grassland**

At the Balmoral BOA, the rehabilitated *D. sericeum* grasslands are to be monitored and compared with adjacent native grassland control plots. Monitoring will provide benchmark data from controls, feedback on success of rehabilitation techniques, ongoing information on grassland establishment, grass health, weed control and demonstration of achieved rehabilitation acceptance criteria.

Monitoring of trial sites is to be undertaken bi-monthly (every two months) for the 12 months post restoration to accurately determine the success/failure of trial methodology. Monitoring will include surveying two 1 m<sup>2</sup> cover-abundance plots in each sub-plot (n=144 over 3 trial sites). Within each 1 m<sup>2</sup> plot, the following data is to be recorded:

- ▶ Species present (to species level if possible), including natives and weeds
- ▶ Cover-abundance of each species, leaf litter, bare ground and cryptogams

Following the completion of the rehabilitation trials, a report is to be prepared detailing the results of the trial, an analysis of the monitoring results and the identification of a preferred or optimal rehabilitation





method. Based on the trials undertaken, the preferred rehabilitation method will be selected for the rehabilitation of the remaining 350 ha of native grassland.

Established *D.sericeum* grasslands should be subject to ongoing monitoring and comparison with control sites within neighbouring remnant grassland communities

## 8.2.2 Monitoring grazing

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Pasture monitoring will be conducted at the end of each dry season to assess the effectiveness of the grazing management strategies and compliance with the Grazing Agreement. Pasture monitoring will assess pasture biomass, and ground cover and will be undertaken as per the DPI&F Stocktake guidelines or a similar land condition monitoring process.

## 8.2.3 Monitoring sedimentation and erosion

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Currently erosion is not a significant issue within the offset areas (URS 2010 a, b & c, ELA 2012). Minor erosion exists in some areas, however, levels of erosion do not warrant targeted management at this stage. Any erosion issues shall be identified opportunistically during the course of management activities. Areas of significant erosion shall be recorded and management action taken where appropriate to rectify the issue. The exclusion of stock from riparian areas and the control of pest vertebrates such as feral pigs should help to alleviate any erosion issues.

## 8.3 Reporting

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BMA will prepare, or cause to be prepared, an annual report within three months of the anniversary of the commencement (approval) of the Caval Ridge Offsets Management Plan and submitted to both DEHP and DotE. Both agencies will be advised in writing of the commencement of management regimes associated with this Plan. Following five years after the commencement of operations reports are required to be submitted every fifth year to DotE.

This report will be published online and provided to DEHP and DotE and will address the management actions undertaken in the offset areas and the outcome of these actions in contrast to the performance criteria, as detailed in **Table 13**, including the identification of the need for improved management. The progress towards relevant native vegetation attaining remnant or other protected status within 20 years or prior to the surrender of the EA for the CRM will also be detailed.

## 8.4 Review of Biodiversity Offset Management Plan

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This BOMP is to be reviewed by BMA on an on-going basis to ensure it remains current and applicable to the activities being undertaken at the offset areas and with any additional offset requirements for future BMA projects in the region.

As monitoring techniques and methodologies are likely to evolve over time, the BOMP review will also include an assessment of the monitoring techniques to ensure the techniques are current and that the BMP is adapted to include any more appropriate technologies or methodologies which may become available.

It is proposed that the first review of the BOMP be undertaken following the refining of management zones then subsequently at 5 year intervals.





## 8.5 Risk Analysis

The following risk assessment (Table 14) has considered:

- ▶ any real or potential risks associated with achieving the management objectives and outcomes;
- ▶ the actions taken to minimise those risks and;
- ▶ any remedial action that will be undertaken if any of the risks occur

**Table 14: Risk Analysis**

Number	Risk	Level of Risk (Extreme, High, Moderate or Low)	Proposed Actions to Minimise Risk	Proposed Remedial Actions if Risk Occurs
1	Grazing	Low	Fence the Declared Area and graze the Declared Area in accordance with this management plan.	Reduce grazing.
2	Erosion	Low	Fence the Declared Area and graze the Declared Area in accordance with this management plan.	Reduce grazing. Rehabilitation and revegetation if necessary.
4	Pest Animals and Weeds	Moderate	Limit the introduction and presence of weeds and pest animals.	Instigate and increase control measures.
5	Drought	Moderate	Maintain biocondition of the offset area. Monitor climatic conditions and manage grazing levels accordingly.	Reduce gazing. Allow offset area to recover post drought, particularly through the control of weeds. Maintain a minimum of 50% groundcover at the end of the Dry season
6	Fire	Moderate	Maintaining firebreaks. Manage fuel loads through controlled grazing.	Allow offset area to recover post fire, particularly through the control of weeds. Rehabilitation and revegetation if necessary.





## 9.0 Information sources

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## **Appendix 1 – EPBC Act Approval Conditions**

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**Approval**

**Caval Ridge Coal Mine Project – EPBC No 2008/4417**

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

**Proposed action**

**person to whom the approval is granted** BM Alliance Coal Operations Pty Ltd

**proponent's ACN (if applicable)** 67096412752

**proposed action** To develop a new open cut coal mine at Caval Ridge located approximately 6.2 km south of Moranbah and approximately 160 km south - west of Mackay, Queensland and as described in the referral received 26 August 2008, variation to referral request dated 12 October 2010, Environment Impact Statement dated July 2009, Supplementary Environment Impact Statement dated November 2009 and the BMA Caval Ridge Mine Project Change Request dated September 2010 – [See EPBC Act referral 2008/4417]

**Approval decision**

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approved

**Conditions of approval**

This approval is subject to the conditions specified below.

**expiry date of approval**

This approval has effect until 31 March 2041.

**Decision-maker**

**name and position** James Barker  
A/g Assistant Secretary  
Environment Assessment Branch

**signature** 

**date of decision** 15/3/11

## Conditions attached to the approval

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1. The person taking the action must not clear more than 25.2 ha of the EPBC listed "Brigalow (*Acacia harpophylla* dominant and co-dominant)" endangered ecological community and 124.6 ha of the EPBC listed Bluegrass (*Dichanthium* spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) endangered ecological community, (now included within the "Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin" ecological community).
2. To offset the impacts to the "Brigalow (*Acacia harpophylla* dominant and co-dominant)" endangered ecological community and the "Bluegrass (*Dichanthium* spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) endangered ecological community, (now included within the "Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin" endangered ecological community), the person taking the action must, before commencement of operations (excluding early works), obtain the Minister's approval of an Offset Management Plan for the Norwich Park Nature Refuge and the Gregory Crinum Offset Area.

This plan must include:

- a. management actions to:
  - i. protect and enhance no less than 126 hectares of the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community in the Norwich Park Nature Refuge, within the areas identified in the map at Appendix 1; and
  - ii. protect and enhance 733.3 hectares of Bluegrass (*Dichanthium* spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) ecological community in the Gregory Crinum Offset Area, within the areas identified in the map at Appendix 2.
- b. the desired outcomes/objectives of implementing the plan;
- c. details of the Norwich Park Nature Refuge, including a clear definition of the location and boundaries of the Norwich Park Nature Refuge, through maps and / or textual descriptions as well as an accompanying *shapefile*;
- d. details of the Gregory Crinum Offset Area, including a clear definition of the location and boundaries of the Gregory Crinum Offset Area, through maps and / or textual descriptions as well as an accompanying *shapefile*;
- e. management actions that are proposed to protect offset areas and to enhance the extent and condition of the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community and Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin ecological community habitat values including weed control, fire management, erosion and sediment control, management of livestock and restrictions on access;
- f. management actions for the long-term protection of the established Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community and Bluegrass (*Dichanthium* spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) ecological community;
- g. the timing, responsibilities and performance criteria for such actions;
- h. the development and implementation of a monitoring program for enhancing the offset areas;
- i. a process to report to the Department the management actions undertaken in the offset areas and the outcome of those actions, including identifying any need for improved management. For the five years after the commencement of operations (excluding early works) reports are to be submitted annually on or before the anniversary of the commencement of operations (excluding early works). Subsequently reports are to be submitted every fifth year on or before the anniversary of the commencement of operations (excluding early works);

- j. a description of the potential risks to successful management and rehabilitation in the offset areas, and a description of the contingency measures that would be implemented to mitigate these risks; and
- k. details of parties responsible for monitoring, reviewing and implementing the plan.

The approved Offset Management Plan must be implemented.

- 3. The Gregory Crinum Offset Area must be protected by a Nature Refuge Agreement within two years of the date of this approval.
- 4. Before commencement of operations (excluding early works), the person taking the action must submit to the Minister for approval a "Threatened Flora and Fauna Species and Ecological Communities Management Plan". The Plan must contain, but is not limited to, the following:
  - a. Management actions relating to EPBC listed species and ecological communities; and
  - b. Mitigation actions relating to EPBC listed species and ecological communities.

The approved Threatened Flora and Fauna Species and Ecological Communities Management Plan must be implemented. Any changes to the Threatened Flora and Fauna Species and Ecological Communities Management Plan must be approved by the Minister and approved variations to the Plan must be implemented. This plan may be made publicly available on the internet by the Department.

- 5. Within 14 days from the commencement of the action (excluding early works), the person taking the action must advise the Department in writing of the actual date of commencement.
- 6. Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the Department at the same time as the compliance report is published.
- 7. Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.
- 8. If the person taking the action wishes to carry out any activity otherwise than in accordance with the Offset Management Plan and Threatened Flora and Fauna Species and Ecological Communities Management Plan referred to in conditions 2 and 4 the person taking the action must submit for the Minister's written approval a revised version of any such plan. The varied activity shall not commence until the Minister has approved the varied plan in writing. If the Minister approves such a revised plan, that plan must be implemented in place of the plan originally approved. Unless the Minister has approved the revised plan, then the person taking the action must continue to implement the plan originally approved, referred to in conditions 2 and 4.
- 9. If the Minister believes that it is necessary or convenient for the better protection of listed threatened species and communities to do so, the Minister may request that the person taking the action make specified revisions to the plans pursuant to conditions



2 and 4 and submit the revised plan for the Minister's written approval. The person taking the action must comply with any such request. The revised approved plan must be implemented. Unless the Minister has approved the revised plan then the person taking the action must continue to implement the plan originally approved, referred to in conditions 2 and 4.

10. If, at any time after 5 years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the Minister.
11. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the above conditions of approval, including measures taken to implement the management plans required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.
12. Unless otherwise agreed to in writing by the Minister, the person taking the action must publish all management plans referred to in these conditions of approval on their website. Each plan must be published on the website within 1 month of being approved.

**Footnote:** To avoid doubt, if a condition of State (QLD) approval held by the proponent requires an Offset Management Plan or Threatened Flora and Fauna Species and Ecological Communities Management Plan, the proponent may simultaneously meet the relevant requirements of both conditions by submitting a single plan.

#### **Definitions**

**Department** - the Australian Government Department responsible for the *Environment Protection and Biodiversity Conservation Act 1999*.

**Minister** - the Minister responsible for the *Environment Protection and Biodiversity Conservation Act 1999*.

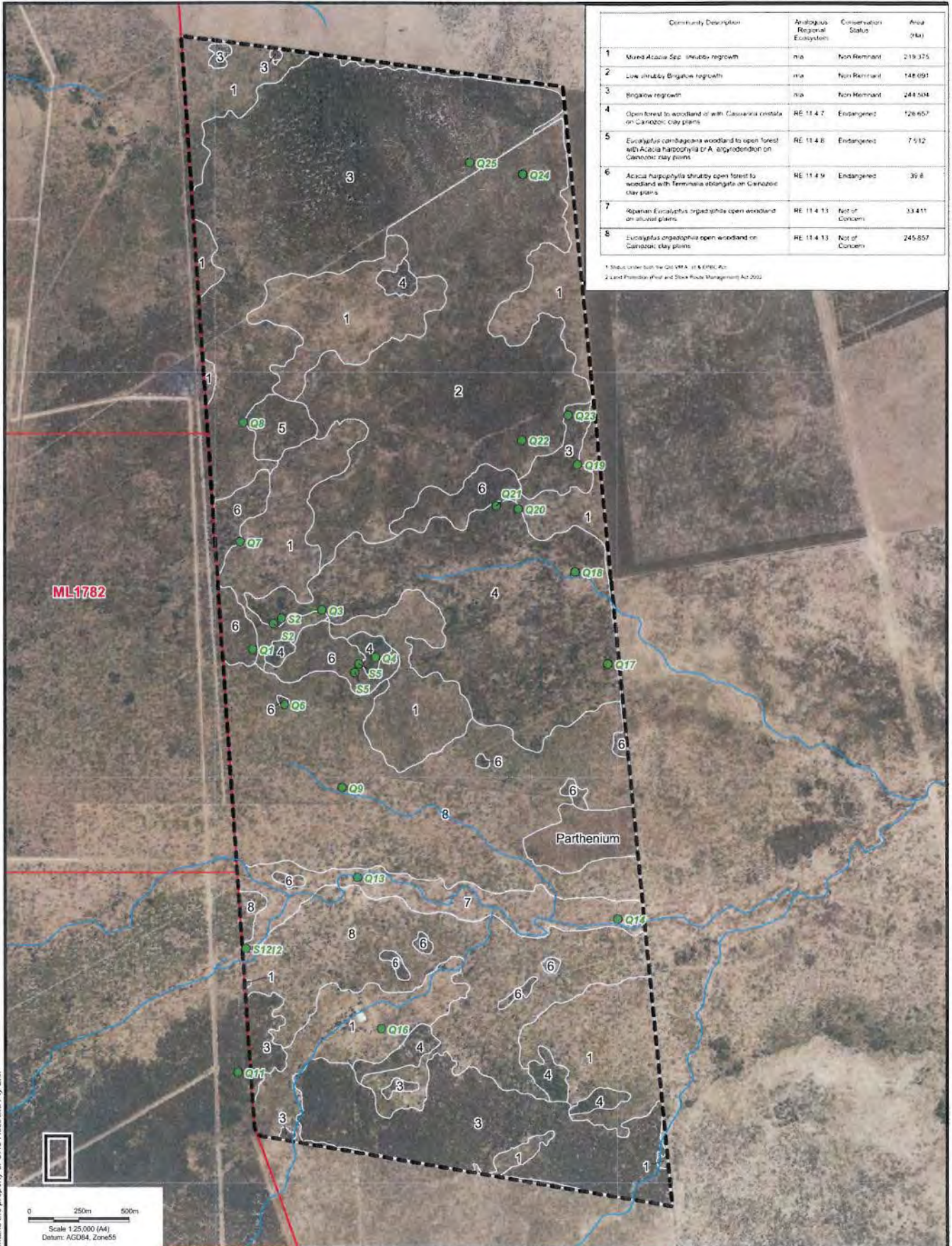
**Shapefile** – an ESRI Shapefile, containing '.shp', '.shx' and '.dbf' files and other files capturing attributes including at least the EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format.

#### **Early Works**

- vegetation clearing and construction activities related to the Buffel Accommodation Village;
- vegetation clearing and construction activities related to construction site offices, laydown areas, and ablution facilities;
- road construction and intersection upgrades for the Buffel Accommodation Village and Mine site;
- construction of 66kV power line to Buffel Accommodation Village and Mine site; and
- installation of environmental monitoring equipment and services.

**Commencement of Operations** – any works required to be undertaken in relation to the Caval Ridge Coal Mine Project.

# Appendix 1



Community Description	Analogous Regional Ecosystem	Conservation Status	Area (Ha)
1 Mound Acacia Sep. shrubby regrowth	n/a	Non Remnant	219,375
2 Low shrubby Brigalow regrowth	n/a	Non Remnant	148,691
3 Brigalow regrowth	n/a	Non Remnant	244,504
4 Open forest to woodland of euc. Casuarina cretata on Carnarvon clay plains	RE 11.4.7	Endangered	126,657
5 Eucalyptus cambageana woodland to open forest with Acacia harpoochya C.A. acyrodendron on Carnarvon clay plains	RE 11.4.8	Endangered	7,512
6 Acacia haepophylla shrubby open forest to woodland with Terminalia oblongata on Carnarvon clay plains	RE 11.4.9	Endangered	39.8
7 Riparian Eucalyptus argedgitha open woodland on alluvial plains	RE 11.4.15	Not of Concern	33,411
8 Eucalyptus argedgitha open woodland on Carnarvon clay plains	RE 11.4.13	Not of Concern	245,857

1 Status under both the Qld SFA, 11 & EPBC Act  
2 Land Protection (Pur and Stock Roads Management) Act 2002

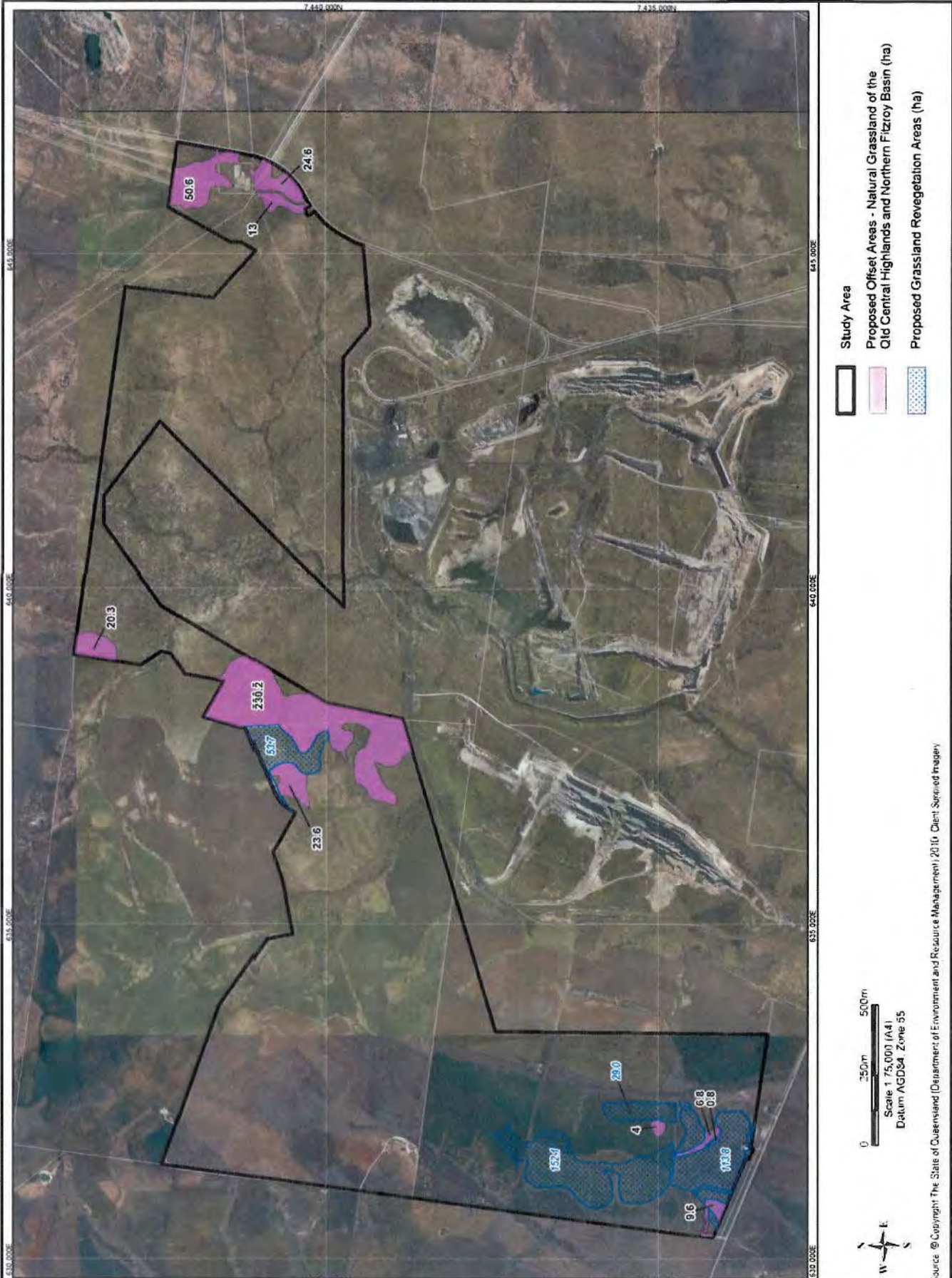
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Mining Lease Boundary      ● Sample Locations

Client  	Project <b>BMA BIODIVERSITY OFFSETS</b>	Title <b>NORWICH PARK VEGETATION MAPPING</b>
	Drawn: VH      Approved: CT      Date: 24-01-2011 Job No: <b>4262 6695</b> File No: 42626695-g-152.wor	<b>Appendix 1</b>





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Client  	Project BMA BIODIVERSITY OFFSETS	Title GREGORY CRINUM PROPOSED GRASSLAND OFFSET AREAS
	Drawn: VH    Approved: CT    Date: 24-01-2011 Job No: 4262 6695    File No: 42626695-g-153.wor	Figure: 3

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BHP Billiton Mitsubishi Alliance

## Caval Ridge Mine Offset Management Plan



## Appendix 2 – Coordinator General's Conditions





# Appendix 1 – Conditions and Recommendations

## Contents

Schedule 1	Coordinator-General's imposed conditions
Schedule 2	Jurisdiction for conditions
Schedule 3	Stated conditions for mine environmental authorities under the <i>Environmental Protection Act 1994</i> (EPBC Act)
Schedule 4	Recommended conditions for other approvals
Schedule 5	Coordinator-General's other recommendations
Schedule 6	Glossary, acronyms and abbreviations

# Appendix 1

## Schedule 1

### Coordinator-General's imposed conditions

These conditions are **imposed** by the Coordinator-General on the project under section 54B of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) and apply to project elements that are not the subject of an environmental authority (mining activity) (EA) and associated environmentally relevant activities (ERAs) under the *Environmental Protection Act 1994* (EP Act), for the Caval Ridge Mine. Conditions applicable to the EA, including ERAs, for the construction and operation of the CRM are provided in Schedule 3 of Appendix 1 of this report.

All of the conditions stated in this Schedule 1 take effect from the date of this Coordinator-General's Report.

These conditions do not relieve the proponent of the obligation to obtain all other approvals and licences from all relevant authorities required under any other Act.

In accordance with section 54B(3) of the SDPWO Act, the Coordinator-General has **nominated** entities to have jurisdiction for a number of conditions in this schedule. Schedule 2 describes which entity has jurisdiction for the conditions and the entities that should be consulted by the proponent in regards to each condition ('Consultative Bodies').

In accordance with section 54D of the SDPWO Act, these conditions apply to anyone who undertakes the project, including, for example the proponent and an agent, contractor, subcontractor or licensee of the proponent and public utility providers undertaking public utility works.

To simplify presentation, this Schedule 1 is divided into four parts as follows:

- **Part 1: General conditions** for the CRM (which applies to both the construction and operation and maintenance stages of the CRM, unless otherwise specified).
- **Part 2: Construction stage of the CRM** (which applies to all activities from commissioning, including site preparation, demolition and material deliveries, construction activities and decommissioning and rehabilitation of worksites).
- **Part 3: Operation stage of the CRM** (which applies to the project from the time the CRM coal handling and preparation plant (CHPP) exceeds the 250,000 tonne of coal output point).
- **Part 4: New conditions applicable to the Daunia Mine** (which arise from the cumulative impacts of BMA's Bowen Basin Coal Growth (BBCG) project).

Note however that some conditions in each part could also have some relevance to the other parts.





## **Part 1: General conditions**

### **1. General conditions**

- (a) The project must be carried out generally in accordance with the Caval Ridge Coal Mine Project Environmental Impact Statement (EIS) (July 2009) for the project, and the Caval Ridge Coal Mine Project EIS Supplementary Report (SEIS) for the project (November 2009), and Appendices 2–5 of this report.
- (b) The proponent must notify the Coordinator-General and all nominated entities in writing of the commencement of the construction stage of the Caval Ridge Mine (CRM) and the commencement of the operation stage of the CRM at least four weeks prior to the relevant commencement date.
- (c) Within three months of advertising the draft Environmental Authority (EA) for CRM, the proponent must provide a copy of the final commitments register for the CRM to the Coordinator-General including all Social Impact Mitigation Plan (SIMP) commitments (refer to Conditions 10 and 11).

### **2. Mine Water Management**

#### **Water supply**

- (a) The proponent must develop, implement and maintain a water supply strategy and emergency plan which demonstrates water supply to the CRM for at least the next 12 months of operation and report annually to the Department of Environment and Resource Management (DERM) on performance against that plan and any new measures required to ensure future supply of water to the CRM.

#### **Water releases**

- (b) Prior to the EA for the CRM being granted for the CRM component of the Bowen Basin Coal Growth Project, the proponent will prepare a report to DERM. The report shall include additional information about the water balance model including:
  - (i) details of all the assumptions used in the water balance model
  - (ii) an explanation of how water quality predictions were derived, and
  - (iii) a demonstration that contaminated run-off and pump out of pits for an AEP 0.05 wet season can be contained within the storages provided.
- (c) Prior to the EA for the CRM being granted, DERM must review and endorse for inclusion in the EM plan any design changes to water supply, storage and transfer components of the CRM MWMS required to ensure compliance with (b).

#### **Flooding**

- (d) Prior to the EA for the CRM being granted, DERM must review and endorse for inclusion in the EM plan any design of the CRM operational flood protection levees to be sure that those structures can be adequately accommodated within the available space of the CRM mining lease.

### **3. Flora and Fauna**

- (a) The proponent must provide an 'Offset Strategy' for approval by DERM and the Coordinator-General and the Commonwealth Department of Environment, Water Heritage and the Arts (DEWHA) before the commencement of mining operations. The Strategy must provide for and include, but not necessarily be limited to the following:
  - (i) the minimum area of each Regional Ecosystem (RE) to be secured by the proponent in offset arrangements for the CRM as shown in Table 3.1, but the Commonwealth Department of Environment Water Heritage and the Arts (DEWHA) may specify larger

areas of each of these Endangered Ecological Communities (EECs) offsets and DERM may specify larger areas of each 'endangered' or 'of concern' RE offsets where their respective statutory authorities allow this

**Table 3.1. Minimum offset areas for the CRM**

RE	RE number	EPBC Act status	VM Act status	Biodiversity status	Area requiring offset (ha)	Minimum offset required (ha)
Poplar box	11.3.2	N/A	of concern	of concern	108.3	225.6
	11.4.2	N/A	of concern	of concern	4.5	
Brigalow	11.4.8	Endangered	endangered	endangered	8.2	61.8
	11.4.9	Endangered	endangered	endangered	12.4	
Natural grasslands	11.8.11	Endangered	of concern	of concern	124.6	373.8
Forest red gum / river red gum	11.3.25	N/A	least concern	of concern	31.5	63.0
Total not EPBC listed					144.3	288.6
Total EPBC listed					145.2	435.6
<b>TOTAL</b>					<b>289.5</b>	<b>724.2</b>

- (ii) all proposed offset lands for the CRM shown on maps which, to avoid the risk of double-counting, delineate areas of vegetation in each proposed offset area attributable to each phase of the BBCG project
- (iii) an assessment of the extent and condition of the native vegetation proposed to be used as offset areas based upon ground truthing
- (iv) the management of offset lands to exclude grazing or other development, except when required by law to provide access to resource tenure holders
- (v) the management of offset lands so as to encourage regeneration and regrowth of the relevant native vegetation to attain remnant or other protected status within 20 years or prior to the surrender of the EA for the CRM, whichever is sooner
- (vi) annual reporting to DERM, by a suitably qualified third party acceptable to DERM, on activities at the offset area and its progress towards remnant or other protected area status
- (vii) a commitment that If at any time before the EA for the CRM is surrendered, any of the offset lands are to be cleared, or if the proponent relinquishes management of the offset lands or applies to surrender the EA for the CRM before the offset attains remnant status, the proponent must:
  - A establish an alternative offset of equal or greater size and quality and of the same or similar REs
  - B if alternative offset lands cannot be found before clearing takes place or within six months of the proponent ceasing to manage the land or the date of the surrender application, the proponent will provide a monetary contribution to Ecofund Queensland's environmental trust or equivalent offset broker that could be used to purchase land to be added to the protected estate and which will include any ongoing management costs until the environmental authority for the CRM is surrendered
  - C make payment for any residual risk of rehabilitation of the offset area at the time of surrender, with the amount of the monetary contribution, management costs and residual risk determined by DERM in consultation with the offset broker.



- (viii) the offset of the 31.5 hectares of forest red gum / river red gum: *Eucalyptus tereticornis* or *E. camaldulensis* woodland (RE 11.3.25) cleared for the CRM to a ratio of not less than 1:2 by:
  - A protecting and managing the 'major vegetation group' (MVG) on the proposed Blackwater offset area, comprising three REs 11.3.2/11.3.25/11.3.4, which includes approximately 115.8 hectares of RE 11.3.25, or
  - B replanting 63 hectares of land on or adjacent to the CRM site with plant species consistent with this RE prior to the commencement of operation of the CRM, and subsequently ensuring the subsequent survival of those plantings; protecting the replanted land through a legally binding mechanism; and managing that replanted land with the aim of it attaining remnant status within 20 years of replanting, or
  - C use the services of an offset broker such as Ecofund Queensland or other third party to establish an alternative planting to meet the same requirements as under (vii)A on a different site to be approved by DERM.
- (b) The proponent must prepare to the satisfaction of DERM and DEWHA a 'Threatened Flora and Fauna Species and Ecological Communities Management Plan' that:
  - (i) ensures the impacts to these species and communities are minimised
  - (ii) contributes to the survival of these species in the wild, and
  - (iii) achieves conservation benefits for these species and communities where practicable.
- (c) As a minimum, the plan in (b) should include:
  - (i) affected species listed as endangered, vulnerable or rare under the *Nature Conservation Act 1994*
  - (ii) affected species listed by DERM on its 'Back on Track' systems that are identified as in decline and have a good potential for recovery
  - (iii) management measures addressing the threatened species listed in the 'controlling provisions' for the CRM under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
  - (iv) the proponent's commitments to implement management measures to further mitigate the impacts of mining activities on ecological values
  - (v) the additional and ongoing management activities to mitigate impacts to native vegetation communities outlined in chapter 8 of the CRM EIS and section 5.4 of the 'EPBC Matters Report' in Appendix C2 of the CRM EIS
  - (vi) how the proponent will satisfy the requirements of section 322 of the *Nature Conservation (Wildlife Management) Regulation 2006* relating to tampering with animal breeding places
  - (vii) a commitment to provide information on flora and fauna management actions for significant species for inclusion in DERM's 'Recovery Actions Database' when that framework is finalised and becomes operational.
- (d) The plan in (b) should be provided to DERM and DEWHA for review at least 28 days prior to commencement of any mining construction activity, for the CRM project other than early road works.

#### **4. Audit reports**

- (a) Compliance with the Coordinator-General's imposed (Schedule 1) conditions of this report must be audited by an appropriately qualified and experienced third party auditor or auditors relevant to the matters being audited, nominated by the proponent and accepted by the Coordinator-General within six months of commencement of construction of the CRM, then annually until the second year of operation of the CRM, and then biennially thereafter until six years of operation of the CRM has occurred.
- (b) The proponent must submit the third party audit report(s) to the Coordinator-General within 60 days of the end of the relevant period.
- (c) The audit report must identify the conditions that were activated during the period, and a compliance/non-compliance table. A description of the evidence to support the compliance table must be provided. The audit report must also contain recommendations on any non-compliance or other matter to improve compliance. The third party auditor must certify the findings of the audit report.
- (d) The financial cost of the third party audit is borne by the proponent.
- (e) The proponent must immediately act upon any recommendations arising from the audit report and:
  - (i) investigate any non-compliance issues identified, and
  - (ii) as soon as practicable, implement measures or take necessary action to ensure compliance with this authority.
- (f) Subject to (a), and not more than one month following the submission of the audit report, the proponent must provide written advice to the Coordinator-General addressing the:
  - (i) actions taken by the proponent promptly and routinely to ensure compliance with the Coordinator-General's imposed conditions, and
  - (ii) actions taken to routinely prevent a recurrence of any non-compliance issues.

#### **5. General communication obligations**

- (a) Prior to the commencement of CRM construction works, and then at six-monthly intervals until the completion of construction, the proponent shall advertise in relevant local newspapers, the nature of construction works impacting on public areas proposed for the forthcoming six months, the areas in which these works are proposed to occur, the hours of operation and a contact telephone number.
- (b) The proponent shall undertake early and on-going engagement with owners and occupants of sensitive places adjacent to or predicted to be impacted by the proposed construction and operational works, and works associated with impact mitigation measures. The consultation shall include the provision of clear information about the scale, timing, duration, location, intensity and potential effects of construction and operational works and, where required by Schedule 1 or Schedule 3 conditions, the mitigation measures available to the owner or occupant.
- (c) The proponent shall ensure that the local community and businesses are kept informed (by appropriate means such as: local newsletters, leaflets, newspaper advertisements, community notice boards and an internet page, to be established in accordance with (d)), of the progress of the CRM, including any traffic disruptions and controls, and construction of temporary detours, not less than 48 hours prior to such works being undertaken.



- (d) The proponent shall establish a CRM internet site at least three months prior to the commencement of construction works and maintain an internet page until at least 24 months after commencement of operation of the CRM or as long as required for updating operational air quality results. The internet page shall, as a minimum, contain quarterly work progress and consultation activities updates, including but not limited to:
- (i) a list of environmental management reports that are publicly available and the executive summaries of those reports
  - (ii) minutes from BMA's Moranbah Community Network meetings (refer Condition 6)
  - (iii) quarterly newsletters consistent with (c)
  - (iv) 24 hour per day toll-free complaints contact telephone number, established in accordance with Condition 7(a)(iii)
  - (v) a means of asking questions or providing feedback.

## 6. Moranbah BMA Community Network (Moranbah BCN)

- (a) The proponent shall establish an appropriate representative Moranbah BMA Community Network (Moranbah BCN) to the satisfaction of the Coordinator-General and in accordance with the community communication strategy required under Condition 7, which would have the following functions:
- (i) **Community liaison** on the Daunia Mine, CRM and future BBCG project expansion components, specifically to:
    - A assist the proponent to understand community views
    - B work with the proponent to determine potential impacts and mitigation strategies associated with its mining activities, including consideration of the CRM air quality monitoring program required under section 5.5 of this report
    - C assist BMA to monitor and measure the effectiveness and appropriateness of its community communications strategy and priority projects for its local communities
    - D provide advice to the Sustainable Resource Communities (SRC) Partnership Group and the SRC Bowen Basin Leadership Group when requested
    - E at the proponent's discretion, undertake liaison on matters relevant to other BMA mines outside of the scope of the BBCG project.
  - (ii) With respect to the social impact management plan (**SIMP**) **stakeholder engagement strategy** requirements (refer to Condition 10):
    - A provide advice about and input to issues relating to the implementation of social impact mitigation and management strategies that have been identified in the EIS process and documented in the SIMP
    - B receive and consider progress reports on the implementation of the SIMP
    - C play a key role in the design for collection of qualitative and quantitative data pertinent to monitoring SIMP mitigation and management strategies.
- (b) With respect to its functions under (a)(i), the Moranbah BCN must include local membership representation from the following:
- (i) a Moranbah business owner - 1 representative
  - (ii) an employee of an education institution or childcare centre - 1 representative

- (iii) Moranbah and District Support Services - 1 representative
  - (iv) a youth member of the community or youth worker - 1 representative
  - (v) an employee of the health or medical sector - 1 representative
  - (vi) Isaac Regional Council - 2 representatives
  - (vii) a partner of a BMA employee working on the Daunia or Caval Ridge Mines - 1 representative
  - (viii) representation as agreed through the proponent's indigenous stakeholder engagement strategy
  - (ix) a workforce representative from each of the Daunia and Caval Ridge Mines - 2 representatives
  - (x) the lead construction contractor from each of the Daunia and Caval Ridge Mines (if the lead construction entity is not the proponent) - 2 representatives
  - (xi) representative from a General Manager (or equivalent) from either of the Daunia Mine or CRM for the duration of the construction phase of each mine, with membership rotating between BMA's Moranbah site General Managers during the operations phase - 1 representative
  - (xii) the proponent's Environmental Management Representative (refer to Condition 8) or equivalent from each of the Daunia and Caval Ridge Mines - 2 representatives
  - (xiii) the proponent's Manager (Communities) - 1 representative
  - (xiv) a State Government agencies representative approved by the Coordinator-General in consultation with the Mackay Regional Managers Coordination Network - 1 representative
- (c) With respect to its SIMP functions under (a)(ii):
- (i) membership of the Moranbah BCN should not include representation from groups listed in (b)(iv), (b)(vii) and (b)(x) or the Daunia Mine representatives in (b)(ix), (b)(xi) and (b)(xii).
  - (ii) representatives from other relevant state agencies will be invited to participate, but not with any voting or decision making authority.
- (d) The membership of the Moranbah BCN under (b) or (c) may be varied if approved by the Coordinator-General.
- (e) The proponent shall:
- (i) appoint an independent Chair of the Moranbah BCN approved by the Coordinator-General
  - (ii) ensure that the Moranbah BCN has a clear Terms of Reference developed in consultation with stakeholders and approved by the Coordinator-General, which as a minimum includes a description of how decisions are made by the BCN (e.g. by majority vote), and a meeting frequency:
    - A for Community Liaison ((a)(i)) functions of at least every three months after its first meeting during the construction phase of the CRM and then at least every six months during the operation phase of the CRM
    - B for SIMP ((a)(ii)) functions of at least monthly during the development of the draft SIMP, then at least every second month during the first year implementation period of the first approved SIMP, and thereafter integrated into the regular Moranbah BCN meeting schedule defined in A.



- (iii) provide adequate resources for the establishment and work of the BCN, including:
  - A costs of time and travel of the Chair involved with the BCN
  - B meeting facilities
  - C secretariat support.
- (iv) ensure that the first meeting of the Moranbah BCN is held within three months of the date of advertising of the EA for the CRM and that this first meeting consider the interrelationship of the Moranbah BCN with any existing community liaison or consultative groups of adjoining or interrelated developments
- (v) provide to the Moranbah BCN regular information on the progress of work on the Daunia and Caval Ridge Mines and monitoring results
- (vi) promptly provide to the Moranbah BCN such other information as the Chair may reasonably request concerning the environmental performance of the CRM
- (vii) allow the Moranbah BCN to make comment/s about the:
  - A construction progress and implementation
  - B EM plan and SIMP
  - C compliance with the conditions of this Coordinator-General's report, and
  - D other matters relevant to the construction and operation of the Daunia and Caval Ridge Mine.
- (viii) ensure that the Moranbah BCN has access to reasonable and sufficient information to fulfil its purpose
- (ix) invite representatives from relevant government agencies or other individuals to attend meetings as reasonably required by the Chair
- (x) provide access for Daunia and Caval Ridge Mine site inspections by the Moranbah BCN at times that are mutually acceptable to the proponent and the Moranbah BCN members
- (xi) consider the recommendations and comments of the Moranbah BCN and provide a response to the Moranbah BCN
- (xii) take minutes for each meeting and seek the agreement of the Moranbah BCN members to those minutes within 14 days of that meeting
- (xiii) for Community Liaison ((a)(i) functions of the Moranbah BCN, make BCN minutes available for public inspection on the CRM web page within 14 days of their endorsement by the Chair
- (xiv) for the SIMP ((a)(ii) functions of the Moranbah BCN, make quarterly update reports available for public inspection on the CRM web page within 30 days of their endorsement by the Chair
- (xv) at least six months prior to the commencement of operation of the CRM, expand the Moranbah BCN to include a representative of the CRM operator (if that operator is not the proponent)
- (xvi) six months after the commencement of operation of the CRM, remove the representative of the CRM lead construction contractor from the Moranbah BCN
- (xvii) decommission the Moranbah BCN when the CRM ceases operation.

- (f) In the circumstance of any unresolved disagreement between Moranbah BCN members about the operation of a Moranbah BCN or the responsibilities of its members, including the proponent, the Coordinator-General shall adjudicate and make the final decision.

## **7. Community communication strategy**

- (a) Notwithstanding the requirements of Condition 5, the proponent must prepare a community communication strategy for the construction period, to be initiated prior to the commencement of construction. The strategy must set out the community consultation procedures for the CRM, which shall comply with the obligations under these conditions, other approvals, licences and permits. It will also include:
  - (i) identification of stakeholders likely to be affected by the CRM, including identification of sensitive places, businesses and other sensitive land uses
  - (ii) establishment of procedures and mechanisms through which the community stakeholders can discuss or provide feedback to the proponent or environmental management representative (refer to Condition 8) in relation to the environmental management and construction and operation of the CRM
  - (iii) procedures and mechanisms through which the proponent can respond to any enquiries or feedback from the community stakeholders in relation to the environmental management construction and operation of the CRM
  - (iv) procedures and mechanisms to be implemented to respond to any matters not resolved by the proponent response under Condition 7(a)(iii) on the matters relating to environmental management and the CRM construction and operation
  - (v) a complaints process as specified in Condition 9(c)
  - (vi) where required, special procedures to respond to complaints, issues or incidents, such as face-to-face meetings and on-going communications with affected parties and a documented process for issues resolution
  - (vii) procedures for informing affected road network users of planned traffic arrangements including temporary traffic arrangement changes during construction or operation of the CRM
  - (viii) the provision of relevant training for all employees and sub-contractors on the requirements of the community communication strategy.
- (b) The proponent must prepare and implement a community notification strategy to provide information to road users, including motorists, on the timing of the implementation of CRM elements impacting upon road use or road condition.

## **8. Environmental management representative**

At least two months prior to commencement of construction, the proponent shall nominate a suitably qualified and experienced Environmental Management Representative(s) with the authority within the proponent management structure to require reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts. The proponent shall employ the environmental management representative(s) for the duration of construction and operation of the CRM. The representative(s) shall:

- (a) be the principal point of advice for the proponent in relation to all questions and complaints concerning the environmental performance of the CRM
- (b) certify that the EM plan for the CRM meets the conditions within this Coordinator-General's Report relevant to the provisions of the EP Act
- (c) manage the implementation of all EM plan, and monitoring programs and advise the proponent with respect to the achievement of all CRM environmental outcomes





- (d) review and approve the CRM induction and training program related to environmental matters for all persons involved in construction and operation activities and monitor implementation
- (e) periodically monitor the proponent's environmental activities to evaluate the implementation, effectiveness and level of compliance of construction and operation conditions, including carrying out site inspections at least monthly at all active CRM sites
- (f) have responsibility for considering and advising the proponent on matters specified in these conditions and all other licences and approval related to the environmental performance and impacts of the CRM
- (g) notwithstanding the requirement that the proponent implement the actions outlined in the EM plan to prevent environmental impacts, be given the authority and independence to advise reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts, and in the event of non-compliance with any condition of Schedule 1, to advise the proponent and DERM that relevant actions be taken or ceased to achieve compliance with the condition
- (h) shall be available for contact 8.00am – 4.00pm Monday to Friday if CRM construction or operation activities are being undertaken.

## 9. Consultation, review, complaints and non-conformance

- (a) **Consultation** procedures must include the stakeholder engagement measures described in Conditions 5-8 as a minimum, and meet the following requirements:
  - (i) consultation with owners and occupants of properties around the CRM as well as the wider community, must be conducted for the duration of the construction and operation of the CRM
  - (ii) consultation must commence well in advance of the commencement of construction and operation works
  - (iii) consultation with owners and occupants of affected properties must be conducted with confidentiality where requested by the owners or occupiers of premises and at a level of detail sufficient to address specific construction impacts and mitigation requirements.
- (b) **A review process** must provide for further or alternative mitigation measures to be implemented as soon as practicable in response to monitoring results where non-compliance is identified and in accordance with the agreed outcomes of community consultation.
- (c) **Complaints** — as an extension of the consultation process, there must be a formal process for receiving and dealing quickly and effectively with complaints about CRM construction and operation issues. This process must be established before the commencement of construction works and should adopt a consultative and negotiated basis rather than an adversarial basis. The complaints procedure must be easy to use, with information about its implementation provided on the CRM webpage and through the visitors' information service. As a minimum, the complaints process must include the following elements:
  - (i) established in accordance with the *ICMM good practice guideline (Handling and Resolving Local Level Concerns and Grievances, October, 2009)* and the *MCA Enduring Value Guidance for Implementation (July, 2005)*
  - (ii) a protocol establishing the responsibility for receiving and addressing complaints, and the means of notifying the community of this protocol (e.g. publication of a complaints telephone service, webpage advice, and address for notices and other correspondence) prior to commencement of construction
  - (iii) establishment of a toll-free telephone line with a live operator (not a message service) that is open 7.00am-7.00pm 7 days a week during the construction phase of the CRM and 8.00am - 4.00pm Monday to Friday during the operation phase of the CRM. The aim of the hotline is to enable any member of the general public to reach a person who

can arrange appropriate response/corrective action to complaints within 48 business hours

- (iv) identification of the complainant, the identity of the person who received the complaint, the manner in which the complaint was made, the time and date on which the complaint was made, and the matter to which the complaint relates
  - (v) a process wherein, upon receipt of a complaint, an investigation commences forthwith into the cause of the complaint and where necessary mitigation is required, take any actions reasonably required to address the complaint. At least a verbal response on the action(s) to be taken is provided to the complainant within 48 business hours (unless the complainant agrees otherwise) and a detailed written response within ten business days of the receipt of the complaint. Information on all complaints received and response times shall be made available to the environmental management representative weekly
  - (vi) a database for tracking complaints, issues, the subject of complaints, responses and corrective actions taken
  - (vii) a means of reporting each complaint, such as a complaints register, must include identification of the entity responsible for addressing the complaint, the time and date on which the complaint was addressed and closed out, a brief summary of any action taken to address the complaint, and a notation as to the satisfaction or dissatisfaction of the complainant with the outcome
  - (viii) quarterly reporting of a summary of complaints as part of an overall performance and compliance report posted on the CRM webpage.
- (d) **Non-conformance** — A process for dealing with circumstances where Schedule 1 requirements are not met during CRM construction or operation activities must be established prior to the commencement of construction works. This process must establish a mechanism for reporting, taking corrective action where required, and indicating responsibilities and timing for such action.

## 10. Social Impact Management Plan (SIMP)

- (a) Within three months of advertising of the draft Environmental Authority (EA) for the CRM, the proponent must submit a draft Social Impact Management Plan (SIMP) consistent with the *Social Impact Assessment (SIA) Unit, DIP draft guidelines and template requirements (2010)*, for review by the Coordinator-General prior to release. The SIMP must include:
  - (i) a monitoring program for mitigation and management strategies designed to address social impacts
  - (ii) a Stakeholder Engagement Strategy (refer to Condition 6(a)(ii)) which contains a list of key stakeholders and describes their interest in the project, actions, outcomes and mechanisms, to support a regular review of the effectiveness of the stakeholder engagement strategy
  - (iii) a dispute resolution mechanism established in accordance with the *ICMM good practice guideline (Handling and Resolving Local Level Concerns and Grievances, October, 2009)* and the *MCA Enduring Value Guidance for Implementation (July, 2005)*.

### Specification for release of draft SIMP for consultation

- (b) With respect to the draft SIMP, the proponent must:
  - (i) prepare a consultation plan and consultation schedule to provide opportunities for input from key stakeholders to discuss actions to partner in delivery of the SIMP
  - (ii) provide opportunities for input to the draft SIMP from those who are most affected by the Caval Ridge Mine (CRM)



- (iii) take into consideration any increased demands and cumulative effects placed on stakeholders and the community to participate in consultative processes in the region
  - (iv) consult directly with State and local governments, in particular the Department of Communities and other relevant State government agencies identified in the draft SIMP; and all local governments affected by the CRM
  - (v) the abovementioned government entities shall be considered key stakeholders
  - (vi) record stakeholder feedback and provide a consultation report on outcomes of the release of the draft SIMP
  - (vii) discuss and seek agreement on the content of the draft SIMP including the key responsibilities, timeframes and resource implications for the local governments affected by the CRM.
- (c) After consultation with the Coordinator-General on the draft SIMP and not more than 6 months after commencement of construction of the CRM, the proponent must submit the final draft SIMP for the Coordinator-General's assessment and final approval.
  - (d) The proponent must not commence operation of the CRM unless a final SIMP has been approved by the Coordinator-General.
  - (e) The final SIMP must be implemented in conjunction with other social impact conditions specified in Schedule 1, Appendix 1 of the Coordinator-General's Report.

#### **SIMP Monitoring**

- (f) The proponent must develop a SIMP monitoring plan which includes the following components:
  - (i) list of impacts and issues to be monitored
  - (ii) targets and outcomes sought
  - (iii) a monitoring strategy, including how management of the impact will be monitored
  - (iv) responsibilities for implementation of each monitoring strategy
  - (v) timing and frequency of how often monitoring of the impact should take place
  - (vi) key performance indicators that are informative, relevant, measurable, useful, widely recognised, simple to report, and easily understood.

#### **SIMP reporting, review and auditing arrangements**

- (g) With respect to the SIMP, the proponent must:
  - (i) submit an annual progress report, on a date to be mutually agreed by the proponent and the SIA Unit of DIP
  - (ii) undertake an external audit:
    - A at the completion of the construction stage of the CRM
    - B periodically every three years after the commencement of the operational stage
    - C during the decommissioning phase of the CRM.
  - (iii) prepare and submit a report on each audit's findings to the Coordinator-General
  - (iv) all annual, periodical, and audit reports are to be submitted to the Coordinator-General within 60 days of completion of the relevant period.

- (h) The proponent may also elect to conduct additional internal reviews of the SIMP.

#### **Amendments and termination of the SIMP**

- (i) A SIMP may be altered, re-structured, re-scoped or terminated through agreement by both government and the proponent, following consultation with key stakeholders. Any proposal to terminate the SIMP must be formally agreed with the Coordinator General.
- (j) A process to facilitate any amendments must be identified and agreed by the proponent and the SIA unit of DIP. If necessary, the stakeholder engagement strategy undertaken by the Moranbah BCN (refer to Condition 6) should be updated to describe how stakeholders will be engaged in any change process at the time.
- (k) Should the proponent wish to amend or update the SIMP, it must advise the Coordinator-General which of the following circumstances apply:
  - (i) strategies and actions no longer meet the desired outcomes
  - (ii) need to improve effectiveness of strategies and actions
  - (iii) changes in government policy
  - (iv) significant changes to company operations or mine plan
  - (v) significant changes to national or international best-practice management approaches or frameworks.
- (l) A process to facilitate any amendments must be identified and agreed by the proponent and the SIA unit of DIP. If necessary, the stakeholder engagement strategy undertaken by the Moranbah BCN (refer to Condition 6(a)(ii)) should be updated to describe how stakeholders will be engaged in any change process at the time.

### **11. Proponent specific measures for managing social impact**

#### **SIMP initiative documents**

- (a) The proponent must:
  - (i) submit copies of the following BMA documents to the Coordinator-General for consideration before the release of the draft SIMP:
    - A Community Development Program
    - B Landmark Projects
    - C Skills for Growth
    - D CRM Local Site Initiatives
    - E Five Year Communities Strategy
    - F Workforce and Community Cohesion Strategy
    - G Indigenous Engagement Strategy for the CRM
    - H Final TOR for the Moranbah BCN
  - (ii) ensure that the documents in (i) are incorporated into the CRM SIMP submitted to the Coordinator-General for final approval.
  - (iii) Provide copies of the CRM Road Impact Assessment and CRM Road-Use Management Plan (RMP), submitted to or approved by TMR in accordance with Condition 15 Schedule 1, Appendix 1, to the Coordinator-General for consideration before the release of the draft SIMP.



### **Queensland Police Service (QPS) requirements**

- (b) The proponent must:
  - (i) engage constructively in consultation with QPS on:
    - A a road safety education campaign extending to all of the BMA communities
    - B a good order code of conduct for BMA controlled accommodation villages
    - C the development, implementation and monitoring of fatigue and journey management policies
    - D planning and responses associated with impacts of the CRM, including potential increased demand on police service delivery issues listed in section 5.11.5.1 of this Coordinator-General's report.
  - (ii) include collaborative strategies to monitor and address those matters in the CRM SIMP over which BMA has control.

### **Department of Community Safety (DCS) requirements**

- (c) The proponent must:
  - (i) complete a "*CRM Emergency Management Queensland Procedure*", which will include the disaster management plan, prior to construction work beginning on the CRM site and provide a copy to Emergency Management Queensland regional office
  - (ii) include strategies to monitor and review the Plan in (i) with the relevant parts of DCS.

### **Workforce management requirements**

- (d) The proponent must ensure that the *One-BMA* Standard regarding the behaviour of BMA employees and contractors and the proposed *Workforce and Community Cohesion Program*, which extends that consideration to employee and contractor interactions with the community, will be developed as part of *BMA Draft Five Year Communities Strategy for the Bowen Basin*, and the *BMA Diversity Strategy* and be incorporated into the CRM SIMP.

### **Indigenous engagement requirements**

- (e) The proponent must include its Indigenous Engagement Strategy and specific details about its commitment to Indigenous employment, business/enterprise, and training opportunities, including any school-based education, assistance and support programs, business/enterprise, and training opportunities in the SIMP.

## **12. Greenhouse gas emissions**

- (a) The proponent must develop and implement a 'Greenhouse Gas Management Plan in relation to the Scope 1 and Scope 2 emissions' of the CRM.
- (b) The plan in (a) must include, but not be limited to:
  - (i) The proponent's policy on greenhouse gas emissions
  - (ii) regular monitoring of emissions from the construction and operation phases of the CRM
  - (iii) an Energy Management Plan, incorporating the identification and evaluation of opportunities for continuous improvement in energy efficiency and emissions control
  - (iv) a fugitive gas management plan, incorporating the identification and evaluation of opportunities to reduce fugitive emissions of methane gas.

- (c) The plan in (a) must be submitted to the Coordinator-General for approval within three months of the granting of ML70403.

## **Part 2: Construction phase**

### **13. Mineral waste**

- (a) Prior to the EA for the CRM being granted, the proponent must provide DERM with:
- (i) sufficient evidence to justify the effectiveness and reliability of the proposed belt press filter technology (e.g. processing results from a statistically relevant sample of material that would be representative of the tailings to be produced at the CRM)
  - (ii) report the most recent results and analysis of the testing of the belt filter press pilot plant at the Peak Downs mine
- (b) If DERM is not satisfied that the evidence provided by the proponent in (a) adequately demonstrates that the proposed belt press filter will operate as DERM requires, then prior to the EA for the CRM being granted, the proponent must also provide DERM with sufficient evidence, in the form of design details, maps and associated documentation prepared by a suitably qualified and experienced person to establish to DERM's satisfaction the location, layout, design and capacity of a tailings storage facility that could accommodate tailings if the proposed belt filter press equipment produce cake with a shear strength of less than 1000 Pascals.

### **14. Accommodation**

#### **Construction workers living in Moranbah**

- (a) From the commencement of construction of the CRM, and then at 12-monthly intervals thereafter until the completion of construction of the CRM, the proponent must report to the Coordinator-General in the CRM SIMP the accommodation arrangements for the CRM construction workforce.
- (b) If at any point during the construction of the CRM the number of CRM construction workers, who are working full time and are not already residing in Moranbah whilst working on the project exceeds 12, then the proponent must provide new dwellings in Moranbah for those additional construction personnel and provide evidence of those dwellings in the SIMP reports required under (a).
- (c) Following completion of construction of the CRM, any new dwellings provided in Moranbah in accordance with (b) may be absorbed within BMA's broader accommodation program and reporting obligations on those dwellings shall cease.

#### **Assessment of new worker village proposals**

- (d) Assessment of any new accommodation village for the CRM should be undertaken in accordance with the existing Terms of Reference (TOR) for the BBCG project as part of the overall EIS process for this 'significant project' under Part 4 of the SDPWO Act.

#### **Provision of construction camp accommodation**

- (e) Notwithstanding the proponent's obligations under (b), the proponent must also endeavour to provide sufficient construction camp units at each stage of the CRM development to accommodate the CRM construction workforce at either the approved 'Denham Village' or at another location.

#### **Intersection of Denham Village access road and Moranbah Access Road**

- (f) With respect to the intersection of the 'Denham Village' access road with the Moranbah Access Road, the proponent must:



- (i) fund the full design, construction and maintenance costs of that intersection, and
- (ii) complete construction of that intersection upgrade within three months of commencement of use of the Denham Village site for accommodation purposes.

## 15. Traffic management

- (a) Within three months of appointing a construction contractor for the CRM, and no later than six months prior to the commencement of any significant construction works on the CRM, the proponent must, in consultation with the Manager of the Department of Transport and Main Roads (TMR) Mackay Regional Office and the Isaac Regional Council (IRC), undertake the following:
  - (i) Review and finalise a CRM **Road Impact Assessment** that includes details of all CRM transport impacts on the safety and efficiency of state-controlled roads in accordance with the *Department of Main Roads Guidelines for Assessment of Road Impacts of Developments (2006)* and the methodology outlined in the *Notes for Contribution Calculations* prepared by the former Department of Main Roads Central District.
  - (ii) Submit the Road Impact Assessment to the Manager of the TMR Mackay Regional Office for review and approval.
  - (iii) Prepare, for TMR approval and IRC consultation, a CRM **road-use management plan (RMP)** for all public roads for each phase of the CRM which includes:
    - A detailed projections of traffic volumes
    - B proposed transport routes and schedules
    - C required road pavement and other infrastructure maintenance and/or upgrades to mitigate road impacts
    - D proposals about access and/or connection to public roads
    - E dust control and road safety proposals (including driver fatigue management)
    - F arrangements to ensure compliance with the management of workforce movements, including strategies to ensure that bus patronage levels proposed in the EIS for transport of workers between the CRM and accommodation villages and between Mackay and the accommodation villages, are met within three years of commencement of operation of the CRM
    - G provision for the proponent, TMR and IRC to coordinate upgrading works at the Peak Downs Highway / Moranbah Access Road intersection to address the cumulative impacts of the BBCG project
    - H measures to be implemented by the proponent to limit workforce use of the Peak Downs Highway to those levels forecast in the CRM EIS and in the projections in A.
- (b) The proponent must implement the RMP approved by TMR.
- (c) Prior to the commencement of any construction work related to the CRM on State-Controlled Roads, the proponent must liaise with TMR Mackay Regional Office and must conclude a **State-Controlled Road Infrastructure Agreement (Number 1)** with TMR which includes:
  - (i) the provision by the proponent of a haul road, service road and conveyor underpass of the Peak Downs Highway prior to the commencement of operation of the CRM, including the vertical realignment of that section of the highway and the provision of a diversion road while the vertical realignment is being undertaken.
  - (ii) the provision by the proponent, within 12 months of commencement of construction of the CRM, of:

- A one intersection on the north side of the Peak Downs Highway, 3.6 kilometres southwest of the Winchester Road intersection, which provides access to the CRM site for the construction phase only (except for the delivery of oversize material during CRM operation) and
  - B one intersection on the south side of the Peak Downs Highway, 5.1 kilometres southwest of the Winchester Road intersection, which provides access to the CRM site for the construction phase only
- (iii) the provision by the proponent prior to the commencement of operation of the CRM, of one intersection on the south side of the Peak Downs Highway, approximately 5.8km southwest of the Winchester Road intersection, which provides operational phase access to the CRM
- (iv) the provision of a practical and safe stock route access to the Peak Downs Highway.
- (d) Prior to the commencement of operation of the CRM, the proponent must liaise with TMR Mackay Regional Office and must conclude a **State-Controlled Road Infrastructure Agreement (Number 2)** with TMR which includes:
  - (i) proponent-funded upgrades of the Moranbah Access Road and Winchester Road intersections with the Peak Downs Highway to include:
    - A 'seagull form' treatments at both intersections
    - B left turn channels on the Peak Downs Highway at the Moranbah Access Road, with extensions to the acceleration lanes that meet TMR requirements and
    - C any other necessary road maintenance and upgrades identified in the final RMP for these two intersections to ameliorate any adverse impacts of the road use by the CRM to the assets of TMR.
  - (ii) maintenance contributions associated with the CRM traffic as calculated in the Road Impact Assessment and agreed upon with the TMR Mackay Regional Office.
- (e) If the State-Controlled Road Infrastructure Agreements in (c) or (d) are not concluded within six months of submission of an advanced draft of those documents to TMR, the proponent or TMR may refer the matter to the Coordinator-General for mediation.
- (f) Prior to the commencement of construction of any construction work related to the CRM on local roads controlled within the Isaac Region, the proponent must conclude an **IRC Road Infrastructure Agreement** approved by the IRC which includes:
  - (i) within six months of commencement of construction, the provision by the proponent of an access road from the Moranbah Access Road to the Denham Village accommodation camp
  - (ii) within six months of commencement of construction, the provision by the proponent of an intersection on the west side of the Moranbah Access Road, which provides access to the Denham Village accommodation camp:
  - (iii) maintenance contributions associated with the CRM traffic as calculated and agreed upon with the IRC.
- (g) If the IRC Infrastructure Agreement is not concluded within two months of submission of the RMP to IRC for the CRM, the proponent or the IRC may refer the matter to the Coordinator-General for mediation.
- (h) Prior to the commencement of any construction works on public roads, the proponent must prepare detailed drawings and a Traffic Management Plan (TMP) for each construction activity in a public road corridor which:
  - (i) has taken account of reviews of drafts of these documents by TMR, the Queensland Police Service (QPS) and IRC





- (ii) incorporates a provision that, prior to commencement of any program of oversized transport movements that may be required for the construction of the project, the proponent will consult with TMR, QPS and IRC.
- (i) The proponent must implement each TMP during construction and commissioning of the CRM.
- (j) The proponent must consult with TMR, QPS and the IRC before obtaining the necessary permits for excess mass or over-dimension loads associated with the CRM as required under the *Transport Operations (Road Use Management) Act 1995*.

### **Part 3: Operation phase**

#### **16. Air quality**

- (a) If 'Option 2', Conditions B1-B11, Schedule 3, Appendix 1 apply, then the proponent must conduct a review after 24 months operation of the CRM in consultation with DERM, Queensland Health, the IRC, DEEDI and the Coordinator-General.
- (b) The terms of reference for the review in (a) must be approved by DERM and Queensland Health.
- (c) The review in (a) must aim to determine whether the approach is effectively managing air particulate emissions with respect to the 50 µg/m<sup>3</sup> goal for PM<sub>10</sub>.
- (d) The review in (a) must be submitted to DERM and Queensland Health within 28 months of commencement of operation of the CRM.
- (e) With reference to advice from DERM and Queensland Health, following its consideration of the review document, the Coordinator-General will decide whether:
  - (i) 'Option 2', Conditions B1-B11, Schedule 3, Appendix 1 continue to apply to the CRM without further formal review
  - (ii) 'Option 2', Conditions B1-B11, Schedule 3, Appendix 1 continue to apply to the CRM subject to further formal review(s) to be conducted according to a schedule specified by the Coordinator General, or
  - (iii) 'Option 2', Conditions B1-B11, Schedule 3, Appendix 1 is replaced with 'Option 1', Conditions B1-B7, Schedule 3, Appendix 1.
- (f) The principal consideration with respect to the Coordinator-General's decision under (e) will be adherence of the CRM with the objectives of the air particulate provisions of the EPP (Air).

#### **17. Cumulative impacts study**

The proponent must:

- (a) participate in the study of cumulative social impacts of mining in the Isaac Region local government area described in Recommendation 8, Schedule 5, Appendix 1 of this report
- (b) contribute information about all of its operations in the Isaac region
- (c) contribute \$150 000 to the cost of the study
- (d) collaborate with the state and local government agencies and other resource industry stakeholders in the study and in the development of cumulative social impact mitigation and management strategies in line with the findings of the study and the outcomes of the Whitsunday Hinterland and Mackay (WHAM) statutory plan
- (e) ensure that the CRM SIMP includes BMA's commitment to participate in the study.

## 18. Accommodation

### Worker accommodation

- (a) From the commencement of operation of the CRM, and then at yearly intervals for the following 20 years, the proponent must report to the Coordinator-General in the SIMP the accommodation arrangements for the CRM operational workforce, including the average number of workers residing in accommodation villages at the commencement of operation of the CRM and for each 12-month period thereafter.
- (b) The proponent must not accommodate more than approximately 70% of its total CRM operational workforce in operational accommodation village(s) or other fly-in-fly-out (FIFO), bus-in-bus-out (BIBO), drive-in-drive-out (DIDO) arrangements.
- (c) The proponent must provide new dwellings in the Isaac Region local government area to accommodate at least approximately 30% of the CRM operational personnel and their accompanying immediate family members.
- (d) The number of new dwellings required under (c) may be reduced for each CRM operational worker that has existing permanent accommodation within the Isaac Region local government area if that accommodation is owned by the proponent or the CRM worker, (and this should be documented in the SIMP).
- (e) Notwithstanding the proponent's obligations under (b)-(d), the proponent must also provide sufficient accommodation village units at each stage of the CRM development to accommodate at least 60 per cent of the CRM operational workforce.

### BBCG project housing impacts study

- (f) The proponent must engage the Office of Economic and Statistical Research (OESR) to undertake the "*BBCG Project Housing Impacts Study*" (including the CRM and Daunia Mine) which will provide an analysis of the impacts of each component of the BBCG project on the housing market in Moranbah or surrounding areas. This study must provide:
  - (i) detailed demographic analysis including:
    - A resident population estimates and age-sex population projections
    - B dwelling and household projections
    - C place of work / place of residence analysis
    - D customised statistical local area and locality-level profiles utilising unpublished data from the 2006 Census, as well as OESR's housing sales and rents databases
    - E housing and accommodation – housing tenure, dwelling stock, sales volumes and prices
  - (ii) housing demand and housing need by low and moderate income key workers
  - (iii) a description and analysis of BMA's current full suite of accommodation arrangements for all of its entire personnel (both direct employees and contractors engaged in all BMA business activities, including non-BBCG project activities) in the Whitsunday Hinterland and Mackay (WHAM) planning region, including existing and proposed FIFO/DIDO/BIBO arrangements
  - (iv) the likely impact of the BBCG project components on the housing market and on housing demand
  - (v) a description of the currently available options through the proponent for the provision of accommodation



- (vi) a framework which enables the proponent to develop a more detailed strategy for accommodating workers as well as for developing mitigation strategies in relation to housing impacts on non-resource key workers of each of the CRM project components.
- (g) The Terms of Reference for the study in (f) must be developed in consultation with the Moranbah BCN and approved by the Coordinator-General.
- (h) The report for the study in (f) must be presented to the Coordinator-General before the EA for the CRM is granted.
- (i) If the Coordinator-General determines that the final study report in (h) does not meet the Terms of Reference approved under (g), then the report must be subsequently amended and presented to the Coordinator-General for approval before the EA for the CRM is granted.
- (j) The results of the study in (f) must be made publicly available and be considered in future revisions of the CRM SIMP, with intellectual property rights of the data collected:
  - (i) shared between BMA and OESR for data supplied by BMA; and
  - (ii) retained by OESR for all other data.

### **BBCG Project Housing Impact Plan**

- (k) The results of the study in (f) must guide the proponent's development of a "*BBCG Project Housing Impact Plan*". Housing impact mitigation and management strategies included in the Plan must address the following issues:
  - (i) accommodation provision for the proponent's workforce that are not housed in any project specific worker accommodation by a range of means including (but not limited to) direct supply of housing/units and facilitating joint ventures for construction of dwellings
  - (ii) support for investment in non-resource worker housing
  - (iii) accommodation advice services for workers and families wishing to settle in the BBCG project area
  - (iv) specific recommendations on contributions to non-resource worker housing required to be made by the proponent to specifically mitigate the impacts of each of the BBCG project components
  - (v) monitoring of the effect of any provision of affordable non-resource worker housing,
  - (vi) proposed worker accommodation village, FIFO / DIDO / BIBO arrangements for all BBCG project components, and
  - (vii) a requirement for performance review of the success of the workforce housing supply elements of the Plan.
- (l) The Terms of Reference for the plan in (k) must be developed in consultation with the Moranbah BCN and approved by the Coordinator-General.
- (m) A final draft of the plan in (k) must be presented to the Moranbah BCN for review and input and the proponent must take into account any feedback on or suggested amendments to the plan provided by the BCN in the finalisation of the plan report.
- (n) The final draft of the plan in (k) must be presented to the Coordinator-General within four months of grant of the EA, unless otherwise agreed by the Coordinator-General.
- (o) If the Coordinator-General determines that the final draft of the plan presented under (n) does not meet the Terms of Reference approved under (l), then the report must be subsequently amended and presented to the Coordinator-General for approval within six months of the grant of the EA, unless otherwise agreed by the Coordinator-General.

- (p) Operation of the CRM cannot commence unless the Coordinator-General approves the final plan
- (q) Housing impact mitigation and management strategies recommended in the final plan approved by the Coordinator-General must be included in future revisions of the CRM SIMP.
- (r) The Coordinator-General may specify implementation of the recommended management strategies contained in the final plan to cover any or all of the components of the BBCG project in:
  - A the imposed conditions of the EIS Assessment Report for the Goonyella-Riverside Expansion component of the BBCG project; and/or
  - B any relevant Change Report for any component of the BBCG project prepared in accordance with section 35I of the SDPWO Act.

**Part 4: New conditions applicable to the Daunia Mine**—which arise from the cumulative impacts of BMA’s BBCG project

**19. Construction workers living in Moranbah or Nebo**

- (a) From the commencement of construction of the DM, and then at 12-monthly intervals thereafter until the completion of construction of the DM, the proponent must report to the Coordinator-General the accommodation arrangements for the Daunia Mine construction workforce.
- (b) If at any point during the construction of the Daunia Mine the number of Daunia Mine construction workers, who are working full time and are not already residing in the towns of Moranbah or Nebo whilst working on the project exceeds five, then the proponent must provide new dwellings in the towns of Moranbah or Nebo for those additional construction personnel and provide evidence of those dwellings in the reports required under (a).
- (c) Following completion of construction of the Daunia Mine, any new dwellings provided in Moranbah or Nebo in accordance with (b) may be absorbed within BMA’s broader accommodation program and reporting obligations on those dwellings shall cease.



## Schedule 2

### Jurisdiction for Coordinator-General's conditions

Condition number	Condition short title	Entity with jurisdiction	Consultative bodies
<b>Part 1: General conditions</b>			
Condition 1	General conditions	Coordinator-General (CG)	Department of Environment and Resource Management (DERM), Department of Employment, Economic Development and Innovation (DEEDI)
Condition 2	Mine water management	DERM	CG
Condition 3	Flora and Fauna	DERM	Commonwealth Department of Environment Water Heritage and the Arts (DEWHA)
Condition 4	Audit reports	CG	DERM, DEEDI, Isaac Regional Council (IRC), Department of Communities (DoC), Moranbah BMA Community Network (Moranbah BCN), Department of Transport and Main Roads (TMR)
Condition 5	General communication obligations	CG	IRC
Condition 6	Moranbah BCN	CG	IRC, DEEDI, Department of Infrastructure and Planning (DIP)
Condition 7	Community communication strategy	CG	IRC, Moranbah BCN
Condition 8	Environmental management representative	CG	DERM, IRC
Condition 9	Consultation, review, complaints and non-conformance	CG	DIP, IRC, Moranbah BCN
Condition 10	Social Impact Management Plan (SIMP)	CG	DIP, IRC, Moranbah BCN
Condition 11	Proponent specific measures for managing social impact		SIMP initiative documents: 11(a) - DIP, IRC, Moranbah BCN
			Queensland Police Service (QPS) requirements: 11(b) - QPS
			Department of Community Safety (DCS) requirements: 11(c) – DCS
			Workforce management requirements: 11(d) – DIP
Condition 12	Greenhouse gas emissions		Indigenous engagement requirements: 11(e) - DIP
			DERM

<b>Part 2: Construction phase</b>		
Condition 13	Mineral waste	DERM DEEDI
Condition 14	Accommodation	Construction workers living in Moranbah: 14(a)-(c) – DIP, IRC
		Assessment of new worker village proposals 14(d) – DIP, IRC Urban Land Development Authority (ULDA)
		Provision of construction camp accommodation 14(e) - IRC
Condition 15	Traffic management	Intersection of Denham Village access road and Moranbah Access Road 14(f) - nil
		IRC
		TMR for state controlled roads IRC for local roads
<b>Part 3: Operation phase</b>		
Condition 16	Air quality	DERM, Queensland Health, IRC, DEEDI, Moranbah BCN
Condition 17	Cumulative impacts study	IRC, Mackay Regional Council, Moranbah BCN
		Worker accommodation: 18(a)–(e) - IRC, Moranbah BCN
Condition 18	Accommodation	BBCG project housing impacts study: 18(f)-(j) - Office of Economic and Statistical Research (OESR) in Queensland Treasury, DIP, IRC, Moranbah BCN, ULDA, DoC
		BBCG project housing impacts plan: 18(k)-(p) – DIP, IRC, Moranbah BCN, ULDA, DoC and OESR,
		Conditions 18(q)-(r) - DIP, IRC, Moranbah BCN, ULDA and DoC
<b>Part 4: New conditions applicable to the Daunia Mine</b>		
Condition 19	Construction workers living in Moranbah or Nebo	CG DIP, IRC



## Schedule 3

### Stated conditions for mine environmental authorities under the *Environmental Protection Act 1994*

#### Departmental Interest: General environment

##### **A1 Financial assurance**

Provide a financial assurance in the amount and form required by the administering authority prior to the commencement of activities proposed under this environmental authority.

*Note: The calculation of financial assurance for condition (A1-1) must be in accordance with Guideline 17 and may include a performance discount. The amount is defined as the maximum total rehabilitation cost for complete rehabilitation of all disturbed areas, which may vary on an annual basis due to progressive rehabilitation. The amount required for the financial assurance must be the highest Total Rehabilitation Cost calculated for any year of the Plan of Operations and calculated using the formula: (Financial Assurance = Highest Total Annual Rehabilitation Cost x Percentage Required)*

##### **A2** The financial assurance is to remain in force until the administering authority is satisfied that no claim on the assurance is likely.

*Note: Where progressive rehabilitation is completed and acceptable to the administering authority, progressive reductions to the amount of financial assurance will be applicable where rehabilitation has been completed in accordance with the acceptance criteria defined within this environmental authority.*

##### **A3 Maintenance of measures, plant and equipment**

The environmental authority holder must ensure that:

- a) all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority are installed;
- b) such measures, plant and equipment are maintained in a proper condition; and
- c) such measures, plant and equipment are operated in a proper manner.

##### **A4 Monitoring**

Record, compile and keep for a minimum of five years all monitoring results required by this environmental authority and make available for inspection all or any of these records upon request by the administering authority.

##### **A5** Where monitoring is a requirement of this environmental authority, ensure that a competent person(s) conducts all monitoring.

**A6 Storage and handling of flammable and combustible materials**

Spillage of all flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm (other than trivial harm) and maintained in accordance with Section 5.8 of *AS 1940—Storage and Handling of Flammable and Combustible Liquids of 2004*.

**A7 Definitions**

Words and phrases used throughout the environmental authority are defined in the **Definitions** section at the end of the Environmental Authority. Where a definition for a term used in the environmental authority is sought and the term is not defined within the environmental authority, the definitions in the *Environmental Protection Act 1994*, its Regulations and Environmental Protection Policies must be used.

**A8 Notification of emergencies, incidents and exceptions**

All reasonable actions are to be taken to minimise environmental harm, or the risk thereof, resulting from any emergency, incident or circumstances not in accordance with the conditions of this environmental authority.

**A9** As soon as practicable after becoming aware of any emergency, incident or information about circumstances which result or may result in environmental harm not in accordance with the conditions of this environmental authority, the administering authority must be notified in writing.

**A10** Not more than ten (10) business days following the initial notification of an emergency, incident or information about circumstances which result or may result in environmental harm, written advice must be provided to the administering authority in relation to:

- a) proposed actions to prevent a recurrence of the emergency or incident;
- b) the outcomes of actions taken at the time to prevent or minimise environmental harm; and
- c) proposed actions to respond to the information about circumstances which result or may result in environmental harm.

**A11** As soon as practicable, but not more than six (6) weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident, which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority, written advice must be provided of the results of any such monitoring performed to the administering authority.

**Option 1 - Air conditions**

**Department Interest: Air**

**B1** When requested by the administering authority or as a result of a complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer), dust and particulate monitoring must be undertaken, and the results thereof notified to the





administering authority within **fourteen (14) days** following completion of monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place. Dust and particulate matter must not exceed the following levels when measured at any sensitive or commercial place:

- a) Dust deposition of 120 milligrams per square metre per day based on a monthly average, when monitored in accordance with Australian Standard AS 3580.10.1:2003 (or more recent editions); and
- b) A concentration of total particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with Australian/New Zealand Standard AS/NZS 3580.9.3:2003 (or the most recent editions); and
- c) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre ( $\mu\text{m}$ ) ( $\text{PM}_{10}$ ) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, at a sensitive or commercial place in proximity to the site, when monitored in accordance with:
  - i. Australian Standard AS 3580.9.6:2003 (or more recent editions) Ambient air - Particulate matter - Determination of suspended particulate  $\text{PM}_{10}$  high-volume sampler with size-selective inlet - Gravimetric method; or
  - ii. any alternative method of monitoring  $\text{PM}_{10}$  which may be permitted by the Air Quality Sampling Manual as published from time to time by the administering authority.

#### **Background dust and particulate matter monitoring**

- B2** The holder of the environmental authority must develop and implement a background dust and particulate matter monitoring program. The program must be able to detect a significant change to dust levels to sensitive receptors due to activities that are part of this mining project.
- B3** The program must include, but not be limited to, the details as specified in Table 1 – Background dust and particulate matter monitoring.
- B4** The holder of the environmental authority must report the results and analysis of dust and particulate matter monitoring to the administering authority on request.

**Table 1 (Background dust and particulate matter monitoring)**

Air quality determination	Monitoring point location (GDA94)	Monitoring point description
A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM <sub>10</sub> ) suspended in the atmosphere over a 24 hour averaging time	(To be provided by proponent)	(To be provided by proponent)
	(To be provided by proponent)	(To be provided by proponent)
Concentration of particulate matter suspended in the atmosphere in micrograms per cubic metre over a 24 hr averaging time	(To be provided by proponent)	(To be provided by proponent)
Deposited dust	(To be provided by proponent)	(To be provided by proponent)
Meteorological data (including but not limited to wind speed and direction, humidity, temperature and precipitation)	(To be provided by proponent)	(To be provided by proponent)
Siting of monitoring equipment	(To be provided by proponent)	(To be provided by proponent)

Note: *Details necessary to complete all tables to be provided by the proponent prior to issue of this Environmental Authority.*

### **Odour nuisance**

- B5** The release of noxious or offensive odour(s) or any other noxious or offensive airborne contaminant(s) resulting from the mining activity must not cause an environmental nuisance at any sensitive or commercial place.
- B6** When requested by the administering authority, odour monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within **fourteen (14)** days to the administering authority following completion of monitoring.
- B7** If the administering authority determines the odour released to constitute an environmental nuisance, then the environmental authority holder must:
- a) address the complaint including the use of appropriate dispute resolution if required; and
  - b) immediately implement odour abatement measures so that emissions of odour from the activity do not result in further environmental nuisance.

### **Option 2 - Air conditions**

#### **Department Interest: Air**

- B1** The release of noxious or offensive odours, or any other noxious or offensive airborne contaminants resulting from the activities to which this environmental authority relates, must not cause a nuisance at any sensitive or commercial place.



- B2** The holder must implement and maintain best practice environmental management dust control procedures that incorporate a program for continuous improvement for the management of dust resulting from the mining activities with respect to, but not limited to equipment selection, mine planning, engineering design and operation, and staff training.
- B3** Dust generated by the mining activities must not cause any of the following air quality objectives to be exceeded at a sensitive or commercial place:
- a) a level of deposited dust of 120 milligrams per square metre per day based on a monthly average, and
  - b) a concentration of total particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time.
- B4** The holder must take all reasonable and practical measures to limit the concentration of particulate matter generated by the mining activities with an aerodynamic diameter of less than 10 micrometres (PM<sub>10</sub>), to 50 micrograms per cubic metre (50 µg/m<sup>3</sup>) suspended in the atmosphere over a 24 hour averaging time with not more than 5 exceedences recorded over 12 months at any sensitive or commercial place.

#### **Dust and particulate matter monitoring, control and reporting**

- B5** The holder of the environmental authority must develop and implement a dust and particulate matter monitoring and control program.
- B6** The program must include:
- a) the collection of air quality and meteorological data at locations specified in Table B1b and using the combination of monitoring methods described in Table B1a specified by the administering authority for each of the locations and included in the Plan of Operations for operational activities,
  - b) a system to identify adverse meteorological conditions likely to produce elevated levels of PM<sub>10</sub> at a sensitive or commercial place due to the mining activities, and
  - c) a dust control strategy that would activate the timely implementation of high management dust control actions (listed in Table B2 Dust and particulate control action options) in addition to the best practice environmental management dust control measures during periods identified in (b).
- B7** The dust and particulate matter monitoring and control program must be submitted to the administering authority with the Plan of Operations for operational activities.
- B8** Where monitoring identifies instances where the concentration specified in Condition B4 is exceeded, the holder should report to the administering authority within 14 days:
- a) the concentration of PM<sub>10</sub> particulates at the sensitive or commercial site

- b) a description of meteorological conditions recorded in accordance with Table B1a (Dust and particulate matter monitoring) occurring at the time
- c) the concentration of PM<sub>10</sub> particulates upwind of the mining activities (if known), and
- d) measures taken to reduce dust generated by the mining activities.

**B9** Notwithstanding condition B6, if requested by the administering authority, dust and particulate monitoring must be undertaken for a stated period at a specified sensitive or commercial place, and the results provided to the administering authority within **fourteen (14)** days following completion of monitoring.

**B10** If the monitoring required by condition B9 is undertaken for over one month, then monthly interim reports should be provided to the administering authority.

**B11** The holder of the environmental authority must report annually to the administering authority:

- a) the results and an analysis of dust and particulate matter monitoring, including consideration of the relevant meteorological data
- b) details of the use of high management control measures including the dust and atmospheric conditions that triggered the action, when, where and what action was applied, and the effectiveness of the action meeting the requirements of conditions B3 and B4
- c) identification of any trends that should be considered in management of the mining activities and dust management practices, and
- d) any changes to the dust and particulate control actions and monitoring resulting from an analysis of (a), (b) and (c).



**Table B1a Dust and particulate matter monitoring**

<b>Air quality determination</b>	<b>Monitoring method to be used</b>
Concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre ( $\mu\text{m}$ ) ( $\text{PM}_{10}$ ) suspended in the atmosphere over a 24 hour averaging time	Real-time monitoring of the 24 hour average. Australian Standard AS 3580.9.8:2008 <i>Determination of suspended <math>\text{PM}_{10}</math> continuous direct mass method using a tapered element oscillating microbalance analyser</i> (or the most recent version), or any alternative method of monitoring $\text{PM}_{10}$ that may be permitted by the Air Quality Sampling Manual as published from time to time by the administering authority.
Concentration of particulate matter suspended in the atmosphere in micrograms per cubic metre over a 24 hr averaging time	AS/NZS 3580.9.3:2003 <i>Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method</i> (or the most recent version)
Deposited dust	Australian Standard AS 3580.10.1:2003 (or the most recent version);
Meteorological data (including but not limited to wind speed and direction, humidity, temperature and precipitation)	AS 2923:1987: <i>Guideline for measurement of horizontal wind for air quality applications</i> or as approved by the administering authority.
Siting of monitoring equipment	AS/NZS 3580.1.1:2007 Guide to siting air monitoring equipment

**Table B1b Dust and particulate matter monitoring locations**

<b>Monitoring location</b>	<b>Receiving area on the receiving areas plan</b>	<b>Relevant upwind location</b>	<b>Monitoring point location (GDA94)</b>	<b>Monitoring point description</b>
(To be provided by proponent)	(To be provided by proponent)	(To be provided by proponent)	(To be provided by proponent)	(To be provided by proponent)
(To be provided by proponent)	(To be provided by proponent)	(To be provided by proponent)	(To be provided by proponent)	(To be provided by proponent)

Note: Details necessary to complete all tables to be provided by the proponent prior to notification of the draft Environmental Authority.

**Table B2 Dust and particulate control actions**

<b>Activity options</b>	<b>High management control actions</b>
Dragline operations - overburden	(To be provided by proponent)
Bulldozing of overburden	(To be provided by proponent)
Truck dumping of overburden	(To be provided by proponent)
ROM - erosion active stockpile	(To be provided by proponent)
Blasting - coal and overburden	(To be provided by proponent)
Drilling of overburden	(To be provided by proponent)
Haul roads management	(To be provided by proponent)
Grader	(To be provided by proponent)

Note: Final response activity controls to be developed in consultation with the proponent prior to the notification of the draft Environmental Authority.

**Department Interest: Water**

**W1 Contaminant release**

Contaminants that will or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under the conditions of this environmental authority.

**W2** The release of contaminants to waters must only occur from the release points specified in Table W1 and depicted in Figure 1 attached to this environmental authority.

**Table W1 (Contaminant Release Points, Sources and Receiving Waters)**

<b>Release point (RP)</b>	<b>Longitude (GDA94)</b>	<b>Latitude (GDA94)</b>	<b>Contaminant source and location</b>	<b>Monitoring point</b>	<b>Receiving waters description</b>
Discharge Point 1	612072*	7550199	12N Dam	Discharge Point	Cherwell Creek

Note (\*) location to be confirmed after detailed design of the dam outlet

**W3** The release of contaminants to waters must not exceed the release limits stated in Table W2 when measured at the monitoring points specified in Table W1 for each quality characteristic.



**Table W2 (Contaminant release limits)**

<b>Quality characteristic</b>	<b>Release limits</b>	<b>Monitoring frequency</b>
Electrical conductivity ( $\mu\text{S/cm}$ )	1000	Daily during release (the first sample must be taken within 2 hours of commencement of release)
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)
Turbidity (NTU)	NA*	Daily during release* (first sample within 2 hours of commencement of release)
Suspended Solids (mg/L)	200	Daily during release* (first sample within 2 hours of commencement of release)
Sulfate ( $\text{SO}_4^{2-}$ ) (mg/L)	1000	Daily during release* (first sample within 2 hours of commencement of release)

*Note NA – not available, \* local trigger values need to be developed*

- W4** The release of contaminants to waters from the release points must be monitored at the locations specified in Table W1 for each quality characteristics and at the frequency specified in Table W2 and Table W3.

**Table W3 (Release contaminant trigger investigation levels)**

Quality characteristic	Trigger levels (µg/L)	Comment on trigger level	Monitoring frequency
Aluminium	55	<i>For aquatic ecosystem protection, based on LOR for ICPMS</i>	Commencement of release and thereafter weekly during release
Arsenic	13	<i>For aquatic ecosystem protection, based on SMD guideline</i>	
Cadmium	0.2	<i>For aquatic ecosystem protection, based on SMD guideline</i>	
Chromium	1	<i>For aquatic ecosystem protection, based on SMD guideline</i>	
Copper	2	<i>For aquatic ecosystem protection, based on LOR for ICPMS</i>	
Iron	300	<i>For aquatic ecosystem protection, based on low reliability guideline</i>	
Lead	10	<i>For aquatic ecosystem protection, based on LOR for ICPMS</i>	
Mercury	0.2	<i>For aquatic ecosystem protection, based on LOR for CV FIMS</i>	
Nickel	11	<i>For aquatic ecosystem protection, based on SMD guideline</i>	
Zinc	8	<i>For aquatic ecosystem protection, based on SMD guideline</i>	
Boron	370	<i>For aquatic ecosystem protection, based on SMD guideline</i>	
Cobalt	90	<i>For aquatic ecosystem protection, based on low reliability guideline</i>	
Manganese	1900	<i>For aquatic ecosystem protection, based on SMD guideline</i>	
Molybdenum	34	<i>For aquatic ecosystem protection, based on low reliability guideline</i>	
Selenium	10	<i>For aquatic ecosystem protection, based on LOR for ICPMS</i>	
Silver	1	<i>For aquatic ecosystem protection, based on LOR for ICPMS</i>	
Uranium	1	<i>For aquatic ecosystem protection, based on LOR for ICPMS</i>	
Vanadium	10	<i>For aquatic ecosystem protection, based on LOR for ICPMS</i>	
Ammonia	900	<i>For aquatic ecosystem protection, based on SMD guideline</i>	
Nitrate	1100	<i>For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN</i>	
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000	<i>Protection of livestock and short term irrigation guideline</i>	

**Note:**

1. All metal and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
2. The list of quality characteristics required to be monitored as per table W3 will be reviewed once the results of the monitoring data is gathered for the interim period until 31 December 2011 or an earlier date if the data is, or becomes, available and if it is determined that there is no need to monitor for certain individual characteristics these can be removed from Table W3.
3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC and ARMCANZ (2000)
4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.



**W5**

If quality characteristics of the release exceed any of the trigger levels specified in Table W3 during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in Table W3 and:

1. where the trigger values are not exceeded then no action is to be taken, or
2. where the downstream results exceed the trigger values specified in Table 3 for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and
  - a) if the result is less than the background monitoring site data, then no action is to be taken, or
  - b) if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMICANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
    - (i) details of the investigations carried out, and
    - (ii) actions taken to prevent environmental harm.

*Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W5(2)(b)(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.*

**W6** If an exceedance in accordance with condition W5(2)(b) is identified, the environmental authority holder must notify the administering authority within fourteen (14) days of receiving the result.

**W7 Contaminant release events**

The environmental authority holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations upstream of each Release Point as specified in Table W4 for any receiving water into which a release occurs.

**W8** Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table W4 for the contaminant release point(s) specified in Table W1.

**Table W4 (Contaminant Release during Flow Events)**

Receiving water description	Release point	Gauging station description	Longitude (GDA94)	Latitude (GDA94)	Minimum flow in receiving water required for a release event	Flow recording frequency
Upstream Cherwell Creek	12N Dam	Upper Cherwell Creek	609610	7547809	≥0.5m <sup>3</sup> /s	Daily during discharge

**W9** Contaminant release flow rate must not exceed **20%** of receiving water flow rate.

**W10** The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table W1.

**W11** Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

**W12 Notification of release event**

The environmental authority holder must notify the administering authority as soon as practicable (no later than **six (6) hours** of having commenced releasing mine affected water to the receiving environment). Notification must include the submission of written verification to the administering authority of the following information:

- a) release commencement date/time
- b) expected release cessation date/time
- c) release point/s
- d) release volume (estimated)
- e) receiving water/s including the natural flow rate, and
- f) any details (including available data) regarding likely impacts on the receiving water(s).

*Note: Notification to the administering authority must be addressed to the Manager and Project Manager of the local administering authority via email or facsimile.*

**W13** The environmental authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours after of cessation of a release) of the cessation of a release notified under condition W12 and within twenty-eight (28) days provide the following information in writing:

- a) release cessation date/time
- b) natural flow volume in receiving water
- c) volume of water released
- d) details regarding the compliance of the release with the conditions of Department Interest:  
Water of this environmental authority (i.e. contamination limits, natural flow, discharge volume)
- e) all in-situ water quality monitoring results, and
- f) any other matters pertinent to the water release event.

**W14 Notification of release event exceedance**

If the release limits defined in Table W2 are exceeded, the environmental authority holder must notify the administering authority within twenty-four (24) hours of receiving the results.

**W15** The environmental authority holder must, within twenty-eight (28) days of a release that exceeds the conditions of this authority, provide a report to the administering authority detailing:

- a) the reason for the release
- b) the location of the release
- c) all water quality monitoring results
- d) any general observations
- e) all calculations, and



f) any other matters pertinent to the water release event.

**W16 Monitoring of water storage quality**

Water storages stated in Table W5, which are associated with the release points, must be monitored for the water quality characteristics specified in Table W6 at the monitoring locations and at the monitoring frequency specified in Table W5.

**Table W5 (Water storage monitoring)**

<b>Water storage description</b>	<b>Longitude (GDA94)<sup>(*)</sup></b>	<b>Latitude (GDA94)<sup>(*)</sup></b>	<b>Monitoring location<sup>(*)</sup></b>	<b>Frequency of monitoring<sup>(*)</sup></b>
12N Dam			Discharge Point 1	Monthly
Sed Dam N3				
Sed Dam N2				
Sed Dam N1				
Sed Dam S3				
Sed Dam S2				
Sed Dam S1				
Catchment Dam North				
Catchment Dam South				
Mine Water Dam N3				
Mine Water Dam N2				
Mine Water Dam N1				
Mine Water Dam S1				
Mine Water Dam 5				
Mine Water Dam 4				
Mine Water Dam 4a				
Mine Water Dam 3				
Mine Water Dam 2				
Mine Water Dam 1				

Note (\*) Water monitoring locations and frequency to be provided by proponent.



**W17** In the event that water storages defined in Table W5 exceed the contaminant limits defined in Table W6, the environmental authority holder must implement measures to prevent access to waters by all livestock.

**Table W6 (Onsite water storage contaminant limits)**

Quality characteristic	Test value	Contaminant limit
pH (pH unit)	Range	Greater than 4, less than 9 <sup>2</sup>
EC (µS/cm)	Maximum	5970 <sup>1</sup>
Sulfate (mg/L)	Maximum	1000 <sup>1</sup>
Fluoride (mg/L)	Maximum	2 <sup>1</sup>
Aluminium (mg/L)	Maximum	5 <sup>1</sup>
Arsenic (mg/L)	Maximum	0.5 <sup>1</sup>
Cadmium (mg/L)	Maximum	0.01 <sup>1</sup>
Cobalt (mg/L)	Maximum	1 <sup>1</sup>
Copper (mg/L)	Maximum	1 <sup>1</sup>
Lead (mg/L)	Maximum	0.1 <sup>1</sup>
Nickel (mg/L)	Maximum	1 <sup>1</sup>
Zinc (mg/L)	Maximum	20 <sup>1</sup>

Notes: <sup>1</sup>Contaminant limit based on ANZECC and ARMCANZ (2000) stock water quality guidelines;

<sup>2</sup> Page 4.2-15 of ANZECC and ARMCANZ (2000) 'Soil and animal health will not generally be affected by water with pH in the range of 4-9'

<sup>3</sup>Total measurements (unfiltered) must be taken and analysed

**W18 Receiving environment monitoring and contaminant trigger levels**

The quality of the receiving waters must be monitored at the locations specified in Table W8 for each quality characteristic and at the monitoring frequency stated in Table W7.

**Table W7 (Receiving waters contaminant trigger levels)**

Quality characteristic	Trigger level	Monitoring frequency
pH	6.5 – 8.0	Daily during the release
Electrical Conductivity (µS/cm)	1000	
Suspended solids (mg/L)	N/A	
Sulfate (SO <sub>4</sub> <sup>2-</sup> ) (mg/L)	1000 (Protection of irrigation value)	

Note N/A denotes local trigger value to be determined by the proponent based on 80 percentile of upstream reference site.

**Table W8 (Receiving water upstream background sites and down stream monitoring points)**

Monitoring points	Receiving waters location description	Latitude (GDA94)	Longitude (GDA94)	Monitoring frequency
<b>Upstream background monitoring points</b>				
Upstream Cherwell Creek	Cherwell Creek at upstream gauging station	609610	7547809	Daily during controlled releases from 12N Dam and Daily during natural flow event in Cherwell Creek
Upstream of Horse Creek Diversion	Upstream of Horse Creek Diversion	To be provided by proponent	To be provided by proponent	Daily during natural flow event in Horse Creek Diversion
Upstream Harrow Creek	Harrow Creek upstream of Peak Downs Mine 10 North Dam	614412	7543440	Daily during natural flow event in Harrow Creek
<b>Downstream monitoring points</b>				
Downstream Cherwell Creek	Cherwell Creek at downstream gauging station	612309	7550588	Daily during controlled releases from 12N Dam and Daily during natural flow event in Cherwell Creek
Downstream Horse Creek	Downstream Horse Creek	609846	7560358	Daily during natural flow event in Horse Creek Diversion
Downstream Harrow Creek	Downstream Harrow Creek	616815	7547919	Daily during natural flow event in Harrow Creek

**W19** If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table W7 during a release event, the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and:

1. where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken, or
2. where the downstream results exceed the upstream results, complete an investigation in accordance with the ANZECC & ARM CANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
  - (i) details of the investigations carried out, and
  - (ii) actions taken to prevent environmental harm.

*Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W19(2)(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.*



## W20 Receiving Environment Monitoring Program (REMP)

A REMP must be implemented by **(3 months from the date of issue)** to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the site, with the aims of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water.

For the purposes of the REMP, the receiving environment is the waters of the Cherwell Creek and connected waterways within **ten (10) kilometres** downstream of the release.

**W21** The REMP report must address (but not necessarily be limited to) the following:

- a) description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality)
- b) description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the *Environmental Protection (Water) Policy 2009*)
- c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed
- d) water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP
- e) monitoring for any potential adverse environmental impacts caused by the release
- f) monitoring of stream flow and hydrology
- g) monitoring of toxicants should consider the indicators specified in Table W3 to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ (2000) guidelines for slightly to moderately disturbed ecosystems
- h) monitoring of physical chemical parameters specified in Table W2 (Contaminant Release Limits) and dissolved oxygen saturation and temperature
- i) monitoring biological indicators (for macroinvertebrates in accordance with the AusRivas methodology) and metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ (2000), BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*) for permanent, semi-permanent water holes and water storages
- j) the locations of monitoring points (including the locations specified in Table W8 which are background and downstream impacted sites for each release point)
- k) the frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within two (2) years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines 2009*. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges
- l) specify sampling and analysis methods and quality assurance and control
- m) any historical datasets to be relied upon

- n) description of the statistical basis on which conclusions are drawn, and
- o) any spatial and temporal controls to exclude potential confounding factors.

**W22** The REMP report must be prepared and submitted in writing to the administering authority by **(date to be negotiated)**.

**W23 Water Reuse**

Water contaminated by mining activity may be piped or trucked or transferred by some other means that does not contravene the conditions of this authority during periods of dry weather for the purpose of supplying stock water to properties directly adjoining properties owned by the environmental authority holder or a third party and subject to compliance with the quality release limits specified in Table W9.

**Table W9 (Stock water release limits)**

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	5000

*Note: Any additional parameter by third party agreement*

**W24** Water contaminated by mining activity may be piped or trucked or transferred by some other means that does not contravene the conditions of this authority during periods of dry weather for the purpose of supplying irrigation water to properties directly adjoining properties owned by the environmental authority holder or a third party and subject to compliance with quality release limits in Table W10.

**Table W10 (Irrigation water release limits)**

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	Site specific value to be determined in accordance with ANZECC & ARM CANZ (2000) Irrigation Guidelines and provided through an amendment process

*Note: Any additional parameter by third party agreement*

**W25** Water contaminated by mining activity may be piped or trucked off the mining lease for the purpose of supplying water to a third party for purpose of construction and/or road maintenance in accordance with the conditions of this environmental authority.





**W26** Water contaminated by mining activity may be piped or trucked for the purpose of supplying water to Peak Downs Mine in accordance with the conditions of this environmental authority. The volume, pH and electrical conductivity of water transferred to Peak Downs Mine must be monitored and recorded.

**W27** If the responsibility of water contaminated by mining activities (the water) is given or transferred to another person in accordance with conditions W23, W24, W25 or W26:

- a) the responsibility of the water must only be given or transferred in accordance with a written agreement (the third party agreement), and
- b) include in the third party agreement a commitment from the person utilising the water to use water in such a way as to prevent environmental harm or public health incidences and specifically make the persons aware of the General Environmental Duty (GED) under section 319 of the *Environmental Protection Act 1994*, environmental sustainability of the water disposal and protection of environmental values of waters.

**W28 Water General**

All determinations of water quality must be:

- a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements
- b) made in accordance with methods prescribed in the latest edition of the administering authority's *Water Quality Sampling Manual*

*Note: Condition W28 requires the Water Quality Manual to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.*

- c) collected from the monitoring locations identified within this environmental authority, within ten (10) hours of each other where possible
- d) carried out on representative samples, and
- e) laboratory testing must be undertaken using a laboratory accredited (e.g NATA) for the method of analysis being used.

**W29** The release of contaminants directly or indirectly to waters:

- a) must not produce any visible discolouration of receiving waters, and
- b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

**W30 Annual Water Monitoring Reporting**

The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each annual return:

- a) the date on which the sample was taken
- b) the time at which the sample was taken
- c) the monitoring point at which the sample was taken
- d) the measured or estimated daily quantity of the contaminants released from all release points
- e) the release flow rate at the time of sampling for each release point
- f) the results of all monitoring and details of any exceedances with the conditions of this environmental authority, and
- g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

**W31 Temporary Interference with waterways**

Temporarily destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with the administering authority's *Guideline - Activities in a Watercourse, Lake or Spring associated with Mining Activities*.

**W32 Water Management Plan**

A Water Management Plan must be developed and implemented by **(3 months from the date of issue)** that provides for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity and to ensure compliance with the conditions of this environmental authority.

**W33** The Water Management Plan must be developed in accordance with the administering authority's *Guideline for Preparation of Water Management Plans for Mining Activities 2009* or any updates that become available from time to time and must include at least the following components:

- a) Contaminant Source Study
- b) Site Water Balance and Model
- c) Water Management System
- d) Saline Drainage Prevention and Management Measures
- e) Acid Rock Drainage Prevention and Management Measures (if applicable)
- f) Emergency and Contingency Planning, and
- g) Monitoring and Review.

**W34** Each year the environmental authority holder must undertake a review of the Water Management Plan prior to the wet season (i.e. by 1 November) and a further review following the wet season (i.e. by 1 May the following year) to ensure that proper and effective measures, practices or



procedures are in place so that the mine is operated in accordance with the conditions of this environmental authority and that environmental harm is prevented or minimised.

**W35** A copy of the Water Management Plan and/or a review of the Water Management Plan must be provided to the administering authority on request.

**W36 Saline Drainage**

The environmental authority holder must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of saline drainage.

**W37 Acid Rock Drainage**

The environmental authority holder must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of acid rock drainage.

**W38 Stormwater and Water sediment controls**

An Erosion and Sediment Control Plan must be developed by a suitably qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to water and contamination of storm water.

**W39** The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any waters without appropriate treatment.

**W40** Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or waters.

**W41 Fitzroy River Basin Study**

The administering authority and the environmental authority holder both acknowledge that the conditions for release of contaminants to the Isaac River in this environmental authority have been calculated without the benefit of the findings of projects proposed to be undertaken as per recommendations 2 and 3 of the *Study of cumulative impacts on water quality of mining activities in the Fitzroy River Basin* (April 2009). The administering authority may, based on the information provided in the study report when it becomes available, all relevant information available at the time and the regulatory framework applicable at that time, consult with the environmental authority holder about the conditions in the environmental authority concerning the treatment and disposal of waste water.

The aim of the consultation shall be the meaningful review of the contaminant release limits imposed in this authority having regard to:

- a) the study results
- b) near field monitoring results
- c) QLD Water Quality Guidelines, and

d) best practice environmental management.

If this review leads to a change in the requirements on this environmental authority holder, this shall be advanced by way of an authority amendment or a Transitional Environmental Program and as is necessary or desirable.

**W42 Stream sediment contaminant levels**

All reasonable and practicable erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the movement of sediment, including:

- a) all clean waters, from undisturbed areas, kept separate from dirty waters from disturbed areas
- b) water from disturbed catchments diverted into the mine water management system and sedimentation dams
- c) new sedimentation dams designed to capture the sediment volume calculated for the catchment area for a 24 hour 10 year annual recurrence interval (ARI) storm event, and
- d) sediment shall be excavated from sediment dams as required to maintain design capacity.

**W43 Interfering with waterways**

The environmental authority holder is permitted to destroy vegetation, excavate and fill watercourses to establish temporary crossings when there is no flow. Works shall remain in place for no longer than four (4) weeks.

**W44 Mine Water Management System (MWMS)**

The environmental authority holder must prepare, to the satisfaction of the administering authority, an integrated mine water management system (MWMS) which shall as a minimum address:

- a) runoff from all mine areas and catchments draining into the MWMS, including runoff into mine pits;
- b) transfer of mine water between storages;
- c) mine water demands, including the reuse of mine water in plant operations and dust suppression;
- d) all mine water process inputs and losses, including evaporation losses and losses or recycling of extracted water from belt filter press;
- e) water quality;
- f) design storage allowance for the adequate containment of contaminated runoff and pump-out of pits during wet seasons;
- g) controlled discharges to remain compliant with all environmental authority conditions;
- h) uncontrolled discharges from the MWMS to the receiving environment; and
- i) annual updating of the water balance model with mine monitoring data including:
  - I. rainfall;
  - II. actual dam volumes;
  - III. raw water demand;
  - IV. water quality;
  - V. actual storage capacity of dams;



- VI. mine water transfer operations;
- VII. controlled releases; and
- VIII. quality and quantity of uncontrolled releases.

- W45** The holder of the environmental authority must ensure that the probability of an uncontrolled discharge from any dam listed in Table W5 is limited to the AEP probabilities specified in Table G3. The probability of uncontrolled discharges must be managed by ensuring adequate design storage capacity, transfer capacity, and operations, and contingency measures of the integrated mine water management system (MWMS).
- W46** The environmental authority holder must develop, calibrate, and maintain a complete mine water balance model (with coupled contaminant balance model) that adequately represents all sources of mine water contributing to all dams that comprise the integrated mine water system, mine pits, and operations of the MWMS including controlled releases (where applicable). All key assumptions and input parameters of the mine water balance model must be documented and be available for auditing.
- W47** The environmental authority holder must undertake system risk failure assessments on the MWMS and submit to the administering authority system failure contingency plans which ensure that:
- a) there is no increase in the frequency of uncontrolled discharges from the storage components of the MWMS, and
  - b) controlled discharges remain compliant with all environmental authority conditions.
- W48** All key assumptions for mine water operations in the mine water balance model must be documented in Standard Operating Procedures and the MWMS must be operated in accordance with the procedures.
- W49** Assessments utilising the mine water balance model to evaluate water management system capacity and operations in response to rainfall must be undertaken by competent personnel.
- W50** The environmental authority holder must implement and maintain monitoring of actual mine water quantity and quality within the mine water management system to demonstrate, and continually improve the mine water balance model calibration.
- W51** On 1 November each year, the environmental authority holder shall review the mine catchments, storage capacity, current storage volumes, system transfer capacity, and Standard Operating Procedures of all key infrastructure elements of the mine water management system and update the mine water balance model. An assessment of the mine water balance model must be undertaken to ensure that the mine water management system has sufficient storage capacity,

transfer capacity, and transfer operations to ensure that the frequency of uncontrolled discharges of mine water is less than or equal to the specified AEP in Table G3.

The assessment must be undertaken with an appropriate period of climate data that includes representation of wet season rainfall events up to the AEP specified in Table G3. The assessment results must be documented and be available for auditing.

- W52** The environmental authority holder must notify the administering authority within fourteen (14) days, if the assessment of the mine water management system shows that probability of uncontrolled discharge from any dam within the integrated mine water system is greater than the specified AEP in Table G3.
- W53** In the event of failure of any component, or series of components, of the mine water management system, The holder of the environmental authority must utilise the mine water balance model to reassess the performance of the mine water management system in its failed state, and notify the administering authority if the assessment of the mine water management system shows that the probability of uncontrolled discharge would be greater than the AEP specified in Table G3.
- W54** Notwithstanding the provisions for *Mandatory Report Levels in Department Interest: Dams*, the environmental authority holder must not allow any uncontrolled discharge to be caused by either failure to:
- a) stop transferring water to a dam where the transfer into that dam contributes in part, or full, to the overflow (uncontrolled discharge) of that dam, or
  - b) start and continue transferring water from a mine water dam, where the Standard Operation Procedures require the water transfer from the dam to prevent overflow (uncontrolled discharges).
- W55** **Monitoring and Reporting in the event of uncontrolled release**
- In the event of an uncontrolled release from any component of the integrated mine water system to the receiving environment, the environmental authority holder shall:
- a) sample and monitor the uncontrolled release waters during or as immediately practical after the event (recognising that uncontrolled discharges should only occur during extreme rainfall and site may not be accessible) to determine quality characteristics of the uncontrolled release for parameters specified in Table W2, and Table W3.
  - b) sample and monitor the receiving environment monitoring sites listed in Table W8 for sites relevant to the uncontrolled release location.
  - c) estimate the quantity of uncontrolled release waters, by a suitably qualified and experienced person.
  - d) provide a written report to the administering authority within fourteen (14) days of the uncontrolled release event, which shall include as a minimum:
    - i. the time and dates of the uncontrolled release event



- ii. the location of the uncontrolled release
- iii. the monitoring quality of the uncontrolled release waters, or if not available due to site access constraints in wet weather during the event, the quality of waters in the dam that contributed to the uncontrolled release before the event (from monitoring undertaken as part of condition W16) and quality in that dam after the release events
- iv. the estimated quantity of uncontrolled release
- v. downstream receiving water monitoring results
- vi. rainfall during, or that contributed to, the uncontrolled release event and dam levels prior to the rainfall event that caused uncontrolled release
- vii. a determination of whether uncontrolled release was solely caused by rainfall exceeding the design AEP events specified in Table G3
- viii. a determination of whether the uncontrolled release was caused in part of fully by failure to operate the integrated mine water system in accordance with Standard Operating Procedures for the integrated mine water system, or physical failure of one or more components of the integrated mine water system
- ix. a determination of whether the uncontrolled release caused environmental harm, and
- x. if determined that the uncontrolled release could have been reasonably prevented, actions that will be taken to ensure uncontrolled releases comply in all respects with this environmental authority.

**W56 Sewage Treatment**

When required, the treated wastewater from the sewage treatment plant may be used to irrigate defined areas described as gardens and lawns within the confines of the Plant Site or for dust suppression, industrial reuse, evaporated or any other use consistent with Class A+ under the Administering Authority's guideline titled 'Queensland Water Recycling Guidelines', dated December 2005. Sewage effluent from sewage treatment facilities must not be directly or indirectly released from the sewage treatment plant to any waters, stormwater drain or drainage line.

**W57 Quantity of Contaminated Water Released to Land**

The rate of application of water from the sewage treatment plant to gardens, lawns or other irrigation areas must not exceed the sustainable capacity of the land to assimilate the effluent.

**W58 Quality of Contaminated Water Released to Land**

Sewage must be treated to comply with each of the release limits specified in Table W11 for each quality characteristic before any release of the effluent to land or other reuse.

**W59** The quality of treated sewage must be monitored in accordance the requirements of Table W11 and records kept of the results.

**Table W11 (Treated sewage release quality characteristic limits)**

Quality characteristics	Unit	Release limit	Limit type	Minimum monitoring frequency
5-day Biochemical Oxygen Demand	mg/L	20	Maximum	Weekly
Suspended Solids	mg/L	30	Maximum	Weekly
pH	pH units	6 – 8.5	Range	Weekly
Turbidity (measured before disinfection)	NTU	2	Median	Continuous
		5	Maximum	
Total dissolved solids	mg/L	1000	Maximum	Weekly
E-coli	cfu/100 mL	1	Median	Weekly (with three replicates) in for at least first year.  Then if verified as complying with these limits, monthly (with three replicates)
		10	95 <sup>th</sup> percentile	
Clostridium perfringens	cfu/100 mL	1	Median	
		10	95 <sup>th</sup> percentile	
F-RNA Bacteriophage	pfu/100 mL	1	Median	
		10	95 <sup>th</sup> percentile	
Somatic coliphage	pfu/100 mL	1	Median	
		10	95 <sup>th</sup> percentile	

**W60** When weather or land conditions, prevent the irrigation of treated effluent, alternative measures must be taken to store or use the treated effluent.

**W61** The irrigation and reuse on land of treated wastewater to land, taken as from the edge of the wetted area, must not be carried out

- a) within twenty (20) metres of any boundary of the mining lease, public road or stormwater drain, except in the case of advanced disinfected effluent applied by either small drip irrigation, subsurface irrigation or small surface sprays with a spray plume not exceeding a diameter of 1.0 metres or 0.3 metres in height in which case the separation distance is reduced to 2 metres
- b) in a manner likely to cause effluent runoff or surface ponding
- c) within one-hundred (100) metres of any water supply bore
- d) in any manner or quantity that causes spray to drift beyond the boundaries of the mining lease or any runoff of contaminants to any waters or stormwater drain
- e) in any manner or quantity that adversely affects soil, vegetation or groundwater quality
- f) in any manner likely to adversely affect public health, and
- g) such as to cause any exceedance of the Environmental Investigation Thresholds listed in Appendix 9 of the *Guidelines for Assessment and Management of Contaminated Land in Queensland*.

### Groundwater

**W62** The holder of the environmental authority must develop and implement a groundwater monitoring program. The program must be able to detect a significant change to ground water quality values (consistent with the current suitability of the groundwater for domestic and agricultural use and any discharge to surface waters) due to activities that are part of this mining project.





**Background groundwater monitoring program**

- W63** A background groundwater monitoring program must be developed to include bore(s) that are located an appropriate distance from potential sources of impact from mining activities to provide the following:
- a) representative groundwater samples from the aquifers potentially affected by mining activities
  - b) at least twelve (12) sampling events, no more than two (2) months apart over a 2 year period, to determine background groundwater quality as far as practicable
  - c) background groundwater quality in hydraulically isolated background bore(s) that have not been affected by any mining activities, and
  - d) final groundwater contaminant trigger levels and limits required in condition W63.
- W64** Groundwater contaminant trigger levels as per Table W13 (Groundwater contaminant trigger levels) must be finalised based on a background groundwater monitoring program defined in condition W62 and submitted to the administering authority no more than **24 months from the date of issue** of this environmental authority.
- W65** The groundwater monitoring data must be reviewed on an annual basis by a suitably qualified and experienced hydrogeologist. The review must include the assessment of groundwater levels and quality data, and the suitability of the monitoring network. The assessment must be submitted to the administering authority within twenty-eight (28) days of receiving the report.
- W66** Groundwater must be monitored in conjunction with condition W62 and at least at the locations and frequency defined in Table W12 (Groundwater monitoring locations and frequency).

**Table W12 (Groundwater monitoring locations and frequency)**

Monitoring point	Description	Latitude (GDA 94)	Longitude (GDA94)	Monitoring frequency
Monitoring Point X				At least every two (2) months
Monitoring Point X				
Monitoring Point X				
Monitoring Point X				
Monitoring Point X				
Monitoring Point X	(To be provided by proponent)			
Monitoring Point X				
Monitoring Point X				
Monitoring Point X				
Monitoring Point X				

- W67** The holder of the environmental authority must report the results and analysis of groundwater monitoring to the administering authority on request.
- W68** Subject to condition W62 groundwater levels must be monitored and recorded and groundwater draw down fluctuations in excess of two (2) metres per year, not resulting from the pumping of licensed bores, must be notified within **fourteen (14) days** to the administering authority following completion of monitoring.
- W69** The method of water sampling required by the environmental authority must comply with that set out in the current edition of the Department of Environment and Resource Management's Water Quality Sampling Manual, or subsequent updated versions. The following information must also be recorded in relation to all groundwater water sampling:
- a) the date on which the sample was taken
  - b) the time at which the sample was taken
  - c) the monitoring point at which the sample was taken, and
  - d) the results of all monitoring.
- W70** If the groundwater contaminant trigger levels defined in Table W13 (Groundwater contaminant trigger levels) are exceeded then the environmental authority holder must complete an investigation into the potential for environmental harm and notify the administering authority within **twenty-eight (28) days** of receiving the analysis results.



**Table W13 (Groundwater contaminant trigger levels)**

Parameter	Unit	Trigger levels	Limit type
pH	pH Units	6.5 - 8.5	Minimum/Maximum
Electrical Conductivity	µS/cm		Maximum
Total Dissolved Solids	mg/L		
Calcium	µg/L		
Magnesium	µg/L		
Sodium	µg/L		
Potassium	µg/L		
Chlorine	µg/L		
SO <sub>4</sub>	µg/L		
CO <sub>3</sub>	µg/L	(To be provided by the proponent after 2 years of background quality monitoring in accordance with condition W66)	
HCO <sub>3</sub>	µg/L		
Iron	µg/L		
Aluminium	µg/L		
Silver	µg/L		
Arsenic	µg/L		
Mercury	µg/L		
Antimony	µg/L		
Molybdenum	µg/L		
Selenium	µg/L		
Total Petroleum Hydrocarbons	µg/L		

**Departmental Interest: Noise and vibration**

**D1 Noise nuisance**

Noise from the mining activity must not cause a noise nuisance at any sensitive place.

**D2** All noise from the mining activity must not exceed the levels specified in Table D1 at any sensitive place.

**D3** Noise is not considered to be a nuisance under condition D1 if monitoring shows that noise from the mining activity does not exceed the following levels in the time periods specified in Table D1.

**Table D1 Noise limits (sensitive place)**

Noise Level [dB(A)] at a 'Sensitive Place' expressed as	Monday to Sunday		
	7am – 6pm	6pm – 10pm	10pm – 7am
L <sub>Aeq,adj,15 mins</sub> <sup>1</sup>	RBL <sub>3</sub> + 5	RBL <sub>3</sub> + 5	RBL <sub>3</sub> + 5
L <sub>A1,15 mins</sub> <sup>2</sup>	45	45	45

Note <sup>1</sup> External noise limit

Note <sup>2</sup> Internal noise limit

Note <sup>3</sup> Rated Background Level (RBL) as defined in the DERM's *Ecoaccess Planning for Noise Control* Guideline

#### **D4 Noise monitoring**

When requested by the administering authority, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of noise nuisance at any sensitive place, and the results must be notified within fourteen (14) days to the administering authority following completion of monitoring.

Monitoring must include:

- a) L<sub>Aeq,adj,15 mins</sub> (external)
- b) L<sub>A1,15 mins</sub> (internal – or a measured external noise level and calculation of corresponding internal noise level)
- c) the level and frequency of occurrence of impulsive or tonal noise
- d) atmospheric conditions including wind speed and direction
- e) effects due to extraneous factors such as traffic noise, and
- f) location date and time of recording.

**D5** The method of measurement and reporting of noise levels must comply with the current edition of the Department of Environment and Resource Management's *Noise Measurement Manual* and any subsequent versions.

**D6** If monitoring indicates exceedance of the relevant limits in Table D1, then the environmental authority holder must:

- a) address the complaint including the use of appropriate dispute resolution if required, and
- b) immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.

#### **D7 Vibration nuisance**

Subject to conditions D8 and D9, vibration from the mining activity must not cause an environmental nuisance at any sensitive or commercial place.

**D8** If the environmental authority holder can provide evidence through monitoring that the limits defined in Table D2 are not being exceeded then the holder is not in breach of condition D7.



**D9**

If monitoring indicates exceedance of the relevant limits in Table D2, then the environmental authority holder must:

- a) address the complaint including the use of appropriate dispute resolution if required, and
- b) immediately implement vibration abatement measures so that vibration from the activity does not result in further environmental nuisance.

■ **Table D2 Airblast overpressure and peak particle velocity levels**

<b>Blast noise and vibration parameter</b>	<b>Monday to Sunday - 8am to 5pm</b>
Airblast overpressure level (dB linear peak)	115 dB (linear peak) for 4 out of any 5 consecutive blasts regardless of the interval between blasts. Any single blast must not exceed 120 dB (linear peak).
Peak particle velocity (mm/s)	For vibrations of more than 35 Hz – no more than 25 mm/s ground vibration  For vibrations of no more than 35 Hz – no more than 10 mm/s ground vibration

**D10** When requested by the administering authority, vibration monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within **fourteen (14) days** to the administering authority following completion of monitoring.

**D11** The method of measurement and reporting of vibration levels must comply with Appendix J of AS 2187.2-2006.

**D12 Airblast overpressure nuisance**

Subject to Conditions D13 and D14, airblast overpressure level from blasting operations must not cause an environmental nuisance, at any sensitive or commercial place.

**D13** If the environmental authority holder can provide evidence through monitoring that the limits defined in Table D2 are not being exceeded then the holder is not in breach of condition D12.

**D14** If monitoring indicates exceedance of the relevant limits in Table D2, then the environmental authority holder must:

- a) address the complaint including the use of appropriate dispute resolution if required, and
- b) immediately implement airblast overpressure abatement measures so that airblast overpressure from the activity do not result in further environmental nuisance.

**D15** When requested by the administering authority, airblast overpressure monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on

mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within fourteen (14) days to the administering authority following completion of monitoring.

**D16** Airblast overpressure monitoring must include the following descriptors, characteristics and conditions:

- a) location of the blast(s) within the mining area (including which bench level)
- b) atmospheric conditions including temperature, relative humidity and wind speed and direction
- c) location, date and time of recording.

**D17** The method of measurement and reporting of airblast overpressure levels must comply with Appendix J of AS 2187.2-2006.

#### **Department Interest: Waste**

##### **E1 Storage of tyres**

Scrap tyres stored awaiting disposal or transport for take-back and recycling, or waste-to-energy options must be stored in stable stacks less than 3 m high, and at least 10 m from any other scrap tyre storage area, or combustible or flammable material, including vegetation.

**E2** All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10 m radius of the scrap tyre storage area.

##### **E3 Disposal of tyres**

Disposing of scrap tyres resulting from the authorised activities in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as reasonably practicable. A record must be kept of the number and location for tyres disposed.

##### **E4 Waste Management**

A Waste Management Plan, in accordance with the Environmental Protection (Waste Management) Policy 2000, must be implemented and must cover:

- a) how the environmental authority holder will recognise and apply the waste management hierarchy
- b) identify characterisations of wastes generated from the project and general volume trends over the past five (5) years
- d) waste commitments with auditable targets to reduce, reuse and recycle
- e) waste management control strategies including:
  - i. the type of wastes
  - ii. segregation of the wastes
  - iii. storage of the wastes
  - iv. transport of the wastes



- v. monitoring and reporting matters concerning the waste
- vi. emergency response planning, and
- vii. disposal, reused and recycling options
- f) identify the potential adverse and beneficial impacts of the wastes generated
- g) hazardous characteristics of the wastes generated including:
  - i. disposal procedures for hazardous wastes
  - ii. processes to be implemented to allow for continuous improvement of the waste management systems
  - iii. identification of responsible staff (positions) for implementing, managing and reporting the Waste Management Plan, and
  - iv. staff awareness and induction programs that encourage re-use and recycling.

**E5** Records of trade and regulated wastes or material leaving the mining lease for recycling or disposal, including the final destination and method of treatment, must be in accordance with the *Environmental Protection (Waste Management) Policy 2000*.

**E6 Coal Handling and Preparation Plant Waste**

Waste from the Coal Handling and Preparation Plant must be disposed of in:

- a) regulated dams in accordance with conditions in Department Interest: Dams of this environmental authority if the residual shear strength of the waste is less than 1000 Pascals prior to disposal, or
- b) the Authorised Spoil Disposal Areas in accordance with conditions in Department Interest: Waste Table E1 (Location of Spoil Disposal Facility) if the residual shear strength of the waste is equal or more than 1000 Pascals prior to disposal.

**E7 Spoil disposal facility - certification and operation**

Authorised spoil disposal facilities, used for the disposal of waste are located within the control points defined in Table E1.

■ **Table E1 (Location of spoil disposal facility)**

Name of spoil disposal facility	Control points	
	Longitude (GDA 94)	Latitude (GDA 94)
Caval Ridge Spoil Dumps	(A list of control points to be provided by the proponent)	(A list of control points to be provided by the proponent)

**E8** Spoil disposal facility(s) shall be designed to prevent environmental harm arising from contaminants being generated in the facility, leachate and runoff from the facility or other sources.

**E9** Authorised spoil disposal facility(s) must be constructed and maintained in accordance with certified design plans, submitted to the administering authority.

- E10** Design plans for the authorised spoil disposal facility(s) must include performance indicators, such that:
- a) during operations the spoil disposal facility(s) will be operated with minimal or no potential for adverse environmental harm resulting from collapse of any component of facility, and
  - b) the potential for leachate generation will be minimal or non-existent, and
  - c) adequate drainage structures, erosion protection and storage are provided to manage seasonal and rare rainfall events with minimal or no environmental harm.

- E11** Construction of any spoil disposal facility detailed in Table E1 must not commence unless:
- a) the environmental authority holder has submitted to the administering authority two copies of a design plan, and
  - b) certification from a suitably qualified and experienced person that the design of the spoil disposal facility(s) will deliver the performance stated in that design plan and that it will be compliant in all other respects with this environmental authority, and
  - c) at least twenty (20) business days has passed since the receipt of those documents by the administering authority, or
  - d) the administering authority notifies the environmental authority holder that a design plan and certification, has been submitted for that disposal facility.

**E12 Operational plan – Spoil disposal facility**

An operational plan must be developed and maintained for the spoil disposal facility. The operational plan must include but not be limited to:

- a) description of landform development stages of the spoil disposal facility
- b) placement technique for spoil and waste material from the coal handling and processing plant on the Caval Ridge mine site
- c) management of any containment structures within the spoil disposal facility designed to contain materials from the coal handling and processing plant on the Caval Ridge mine site
- d) demonstration of how operations of the spoil disposal facility are consistent with the accepted design plan for the facility, and
- e) decommissioning and rehabilitation strategies for the spoil disposal facility that demonstrate consistency with conditions of this environmental authority.

**Departmental Interest: Land**

**F1 Preventing contaminant release to land**

Contaminants must not be released to land in a manner which constitutes nuisance, material or serious environmental harm.

**F2 Topsoil**

Topsoil must be strategically stripped ahead of mining in accordance with a topsoil management plan.





**F3** A topsoil inventory which identifies the topsoil requirements for the mining project and availability of suitable topsoil on site must be detailed in the Plan of Operations.

**F4 Rehabilitation landform criteria**

Progressive rehabilitation must commence within two (2) years of when areas become available within the operational land.

**F5 Residual void studies**

- a) The holder of the environmental authority must prepare a revised residual void model for approval by the administering authority during the fifth year after commencement of operation.
- b) The model in a) must be subject to review each subsequent five years while the mine continues to operate.
- c) Any amendment to the approved residual void model that may arise from the reviews in a) or b) must be based on any significant changes to groundwater characteristics or other data considered relevant by the administering authority that becomes available from the groundwater monitoring program.
- d) Notwithstanding obligations under a), b) and c), the holder of the environmental authority must undertake residual void water balance modelling during mine closure planning, in consultation with the administering authority, to ensure assumptions regarding surface water runoff and groundwater ingress are suitable for the site.

**F6 Residual void outcome**

Complete an investigation into residual voids and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in conditions F4 and landform design criteria for Departmental review and comment. On acceptance of the criteria proposed in the residual void management plan, the criteria must be specified in the Environmental Authority.

The investigation must at a minimum include the following:

- a) a study of options available for minimising final void area and volume
- b) develop design criteria for rehabilitation of final voids
- c) a void hydrology study, addressing the long-term water balance in the voids, connections to groundwater resources and water quality parameters in the long term
- d) a study of the measures to protect the residual voids, uncompacted overburden and workings from the 'probable maximum flood' level based on the Bureau of Meteorology's 'probable maximum precipitation' forecast for the locality
- e) a pit wall stability study, considering the effects of long-term erosion and weathering of the pit wall and the effects of significant hydrological events
- f) a study of void capability to support native flora and fauna, and
- g) a proposal/s for end of mine void rehabilitation success criteria and final void areas and volumes.

These studies will be undertaken during the life of the mine, and will include detailed research and modelling.

**F7 Rehabilitation monitoring program**

Once rehabilitation has commenced, the environmental authority holder must conduct a Rehabilitation Monitoring Program on a two (2) yearly basis, which must include sufficient spatial and temporal replication to enable statistically valid conclusions as established under the rehabilitation program.

**F8** The Rehabilitation Monitoring Program must be developed and implemented by a person possessing appropriate qualifications and experience in the field of rehabilitation management, nominated by the environmental authority holder.

**F9** The Rehabilitation Monitoring Program must be included in the Plan of Operations and updated with each subsequent Plan of Operations, describing:

- a) how the rehabilitation objectives will be achieved; and
- b) verification of rehabilitation success.

**F10 Post closure management plan**

A Post Closure Management Plan for the site must be prepared at least **eighteen (18) months** prior to the final coal processing on site and implemented for a nominal period of:

- a) at least thirty (30) years following final coal processing on site, or
- b) a shorter period if the site is proven to be geotechnically and geochemically stable and it can be demonstrated to the satisfaction of the administering authority that no release of contaminants from the site will result in environmental harm.

**F11** The Post Closure Management Plan must include the following elements:

- a) operation and maintenance of:
  - i. wastewater collection and reticulation systems
  - ii. wastewater treatment systems
  - iii. the groundwater monitoring network
  - iv. final cover systems, and
  - v. vegetative cover.
- b) monitoring of:
  - i. surface water quality
  - ii. groundwater quality
  - iii. seepage rates
  - iv. erosion rates
  - v. the integrity and effectiveness of final cover systems, and



- vi. the health and resilience of native vegetation cover.

## **F12 Mining waste management**

A Mining Waste Management Plan together with the certification by an appropriately qualified person must be developed and implemented during the continuation of the environmental authority. The Mining Waste Management Plan must at a minimum include:

- a) characterisation programs to ensure that all mining waste is progressively characterised during disposal for net acid producing potential, salinity and the following contaminants: pH, Electrical Conductivity (EC), Acid Neutralising Capacity (ANC), Net Acid Generation (NAG) (reporting NAG capacity and NAG pH after oxidation), Net Acid Producing Potential (NAPP), Total Sulfur (S), Chromium Reducible Sulfur (Scr), Boron (B) Cadmium (Cd), Iron (Fe), Aluminium (Al), Copper (Cu), Magnesium (Mg), Manganese (Mn), Calcium (Ca), Sodium (Na), Zinc (Zn) and Sulfate (SO<sub>4</sub>).
- b) characterisation programs to ensure that the physical properties of the mining waste is progressively characterised during disposal
- c) the availability or leachability of metals from the mining waste
- d) quantity of potentially acid forming (PAF) mining waste
- e) review potential impacts of PAF mining waste on the success of proposed rehabilitation methods
- f) management actions for mining waste that has been identified as having a high availability or leachability of metals in accordance with condition F12
- g) management actions for mining waste that has been defined as PAF
- h) identification of environmental impacts and potential environmental impacts;
- i) control measures for routine operations to minimise likelihood of environmental harm
- j) contingency plans and emergency procedures for non-routine situations, and
- k) periodic review of environmental performance and continual improvement.

## **F13 Acid mine drainage and leachate management**

Subject to the release limits defined in Departmental Interest: Water, all reasonable and practicable measures must be implemented to prevent hazardous leachate being directly or indirectly released or likely to be released as a result of the activity to the environment.

## **F14 Storage and handling of flammable and combustible liquids**

All flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm and maintained in accordance with the current version of *AS 1940 – Storage and Handling of Flammable and Combustible Liquids*.

**F15** Spillage of all flammable and combustible liquids must be controlled in a manner that prevents environmental harm.

**F16 Storage and handling of chemicals**

All chemicals must be contained within an on-site containment system and controlled in a manner that prevents environmental harm and maintained in accordance with the current version of the relevant Australian Standard.

**F17** Spillage of all chemicals must be controlled in a manner that prevents environmental harm.

**F18 Exploration**

Disturbance due to exploration activities in areas not scheduled to be mined must be rehabilitated in accordance with provisions detailed in the administering authority's *Code of Environmental Compliance for Exploration and Mineral Development Projects*.

**Department Interest: Dams**

**G1 All Dams**

The hazard category of each dam must be determined by a suitably qualified and experienced person, prior to its construction and at least once every year thereafter.

**G2** Construction of any dam determined to be in the significant or high hazard category (ie. a regulated dam) must not be commenced unless the location, basic details, and hydraulic performance of that dam are specifically referenced in this environmental authority.

**G3** On cessation of operation of any dam, that dam must be maintained so as to avoid environmental harm until that dam is decommissioned.

**G4** Prior to the cessation of the environmentally relevant activity, each dam must be decommissioned such that it either:

- a) becomes a stable landform, that no longer contains flowable substances, or
- b) is approved or authorised under relevant legislation for a beneficial use, or
- c) is a void authorised by the administering authority to remain after decommissioning, and
- d) is compliant with the rehabilitation requirements of this environmental authority.

**Regulated Dams - Location**

**G5** The following regulated dams must be wholly located within the control points defined in Table G1.



**Table G1 (Location of regulated dams)**

Name of regulated dam	Longitude GDA 94 <sup>(*)</sup>	Latitude GDA 94 <sup>(*)</sup>
12 North Dam		
Mine Water Dam N1		
Mine Water Dam N2		
Mine Water Dam N3		
Mine Water Dam S1		

Note<sup>(\*)</sup> Details to be provided by Proponent

**G6** The following regulated dams must be consistent with the basic details in Table G2.

**Table G2 (Basic details of regulated dams)**

Regulated dam	Maximum surface area (ha) <sup>(*)</sup>	Maximum volume of dam (ML) <sup>(*)</sup>	Maximum depth of dam (m) <sup>(*)</sup>	Purpose of dam
12N Dam				Collection, storage and management of mine water including pit waters
Mine Water Dam N1				Collection and transfer of pit water
Mine Water Dam N2				Collection and transfer of pit water
Mine Water Dam N3				Collection and transfer of pit water
Mine Water Dam S1				Collection and transfer of pit water

Note<sup>(\*)</sup> Details to be provided by Proponent

**G7** The following regulated dams must meet the hydraulic performance criteria specified in Table G3.

**Table G3 (Hydraulic performance criteria of regulated dams and integrated mine water management system dams)**

<b>Regulated dam</b>	<b>Hazard category for failure to contain</b>	<b>Uncontrolled discharge AEP</b>	<b>Hazard category for dambreak</b>	<b>Spillway critical design storm AEP</b>	<b>Mandatory reporting level</b>
<b>Regulated dams</b>					
12N Dam	Significant	1: 100	Significant	1: 1000	1: 100 AEP 72 hour storm volume below spillway level OR 1:100 AEP wind wave height below spillway level.
Mine Water Dam N1	Significant	1: 100	Significant	1: 1000	
Mine Water Dam N2	Significant	1: 100	Significant	1: 1000	
Mine Water Dam N3	Significant	1: 100	Significant	1: 1000	
Mine Water Dam S1	Significant	1: 100	Significant	1: 1000	
<b>Low hazard dams (not regulated) that form part of the integrated mine water system</b>					
Sed Dam N1	Low	1:10	Significant	1: 1000	Not Applicable
Sed Dam N2	Low	1:10	Significant	1: 1000	
Sed Dam N3	Low	1:10	Significant	1: 1000	
Sed Dam S1	Low	1:10	Significant	1: 1000	
Sed Dam S2	Low	1:10	Significant	1: 1000	
Sed Dam S3	Low	1:10	Significant	1: 1000	
Catchment Dam North	Low	1:10	Significant	1: 1000	
Catchment Dam South	Low	1:10	Significant	1: 1000	
Mine Water Dam 1	Low	1:10	Significant	1: 1000	
Mine Water Dam 2	Low	1:10	Significant	1: 1000	
Mine Water Dam 3	Low	1:10	Significant	1: 1000	
Mine Water Dam 4	Low	1:10	Significant	1: 1000	
Mine Water Dam 4a	Low	1:10	Significant	1: 1000	
Mine Water Dam 5	Low	1:10	Significant	1: 1000	

**G8 Regulated Dams - Certification and Operation**

Every regulated dam must be constructed in accordance with a certified design plan that has been submitted to the administering authority, and such that the resulting dam will deliver the performance stated in that submitted design plan and that dam is compliant in all respects with this environmental authority.

**G9 Construction of a regulated dam must not be commenced unless:**

- a) the environmental authority holder has submitted to the administering authority two copies of a design plan, together with the certification of a suitably qualified and experienced person that the design of the regulated dam will deliver the performance stated in that submitted design plan and that dam is compliant in all respects with this environmental authority, and
- b) at least twenty (20) business days has passed since the receipt of those documents, or the administering authority notifies the environmental authority holder that a design plan and certification has been received.



**G10**

When construction of any regulated dam is complete and prior to commencing operation of that dam, the environmental authority holder must submit to the administering authority two (2) copies of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in that submitted design plan and that dam is compliant in all respects with this environmental authority.

**G11** An operational plan must be kept current for each regulated dam.

**G12** Where an operational plan covers decommissioning and rehabilitation, those operations are to be consistent with the design plan for the dam and the rehabilitation requirements of this environmental authority.

**G13** The environmental authority holder must notify the administering authority within twenty-four (24) hours, of the level in any regulated dam reaching the mandatory reporting level (MRL) and must immediately act to prevent or minimize any actual or potential environmental harm.

**G14** **Regulated Dams - Annual Inspection and Report**

Each regulated dam must be inspected annually by a suitably qualified and experienced person.

**G15** At each annual inspection, the condition and adequacy of each regulated dam must be assessed for dam safety and against the necessary structural, geotechnical and hydraulic performance criteria.

**G16** At each annual inspection, if a mandatory reporting level is required, it must be determined and marked on each regulated dam.

**G17** A final assessment of adequacy of available storage in each regulated dam must be based on a dam level observed within the month of October and result in an estimate of the level in that dam as at 1 November.

**G18** For each annual inspection, two (2) copies of a report on the condition and adequacy of each regulated dam, certified by the suitably qualified and experienced person and including any recommended actions to be taken to ensure the integrity of each regulated dam; must be provided to the administering authority by 1 December.

**G19** The environmental authority holder must, within one week of receipt of the annual inspection report, consider the report and its recommendations; and as soon as possible, but within one month of receipt of the annual inspection report, formulate and implement actions to ensure that each regulated dam safely performs its intended functions.

## **Departmental Interest: Flora and Fauna**

- H1** A qualified spotter catcher is to be engaged to work ahead of the site clearing works at the commencement of the vegetation clearing activity.
- H2** The environmental authority holder must develop and implement a 'Watercourse Revegetation Plan' for all creek diversions including but not limited to:
- a) the establishment of benchmarks for vegetation condition in watercourses and riparian areas,
  - b) a description of how and when the revegetation objectives will be achieved,
  - c) an aquatic ecology monitoring program to ensure that the aquatic ecology values are maintained or enhanced,
  - d) a description of performance monitoring and reporting arrangements, and
  - e) contingency actions should stated performance objectives not be achieved.
- H3** The Watercourse Revegetation Plan must be submitted to the approving authority prior to the commencement of any creek diversions.





## Environmental Authority Definitions

Words and phrases used throughout this Environmental Authority are defined below except where identified in the *Environmental Protection Act 1994* or subordinate legislation. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

**'acceptance criteria'** means the measures by which actions implemented are deemed to be complete. The acceptance criteria indicate the success of the decommissioning and rehabilitation outcomes or remediation of areas which have been significantly disturbed by the environmentally relevant activities. Acceptance criteria may include information regarding:

- stability of final land forms in terms of settlement, erosion, weathering, pondage and drainage
- control of geochemical and contaminant transport processes
- quality of runoff waters and potential impact on receiving environment
- vegetation establishment, survival and succession
- vegetation productivity, sustained growth and structure development
- fauna colonisation and habitat development
- ecosystem processes such as soil development and nutrient cycling, and the recolonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes
- microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration
- effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development
- resilience of vegetation to disease, insect attack, drought and fire
- vegetation water use and effects on ground water levels and catchment yields.

**'acid mine drainage (AMD)'** means any contaminated discharge emanating from a mining operation formed through a series of chemical and biological reaction, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining operations.

**'acid rock drainage'** means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining activities.

**'administering authority'** means the Department of Environment and Resource Management or its successor.

**'Annual Exceedance Probability'** or **'AEP'** means the probability that at least one event in excess of a particular magnitude will occur in any given year.

**'airblast overpressure'** means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

**'ambient (or total) noise'** at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

**'ANZECC & ARMCANZ'** means the Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) 2000, Australian and New Zealand Guidelines for Fresh Marine Water Quality.

**'appropriately qualified person'** means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.

**'assess'** by a suitably qualified and experienced person in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- a) exactly what has been assessed and the precise nature of that assessment
- b) the relevant legislative, regulatory and technical criteria on which the assessment has been based
- c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts, and
- d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

**'associated works'** in relation to a dam, means:

- a) operations of any kind and all things constructed, erected or installed for that dam, and
- b) any land used for those operations.

**'authority'** means environmental authority (mining activities) under the *Environmental Protection Act 1994*.

**'bed and banks'** for a waters, river, creek, stream, lake, lagoon, pond, swamp, wetland or dam means land over which the water of the waters, lake, lagoon, pond, swamp, wetland or dam normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed and banks that is from time to time covered by floodwater.

**'beneficial use'** in respect of dams means that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is:

- a) of benefit to that owner in that it adds real value to their business or to the general community
- b) in accordance with relevant provisions of the Environmental Protection Act 1994
- c) sustainable by virtue of written undertakings given by that owner to maintain that dam, and
- d) the transfer and use have been approved or authorised under any relevant legislation.

**'biosolids'** means the treated and stabilised solids from sewage.

**'blasting'** means the use of explosive materials to fracture:

- a) rock, coal and other minerals for later recovery, or
- b) structural components or other items to facilitate removal from a site or for reuse.



**'bunded'** means within bunding consistent with Australian Standard 1940.

**'certification', 'certifying' or 'certified'** by a suitably qualified and experienced person in relation to a design plan or an annual report regarding dams, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- (a) exactly what is being certified and the precise nature of that certification
- (b) the relevant legislative, regulatory and technical criteria on which the certification has been based
- (c) the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts, and
- (d) the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

**'chemical'** means:

- a) an agricultural chemical product or veterinary chemical product within the meaning of the *Agricultural and Veterinary Chemicals Code Act 1994* (Commonwealth), or
- b) a dangerous good under the dangerous goods code, or
- c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997, or
- d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers' Advisory Council and published by the Commonwealth, or
- e) any substance used as, or intended for use as:
  - i. a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product, or
  - ii. a surface active agent, including, for example, soap or related detergent, or
  - iii. a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide, or
  - iv. a fertiliser for agricultural, horticultural or garden use, or
- f) a substance used for, or intended for use for:
  - i. mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater, or
  - ii. manufacture of plastic or synthetic rubber.

**'commercial place'** means a work place used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees accommodation or public roads.

**'competent person'** means a person with the demonstrated skill and knowledge required to carry out the task to a standard necessary for the reliance upon collected data or protection of the environment.

**'construction' or 'constructed'** in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for purposes of preparing a design plan.

**'contaminate'** means to render impure by contact or mixture.

**'contaminated'** means the substance has come into contact with a contaminant.

**'contaminant'** A contaminant can be:

- a) a gas, liquid or solid, or
- b) an odour, or
- c) an organism (whether alive or dead), including a virus, or
- d) energy, including noise, heat, radioactivity and electromagnetic radiation, or
- e) a combination of contaminants.

**'control measure'** means any action or activity that can be used to prevent or eliminate a hazard or reduce it to an acceptable level.

**'cover material'** means any soil or rock suitable as a germination medium or landform armouring.

**'dam'** means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. A dam does *not* mean a fabricated or manufactured tank or container designed to an Australian Standard that deals with strength and structural integrity of that tank or container.

**'design plan'** is the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include all investigation and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes; so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment for the structure. Documentation must be such that a 'suitable qualified and experience person' could conduct an independent review without seeking further information from the designer.

**'design storage allowance'** or **'DSA'** means an available volume, estimated in accordance with the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995), that must be provided in a dam as at the first of November each year in order to prevent a discharge from that dam to a probability (AEP) specified in that guideline. The DSA is estimated based on 100% runoff of wet season rainfall at the relevant AEP, taking account of process inputs during that wet season, with no allowance for evaporation.

**'development approval'** means a development approval under the *Integrated Planning Act 1997* in relation to a matter that involves an environmentally relevant activity under the *Environmental Protection Act 1994*.

**'domestic waste'** means waste, other than domestic clean-up waste, green waste, recyclable waste, interceptor waste or waste discharged to a sewer, produced as a result of the ordinary use or occupation of domestic premises.

**'dwelling'** means any of the following structures or vehicles that is principally used as a residence:

- a) a house, unit, motel, nursing home or other building or part of a building, or
- b) a caravan, mobile home or other vehicle or structure on land, or
- c) a water craft in a marina.

**'effluent'** treated waste water discharged from sewage treatment plants.



**'end-of-pipe'** means the location at which water is released to waters or land.

**'environmental authority'** means an environmental authority under Chapter 5 of the *Environmental Protection Act 1994*.

**'environmental authority holder'** means the holder of this environmental authority.

**'environmentally relevant activity'** means an environmentally relevant activity as defined under Section 18 of the *Environmental Protection Act 1994* and listed under Schedule 1 of the *Environmental Protection Regulation 1998*.

**'financial assurance'** means a security required under the *Environmental Protection Act 1994* by the Administering Authority to cover the cost of rehabilitation or remediation of disturbed land or to secure compliance with the environmental authority.

**'floodwater'** means water overflowing, or that has overflowed, from waters, river, creek, stream, lake, pond, wetland or dam onto or over riparian land that is not submerged when the watercourse or lake flows between or is contained within its bed and banks.

**'flowable substance'** means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

**'foreseeable future'** is the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptable probability of failure before that time.

**'general waste'** means waste other than regulated waste.

**'hazard'** in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

**'hazard category'** means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

**'hazardous waste'** means a substance, whether liquid, solid or gaseous that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause environmental harm.

**'hydraulic performance'** means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

**'infrastructure'** means water storage dams, roads and tracks, buildings and other structures built for the purpose and duration of the conduct of the environmentally relevant activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams, waste dumps,

voids, or stockpiles and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.

**'LA 10, adj, 10 mins'** means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 10% of any 10-minute measurement period, using Fast response.

**'LA 1, adj, 10 mins'** means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 10-minute measurement period, using Fast response.

**'LA, max adj, T'** means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over any 10 minute period, using Fast response.

**'LAr,1 hour'** means the rating level, equal to LAeq,adj,1 hour.

**'lake'** includes:

- a) lagoon, swamp or other natural collection of water, whether permanent or intermittent, and
- b) the bed and banks and any other element confining or containing the water.

**'land'** in the **'land schedule'** of this document means land excluding waters and the atmosphere.

**'land capability'** as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

**'land suitability'** as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

**'land use'** term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

**'landfill'** means land used as a waste disposal site for lawfully putting solid waste on the land.

**'levee', 'dyke' or 'bund'** means a long embankment that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of water or flowable substances at any other times.

**'mandatory reporting level'** or **'MRL'** means a warning and reporting level determined in accordance with the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995). An MRL is the lowest level required in a regulated dam to allow either of the following to be retained:

- a) the runoff from a 72 hour duration storm at the AEP specified in the Table 5, or
- b) a wave allowance at that AEP as estimated using a recognised engineering method.

**'mg/L'** means milligrams per litre.



**'mineral'** means a substance which normally occurs naturally as part of the earth's crust or is dissolved or suspended in water within or upon the earth's crust and includes a substance which may be extracted from such a substance, and includes:

- a) clay if mined for use for its ceramic properties, kaolin and bentonite
- b) foundry sand
- c) hydrocarbons and other substances or matter occurring in association with shale or coal and necessarily mined, extracted, produced or released by or in connection with mining for shale or coal or for the purpose of enhancing the safety of current or future mining operations for coal or the extraction or production of mineral oil therefrom
- d) limestone if mined for use for its chemical properties
- e) marble
- f) mineral oil or gas extracted or produced from shale or coal by in situ processes
- g) peat
- h) salt including brine
- i) shale from which mineral oil may be extracted or produced
- j) silica, including silica sand, if mined for use for its chemical properties
- k) rock mined in block or slab form for building or monumental purposes

But does *not* include:

- a) living matter
- b) petroleum within the meaning of the Petroleum Act 1923
- c) soil, sand, gravel or rock (other than rock mined in block or slab form for building or monumental purposes) to be used or to be supplied for use as such, whether intact or in broken form
- d) water.

**'mine water'** means process water and contaminated storm water.

**'natural flow'** means the flow of water through waters caused by nature.

**'nature'** includes:

- a) ecosystems and their constituent parts, and
- b) all natural and physical resources, and
- c) natural dynamic processes.

**'noxious'** means harmful or injurious to health or physical well being.

**'offensive'** means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

**'operational land'** means the land associated with the project for which this environmental authority has been granted.

**'operational plan'** means a document that amongst other things sets out procedures and criteria to be used for operating a dam during a particular time period. The operational plan as defined herein may form part of a plan of operations or plan otherwise required in legislation.

**'palletised'** means stored on a movable platform on which batteries are placed for storage or transportation.

**‘peak particle velocity (ppv)’** means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mms-1).

**‘protected area’** means:

- a) a protected area under the *Nature Conservation Act 1992*, or
- b) a marine park under the *Marine Parks Act 1992*, or
- c) a World Heritage Area.

**‘progressive rehabilitation’** means rehabilitation (defined below) undertaken progressively or a staged approach to rehabilitation as mining operations are ongoing.

**‘process water’** means water used or produced during the mineral development activities.

**‘receiving environment’** means all groundwater, surface water, land, and sediments that are not disturbed areas authorised by this environmental authority.

**‘receiving waters’** means all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

**‘recycled water’** means appropriately treated effluent and urban stormwater suitable for further use.

**‘reference site’** or **‘analogue site’** may reflect the original location, adjacent area or another area where rehabilitation success has been completed for a similar biodiversity. Details of the reference site may be as photographs, computer generated images and vegetation models etc.

**‘regulated dam’** means any dam in the significant or high hazard category as assessed using the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

**‘regulated waste’** means non-domestic waste mentioned in schedule 7 of the *Environmental Protection Regulation 1998* (whether or not it has been treated or immobilised), and includes:

- a) for an element – any chemical compound containing the element, and
- b) anything that has contained the waste.

**‘rehabilitation’** the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

**‘representative’** means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

**‘residual void’** means an open pit resulting from the removal of ore and/or waste rock which will remain following the cessation of all mining activities and completion of rehabilitation processes.

**‘saline drainage’** means the movement of waters, contaminated with salt(s), as a result of the mining activity.

**‘self sustaining’** means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.





**'sensitive place'** means:

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises, or
- b) a motel, hotel or hostel, or
- c) an educational institution, or
- d) a medical center or hospital, or
- e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area, or
- f) a public park or gardens.

**'sewage'** means the used water of person's to be treated at a sewage treatment plant.

**'spillway'** means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

**'stable'** in relation to land, means land form dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.

**'stormwater'** means all surface water runoff from rainfall.

**'suitably qualified and experienced person'** in relation to dams means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 1988, OR registered as a National Professional Engineer (NPER) with the Institution of Engineers Australia, OR holds equivalent professional qualifications to the satisfaction of the administering authority for the Act; AND the administering authority for the Act is satisfied that person has knowledge, suitable experience and demonstrated expertise in relevant fields, as set out below:

- a) knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams, and
- b) a total of five years of suitable experience and demonstrated expertise in the geomechanics of dams with particular emphasis on stability, geology and geochemistry, and
- c) a total of five years of suitable experience and demonstrated expertise each, in three of the following categories:
  - Investigation and design of dams.
  - Construction, operation and maintenance of dams.
  - Hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology.
  - Hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes.
  - Hydrogeology with particular reference to seepage, groundwater.
  - Solute transport processes and monitoring thereof.
  - Dam safety.

**'trivial harm'** means environmental harm which is not material or serious environmental harm and will not cause actual or potential loss or damage to property of an amount of, or amounts totalling more than \$5,000.

**'tolerable limits'** means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing pondage and limiting infiltration and percolation.

**'void'** means any constructed, open excavation in the ground.

**'waste'** as defined in section 13 of the *Environmental Protection Act 1994*.

**'waste management hierarchy'** has the meaning given by the Environmental Protection (Waste Management) Policy 2000.

**'waste management principles'** has the meaning given by the Environmental Protection (Waste Management) Policy 2000.

**'waste water'** means used water from the activity, process water or contaminated storm water.

**'water quality'** means the chemical, physical and biological condition of water.

**'waters'** includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.

**'µg/L'** means micrograms per litre.

**'µs.cm-1'** means microsiemens per centimetre.



## Schedule 4

### Recommended conditions for other approvals

#### 1. Aboriginal cultural heritage

The proponent must develop and have approved under the *Aboriginal Cultural Heritage Act 2003*, a Cultural Heritage Management Plan (CHMP) prior to any excavation, construction or other activity that may cause harm to Aboriginal cultural heritage.

#### 2. Connection to a state-controlled road

Approval must be obtained from the chief executive of the Department of Transport and Main Roads (TMR) under the *Transport Infrastructure Act 1994* for carrying out works for connections to any state-controlled road.

#### 3. Interference with a railway

- (a) Approval must be obtained from railway manager prior to any interference with a railway under the *Transport Infrastructure Act 1994*.
- (b) If any project works are likely to interfere with the operation of railway services, consultation must be undertaken with the railway manager to identify and implement actions which will minimise disruption to railway operations.

#### 4. Explosives

Any use, storage and transport of explosives off a mining lease required for the project must be approved in accordance with the *Explosives Act 1999*.

#### 5. Traffic management and road-use plans and associated infrastructure agreements

- (a) Prior to undertaking any works, the proponent must obtain relevant licences and permits under the *Transport Infrastructure Act 1994* for works within the state-controlled road corridor.

#### 6. Waterway diversions under the *Water Act 2000*

In accordance with s52 of the SDPWO Act, I recommend to the Minister responsible for administration of the *Water Act 2000* that the following conditions be attached to any licence, permit or approval required by the proponent to undertake waterway diversions for the Caval Ridge Mine (CRM):

Prior to the issuing of the environmental authority under the *Environmental Protection Act 1994* (EP Act) for the CRM, the proponent must submit to the Department of Environment and Resource Management (DERM)

- (a) a design of the proposed Caval Creek diversion that incorporates a slight meander
- (b) a plan that provides for increased monitoring and vegetation management that will allow Caval Creek to develop physical integrity characteristics similar to the existing watercourse, and
- (c) an independent written analysis by an appropriately qualified professional that the final designs of all CRM creek diversions will not cause significant downstream environmental harm as a result of altered flow and flood patterns of those creeks.

## 7. Potential groundwater impacts

In accordance with s52 of the SDPWO Act, I recommend to the Minister responsible for administration of the *Water Act* 2000 that the following conditions be attached to any licence, permit or approvals required by the proponent associated with groundwater impacts of the CRM:

- (a) Mechanisms should be implemented to ensure that the proposed CRM does not result in an undue adverse impact on the availability and quality of groundwater supplies to neighbouring landholders.
- (b) The proponent should reach mutually agreeable arrangements with landholders potentially affected by groundwater drawdown for the provision of alternative supplies throughout the mine life, and after mine closure. Alternative supplies should be put in place before supplies from relevant existing landholder bores are adversely affected and the costs associated with changes to landholder extraction of groundwater from bores on affected land should be covered by the proponent.
- (c) Prior to the surrender of mining leases, post-mining, pursuant to the *Minerals Resources Act 1989* and the EP Act, the conditions under which an alternative supply of groundwater would be provided to any landholders potentially adversely affected by impacts to groundwater directly attributable to the mine dewatering program must be agreed to between the proponent and the relevant regulators.
- (d) To remove any doubt, (a) to (c) apply regardless of whether any potential impact of the CRM on groundwater results from activities on ML70403 or ML1775.



## Schedule 5

### Coordinator-General's other recommendations

#### 1. Visual amenity

**I recommend that:**

- (a) the results of the proposed visual impact mitigation strategies outlined in the draft Environmental Management (EM) plan be monitored by the proponent in consultation with the Isaac Regional Council (IRC) throughout the life of the Caval Ridge Mine (CRM), and those strategies be enhanced wherever they are considered to have insufficiently reduced the visual contrasts between the major CRM components, as seen from key viewpoints on the Peak Downs Highway, the Moranbah Access Road and Moranbah.
- (b) notwithstanding other obligations on the proponent to provide a satisfactory level of mine site and spoil rehabilitation, that the proponent, in consultation with the Department of Environment and Resource Management (DERM) and IRC, achieves a minimum average of 30 per cent revegetation foliage coverage of all elevated spoil areas (excluding tourist lookouts established as part of the project) that are visible from key viewpoints on the Peak Downs Highway, the Moranbah Access Road and Moranbah within three years of completion of placement of spoil in each of those areas.

#### 2. Strategic cropping land

**I recommend** that the proponent, either directly or through the Queensland Resources Council, participate in industry consultation on the proposed policy and planning framework for strategic cropping land being conducted by the Department of Infrastructure and Planning.

#### 3. Rehabilitation of previous failure of existing Cherwell Creek diversion

**I recommend** that DERM ensures that any of its remaining environmental protection requirements for the rehabilitation of the failed existing Cherwell Creek diversion on ML1775 for the Peak Downs Mine be transferred to the CRM operations and be added to the CRM environmental authority.

#### 4. Provision of additional information on mine tailings and water management

**I recommend that:**

- (a) DERM should not issue the environmental authority for the CRM to BMA until DERM has endorsed for inclusion in the EM plan the plans for the matters specified in Schedule 1, Appendix 1 in Condition 2(b) (with respect to water management), Condition 2(d) (with respect to flood protection) and Condition 13(c) (with respect to tailings management)
- (b) the methodologies outlined in the "*Final model water conditions for coal mines in the Fitzroy Basin*" (July 2009) and "*Conditions for Coal Mines in the Fitzroy Basin – approach to Discharge Licensing*" (Version 10 June 2009), be followed by DERM and the proponent to review the discharge limit proposed by the proponent of 1500 microsiemens per centimetre ( $\mu\text{S}/\text{cm}$ ) electrical conductivity for water released from the CRM mine site (currently 1000  $\mu\text{S}/\text{cm}$  in Table W2, Schedule 3, Appendix 1) and as otherwise controlled by draft EA conditions W1-W22 in Schedule 3, Appendix 1 of this report
- (c) any consideration by DERM of a water electrical conductivity limit above 1500  $\mu\text{S}/\text{cm}$  be possible only following submission by BMA of a very detailed technical business case.

#### 5. Consideration of the BMA Biodiversity Offset Strategy in Appendix 2 of this report

**I recommend** that in their consideration of the BMA Biodiversity Offset Strategy for the CRM in Appendix 2 of this report, DERM and DEWHA consider:

- (a) that I regard the general scope of the offset proposal for brigalow at Norwich Park to be acceptable

- (b) that subject to verification of sufficient integrity of the proposed offset vegetation, I consider that an offset of poplar box vegetation at Blackwater of at least 450 hectares would be acceptable
- (c) that subject to the provision of more detailed information, I consider that the offset proposal for natural grasslands at Gregory Crinum appears to be insufficient for EPBC-listed EECs without further augmentation
- (d) to avoid the risk of double-counting, the proponent delineates and quantifies in the Biodiversity Offset Strategy the areas of vegetation in each proposed offset area attributable to each phase of the Bowen Basin Coal Growth (BBCG) project
- (e) my observations in section 7.3.6.3 of this report in relation to BMA's offset proposals.

## 6. Moranbah town air quality monitoring

- (a) **I recommend that** following an appropriate period of data and equipment calibration and verification, the proponent publicly reports the results of its Moranbah town air quality monitoring at least monthly and no later than 20 days after collection of data for the last day of each calendar month.
- (b) **I recommend that** the proponent work with the IRC, DERM and other resource companies with quarries or mines in the vicinity of Moranbah with the objective of creating an integrated air quality monitoring system in the town of Moranbah which:
  - (i) establishes a voluntary communication network between the IRC and environmental officers on mine sites to share information in confidence about meteorological and air quality conditions in the town and at the respective mine sites aimed at jointly improving air quality management knowledge and practices in the area, and
  - (ii) following an appropriate period of data and equipment calibration and verification, progress to more frequent reporting of results on a publicly accessible webpage than the approximate quarterly reporting currently proposed by the proponent.

## 7. BMA's financial contribution to social impact mitigation

**I recommend that:**

- (a) as part of the assessment process for the EIS for the Goonyella-Riverside expansion component of the BBCG project, the proponent and DIP jointly review the total scale of BMA's spending on programs which are aimed at mitigating the social impacts of its mining operations in the Bowen Basin (currently grouped largely under BMA's Community Partnership Program).
- (b) the evaluation in (a) consider:
  - (i) the scale of such spending by other resource companies in this region and other comparable regions (where known), and
  - (ii) with respect to the scale of the *Community Partnerships Program*, the relative increase in the scale of BMA's business activities and relative impacts in the Bowen Basin resulting from the BBCG project is a relevant factor.

## 8. Study on the cumulative social impacts of mining in the Isaac Region local government area

- (a) the IRC and DIP jointly lead a study to identify the:
  - (i) cumulative social impacts of mining in the Isaac Region local government area and
  - (ii) mitigation measures and social infrastructure required to address those impacts
- (b) the study be conducted during 2010-2011 as a component of both the statutory IRC Community Planning process and the Whitsunday Hinterland Mackay (WHAM) statutory regional planning process
- (c) DIP provide planning and technical resource support for the study and participate in the project management arrangements



- (d) contributions to the cost of the study be sought from other coal industry participants with operations located within the Isaac Region local government area.

## 9. Accommodation of visiting maintenance and overhaul personnel

I recommend that capacity planning for operational worker villages for the BBCG project allow for the periodic accommodation needs of visiting maintenance personnel (such as the large dragline overhaul crews) in addition to operational personnel.

## 10. Decommissioning of Denham Village

On the basis that the proponent proposes to use Denham Village for accommodation for only construction personnel for the CRM, I recommend that within 12 months of commencement of operation of the CRM, the Denham Village be decommissioned, all camp buildings removed and the site rehabilitated in accordance with any requirements of the EM Plan for the CRM.

## 11. Other Social Impact Management Plan (SIMP) recommendations

I recommend that:

- (a) the community health, safety and wellbeing concerns raised in the EIS and SEIS and submissions be addressed comprehensively through the development and implementation of the social infrastructure section of the CRM SIMP in consultation with key stakeholders and the community as described in section 5.115 of this report.
- (b) with respect to social infrastructure needs of the WHAM planning region:
  - (i) the proponent works closely with the Moranbah BMA Community Network (refer to Condition 6), the Sustainable Resource Communities Local Leadership Group and the Queensland Government Central Queensland Regional Managers Coordination Network to prioritise social infrastructure needs in the CRM study area, and
  - (ii) strategies to address these priorities, as related to the CRM, are detailed in the CRM SIMP.
- (c) the proponent engage with state and local government and non-government organisations (e.g. QPS, DoC, the IRC, Moranbah District Support Services) to ensure that community safety mitigation strategies included in the *BMA Draft Five Year Communities Strategy for the Bowen Basin* focus on and reflect local priorities and concerns
- (d) engagement processes to progress workforce and community programs be incorporated into the BMA Stakeholder Engagement Strategy as part of the CRM SIMP
- (e) any outcomes of the proponent's audit of operation sites and accommodation villages to determine its existing practices with regard to buying and investing locally and supporting local businesses which identify new opportunities for local business:
  - (i) be the subject of consultation with members of the Moranbah BCN to determine how local businesses and residents can take advantage of these opportunities
  - (ii) ensure that any strategies devised are incorporated in the SIMP
- (f) during the development of this strategy, the proponent discuss with Indigenous parties opportunities for the provision of additional support for Indigenous students to strengthen pathways from schooling to employment.

# Schedule 6

## Glossary, acronyms and abbreviations

### The following terms have been used in this report:

**‘Airblast overpressure’** means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

**‘Ambient (or total) noise’** at a place, means the level of noise at the place from all sources (near and far), measured as the Leqan appropriate acoustic parameter/s (e.g. Leq, L10, Lmax) depending on the requirements of the investigation, and for an appropriate time interval.

**‘Background’** for noise levels means background noise level measured in accordance with the Queensland Government’s Noise Measurement Manual.

**‘Construction Areas’** means the construction worksites, construction car parks, and any areas licensed for construction or on which Construction Works are carried out, including without limitation, the Peak Down Highway corridor and any sites off the mining leases.

**‘Construction Works’** means all works necessary for the construction of the Project, including demolition of existing buildings and structures, site preparation, Public Utility Works and associated road works.

**‘Construction EM plan’** means an environmental management plan or plans, including any sub-plans, for the construction phase of the Project.

**‘Green Power’** means electricity sourced from a renewable energy source accredited by National GreenPower Accreditation Program that meets the criteria of the Australian Government’s Renewable Energy Target.

**‘LA 1, adj, 150 mins’** means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 150-minute measurement period, using Fast response.

**‘LA eq, adj, 15 mins’** means the A-weighted equivalent continuous (or ‘average’) sound pressure level, (adjusted for tonal character and impulsiveness of the sound) for any 15-minute measurement period, using Fast response

**‘LA 90, 15 mins’** means the A-weighted sound pressure level, exceeded for 90% of any 15-minute measurement period, using Fast response. This parameter is used in Ecoaccess Planning for Noise Control to determine the Rating Background Level (refer Table D1)

**‘Peak particle velocity (ppv)’** means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mms-1).

**‘Proponent’** means the entity responsible for the procurement, construction and operation of the BBCG project and Caval Ridge Mine, i.e. BMA.

**‘Public Utility Works’** means

- a) the replacement, modification or relocation of public utilities required as a consequence of the project, and
- b) the construction of new utility infrastructure required for the project.

**‘Sensitive Place’** means any of the following places:

- a) a dwelling
- b) a library, child-care centre, kindergarten, school, college, university or other educational institution
- c) a hospital, surgery or other medical institution, or





- d) a commercial premises relying on calibrated equipment or computers sensitive to vibration greater than the guide values set out in Table 13 of Schedule 3 of these Conditions.

'Waters' includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), any underground water and any part thereof (*Water Act 2000*).

**The following acronyms and abbreviations have been used in this report:**

ACARP	Australian Coal Association Research Program
ACH Act	<i>Aboriginal Cultural Heritage Act 2000</i>
AEP	annual exceedance probability
ARI	average recurrence interval (i.e. for flood or rainfall event frequency)
BB	BaradaBarna (Native Title claimants)
BBCG	Bowen Basin Coal Growth project – defined in section 2.2.1 of this report
BBKY	BaradaBarna Kabalbara and Yetimarla #4 group (Native Title claimants)
BIBO	bus-in-bus-out transportation of workers to work sites and/or accommodation facilities who have a permanent place of residence outside of the project area
BMA	BHP Billiton Mitsubishi Alliance Coal Operations Pty Ltd – the proponent, as manager and agent on behalf of the CQCA
BMC	BHP Billiton Mitsui Coal Pty Ltd
CG	Coordinator-General of the State of Queensland – constituted under the SDPWO Act
CHMP	cultural heritage management plan (under the ACH Act)
CHPP	coal handling and preparation plant
CHR	Construction Hazard and Risk (EM plan sub-plan)
CLR	Contaminated Land Register (under the <i>Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland 1998</i> )
CO2-e	carbon dioxide equivalent – internationally recognised measure that allows for the comparison of different greenhouse gases in terms of their global warming potential
CPP	community partnerships program
CQCA	Central Queensland Coal Associates Joint Venture between BHP Billiton and Mitsubishi Corporation – which is managed by BMA
CRG	community reference group
CRM	Caval Ridge Mine – as defined in the EIS, SEIS and section 2.2.2 of this report, part of BMA's Bowen Basin Coal Growth project.
Cwth	Commonwealth of Australia
dBA	acceptable decibels (unit of noise measurement)
DCS	Department of Community Safety
DEEDI	Department of Employment, Economic Development and Innovation
DERM	Department of Environment and Resource Management
DEWHA	Department of Environment, Water, Heritage and the Arts (Commonwealth)
DIDO	drive-in-drive-out transportation of workers to work sites and/or accommodation facilities who have a permanent place of residence outside of the project area

DIP	Department of Infrastructure and Planning
DoC	Department of Communities
DSQ	Disability Services Queensland in DOC
EA	environmental authority (under the EP Act)
EC	electrical conductivity (measure of salinity)
EEC	endangered ecological communities (EPBC Act, MNES)
EIA	environmental impact assessment
EIS	environmental impact statement – for the Bowen Basin Coal Growth Project, Caval Ridge Mine (July 2009) prepared by BMA
EM plan	environmental management plan – under the EP Act
EMR	Environmental Management Register (under the <i>Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland 1998</i> )
EMS	environmental management system
EP Act	<i>Environmental Protection Act 1994</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwth)
EPP	Environmental Protection Policy
EPP (Air)	<i>Environmental Protection (Air) Policy 2008</i>
EPP (Noise)	<i>Environmental Protection (Noise) Policy 2008</i>
EPP (Waste)	<i>Environmental Protection (Waste Management) Policy 2000</i>
EPP (Water)	<i>Environmental Protection (Water) Policy 2009</i>
EP Reg	<i>Environmental Protection Regulation 1998</i>
ERA	environmentally relevant activity (EP Act)
ESCP	Erosion and Sediment Control Plan
FIFO	fly-in-fly-out transportation of workers to work sites and/or accommodation facilities who have a permanent place of residence outside of the project area
GHG	greenhouse gas.
GQAL	good quality agricultural land
Hz	hertz
IAS	initial advice statement
ICMM	International Council on Mining and Metals
IDAS	Integrated Development Assessment System (under SPA)
IPA	<i>Integrated Planning Act 1997</i>
IRC	Isaac Regional Council – formed on 15 March 2008 following the amalgamation of the former Belyando, Nebo and Broadsound Shire Councils
kV	kilovolt
Leq	average noise level
LGAQ	Local Government Association of Queensland
Lmax	maximum noise level
L90	steady-state noise level (i.e. noise levels that are exceeded for 90% of each sample period)
LoS	level of service



LOX	limit of oxidation
MDL	mineral development licence (MRA)
MDLA	mineral development licence application
MIA	mine industrial area
MCIG	Moranbah Cumulative Impacts Group
MNES	matters of national environmental significance (under the EPBC Act)
MRA	<i>Mineral Resources Act 1989</i>
ML (1)	Mining Lease (MRA)
ML (2)	megalitre (one million litres)
MLA	Mining Lease Application
Moranbah BCN	Moranbah BMA Community Network, defined by Schedule 1, Condition 6 of this Coordinator General's Report.
m <sup>3</sup> /s	cubic metres per second (flow rate)
µm	micrometres
µS/cm	microsiemens per centimetre (measure of electrical conductivity (EC), i.e. salinity)
Mtpa	million tonnes per annum
MWMS	mine water management system
NAF	non-acid forming
NC Act	<i>Nature Conservation Act 1992</i>
NEPC	National Environmental Protection Council
NEPM	National Environment Protection Measures made under the <i>National Environment Protection Council Act 1994</i> (Cth).
NNTT	National Native Title Tribunal
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	oxides of nitrogen, which includes NO <sub>2</sub>
NRA	Nature Refuge Agreement (under the NC Act)
OESR	Office of Economic and Statistical Research (of Queensland Treasury)
Pa	Pascals (unit of force)
PIFU	Planning Information Forecasting Unit (of OESR)
PM <sub>2.5</sub>	particulate matter with equivalent aerodynamic diameter less than 2.5 µm
PM <sub>10</sub>	particulate matter with equivalent aerodynamic diameter less than 10 µm
PMF	probable maximum flood
QPIF	Queensland Primary Industries and Fisheries (part of DEEDI)
QPS	Queensland Police Service
QRC	Queensland Resources Council
RE	regional ecosystem – under the VM Act
REMP	receiving environment monitoring program
RMP	road-use management plan (TIA)
ROM	run-of-mine
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i>

SEIS	supplementary environmental impact statement – for the Caval Ridge Mine of the Bowen Basin Coal Growth Project (November 2009) prepared by BMA
SEQ	South East Queensland
SIMP	social impact management plan – for the CRM to be prepared by BMA for approval by the Coordinator-General
SPA	<i>Sustainable Planning Act 200</i>
SPP	State Planning Policy
SPQ	single persons quarters
SPR	<i>Sustainable Planning Regulation 2009</i>
SRC policy	Sustainable Resource Communities policy of the Queensland Government released in September 2008
TAPM	The Air Pollution Model, version 4, CSIRO (2008) – meteorological model
TEOM	Tapered element oscillating microbalance analyser (air quality monitor)
TIA	<i>Transport Infrastructure Act 1994</i>
TLO	train load-out
TOR	terms of reference – for the EIS for the BBCG project which covers all four components of the project
TMP	Traffic Management Plan – defined by the <i>Transport Infrastructure Act 1994</i> and the <i>Transport Planning and Coordination Act 1994</i>
TMR	Department of Transport and Main Roads
TSP	total suspended particles
UDA	Urban Development Area
ULDA	Urban Land Development Authority – constituted under the <i>Urban Land Development Authority Act 2007</i>
VM Act	<i>Vegetation Management Act 1999</i>
WHAM	Whitsunday Hinterland and Mackay



BHP Billiton Mitsubishi Alliance

## Caval Ridge Mine Offset Management Plan



## Appendix 3 – Norwich Park Nature Refuge Agreement





**Queensland  
Government**

Enquiries: Andi Dunlop  
Telephone: 3330 5576  
Ref: CTS12002/10

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Department of  
**Environment and Resource  
Management**

24 JUL 2010

Ms Jade Buller  
Environmental Advisor  
BHP Billiton Mitsubishi Alliance (BMA)  
GPO Box 1389  
BRISBANE QLD 4001

Dear Ms Buller

I am delighted to sign the Norwich Park Nature Refuge conservation agreement and return a copy to you for your records. The necessary action to formally declare your nature refuge will occur shortly.

Government alone cannot achieve the goal of conserving Queensland's biodiversity and protecting its natural landscapes. The commitment that you have made through your nature refuge Conservation Agreement will bring lasting benefits to the community as a whole.

Congratulations and thank you for your willingness to be involved in conservation in a most practical manner.

Yours sincerely

John Bradley  
**Director-General**

Level 13  
400 George Street Brisbane Qld 4000  
GPO Box 2454 Brisbane  
Queensland 4001 Australia  
Telephone + 61 7 3330 6301  
Facsimile + 61 7 3330 6306  
Website [www.derm.qld.gov.au](http://www.derm.qld.gov.au)  
ABN 46 640 294 485

**CONSERVATION AGREEMENT**

**TO ESTABLISH NORWICH PARK NATURE REFUGE**

## TABLE OF CONTENTS

1.	Interpretation .....	2
2.	Commencement and Term.....	7
3.	Management of the Land .....	7
4.	Threatening Process.....	8
5.	Emergency Event .....	8
6.	Entry by the DERM.....	8
7.	Indemnity.....	9
8.	Assistance to the Landholder.....	9
9.	Management Conditions .....	9
10.	Agreement Binding.....	10
11.	Change of Owner .....	10
12.	Liability of the DERM.....	10
13.	Compliance with Laws .....	11
14.	Mediation .....	11
15.	Default.....	11
16.	Termination .....	12
17.	Notices .....	12
18.	Severability .....	12
19.	Waiver.....	12
20.	Governing Law.....	13
21.	Costs .....	13
22.	Execution .....	13
23.	Entire Agreement.....	13
	SCHEDULE 1.....	14
	SCHEDULE 2.....	16
	SCHEDULE 3.....	17
	SCHEDULE 4.....	18
	SCHEDULE 5.....	23



**BETWEEN:** State of Queensland represented by the Department of Environment and Resource Management.

(“DERM”)

**AND:** The Landholder specified in Schedule 1.

(“Landholder”)

## RECITALS

- A. The Landholder is the lessee under the Lease registered over the Land.
- B. The parties agree that the Land should be declared as a nature refuge in accordance with the *Nature Conservation Act 1992* (“the Act”) to protect the Land’s Significant Cultural and Natural Resources.
- C. The DERM has obtained the written consent from all persons who, at the Date of this Agreement, have the benefit of a lease, mining interest or other encumbrance over the Land and whose rights under that lease, mining interest or encumbrance will be materially affected by the Landholder entering into this Agreement.
- D. To protect the Land’s Significant Cultural and Natural Resources, the Landholder has agreed to manage the Land in accordance with the Management Principles, the Declared Management Intent, the Management Plan (if any) and the terms of this Agreement.
- E. The parties wish to record the terms of their agreement.

## NOW THE PARTIES AGREE AS FOLLOWS –

### 1. Interpretation

- 1.1 In this Agreement unless the context otherwise requires or the contrary intention appears, the following terms will have the meanings assigned to them –

“Aboriginal Cultural Heritage”	Has the same meaning as in the <i>Aboriginal Cultural Heritage Act 2003</i> .
“Act”	The <i>Nature Conservation Act 1992</i> .
“Agreement”	This document and all schedules to this document.
“Business Day”	A day (other than a Saturday, Sunday or a public holiday) on which banks are open for business in Queensland.

<b>“Contaminated Land”</b>	'Contaminated Land' refers to land contaminated by Hazardous Substances which may pose a risk to human health or the environment. Some Contaminated Land is recorded on the contaminated land register.
<b>“Control Program”</b>	Typically baiting, shooting, trapping, and poisoning.
<b>“Cultural Resources”</b>	Places or objects on the Land that have anthropological, archaeological, historical, scientific or sociological significance or value.
<b>“Date of this Agreement”</b>	The date referred to in clause 22.
<b>“Declared Management Intent”</b>	The management intent specified at the time of declaration of the Land as a nature refuge in the <i>Nature Conservation (Protected Areas) Regulation 1994</i> .
<b>“Declared Pest Plants”</b>	A plant declared as a pest under the <i>Land Protection (Pest and Stock Route Management Act) 2002</i> .
<b>“Decommissioning”</b>	The permanent closure and removal (where appropriate) of unwanted, Major Infrastructure, and the stabilisation and rehabilitation of the site.
<b>“DERM”</b>	The State of Queensland represented by the Department of Environment and Resource Management, acting through the Minister.
<b>“Disease”</b>	Disease impacting on native wildlife and/or soil, such as phytophthora, citrus canker, eucalyptus rust, chlamydia, conjunctivitis and chytrid frog fungus.
<b>“Easement”</b>	An Easement under the <i>Land Title Act 1994</i> .
<b>“Emergency Event”</b>	Any event or circumstance that is not within the control of a party and which could not have been overcome, prevented or remedied by the exercise of reasonable care on its part and includes – <ul style="list-style-type: none"> <li>(a) Act of God;</li> <li>(b) fire, flood, storm, landslide, wash away;</li> <li>(c) cyclone;</li> <li>(d) outbreak of disease;</li> <li>(e) pest plagues; and</li> <li>(f) riot or civil commotion.</li> </ul>
<b>“Fauna Deterrent”</b>	Typically scare guns, netting, exclusion fencing and plastic/metal tree collars.
<b>“Fire Events”</b>	Any fire, both wildfire and planned burns.
<b>“Fire Management Infrastructure”</b>	Typically fire lines/fire breaks, water points, helicopter landing pads and lookouts.

<b>“Hazardous Substances”</b>	Substances that pose a pollution and/or health risk to natural resources, animals, plants or people, typically chemicals and fuel or substances containing heavy metals.
<b>“Heavy Machinery”</b>	Typically tractors, loaders, dozers, skidders, graders and any other machinery over 2.5 tonne.
<b>“Infrastructure”</b>	Buildings, dwellings, roads, fences, telecommunications/power/water structures etc.
<b>“Instability”</b>	Evidence of Instability may be present in the form of exposed slip or slump faces, erosion gullies, exposed sub-soil, acid sulphate soil, ground cracks and hummocky geology.
<b>“Land”</b>	The Land described in Item 2 of Schedule 1.
<b>“Land Uses”</b>	Land uses which may be undertaken on the land include, but are not limited to: <ul style="list-style-type: none"> <li>(a) Grazing;</li> <li>(b) Eco-tourism;</li> <li>(c) Recreational horse riding; and</li> <li>(d) Selective timber harvesting</li> </ul>
<b>“Landholder”</b>	The landholder described in Item 1 of Schedule 1 and includes the landholder’s executors and administrators.
<b>“Lease”</b>	The lease described in Item 3 in Schedule 1.
<b>“Major Infrastructure”</b>	Typically roads, formed tracks, dwellings, shed, dams, any Infrastructure requiring a foundation or any Infrastructure where clearing of remnant vegetation is required.
<b>“Management Intent”</b>	The management intent specified in Schedule 3.
<b>“Management Plan”</b>	A Management Plan that may be prepared by the Minister for the nature refuge over the Land, in accordance with the Act and approved by the Governor in Council.
<b>“Management Principles”</b>	Those principles specified in the Act and set out in clause 3.2.
<b>“Minister”</b>	The Minister from time to time administering the Act.
<b>“Monitoring Report”</b>	A report template sent to landholders annually for completion and submission. The report template will focus on landholder observations regarding natural and cultural resources on the property, general observations and significant events. The report will assist the landholder and the DERM to assess outcomes, identify trends and impacts to guide continual improvement of natural and cultural resource protection on the Land.

<b>“Natural Resources”</b>	The natural and physical features of the Land, including wildlife, soil, water, minerals and air.
<b>“Pest Animals”</b>	Typically an animal that is either a: declared pest, declared under a local law, an invasive species, or a non-endemic species. For example: pigs, goats, camels, rabbits, horses, foxes, cats.
<b>“Pest Plants”</b>	Typically a plant that is either a: declared pest, declared under a local law, an invasive species, or a non-endemic species. For example: lantana, groundsel, buffel grass.
<b>“Protected Area Plan”</b>	The plan in Schedule 5.
<b>“Scour”</b>	Erosion that has, or has the potential to, form a channel or undercutting.
<b>“Sensitive Areas”</b>	Typically steep slopes, areas of Instability, drainage lines and areas of high soil erodibility.
<b>“Significant Cultural and Natural Resources”</b>	Includes those resources specified in Schedule 2.
<b>“Significant Geological Features and Landforms”</b>	Typically rocky outcrops, boulders, cliff faces, gorges, caves, sand dunes, volcanic plugs, crevices and fossils.
<b>“Significant Indigenous Cultural Heritage”</b>	Aboriginal cultural heritage under the <i>Aboriginal Cultural Heritage Act 2003</i> is “anything that is (a) a significant Aboriginal area in Queensland; or (b) a significant object; or (c) evidence, of archaeological or historic significance, of Aboriginal occupation of an area of Queensland.” Examples include: scar and engraved trees, artefact scatters, occupation sites, art sites, burial places, ceremonial sites, stone grinding grooves and middens.
<b>“Significant Non-Indigenous Cultural Heritage”</b>	Significant Non-Indigenous Cultural Heritage is an historic place or object of architectural, scientific, social or technological significance to past, present or future generations. Examples include: buildings and ruins, rural Infrastructure, timber industry, transport routes, archaeological places, military and mining.
<b>“Statewide Forests Process”</b>	The process whereby key timber industry and conservation group representatives make recommendations to the Queensland Government on long-term timber supply arrangements.
<b>“Threatening Process”</b>	Any process that is capable of – <ul style="list-style-type: none"> <li>(a) threatening the survival of any protected area, area of major interest, protected wildlife, community or native wildlife or native wildlife habitat;</li> <li>(b) affecting the capacity of any protected area, area of major interest, protected wildlife, community of native wildlife or native wildlife habitat to sustain natural processes; or</li> </ul>

(c) adversely affecting the Cultural Resources.

**“Unnatural Encouragement”**

Typically Waste receptacles that allow native animal access and feeding of native animals.

**“Waste”**

Anything that is left over, an unwanted by-product or surplus to the activity generating the Waste. Waste can be gas, liquid, solid, or energy, or a combination of any of these.

**“Water Values”**

Typically water quality, water availability, aquatic habitat values, riparian environments and ground water.

**“Watercourse”**

Typically streams, rivers, creeks, gullies, waterways and drainage lines.

**“Wetland”**

Permanent or periodic inundation or water-logging, which when wet display natural processes including the dynamics of water flow and water structures and/or provides valuable functions or habitat for native wildlife or wildlife processes at a species, community or ecosystem level. Water may be static, flowing, fresh, brackish or salty, and includes lakes, creeks, waterholes, rivers, marsh land, sedgeland, mangroves, reefs, floodplains, springs, man-made Wetlands where they provide biodiversity values etc.

- 1.2 A reference to a person includes a reference to corporations and other entities recognised by law.
- 1.3 In this Agreement the Table of Contents has been inserted for convenience of reference only and is not intended to be part of or to affect the meaning or interpretation of any of the terms and conditions of this Agreement.
- 1.4 A reference to a statute, regulation, ordinance or local law will be deemed to extend to all statutes, regulations, ordinances or local laws amending, consolidating or replacing them.
- 1.5 In this Agreement the headings to the clauses have been inserted for convenience of reference only and are not intended to be part of, or to affect the meaning or interpretation of, any of the terms and conditions of this Agreement.
- 1.6 The singular includes the plural and vice versa.
- 1.7 Words importing one gender include a reference to all other genders.
- 1.8 A covenant or agreement on the part of two or more persons will be deemed to bind them jointly and severally.
- 1.9 A reference to a clause, schedule or attachment is a reference to a clause, schedule or attachment to this Agreement and includes any amendments to them made in accordance with this Agreement.
- 1.10 In the case of any inconsistency between the Schedules and a clause contained in this Agreement, the provisions of the clause will prevail to the extent of any inconsistency.

1.11 Terms used in the Agreement and which are defined in the Act, have the same meaning as those terms in the Act.

## **2. Commencement and Term**

2.1 This Agreement is made pursuant to section 45 of the Act and is conditional upon the Governor in Council declaring the Land, by regulation, as a nature refuge, in accordance with the Act.

2.2 If the condition in clause 2.1 is not satisfied on or before that date specified in Item 4 in Schedule 1, then the Landholder will continue to manage the Land in accordance with the Management Principles, the Management Intent and the terms and conditions of this Agreement.

2.3 This Agreement will terminate on –

- (a) the date specified in Item 5 in Schedule 1;
- (b) the date that the declaration of the nature refuge over the Land is revoked in accordance with the Act; or
- (c) the date that the Lease is resumed, surrendered or forfeited under the Land Act 1994, whichever is the first to occur.

## **3. Management of the Land**

3.1 Subject to clause 2.2, the Landholder will manage the Land in accordance with –

- (a) the Management Principles;
- (b) the Declared Management Intent;
- (c) this Agreement; and
- (d) the Management Plan (if any).

3.2 The Management Principles are –

- (a) to conserve the Land's Significant Cultural and Natural Resources;
- (b) to provide for the controlled use of the Land's Cultural Resources and Natural Resources; and
- (c) to take into account the interest of the Landholder.

3.3 The parties agree that if there is any inconsistency between –

- (a) the Management Intent and the Declared Management Intent, then the Declared Management Intent will prevail to the extent of any inconsistency;
- (b) the Management Plan (if any) and the terms of this Agreement, then the Management Plan will prevail to the extent of any inconsistency; and
- (c) the terms of this Agreement and the conditions of the Lease, then the Lease will prevail to the extent of any inconsistency.

3.4 The DERM will use its best endeavours to -

- (a) notify the Landholder that the land has been declared a nature refuge; and

(b) provide the Landholder with a copy of the Declared Management Intent, as soon as practicable after the regulation is made under section 46 of the Act.

3.5 If a Management Plan is prepared by the Minister, the DERM will provide the Landholder with a copy of that Management Plan as soon as practicable after it is approved by the Governor in Council.

3.6 The Landholder will manage the Cultural Resources and Natural Resources in accordance with this Agreement.

#### **4. Threatening Process**

4.1 The Landholder will notify the DERM as soon as practicable after the Landholder becomes aware of the existence and nature of any Threatening Process on the Land, or on any adjoining land, or on any neighbouring land.

4.2 Upon receipt of that notice, the DERM will discuss with the Landholder what, if any, action is necessary to deal with the Threatening Process.

4.3 The parties' obligations under this Agreement will continue for the duration of any Threatening Process.

#### **5. Emergency Event**

5.1 Where either of the parties is unable, by reason of an Emergency Event, to carry out, wholly or in part, their obligations under this Agreement, they will give notice of such Emergency Event to the other party as soon as practicable. That notice must contain full particulars of the Emergency Event and upon receipt of that notice, the obligations of the party giving the notice, (so far as they are affected by the Emergency Event) will be suspended for the duration of the Emergency Event.

5.2 The party giving the notice will take all steps and use all reasonable diligence to deal with the Emergency Event as soon as practicable.

5.3 If the performance of any obligation under this Agreement is prevented by an Emergency Event, the time for performance will be extended by the duration of the Emergency Event.

5.4 Non-performance by either party of any obligation or condition of this Agreement, resulting from an Emergency Event, will not give rise to any liability to the other party for any direct, indirect, consequential or special losses or damages of any kind arising out of, or in any way connected with, that non-performance.

5.5 In containing the Emergency Event, the Landholder will only take action that has a minimal effect on the Cultural Resources and Natural Resources.

#### **6. Entry by the DERM**

6.1 The Landholder will permit the DERM and its employees, servants, agents and contractors to enter the Land, at all reasonable times, after the DERM gives the Landholder at least 5 Business Days' notice, for the following purposes –

(a) to determine if the Land is being managed in accordance with the terms of this Agreement; and

(b) to carry out the DERM's rights and obligations under this Agreement and the Act.

6.2 The right of entry under clause 6.1 does not include a right of entry into buildings used primarily for residential purposes.

## **7. Indemnity**

The DERM –

- (a) indemnifies; and
- (b) releases and discharges,

the Landholder from and against all actions, proceedings, claims, demands, costs, losses, damages and expenses which may be brought against or made upon the Landholder, or which the Landholder may pay, sustain, or be put to by reason of, or in consequence of, or in connection with the DERM's entry onto the Land under clause 6, other than as a result of the negligent act or omission, or the wilful default of the Landholder, its employees, servants, agents, contractors or invitees.

## **8. Assistance to the Landholder**

8.1 From time to time, the DERM may provide financial, technical and/or other assistance to the Landholder as specified in Item 8 in Schedule 1, or as agreed by the parties from time to time.

8.2 The assistance provided by the DERM under clause 8.1 is in consideration for the Landholder complying with the terms and conditions of this Agreement.

## **9. Management Conditions**

9.1 In addition to the management conditions specified in clause 9, the Landholder must comply with the obligations specified in Schedule 4.

### *Mining*

9.2 The parties acknowledge that existing and future rights related to mineral and petroleum exploration and extraction are not altered by this Agreement.

9.3 The parties acknowledge that any lawfully approved mining or petroleum-related activity on the Land is planned and conducted in accordance with relevant statutory requirements, including environmental, conservation and cultural heritage requirements relevant to the Land.

### *Forestry*

9.4 The Landholder acknowledges and agrees that –

- (a) existing rights of the Queensland Government to have access to and permit the sale of forest products (e.g. timber) on the Land are not altered by this Agreement;
- (b) the policy intent of the Queensland Government at the Date of this Agreement is to provide certainty to the forest industry, to protect environmental values and to ensure ecologically sustainable management of forests which will include a transition out of commercial native hardwood timber harvesting in favour of plantations;



- (c) the Queensland Government has established the Statewide Forests Process to achieve these objectives for all State-owned land; and
- (d) harvesting of timber on State-owned lands is planned and conducted with regard to regional and local conservation values.

### *Sustainable grazing*

#### 9.5 Subject to –

- (a) the Landholder being granted a Crown lease over the Land for the purpose of conducting a grazing enterprise;
- (b) the provisions of the Land Act 1994 (or any replacement or substituted legislation relating to the issue of and rights granted under Crown leases); and
- (c) the provisions of this Agreement,

the State of Queensland acknowledges the granted rights of the Landholder to conduct a grazing enterprise on the Land throughout the term of this Agreement.

#### **10. Agreement Binding**

The parties agree that –

- (a) there may be other entities, groups or individuals, including native title holders, who have an interest in the Land and who are not parties to this Agreement;
- (b) this Agreement is not a registrable conservation agreement as defined in the Act; and
- (c) subject to clause 11, this Agreement is only binding on the parties to this Agreement and is not binding on the Landholder's successors in title, or other persons who have an interest in the Land.

#### **11. Change of Owner**

11.1 The Landholder will notify the DERM of the name and contact details of the person with whom the Landholder has entered into a contract of sale or other Agreement for the sale or transfer of the whole or part of the Lease. Notification will be no later than 10 Business Days after entering into the relevant agreement, for the purposes of the DERM contacting the new Landholder.

11.2 The Landholder must not transfer the Lease, or part of the Lease, unless the proposed transferee and the DERM have entered into a Deed of Assignment, with the intention of entering into an agreement on identical terms to this Agreement once the transfer of the lease has proceeded.

#### **12. Liability of the DERM**

The Landholder agrees that the DERM will not be liable for any act or omission which occurs on the Land merely as a result of the parties entering into this Agreement, or the subsequent declaration of the Land as a nature refuge in accordance with the Act.

### **13. Compliance with Laws**

- 13.1 At its own expense, the Landholder will comply with and observe all Acts of Parliament, local laws, regulations or rules for the time being in force which apply to the Landholder's obligations under this Agreement.
- 13.2 Any approval under this Agreement to undertake activities does not constitute an approval under any other Act of Parliament, local laws, regulations or rules referred to in clause 13.1.

### **14. Mediation**

- 14.1 If a dispute arises in connection with this Agreement, a party to the dispute must give a notice to the other party, providing details of the dispute and requiring its resolution under this clause 14 (Notice of Dispute).
- 14.2 Each party must confer within 5 Business Days after the Notice of Dispute is given to them to try to resolve the dispute.
- 14.3 If the dispute is not resolved within 10 Business Days after the Notice of Dispute is given to the other party (First Period), the dispute is by this clause submitted to mediation. The mediation must be conducted at the place specified in Item 6 of Schedule 1, or such other place as the parties agree. The Institute of Arbitrators and Mediators Australia Rules for the Mediation of Commercial Disputes (Edition 2 – September 1995) as amended by this clause 14 apply to the mediation, except where they conflict with this clause 14.
- 14.4 If the parties have not agreed upon the mediator and the mediator's remuneration within 10 Business Days after the First Period –
- (a) the mediator is the person appointed by; and
  - (b) the remuneration of the mediator is the amount or rate determined by,
- the President of the Queensland Law Society (President) or the President's nominee, acting on the request of either party to the dispute.
- 14.5 The parties must pay the mediator's remuneration in the proportion determined by the mediator. Each party must pay its own costs of the mediation.

### **15. Default**

- 15.1 If the Landowner is in default in the performance of any obligation under this Agreement, the DERM may give written notice to the Landholder specifying –
- a) the default;
  - b) what action is required to remedy the default; and
  - c) the time by which the default is to be rectified.
- 15.2 In determining what action is required by the Landholder to remedy the default, the DERM may have regard to the financial resources of the Landholder and any financial assistance provided to the Landholder under this Agreement.

- 15.3 The time specified in the notice by which the Landholder is to remedy the default, must be a reasonable time, having regard to the nature of the default.
- 15.4 However, if the default was as a result of intentional or reckless action on the part of the Landholder or its servants or agents, the DERM is not obliged to take into consideration the financial resources of the Landholder or any amount of financial assistance received by the Landholder under this Agreement.
- 15.5 If the Landholder fails to rectify the default in accordance with the notice, then the DERM may rectify the default, or engage others to rectify the default, at the cost of the Landholder.
- 15.6 The cost of any rectification will be a debt owing to the DERM.

## **16. Termination**

This Agreement will terminate if the declaration of the nature refuge over the Land is revoked in accordance with the Act.

## **17. Notices**

- 17.1 Notices under this Agreement may be delivered by hand, by registered mail, or by facsimile to the addresses specified in Item 7 of Schedule 1, or any substitute address as may have been notified in writing by the relevant addressee from time to time.
- 17.2 Notice will be deemed to be given –
- (a) 5 Business Days after deposit in the mail with postage prepaid;
  - (b) when delivered by hand; or
  - (c) if sent by facsimile transmission, upon an apparently successful transmission being noted by the sender's facsimile machine prior to close of business at 5.00pm. Facsimile transmissions received after 5.00pm will be deemed to be received at the start of the next working day, as the case may be.
- 17.3 Any notice to a party may be given to its solicitor by any of the means specified in clause 17.2 to the solicitor's business address or facsimile number.

## **18. Severability**

If anything in this Agreement is invalid, unenforceable, illegal or void, then it is severed and the remaining terms continue in force.

## **19. Waiver**

No rights under this Agreement will be deemed to be waived except by written notice signed by each party. A waiver by either party will not prejudice that party's rights in respect of any subsequent breach of this Agreement by the other party. Any failure by either party to enforce any clause of this Agreement, or any forbearance, delay, or indulgence granted by either party to the other will not be construed as a waiver of rights under this Agreement.

**20. Governing Law**

This Agreement will be governed by and construed according to the law of the State of Queensland and the parties agree to submit to the jurisdiction of the Courts of the State of Queensland.

**21. Costs**

Each party will pay its own costs of and incidental to the negotiation, preparation and execution of this Agreement.

**22. Execution**

22.1 The parties agree that if this Agreement is not executed by both parties on the same date, this Agreement will commence on and from the later of the dates of execution.

22.2 The parties will execute copies of this Agreement with each party retaining an original copy.

**23. Entire Agreement**

This Agreement constitutes the entire agreement between the parties. Any prior arrangements, agreements, warranties, representations or undertakings are superseded.

**SCHEDULE 1**

**Item 1** Landholder: **BHP COAL PTY LTD**  
**A.C.N. 010 595 721**  
**QCT MINING PTY LTD**  
**A.C.N. 010 487 840**  
**MITSUBISHI DEVELOPMENT PTY LTD**  
**A.C.N. 009 779 873**  
**QCT INVESTMENT PTY LTD**  
**A.C.N. 010 487 831**  
**BHP QUEENSLAND COAL INVESTMENTS PTY LTD**  
**LTD**  
**A.C.N. 098 876 825**  
**UMAL CONSOLIDATED PTY LTD**  
**A.C.N. 000 767 386**  
**QCT RESOURCES PTY LIMITED**  
**A.C.N. 010 808 705**

**Item 2** Land: **Part of lot 9 on plan CNS139 and part of lot 2 on plan SP214733, situated in the County of Cairns, containing an area of about 1,087ha, shown on plan PA488.**

**Item 3** Lease: **TL 0/233437 and TL 0/233439**

**Item 4** Date for Satisfaction of Condition in clause 2: **No later than 12 months after the Date of this Agreement.**

**Item 5** Expiry Date: **16/06/2030**

**Item 6** Place of Mediation: **Brisbane**

**Item 7** Address for Notices:

**Landholder**

Address: **Level 23, Riparian Plaza, 71 Eagle St, Brisbane**

Postal Address: **GPO Box 1389, Brisbane, Queensland, 4001**

Attention: **Manager Environment**  
Telephone: **07 3226 0754**  
Facsimile: **07 3226 0625**  
Email: **peter.a.roe@bmacoal.com**

Address: **400 George Street, Brisbane, Q 4000**

Postal Address: **GPO Box 2771, Brisbane, Q 4001**

Attention: **Director-General**

Telephone: **(07) 3330 6240**

Facsimile: **(07) 3330 6306**

**Item 8** Assistance: **The State may provide assistance to the Landholder, including:**

- **advice on the control of pest plants and animals;**
- **advice on wildfire prevention and suppression;**
- **assistance in enforcing any regulation pertaining to the land.**

## SCHEDULE 2

### Significant Cultural and Natural Resources for this Land

This Agreement is intended to protect and enhance the following Significant Cultural and Natural Resources for this Land:

1. **The following regional ecosystems that have no representation in the Protected Area:-**
  - i. *Eucalyptus orgadophila* open woodland on Cainozoic clay plains, described as the endangered regional ecosystem 11.4.13.
  
2. **The following regional ecosystems that have low representation in the Protected Area:-**
  - i. *Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains, described as endangered regional ecosystem 11.4.9;
  - ii. *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains, described as endangered regional ecosystem 11.4.8;
  - iii. *Acacia harpophylla*, *Lysiphyllum carronii* ± *Casuarina cristata* open-forest to woodland, described as endangered regional ecosystem 11.4.9a;
  - iv. *Eucalyptus* spp. and/or *Corymbia* spp. grassy or shrubby woodland on Cainozoic clay plains, described as the not of concern regional ecosystem 11.4.2;
  - v. *Eucalyptus melanophloia* woodland on alluvial plains, described as the not of concern regional ecosystem 11.3.6; and
  - vi. *Eucalyptus populnea* woodland on alluvial plains, described as the not of concern regional ecosystem 11.3.2.
  
3. **Known habitat for rare and threatened species, including:-**
  - i. the vulnerable ornamental snake – (*Denisonia maculata*); and
  - ii. the rare little pied bat – (*Chalinolobus picatus*).
  
4. **Suitable habitat for rare and threatened species, including:-**
  - i. the endangered star finch (eastern subspecies) – (*Neochmia ruficauda ruficauda*), and red goshawk – (*Erythroriorchis radiatus*); and
  - ii. the vulnerable Squatter pigeon (southern subspecies) – (*Geophaps scripta scripta*); and
  - iii. the rare common death adder – (*Acanthophis antarcticus*), square-tailed kite – (*Lophoictinia isura*), black-chinned honeyeater – (*Melithreptus gularis*), and *Anomalopus brevicollis*.

### **SCHEDULE 3**

#### **Management Intent**

- (a) manage and conserve the significant cultural and natural values of the nature refuge;
- (b) permit or restrict, or require to be conducted, particular activities in or in relation to the nature refuge;
- (c) permit or restrict the use of the Land for a particular purpose; and
- (d) permit or restrict access to the Land by particular persons or animals.



## SCHEDULE 4

### Item 1. General

*Protection of the natural and cultural resources of the Land by:*

- a) Not permitting or applying for subdivision of the Land or for the erection of Major Infrastructure, except where consent in writing for non-residential buildings necessary for the proper and effective management of the Land is given in this Agreement or by the Minister. Where this Agreement or the Minister has given consent in writing, the Infrastructure must be sensitively designed to harmonise with the surrounding natural environment.
- b) Existing and future rights related to mineral and petroleum exploration and extraction are not altered by this Agreement.
- c) Any lawfully approved mining or petroleum-related activity on the Land will be planned and conducted in accordance with relevant statutory requirements, including environmental, conservation and cultural heritage requirements relevant to the Land.
- d) Existing rights of the Queensland Government to access and permit the sale of forest products (e.g. timber) on the Land are not altered by this Agreement.
- e) The policy intent of the Queensland Government at the time of this Agreement is to provide certainty to the forest industry, to protect environmental values and to ensure ecologically sustainable management of forests. This will include a transition out of commercial native hardwood timber harvesting in favour of plantations.
- f) The Queensland Government has established the Statewide Forests Process to achieve these objectives for all State owned land.
- g) Further commercial timber harvesting on the Land may occur, but only where necessary to provide supply to the timber industry under the Statewide Forests Process.
- h) Harvesting of timber on State owned lands is planned and conducted with regard to regional and local conservation values and in accordance with relevant standards.

### Item 2. Natural resource protection

*Ecosystem management and protection (e.g. regional ecosystems, vegetation communities)*

*Protection of the viability and resilience of ecosystems on the Land by:*

- a) Conducting Land Uses and land management activities on the Land in such a way that ecological integrity and diversity of ecosystems are protected.
- b) Managing all regrowth vegetation communities on the Land to ensure they return to remnant status of the same regional ecosystem description as described by this Agreement.
- c) Not undertaking further infrastructure development, unless otherwise allowed under this Agreement, within areas of the nature refuge that contain brigalow (*Acacia harpophylla*), or in other areas of the nature refuge where such development may, in the opinion of the Queensland Herbarium, impact negatively on brigalow communities.
- d) Managing fire on the property to maintain the extent of brigalow communities, in accordance with an agreed Fire Management Plan.
- e) Undertaking any grazing activities in accordance with current best practice guidelines.

### ***Wildlife and habitat protection***

*Protection of populations of native plants and animals, including their habitat, from threatening processes by:*

- f) Protecting native plants and animals by not deliberately damaging, marking, moving or removing any native plant or animal, unless otherwise approved in this Agreement.
- g) Protecting native animal habitats by not damaging, destroying, marking, moving, digging up or otherwise interfering with active nests (i.e. canopy, sub-canopy and ground nests), burrows, roosts, caves or other structures used by native animals.
- h) Conducting and managing Land Uses and land management activities in a manner that minimises interruption to breeding cycles and food sources.
- i) Not intentionally killing or taking native fauna unless licensed to do so under relevant legislation.
- j) Not employing any native Fauna Deterrent unless otherwise approved in this Agreement or licensed.
- k) Preventing Unnatural Encouragement of wildlife, unless otherwise approved in this Agreement.

### ***Water, Watercourses and Wetland protection***

*Protection of Wetland and Water Values on the Land by:*

- l) Minimising unnatural contamination, sedimentation or degradation resulting from Land Uses and land management activities conducted on the Land.
- m) Providing for natural water flows and processes, unless specified otherwise or where established prior to this Agreement.
- n) Protecting Wetland and riparian vegetation to prevent or minimise Scour and/or Instability.

### ***Soil stability and protection***

*Protection of soil productivity and integrity on the Land by:*

- o) Preventing or minimising soil erosion, compaction or any deterioration of the soil's physical, biological or chemical properties resulting from Land Uses and land management activities conducted on the Land.
- p) Protecting soil from mechanical disturbance in Sensitive Areas, unless approved otherwise in this Agreement.
- q) Protecting areas of obvious past, present or potential Instability by restricting Land Uses and land management activities in such areas, with the exception of site rehabilitation activities.

### ***Protection of Significant Geological Features and Landforms***

*Protection of Significant Geological Features and Landforms on the Land by:*

- r) Conducting Land Uses and land management activities on the Land in such a way to prevent loss, minimise damage to, or deterioration of, Significant Geological Features and Landforms on the Land.

### **Item 3. Cultural resource protection**

#### ***Protection of Significant Indigenous Cultural Heritage resources***

##### *Protection of Significant Indigenous Cultural Heritage resources on the Land by:*

- a) Conducting Land Uses and land management activities on the Land in such a way to prevent damage or harm to any Significant Indigenous Cultural Heritage resources.
- b) Reporting any newly discovered Indigenous cultural heritage resources to the DERM.
- c) Not removing, moving, damaging, collecting or interfering with any artefacts or sites on the Land.

#### ***Protection of Significant Non-Indigenous Cultural Heritage resources***

##### *Protection of Significant Non-Indigenous Cultural Heritage resources on the Land by:*

- d) Conducting Land Uses and land management activities on the Land in such a way to prevent or minimise damage to any Significant Non-Indigenous Cultural Heritage resources.
- e) Reporting any newly identified non-Indigenous cultural heritage resources to the DERM.
- f) Not removing, moving, collecting or interfering with any artefacts or sites on the Land.

### **Item 4. Land protection and threat abatement**

#### ***Pest Animal management***

##### *Protection of natural and cultural resources on the Land from Pest Animals by:*

- a) Taking steps to minimise the introduction of Pest Animals and control of existing populations of Pest Animals on the Land.
- b) Humanely control/cull Pest Animals.
- c) Timing and management of Control Programs to prevent the capture, injury or death of non-target native animals.
- d) Informing the DERM about any new occurrences of Declared Pest Animals.

#### ***Pest Plant management***

##### *Protection of natural and cultural resources on the Land from Pest Plants by:*

- e) Taking steps to minimise the introduction, establishment and spread of Pest Plants and control of existing infestations of Pest Plants on the Land.
- f) Timing and management of Control Programs to prevent the illness, injury or death of native wildlife.
- g) Informing the DERM about any new occurrences of Declared Pest Plants.
- h) Controlling or eradicating any new occurrences of Declared Pest Plants.
- i) Taking precautions to minimise the risk of equipment and vehicles spreading or introducing Pest Plant seeds, other vegetative material, deposits of mud or other debris on leaving an infected area within the Land or prior to entering the Land.

#### ***Disease management***

##### *Protection of natural and cultural resources on the Land from Disease by:*

- j) Taking reasonable steps to minimise the introduction, establishment and spread of Disease where feasible.

- k) Reporting any unusual flora or fauna death, damage or Disease activity that may threaten natural resources on the Land to the DERM.
- l) Quarantining all machinery and equipment from Disease infected areas until cleaned/disinfected.

## **Item 5. Land use and management**

### ***Fire management***

*Implementation of fire management strategies to protect natural and cultural resources on the Land by:*

- a) Developing and implementing appropriate fire management strategies (typically prevention, preparedness and suppression).
- b) Developing and implementing a Fire Management Plan for the property.
- c) Taking steps to prevent fire entering those areas of the nature refuge that contain brigalow (*Acacia harpophylla*), to prevent damage to fire-sensitive ecosystems and to prevent groundcover disturbance as a result of fire that may encourage the spread of non-native grasses (such as buffel grass) into these ecosystems.
- d) Keeping a register of fires on the property that can be viewed by DERM on request.

### ***Native vegetation removal/management (i.e. timber, plant)***

*Harvest/removal of native vegetation (typically timber, thinning, whole plants, plant parts, seed) on the Land will maintain or enhance natural and cultural resources by:*

- e) Protecting native vegetation by not deliberately destroying, removing or damaging native vegetation on the Land, unless otherwise approved in this Agreement.
- f) Only felling timber for the purposes of replacing old or building new fences/yard rails on the Land.

### ***Built Infrastructure management (e.g. roads, tracks, fences, watering points)***

*Protection of natural and cultural resources on the Land from any adverse impacts associated with new or existing built Infrastructure by:*

- g) Constructing Major Infrastructure only where required and where allowed under this agreement or approved by the DERM.
- h) Designing roads and tracks appropriate to site condition and function.
- i) Ensuring new and existing Infrastructure, where allowed under this Agreement, is planned, sited, constructed and maintained to achieve the desired function and minimise impacts on natural and cultural resources on the Land.
- j) Decommissioning Major Infrastructure in consultation with the DERM and restore the site to a safe stable and rehabilitated state.
- k) Minimising the total area of disturbance when building Infrastructure.

### ***Waste and Hazardous Material management***

*Management of Waste and Hazardous Materials to protect natural and cultural resources on the Land by:*

- l) Conducting Land Uses and management activities in such a way as to minimise the risk of land and water pollution, visual or other degradation from Wastes on the Land.

- m) Securing, storing, using and disposing of Hazardous Substances in accordance with label instructions.
- n) Not burying/disposing of any non-degradable Waste on the Land, unless otherwise approved in this Agreement or approved by the DERM.

#### **Item 6. Continual improvement**

##### ***Monitoring***

*Monitoring will be conducted on the Land to assess whether the outcomes of this Agreement have been met by:*

- a) Ensuring monitoring conducted by the Landholder assesses condition, trend and impacts, with the view to continual improvement and corrective action where required.
- b) Upon DERM's request, provide access and reasonable assistance to DERM staff in order to conduct field data collection activities at established Ecosystem Dynamics Simulator plot sites on the Land.
- c) Developing and implementing a Monitoring Plan for the property within 12 months of executing this Agreement.
- d) Completing an annual Monitoring Report, noting observations relating to this Agreement and significant events on the Land for that year. The Monitoring Report must be submitted to the EPA on 31 March each year.
- e) Attaching any other monitoring or research results conducted on the Land, generated by or commissioned by the Landholder, to the Monitoring Report.

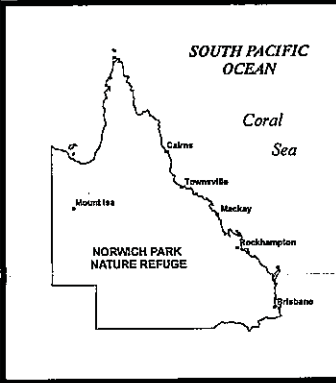
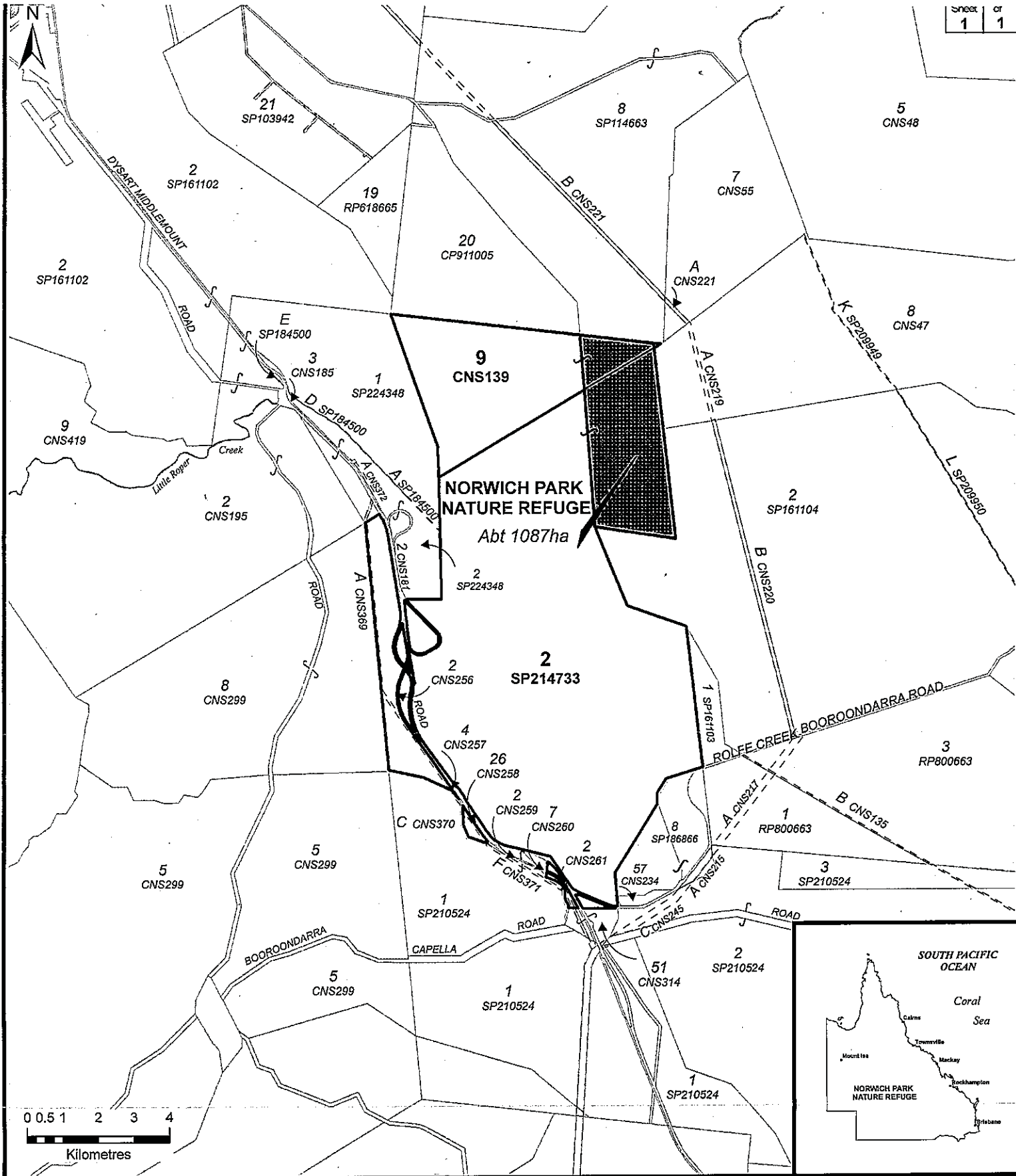
##### ***Restoration/revegetation***





*Any restoration/revegetation works conducted on the property will enhance natural and cultural resources on the Land by:*

- f) Using local provenance seed stock, preferably sourced from the Land, when planting or direct seeding.
- g) Conducting restoration work in consultation with the DERM.

**SCHEDULE 5**

**Protected Area Plan  
PA488  
(attached)**



 <b>Queensland Government</b> <small>DATUM: GDA94 ZONE: MGA 55</small>	<h2 style="margin: 0;">PLAN OF NORWICH PARK NATURE REFUGE</h2> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Norwich Park Nature Refuge</p> </div> <div style="text-align: center;">  <p>Exclusion Area</p> </div> </div>	<p>Scale: <b>1:100000</b> Note A4 copy is reduced.</p>	
<p><small>© The State of Queensland (Department of Environment and Resource Management) 2010. Produced to delineate the boundaries of the Nature Refuge under the provisions of the Nature Conservation Act 1992 and the Survey and Mapping Infrastructure Act 2002. While every care is taken to ensure the accuracy of this product the Department of Environment and Resource Management makes no representation or warranties about its accuracy, reliability, completeness or suitability for any particular purpose. Additionally, the Department of Environment and Resource Management disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the product being inaccurate or incomplete in any way and for any reason. The property boundaries shown on this plan are APPROXIMATE ONLY. They are NOT an accurate representation of the legal boundaries. Based upon an extraction from the Digital Cadastral Data Base on: 01/02/2010</small></p>			
<p><b>PARISH:</b> KIRKALDY &amp; WYNDHAM      <b>LOCAL AUTH:</b> ISAAC REGIONAL</p> <p><b>COUNTY:</b> CAIRNS      <b>REGION:</b> CAPRICORNIA</p> <p><b>LOCALITY:</b> DYSART      <b>ELECTORATE:</b> MIRANI</p>		 <h1 style="margin: 0;">AP19045</h1>	
<p><b>SYSINT Code:</b> 8428NWH001</p>	<p><b>PA Number:</b> PA488</p>		<p><b>Drawn By:</b> JMM</p>
<p><b>File Ref:</b> BNE39412</p>	<p><b>Map Ref:</b> 8552-12222</p>		<p><b>Date:</b> 01/02/2010</p>

**Executed as a Deed on the Dates Appearing Below**

**BM ALLIANCE COAL OPERATIONS PTY LTD** as manager and agent on behalf of the Central Queensland Coal Associates Joint Venture participants, with authority to bind each of the participants in proportion to their respective participating interest in the Joint Venture.

**SIGNED** by

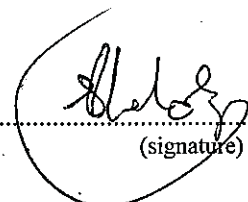
**BM ALLIANCE COAL OPERATIONS PTY LTD (ABN 67 096 412 752)** as the duly constituted attorney of **BHP Coal Pty Ltd (ABN 83 010 595 721)**, **Umal Consolidated Pty Ltd (ABN 29 000 767 386)**, **BHP Queensland Coal Investments Pty Ltd (ABN 56 098 876 825)**, **Mitsubishi Development Pty Ltd (ABN 17 009 779 873)**, **QCT Investment Pty Ltd (ABN 45 010 487 831)**, **QCT Mining Pty Ltd (ABN 47 010 487 840)** and **QCT Resources Pty Ltd (ABN 74 010 808 705)** under registered power of attorney no. 707957220. BM Alliance Coal Operations Pty Ltd declares that it has not received any notice of revocation of its power of attorney.

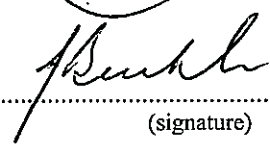
in accordance with section 127(1) of the *Corporations Act 2001* (Cth)

this 26<sup>th</sup> day of April 2010

by: Gideon Oberholzer  
a Director

and by: Jill Buckle  
a Company Secretary

  
(signature)

  
(signature)



SIGNED for and on behalf of the STATE OF QUEENSLAND by

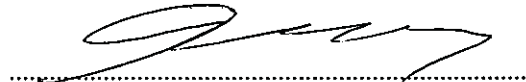
JOHN BRADLEY

the Chief Executive of the Department of Environment and Resource Management a delegate of the Minister administering the *Nature Conservation Act 1992*

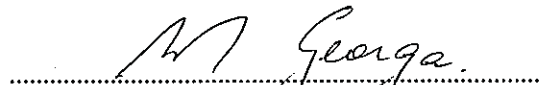
this 24th day of July 2010

in the presence of:

Margaret GEORGA  
(print name of witness)



(signature)



(signature of witness)



## Appendix 4 – Balmoral Grassland Restoration Program

The Commonwealth EPBC Act approval for the Caval Ridge Mine (2008/4417) specifies that BMA must 'Protect and enhance 733.3 hectares of Bluegrass (*Dichanthium* spp) dominant grasslands of the Brigalow Belt Bioregions (North and South) ecological community in the Gregory Crinum Offset Area'.

As stated previously this TEC in the 'Balmoral' BOA has been superseded by 'Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin'.

The Caval Ridge Mine Offset Management Plan (BMA 2011) identifies that of the 733.3 ha offset required, 383.3 ha is remnant *Dichanthium sericeum* grassland (RE 11.8.11) with an additional 350 ha of degraded grasslands specified for restoration. The remnant grassland (RE 11.8.11) and proposed *D. sericeum* grassland restoration are shown on Figure 4.

The objectives of the *D. sericeum* grassland restoration program are to:

- Re-establish 350 ha of native grassland (equivalent to RE 11.8.11) in the 'Balmoral' BOA
- Prescribe practices required for the ongoing management of the restored grasslands
- Develop an appropriate monitoring program

### Condition assessment

A quantitative condition assessment was undertaken in the native grasslands (RE 11.8.11) at the 'Balmoral' BOA utilising the BioCondition assessment framework methodology. The condition of the native grasslands at the 'Balmoral' BOA is generally high or moderate due to high species diversity, cover, low weed abundance and landscape functionality.

### Site selection

Two main areas of Sorghum cropping were previously identified for *D. sericeum* grassland restoration (URS 2011). Due to revisions to the RE mapping as part of this study, the precise boundaries and areas have been modified slightly. Importantly the total area of proposed *D. sericeum* grassland restoration remains 350 ha, including:

- An approximately 43 ha area in the central portion of the 'Balmoral' BOA which is bounded by remnant native grassland on two sides (**Figure 5**)
- An approximately 307 ha area in the south-west of the 'Balmoral' BOA which will support and connect small isolated remnants of native grassland (**Figure 5**)

Restoration sites were based primarily on DEHP pre-clearing RE mapping for the 'Balmoral' BOA.

### Trials

Due to the extensive scale of the proposed restoration (350 ha), a number of trials are recommended to determine the most effective methods for re-establishment of native grassland under the specific conditions present at the 'Balmoral' BOA. The trials will aim to determine the most effective methods for seed collection, weed control, sowing, establishment and maintenance.



Trial plots are to be replicated three times, collectively covering the spatial extent of the *D. sericeum* grassland restoration area. Recommended sites for trials have been selected based on spatial extent, topography (drainage and aspect) and ease of access (**Figure 5**).

Proposed treatment options have been selected based on current knowledge and experience in native grassland restoration.

The proposed treatment options include:

- Seed sowing method 1 – grass air seeder followed by light-covering harrows
  - Seed sown at 2 kg/ha
  - Seed sown at 4 kg/ha
- Seed sowing method 2 – grassland mulch spreader (hay bales)
  - Seed sown at 2 kg/ha (or equivalent seed proportion for hay)
  - Seed sown at 4 kg/ha (or equivalent seed proportion for hay)
- Seed sowing method 3 – topsoil translocation (dependant on availability of suitable topsoil)
  - Topsoil spread at 50 mm
  - Topsoil spread at 100 mm

To provide meaningful data for analysis, each seed sowing method will be evaluated with two different sowing rates, replicated four times ( $n=24$ ) across the three trial areas ( $n=72$ ). Each trial area will consist of an overall 0.8 ha plot (80 m x 120 m) with clustered 0.04 ha (20 x 20 m) rehabilitation sub-plots. The 0.04 ha sub-plots have been recommended due to the difficulty in scaling down the proposed trial due to machinery restrictions. Each 0.8 ha trial plot is to be pegged and clearly marked for identification. Clearly marked corner pegs are also required for each sub-plot. Grazing-exclusion fencing will be required in areas subject to grazing.

Each 0.8 ha trial plot is to be located within the general areas identified in (**Figure 5**), ensuring the plot is located in a relatively homogenous location (drainage, aspect, soils etc.) and aligned across the contour to minimise site specific impacts on the experimental design. An example layout of the proposed trial is outlined below in **Table A4.1**.

### Seed collection

Wherever possible, seed for revegetation should be collected from the 'Balmoral' BOA. For the *D. sericeum* grassland restoration, seed can be collected from within the mapped natural grasslands within the 'Balmoral' BOA as they are generally low in weed abundance. Seed may be collected from other areas within the region provided the source locations have low weed abundance. Weed abundance in other native grasslands is to be assessed in accordance with the BioCondition methodology.

When collecting seed for native grasslands (or grassy woodlands), care needs to be taken of environmental and declared weed species including *P. hysterophorus* and *C. ciliaris*. Areas infested with weeds are not to be included in the seed collection program. Areas of *D. sericeum* grassland within the 'Balmoral' BOA are generally in excellent condition, however, there are occasional infestations of both *P. hysterophorus* and *C. ciliaris* which need to be avoided.



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## Caval Ridge Mine Offset Management Plan



### *Timing*

Seed harvesting for native grasses (including *D. sericeum*) should be undertaken during the summer period following rainfall. Monitoring of donor sites within the 'Balmoral' BOA will be required following the first summer rains to determine the most appropriate time for seed collection.





**Table A4.1: Proposed *Dichanthium sericeum* grassland restoration trial layout**

80 m		Method 1 Seed 2 kg/ha	Method 3 50 mm	Method 2 Seed 2 kg /ha	Method 3 100 mm	Method 2 Seed 4 kg / ha	Method 1 Seed 4 kg / ha
		Method 2 Seed 4 kg / ha	Method 1 Seed 4 kg / ha	Method 1 Seed 2 kg/ha	Method 3 50 mm	Method 3 100 mm	Method 2 Seed 2 kg /ha
		Method 3 50 mm	Method 2 Seed 2 kg /ha	Method 3 100 mm	Method 2 Seed 4 kg / ha	Method 1 Seed 2 kg/ha	Method 1 Seed 4 kg / ha
	20 m	Method 3 100 mm	Method 2 Seed 4 kg / ha	Method 3 50 mm	Method 1 Seed 4 kg / ha	Method 2 Seed 2 kg /ha	Method 1 Seed 2 kg/ha
	20 m						
120 m							

### Collection methods

Three methods have been proposed for the collection of seed (or seed resources) for the *D. sericeum* grassland restoration. There are many native species which form part of the *D. sericeum* grassland community (RE 11.8.11) including native grasses, herbs, shrubs, rushes and sedges which should all be broadly collected as part of this project (rather than restricting collection to *D. sericeum* only).

Grassland diversity is important for establishment and biodiversity.

- Method 1 is brush harvesting which enables the collection of mature florets only, allowing for subsequent collection of seed as it matures. Other methods which enable the collection of mature florets may be utilised. Yields of between 50 and 100 kg / ha are expected (Scattini 2008)
- Method 2 is hay bailing or mulching which involves cutting and bailing the entire inflorescence (flower head) of native grasses. Hay bailing may produce up to 2.5 t/ha dry mass depending on a range of climatic and geographic factors (Scattini 2008).
- Method 3 is topsoil translocation which involves the relocation of organic material and topsoil ('O' and 'A' layers respectively) from areas to be cleared (e.g. for adjoining mining activities at GCM) to areas proposed to be rehabilitated.





The difference in seed versus hay/mulch material collected is shown in **Plate 1**. When using hay bales for revegetation, it is important to determine the content of seed versus inflorescence material to determine appropriate seeding rates.



**Plate A4.1: Themeda triandra (Kangaroo Grass) cleaned seed (left) and mulch (right)**

### **Seed storage**

*D. sericeum* is known to have post-harvest seed dormancy. Seeds may germinate rapidly following harvest and then have a short period of dormancy of up to 6 months (Scattini 2008). Germination percentages have been shown to be greatest between 6 and 12 months post collection, decreasing in viability after 4 to 5 years (DPI 2001).

Seed is to be sorted (chaff removed for Method 1), dried and stored. It is recommended that seed is stored in a vermin proof, ventilated shipping container located out of direct sunlight.

Collection details (collector, collection locality, date, rainfall, species etc.) are to be recorded for each seed collection batch.

### **Topsoil preparation**

Due to the erosive nature of the proposed *D. sericeum* grassland restoration sites, a number of measures are proposed to help minimise erosion:

- Restoration works should be staged so that bare soil surfaces are exposed for only brief periods
- Stubble retention of Sorghum crops should be considered prior to restoration
- Dip ripping to 500 mm on the contour at 6 m spacing (twice the width of a regular drill seeder) will capture overland flow and minimise erosion
- Contour banks may be appropriate in some instances where the surface gradient is greater than 5%

**Weed control**

Weed control prior to seeding is an essential part of the successful restoration of native grassland. Areas of disused cropping (abandoned within 2 years) within the 'Balmoral' BOA were observed to be infested with weeds including *P. hysterophorus*, *Sorghum bicolor*, *C. ciliaris* and *Melinis repens* (**Plate A4.2**).

It is recommended that an integrated weed control approach is implemented for the grassland restoration including application of a knock-down herbicide (e.g. glyphosate) combined with a pre-emergent herbicide at least 6 months prior to restoration, followed by an application of knock-down herbicide 3-4 weeks prior to restoration. Additional weed control may be required during this period.



**Plate A4.2: Disused Sorghum cropping land dominated by weeds**

**Seed sowing**

*D. sericeum* and other native grass seeds can be sown from late winter through summer and are best sown from August to October (when annual weeds are minimal) or from January to February (if resting is required between an early summer crop and restoration works) (Scattini 2008). The ideal temperature range for germination is between 20 – 30°C, with *D. sericeum* not specifically requiring wet conditions to germinate (DPI 2001).

Seed sowing is to be undertaken utilising two methods:

- Air seeding followed by light-covering harrows (**Plate A4.3**)
- Hay/mulch spreading (**Plate A4.44**)

These methods can either be undertaken manually (for small areas) or mechanically (for larger areas). Light-covering harrows are to be utilised for air-seeded areas to ensure good seed-soil surface contact. Areas which have been covered with hay/mulch do not require harrowing.

**Plate A4.3: 4WD mounted air seeder****Plate A4.4: 4WD mounted grassland mulch spreader*****Topsoil relocation***

Following the outcomes of the soil seed bank testing, topsoil translocation may be identified as a suitable restoration option. Topsoil translocation involves the relocation of organic material and topsoil ('O' and 'A' layers respectively) from areas to be cleared (donor sites) (e.g. for adjoining mining activities at GCM) to areas proposed to be rehabilitated (recipient sites). The actual depth of the 'A' horizon is to be determined on site. If the 'A' horizon is deep (i.e. >100 mm) it may be necessary to separate it into 'A<sub>1</sub>' and 'A<sub>2</sub>' horizons (topsoil with seed resources and subsoil respectively).

Once the depth of the topsoil at the donor site is determined, it will be possible to translocate this material to the recipient site at the 'Balmoral' BOA. Prior to scalping, it is recommended that the existing vegetation is slashed to ground level followed by scraping of the topsoil (using a grader or scraper depending on the scale).

Topsoil can then be carted from the donor site to the recipient site and re-spread at the recommended depths (50 to 100 mm in the trials). Re-spreading of topsoil would generally be undertaken with a grader.





### **Management of restored areas**

After germination, *D. sericeum* grasslands will need to be managed to ensure they successfully establish. On-going management of restored areas will be required to ensure that the restoration sites are stable, well vegetated and low in weed abundance.

Regular monthly weed control (spot-spraying) will be required for the first 12 months of establishment. Broad-acre weed control (using selective herbicides) will not be possible due to the other native species (herbs, shrubs, rushes and sedges) which are likely to germinate in the native grassland.

The use of grazing within restored areas to stimulate natural disturbance regimes may be required, however grazing should be excluded for at least the first 5 years.

### **Monitoring**

The rehabilitated *D. sericeum* grasslands are to be monitored and compared with adjacent native grassland control plots. Monitoring will provide benchmark data from controls, feedback on success of rehabilitation techniques, ongoing information on grassland establishment, grass health, weed control and demonstration of achieved rehabilitation acceptance criteria.

Monitoring of trial sites is to be undertaken bi-monthly (every two months) for the 12 months post restoration to accurately determine the success/failure of trial methodology. Monitoring will include surveying two 1 m<sup>2</sup> cover-abundance plots in each sub-plot (n=144 over 3 trial sites). Within each 1 m<sup>2</sup> plot, the following data is to be recorded:

- Species present (to species level if possible), including natives and weeds
- Cover-abundance of each species, leaf litter, bare ground and cryptograms

Following the completion of the rehabilitation trials, a report is to be prepared detailing the results of the trial, an analysis of the monitoring results and the identification of a preferred or optimal rehabilitation method. Based on the trials undertaken, the preferred rehabilitation method will be selected for the rehabilitation of the remaining 350 ha of native grassland.

Established *D. sericeum* grasslands should be subject to ongoing monitoring and comparison with control sites within neighbouring remnant grassland communities.

When rehabilitation is undertaken successfully, monitoring is documented evidence which allows for the methods of restoration to become the standard, and for the methods to be applied to other projects.

**Table A4.2** details the performance criteria by which the success of the revegetation and associated activities will be measured.

### **Reporting**

Reporting of the management actions and outcomes of the monitoring activities undertaken will be undertaken on an annual basis. The annual rehabilitation and monitoring report will contain a summary of the management actions undertaken during the reporting period, an analysis of the monitoring results as well as any additional studies or research conducted on vegetation monitoring techniques. The report will detail any non-compliance with performance objectives, as well as results of any corrective or preventative actions taken.



**Performance criteria**

**TableA4.2: Performance criteria**

MANAGEMENT ACTION	EXPECTED OUTCOME	MANAGEMENT ZONES	TARGET	TIMING	
Grazing for conservation	Increased native plant diversity	Managements Zone 1 and 2	Restore native plant species richness, and native canopy, mid-storey and grass cover to within 70% of reference condition	Canopy:15 yrs Midstorey:10 yrs Groundcover: 5 yrs	
		Management Zone 3	Restore native plant species richness, and native canopy mid-storey to within 70% of reference	Canopy:15 yrs Midstorey:10 yrs	
		Management Zone 4	Maintain native species richness and native canopy and mid-storey to within 70% of reference condition	Canopy: 20 yrs Midstorey:15 yrs	
		Managements Zone 1	Stock excluded Stock-proof fencing installed	<1 year	
		Managements Zone 2	Stock excluded Stock-proof fencing installed	1 to 5 years	
		Managements Zone 3	Stocking density reduced for conservation grazing Stock excluded	<1 year 10 to 20 years	
		Reduction of fauna resource competition and soil disturbance	Managements Zone 4	Stocking density set to manage weed infestations ( <i>Cenchrus ciliaris</i> ) and fire hazards Stock excluded	<1 year 20+ years
	Weed management	Reduction in weed cover	All Zones	All infestations of declared plants managed in accordance with the LPA	6 months after identification of infestations
	Feral animal management	Reduction in feral animals	All Zones	Feral animal control undertaken as per Feral Fauna Control Strategy	<1 year and ongoing
Retain dead timber	Increased fauna habitat complexity	Management Zone 1, 2 and 3	Restore lengths of fallen logs per hectare to within 50% of reference condition	10 years	
		Management Zone 4	Restore lengths of fallen logs per hectare to within 10% of reference condition	20 years	
Human disturbance	Reduction of soil disturbance	All Zones	Site access restricted to approved personnel	<1 year and ongoing	





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# Caval Ridge Mine Offset Management Plan



MANAGEMENT ACTION	EXPECTED OUTCOME	MANAGEMENT ZONES	TARGET	TIMING
			Signage installed No timber clearing or removal	
Erosion and sedimentation control	Increased stabilization in riparian zones	Management Zones 2 and 3	Stock excluded Stock-proof fencing installed	<1 year
	Increased vegetation cover on bed and banks	Management Zones 2 and 3	Restore native grass cover to within 50% of reference condition	5 years
Infrastructure – fencing	Stock exclusion	Management Zones 1 and 2	Stock-proof fencing installed	1 to 5 years
Infrastructure – tracks and waterway crossings	Improved access and reduced erosion	All Zones	Access tracks and waterway crossings formalised to facilitate access	As required
Fire management	Improved biodiversity values	All Zones	Ecological burns undertaken in accordance with fire season, intensity and frequency for each regional ecosystem ( <b>Table 12</b> )	As outlined in <b>Table 12</b>
			Ecological burns undertaken in a mosaic across the landscape with not more than 10 to 30% of each regional ecosystem type burnt in any one year	Each year

## Revegetation

<i>Dichanthium sericeum</i> grassland restoration	Increased native plant diversity	N/A	Grassland assessed to be in at least 'Good' condition under the DotE guidelines	2 - 5 years
			No active erosion and bare ground less than 5% (when assessed within two months of effective rain)	2 - 5 years
			Accepted and re-mapped as remnant by the Queensland Herbarium	10 years
Corridor revegetation	Increased habitat connectivity for native fauna	Management Zones 2, 3 and 4	Restore native canopy and mid-storey cover to within 50% of reference condition	Canopy: 20 yrs
				Midstorey: 10 yrs





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## Caval Ridge Mine Offset Management Plan



## Appendix 5 – Figures

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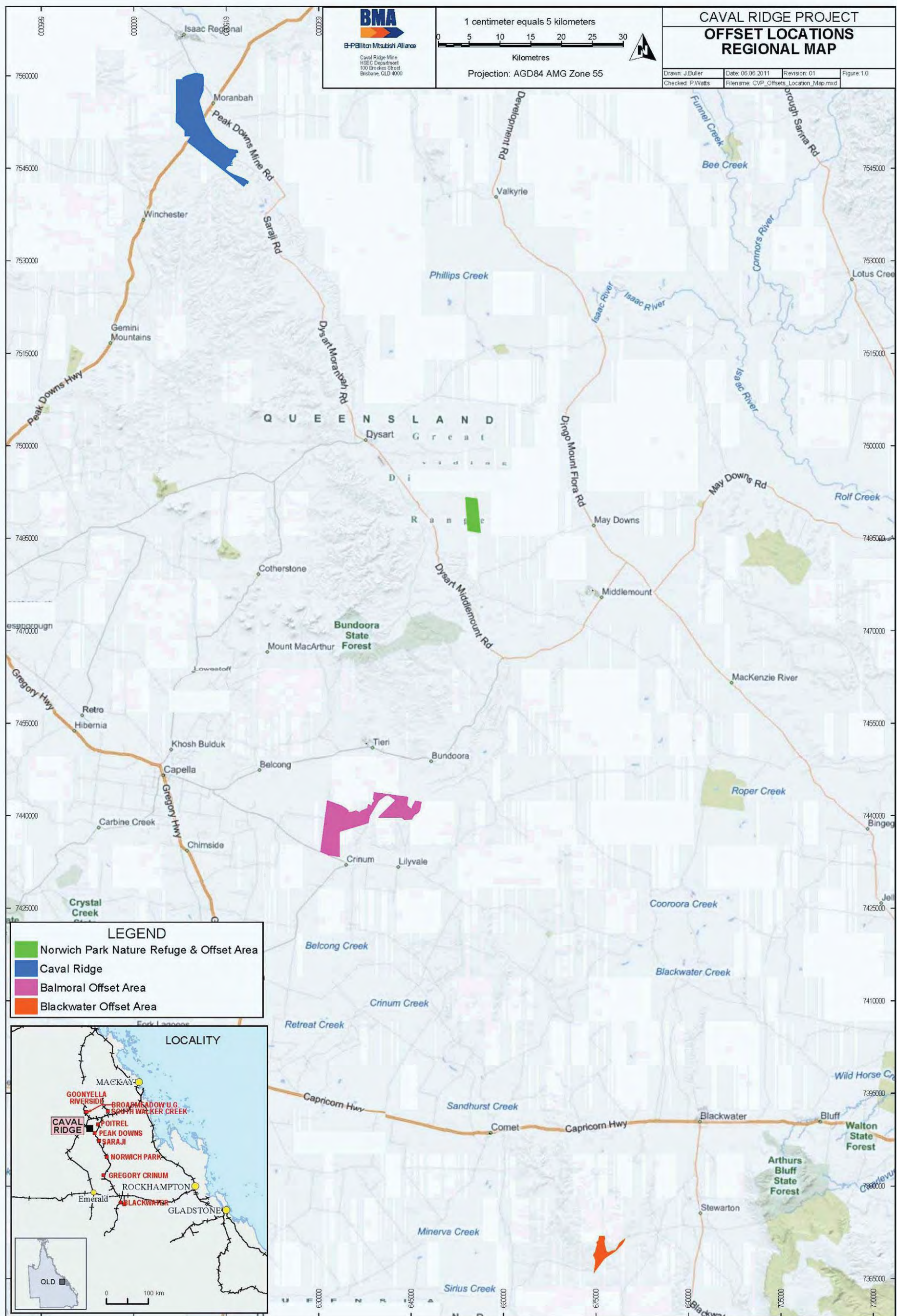
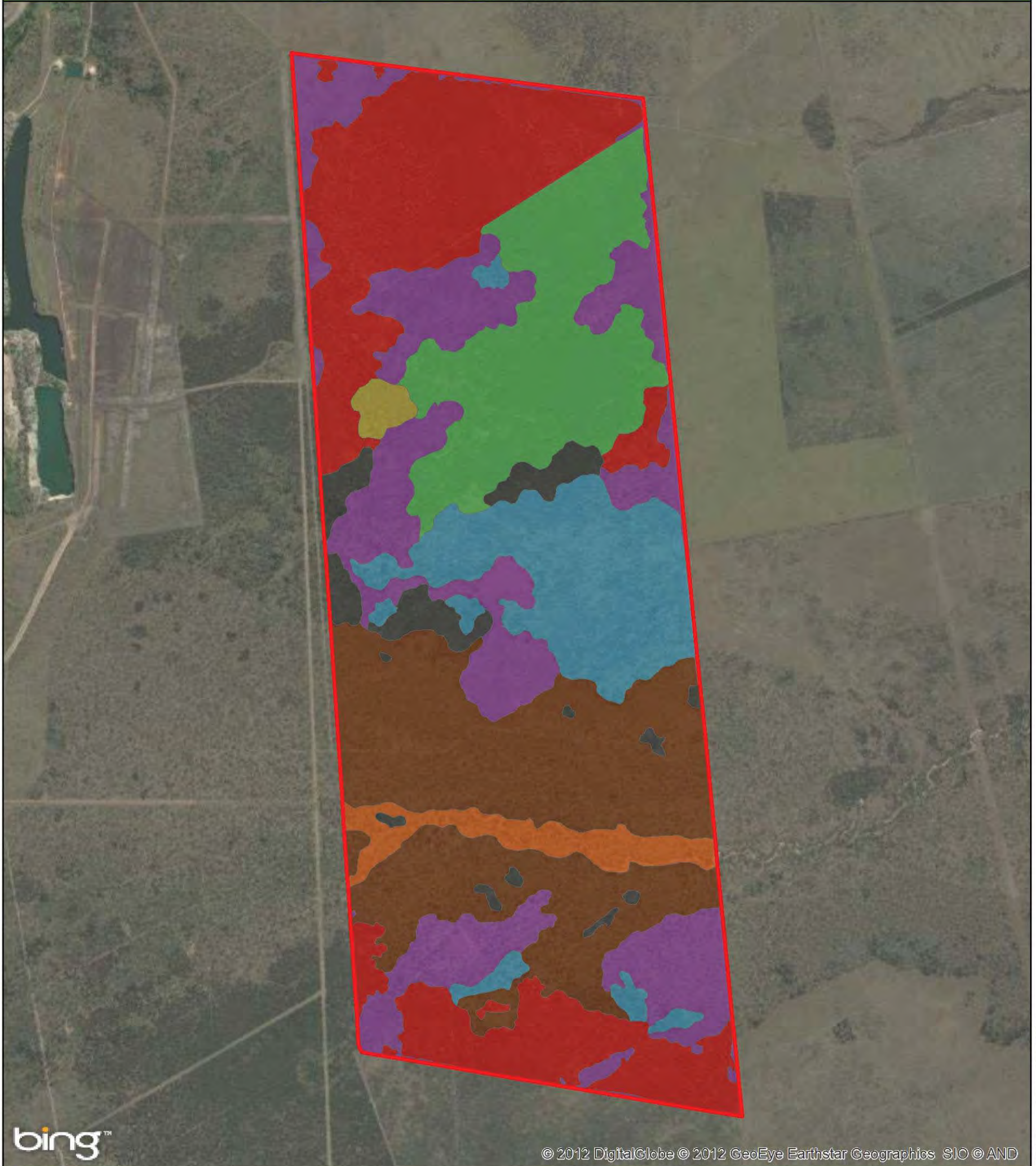


Figure 1: Regional offset location map

# Norwich Park Biodiversity Offset - Vegetation Communities

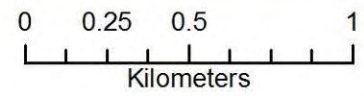
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## Legend

- Norwich Park Biodiversity Offset Area
- Mixed Acacia Spp. shrubby regrowth (219.479 ha)
- Low shrubby Brigalow regrowth (148.091 ha)
- Brigalow regrowth (244.504 ha)
- Open forest to woodland of with *Casuarina cristata* on Cainozoic clay plains, RE 11.4.7 (126.657 ha)
- Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains, RE 11.4.8 (7.912 ha)
- Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains, RE 11.4.9 (39.080 ha)
- Riparian *Eucalyptus orgadophila* open woodland on alluvial plains, RE 11.4.13 (33.307 ha)
- Eucalyptus orgadophila* open woodland on Cainozoic clay plains, RE 11.4.13 (259.203 ha)



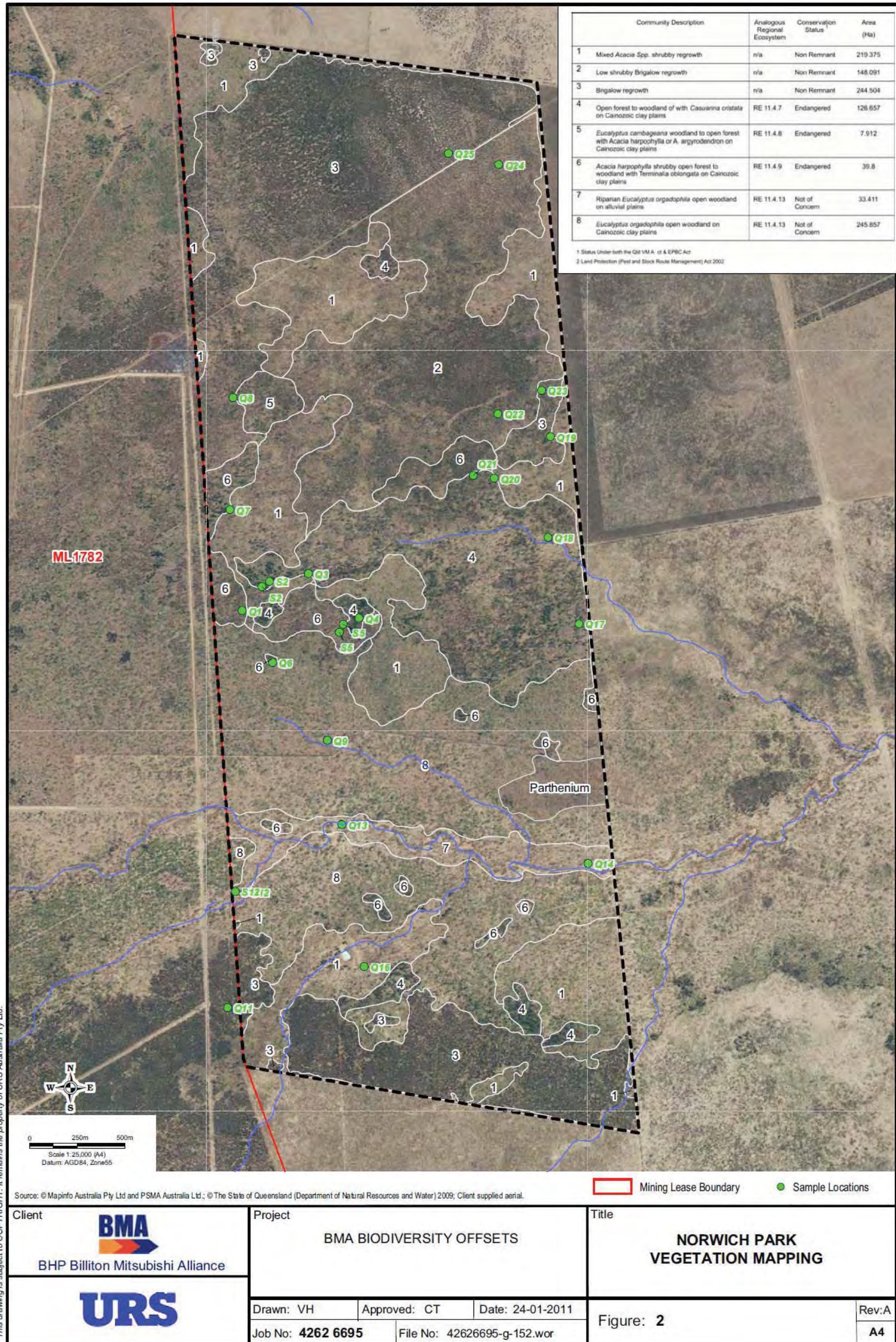
Datum/Projection:  
GDA 1994 MGA Zone 55



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Prepared by: JT Approved by: BD Status: FINAL Date: 21/01/2014

Figure 2a: Norwich Park Nature Refuge Area

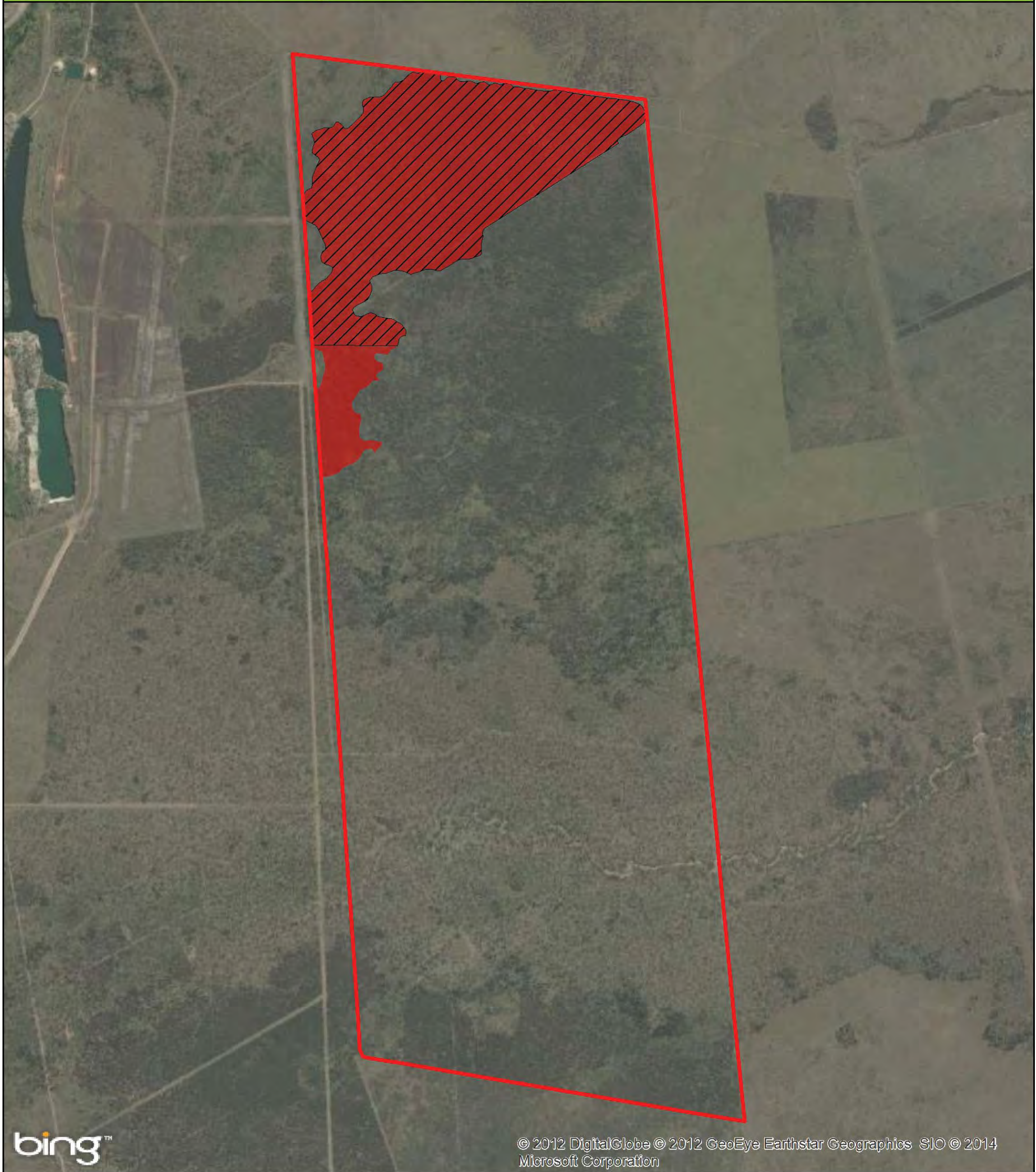


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Figure 2b: Norwich Park Nature Refuge – EPBC Approval Appendix 1

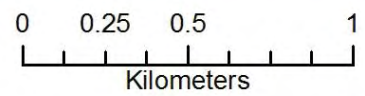
# Norwich Park Biodiversity Offset - Brigalow Offset

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## Legend

- Norwich Park Biodiversity Offset Area
- Brigalow regrowth (157.8 ha)
- Brigalow to be used as Offset for Caval Ridge (140.0 ha)



Datum/Projection:  
GDA 1994 MGA Zone 55



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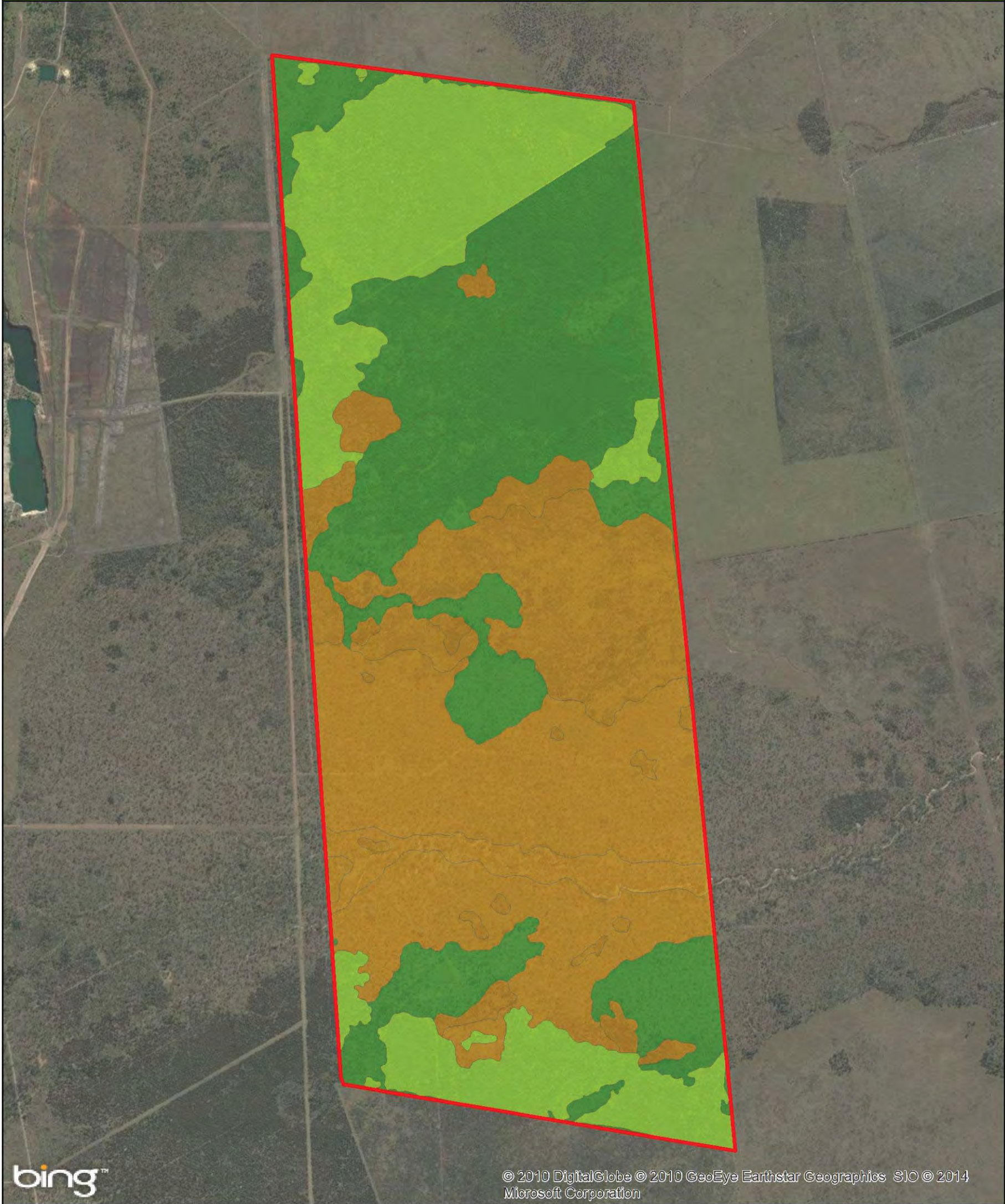
Prepared by: JT    Approved by: BD    Status: FINAL    Date: 21/01/2014

Figure 3: Caval Ridge offset Brigalow regrowth (140 ha)



# Norwich Park Biodiversity Offset - Management Zones

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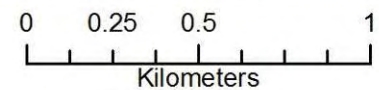


## Legend

Norwich Park Biodiversity Offset Area

## Management Zones

- Management Zone 2
- Management Zone 3
- Management Zone 4



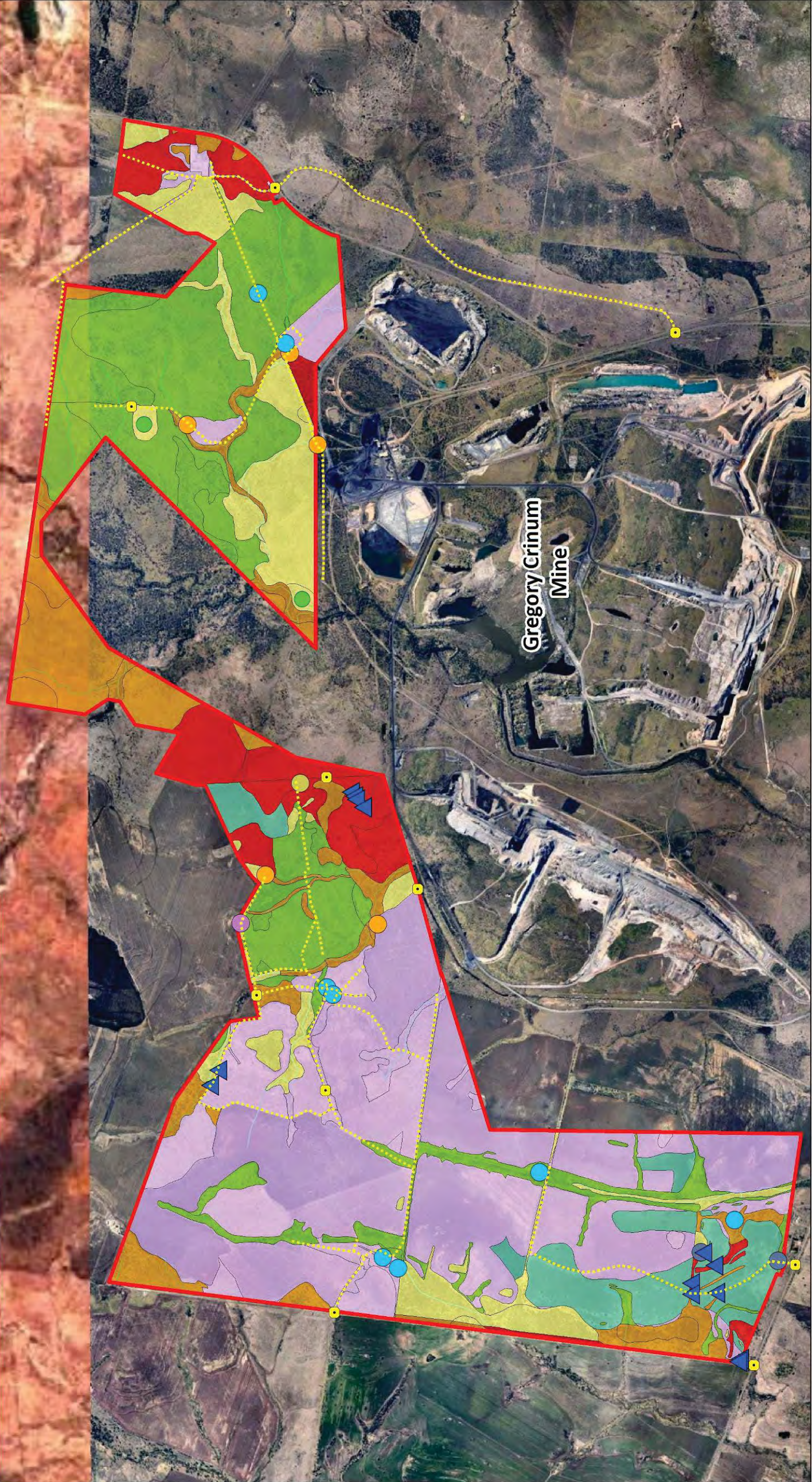
Datum/Projection:  
GDA 1994 MGA Zone 55



Approved by: JT    Status: FINAL    Date: 21/01/2014

Figure 4: Norwich Park Nature Refuge Management Zones

# Balmoral Biodiversity Offset - Management Zones, Site Features and Threatened Species



**Legend**

- Balmoral Biodiversity Offset Area
- Access Points / Gates
- Access Tracks
- Threatened species**
  - Dichanthium queenslandicum
  - Drainage lines
- Management Zones**
  - Management Zone 1
  - Management Zone 2
  - Management Zone 3
  - Management Zone 4
  - Restoration Zone 1
  - N/A
- Management Issues**
  - Brigalow regrowth with Gilgai's
  - Creek diversion
  - Erosion points
- Leucaena leucocephala infestation**
- Parthenium hysterophorus infestation**
- Stock watering point**

**Data Sources:**  
BMA  
Nearmap  
ELA  
URS

**Datum/Projection:**  
GDA 1994 MGA Zone 55

**Scale:**  
0 0.5 1 2 Kilometres

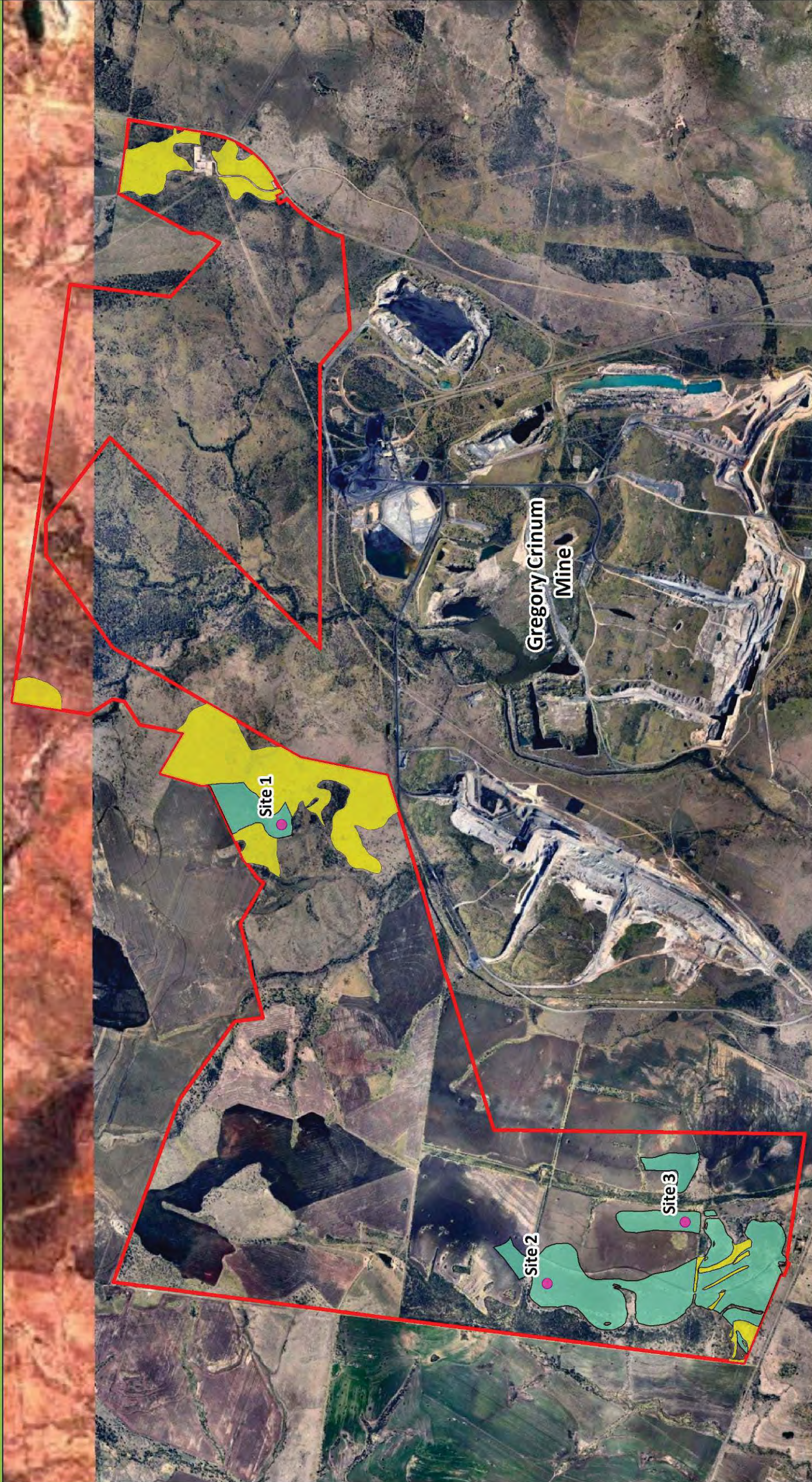
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Client: BMA  
Project Number: 11CANFED-0017

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Figure 5: Balmoral BOA Management Zones

**Balmoral Biodiversity Offset - Dichanthium sericeum grassland and restoration**



- Legend**
- Balmoral Biodiversity Offset Area (5,360 ha)
  - Remnant Dichanthium sericeum grassland 11.8.11 (383.3 ha)
  - Proposed Dichanthium sericeum grassland restoration (350 ha)

Data Sources:  
 BMA  
 Nearmap  
 ELA  
 URS

Datum/Projection:  
 GDA 1994 MGA Zone 55

0 0.5 1 2  
 Kilometres

N

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**Figure 6: Balmoral BOA Grassland Offset and Restoration**

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 Approved by: BD  
 Status: FINAL  
 Date: 01/04/12

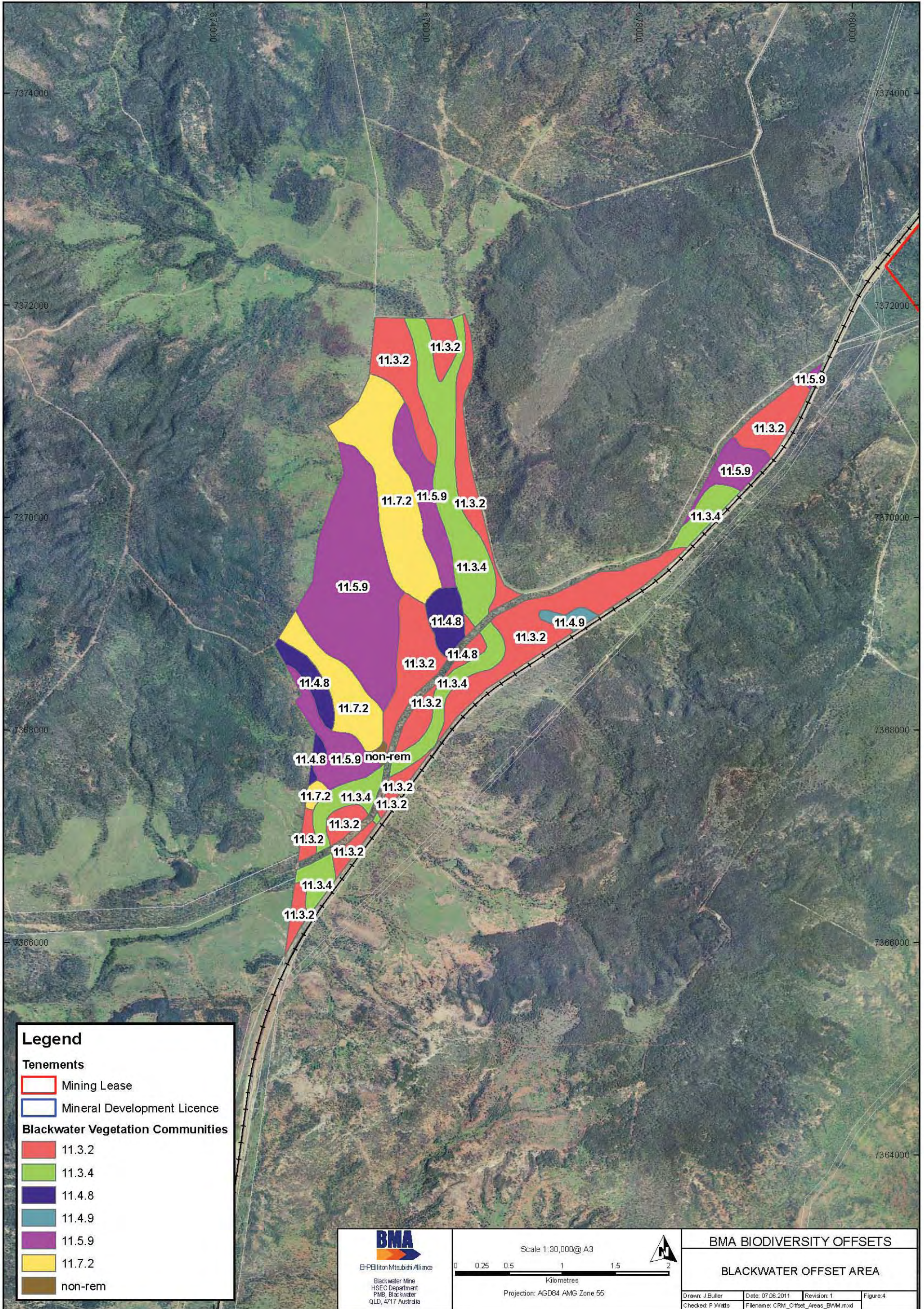


Figure 7: Blackwater BOA