YANCOAL
兖煤澳大利亚有限公司

ASHTON COAL OPERATIONS

Biodiversity Management Plan

Ashton Mine Complex

Version K

Date: April 2025

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1 PURPOSE

This Biodiversity Management Plan (BMP) has been prepared to address the management measures to be implemented by Ashton Coal Operations Pty Limited (ACOL) to manage and mitigate potential impacts of the Ashton Coal Project (ACP) to aquatic and terrestrial flora and fauna.

This BMP has been prepared to address Schedule 3, Conditions 28 and 32 and Schedule 5, Condition 2 of the ACP Development Consent Development Application (DA) 309-11-2001-i, (dated 6 July 2022) (Ashton DA), and to address Schedule 3, Condition 6 of DA 104/96 (dated 6 July 2022) (RUM DA). The conditions of the Ashton DA relate solely to the mining of the Ashton Coal Project, which includes a completed open cut mine, underground mine, and surface facilities. Mining of the Upper Lower Liddell Seam at the Ashton Underground Mine under the approved Longwalls 205 to 208 Extraction Plan is due to be completed by June 2025, at which time underground mining operations will transition to the ACOL-operated RUM. There are no proposed changes to the approved Ashton Coal Project operations, monitoring or management methods under the Extraction Plan for Longwalls 403 to 406.

The conditions of the RUM DA relate solely to the mining of the ACOL-operated RUM. This update of the BMP (Version K) relates to management and monitoring for the ACOL-operating RUM

The Department of Planning and Environment (DPE) approved Modification 11 to the Ashton DA and Modification 10 to the RUM DA on 6 July 2022. These modifications allow for the integration of the two neighbouring underground mines and enables ACOL to access and extract approved but unmined coal resources from a portion of the Ravensworth Underground Mine (RUM). For operational and management purposes, this portion of the RUM will now form an integral part of the Ashton Mine Complex (hereafter denoted as the ACOL-operated RUM). This integration is further described in **Section 2.2**.

2 SCOPE

2.1 Background and Project Overview

ACOL, a wholly owned subsidiary of Yancoal Australia Ltd, operates the ACP, an underground coal mine (and completed open cut mine), located approximately 14 kilometres (km) north-west of Singleton in the Upper Hunter Valley, New South Wales (NSW). **Figure 1** illustrates the locality of the ACP.

The key elements of the ACP and ACOL-operated RUM include:

- an open cut pit (North East Open Cut [NEOC]) that has now been completed, with the final void remaining for the storage of coarse and fine reject;
- a four-seam descending underground mine with approval to extract up to 5.45 million tonnes per annum of run-of-mine (ROM) coal;
- surface mine infrastructure associated with the underground Mine, including gas drainage bores, ventilation fans and mine dewatering infrastructure;
- coal handling and preparation facilities (CHPP) including rail siding and rail loading bin;
- reject and tailings emplacement;
- administration, bathhouse and workshop buildings; and
- integration with the RUM to allow ACOL to access and extract approved but unmined coal resources from a portion of the RUM (refer **Section 2.2**).

Additional detail regarding the integration of the Ashton Underground Mine is described in **Section 2.2**.

The Ashton DA was initially granted for the ACP by the Minister for Planning in October 2002. The approval has been subsequently modified on a number of occasions.

On 24 December 2010, the Minister for Planning approved a modification (DA 309-11-2001-i MOD 6) to the existing Ashton DA under section 75W of Part 3A of the *Environmental Planning and Assessment Act 1979*. The modification includes diverting Bowmans Creek to enable more efficient mining of underlying coal resources by longwall (LW) extraction. The impacts of the diversion and revised LW mine layout on flora and fauna are described in the *Bowmans Creek Diversion Environmental Assessment* (Evans and Peck, 2009).

A Conservation Agreement (dated 16 September 2010) was made between ACOL and the NSW Minister for the Environment under the *National Parks and Wildlife Act 1974* (NP&W Act). The Conservation Agreement covers a parcel of land equal to 65.66 hectares (ha) in the south-east of the ACP site (the Southern Woodland Voluntary Conservation Area [VCA]). The Conservation Agreement, together with the environmental management plans for the ACP site, constitutes the Plan of Management for the conservation area required by the Ashton DA. In addition, a further document titled “Plan of Management Voluntary Conservation Area” dated 20 December 2012, prepared in response to conditions of Aboriginal Heritage Impact Permit (AHIP) No. 1131017, documents additional consultation undertaken since the inception of the Conservation Agreement.

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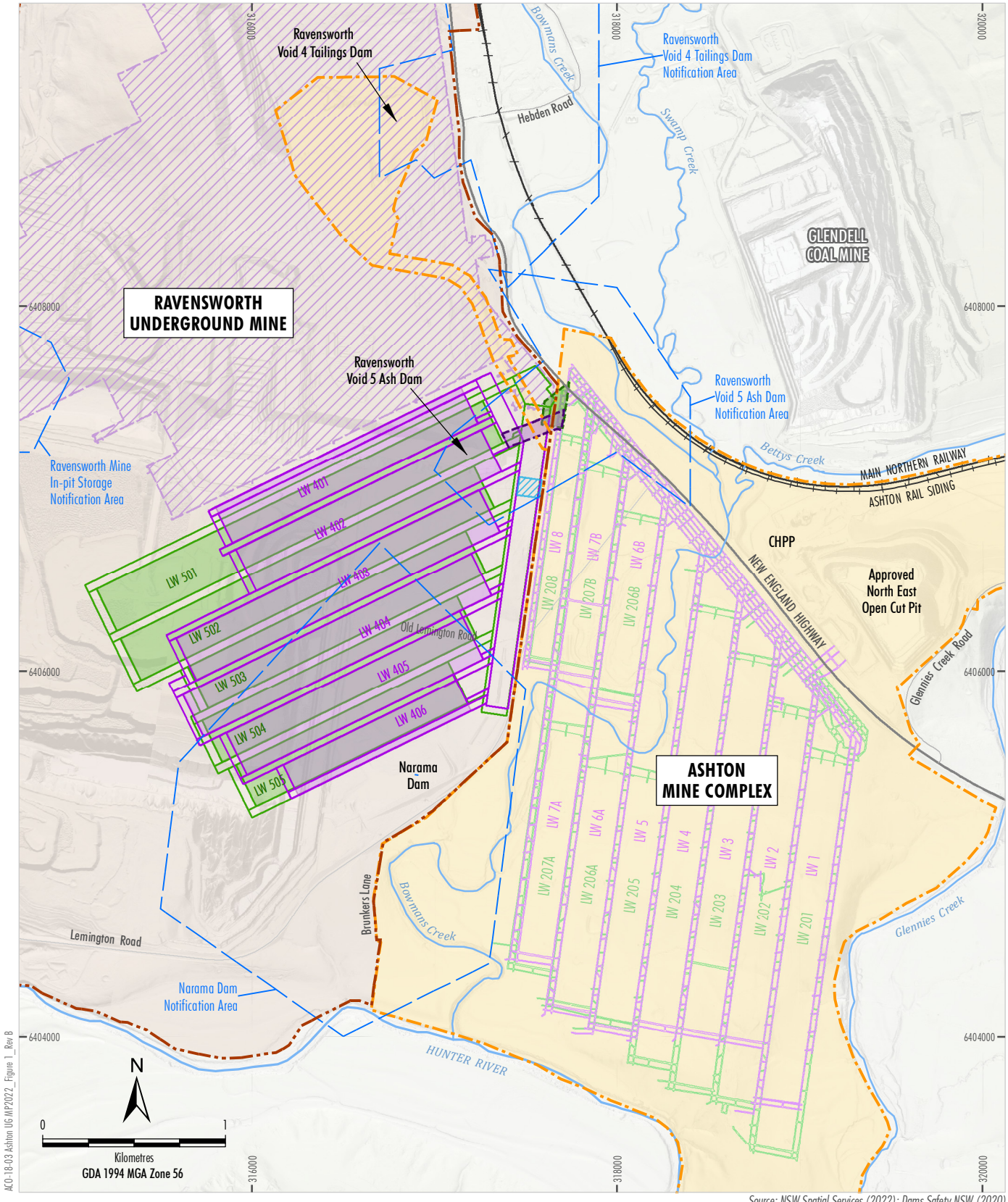

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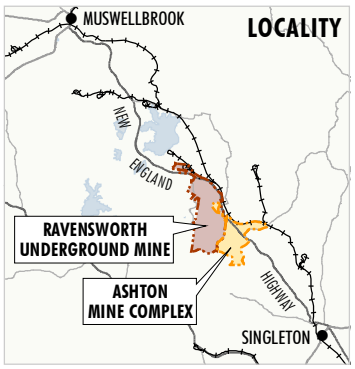

LEGEND

Dam Notification Area

Ashton Mine Complex

- Ashton Coal Project Development Consent Boundary
- Pikes Gully Seam Longwall Layout
- Upper Lower Liddell Seam Longwall Layout

Ravensworth Underground Mine

- Ravensworth Underground Mine Development Consent Boundary
- Existing Shaft 5 Location
- Completed Pikes Gully Seam Workings
- Indicative Pikes Gully Seam Longwall Layout
- Indicative Modified Pikes Gully First Workings
- Indicative Middle Liddell Seam Longwall Layout
- Indicative Middle Liddell Seam First Workings

Source: NSW Spatial Services (2022); Dams Safety NSW (2020)

Note: The approved Upper Liddell and Lower Barrett Seams at the Ashton Coal Project and approved Lemington and Barrett Seams at the Ravensworth Underground Mine are not shown on this figure.

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ASHTON UNDERGROUND MINE

Locality Plan and General Arrangement

Figure 1

Schedule 5, Condition 6 of the Ashton DA, and Schedule 4, Condition 3 of the RUM DA requires the review (and where necessary revision) of the Management Plans within 3 months of the submission of an incident report, Annual Review, Audit (as specified within the DA) or any modification to the conditions of the Development Consent.

This BMP is specifically required by and has been prepared in accordance with Schedule 3, Condition 28 of the Ashton DA, and Schedule 3, Condition 6(i) of the RUM DA.

2.2 Integration of Ashton Underground Mine with Ravensworth Underground Mine

The Ashton Underground Mine and the RUM share a common mining lease boundary and the approved underground mining areas are separated (at their closest) by approximately 45 metres (m) (**Figure 1**).

Modification 11 to the Ashton DA and Modification 10 to the RUM DA enable the integration of the Ashton Underground Mine and RUM, and for ACOL to access and extract approved but unmined coal resources from a portion of the RUM. The modifications allow for connections to be made between the two neighbouring mines via non-subsiding first workings (**Figure 2**). ACOL will utilise its existing LW mining equipment and employees to mine the Pikes Gully and Middle Liddell coal seams at the RUM.

ACOL will handle, process and transport coal from the RUM in the same manner it handles coal from its Ashton Underground Mine. ROM coal will be transferred via underground conveyors to the Ashton Mine Complex and through to the Ashton pit top, via its existing coal clearance system. ROM coal will be processed at Ashton's CHPP prior to being loaded onto trains for transportation to market using the existing rail infrastructure.

Rejects and tailings generated from the processing of the RUM ROM coal will be emplaced in the existing NEOC void and Ravensworth Void 4 Tailings Dam.

Water and gas from the RUM will also be transferred to the Ashton Mine Complex to be managed within the existing water and gas management system.

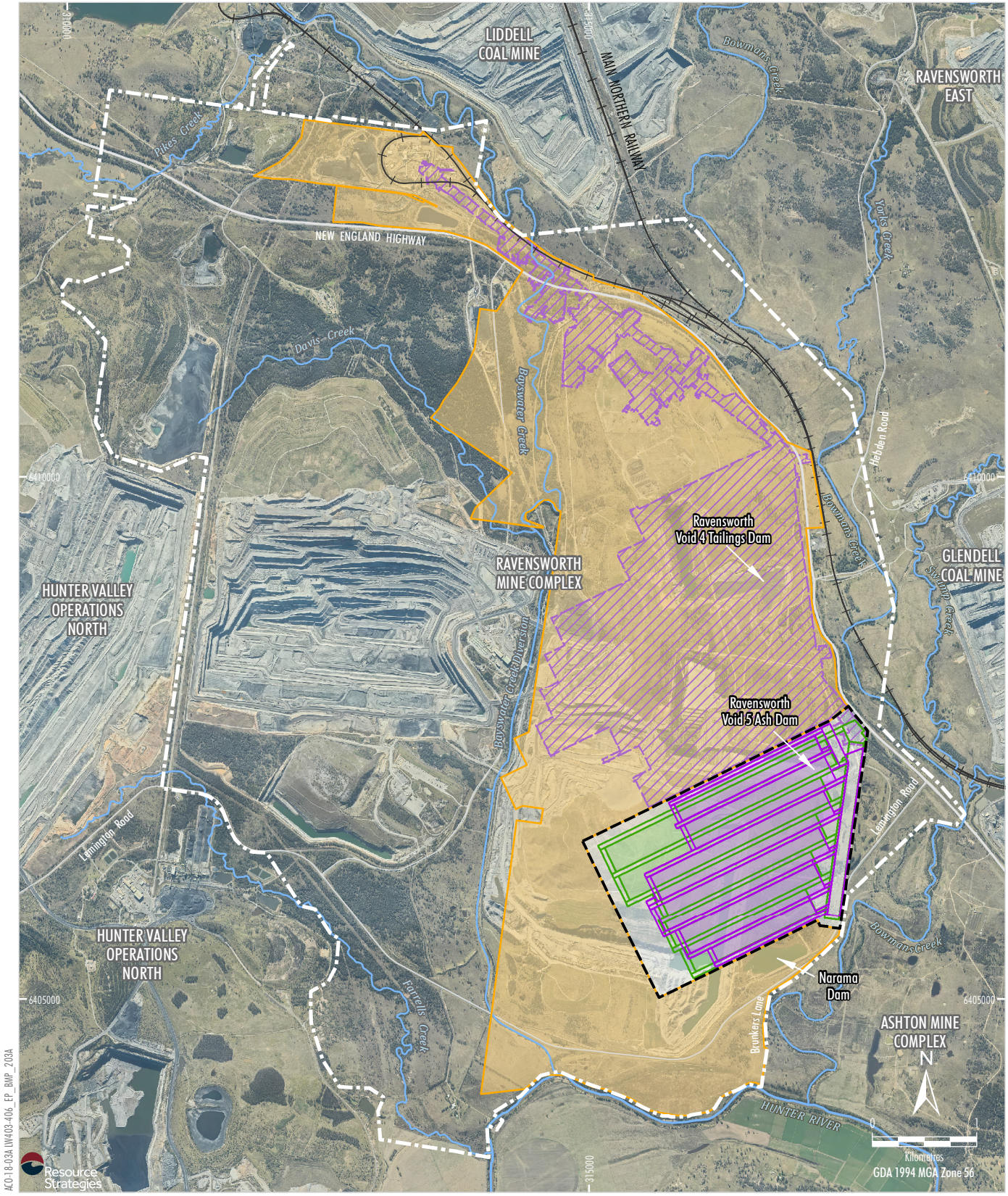
The area of the RUM that will be managed and operated by ACOL under the RUM DA is shown on **Figure 2** (hereafter referred to as the ACOL-operated RUM)[1]. The current land uses over the ACOL-operated RUM include:

- mining activities;
- rehabilitation activities;
- water management; and
- grazing.

Surface infrastructure to be developed for the ACOL-operated RUM will be undertaken in 2025/2026, and will include a dewatering borehole and pipeline south of LW406.

ACOL will implement the management, monitoring and reporting outlined in this Environmental Management System (EMS) during mining of the ACOL-operated RUM.

[1] The integration is referred to as the ACOL-operated portion of the RUM in the Ashton and Ravensworth Modification Reports



LEGEND

- Ravensworth Open Cut Operations Development Consent Boundary

Ravensworth Underground Mine

- Completed Pikes Gully Seam Workings
- Indicative Pikes Gully Seam Longwall Layout
- Indicative Middle Liddell Seam Longwall Layout

Ravensworth Underground Mine - Management Responsibility under Development Consent DA 104/96

- Operational Area to be managed by Resource Pacific Pty Ltd (Glencore) #
- Operational Area to be managed by Ashton Coal Operations Ltd (Yancoal) # ^

Source: NSW Spatial Services (2021)
Orthophoto: Ravensworth Mine Complex (2021)

The Ravensworth Underground Mine includes ancillary infrastructure and surface disturbance associated with underground mining including, but not limited to, ventilation, gas management and water management infrastructure and subsidence monitoring, management and remediation activities.

^ This area is called the 'ACOL-operated portion of the RUM' in the Modification Report.

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RAVENSWORTH UNDERGROUND MINE
LONGWALLS 403 TO 406 EXTRACTION PLAN

ACOL-operated RUM's Management Responsibility Under Development Consent DA 104/96

Figure 2

The remaining areas of the approved RUM (i.e. outside of the ACOL-operated RUM) including the completed Pikes Gully seam Longwalls 1-9 as well as open cut mining activities associated with the Ravensworth Operations Project (Project Approval 09-0176) are managed in accordance with the Ravensworth Environmental Management Strategy (and associated management plans) and the RUM Rehabilitation Management Plan (RMP).

Regular meetings will be held between ACOL and Glencore to discuss the following:

- planned ACOL and Glencore activities within the ACOL-operated RUM and surrounds;
- potential interactions between the Ravensworth Operations Project and the ACOL-operated RUM, including any relevant consequences of subsidence;
- environmental monitoring results relevant to the ACOL-operated RUM; and
- data and report sharing.

In addition, the Built Features Management Plans required under Condition 6, Schedule 3 of the RUM DA will address interactions with Glencore's and AGL Macquarie Pty Ltd's assets and operations.

2.3 Scope and Objectives

This BMP describes the measures to be implemented to manage and mitigate the potential impacts of the ACP on:

- threatened and protected flora and fauna species, populations and communities; and
- terrestrial and aquatic biodiversity values.

The BMP outlines procedures for clearing or disturbing vegetation/habitats and monitoring remnant habitats. It also contains protocols for the identification and management of impacts on flora and fauna. The strategies outlined within this BMP apply to both the underground operations and completed open cut mining area.

Objectives for the ecological values of the site are to:

- Maintain existing areas of vegetation not affected by surface mining as viable habitat through the control of weeds, feral animals and management of grazing regimes to promote natural regeneration.
- Rehabilitate the study area to provide an environment that is equal to, or better than, the pre-mining environment and is available for threatened species that may inhabit the area by improving connectivity between remnants, rehabilitating mined areas and controlling feral animals.
- Minimise impacts or environmental consequences to threatened species, threatened populations, endangered ecological communities and their habitats.
- Manage and, where possible, enhance habitat quality of the aquatic and riparian ecosystem within Bowmans Creek (existing and diversion).

2.4 Consultation and Plan Development

The BMP has previously been developed in consultation with NSW Office of Environment and Heritage (OEH), Singleton Council (SC) and the NSW Resources Regulator (RR) (formerly Department of Trade and Investment, Regional Infrastructure and Services), and approved by DPE.

2.5 Context and Related Documents

This BMP forms part of the ACOL EMS. The following management plans and documents are of relevance to the management of habitats at the ACP:

- The Ashton Coal Forward Program (Forward Program).
- The Ashton Coal Rehabilitation Management Plan (RMP), which includes the requirements of the:
    - Landscape and Revegetation Management Plan;
    - Land Management Plan; and
    - Bushfire Management Plan.

The RMP sets performance indicators and completion criteria for the rehabilitation of the ACOL mine site and land holdings. This includes consideration of the integration of the rehabilitation works consistent with the *Synoptic Plan – Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales* (Andrews, 1999).

3 ACCOUNTABILITIES AND RESPONSIBILITIES

3.1 Roles and Responsibilities

Key ACOL personnel involved with implementing this BMP, including their roles and responsibilities, are described in Table 1 below.

Table 1: Roles and Responsibilities

Role	Accountabilities / Responsibilities
Mine Operators Site Representative (Mine Engineering Manager)	• Organise resources to ensure the requirements of the Management Plan can be effectively implemented.
Owner of the Procedure (Environmental and Community Relations Superintendent)	• Review, amend and update the Management Plan as required. • Audit the effectiveness of implementation of the Management Plan (at least 3 yearly). • Approve the Management Plan, any revisions and associated plans and procedures.
Responsible Person for the Procedure (Environment and Community Relations Coordinator)	• Implement and review the requirements of this Management Plan. • Participate in any review of the Management Plan. • Participate in the underpinning risk assessment associated with the Management Plan.
Supervisors (All levels)	• Become fully familiar and comply with the requirements of this Management Plan as it relates to their role. • Maintain a safe work environment for all employees in accordance with the requirements outlined in this Management Plan. • Supervise all work undertaken within their area of responsibility and ensure it is conducted in accordance with the requirements of this Management Plan and any associated Plans, Procedures or instructions. • Organise for training and assessment of employees who may be affected by the requirements of this Management Plan including instruction on how the Management Plan is to be applied. • Administer resources to facilitate effective compliance with this Management Plan. • Deal with any non-compliance or reported hazard in an efficient and timely manner.
Workers	• Comply with the requirements of this Management Plan as it relates to their role. • Act promptly to rectify or report hazards once identified. • Report any hazardous situations/occurrences, including near-misses immediately to the Supervisor. • Report any issues that may impact ability to comply with the requirements of this Management Plan immediately to the Supervisor. • Bring to the attention of the Supervisor any matter which requires attention in relation to this Management Plan.

4 REQUIREMENTS (CONTROLS)

4.1 Performance Measures

Detailed performance indicators for subsidence impacts to threatened biodiversity values have been developed for the ACP and ACOL-operated RUM in accordance with Condition 29 of Schedule 3 of the Ashton DA and Conditions 1 to 4 of Schedule 3 of the RUM DA, and are presented in **Table 2**.

The Forward Program/RMP also provides detailed consideration of performance indicators and completion criteria for all landscapes associated with the ACOL mine site and land holdings.

Monitoring will be used to assess the impact of the ACP and ACOL-operated RUM against the performance measures and indicators detailed in **Table 2**. If monitoring and assessment indicates that a performance indicator has been exceeded, or likely to be exceeded, ACOL will implement the contingency measures outlined in **Section 4.7**.

Table 2: Performance Measures

Criteria	Performance Measure (A)	Indicator of Success (B)	Key Assessment Considerations (C)
General			
Weed Control	Weeds controlled in accordance with the requirements of the relevant legislation and weed/land management authorities.	Weed densities and sprawl across the site broadly comparable to (or less than) previous surveys. Surveys confirm that all areas targeted during previous years weed control program had been controlled with limited regrowth.	1) Does the monitoring and assessment indicate that a performance measure or Development Consent condition has been exceeded, or likely to be exceeded? 2) Does this exceedance increase the risk for any of the ecological issues (species, populations, communities or habitats) under investigation? 3) What is the nature of the risk? • habitat loss; • habitat connectivity/fragmentation; • structural diversity; • species diversity; • increased predation (feral animals); • competition for resources and weed invasion; and • increased fire frequencies. 4) What are the potential factors that may have contributed to the risk i.e. subsidence, inadequate management measure? 5) What actions, if any are required, can be taken to mitigate and/or minimise the potential for future impacts and monitor the long-term impacts of the exceedance?
Feral Animal Control	Feral animal control using appropriate means for any declared pest species known on the ACP and ACOL-operated RUM. Annually, prior to fox breeding season or as required.	Feral animals managed so that they do not have deleterious impacts on threatened species, threatened populations, endangered ecological communities or their habitats. Monitoring confirms no increase in the fox population and all active rabbit warrens are ripped or fumigated upon detection or on a campaign basis as required.	
Bush Fire Management	Vegetation managed to control fuel loads. Maintain the ecological integrity of managed remnants.	Indicators described in RMP.	
Aboriginal Cultural Heritage	Rehabilitation does not compromise Aboriginal cultural heritage relics or values. Following the Vegetation Clearance and Disturbance Protocol, the Heritage Management Plan is adhered to for all ground disturbing works.	Harm to Aboriginal objects is avoided and where this is not possible is undertaken in accordance with an appropriate permit.	
Terrestrial Biodiversity/ Habitat Values			

Criteria	Performance Measure (A)	Indicator of Success (B)	Key Assessment Considerations (C)
Vegetation Diversity	Vegetation communities removed (or reduced) in an area are replaced with similar communities and dominant species composition. Revegetation works will be undertaken in line with the recommendations of the monitoring programs and relevant scientific research.	Species diversity to be broadly comparable to reference sites over time. As a measure of present diversity onsite, quantitative data collected (18 sample sites) has identified 91 native flora species as being endemic. These species will form the lowest benchmark for rehabilitation of floristic diversity. At least 30% of the areas disturbed for emplacement areas will be re-established as bushland.	6) Does the monitoring and assessment indicate that a performance measure or Development Consent condition has been exceeded, or likely to be exceeded? 7) What is the nature of the exceedance? • habitat loss; • habitat connectivity/fragmentation; • structural diversity ; • species diversity; • seed bank and recruitment of juveniles; • key habitat elements (i.e. hollows, nesting habitat); • key abiotic resources (i.e. water availability); • increased predation (feral animals); or • competition for resources and weed invasion. 8) What are the potential factors that may have contributed to the risk, i.e. subsidence, inadequate management measure or climatic conditions? 9) What actions, if any are required, can be taken to mitigate and/or minimise the potential for future impacts and monitor the long-term impacts?
Effective habitat linkages to surrounding vegetated lands	The rehabilitation program enhances habitat linkages across the site and with surrounding vegetated lands in keeping with the Synoptic Plan.	Corridors developed as per the Rehabilitation Strategy (Evans & Peck, 2009) and Landscape Restoration Report (AECOM, 2009) to create a mosaic of agricultural land and wildlife habitat.	
Ecosystem Health	The vegetation community structure (both physical and biological) is rehabilitated to promote a condition comparable to the local vegetation in pre-mining reference sites. Structural complexity scores will be achieved by sampling complexity using a modified vegetation complexity assessment method. This quantitative data will be compared with data sets from reference sites to assess community structure.	Projected foliage cover and plant species diversity at all key strata levels is broadly comparable to, or better than, pre-mining reference sites (annual monitoring to begin three years after commencement of rehabilitation activities to allow shrubs, grasses and herbs to reach a stage and density where identification of the species may occur). Viable hollow bearing limbs and stags are salvaged and not burnt, to augment and reconstruct faunal habitat. Nest boxes and roosts are installed within existing and rehabilitated habitats and monitored to confirm their suitability for use by local fauna.	

Criteria	Performance Measure (A)	Indicator of Success (B)	Key Assessment Considerations (C)
	Land function of disturbed land is rehabilitated to provide recovery in combination with time.	Positive trends in heterogeneity against land function metrics including: vegetation mosaics; ground cover; leaf litter and organic matter; soil depth and quality; shading; water flow paths and microhabitats.	
	Existing habitat is protected from degradation by grazing and unnecessary vehicle movements.	Key habitat areas fenced or signposted to prevent the uncontrolled entry of livestock and to minimise vehicular traffic.	
Southern woodland conservation area	Manage the VCA in accordance with the Biodiversity Offset Management Plan (BOMP), "Plan of Management Voluntary Conservation Area" and Conservation Agreement.	Specific management practices are incorporated into the site protocols and surveys to indicate that species diversity is comparable to pre-mining reference sites.	
Aquatic and Riparian Biodiversity			
Aquatic Ecosystem health and biodiversity	Manage the impact of the ACP and ACOL-operated RUM on aquatic habitat quality and biodiversity relative to the condition in the catchment.	Macroinvertebrate species diversity, Stream Invertebrate Grade Number – Average Level (SIGNAL) scores and fish diversity in streams and pools experience no change as a result of mining.	1) Does the monitoring and assessment indicate that a performance measure or Development Consent condition has been exceeded, or likely to be exceeded? 2) Does this exceedance increase the risk for aquatic and/or riparian habitats? 3) What is the nature of the risk? • stream health (SIGNAL scores); • macroinvertebrate diversity; • fish diversity; • water quality; • habitat connectivity/fragmentation; • fish passage; • structural elements; and
		Water quality parameters are similar to reference sites or within the default range for lowland rivers set by Australian and New Zealand Environment and Conservation Council (2000) guidelines for the maintenance of aquatic ecological function.	
Habitat extent and linkages	The aquatic and riparian ecosystem within Bowmans Creek is managed and where possible enhanced.	Corridors developed as per the Rehabilitation Strategy (Evans & Peck, 2009) and Landscape Restoration Report (AECOM, 2009) to create a mosaic of agricultural land and wildlife habitat.	

Criteria	Performance Measure (A)	Indicator of Success (B)	Key Assessment Considerations (C)
	To identify changes in riparian vegetation composition and structure occurring along Bowmans Creek over time.	Projected foliage cover and plant species diversity at all key strata levels is broadly comparable to, or better than, pre-mining reference sites. No evidence of dieback or loss of previously healthy riparian trees within pre-mining reference sites (<10%).	• groundwater. 4) Investigate site specific changes against upstream and downstream reference sites. What are the potential factors that may have contributed to the consequence, i.e. subsidence, inadequate management measure or climatic conditions? 5) What are the potential impacts on the long-term viability of the aquatic and riparian habitats? 6) Has the habitat connectivity been affected? 7) What actions, if any are required, can be taken to mitigate and/or minimise the potential for future impacts?
	Ensure fish passage and aquatic ecology of diversion sections is maintained and where possible enhanced.	Fish passage and aquatic ecology of diversion sections to be same or better than pre-construction baseline conditions and in line with trends exhibited in the retained sections of the creek using macroinvertebrate diversity, (SIGNAL index, species lists and River Channel and Environmental [RCE] scores).	
Groundwater Dependant Ecosystems (GDE)	To monitor the health and viability of the GDE over time and obtain data to assist with future regeneration and rehabilitation of the River Red Gum ([RRG] *Eucalyptus camaldulensis*) population on site.	Comparative health assessments indicate that, compared to a reference site, no overall decline in tree health is being observed.	
Threatened species, Populations and Endangered Ecological Communities			

Criteria	Performance Measure (A)	Indicator of Success (B)	Key Assessment Considerations (C)
Endangered population	The overall River Red Gum Population to be managed so that the long-term viability of the local population is not directly impacted by mining. The health of established River Red Gum individuals will be maintained until project completion.	Established area of planted River Red Gum to achieve a co-dominant status in regeneration areas as outlined in the rehabilitation strategy to an area equalling 10.48 ha. Comparative health assessments indicate that, compared to a reference site, no overall decline in tree health is observed. Recruitment of juveniles and seed bank establishment is improved above pre-mining conditions. Comparative assessment of groundwater, surface water, stream water and soil moisture conditions relative to reference control sites does not show relationships between changes in these conditions onsite and a reduction in River Red Gum health.	1) Does the monitoring and assessment indicate that a performance measure or Development Consent condition has been exceeded, or likely to be exceeded? 2) Does this exceedence increase the risk for any threatened species, populations, communities or their habitats? 3) What is the nature of the risk? • habitat loss; • habitat connectivity/fragmentation; • home range size; • structural diversity/elements; • species diversity; • migration; • seed bank and recruitment of juveniles; • key habitat elements (i.e. hollows); • key abiotic resources (i.e. water availability); • increased predation (feral animals); • competition for resources and weed invasion; or • Increased fire frequencies. 4) What are the potential factors that may have contributed to the risk, i.e. subsidence, inadequate management measure or climatic conditions? 5) What actions, if any are required, can be taken to mitigate and/or minimise the potential for future impacts and monitor the long-term impacts?
Threatened species	Threatened fauna species and their habitats are not adversely impacted.	Terrestrial fauna and habitat monitoring shows that the numbers of threatened species and the health (including recruitment) of significant populations are not declining and results are comparable or improved from the baseline surveys. Monitoring shows that individuals are progressively expanding into new home ranges. Monitoring shows that key habitat features (foraging, nesting, refuge habitat) and structural complexity within remnant and rehabilitated/ compensatory habitat areas are not declining and results are comparable with the pre-mining surveys.	

Criteria	Performance Measure (A)	Indicator of Success (B)	Key Assessment Considerations (C)
	Ensure that any threatened fauna or flora that have not been identified in the Environmental Impact Statement (EIS), but which may inhabit the site, are identified as early as practicable.	New listings and new threatened species identified during the annual monitoring program are assessed for impacts and any management recommendations are incorporated into future relevant management plans.	
	Threatened species, threatened populations, or endangered ecological communities.	Central Hunter Grey Box—Ironbark Woodland or Central Hunter eucalypt forest and woodland are not adversely impacted.	No decrease in extent of Central Hunter Grey Box—Ironbark Woodland or Central Hunter eucalypt forest and woodland within the ACOL-operated RUM area.

4.2 Existing Environment

4.2.1 Threatened Species

A detailed flora and fauna impact assessment was conducted for the ACP EIS (HLA Envirosciences Pty Ltd [HLA], 2001), with additional surveys and biannual monitoring reports conducted in accordance with Schedule 3, Condition 28 of the Ashton DA and statutory requirements. A riparian and aquatic ecology assessment report was also prepared for the Bowmans Creek Diversion Environmental Assessment (EA) (Marine Pollution Research [MPR], 2009). These surveys identify 20 threatened flora and fauna species and populations likely to occur within the Ashton Mining Complex area (refer to **Table 3** and **Figure 3**).

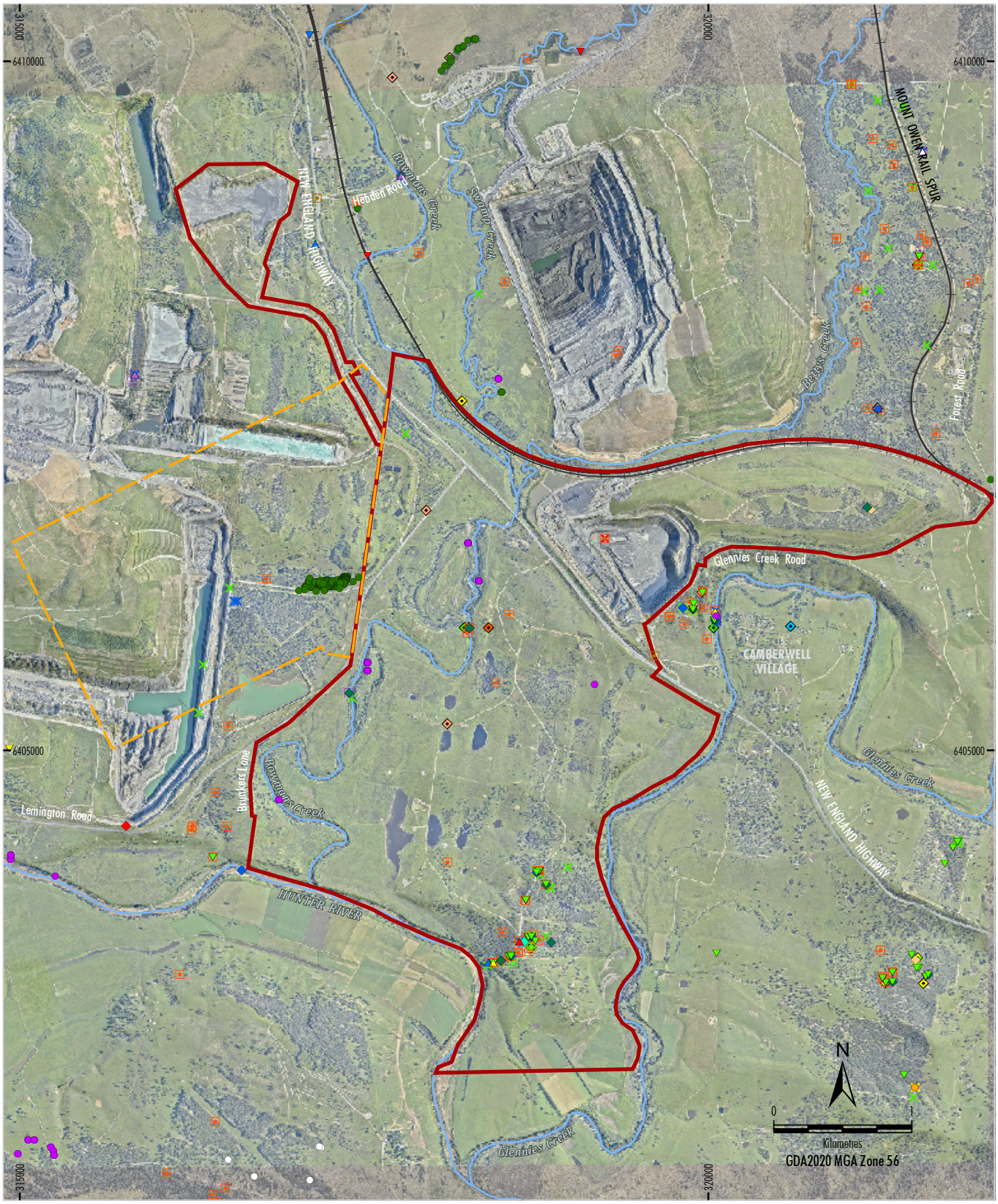
This list is updated following the recording of any new threatened species during the site surveys for monitoring. The updated list is provided in **Table 3.** To date, 24 species are known to occur within the ACP or ACOL-operated RUM or have been identified during surveys. A protocol for the recording and management of newly recorded threatened species is included in **Appendix B**.

Table 3: Threatened Flora and Fauna

Population or Species	TSC Act	EPBC Act	Lifecycle/ Seasonal Limitations
River Red Gum (*Eucalyptus camaldulensis*) population in the Hunter Catchment	E	-	No seasonal limitations. Seed collection Spring.
Hooded Robin *Melanodryas cucullata*	V	-	Requires structurally diverse habitats. Breed between July and November and may raise several broods.
Scarlet Robin *Petroica phoenicea*	V	-	Mainly breed between July and January. The nest is built in the fork of tree usually more than 2 m above the ground; often found in a dead branch in a live tree, or in a dead tree or shrub.
Grey-crowned Babbler *Pomatostomus temporalis*	V	-	Breed between July and February. Nests are maintained year round and used as a dormitory for roosting each night.
Speckled Warbler *Pyrrholaemus sagittatus*	V	-	Breed between August and January. Nests are located in a slight hollow in the ground or the base of a low dense plant.
Turquoise Parrot *Neophema pulchella*	V	-	Nests in tree hollows, logs or posts, from August to December.
Flame Robin *Petroica phoenicea*	V	-	Breeds in spring to late summer. Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks.
Masked Owl *Tyto novaehollandiae*	V	-	Breeding takes place in near vertical hollows, in tall, often prominent trees.
Diamond Firetail *Stagonopleura guttata*	V	-	Feeds exclusively on the ground. Breeds between August and January.

Population or Species	TSC Act	EPBC Act	Lifecycle/ Seasonal Limitations
Spotted Harrier *Circus assimilis*	V	-	Breeds spring (or sometimes autumn), with young remaining in the nest for several months.
Black-breasted Buzzard *Hamirostra melanosternon*	V	-	Breeds from August to October near water in a tall tree.
Little Eagle *Hieraaetus morphnoides*	V	-	Breeds during spring, and young fledge in early summer. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.
Large-eared Pied Bat *Chalinolobus dweryi*	V	V	Females have been recorded raising young in maternity roosts from November through to January.
Greater broad-nosed bat *Scoteanax ruppellii*	V	-	Roosts in tree hollows of old trees. A single young is born in January, with the females raising the young in maternity roosts.
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*	V	-	Maternity caves are used annually in spring and summer.
Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*	V	-	Breeding has been recorded from December to mid-March, when a single young is born.
Large-footed myotis *Myotis macropus*	V	-	In NSW, females have one young each year usually in November or December.
Eastern freetail-bat *Mormopterus norfolkensis*	V	-	Roost mainly in tree hollows but will also roost under bark or in man-made structures.
Grey-headed Flying-fox *Pteropus poliocephalus*	V	V	Annual mating commences in January and a single young is born each October or November. Does not roost within woodland, may forage in spring to autumn, depending on flowering.
Spotted-tail Quoll *Dasyurus maculates*	V	E	Breeding season between April - August. The gestation period is 3 weeks and juveniles become independent at 18 weeks.
Squirrel Glider *Petaurus norfolcensis*	V	-	Gives birth in autumn/winter and again in spring/summer if conditions are favourable. Dispersal at 12 months.
Brush-tailed phascogale *(Phascogale tapoatafa)*	V	-	Nest and shelter in tree hollows with entrances 2.5 – 4 centimetres. Mating occurs between May – July. Females generally only produce one litter.
Green and Golden Bell Frog *Litoria aurea*	E1	V	Breeds in summer when conditions are warm and wet.
Giant Burrowing Frog *Heleioporus australiacus*	V	V	Breeds mainly in Autumn, but has been recorded calling throughout the year immediately before or following heavy rain.

EPBC Act = Commonwealth Environment Protection and Biodiversity Conservation Act 1999, TSC Act = Threatened Species Conservation Act 1995, E = Endangered; V = Vulnerable



ACO-18-03A1LW403-406_EP_BMP_201A

LEGEND

DA 309-11-2001-i
Project Approval Boundary
RUM area operated by Ashton Coal Operations Ltd (Yancoal)
Railway
Watercourse

Flora
Acacia pendula population in the Hunter catchment
Cymbidium canaliculatum population in the Hunter Catchment
Eucalyptus camaldulensis population in the Hunter catchment
Slaty Red Gum
Trailing Woodruff

Fauna
Black-necked Stork
Brown Treecreeper (eastern subspecies)
Brush-tailed Phascogale
Dusky Woodswallow
Eastern Cave Bat
Eastern Coastal Free-tailed Bat
Flame Robin
Greater Broad-nosed Bat
Green and Golden Bell Frog
Grey-crowned Babbler (eastern subspecies)
Grey-headed Flying-fox
Koala
Large Bent-winged Bat
Large-eared Pied Bat
Little Bent-winged Bat
Little Eagle
Little Lorikeet
Masked Owl
Scarlet Robin
South-eastern Glossy Black-Cockatoo
Southern Myotis
Speckled Warbler
Spotted Harrier
Spotted-tailed Quoll
Squirrel Glider
White-bellied Sea-Eagle
White-throated Needletail
Yellow-bellied Sheathtail-bat

Source: ACOL (2024); BioNet (2024); RUM (2024); NSW Spatial Services (2024)
Orthophoto Mosaic: Asthon Coal (Dec 2021); Ravensworth (2021)

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RAVENSWORTH UNDERGROUND MINE
LONGWALLS 403 TO 406 EXTRACTION PLAN

Known Locations of Threatened Species on the ACP and the ACOL-operated RUM

Figure 3

4.2.2 Riparian and Terrestrial Habitats

Terrestrial habitats across the ACP and ACOL-operated RUM include riparian corridors, floodplain pasture, flood terraces, upland forest, woodland remnants, and pasture with scattered trees. The majority of this habitat is characterised by natural regeneration sourced from the small number of remnant mature trees.

The isolated mature hollow-bearing trees and stags provide potential shelter and breeding habitat for a number of bird and arboreal mammal species. Fallen logs and leaf litter provide shelter and breeding habitat for small ground-dwelling mammals and reptiles with the grassy understorey and fallen timber providing suitable foraging substrate for the threatened grey-crowned babbler, speckled warbler and hooded robin.

The riparian habitats along Bowmans and Glennies Creek form part of a fragmented corridor south along the Hunter River and Wollombi Brook. This corridor is likely to be important for fauna movement from the surrounding area into vegetation and habitats of Wollemi National Park on the southern ranges of the Hunter Valley.

The VCA encompasses existing habitat within the south-east of the ACP and is also referred to as the Southern Woodland. In accordance with the Development Consents, active underground mining will be undertaken in this area over the life of the ACP and ACOL-operated RUM. Surface disturbance will be kept to a minimum where possible in accordance with the Conservation Agreement. This area consists of remnant woodland habitat which has been set aside as a conservation area under a commitment made in the original ACP EIS (HLA, 2001) and in accordance with Schedule 3, Condition 27 of the Ashton DA.

4.2.3 Aquatic Habitats

Bowmans Creek is about 56 km long and the headwaters are located in the Little Brothers Range, at an elevation of about 650 m Australian Height Datum. The lower section of the creek within the ACP is 4.5 km long located between the New England Highway and the Hunter River confluence (Evans and Peck, 2009). There is variable flow in this section of the creek and it is generally perennial, although surface flows can cease during severe droughts. The Bowmans Creek floodplain has been previously disturbed by cattle grazing, weed encroachment, vegetation clearing and rubbish dumping.

As described by MPR (MPR, 2009), Bowmans Creek within the ACP provides the following important ecological functions:

- Fish passage between the Hunter River and other upper catchment tributaries upstream of the New England Highway is available intermittently, owing to the variable flow and shallow nature of some of the creek sections that dry out, or where surface water flow is through cobbles, thus isolating pools.
- Off-line fish refuge habitat during extended Hunter River flood events.
- Fish nesting habitat in the form of gravel bars in pools.
- A complex of aquatic ecological habitats (cobble and sediment pools and riffles, rock bar pools) with varying depths and aquatic/emergent plants to support a complex assemblage of aquatic macroinvertebrate fauna.

Glennies Creek is approximately 45 km long and flows from its headwaters at Mount Royal to the Hunter River. It is a perennial creek that provides environmental and compensatory base-flow to the Hunter River from the Glennies Creek Dam storage at Lake St Clair. It is deeply incised into its channel throughout the ACP and consequently the banks are generally steep and, in some cases, unstable. Other than at the New England Highway Road bridge there are minimal rocky outcrops instream, with the channel comprising several long pools more or less permanently connected with their downstream ends. Glennies Creek within the ACP provides valuable fish habitat and supports permanent flow throughout its length. A number of native fish species and platypus are known to inhabit the area. Aquatic vegetation is present throughout the creek length and there are no significant impediments to fish or platypus migration through the ACP (MPR, 2009).

No species of fish or aquatic invertebrates listed under the NSW *Fisheries Management Act 1994* or the EPBC Act were recorded in any of the Bowmans Creek or Glennies Creek monitoring surveys to date. The coastal river freshwater catfish (*Tandanus tandanus*) has been recorded in Bowmans Creek. While not listed as a threatened species, this species' distribution and abundance has been significantly reduced throughout the southern parts of its known range and will be included as a target species within the aquatic ecology monitoring and management practices. In most of the Murray-Darling basin, it has been listed as an endangered population, so there is interest in the health of other NSW populations.

4.2.4 Groundwater Dependant Ecosystems

No GDEs have been reported to date within those parts of the alluvium that are predicted to be impacted during mining activities.

The Bowmans Creek RRG Population (refer to **Figure 3**) is expected to be largely dependent on surface water flows, with limited seasonal recharge to an extent on groundwater baseflows through extending their roots into the water table. There are no impacts predicted on alluvial groundwater levels in this area.

4.3 Monitoring methodology

In accordance with Condition 28 of Schedule 3 of the Ashton Development Consent, ACOL conducts biannual fauna monitoring, and annual vegetation / rehabilitation monitoring within the VCA, Bowmans Creek riparian corridor, NEOC rehabilitation, remnant native woodlands, and land overlying the underground mining operations (referred to as "Underground Surface monitoring") on site. This monitoring is used to assess the continued survival and management of the native flora and fauna within the ACP and ACOL-operated RUM area and assess ecosystem recovery / development of key habitat corridors (refer to **Figure 4**). Monitoring will continue until the completion of underground mining within the extraction area, which is approved to occur until 31 December 2035 by the Ashton DA.

The aim of the monitoring program is to:

- Ensure that existing areas of vegetation not affected by mining are maintained as viable habitats.
- Ensure that the rehabilitation of the mining-disturbed ACP areas provides an environment that is equal to, or better than, the pre-mining environment and is available for threatened species that may inhabit the area.
- Monitor any impacts attributable to the development, and assess the benefit of rehabilitation works.

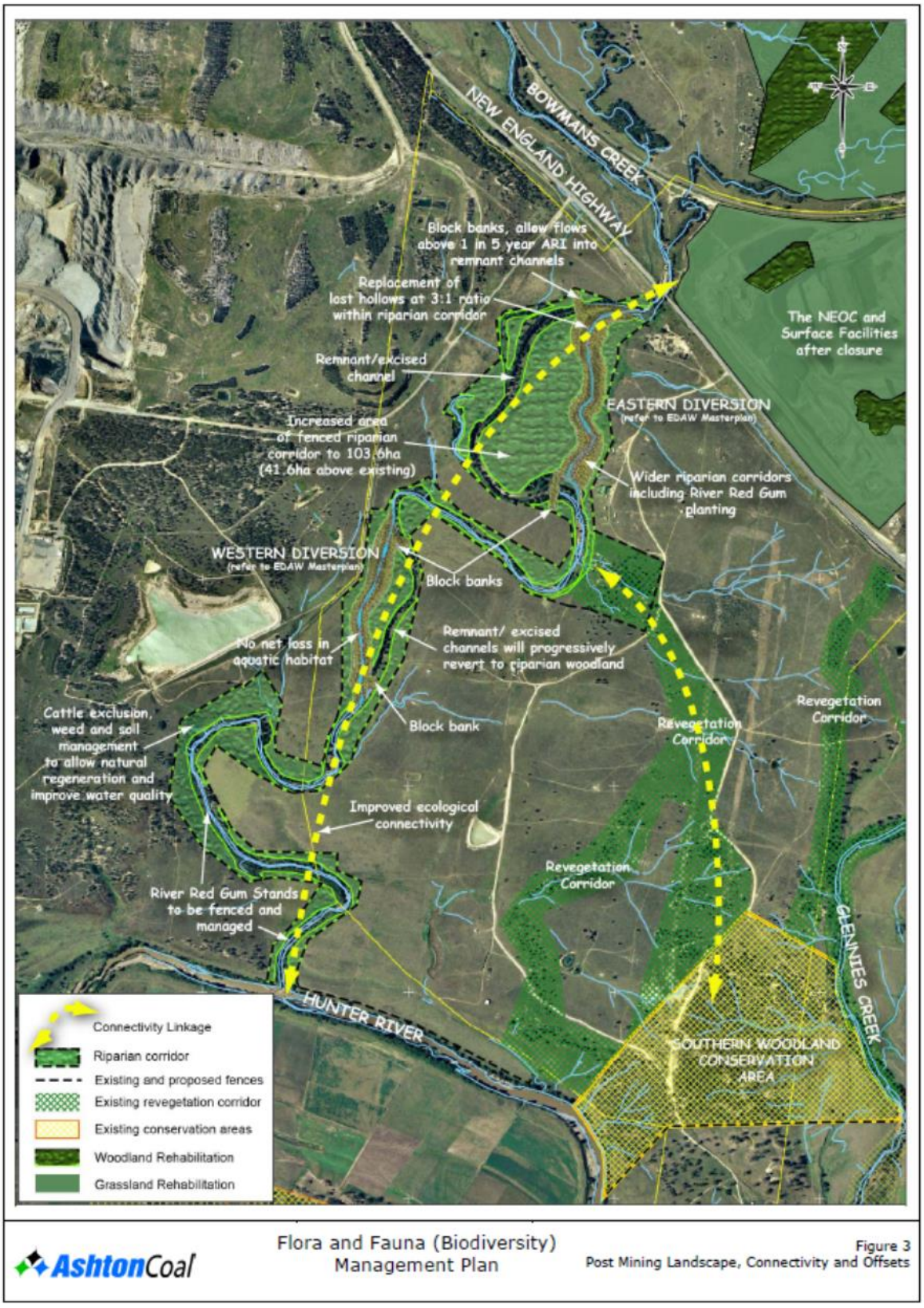


Figure 4: Post-mining Landscape, Connectivity and Offsets

4.3.1 Experimental Design of Performance System

Any monitoring plan is underpinned by spatial-temporal replication to enable comparative contrasts and to evaluate whether or not an event has changed the environment, to determine which components are adversely affected, and to estimate the magnitude of the impact.

This design is often referred to as a Before–After Control-Impact (BACI) design. This is a classic method for measuring the potential impact of a defined event. Impacts can be analysed by measuring conditions before a planned activity and then comparing the findings to those conditions measured after. Studies may also make use of an unaffected or reference (control) site for comparisons. The riparian vegetation and aquatic ecology monitoring incorporates the use of reference sites located up and downstream from the mining areas while terrestrial fauna monitoring uses the VCA, south-eastern woodland and the northern woodland as reference sites.

4.3.2 Terrestrial Fauna Monitoring and Analysis

The locations of the current fauna monitoring sites for the ACP are indicated on **Figure 5**. The locations of proposed fauna monitoring sites for the ACOL-Operated RUM are indicated on **Figure 6**.

The methods utilised during the biannual fauna survey periods include the following:

- Timed observations of bird species at specific locations within the woodland and corridors. Surveys are conducted over an appropriate interval time (15 – 60 minutes depending on patch size) during periods of high activity, i.e. early morning or early evening. Records include species and counts of individuals, with birds recorded outside the survey period documented as 'opportunistic' observations.

- Targeted surveys for grey-crowned babbler, hooded robin and speckled warbler are undertaken within both retained and revegetated habitats, including mapping of roosts and nests (where possible all nest and den trees will be permanently marked in the field for easy relocation and monitoring) and counts of individuals. Surveys are carried out in both breeding and non-breeding seasons and cover all the areas of potential habitat within the subsidence impact area.

- All roost and nest boxes are visually inspected for damage and identification of any species occupying the boxes. During the inspection:

    - exotic species, including starlings, common mynas (*Acridotheres tristis*) and bees, are removed;

    - ants are discouraged using talcum powder, where necessary; and

    - damaged boxes are repaired or replaced.

- Trapping of small and arboreal mammals at established locations in the retained/revegetated woodland areas and key wildlife corridors to the south of the New England Highway. Traps and hair tubes will be set for a minimum of four consecutive nights.

- Five randomly located reptile survey transects established during survey periods.

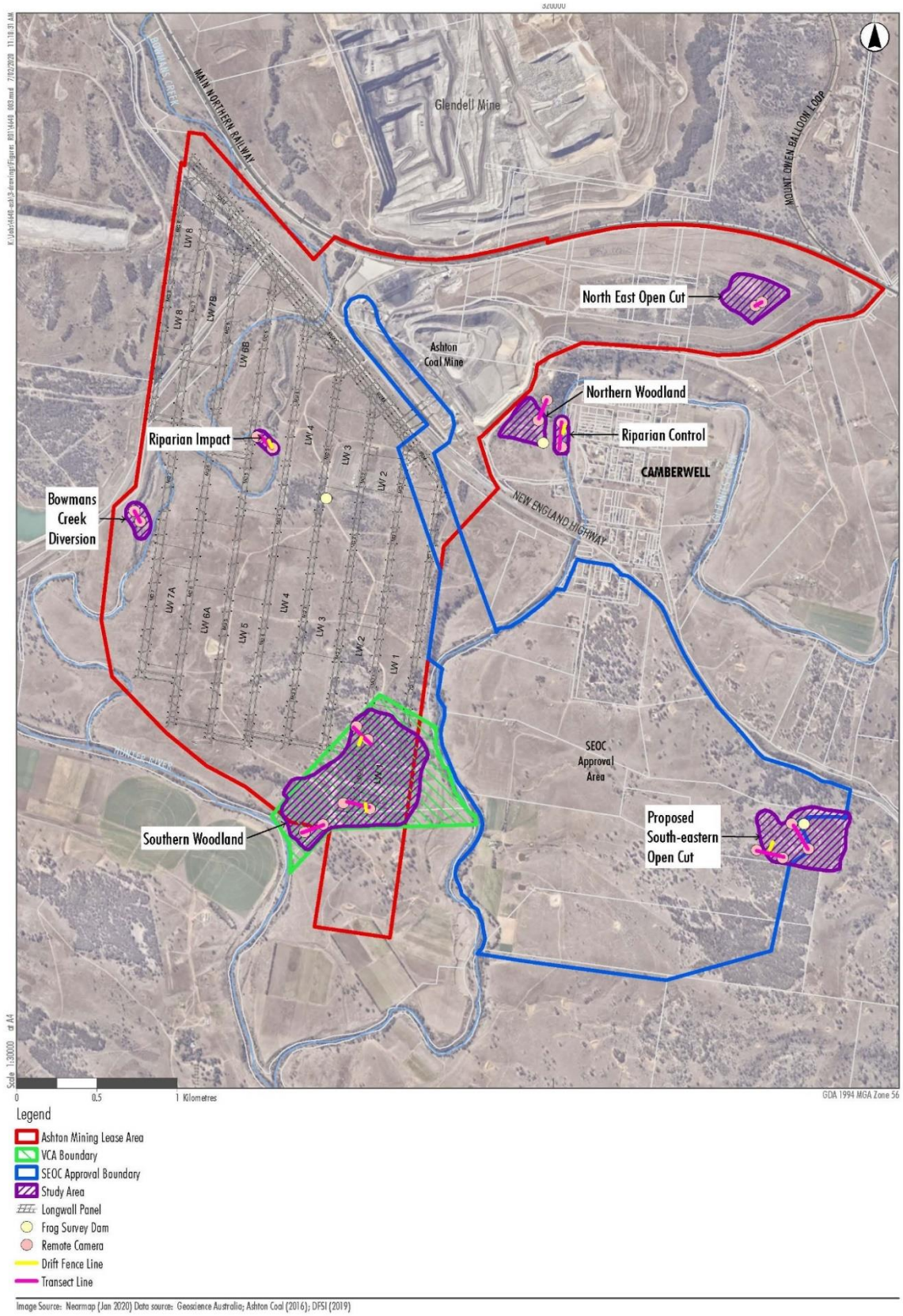
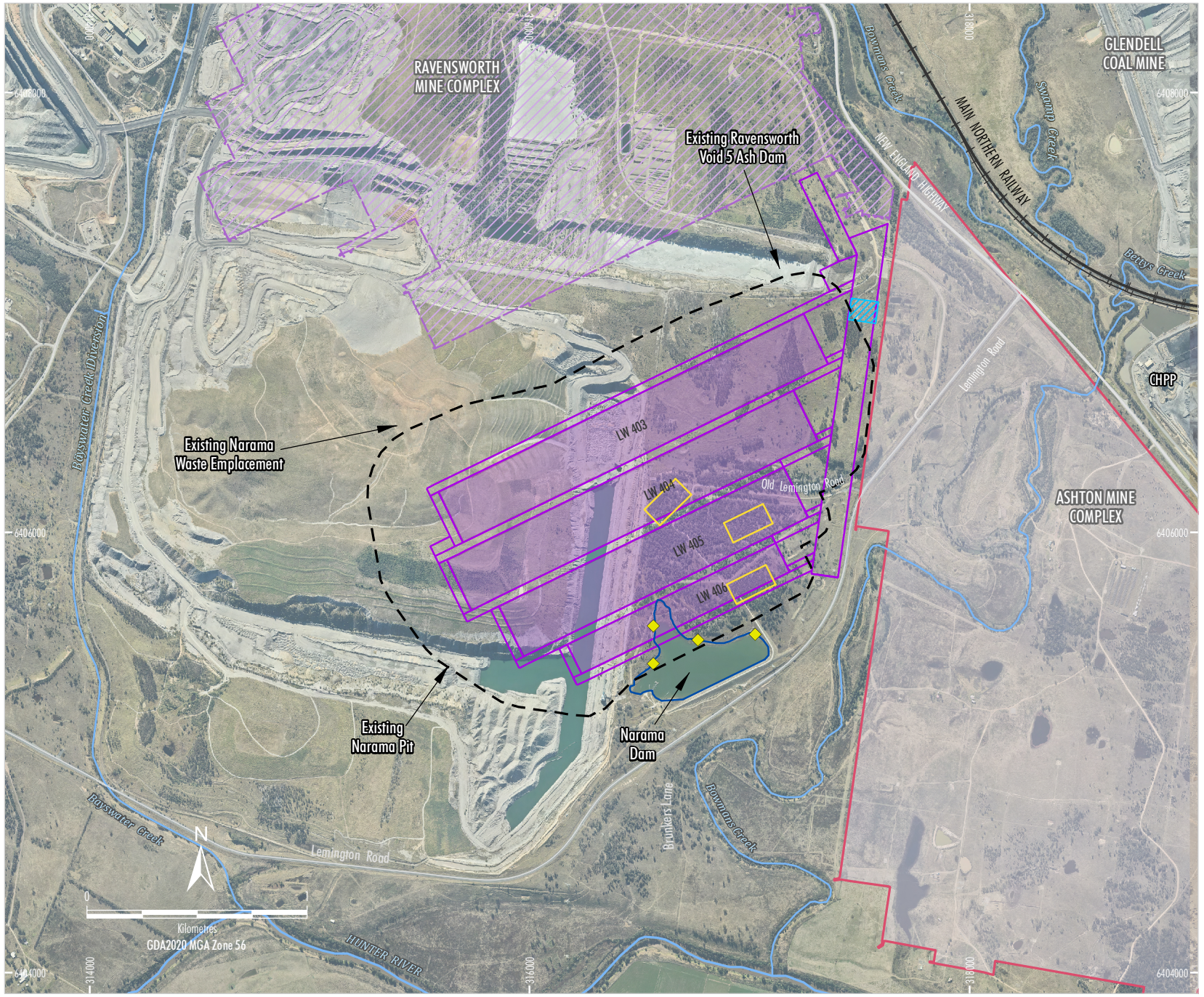


Figure 5: Location of ACP Terrestrial Fauna Monitoring Sites



LEGEND

- Completed Pikes Gully Seam Workings
- Existing Shaft 5 Location
- Pikes Gully Seam Longwall Layout
- Ashton Underground Mine
- Longwalls 403 to 406 Study Area

Indicative Monitoring Locations and Search Methods

- Indicative Southern Myotis & Waterbird Habitat Monitoring Location
- 2 ha, 20 Minute Search
- Aural Visual Survey for at Least 20 Minutes

Source: Ecological (2024); SCT (2021); NSW Spatial Services (2023)
Orthophoto: Ravensworth Mine Complex (2021)

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LONGWALLS 403 TO 406 EXTRACTION PLAN

Location of ACOL-operated RUM Terrestrial Fauna Monitoring Sites

Figure 6

ACO-18-03A LW403-406_EP_BMP_202A

- Amphibians will be monitored at set aquatic locations by listening for breeding choruses within a week of significant rainfall each season during mild conditions. If no rainfall has been recorded for the season the survey must take place in the last week of the season and will include both diurnal and nocturnal searches in areas of suitable habitat.

- Transects used for Landscape Function Analysis (LFA) and arboreal trapping transects are also used for ant assemblage surveys. When ant nests or foraging ants are identified, they are collected, treated with ethanol (in the lab) and identified to genera level following the methods identified in Shattuck (2009).

- Opportunistic sightings and secondary indications (scats, scratches, diggings, tracks etc.) of fauna are noted and include:

    - spotlighting and anabat surveys over a minimum of two non-consecutive nights;
    - searching in suitable habitat for herpetofauna (reptiles and frogs);
    - searches for whitewash, prey remains and regurgitation pellets from owls;
    - checks for raptor nests;
    - checks of trees for scratches consistent with arboreal mammals; and
    - searches for scats of mammals.

- The analysis of the monitoring data will relate the results back to benchmarks, so that if variation in biodiversity parameters is recorded, appropriate changes can be considered.

- Assessment will look at relationships between landscape condition, health, diversity and abundance of the fauna assemblages in the area. This also provides valuable data that can be used in other projects on the site and in the region.

- LFA is also undertaken to provide improved insight into the condition and stability of the retained habitats in comparison to impact areas. LFA monitors the water-driven resources of an area and uses indicators to determine sustainability indexes, which will be plotted over time.

The following monitoring methodology will be implemented throughout Plant Community Type (PCT) 1603 within the ACOL-operated RUM areas:

- Establish a bird monitoring site at Narama Dam to specifically monitor for ongoing waterbird usage and implement methodology in accordance with BMP.

- Establish targeted survey sites over LW 403-406 for threatened woodland birds to monitor for continued habitat usage.

- Conduct baseline acoustic monitoring to determine if Southern Myotis (*Myotis aelleni*) is utilising Narama Dam. If Southern Myotis is recorded during baseline surveys, continue yearly monitoring between October-March to confirm species presence and habitat utilisation until two years post-mining of LW 403 to 406.

- Conduct a baseline survey throughout the Application Area to determine the presence of habitat features for threatened species, including but not limited to:
    - Hollow bearing trees capable of supporting threatened parrots, owls and arboreal mammals (Brush-tailed Phascogale, Squirrel Glider).
    - Stick nests which may be suitable for breeding threatened raptors.
    - Wetland habitat at Narama Dam which may be suitable habitat for threatened birds.
- Conduct yearly inspections to confirm the ongoing presence and condition of habitat features within the Application Area, until two years post-mining.
- Conduct 2 x 30-minute herpetological searches within the Application Area during spring at least two years prior to mining, yearly during mining, and at least two years post-mining. Indicative monitoring locations have not been provided on **Figure 6**, however will be included after ground-truthing has been undertaken to confirm the presence of the microhabitat/best quality habitat. The herpetological searches will target the following areas within the ACOL-operated RUM:
    - areas of best habitat in PCT 1603 for reptiles; and
    - areas of best habitat in riparian/wetland areas for amphibians, which may include areas of Narama Dam and the streams which flow into Narama Dam as shown on **Figure 6**.

4.3.3 Riparian Vegetation Monitoring

Annual riparian monitoring surveys are undertaken to assess mining impacts and vegetation health along the Bowmans Creek riparian corridor. Monitoring will continue up to five years after completion of LW mining.

The current methodology used for the riparian vegetation surveys is outlined in the 2019 *Bowmans Creek Vegetation Monitoring Report* (DnA Environmental, 2019a) and primarily utilises LFA transects to assess land surface function and stability, and floristic analysis quadrats to assess vegetation health and development. Riparian monitoring incorporates the assessment of Bowmans Creek Diversion rehabilitation vegetation. Riparian monitoring transect /quadrat site and reference site locations are shown in **Figure 7**.

The monitoring sites provide representative sample locations within the mining footprint, while reference sites are located outside the mine disturbance footprint. As well as data collected during LFA monitoring, the following attributes are also recorded at each site during the surveys:

- dominant and sub-dominant species within each structural layer;
- percentage cover of each structural layer;
- level of disturbance and conditional rating;
- evidence of regeneration; and
- each site will also be photographed to allow visual comparison and identify any long-term trends in riparian vegetation.

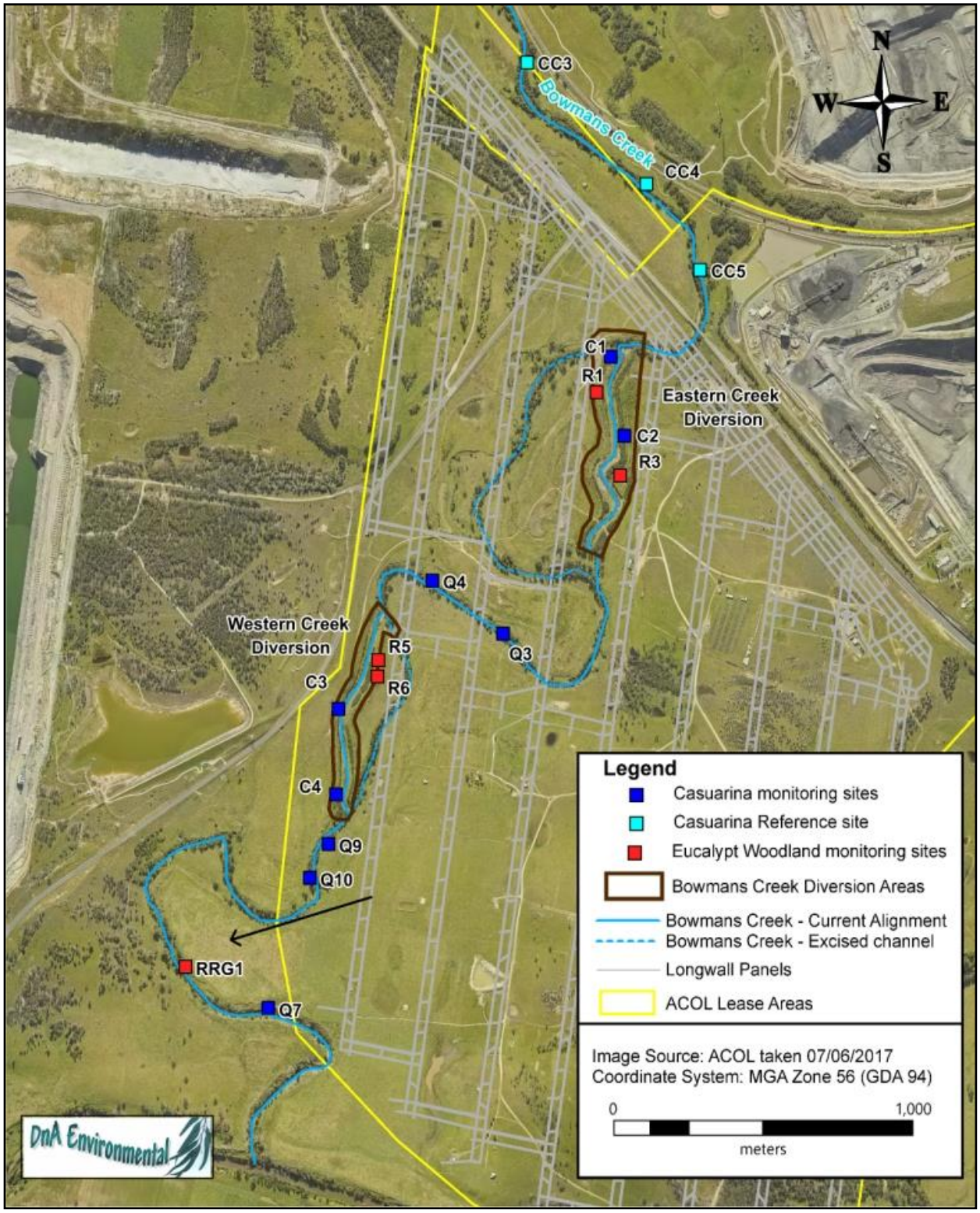


Figure 7: Location of Riparian Vegetation Monitoring Sites

As part of the broader riparian monitoring program, the Bowmans Creek River RRG population is also monitored. RRG monitoring program includes:

- annual monitoring of RRG populations to include visual surveys of ground surface disturbance and tree health;
- annual monitoring of soil moisture and LFA indices at existing stands of RRG;
- an estimation of projected foliage cover of mature RRG trees using vertical photographs; and
- monitoring of rainfall and streamflow data and comparison with RRG health and LFA monitoring results.

4.3.4 Rehabilitation Monitoring

Revegetated areas are monitored annually in the NEOC rehabilitation according to the monitoring methodologies outlined in the 2019 Annual *NEOC Rehabilitation Monitoring Report* (DnA Environmental, 2019b). Monitoring compares the progress of the rehabilitation sites against a set of completion criteria obtained from annual reference site measurements made in areas of remnant woodland and grassland communities in the local area. These completion criteria are detailed in the current version of the RMP.

LFA is undertaken within open cut rehabilitation monitoring. This method uses indicators to define the soil type and ten assessed parameters (e.g. soil, grass and litter cover). These indicators are then used to determine sustainability indexes, which will be plotted over time. This will help to establish the success of site management and rehabilitation works, and will provide information to guide any corrective action.

NEOC rehabilitation monitoring site locations are shown on **Figure 8**.

4.3.5 Southern Woodland Conservation Area (VCA) Monitoring

Monitoring within the VCA is undertaken annually to evaluate the vegetation health, assess underground LW mining impacts, and monitor vegetation community development towards a condition equivalent to, or higher than, prior to mining. Monitoring is completed according to the monitoring methodologies outlined in the *2019 Southern Voluntary Conservation Area Monitoring Report* (DnA Environmental, 2019c). VCA monitoring uses the Biometric Assessment Method, and incorporates the use of quadrats and transects, to assess vegetation condition and community development in areas of subsidence impact and repair. Environment, Energy and Sciences (EES) monitoring forms and photopoints are also completed for three established sites (SVCA01, SVCA02 and SVCA03). This year the sites were renamed to better reflect their location within the SVCA. Three additional transects were also established in areas of subsidence (SVCA04) and subsidence repair (SVCA04 and SVCA05).

VCA monitoring site locations are shown on **Figure 9**.

4.3.6 Underground Surface Monitoring

Vegetation monitoring within the underground surface is undertaken annually to evaluate the condition of agricultural grazing lands and remnant VCA woodland vegetation that are being affected by underground LW mining. Monitoring also ensures vegetation communities are restored to or maintained to the same or higher condition than prior to mining. Monitoring methodology, as outlined in the *2019 Underground Mining Surface Monitoring Report* (DnA Environmental, 2019d), consists of LFA transects, photo points and community development observations. This monitoring program is designed to be consistent with a range of conditions specified within approval documents, the Forward Program/RMP and associated Management Plans.

Underground surface monitoring site locations are shown on **Figure 10**.

Figure 8: Location of NEOC Rehabilitation Monitoring Sites

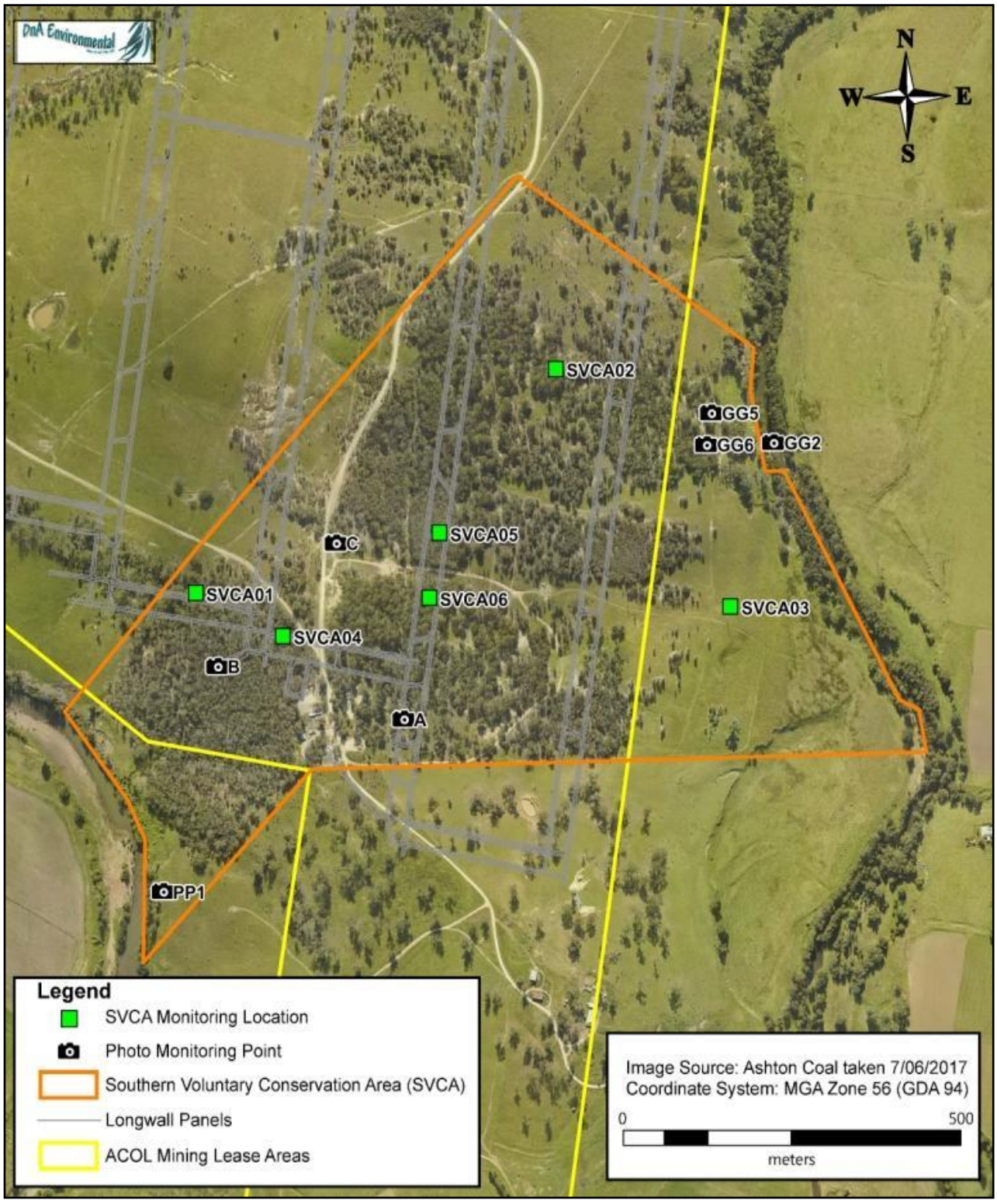


Figure 9: Location of VCA Monitoring Sites

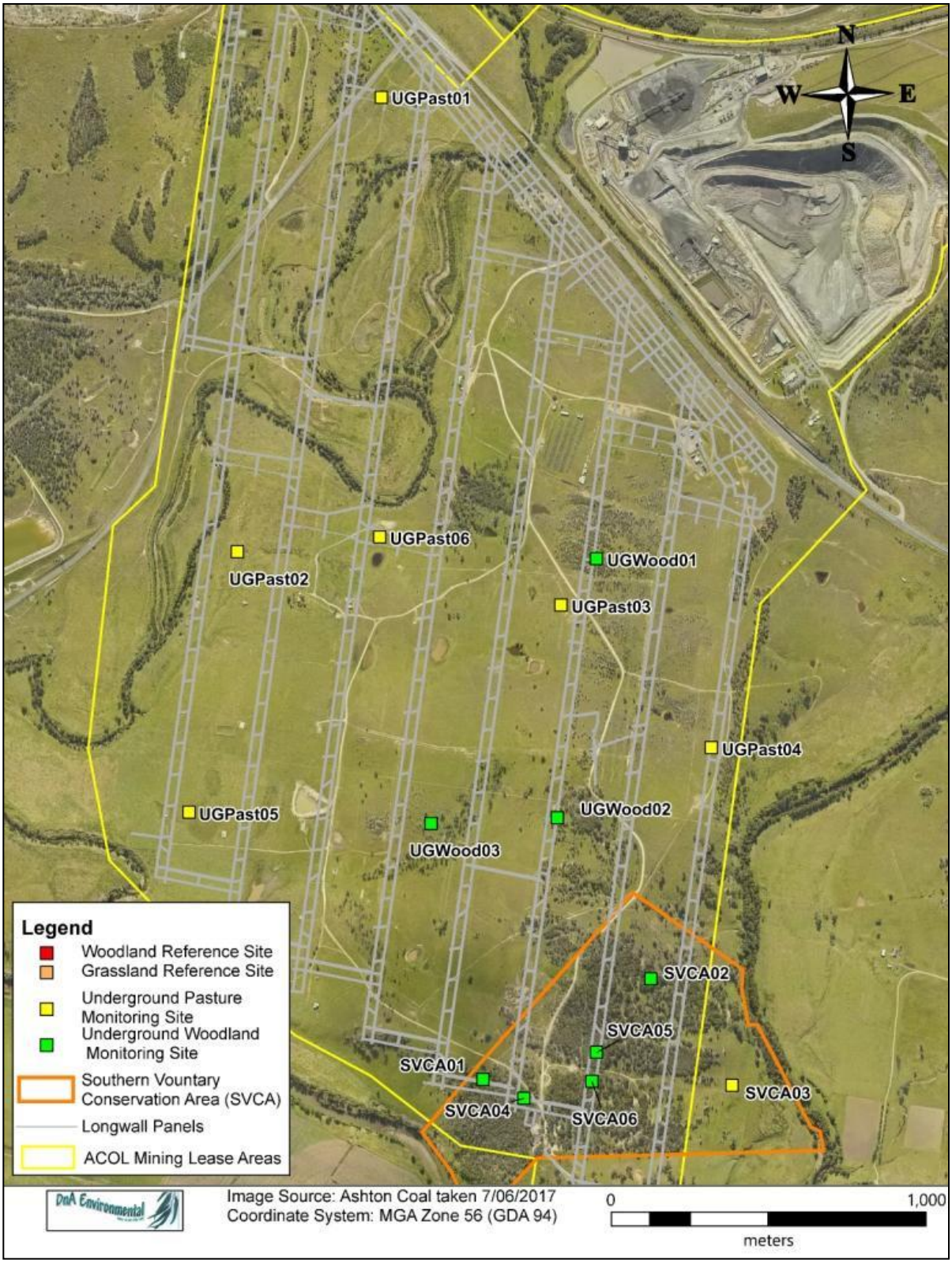


Figure 10: Location of Underground Mining Monitoring Sites

4.3.7 Aquatic Ecology Monitoring Program

Aquatic fauna and habitat, stream health and water quality are monitored at established locations along Bowmans Creek, Glennies Creek and Narama Dam in order to detect any possible mining or diversion related impact over the life of the mine (**Figure 11**).

Pre-mining aquatic monitoring for Bowmans Creek and Glennies Creek has been completed. Pre-mining aquatic monitoring will be undertaken for the Narama Dam and will provide measurable baseline data to assess:

- Impacts on existing communities along the creeks from subsidence and potential breakout points along the channel.
- Impacts to fish, fish passage, macroinvertebrates, water quality and aquatic habitat.

4.3.7.1 Water Quality

- Water quality monitoring results from sites within Bowmans Creek, Glennies Creek and the Narama Dam will be utilised.
- Field water quality (both chemical and physical) monitoring during the biannual aquatic ecology monitoring program will be continued and will include depth profile monitoring of field water quality parameters for electrical conductivity (EC), temperature, pH, turbidity, and dissolved oxygen (DO).
- Additional periodic field monitoring of the water quality within the excised portions of the creek will be undertaken.
- In regards to surface water flows, the NSW Office of Water (now WaterNSW) weir gauge provides adequate data to enable the interpretation of any changes in Bowmans Creek.

4.3.7.2 Aquatic Ecology (Stream Health)

Stream health is monitored in spring and autumn at a number of locations along creek lines including sites upstream, downstream and between the proposed Bowmans Creek diversion channels (see **Figure 11**) to assess the stream health against the pre-mining benchmarks (MPR, 2009).

The stream health monitoring includes:

- Macroinvertebrate sampling using AusRivAS protocols for collection and taxonomy.
- Fish sampling using bait traps set overnight plus direct observations and incidental captures during macroinvertebrate sampling. Data used to produce fish species lists per site per season.
- Site habitat diversity assessment using existing RCE method and site photo referencing.
- Metered and profiled water quality (EC, temperature, pH, turbidity, DO). Data are used to provide specific season between-site comparisons to aid interpretation of site aquatic biota differences for that season.

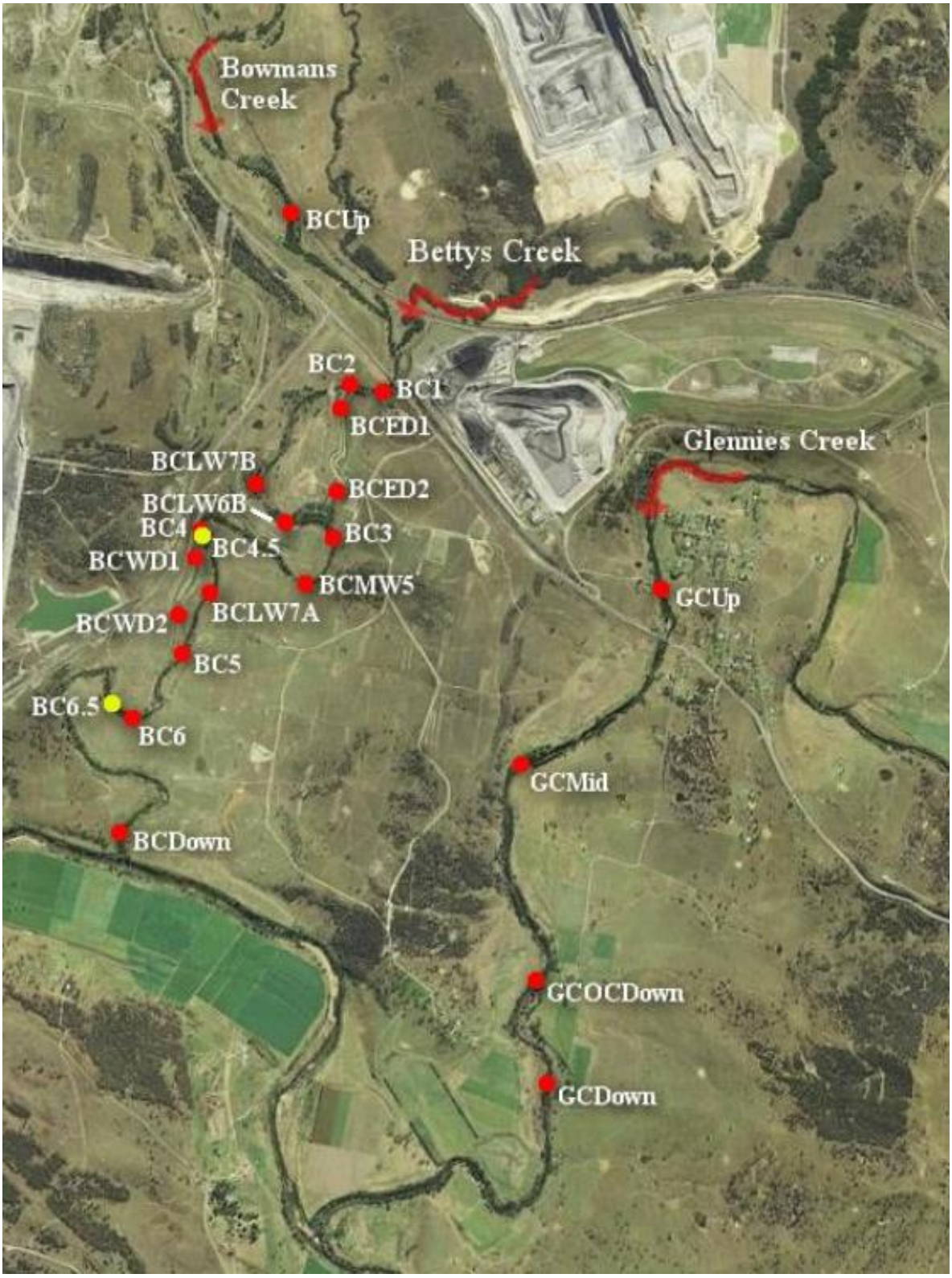


Figure 11: Location of Aquatic Ecology Monitoring Sites

Additional fish trapping sites will be established throughout the creek to monitor fish passage during times when the creek has sufficient flow to allow fish passage and to monitor pool refuge areas during low/no flow periods.

Sampling of short-term post-mining sites will be incorporated into the above biannual surveys to assess impacts to fish, fish passage, macroinvertebrates, aquatic and riparian habitat. These post-mining surveys enable direct assessment of mining impacts on individual pools as mining proceeds and to facilitate the interpretation of the long-term monitoring results. These surveys will be undertaken twice within one year of the LW passing beneath Bowmans Creek. At least one survey of the short-time monitoring sites will also be undertaken prior to mining to allow direct comparison. Any decision to continue monitoring the short-term sites beyond the two post-mining studies would be made on a site-by-site basis and only if there were evidence of localised mining or diversion related impacts.

4.3.7.3 Analysis

The AusRivAS derived macroinvertebrate data are used to compile site species diversity indices (i.e., number of macroinvertebrate taxa at each site) and site pollution sensitivity indices (using the SIGNAL biotic index). It is based on average sensitivity to disturbance of the aquatic macroinvertebrates present within a sample. Higher scores generally indicate healthier aquatic conditions as follows:

- SIGNAL Index > 6 = Healthy Unimpaired.
- SIGNAL Index 5 – 6 = Mildly Impaired.
- SIGNAL Index 4 – 5 = Moderately Impaired.
- SIGNAL Index < 4 = Severely Impaired.

Changes in SIGNAL index can be used to identify trends in the overall ecological health of each site and also make comparisons between sites. The baseline indices over a number of survey periods are provided in **Table 4** below (MPR, 2010).

Table 4: Aquatic Ecology Performance Indicators

Season	Aug 07	Sept 07	Aug 08	Sept 08	Aug 09	Sept 09	Aug 10
Bowmans Creek							
	N=4	N=4	N=4	N=6	N=6	N=6	N=6
Total number of invertebrate taxa	25	30	32	37	44	46	40
Mean number of taxa	14	17	18.8	18.8	19.8	21.2	17.5
SE creek number of taxa	2.5	1.9	1.1	1.8	1.9	2.6	2.4
Site SIGNAL Scores	**2.95**	**3.64**	**4**	**3.93**	**3.75**	**3.55**	**3.61**
Glennies Creek							
	N=4	N=4	N=4	N=6	N=6	N=6	N=6
Total number of invertebrate taxa	34	42	42	34	41	33	36
Mean number of taxa	19	22.6	24.2	20.8	24	21	22
SE creek number of taxa	3.6	1	0.5	0.4	0.8	0.6	2.1
Site SIGNAL Scores	**3.71**	**3.8**	**3.9**	**3.74**	**3.95**	**3.71**	**3.98**

SE: Standard Error of Means

4.3.8 Threatened Ecological Communities Monitoring Program

Multiple threatened ecological communities (TECs) are located over the ACOL-Operation RUM area. Baseline monitoring will be undertaken within both the Central Hunter Grey Box—Ironbark Woodland and the Central Hunter eucalypt forest and woodland.

The extent of Central Hunter Grey Box—Ironbark Woodland or Central Hunter eucalypt forest and woodland within the ACOL-operated RUM area will be monitored yearly, with monitoring to occur at least two years post-mining completion.

Assess vegetation to ensure compliance with the following literature and compare to baseline extent:

- Central Hunter Grey Box—Ironbark Woodland: Central Hunter Grey Box—Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions – endangered ecological community listing (NSW Scientific Committee, 2010).
- Central Hunter eucalypt forest and woodland: EPBC Act (s266B) Approved Conservation Advice (including listing advice) for the Central Hunter Valley eucalypt forest and woodland ecological community (Threatened Species Scientific Community [TSSC] 2015)

Undertake photo monitoring in areas within the mapped extent of the TECs where ponding is predicted twice per year. Set-up permanent photo monitoring points, with photographs facing north, south, east, west and vertical to be captured twice per year. Compare canopy projected foliage cover with previous years, and with control sites in unmined Central Hunter Grey Box—Ironbark Woodland and Central Hunter eucalypt forest and woodland.

4.4 Threatened Species and Habitat Management

4.4.1 Habitat Connectivity

Long term post-mining land use objectives within the ACP are to create a mosaic of agricultural land and wildlife habitat (refer to **Figure 4**). This will be achieved by limiting stock access to riparian and revegetated habitats and by allowing the continued grazing of stock within some woodland units once they have been established. The retention of fencing will allow the rotation of grazing within woodland units, allowing the regeneration process to be controlled in the long-term and to aid in bushfire hazard reduction by grazing.

The open cut area will be a mixture of grazing land and trees in clumps incorporating several dams to capture water from the emplacement areas. Trees in clumps will be fenced to restrict cattle access until maturity. Subsided areas south of the highway will be predominantly improved pasture with isolated stands of trees, riparian vegetation along waterways and the VCA.

The location of treed areas within the open cut area has had general regard to the location of rehabilitation and offsets within the surrounding landscape consistent with the Division of Resources and Energy's Synoptic Plan – *Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales* (1999 or its latest version), for the purpose of establishing wildlife corridor links to adjoining habitat.

Essentially habitat linkages across the landscape are established in a general north-south direction connecting the Hunter River along Bowmans Creek and from Glennies Creek across the NEOC to revegetation and offset areas within the Mt Owen Mine complex and further north. Other linkages are also established with linkage of Glennies Creek and the Hunter River across the VCA and from the VCA to Bowmans Creek.

The RMP defines those areas of rehabilitation and revegetation that provide the majority of connectivity and sets the performance indicators and completion criteria for those areas that will improve habitat linkages across the landscape.

4.4.2 Threatened Species Habitat

The VCA is known habitat of the grey-crowned babbler, hooded robin and speckled warbler and will be managed consistent with the Conservation Agreement using ACOL environmental management plans that constitute the Plan of Management for the site. This habitat is expected to improve as the woodland naturally regenerates and provides structural diversity through all strata levels, additional areas are revegetated where necessary with species that are typical of the area and as weeds and feral grazers/predators are managed. Any increase in habitat size and structural diversity also contributes to the long-term viability of the local breeding populations of these vulnerable species.

In order to minimise risk of impacts on the threatened species listed in **Table 3**, the following habitat enhancement and protection measures will also be implemented:

- As described within the Vegetation Clearance Protocol (**Appendix B**), where possible hollow branches will be relocated to the VCA to provide a supplementary habitat resource for hollow dependent fauna such as gliders and microchiropteran bats. Woody debris from smaller trees will be placed along the bunds or in small piles or strips within woodland to increase shelter and foraging opportunities for native fauna including the threatened grey-crowned babbler, hooded robin and speckled warbler.

- Floodplain/grassy habitat will be created on the areas of fill (due to subsidence rehabilitation) by selective planting to enhance foraging habitat for woodland birds and bats. These areas will be fenced off and incorporated into the ACOL habitat corridor system and include perch sites for the hooded robin and dead timber left on the ground in open woodland areas. Collection of fallen timber will be prohibited.

- Remnant habitat north of the New England Highway will be used to form riparian and vegetation corridors.

- The overall RRG population will be enhanced by planting on the stream and upper banks of the Bowmans Creek diversions. Stock exclusion (fencing) will aim to improve recruitment of juveniles and a seed bank will be established from mature trees on site.

- Existing habitats within the creek north and south of the New England Highway will be limited to weed and pest control, revegetation to enhance wildlife movement along the riparian corridor, and temporary access for block-bank raising.

- The riparian habitats associated with the Bowmans Creek diversion have been designed to include long-term viable habitats for threatened species and will be incorporated into the overall dedicated conservation area for ACP.

4.4.3 Habitat Reinstatement for the Green and Golden Bell Frog

4.4.3.1 Management of Existing Habitats

Whilst the existing habitats within Bowmans Creek will not be actively managed for the green and golden bell frog, the clean water dams at the eastern toe of the emplacement will be vegetated and managed in such a way to filter sediments and to create refuge opportunities for this species. For example, cumbungi (*Typha* sp.) can be used to trap sediment and to provide foraging and resting habitat, while a mixture of sedges, rushes, floating plants (excluding species that are likely to cover the water surface such as Nardoo [*Marsilea* sp.] and *Azolla* sp.) and the strategic placement of rock piles and woody debris will provide refuge for the species outside of the breeding stages of their lifecycle.

4.4.3.2 Habitat Creation

Ponds will be incorporated into creek diversion design to promote fish movement and provide aquatic fauna habitat. The placement of tall shrubs and trees near the aquatic habitats will be designed so as not to shade the aquatic habitat, therefore maintaining basking opportunities. Where the ponds are within pasture that is grazed, efforts will be made to restrict stock to defined access points to manage water quality. With the exception of designated watering areas stock will be excluded from at least 20 m from the high-water mark, allowing vegetation to establish and provide foraging and refuge opportunities.

Foraging habitat and dispersal corridors will be maintained as open woodland with sparse/moderate groundcover interspersed with refuge habitat, i.e. rock piles and fallen timber. Where pasture becomes dense along the edges of the ponds or between clusters of ponds, cattle may be temporarily introduced into the area to assist in maintaining a sparse ground cover as preferred by this species.

4.4.4 Feral Animal Control

Predation of the threatened species will be managed through a feral animal control program within the ACP. Management activities will be centred on a baiting program supplemented by culling by professional shooters, where required. This approach has been selected because of the low density of feral animals. Baiting is typically the preferred feral animal control by surrounding landholders allowing for better coordination of control programs within the district. The program will be annual, prior to the breeding cycle of foxes (*Vulpes vulpes*) and on an as needs basis if an increase in the fox or wild dog population is detected. Trapping is also employed for fox, dogs and pigs where either population densities warrant such methods or baiting and shooting has not been effective.

4.4.5 Protocol for New Threatened Species Records

Significant impacts on any threatened flora and fauna species not identified in the EIS but later recorded during construction or operation of the mine will be managed in accordance with the following protocol:

1. New threatened species identified, typically by:
    a. annual flora and biannual fauna monitoring surveys;
    b. preclearance surveys; or
    c. other site walkovers.
2. Individual responsible for record (generally a consulting ecologist) is to notify:
    a. Environment and Community Relations Superintendent on completion of survey, who will report the finding within the Annual Review; and;
    b. EES in accordance with conditions of the scientific licence where held by consulting ecologist (annually).
3. Review potential impacts to the newly identified threatened species and determine management actions to:
    a. avoid impacts where possible; and
    b. mitigate impacts where avoidance is not possible.
4. With consideration of the activity and proposed management actions review significance of impacts to the newly identified threatened species through completion an assessment of significance (7-part test).
5. Update **Table 3** of this management plan to inform future activities and pre-clearance surveys.

4.5 Biodiversity Offset Management.

To offset the ecological and archaeological impacts of the project and provide for the conservation of an important archaeological area, an area in the south-east of the ACP above the underground mine was established to be conserved in perpetuity. This area is referred to as the Southern Woodland Conservation Area, Southern Conservation Area, VCA or simply the Conservation Area (CA). An agreement with the OEH under the NP&W Act was registered for the area on 16 September 2010.

The CA is 65.45 ha within part of Lot 3 DP 1114623, which is under ACOL ownership and is bound by Glennies Creek in the east, the Hunter River in the west and a private land holder to the south.

As defined within Item F of the Conservation Agreement:

> *The Owner and the Minister recognise that the Development Consent issued by the NSW Department of Planning for Development Application No. 309-11-2011-i on the 11 October 2002 permits the mining of coal by longwall methods in four seams beneath the conservation area, which will impact on the surface of the conservation area.*

To promote habitat connectivity and fauna movement, the CA is augmented by approximately 125 ha of revegetation corridors and 66 ha of Bowmans Creek riparian corridor, as shown in **Figure 4**. Although not subject to any instrument of long-term protection, management of these areas is consistent with the conservation measures implemented for the CA.

The management of the CA is the subject of numerous documents that define the permitted activities and required management practices. **Figure 12** illustrates the context and key documents relating to the CA. A copy of the BOMP for the CA is included within **Appendix C**.

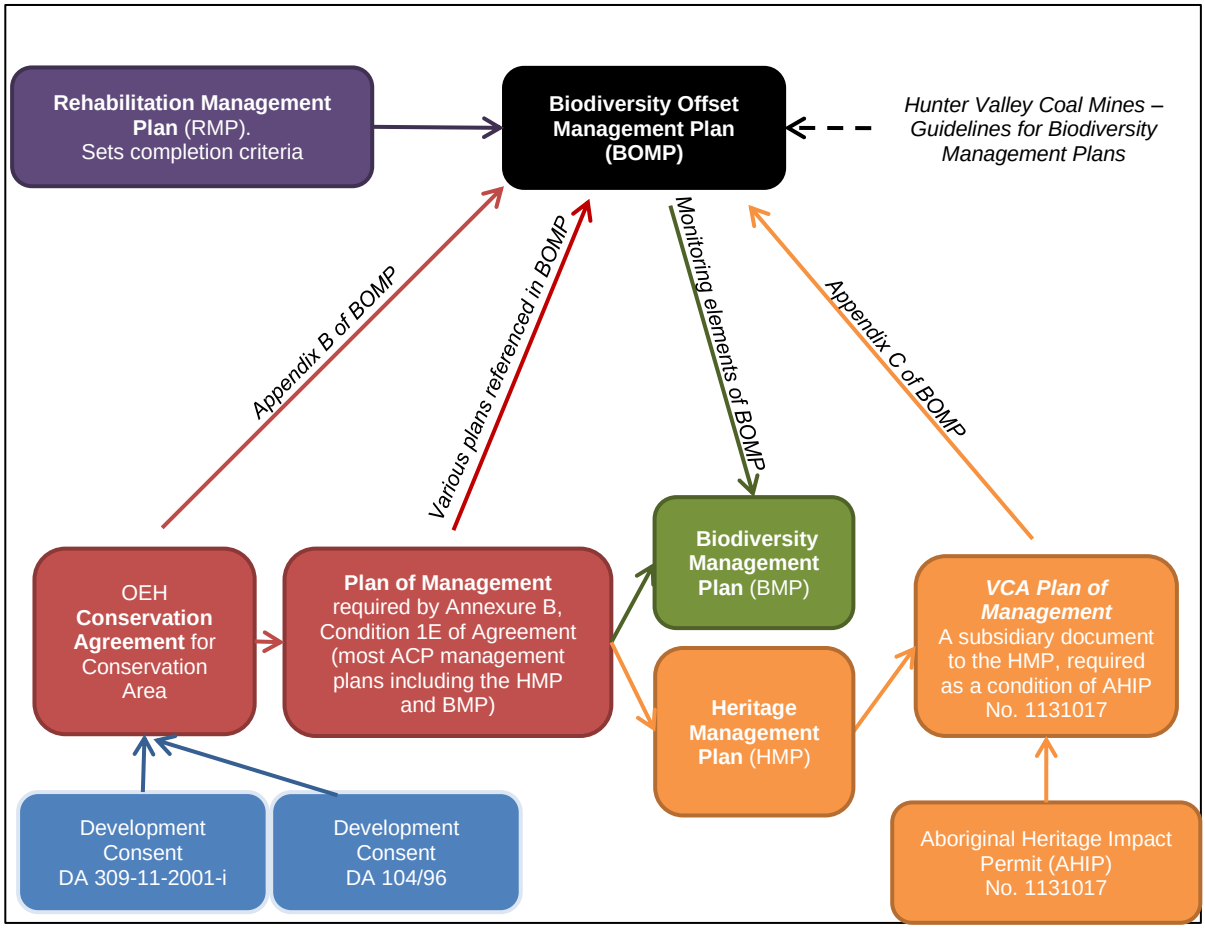


Figure 12: Context and key references for the Biodiversity Offset Management Plan

4.6 Management Actions and Responsibilities

The actions that ACOL undertake to fulfil the consents' conditions (outlined in **Appendix A)** are summarised in **Table 5**. These actions have been categorised into:

- monitoring;
- management; and
- incident response.

Procedures for flora and fauna monitoring and threatened species habitat management are detailed in **Sections 4.3** and **4.4** respectively. Vegetation clearance protocols are detailed in **Appendix B**.

A guiding set of criteria/protocols has been developed to establish the circumstances under which mitigation measures would be required. A proposed Trigger Action Response Plan (TARP) for biodiversity is presented in **Table 6**.

Table 5: Biodiversity Management Actions and Responsibilities

Item	Action	Trigger/Timing	Responsibility
1.0	**Monitoring**		
1.01	Collect baseline data prior to the commencement of the underground mining operations, to be used to monitor the impact of the operations on the aquatic ecosystem health.	Completed prior to commencement of underground mining operations.	Environment and Community Relations Superintendent
1.02	Collect baseline data from temporary monitoring sites on the Hunter River prior to the commencement of Longwall 1, to be used to monitor the impact of the operations on the aquatic ecosystem health.	Completed.	-
1.03	Deleted.	-	-
1.04	Undertake terrestrial fauna and habitat monitoring in accordance with the monitoring methodology outlined in **Section 4.3**. If no rainfall has been recorded for the season, the amphibian survey must take place in the last week of the season.	Biannually.	Environment and Community Relations Superintendent
1.05	Undertake monitoring of the RRG population at existing stands and reference sites as outlined within **Section 4.3** and **Table 2** to monitor the health and viability of these potentially GDEs over time and obtain data to assist with future regeneration and rehabilitation of the RRG population on site.	Biannually.	Environment and Community Relations Superintendent
1.06	Conduct a research program to test roost box preference based on design, positioning and colour of the artificial roost. As many arboreal roosting and denning species may take several years to utilise artificial dens and roosts, roost and den box design and positioning will be re-evaluated every five years if targeted species are not using the boxes.	To be incorporated into the biannual monitoring program.	Environment and Community Relations Superintendent
1.07	Undertake aquatic fauna and habitat monitoring at established locations along Bowmans Creek in accordance with the monitoring methodology outlined in **Section 4.3** and **Table 2** to assess the long-term stability of ecosystems against the pre-mining benchmarks.	Biannually during mine operations and for at least five years following the completion of LW mining under Bowmans Creek or until no significant impact can be confirmed.	Environment and Community Relations Superintendent
1.08	Establish additional long-term stream monitoring sites in the excised sections of Bowmans Creek and in each of the diversion channels to monitor developing aquatic habitat attributes against existing habitat attributes.	Prior to commencement of the Bowmans Creek diversion works.	Environment and Community Relations Superintendent

Item	Action	Trigger/Timing	Responsibility
1.09	Undertake a monthly water quality monitoring program, with the location of monitoring sites within Bowmans Creek to be adjusted as the creek diversions come on line (refer to Water Management Plan).	Monthly.	Environment and Community Relations Superintendent
1.10	Undertake vegetation surveys within established rehabilitated tree plots annually three years after commencement of rehabilitation activities, in accordance with monitoring methods outlined in **Section 4.3**.	Post-mine operations and rehabilitation.	Environment and Community Relations Superintendent
1.11	Undertake weed monitoring surveys within the Bowmans Creek riparian corridor immediately following the commencement of rehabilitation works.	Annually during mine operations and for at least 5 years following the completion of LW mining under Bowmans Creek.	Environment and Community Relations Superintendent
1.12	Conduct field assessment of the areas overlying LWs at the completion of each mining pass, to ascertain the extent of subsidence impacts on excised creek and riparian channel ecosystems. Where required, targeted riparian or habitat enhancement/protection measures will be recommended.	On completion of each LW panel.	Underground Mining Engineer / Environment and Community Relations Superintendent
1.13	Conduct post-mining aquatic monitoring to assess impacts to fish, fish passage, macroinvertebrates and aquatic habitat, and impacts to existing communities along Bowmans Creek from subsidence.	Bi-annually during mine operations and for at least five years following the completion of LW mining under Bowmans Creek.	Environment and Community Relations Superintendent
1.14	Conduct pre- and post-mining aquatic monitoring to assess impacts to aquatic habitat, and impacts to existing communities along the Hunter River from subsidence.	Prior to and on completion of mining Longwall 1 (if LW 1 to be full length).	Environment and Community Relations Superintendent
1.15	Update **Table 3** of this BMP where new previously unidentified threatened species are recorded within the project area.	On recording of previously unrecorded threatened species in the project area.	Environment and Community Relations Superintendent
2.0	**Management**		
2.01	Undertake seed collection in accordance with OEH guidelines and relevant licences. *Collection of River Red Gum seeds requires a licence under the TSC Act.*	Spring, or when available.	Environment and Community Relations Superintendent

Item	Action	Trigger/Timing	Responsibility
2.02	Conduct pre-clearance inspections in accordance with the Vegetation Clearance Protocol (**Appendix C**).	Prior to any clearing between March and November during the life of the mine.	Environment and Community Relations Superintendent
2.03	Provide replacement hollows or nesting boxes in the VCA and within the riparian corridor, as detailed in the Vegetation Clearance Protocol (**Appendix C**).	During all vegetation clearing activities.	Environment and Community Relations Superintendent
2.04	Utilise hollow limbs, felled trees and woody debris from clearing activities to provide habitat, shelter and foraging opportunities for relocated animals and to restore aquatic ecosystems, as described in the Vegetation Clearance Protocol (**Appendix C**).	During all vegetation clearing activities.	Environment and Community Relations Superintendent
2.05	Undertake weed control and revegetation adjacent to Bowmans Creek north and south of the New England Highway to enhance wildlife movement along the riparian corridor. *As existing Bowmans Creek ponds and adjacent pools are likely to be continually colonised by mosquito fish and carp, it is no longer practicable to manage these for the threatened green and golden bell frog.*	Ongoing.	Environment and Community Relations Superintendent
2.06	Vegetate the clean water dams at the eastern toe of the emplacement area in such a way to filter sediments and to create refuge opportunities for amphibian fauna (refer to **Section 4.4.3**).	Ongoing.	Environment and Community Relations Superintendent
2.07	Implement feral animal control programs within the ACP area as described in **Section 4.4.4**.	Ongoing.	Environment and Community Relations Superintendent
2.08	Fence the Bowmans Creek riparian zones (around diversions, the excised creek and the remaining creek) to exclude stock and provide stock watering points away from the protected riparian zones.	Following construction of the diversion works.	Environment and Community Relations Superintendent

Item	Action	Trigger/Timing	Responsibility
2.09	Increase the existing riparian vegetated strip widths along Bowmans Creek Diversion such that the eastern diversion is planted out to a minimum of 93 m and the western diversion is planted out to a minimum of 75 m. Incorporate these expanded width riparian zones into the existing vegetation and terrestrial corridor system.	Construction of Bowmans Creek diversions.	Environment and Community Relations Superintendent
2.10	Provide habitat offsets associated with the Bowmans Creek diversions, including 15.7 ha of combined aquatic and riparian habitat, and 58.7 ha of mixed riparian woodland and grassy floodplain woodland.	Construction of Bowmans Creek diversions.	Environment and Community Relations Superintendent
2.11	Provide fish-friendly riffle and rock bar structures, resting pools to assist fish migration, and cobble bottom pools suitable for catfish nesting in the Bowmans Creek diversions. Fish passage will be maintained in the diverted creek sections under at least moderate flow conditions.	Construction of diversions.	Environment and Community Relations Superintendent
2.12	Enhance the RRG population by planting on the stream and upper banks of the Bowmans Creek diversions. Stock exclusion (fencing) will be provided to improve recruitment of juveniles.	Ongoing.	Environment and Community Relations Superintendent
2.13	Manage the VCA in accordance with the Conservation Agreement. Specific management practices applicable to the CA are provided in **Appendix C** and these have been incorporated into relevant site protocols.	Ongoing.	Environment and Community Relations Superintendent
2.14	Vehicle access in VCA and other woodland areas will be restricted to formed trails for access to private property, management purposes as approved by EES, firefighting and/or any emergency requirements.	Ongoing.	Environment and Community Relations Superintendent
2.15	Maintain a free draining landform as detailed in the Extraction Land Management Plan.	Ongoing.	Environment and Community Relations Superintendent
2.16	If subsidence induced pond formation occurs in the excised creek sections, riparian vegetation will be managed.	Detection of pond formation in excised creek sections.	Environment and Community Relations Superintendent/Underground Mining Engineer

Item	Action	Trigger/Timing	Responsibility
3.0	**Incident Response**		
3.01	Injured terrestrial animals that are found prior to or during clearing activities will be cared for and handed over to Wildlife Aid (0429 850 089) or veterinary surgeries in Singleton or Muswellbrook for further treatment.	If injured terrestrial animals are found prior to or during clearing activities.	Environment and Community Relations Superintendent
3.02	In the event of the detection of the masked owl or other threatened flora or fauna species (including those that were previously unrecorded on the site) within any habitat areas to be cleared, all clearing work will cease and further investigations will take place, in accordance with the Vegetation Clearing Protocol provided in **Appendix B**.	Detection of a threatened species within any habitat areas to be cleared.	Environment and Community Relations Superintendent
3.03	Where perceptible impacts to terrestrial and aquatic habitat are noted, the following procedure will be followed and reported in accordance with **Table 2** and **Table 6**: • undertake additional investigation to ascertain the actual cause (mine related or other); • assess the impact against the performance measures and indicators detailed in Table 2 and Table 6; • if mine related, consult relevant government agencies; • develop and implement a specific response plan to prevent further impacts; and • undertake remediation as required.	Perceptible impacts noted during monitoring activities or exceedance of Performance Indices.	Underground Mining Engineer / Environment and Community Relations Superintendent
3.04	Pre-clearance surveys (as part of ground disturbance permits) shall be used to identify the presence of any threatened species within construction or operations facilities at the ACP. Upon detection of a threatened species; • an assessment will be undertaken regarding whether the species is a critical stage of its life cycle; and • works will not recommence until the species has vacated the habitat or can be relocated. • animals (non-breeding) will not be relocated without the consent of the EES (breeding animals will not be disturbed).	Upon detection of a threatened species.	Underground Mining Engineer / Environment and Community Relations Superintendent
3.05	Any disturbance planned or created, outside that allowed by the ground disturbance permits, will be reported to the Environment and Community Relations Superintendent as soon as practicable.	Any disturbance planned or created, outside that allowed by GDP.	All site personnel

Item	Action	Trigger/Timing	Responsibility
3.06	In the event that it is not practical to maintain a free draining landform, an assessment will be undertaken into the suitability of creating a permanent wetland or stock watering point with due consideration given to the: • overall rehabilitation and final land use objectives of the ACP; • use of riparian revegetation techniques (stock exclusion and provision of edge and emergent vegetation); • feasibility of providing sustainable wetland habitat and its potential to support threatened species; • impacts to terrestrial threatened species and/or loss of agricultural land; and • risk of inrush into the underground workings.	Areas of ponding that are unable to be practically drained or filled to create a free-draining landform.	Underground Mining Engineer, Environment and Community Coordinator
3.07	Restoration of creek water quality/quantity using a supply of good quality make-up water.	If any significant deterioration in water quality or quantity is identified as a result of monitoring.	Underground Mining Engineer / Environment and Community Relations Superintendent
3.08	Provision of engineering solutions for den or nest trees identified during the monitoring surveys that are at risk of damage, i.e. shoring up the tree and the ground with anchors and/or ground works.	In response to outcomes of monitoring.	Environment and Community Relations Superintendent
3.09	If a den or nest tree appears to be failing and an engineering solution is not possible, apply for National Parks and Wildlife Services licence to relocate the nests and undertake relocation actions.	In response to outcomes of monitoring.	Environment and Community Relations Superintendent

4.6.1 Trigger Action Response Plan

Table 6: Biodiversity Trigger Action Response Plan

Note: All measures within this TARP are the responsibility of the Environment and Community Relations Superintendent

Aspect	Method/Parameters/Frequency	Purpose	Trigger	Response
Flora and Fauna – Terrestrial				
Terrestrial Fauna and Habitat	Biannual fauna and habitat monitoring surveys, including targeted searches for threatened species as outlined in **Section 4.3**. Amphibian surveys – concurrent with surveys above, or if no rainfall has been recorded for the season, the amphibian survey must take place in the last week of the season.	To assess the continued survival and management of the native flora and fauna within the study area.	Terrestrial fauna and habitat monitoring shows that the numbers of threatened species and the health (including recruitment) of significant populations are declining and results are not comparable or improved from the baseline surveys. Monitoring shows that key habitat features (foraging, nesting, refuge habitat) and structural complexity within remnant and rehabilitated/ compensatory habitat areas are declining and are not comparable or improved from the baseline surveys. Where overall monitoring trends indicate a negative impact to species diversity or abundance.	Investigate in accordance with the key considerations in **Table 2**. Develop strategy to ensure viability of local population is maintained or enhanced (may include provision of additional habitat resources i.e. nest boxes, ground logs/hollows, provision of compensatory habitat, additional weed/feral animal control).
Riparian Vegetation	Biannual monitoring of transects and quadrats along Bowmans Creek (includes both control and impact sites) as shown in **Figure 7**, noting dominant and sub-dominant species, percentage cover of each	To identify changes in vegetation composition and structure occurring along Bowmans Creek over time.	Dieback or loss of small number of riparian trees (>10%).	Consider leaving in place (as roosts or perches for bats / birds of prey) or use of stags for use in diversions (e.g. to create woody debris) or within revegetation area as habitat for small ground-dwelling mammals and reptiles.

Aspect	Method/Parameters/Frequency	Purpose	Trigger	Response
	structural layer, level of disturbance and condition rating, evidence of regeneration, presence of noxious or environmental weeds, and targeted searches for threatened flora species. Each site to be also monitored via photographic record.		Decline in species diversity or condition, relative to a control site, over time. For example: Project foliage cover and species number at any key strata level no longer broadly comparable to a control site or pre-mining condition.	Investigate site specific changes against upstream and downstream reference sites. If changes mirrored in reference sites, investigate possible regional, climatic or seasonal basis for deterioration based in the first instance. Compare observations to predicted impacts in EA (i.e. some change in riparian vegetation is anticipated following construction of diversion). If within predictions, or a result of regional, seasonal or climatic conditions – no further action other than reporting in biannual reports and Annual Review. If site specific deterioration is not able to be linked to other site changes (i.e. not regional, seasonal, climatic), and outside that predicted in the EA investigate links between site changes, water quality and habitat quality changes and check against groundwater monitoring trends. Reference should be made to the key considerations in **Table 2**. If causes determined to be site specific initiate reporting procedures. Investigate possible links with mining then develop mitigation measures and/or action plan as necessary

Aspect	Method/Parameters/Frequency	Purpose	Trigger	Response
River Red Gum Population	Biannual monitoring of RRG populations including visual surveys of ground surface disturbance and tree health; monitoring of ground water, soil moisture and leaf area index (LAI) at existing stands of River Red Gum and reference sites; an estimation of projected foliage cover of mature River Red Gum trees. Monitoring of rainfall and streamflow data for comparison with evapotranspiration rates and LAI changes.	To provide important information in the management of existing stands of RRG and improve the success of regeneration of this community within the ACP.	Decline in tree health or condition, relative to a reference site. Recruitment of juveniles and seed bank establishment is declining and no longer broadly comparable to a control site or pre-mining condition.	Investigate in accordance with the key considerations in **Table 2**. If a result of regional, seasonal or climatic conditions – no further action other than reporting in biannual reports. If causes determined to be site specific initiate reporting procedures. Investigate possible links with mining then develop mitigation measures and/or action plan as necessary.
Rehabilitation Monitoring	Any revegetated areas will be monitored following the methodologies outlined within the annual Rehabilitation Monitoring Program which compares the progress of the rehabilitation sites against a set of completion criteria obtained from measurement made in areas of remnant woodland and grassland communities in the local area.	To monitor the health and viability of revegetated areas over time and obtain data to assist with the long-term rehabilitation of the site.	Vegetation cover is insufficient to control erosion. If data shows that future structural and diversity goals will not be met. Negative trends in heterogeneity against land function metrics including: vegetation mosaics; ground cover; leaf litter and organic matter; soil depth and quality; shading; water flow paths and microhabitats.	Additional planting and safeguarding will be implemented in the area of impact. An adaptive reworking of the planting program will be undertaken to incorporate a wider range of species. The benefits of introducing additional growing material or providing additional soil ameliorants will also be investigated. Measures will be put into place, with the goal of increasing cover and diversity as compared with reference sites.

Aspect	Method/Parameters/Frequency	Purpose	Trigger	Response
Aquatic Ecology				
Aquatic Macroinvertebrates and Fish	Biannual sampling as per AusRivAS protocols with site SIGNAL indices calculated. Fish sampling using overnight bait traps. Survey locations include both established long-term sites, and short terms sites shown in **Figure 11**.	To monitor long-term seasonal and climatic trends during pre- and post-mining. To identify any potential mining-related impact.	Significant deterioration or continuing downward trend in macroinvertebrate diversity or site SIGNAL compared to pre-mining conditions, with regard to seasonal, climatic baseline variations. Trigger is individual Site Diversity or SIGNAL value below the mean Site Diversity or SIGNAL value obtained from previous sampling (refer to Table 4).	Investigate site specific changes against upstream and downstream reference sites. If changes mirrored in reference sites, investigate possible regional, climatic or seasonal basis for deterioration based in the first instance. If regional, seasonal or climatic – no further action other than reporting in biannual reports and Review. If site specific deterioration is not able to be linked to other site changes (i.e. not regional, seasonal, climatic), investigate links between site changes, water quality and habitat quality changes and check against groundwater monitoring trends. Reference should be made to the key considerations in **Table 2**. If causes determined to be site specific, initiate reporting procedures. Investigate possible links with mining then develop mitigation measures and/or action plan as necessary.

Aspect	Method/Parameters/Frequency	Purpose	Trigger	Response
Site Habitat Condition & Diversity	Bi-annual habitat diversity assessment using RCE & site photo referencing photos for habitat condition plus plant diversity and cover estimates for algae/aquatic plants.	To monitor long-term seasonal and site related changes/trends in aquatic habitat condition, pre-, during and post-mining, to aid in identifying possible physical impacts related to mining.	Any deterioration or degradation in habitat quality based on either direct observation, SIGNAL index or observed habitat/species diversity.	Investigate site specific changes against upstream and downstream reference sites. If changes mirrored in reference sites, investigate possible regional, climatic or seasonal basis for deterioration based in the first instance. If regional, seasonal or climatic – no further action other than reporting in biannual reports and Annual Review. If site specific deterioration is not able to be linked to other site changes (i.e. not regional, seasonal, climatic), investigate links between site changes, water quality and habitat quality changes and check against groundwater monitoring trends. Reference should be made to the key considerations in **Table 2.** If causes determined to be site specific initiate reporting procedures, investigate possible links with mining then develop mitigation measures and/or action plan as necessary. Continue to monitor short-term sampling sites biannually until evidence of mining-related impact has been remediated/mitigation measures have been proven to be effective.

Aspect	Method/Parameters/Frequency	Purpose	Trigger	Response
Site Water Quality	Field water quality (both chemical and physical) monitoring during the biannual aquatic ecology monitoring program including depth profile monitoring of EC, Temp, pH, turbidity, DO. The monthly water quality monitoring at the existing 'whole of mine' sites will also be utilised.	To monitor long-term seasonal and site related changes/trends in specific aquatic site water quality, pre- during and post-mining, to aid in identifying possible water quality impacts related to mining.	Any deterioration or significant changes in site specific water quality parameters.	Investigate site specific changes against upstream and downstream reference sites. If changes mirrored in reference sites, investigate possible regional, climatic or seasonal basis for deterioration based in the first instance. If regional, seasonal or climatic – no further action other than reporting in biannual reports and Annual Review. If site specific deterioration is not able to be linked to other site changes (i.e. not regional, seasonal, climatic), investigate links between site changes, water quality and habitat quality changes and check against groundwater monitoring trends. Reference should be made to the key considerations in **Table 2.** If causes determined to be site specific initiate reporting procedures. Investigate possible links with mining then develop mitigation measures and/or action plan as necessary. Continue to monitor short-term sampling sites biannually until evidence of mining-related impact has been remediated / mitigation measures have been proven to be effective.

Aspect	Method/Parameters/Frequency	Purpose	Trigger	Response
River Red Gum	Visual surveys, groundwater level monitoring in adjacent piezometers, soil moisture, LAI, projected foliage cover, and level of recruitment. Review of rainfall and stream flow data and comparison with evapotranspiration rates and LAI changes.	To monitor the heath and viability of the RRG population over time and obtain data to assist with future regeneration and rehabilitation of this population on site.	Comparative health assessments indicate that compared to a reference site, an overall decline in tree health is being observed. AND Comparative assessment of groundwater, surface water and soil moisture conditions relative to a control site indicates a relationship between these changing conditions and a reduction in RRG health.	Investigate in accordance with the key considerations in **Table 2**. Develop strategy to ensure viability of local population is maintained or enhanced (may include additional seed collection and propagation and allocation of additional regeneration areas, outside of affected area).
TECs within the ACOL-Operated RUM area				

Aspect	Method/Parameters/Frequency	Purpose	Trigger	Response
Central Hunter Grey Box – Ironbark Woodland and Central Hunter eucalypt forest and woodland	Monitor the extent of Central Hunter Grey Box—Ironbark Woodland or Central Hunter eucalypt forest and woodland within the ACOL-Operated RUM area yearly, with monitoring to occur at least two years post-mining completion. Assess vegetation to ensure compliance with the following literature and compare to baseline extent: • Central Hunter Grey Box—Ironbark Woodland: Central Hunter Grey Box—Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions – endangered ecological community listing (NSW Scientific Committee, 2010); and • Central Hunter eucalypt forest and woodland: EPBC Act (s266B) Approved Conservation Advice (including listing advice) for the Central Hunter Valley eucalypt forest and woodland ecological community (TSSC, 2015)	Monitor for change in extent of Central Hunter Grey Box—Ironbark Woodland or Central Hunter eucalypt forest and woodland within the ACOL-Operated RUM area.	A decrease in extent of Central Hunter Grey Box—Ironbark Woodland or Central Hunter eucalypt forest and woodland compared to baseline extent. Decrease in projected foliage cover or tree death, compared to baseline as identified from photo point monitoring. If a result of regional, seasonal, or climatic conditions, as identified by comparing fluctuations at control sites – no further action other than reporting in biannual reports.	Investigate in accordance with the key considerations the RUM DA. Determine the cause of the decrease in extent. Ensure landform is remediated to be free draining if ponding is resulting in a decrease of extent of Central Hunter Grey Box—Ironbark Woodland or Central Hunter eucalypt forest and woodland.

4.7 Contingency Response

The flow chart in **Figure 13** demonstrates the implementation of this plan with respect to the performance measures/indicators identified in **Section 4.1** and general steps to be undertaken in the event that potential unplanned impact and/or exceedance of the criteria occurs.

In the event the performance measures and actions provided in **Table 2** and **Table 6** are considered to have been exceeded, or are likely to be exceeded, ACOL will undertake the following:

- ACOL will report the likely exceedance of the performance indicator as soon as practicable to the relevant agencies as required under the Ashton DA or legislation, after becoming aware of the exceedance.
- ACOL will identify an appropriate course of action with respect to the identified impact in consultation with appropriate specialists and relevant agencies.
- Review the effectiveness of this BMP and performance measures to adequately manage potential impacts within the limits of the project approval.

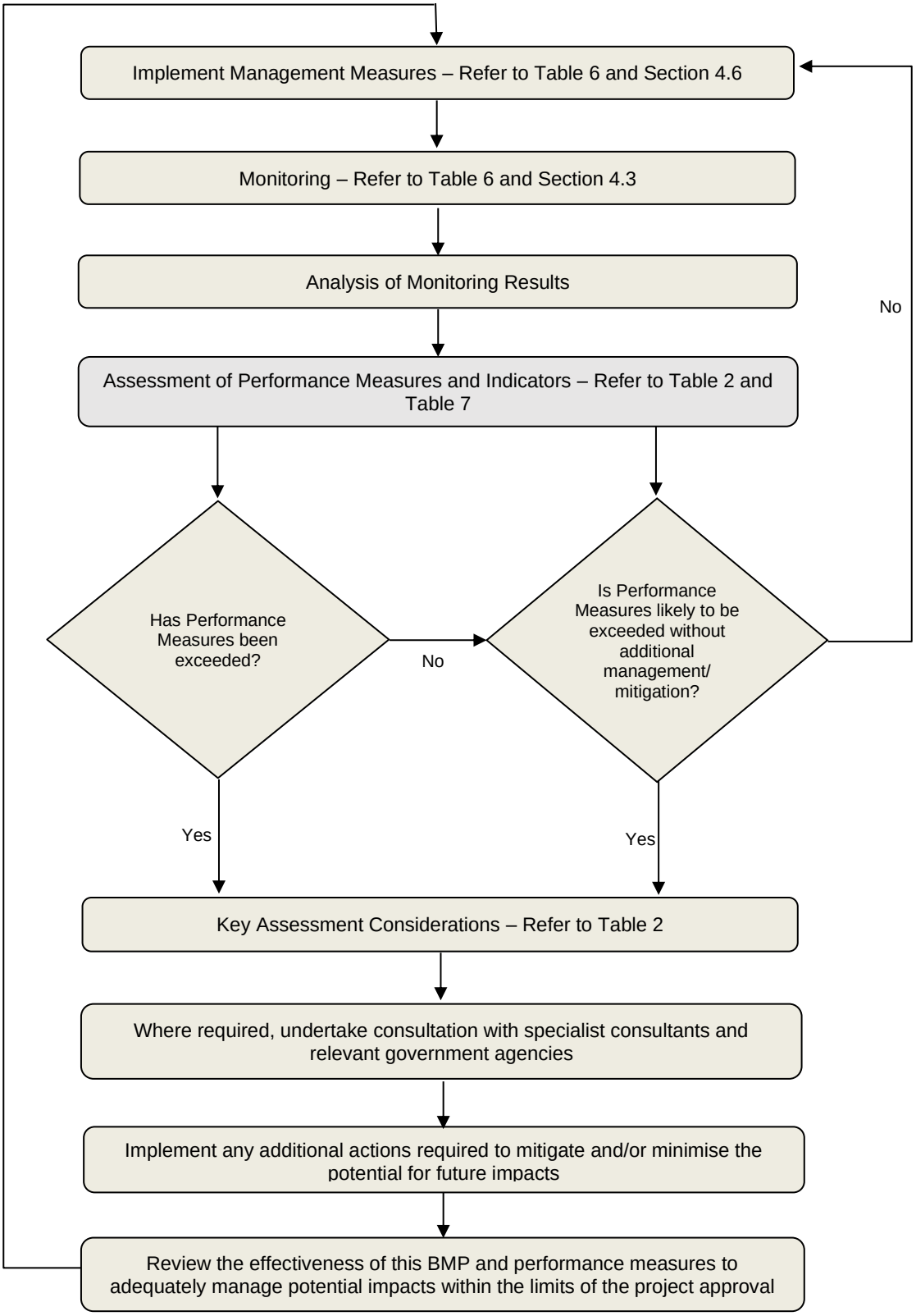


Figure 13: Biodiversity Management Plan Implementation and Contingency Response

5 REPORTING

The Annual Review is the primary reporting tool for the ACP and ACOL-operated RUM. The Annual Review is required to be prepared under Condition 10, Schedule 5 of the Ashton DA and Condition 2, Schedule 4 of the RUM DA and Mining Lease, and its purpose is to review the performance of the mine against the Environmental Management Strategy and the relevant Mining Operations Plans, the conditions of both DAs, and other licenses and approvals relating to the mine. The Annual Review is (among other things) required to:

- Describe the works (including rehabilitation) undertaken during the previous year and proposed during the following year.
- Include a comprehensive review of the monitoring results against the statutory requirements, limits of performance measures, monitoring results of previous years and against relevant predictions made in the EA and previous EIAs.

In the context of biodiversity management, the Annual Review will report against and review the findings of monitoring conducted in relation to the items in **Table 2** and **Table 6**. Once finalised and approved, the Annual Review will be made publicly available via ACOL's website within 30 days and distributed to appropriate stakeholders as outlined in Condition 13, Schedule 5 of the Ashton DA and in Condition 9, Schedule 4 of the RUM DA.

A summary of the key reporting requirements for the ACP and ACOL-operated RUM, along with the distribution and timing is provided in **Table 7**.

Table 7: Summary of Reporting Requirements, Distribution and Timing

Report	Requirements	Distribution	Trigger/Timing

Annual Review	In accordance with Condition 13 of Schedule 5 of the Ashton DA and Condition 9 of Schedule 4 of the RUM DA, flora and fauna monitoring results will be publicly available on ACOL's website with summaries reported as part of the Annual Review. In accordance with Condition 10 of Schedule 5 of the Ashton DA and Condition 2 of Schedule 4 of the RUM DA, the Annual Review will include the following information relevant to flora and fauna as well as biodiversity:
	• description of the works (including any rehabilitation) that were carried out during the previous year;
	• description of the works that that are proposed to be carried out in the current year;
	• a comprehensive review of monitoring results and complaints received, including a comparison of the results against:
	  ○ relevant statutory requirements, limits or performance measures/ criteria;
	  ○ monitoring results of previous years; and
	  ○ relevant predictions in the EA and previous EISs;
	• identification of any non-compliances over the last year, and describe what actions were (or are being) taken to ensure compliance;
	• identification of any trends in the monitoring data over the life of the ACP and ACOL-operated RUM;
	• identification and analysis of any discrepancies between the predicted and actual impacts of the ACP and ACOL-operated RUM; and
	• description of the measures to be implemented over the next year to improve the environmental performance of ACP.
		DPHI.
		RR,
		MEG,
		EPA,
		NSW Energy, Environment and Science Group,
		SC,
		National Resources Access Regulator,
		CCC.
		Website within 30 days of approval.
			Annually by 31 March

Complaints Register	Records key details of all complaints received by the Environment and Community Response Line and publish on ACOL's Website.	ACOL Website.	Upon receipt of complaint Published on website within 30 days

Report	Requirements	Distribution	Trigger/Timing
Complaint/Enquiry notification form	To provide a standard format for the investigation and response to received complaints.	Internal	Upon receipt of complaint
Incident Report	Incidents causing or threatening material harm to the environment must be reported to the Secretary of DPIE, EPA and any other relevant agencies, at the earliest opportunity. Any other incident (breach or exceedance of the limits or performance measures/criteria in the DA), associated with the ACP, must be reported to DPE and any other relevant agencies as soon as practicable after becoming aware of the incident. A detailed report is to be provided to the Secretary of DPE and any other relevant agencies, within 7 days of the date of the incident, and any such further reports as may be requested. A non-compliance investigation will be undertaken (refer below), with the report provided to the DPE and other relevant agencies, if requested.	EPA, DPHI and other relevant agencies. Annual Return. A summary is provided in the Annual Review.	Immediately after becoming aware of material harm incident.
Non-Compliance Investigation	Within 7 days of becoming aware of a non-compliance, ACOL will notify the DPE in writing via the DPE's Major Projects Website of the non-compliance, which must include DA number and name. When non-compliance with the impact criteria occurs, an investigation will be undertaken. The investigation will: • describe the date, time, location and nature of the exceedance; • identify the cause (or likely cause) of the exceedance; • identify the activities that were occurring at the time of the non-compliance; • determine the activities that were most likely contributing to the non-compliance; • describe what action has been taken to date; and • describe the proposed measures to address the exceedance.	The outcome of the investigation is reported to the DPHI. A summary is provided in the Annual Review.	When compliance evaluation determines Non Compliance with Impact Criteria.

Report	Requirements	Distribution	Trigger/Timing
ACOL website (www.yancoal.com.au)	Among other purposes, the ACOL website is used to provide updates on the environmental management and monitoring results for the ACP and ACOL-operated RUM. Revised versions of BMP will be updated on the ACOL website within 30 days of approval as required.	Public.	Updated monthly.
BMP revisions	The current revised version of this Management Plan is required to be distributed and placed on the website within 30 days of approval.	EES, SC, CCC, DPHI and website.	Within 30 days of approval.

CCC = Community Consultative Committee, EPA = Environment Protection Authority, MEG = Mining, Exploration and Geosciences (formerly Department of Resources and Geosciences).

6 REVIEW AND PERFORMANCE

This Management Plan will be reviewed and maintained to ensure that it remains effective. A review of this Management Plan may be triggered by the following (as applicable to the Management Plan):

- a frequency-based review period (minimum three yearly);
- changes to legislation or other requirements (e.g. associated Codes of Practice, Australian Standards or TRG's);
- changes to any design principles, engineering standards and technical standards relied on for control measures;
- significant changes in operations that may affect health and safety, environment or community;
- directives (in writing) from regulatory bodies (e.g. Chief Inspector or the Secretary of DPHI);
- alerts or notices from regulatory bodies, OEM's or other relevant external stakeholders;
- significant incidents or accidents (including Notifiable Incidents);
- audit findings indicating deficiencies or weaknesses;
- recommendations from external equipment manufacturers or suppliers; or
- adverse site or regional environmental trends.

In addition to the above, the BMP will be reviewed and updated, if necessary, to the satisfaction of the Secretary of DPE, in accordance with Condition 6 of Schedule 5 of the Ashton DA and Condition 3 of Schedule 4 of the RUM DA, within 3 months of a:

- lodgement of an Annual Review;
- submission of an incident causing or threatening to cause material harm to the environment in relation to flora or fauna;
- submission of an Independent Environmental Audit; and
- modification to the conditions of either Development Consent which has the potential to alter impacts of the ACP and ACOL-operated RUM.

In order to assess the performance of the management plan the following aspects will be considered:

- What was the nature, frequency and extent of non-compliance (if any)?
- Does the management plan and actions still fulfil the objectives?
- Were the management actions and reporting completed as specified within the plan?
- Are aspects of the plan now obsolete, inefficient or ineffective?
- The response to these aspects will inform the update of the BMP.

Within 30 days of approval of updated versions of the BMP, the Management Plan will be made available on the Ashton Coal Website.

7 RELATED DOCUMENTS AND REFERENCE INFORMATION

7.1 Internal Documents

- Ashton Pollution Incident Response Management Plan.
- Ashton Coal EMS.
- Forward Program.

7.2 External Documents

- AECOM (2009) *Bowmans Creek Landscape Restoration Report*. Report prepared for Ashton Coal Operations Pty Ltd. AECOM Pty Ltd.
- Andrews Neil Architect Planners (1999) *Synoptic Plan: integrated landscapes for coal mine rehabilitation in the Hunter Valley of NSW.*
- Australian and New Zealand Environment and Conservation Council (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (gazetted March 2001). Australian and New Zealand Environment & Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand.
- DnA Environmental (2019a) Bowmans Creek Vegetation Monitoring Report.
- DnA Environmental (2019b) 2019 Southern Voluntary Conservation Area Monitoring Report.
- DnA Environmental (2019c) 2019 ACOL Underground Mining Surface Monitoring Report.
- DnA Environmental (2019d) Bowmans Creek Riparian Monitoring Report.
- Eco Logical Australia (2024) *Ravensworth Underground Mine LW403-406 Biodiversity review*, Prepared for Ashton Coal Operations Pty Ltd.
- Evans and Peck (2009) *Bowmans Creek Diversion Environmental Assessment*. Prepared for Ashton Coal Operations Limited, Evans and Peck Pty Ltd.
- HLA Envirosciences Pty Ltd (2001), *Ashton Coal Project Environmental Impact Statement*. Prepared for White Mining Limited, HLA-Envirosciences Pty Ltd, Newcastle, NSW Australia.
- Marine Pollution Research (2009) *Riparian and Aquatic Ecology Assessment*. Report prepared for Ashton Coal Operations Pty Ltd. Marine Pollution Research Pty Ltd., October 2009.
- Marine Pollution Research (2010) *Aquatic Ecology Monitoring Bowmans & Glennies Creeks – Autumn 2010*. Report prepared for Ashton Coal Operations Pty Ltd. Marine Pollution Research Pty Ltd., November 2010.
- NSW Scientific Committee (2010), *Central Hunter Grey Box-Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions - endangered ecological community listing*.
- Shattuck, S.O. (2009) *A revision of the Australian species of the ant genus Myrmecina (Hymenoptera: Formicidae)*. Zootaxa. 2146: 1–21 [p. 21].

- Threatened Species Scientific Committee (2015) *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (s266B) Approved Conservation Advice (including listing advice) for the Central Hunter Valley eucalypt forest and woodland ecological community*.

8 REVISION HISTORY

This Biodiversity Management Plan has been prepared in conjunction with Ashton Coal Operations Pty Ltd by various consultants building on previous versions that have been implemented since the inception of the project, the version history and associated authors are shown below.

Version History

Version/ Date	Status	Details	Authorised/ Approved for Issue	
			Name/ Position	Date
C 19/08/2006	Final	Approved	Tracey Rock	19/08/2006
D 01/08/2012	Final	Approved	P. Fletcher, Technical Services Manager	01/08/2012
E 27/06/2014	Final	Minor updates from 2013 3yr compliance audit	L. Richards, Environment and Community Relations Manager	27/06/2014
F 30/06/2014	Final	Inclusion of the BOMP Guideline for Conservation Area	D. Short, Environment and Community Relations Manager	15/06/2016
G 6/06/2016	Final	Major review of plan	D. Short, Environment and Community Relations Manager	11/10/2016
H 5/06/2017	Final	Minor review of Plan to reflect DA Modification 5	P. Brown, Environment and Community Relations Superintendent	5/06/2017
H 10/10/2017	Final	Approved	P. Brown, Environment and Community Relations Superintendent	10/10/2017
I 5/06/2020	Final	Minor review of Plan triggered by submission of annual Review and Independent Environmental Audit	P. Brown, Environment and Community Relations Superintendent	5/06/2020
J 5/11/2020	Final	Minor review of Plan triggered by submission of annual Review and Independent Environmental Audit inc. change of name to BMP	P. Brown, Environment and Community Relations Superintendent	
K 04/2025	Final	To incorporate the Ravensworth Underground Mine Longwalls 403 to 406 Extraction Plan	P. Brown, Environment and Community Relations Superintendent	

External Approval Register

Organisation	Nominated Representative	Version	Date Issued	Date Approved
DP&I	Howard Reed	17/07/2012	18/07/2012	27/07/2012
DRE	Brad Mullard	17/07/2012	18/07/2012	31/07/2012
DP&E	Howard Reed	15/06/2016	16/06/2016	11/10/2016
DP&E	Matthew Sprott	10/10/2017	22/06/2017	04/10/2017
DPIE	Matthew Sprott	5/11/2020		TBC
DPHI	Phil Brown	20/12/2024		

9 APPENDICES

APPENDIX A: APPROVAL CONDITIONS RELEVANT TO BIODIVERSITY

Table 8: Approval Conditions for the Ashton Coal Project

Condition Number	Condition Requirement (DA 309-11-2001 MOD 11)	Addressed in BMP
Schedule 3 Condition 28	The Applicant must prepare a Biodiversity Management Plan for the Ashton Mine Complex to manage potential impacts of the development. This plan must:	This BMP (including BOMP in Appendix C)
	(a) be prepared in consultation with BCD and Council, and be submitted to the Planning Secretary for approval;	Comments incorporated into this BMP
	(b) describe how the implementation of the offset strategy would be integrated with the overall rehabilitation of the site (see below);	Appendix C RMP
	i) a description of the short, medium, and long term measures that would be implemented to: • implement the offset strategy; and	BOMP in Appendix C
	• manage the remnant vegetation and habitat on the site and in the offset areas;	Section 4.5 and 4.6 Appendix C
	(ii) detailed performance and completion criteria for implementation of the offset strategy;	Appendix C Section 4.1
	(iii) a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for:	Section 4.6
	• implementing revegetation and regeneration within the disturbance areas and offset areas, including establishment of canopy, sub-canopy (if relevant), understorey and ground strata;	Section 4.6 RMP
	• maximising salvage and beneficial use of resources in areas that are to be impacted, including vegetative, soil and cultural heritage resources;	Section 4.6 Appendix B
	• protecting vegetation and soil outside the disturbance areas;	Section 4.6 Appendix C
	• rehabilitating creeks and drainage lines on the site (both inside and outside the disturbance areas), to minimise net loss of stream length and aquatic habitat;	Section 4.6
	• managing salinity;	RMP
	• conserving and reusing topsoil;	RMP
	• undertaking pre-clearance surveys;	Appendix B
	• managing impacts on fauna;	Section 4.6 Appendix C
	• landscaping the site and along public roads to minimise visual and lighting impacts, particularly along the New England Highway;	RMP
	• collecting and propagating seed;	Section 4.6
	• salvaging and reusing material from the site for habitat enhancement;	Section 4.6

Condition Number	Condition Requirement (DA 309-11-2001 MOD 11)	Addressed in BMP
	• salvaging, transplanting and/or propagating threatened flora and native grassland;	Section 4.4 and 4.6
	• controlling weeds and feral pests;	Section 4.4.4, 4.6 and Appendix C
	• managing grazing and agriculture on site and in the offset areas;	RMP
	• controlling access; and	Appendix C RMP
	• bushfire management;	RMP
	(iv) a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;	Section 4.3
	(v) a description of the potential risks to successful revegetation, and a description of the contingency measures that would be implemented to mitigate these risks; and	Section 4.6.1 and 4.7
	(vi) details of who would be responsible for monitoring, reviewing, and implementing the plan.	Section 3.1 and 4.6
	The Applicant must implement the approved management plan as approved from time to time by the Planning Secretary.	Noted
Schedule 5 Condition 2	Management Plan Requirements 2. The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:	Noted
	(a) detailed baseline data;	Section 4.2
	(b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions);	This table Appendix D
	• any relevant limits or performance measures/criteria;	Section 4.1 and 4.6.1
	• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 4.1 and 4.6.1
	(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	This BMP and BOMP (Appendix C)
	(d) a program to monitor and report on the: • impacts and environmental performance of the development; • effectiveness of any management measures (see (c) above);	Section 5 and 6
	(e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 4.6.1 and 4.7
	(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 6

<table>
<tr><th>Condition Number</th><th>Condition Requirement (DA 309-11-2001 MOD 11)</th><th>Addressed in BMP</th></tr>
<tr><td></td><td>(g) a protocol for managing and reporting any:
• incidents;
• complaints;
• non-compliances with the conditions of this consent and statutory requirements; and
• exceedances of the impact assessment criteria and/or performance criteria; and</td><td>Section 5</td></tr>
<tr><td></td><td>(h) a protocol for periodic review of the plan.</td><td>Section 6</td></tr>
<tr><td></td><td>Note: The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</td><td>Noted</td></tr>
<tr><td>Schedule 5 Condition 6</td><td>Revision of Strategies, Plans and Programs
Within 3 months of:
(a) submission of an incident report under condition 8 below;
(b) submission of an annual review under condition 10 below;
(c) submission of an audit under condition 11 below; and
(d) any modification to the conditions of this consent (with the exception of MOD 5);
the Applicant must review, and if necessary, revise, the strategies, plans, and programs required under this consent to the satisfaction of the Planning Secretary.</td><td>Section 6</td></tr>
<tr><td></td><td>The Applicant must publish on its website any revised document resulting from these reviews within 30 days of the Planning Secretary's approval of the document.
Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</td><td>Section 6</td></tr>
<tr><td>Schedule 3 Condition 29</td><td>The Applicant must ensure that underground mining does not cause any exceedances of the performance measures in Table 10.

Table 10: Subsidence Performance Measures
<table><tr><th colspan="2">Biodiversity</th></tr><tr><td>Threatened species, populations, habitat or endangered ecological communities</td><td>Negligible impact</td></tr></table>
Notes: The Applicant will be required to define more detailed performance indicators for each of these performance measures in the various management plans that are required under this consent.</td><td>This BMP</td></tr>
<tr><td>Schedule 3 Condition 32</td><td>The Applicant must prepare an Extraction Plan for all second workings on site. This plan must:
(h) include a:
• Biodiversity Management Plan, which has been prepared in consultation with BCD, to manage the potential impacts and consequences of subsidence on biodiversity, and which includes:
- a program of works to ensure that overall terrestrial and aquatic biodiversity values are the same or better than existing in Bowmans Creek prior to longwall mining;
- measures to manage potential impacts and/or environmental consequences of the proposed second workings on aquatic and terrestrial flora and fauna;</td><td>This BMP and the RMP</td></tr>
</table>

Table 9: Approval Conditions for the Ravensworth Underground Mine

<table>
<tr><th>Condition Number</th><th>Condition Requirement (DA 104/96 MOD 10)</th><th>Addressed in BMP</th></tr>
<tr><td>Schedule 3, Condition 1</td><td>The Applicant must ensure that the development does not cause any exceedances of the performance measures in Table 1, to the satisfaction of the Planning Secretary.

Table 1: Subsidence Impact Performance Measure
<table><tr><th colspan="2">Biodiversity</th></tr><tr><td>Threatened species, threatened populations, or endangered ecological communities</td><td>Negligible environmental consequences</td></tr></table>
Notes: The Applicant will be required to define more detailed performance indicators for each of these performance measures in the various management plans that are required under this consent (see Condition 6 below).</td><td>This BMP</td></tr>
<tr><td>Schedule 3, Condition 6</td><td>The Applicant must prepare and implement an Extraction Plan for any second workings on site, to the satisfaction of the Planning Secretary. The plan must:
(i) include a:
• Biodiversity Management Plan, which has been prepared in consultation with BCD and the Resources Regulator, which:
○ includes a program of works to ensure that overall terrestrial and aquatic biodiversity values are the same or better than existed in the locality prior to longwall mining; and
○ provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on aquatic and terrestrial flora and fauna.</td><td>This BMP and RMP</td></tr>
<tr><td>Schedule 4, Condition 3</td><td>Revision of Strategies, Plans and Programs
Within 3 months of:
(a) the submission of an annual review under condition 2 above;
(b) the submission of an incident report under condition 5 below;
(c) the submission of an audit under condition 7 below; and
(d) any modification to the conditions of this consent,
the Applicant must review, and if necessary, revise, the strategies, plans, and programs required under this consent to the satisfaction of the Planning Secretary.
Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</td><td>Section 6</td></tr>
</table>

APPENDIX B: VEGETATION CLEARANCE / DISTURBANCE PROTOCOL

1. Delineation of area to be cleared

The boundary between the area to be cleared and adjoining vegetation will be clearly marked or fenced. Habitat trees in close proximity to construction activities will be clearly marked and protected. Marked boundaries will be cross-referenced to the approved impact area.

2. Pre-clearance inspections

a) Ecological

A desktop review of previous studies/surveys of the area and the likelihood of threatened species occurring within the area will be undertaken prior to carrying out field surveys. The review will identify the potential for breeding or hibernating native fauna or populations of the threatened species listed in **Table 3** of this BMP. **Table 3** is updated following the recording of previously unrecorded threatened species. This process will assist in formulating the scope and design of field surveys.

Pre-clearance inspections will be undertaken within two weeks prior to the commencement of vegetation clearing, and where possible will be scheduled to avoid disturbance during hibernation and breeding periods. The pre-clearance inspections will include identification and inspection of trees containing hollows, including stags. Any isolated trees that have been identified as providing hollows, and which are located close to the construction and stockpile areas, will be protected with orange barrier netting during construction.

Should any threatened species be identified within the area to be cleared, Ashton Coal Operations Pty Ltd will notify National Parks and Wildlife Services. Where necessary, fauna management strategies such as capture and release programs would be developed prior to the commencement of clearing activities.

b) Archaeological

Prior to undertaking clearing or other revegetation or rehabilitation works it is necessary to review the potential for items of Aboriginal Heritage to be impacted by the activity. The Heritage Management Plan (HMP) must be consulted to ensure sufficient consideration is given to the avoidance of impact to Aboriginal heritage values.

3. Vegetation clearance

Where possible, vegetation clearance will be scheduled to incorporate seasonal habitat requirements of bats and other mammals (refer to **Table 3** of this BMP), by avoiding hibernation and breeding periods.

Habitat trees will be inspected for fauna immediately before and after felling. Animals found prior to or during clearing activities will be released to surrounding suitable habitat. Injured animals found prior to or during clearing activities will be cared for in accordance with the Animal Ethics and Care Committee permit. If necessary, the Wildlife Information and Rescue Service will be contacted for first aid advice or assistance.

In the event of the detection of the masked owl or other threatened species including but not limited to the Grey-crowned Babbler (*Pomatostomus temporalis*), Hooded Robin (*Melanodryas cucullata*) and Speckled Warbler (*Pyrrholaemus sagittatus*) within the woodlands to be cleared, all clearing work will cease and further investigations will take place to determine if nesting is occurring. If nesting is recorded, a buffer of 200m around the nest site will be established. Clearing may occur outside of this exclusion zone until any young have left the nest.

In the case of arboreal or flying mammals attempts will be made to relocate the den or roost to the Voluntary Conservation Area (VCA). After capture, the animal(s) will be held by a trained wildlife carer for a period of no longer than two weeks until the roost or den can be relocated, either as an entire tree or part thereof, in a similar location to the south of the New England Highway with regard to vegetation, aspect and height above ground. Artificial roosts or den sites will also be placed around the relocated roost or den. If relocation of the roost or den is not possible, at least three suitable artificial boxes will be provided within the most suitable habitat. Work may recommence once the animal(s) have been captured and removed from the area.

Felled trees will be placed between cleared and remnant bushland where possible to provide runways of ground cover for dispersal of animals. Tree trunks will be placed along the bunds adjacent to cleared woodland to facilitate terrestrial species movement and to provide refuge and foraging opportunities. Woody debris from smaller trees will be placed along the bunds or in small piles or strips within the woodland to the south of Glennies Creek Road where grey-crowned babbler foraging habitat is to be established to encourage the relocation of the northern woodland population. Excess material may be mulched and used on site.

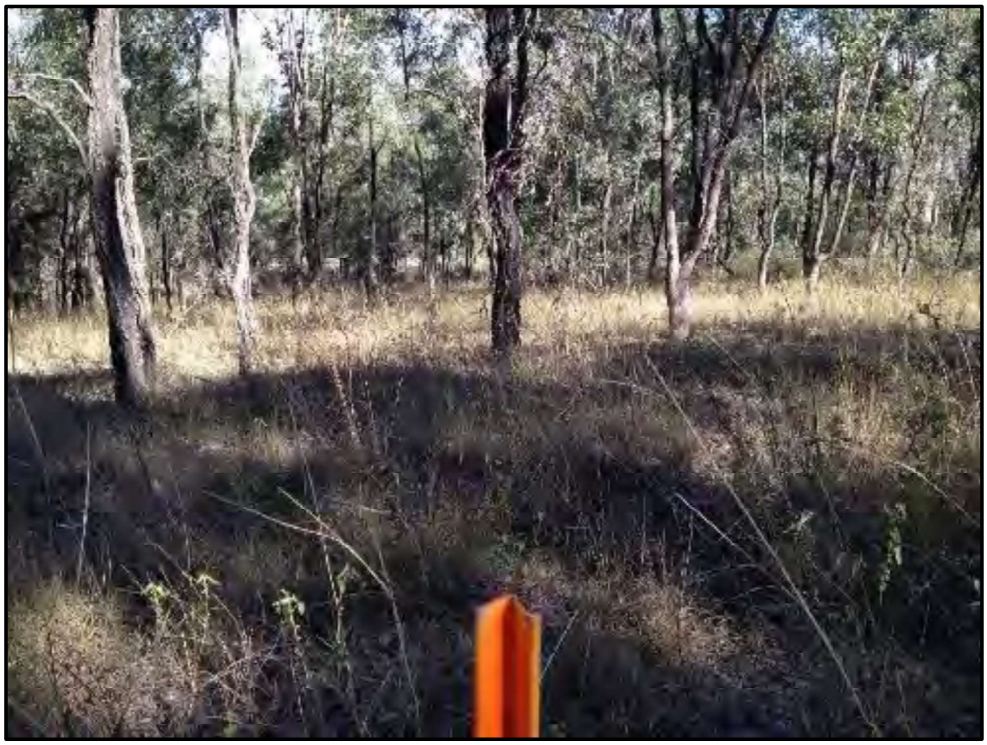
Small piles of timber will also be placed within the VCA and to the south of Glennies Creek Road to provide habitats for relocated animals and to increase shelter and foraging opportunities for animals already within the woodlands. Micro habitats, including dead trees, stags, stumps and hollow branches will be salvaged and relocated to areas lacking tree hollow habitat and/or to revegetation areas.

Some timber will be used within dams to provide perches for wetland species and refuge for amphibians. Large woody debris will be used to restore aquatic habitat within the Bowmans Creek diversions.

Where practicable, tree hollows in large branches will be removed during tree clearing operations and relocated to the VCA. These will be blocked at one end and then attached to a living tree at approximately 4 m above the ground to provide a supplementary habitat resource. Replacement hollows or nesting boxes will be provided within the riparian corridor at a ratio of 3:1 to offset the loss of habitat trees removed during vegetation clearing. The design of replacement habitat boxes, including the height, aspect, location and timing for placement, will depend on the species to be targeted, and will be determined in consultation with an experienced ecologist. The design will also consider publicly available results of fauna monitoring programs undertaken within the local area (particularly at the Mt Owen Mine).

APPENDIX C: BIODIVERSITY OFFSET MANAGEMENT PLAN

BIODIVERSITY OFFSET MANAGEMENT PLAN



Ashton Coal Project

Version A10

Effective: 05 November 2020

CONTENTS

Figures

Tables

1 PURPOSE

This Biodiversity Offset Management Plan (BOMP) has been prepared to describe the strategies for managing and enhancing biodiversity in the Southern Conservation Area (VCA).

This BOMP has been prepared to address conditions pertaining to biodiversity in the VCA (in conjunction with the Biodiversity Management Plan (BMP) as included in Schedule 3, Condition 28 and Schedule 5, Condition 2 of the ACP Development Consent (DA) DA 309-11-2001, June 2016 (Modification 5).

The core requirement for this BOMP is through a Department of Planning, Industry and Environment (DPIE) driven industry wide push for consistency in the management of biodiversity offsets using the *Hunter Valley Coal Mines – Best Practice Guidelines for Biodiversity Management Plans* (January 2014). This resulted in a review of the BMP and inclusion of this document as an appendix. Biodiversity management within the ACP outside the VCA will continue to be addressed in the BMP and the Mining Operations Plan (MOP).

2 SCOPE

2.1 Background and Project Overview

The Ashton Coal Project (ACP) is located 14 km north-west of Singleton near the village of Camberwell, within the Singleton local government area (**Figure 1**).

The ACP is bound to the north by the Main Northern Railway and to the south by the Hunter River. Glennies Creek forms the eastern boundary, while Bowmans Creek is located near the western boundary. The New England Highway divides the underground and open cut and infrastructure areas while Glennies Creek Road forms the south eastern boundary of the former open cut area.

Ashton Coal Operations Pty Ltd (ACOL) operates the ACP (**Figure 2**), which is comprised of the following key features that were approved in 2002 under DA 309-11-2001-I:

- The rehabilitated North East Open Cut (NEOC), with its final void remaining for the storage of coarse and fine reject;
- A four seam descending underground mine with approval to extract up to 5.45 Million tonnes per annum (Mtpa) of Run of Mine (ROM) coal;
- Surface mine infrastructure associates with the underground Mine, including gas drainage bores, ventilation fans and mine dewatering infrastructure;
- Coal handling and preparation facilities (CHPP) including rail siding and rail loading bin;
- Reject and tailings emplacement; and
- Administration, bathhouse and workshop buildings.

To offset the ecological and archaeological impacts of the project and provide for the conservation of an important archaeological area, an area in the south east of the ACP, above the underground mine was proposed to be conserved in perpetuity. The area proposed for conservation is referred to as the Southern Woodland Conservation Area, Southern Conservation Area or Voluntary Conservation Area (VCA). An agreement with NSW Environment, Energy and Science (EES) (formerly the Office of Environment and Heritage) under the *National Parks and Wildlife Act 1974* was registered for the area being 65.45 hectares in size on 16 September 2010 (found in **Appendix A**).

To promote habitat connectivity and fauna movement, the VCA is augmented by approximately 125 ha of revegetation corridors and 66 ha of Bowmans Creek riparian corridor, as shown in Figure 3. Although not subject to any instrument of long term protection, management of these areas is consistent with the conservation measures implemented for the VCA.

2.2 Statutory Requirements

The statutory approvals and agreements for the ACP relevant to biodiversity are shown in **Table 1**.

Table 1: Statutory Approvals and Agreements for the Ashton Coal Project Relevant to Biodiversity Impacts

Reference	Description	Date Approved	Legislation	Authority
Voluntary Conservation Agreement				
Part Lot 3 DP 1114623	Voluntary Conservation Agreement over Southern Woodland area in Part Lot 3 DP 1114623.	16 September 2010	*National Parks and Wildlife Act 1974*	EES
Development Consent				
DA 309-11-2001-I	The original approval provided for an open cut, multi-seam descending longwall underground mine, workshops and coal processing and rail loading facilities. Subsequent modifications were approved for minor changes. The most recent modification was approved in June 2016, Modification 5, to allow for integration with the SEOC Project. Approval includes: • Changes to the CHPP, conveyors and pipelines for coal processing and reject disposal from the SEOC; • An increase in total production rates to 8.6 Mtpa of ROM coal, to account for production from the SEOC; and • Fine rejects to be piped from the ACP underground mine to the SEOC for disposal.	Originally approved in 2002, and last modified in June 2016 (Modification 5)	Originally approved under Part 4 of EP&A Act 1979 Subsequent modifications under S96 and later S75W of the EP&A Act 1979	DPIE

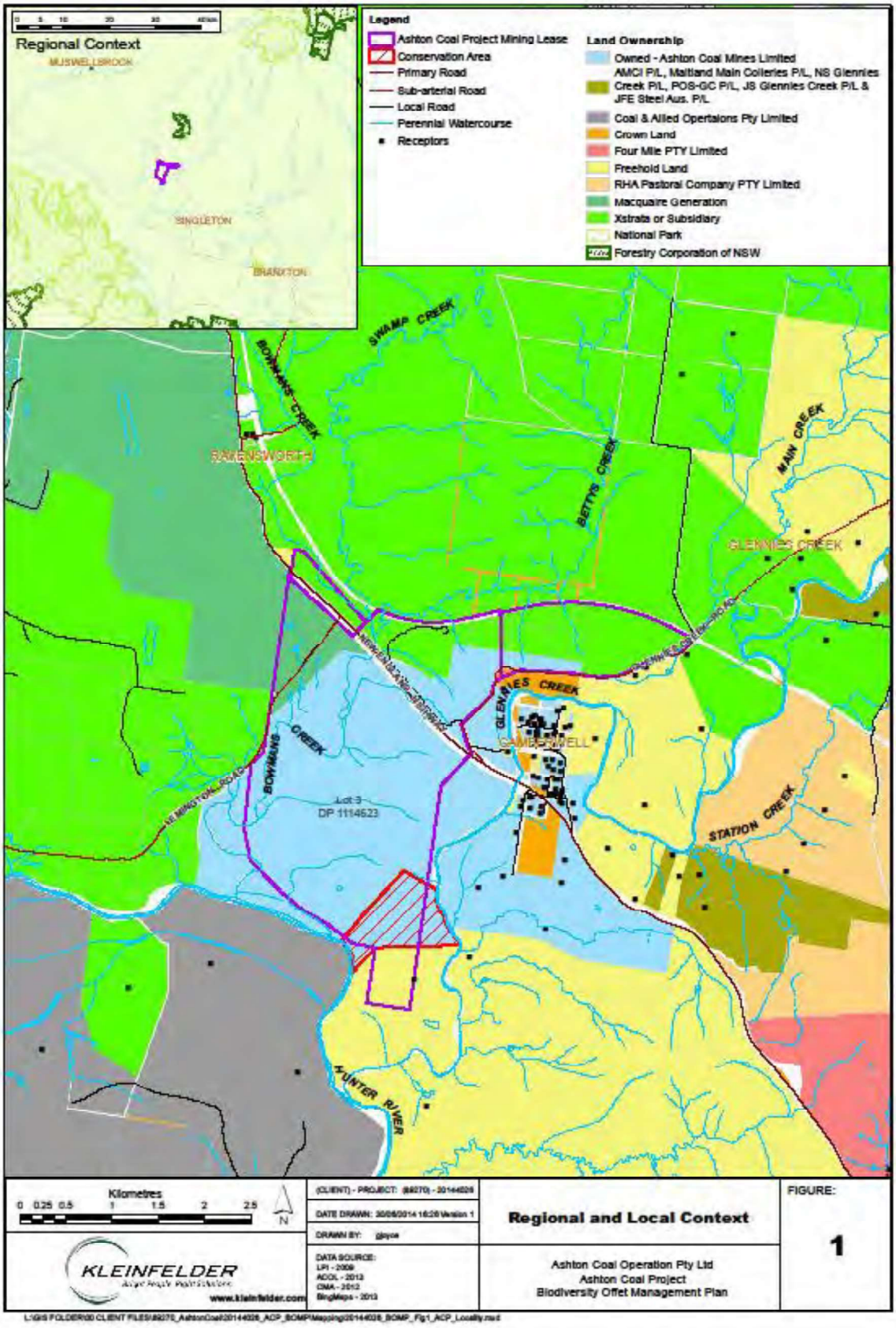

Regional Context
MUSWELLBROOK
SINGLETON
BRANXTON
Legend
Ashton Coal Project Mining Lease
Conservation Area
Primary Road
Sub-arterial Road
Local Road
Perennial Watercourse
Receptors
Land Ownership
Owned - Ashton Coal Mines Limited
AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
Coal & Allied Opertaions Pty Limited
Crown Land
Four Mile PTY Limited
Freehold Land
RHA Pastoral Company PTY Limited
Macquarie Generation
Xstrata or Subsidiary
National Park
Forestry Corporation of NSW
SWAMP CREEK
BOWMANS CREEK
SAXENSWORTH
BETTYS CREEK
MAIN CREEK
GLENNIES CREEK
GLENNIES CREEK ROAD
GLENNIES CREEK
CAMPBELLS
BOWMANS CREEK
Lot 3
DP 1114623
STATION CREEK
HUNTER RIVER
Kilometres
0 0.25 0.5 1 1.5 2 2.5
N
KLEINFELDER
www.kleinfelder.com
DATA SOURCE:
LPI - 2009
ACOL - 2013
CMA - 2012
BingMaps - 2013
Regional and Local Context
Ashton Coal Operation Pty Ltd
Ashton Coal Project
Biodiversity Offet Management Plan
FIGURE:
1

Figure 1: Regional and Local Context Plan

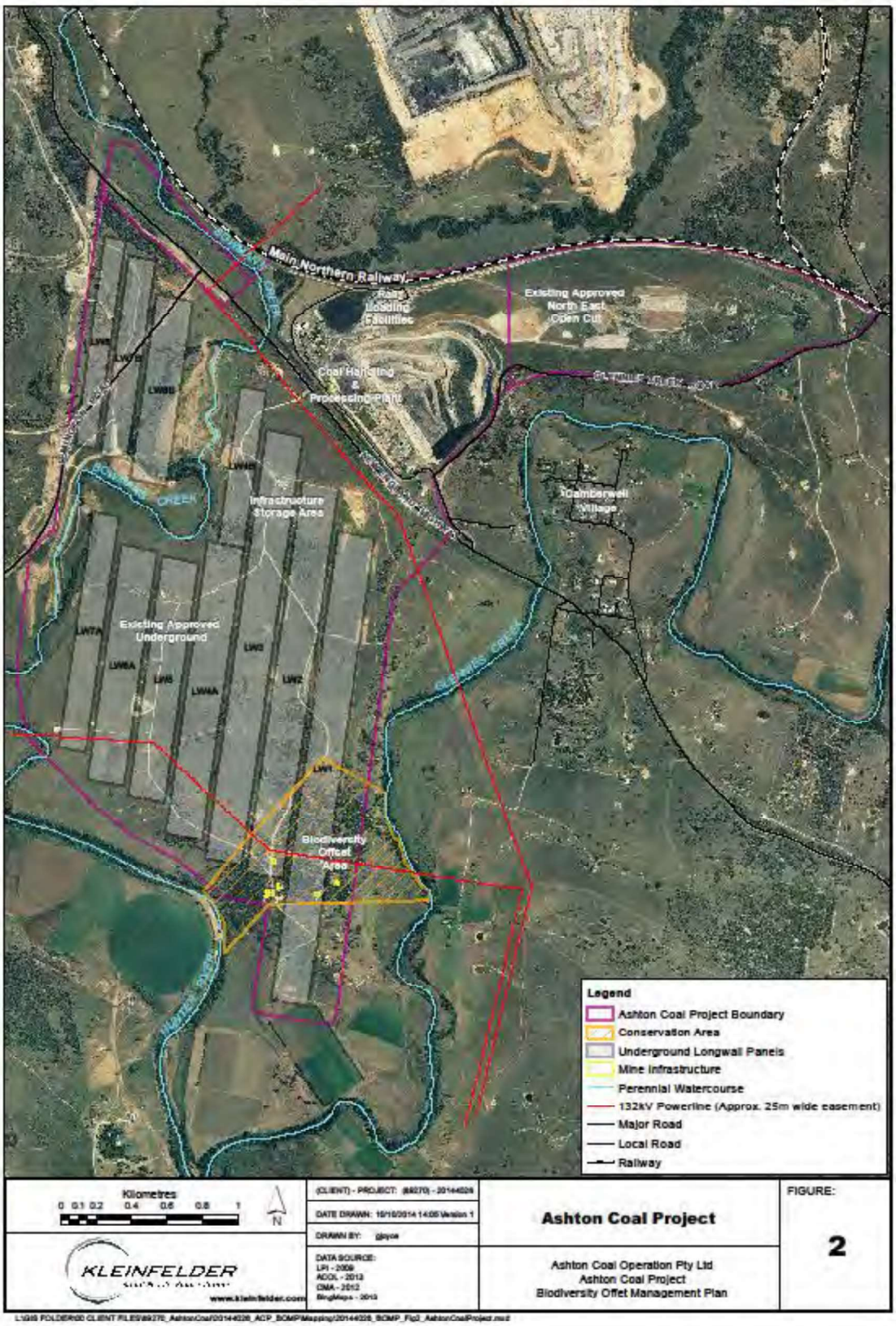


Figure 2: Ashton Coal Project

2.3 Scope of this Biodiversity Offset Management Plan

This BOMP is incorporated as an appendix to the BMP and forms a component of one of many integrated management plans and monitoring programs developed to support the overriding ACP Environmental Management Strategy (EMS). The EMS addresses overall environmental management for the ACP.

This BOMP relates only to those areas of the ACP set aside primarily for conservation management purposes, including the:

a) Conservation Area defined by the Conservation Agreement dated 16 September 2010 over part Lot 3 Deposited Plan (DP) 11114623 (**Figure 2**);

b) Revegetation corridors connecting the VCA with other remnant vegetation communities; and

c) Bowmans Creek riparian corridors

The management of biodiversity within all other areas of the ACP is addressed under the FFMP and MOP. **Figure 3** illustrates the context and key references of the Biodiversity Offset Management Plan for the VCA.

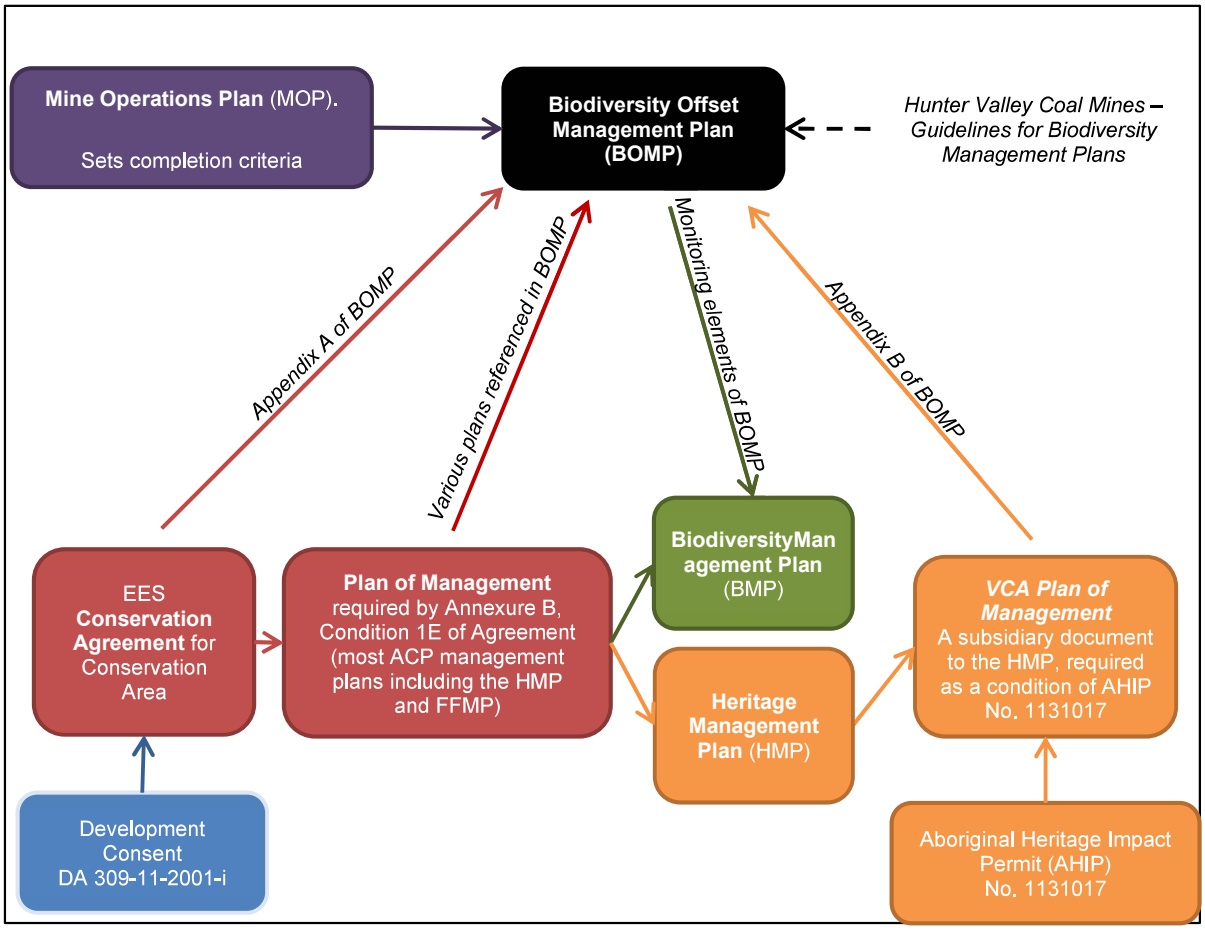


Figure 3: Context and Key References for the Biodiversity Offset Management Plan

2.4 Overall Objectives of the BOMP

The overall objective of this BOMP is to bring together the relevant documents into a single source to improve the auditability, efficiency and effectiveness of the management of the offset area to improve vegetation condition and habitat. In particular this document will:

- Identify the land managed under this BOMP;
- Identify and where relevant incorporate the various documents that pertain to the baseline environment and required management within the VCA;
- Provide a clear, concise, staged and instructional working document outlining the management strategies and actions for the VCA; and
- Outline monitoring, performance and completion criteria and reporting procedures for the VCA.

2.5 Consultation and Plan Development

The plan is based on the Conservation Agreement for the VCA that was developed in consultation with EES (refer to **Appendix A**), and a Plan of Management for the Voluntary Conservation Area that was prepared in consultation with the Aboriginal Community (refer to **Appendix B**).

This document has then been provided to EES and SC for consultation, and DPIE for review and approval. The FFMP (including the BOMP) was last reviewed and updated on the 5 June 2017 and approved by DPIE on the 10 October 2017. Copies of correspondence are included in the FFMP.

3 ACCOUNTABILITIES AND RESPONSIBILITIES

3.1 Roles and Responsibilities

Table 2 outlines the specific roles and responsibilities of ACOL staff and contractors for the implementation of this BOMP.

Table 2: BOMP Roles and Responsibilities

Role	Responsibilities
Operations Manager	The overall responsibility for all works undertaken on the ACP.
Environment and Community Relations Superintendent	• To authorise this BOMP. • To provide the final authorised distribution of this management plan and all environmental reports. • Implementing the procedures contained in this management plan. • Post induction education and contact with all employees and contractors on issues. • Inclusion of all monitoring results and analysis within the Annual Review. • Timely reporting of environmental monitoring data. • Organise revisions of this BOMP as required. • Develop strategies to prevent or reduce environmental impacts.
Relevant Area Manager (i.e. responsible manager relevant to the location of the activity)	• Ensure that all operations on site are undertaken in compliance with this BOMP. • Ensure all site personnel have received the appropriate training for their responsibilities. • Implement management controls as required. • Report any incidences or complaints immediately to the Environment and Community Relations Manager. • Provide feedback on the adequacy and effectiveness of this plan.
Employees and Contactors	• Ensure the implementation of this BOMP with respect to their specific work practices. • Act in accordance with the management procedures or protocols outlined in this plan. • Ensure any potential or actual issues, including environmental incidents, are reported to the Environment and Community Relations Manager or delegate.

4 BIODIVERSITY OFFSETS

4.1 Land Tenure and Permitted Land Use

The offset strategy for the ACP includes the 65.45 ha VCA located in the south of the ACP, the 125 ha of revegetation corridors linking the VCA to other remnant vegetation, and the 66 ha of riparian corridor adjacent to Bowmans Creek. These three areas are located within Lot 3 DP 1114623, which is under ACOL ownership.

The VCA is bound by Glennies Creek in the east, the Hunter River in the west (**Figure 1**) and a private land holder to the south.

Currently, the VCA has two primary land uses, conservation and underground mining. Up to three longwall panels in each of the four proposed seams (Pikes Gully, Upper Liddell and Upper Lower Liddell seams) are proposed to be extracted from four descending seams beneath the VCA.

Longwall mining operations that occur beneath the VCA have the potential to cause surface subsidence of up to 5.9 m. The VCA also contains infrastructure required to ensure the ongoing safe operation of the underground mine.

A number of access tracks occur within the VCA. A right of carriageway to the 'EIS 130' property south occurs through the central section of the VCA. Other smaller tracks are used intermittently for maintenance and monitoring purposes.

A 132kV powerline easement also runs east to west through the central section of the VCA.

4.1.1 Use of the Conservation Area

Section 2 of the conservation agreement defines uses allowable within the VCA. These are summarised below and are repeated for clarity in the relevant components of **Section 5** below:

1) General Responsibilities

(a) Except as otherwise permitted by the conservation agreement the ACOL must not intentionally carry out any act that may harm any native fauna, native plants, their habitats, cultural heritage, geo-heritage or other conservation values in the VCA.

2) Development

(a) Except as permitted by the agreement the ACOL shall not construct any new road, access, track, building or internal fencing or any development that could adversely affect the conservation values of the VCA.

(b) ACOL is permitted to:

i. Construct a fence on the external boundary, and any internal fencing required to control grazing;

ii. Maintain existing tracks where required;

iii. Relocate the existing access road and right of carriageway to private property south of the VCA consistent with the consent and with consultation with EES;

iv. Relocate existing power lines and associated easement as may be required by current and future approved mining operations;

v. Establish and maintain drainage swales in accordance with the Subsidence Management Plan and Section 3 Schedule 2 of the development consent that includes consultation with EES;

vi. Carry out any necessary surface works that may be required to ensure the ongoing operation and safety of the underground mining operations that by necessity cannot be carried out outside the boundaries of the conservation area.

(c) On completion of the revised access way (2.iii), the relocation of power lines (2.iv), and other surface works, the agreement will be updated with an amended diagram prepared by ACOL.

3) Subdivision

(a) ACOL must not subdivide the VCA

4) Threatened Biodiversity

(a) ACOL must manage the VCA consistent with the *Biodiversity Conservation Act 2016* to protect threatened biodiversity and its habitat, eliminate or manage threats and ensure impacts are properly assessed.

5) Fire

(a) ACOL must not light a fire within the VCA unless it complies with the Rural Fires Act 1997 (RF Act) and:

i. The lighting of fire is for the purpose of a controlled burn in accordance with the agreement (included in this BOMP), and the ACP Bushfire Management Plan;

ii. Is necessary for bushfire hazard reduction work carried out in accordance with a notice served on ACOL under the RF Act;

iii. Life or property is immediate threat and the lighting of fire is reasonably necessary to protect life or property;

iv. The fire is a camp fire subject to compliance with the RF Act; or

v. The Director General of EES gives prior written consent to the lighting of fire.

6) Cultural Heritage

(a) In accordance with Part 6 of the *National Parks and Wildlife Act 1974* (NPW Act), ACOL must preserve and protect Aboriginal Cultural Heritage values within the VCA.

(b) In accordance with Part 6 of the NPW Act, ACOL must obtain appropriate permits and consents if there is potential to impact on Aboriginal objects.

7) Control of Non-indigenous Plants and Fauna

(a) ACOL must us their best endeavours to control and where possible remove all non-indigenous plants and fauna from the VCA; an

(b) ACOL must take such reasonable measures in relation to non-indigenous plants and fauna as specified in the Conservation Agreement (and repeated in this BOMP).

ACOL **must not** undertake, consent to or permit (unless otherwise specified in the Conservation Agreement or with prior written consent of the Director General):

- The sowing or planting of trees, grasses or other plants in the conservation area;
- The introduction of any non-indigenous plants or non-indigenous fauna into the conservation area;
- The entry of domestic animals including pets and domestic livestock in the conservation area;
- The use or application of fertiliser or pesticides in the conservation area;
- The use of trail bikes, four wheel drive vehicles or any other vehicle in the conservation area off any formed road;

- Any works in the conservation area, especially any revegetation work and developments, which have the potential to impact on any cultural features;
- The removal of any biological or inorganic component of the conservation area; or
- Any works which will adversely affect the natural flows and bodies of water apart from those works outlined in 2b)(v) above or approved mining operations.

4.2 Land Security

A Conservation Agreement between the Minister administering the New South Wales *National Parks and Wildlife Act (1974)* and Ashton Coal Mines Limited (for Ashton Coal Mine) was approved in November 2010. This Conservation Agreement has been in place since approval and ACOL have been enacting their requirements under the agreements since this time.

This Conservation Agreement provides for the long-term security of the VCA.

4.3 Baseline Environment

4.3.1 Land Use History

Broad scale clearing has occurred throughout the majority of the Singleton area. Historical imagery of the VCA (1958) shows a predominantly cleared landscape with scattered paddock trees. The south-west of the VCA has been less extensively cleared, the historical imagery of the area shows a greater density of trees retained in this area in 1958.

The predominant land use of the VCA has historically been grazing. Since the implementation of the Conservation Agreement cattle have been excluded from the VCA (other than for management purposes for load reduction and weed management). Currently the VCA has two primary land uses, conservation and underground mining.

4.3.2 Climatic Information

Approximately 17 km west of the ACP, the Bureau of Meteorology (BOM) station at the Jerry's Plains Post Office holds climate records from 1884 to 2014, providing long term indications of weather in the area (can be accessed via the Bureau of Meteorology). Climate data is also collected daily onsite via the ACOL weather station (refer to www.ashtoncoal.com.au). A summary of long term historical averages is provided in **Table 3**.

Table 3: Historic Climatic Data

Month	Historical Averages		
	Min Temp (°C)	Max Temp (°C)	Rainfall Median (mm)
January	17.2	31.8	64.3
February	17.1	30.9	51.4
March	15.0	28.9	47.1
April	11.0	25.3	32.3
May	7.4	21.3	29.9
June	5.3	18.0	31.2
July	3.8	17.4	35.1

Month	Historical Averages		
	Min Temp (°C)	Max Temp (°C)	Rainfall Median (mm)
August	4.4	19.4	30.5
September	7.0	22.9	34.3
October	10.3	26.3	49.2
November	13.2	29.1	50.1
December	15.7	31.2	57.0
Annual	**10.6**	**25.2**	**644.2**

Source: Historical from the Bureau of Meteorology, Jerry's Plains Post Office weather station.

4.3.3 Landform, Geology, Soils and Erosion

The VCA is located near the southern end of a north south ridge that divides the catchments of Glennies Creek and Bowmans Creek and the Hunter River. The land reaches a topographic high of 104m AHD near the main access road. From the primary access road, the land falls steeply to the east and south west meeting Glennies Creek and the Hunter River at elevations of 52m AHD and 50m AHD respectively. Flood levels (based on the Hunter River) for the area are as follows:

- 1 in 100 year flood level of 62.7m AHD;
- 1 in 20 year flood level of 61.6m AHD; and
- 1 in 5 year flood level of 58.6m AHD.

The alluvial flats area in the south east of the VCA will be subject to minor flooding impacts during a 1 in 5 year event (less than 1m of water). The larger events will result in this lower area being inundated by 4-5m of water, and flood levels extending up the base of the lower slopes (note the current tree line is indicative of the 1 in 100 year flood level). See **Figure 4** for the topography of the VCA.

The soil across the VCA is characterised by the Bayswater and Hunter soil landscapes as described by Kovac and Lawrie (1991). The Bayswater soil landscape (Solodic Soils) has formed *in situ* from parent rock with alluvium in the drainage lines. The soil is characterised by sandy clay loam and loamy sand to sandy clay in alluvial soils. Moderate sheet and gully erosion is common on the slopes within this soil landscape. The Hunter soil landscape (Alluvial Soils) covers the floodplains of the Hunter River and its tributaries (Glennies and Bowmans Creeks). The main soils are formed in the alluvium. Minor stream bank erosion occurs along the watercourses with minor sheet and gully erosion on adjacent terraces (Kovac and Lawrie, 1991). Kovac and Lawrie (1991) map the higher central section of the VCA as containing the Bayswater soil landscape. While the eastern and western section of the VCA adjoining Glennies Creek and the Hunter River floodplains are generally characterised by the Alluvial Hunter soil landscape.

4.3.4 Vegetation Communities, Threatened and Migratory Species

The baseline environment and conservation values for the VCA are defined within the Conservation Agreement Annexure B and documents referenced within the Conservation Agreement, these documents include:

- HLA Envirosciences, 2001. *White Mining Limited Ashton Coal Project Environmental Impact Statement*.

- Parsons Brinckerhoff, 2004. Ashton Coal – *Southern Woodland Preliminary Ecological Assessment*.
- ERM, 2005. *Ashton Coal Bi-annual Fauna Monitoring Autumn Census*.

For determination of overall change within the VCA since the inception of the ACP, these documents are to be used as the primary source for baseline data. More recent sources of baseline data may supplement this information, this includes:

- PEA Consulting January 2010, *Additional Ecological information for the South East Open Cut Environmental Assessment- Response to Adequacy Review*.
- Annual monitoring records, including bi-annual fauna monitoring and annual rehabilitation and underground surface monitoring reports.

Based on 2010 vegetation mapping (PEA Consulting), **Figure 5** shows the extent of vegetation communities in the VCA, with **Table 4** showing the composition and status under the legislation. **Table 5** shows the threatened species recorded within the VCA and their status under the legislation.

Table 4: Vegetation Communities within the Conservation Area

Vegetation Type	Endangered Ecological Community	Area (ha)
Box – Ironbark Woodland **Biometric Vegetation Type:** *Grey Ironbark – Spotted Gum – Grey Box open forest on hills of the Hunter Valley, Sydney Basin*. The canopy is dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark) and *E. moluccana* (Grey Gum), mature *Allocasuarina luehmannii* (Bull Oak) also occur. Exotics species include *Opuntia stricta* (Prickly Pear), *O. aurantiaca* (Tiger Pear) and *Lycium ferocissimum* (African Boxthorn).	Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions (TSC Act)	22.75
Bull Oak Scrub **Biometric Vegetation Type:** *Bull Oak Forests of the Central Hunter Valley* A. luehmannii (Bull Oak) dominates this community almost exclusively. Exotic species include *O. stricta* (Prickly Pear) and *Senecio madagascariensis* (Fireweed) at low densities.	Not listed	10.5
Hunter Valley River Oak Forest **Biometric Vegetation Type:** *River Oak Riparian Woodland of the North Coast and Northern Sydney Basin* Areas of the Glennies Creek and Hunter River riparian areas area dominated by *Casuarina cunninghamiana* (River Oak). Exotic species include *Salix babylonica* (Willow) and *L. ferocissimum* (African Boxthorn).	Not listed	2.8
Open dry grassland **Biometric Vegetation Type:** *Cleared* Result of clearing, likely to be in part a derived native grassland of the Grey Ironbark – Spotted Gum – Grey Box Forest. Isolated or small stands of trees occur within the dry pasture areas.	Not listed	26.7 Includes 0.18ha of infrastructure

Vegetation Type	Endangered Ecological Community	Area (ha)
Exotic species include *L. ferocissimum* (African Boxthorn).		
Riparian grassland **Biometric Vegetation Type:** *Cleared* Located on alluvial soils adjoining Glennies Creek with a history of pasture improvement and cropping.	Not listed	2.7
	Total	**65.45**

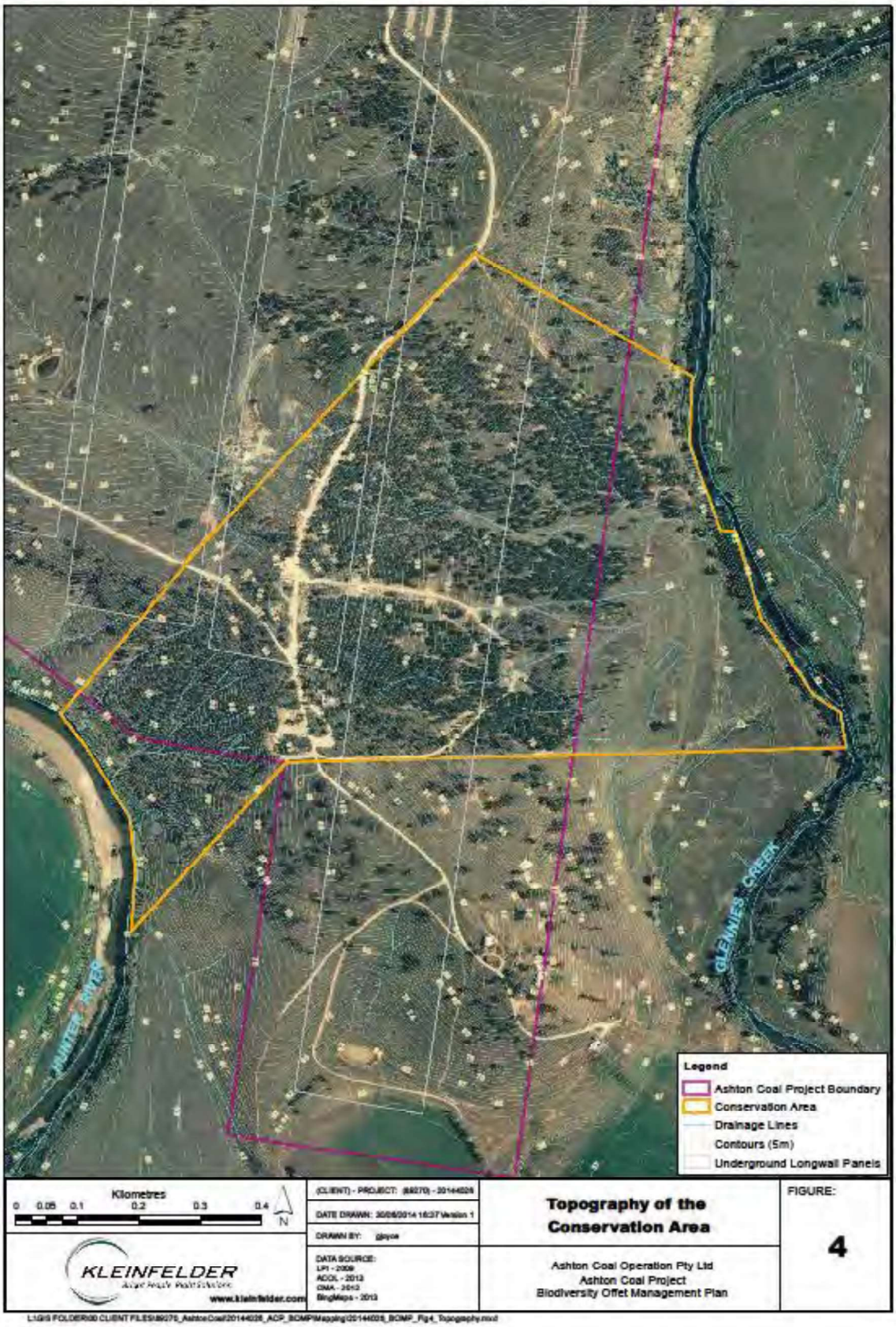


Figure 4: Topography of the Conservation Area

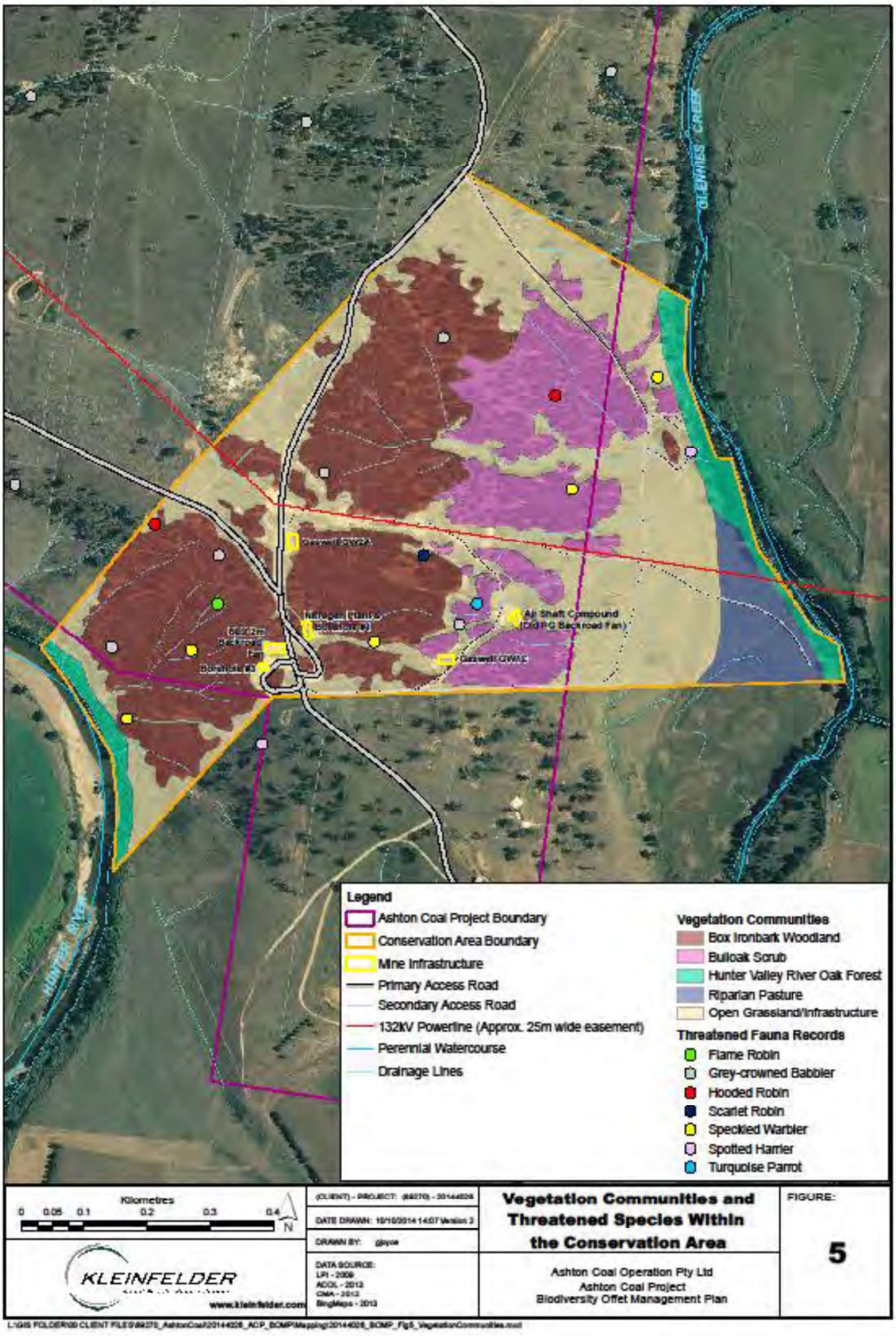


Figure 5: Vegetation Communities and Threatened Species within the Conservation Area

Table 5: Threatened Species within the Conservation Area

Species	Status		Occurrence
	TSC Act	EPBC Act	
Birds			
Circus assimilis Spotted Harrier	V	-	X
Chthonicola sagittata Speckled Warbler	V	-	X
Melanodryas cucullata cucullata Hooded Robin	V	-	X
Petroica phoenicea Flame Robin	V		X
Hieraaetus morphnoides *Little Eagle*	V	-	X
Neophema pulchella Turquoise Parrot	V		X
Petroica boodang Scarlet Robin	V	-	X
Pomatostomus temporalis temporalis Grey-crowned Babbler	V	-	X
Mammals			
Chalinolobus dwyeri Large–eared Pied Bat	V	V	X
V – Vulnerable | E – Endangered | X present			

4.3.5 Introduced Species

4.3.5.1 Weeds

During the surveys for the Environmental Impact Statement (EIS) weeds were noted within the flora and fauna report. *Rubus vulgaris* (Blackberry) was identified within pasture areas of the ACP, *Lycium ferocissimum* (African Boxthorn) was identified within the grasslands and woodland vegetation, and *Opuntia aurantiaca* (Tiger Pear) and *O. stricta* (Prickly Pear) were both identified within the woodland vegetation. Since the EIS surveys *Rubus vulgaris* (Blackberry) has been controlled in the VCA. Additionally various levels of infestations of noxious and environmental weeds have been identified within the VCA and the ACP during the annual monitoring, the full list of these species are found in **Table 6**.

These weeds will be the focus of management actions within the VCA. **Table 6** lists weeds recorded within the VCA.

Table 6: Noxious and Environmental Weed Species within the Conservation Area

Taxonomic Name	Common Name	Control Order Measures
Cestrum parquai	Green Cestrum	The plant must be fully and continuously suppressed and destroyed.
Lycium ferocissimum	African Boxthorn	
Opuntia stricta var. stricta	Prickly Pear	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.
Rubus vulgaris (part of the *R. fruticosus sp. agg.*)	Blackberry	
Hypericum perforatum	St John's Wort	
Salix babylonica	Willow	Must not be sold, propagated or knowingly distributed.
Senecio madagascariensis	Fireweed	
Xanthium occidentale	Noogoora Burr	None specified by Control Order, follow DPI best practice. Environmental weeds are not declared noxious but without control can impact on the environment.
Opuntia aurantiaca	Tiger Pear	
Phytolacca octandra	Inkweed	
Cardiospermum grandiflorum	Balloon Vine	
Galenia pubescens	Galenia	
Olea europaea ssp africana	African Olive	
Ricinus communis	Castor Oil Plant	

4.3.5.2 Vertebrate Pests

Table 7 details the vertebrate pest species recorded in across the ACP site. These pest species will be the focus of management actions within the VCA.

Table 7: Vertebrate Pest Species within the Ashton Coal Project Area

Taxonomic Name	Common Name
Canis lupus familiaris	Wild Dog
Felis catus	Cat
Lepis capensis	Brown Hare
Sus scrofa	Wild pig
Oryctolagus cuniculus	Rabbit
Vulpes vulpes	Red Fox

4.4 Management Zone Stratification

Management zones within the VCA are based on the current vegetation types, generally these are considered to be the final land use vegetation type (or at least that which is required under the relevant approvals).

Over time as natural regeneration progresses the management zone boundaries are likely to change as the grasslands regenerate and ironbark or grey box are interspersed within the bull oak.

Regardless of the management zone, the majority of management practices are relevant across the entire VCA. **Figure 6** and **Table 8** illustrates the VCA management zones.

Table 8: Management Zones within the Conservation Area

Mgt Zone	Final Land Use Vegetation Type	Objective	Area (ha)
A	**Box – Ironbark Woodland** **Biometric Vegetation Type:** *Grey Ironbark – Spotted Gum – Grey Box open forest on hills of the Hunter Valley, Sydney Basin*.	Conserve and maintain	22.75
B	**Bull Oak Scrub** **Biometric Vegetation Type:** *Bull Oak Forests of the Central Hunter Valley*	Conserve and maintain	10.5
C	**Hunter Valley River Oak Forest** **Biometric Vegetation Type:** *River Oak Riparian Woodland of the North Coast and Northern Sydney Basin*	Conserve and maintain	2.8
D	**Open dry grassland** **Biometric Vegetation Type:** *Cleared*	Allow natural regeneration to adjoining woodland communities	26.7 Includes 0.18ha of infrastructure
E	**Riparian grassland** **Biometric Vegetation Type:** *Cleared*.	Allow natural regeneration to adjoining woodland communities	2.7
			65.45

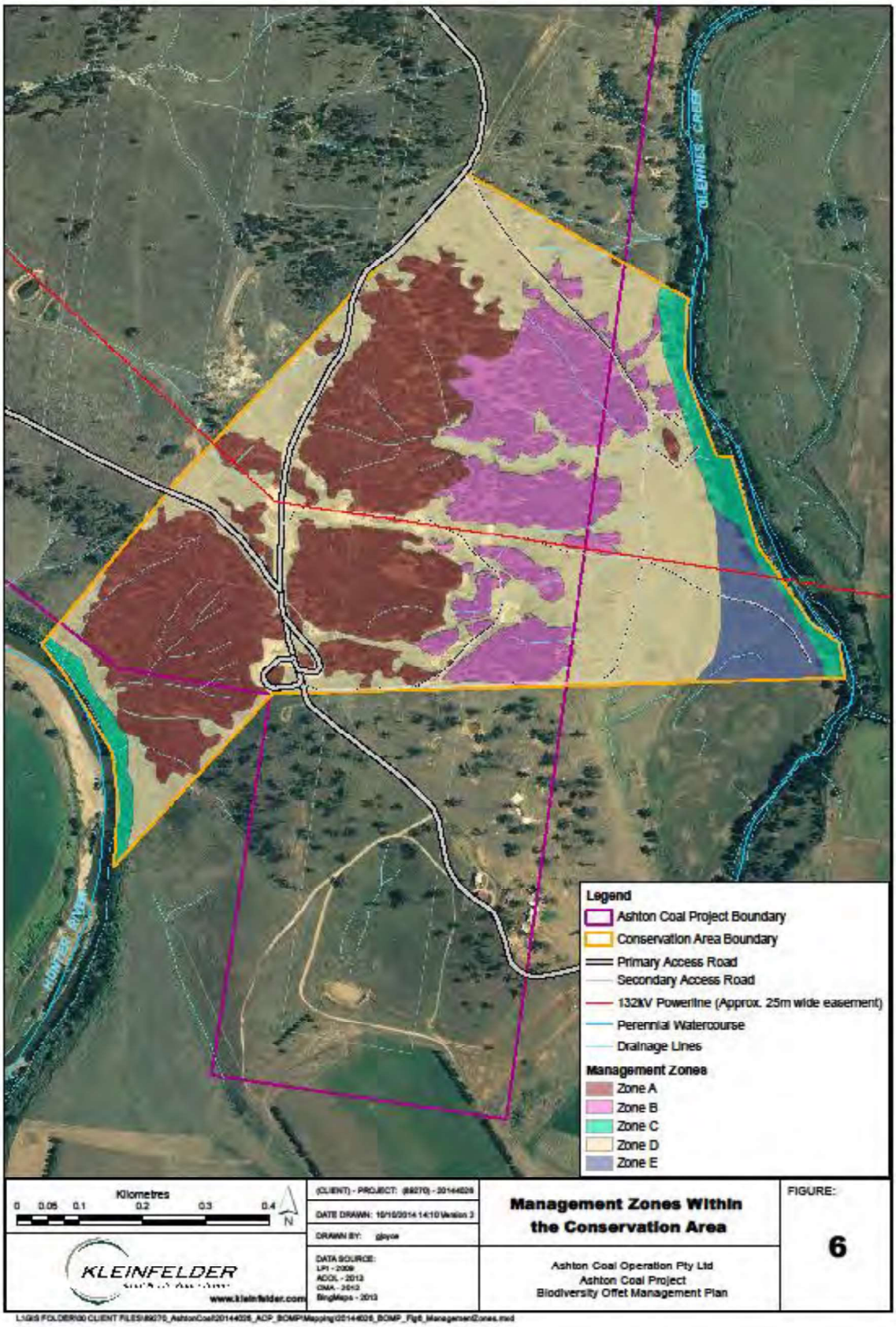


Figure 6: Management Zones within the Conservation Area

5 MANAGEMENT STRATEGIES

This section outlines measures to manage the remnant vegetation and habitat within the VCA and associated conservation corridors. Timing of management actions (performance criteria) will be as outlined in **Table 9**. While the revegetation corridors and Bowmans Creek riparian corridor are not subject to the long-term protection, land-use constraints or management commitments agreed in the voluntary conservation agreement, they are managed in accordance with the management measures set out in the FFMP, which are generally consistent with the actions outlined in this section.

The reporting periods and action timeframes for the implementation of this BOMP are scheduled to operate in calendar years (i.e. 1 January to 31 December) to align with site wide annual reporting arrangements.

Table 9: Management Plan Timing

Plan Year	Calendar Year
Years 1 –3	2015 –2017
Years 4 – 6	2018 –2020
Years 7 – 9	2021 –2023
Years 10 – 12	2024 –2026

Longwall mining beneath the VCA is a permitted land use. Impacts from subsidence and associated rehabilitation activities are managed through the approved Extraction Plan (EP) required under Condition 32 of Schedule 3 of the Development Consent, and as stated within this document.

Figure 7 illustrates the land management issues within the VCA, illustrating Cultural Heritage, fencing, gates and access roads.

5.1 General Management Principals

General management actions for the VCA ensure ACOL will:

- Except as otherwise permitted by the conservation agreement (and repeated in this document), ACOL must not intentionally carry out any act that may harm any native fauna, native plants, their habitats, cultural heritage, geo-heritage or other conservation values in the CA;
- Carry out any necessary surface works that may be required to ensure the ongoing operation and safety of the underground mining operations that by necessity cannot be carried out outside the boundaries of the CA;
- Permit visitation, research and community use at a level that does not adversely impact on the conservation or Aboriginal heritage values of the area. Research projects will be discussed with EES prior to commencement; and
- On completion of the revised access way, the relocation of power lines, and other surface works, provide an updated diagram prepared by ACOL for the update of the Conservation Agreement.

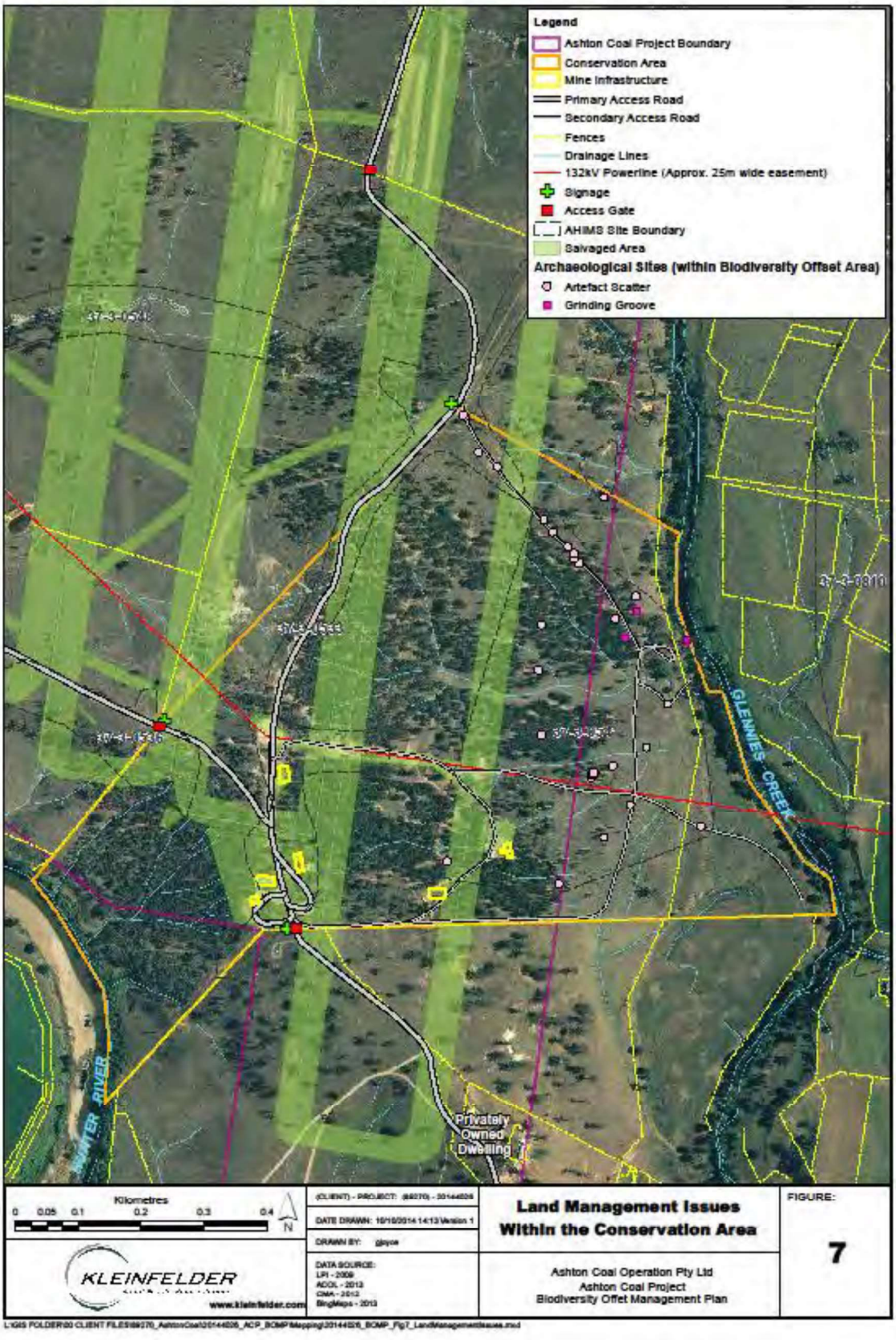


Figure 7: Land Management Issues in the Conservation Area

5.2 Completed Management Actions

The Conservation Agreement and the boundary of the VCA was formalized on 16 September 2010, however since approval of the ACP in 2002 the VCA has been the subject of various management actions, these include:

- Erection and maintenance of fencing;
- Exclusion of livestock;
- Weed inspection and control;
- Closure of access tracks other than the core access roads;
- Bi-annual fauna monitoring; and
- Annual flora surveys and soil testing.

5.3 Aboriginal Cultural Heritage

Ashton Coal has an obligation to preserve and protect Aboriginal cultural heritage values.

Pursuant to Section 2 of the Conservation Agreement, ACOL will:

- In accordance with Part 6 of the *National Parks and Wildlife Act 1974* (NPW Act), preserve and protect Aboriginal Cultural Heritage values within the VCA;
- In accordance with Part 6 of the NPW Act, obtain appropriate permits and consents if there is potential to impact on Aboriginal objects;
- Record and manage any newly identified Aboriginal objects, as per the Heritage Management Plan (HMP);
- Permit visitation, research and community use at a level that does not adversely impact on the conservation or Aboriginal heritage values of the area. Research projects should be discussed with EES;
- Permit visitation, research and community use by the Aboriginal Community as outlined in the HMP; and
- Ensure development in the VCA does not impact on cultural heritage. ACOL should be aware that any developments which impact on cultural heritage will require a Section 90 consent under the NPW Act.

Table 10 outlines the performance and completion criteria applicable to Aboriginal cultural heritage in the VCA.

Table 10: Aboriginal Cultural Heritage Performance Criteria and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Record and manage newly identified Aboriginal objects	To be completed as per the HMP				New sites managed in accordance with the HMP.
Archaeological assessment prior to works.	Surface disturbance activities undertaken in accordance with an AHIP or subject to a due diligence archaeological process where outside of an AHIP area.				All surface disturbance works undertaken in accordance with an approved AHIP or where outside of an AHIP area evidence of a due diligence assessment is available.

5.4 Fencing, Gates and Signage

The objective of fencing, gates and signage management is to exclude stock, limit access, enhance revegetation and maintain biodiversity values (including protecting threatened species) and notify the presence of the conservation area and conservation values. An existing boundary fence occurs around the VCA.

Pursuant to the Conservation Agreement, ACOL is permitted to:

- Construct a fence on the external boundary, and any internal fencing required to control grazing;
- Construct and maintain fences where required to ensure they are stock proof but will not impede the movement of, or be a danger to, native fauna;
- Clear a corridor not greater than 3 metres wide during construction or for maintenance for the installation of fences or other agreed rural structures; and
- Remove old internal fences within the conservation area and facilitate restoration of native vegetation by allowing natural regeneration.

Table 11 outlines the performance and completion criteria applicable to fencing within the VCA.

Table 11: Fencing, Gates and Signage Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Review of fence mapping and update.	Completed	-	-	-	Mapping completed.
Remove redundant fence, retain timber posts where feasible for habitat.	Completed	-	-	-	Redundant fencing removed.

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Inspections of fencing conducted during monitoring, maintenance conducted as required.	Completed annually	Completed annually	Completed annually	Completed annually	Annual inspection completed and maintenance programmed for completion.
Signage is erected notifying presence of Aboriginal sites on each access road.	Signage erected	Signage is present	Signage is present	Signage is present	Signage erected and maintained for duration of BOMP.

5.5 Access Tracks

The objective of access management is to provide suitable access for emergency vehicles, private property, maintenance or other approved activities.

Pursuant to the Conservation Agreement and associated Plan of Management and MOP, ACOL will:

- Maintain existing tracks where required;
- If required, relocate the existing access road and right of carriageway to private property south of the VCA consistent with the consent and with consultation with EES;
- Keep vehicle access to formed trails for access to private property, management purposes as outlined, approved by EES, fire fighting and/or any emergency requirements;
- Ensure the width of roads and trails has a maximum of 4 metres wide roadway with 2 metres width for vegetation clearance on each side;
- Construct replacement access roads using recommendations for construction and maintenance to be determined by ACOL in consultation with the EES;
- Remove fallen timber and any other obstructions to maintain access;
- Close unwanted tracks within the conservation area and facilitate restoration of native vegetation by allowing natural regeneration; and
- Unless agreed by the Director General, not use trail bikes, four wheel drive vehicles or any other vehicle in the VCA off any formed road unless specified above.

Table 12 outlines the performance and completion criteria for access management within the CA.

Table 12: Access Management Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 – 12	
Update mapping of current access tracks, including condition (as specified below).	Completed				Mapping of access tracks completed.
Primary access roads (as shown by **Figure 8**) will be maintained suitable for a Category 1 tanker.	Inspected and maintained annually	Inspected and maintained annually	Inspected and maintained annually	Inspected and maintained annually	Unsealed roads meet the following: • **Width:** 4m. • **Grade:** Less than 15 degrees. • **Cross slope:** Less than 5 degrees (28cm over 4m width). • **Clearance height:** 4.5m. • **Curves:** Minimum turning radius of 6m. • **Passing Bay:** At 500m intervals where possible. • **Dead Ends:** 12m minimum turning radius. • **Clearance on road side:** Clear of dead trees and other vegetation that may be hazardous during fire management activities.

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 – 12	
Secondary access roads (as shown by **Figure 7**) are maintained suitable for Category 7 tanker.	Inspected and maintained annually, mapping updated when does not meet standard	Inspected and maintained annually, mapping updated when does not meet standard	Inspected and maintained annually, mapping updated when does not meet standard	Inspected and maintained annually, mapping updated when does not meet standard	Unsealed roads meet the following: • **Width:** 3.5m. • **Grade:** Less than 20 degrees. • **Clearance height:** 3.5m. • All others measures as per Category 1 tracks.
Other access roads suitable for Category 9 vehicles (e.g. Four wheel drive Land Cruiser).	Inspected and maintained annually	Inspected and maintained annually	Inspected and maintained annually	Inspected and maintained annually	Road passable by four wheel drive vehicle.
Redundant roads are closed and rehabilitated when not required.	Access roads maintained and restricted to defined roads.		On rehabilitation of subsidence cracking from last seam in Longwall 1 and 2, all access roads are reviewed with those not meeting completion criteria revegetated.		Access roads within the VCA on completion of mining are restricted to only those required for private property access, ongoing management or emergency vehicles, all others are revegetated.

5.6 Erosion, Sediment Control and Soil Management

The objective of erosion and sediment control and soil management is to improve the soil profile within the area, for the protection of cultural objects and promotion of native vegetation regrowth.

Areas of erosion within the VCA have been recorded along old vehicle access tracks and at areas on the base of the slope. The eroded areas contain exposed artefacts, while erosion has slowed with closure of the track further management may be required to reduce water flow and retain and build up soils. Soil mats should be considered for use as erosion controls and vehicle access restricted to defined roads to limit soil compaction.

There are two sets of completion criteria applicable to the VCA area, one that relates to the whole Conservation Area and one that relates to only those areas that are affected by mine subsidence and the decommissioning of surface infrastructure. Ultimately surface remediation works are completed having regard to this BOMP, and the approved Extraction Plans (these plans are developed for each successive seam accounting for the predicted subsidence, and works developed to meet required completion criteria).

The Conservation agreement prescribes that:

- Where clearing is necessary, all works are undertaken in a manner that minimises disturbance to soil and hydrological characteristics and is in accordance with any recommendations made in the HMP or any other relevant Ashton Coal Environmental Management Plan (relevantly the Vegetation Clearance Protocol within the BMP).

The performance and completion criteria applicable to both are described below in **Table 13**.

Table 13: Erosion Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
All of Conservation Area					
Inspection of VCA for signs of erosion and changes to areas of existing erosion.	Review monitoring program and ensure erosion inspections are incorporated into annual monitoring program.		Erosion Inspections completed annually. Areas of erosion where present recorded and management proposed.		All identified rill or sheet erosion areas identified and included in a management program.
Erosion management where recommended by annual inspection.	Recommendations for erosion management to be assessed and where they do not impact on the conservation values of the VCA to be included within in a management strategy within 6 months of the inspection, with a reasonable level of works to be scheduled to occur within the next budgeting period. Repair of erosion within the VCA does not impact on the conservation values. Management actions implemented within 6 months of inspection.				All identified erosion management requirements are included within a current management schedule.
Subsidence Related Impact and Surface Infrastructure Decommissioning					
Survey of landform following subsidence	Survey and works completed following subsidence where required as prescribed within the Subsidence Environmental Management Plan. Survey undertaken following decommissioning of infrastructure.				The landform is consistent with surrounding landform, where practical.
Rill / sheet erosion inspections	Review and works completed following subsidence where required as prescribed within the Extraction Plan. Survey undertaken following decommissioning of infrastructure.				No identifiable rill or sheet erosion within areas of subsidence rehabilitation and infrastructure decommissioning.

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Surface disturbance/ hazards remediated	Action undertaken based on above monitoring and results of visual inspection and ongoing subsidence monitoring activities. Permanent subsidence cracking is subsidence cracking that has not closed within one month of mining.				All subsidence cracking repaired by filling or ripping in accordance with an approved Extraction Land Management Plan. No visible subsidence cracking.
Soil assessment completed within areas where a growing media needs to be re-established.	Soil assessment completed following infrastructure decommissioning and surface works, where growing media is considered absent, OR where it is considered to be limiting natural regeneration.				• Topsoil depth consistent with pre-existing environment. • Structure and texture consistent with pre-existing environment. • Presence of an A-Horizon (where present in adjacent remnant surface soil). • pH and EC broadly comparable to that of local remnant surface soil.

5.7 Stock Management

The objective of livestock management within the VCA is for the purpose of reducing fuel loads with respect to bushfire hazard reduction and also for weed management where warranted.

Pursuant to the Conservation Agreement, ACOL will manage livestock within the VCA as follows:

- Mustering of livestock with the use of working dogs and horses;
- Controlled grazing may be used as a hazard reduction tool to reduce fuel loads in the conservation area as deemed necessary, and with the following guidelines;
- Grazing should be initially excluded from the VCA to encourage the natural regeneration of indigenous plants and to encourage the growth of a shrub layer;
- Grazing must be excluded from areas of revegetation;
- Grazing may be desirable to reduce seeding of particular weed species;
- Where native grasses and ground covers are present, rotational grazing should be used. Graze with high numbers for short periods and allow long rest periods to ensure flowering and reseeding to occur of native ground layer species;

- Stock should be removed during peak flowering times, that is in Spring or early Summer, being September through to the end of January;
- Groundcover should be maintained above 80%;
- Stock to be removed from VCA if unacceptable levels of erosion or damage are apparent; and
- Stock is excluded from areas undergoing revegetation and from the margins of Glennies Creek where feasible.
- The DPIE will be notified of the use of livestock in the VCA within 2 weeks of commencement and removal. This will also be reported in the Annual Review.

Table 14 outlines the performance and completion criteria applicable to erosion control within the VCA.

Table 14: Livestock Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Utilisation of livestock for the purposes of hazard reduction.	Remove stock if an unacceptable level of erosion damage occurs. Stock removed if groundcover below 80%. Stock should not be present within VCA during September to end of January.				Details of livestock use recorded including dates within VCA reported in Annual Review,.

5.8 Seed Collection and Propagation

Pursuant to the Conservation Agreement, Plan of Management, FFMP and MOP, ACOL:

- Collection of seed collection in keeping with *Guidelines Collection of Seed, and other Plant Propagation material*, and the following limitations and permissions:
- Suitably trained personnel will supervise the collection and storage consistent with the Florabank Guidelines (1999).
- Collect seed in the conservation area only if seed of the particular species and genotype is not available elsewhere, or if the seed collected is intended for seedlings that will be planted within the VCA or adjacent to the VCA.
- Licences are required for collection of material of protected plants listed under Section 131 (Schedule 13) of the NPW Act.
- Where seed collection involves species listed on Schedule 1 or 2 of the *Threatened Species Conservation Act 1995*, the relevant licence or prior written permission from the Planning Secretary should be obtained.

Table 15: Seed Collection Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Seed availability assessment.	Periodic seed availability inspections documented and seed collection periods (where necessary) per year. Records of the vegetation communities seeds have been collected from, species targeted and weights of seed collected to be retained.				Records complete and retained.
Seed propagation (where completed).	Records retained on what seed has been propagated and germination success rates. At least 70% success should be the target.				Records complete and retained.
Infrastructure is decommissioned and associated areas revegetated.	Nil		Seed availability is reviewed if required to ensure stock for planting		Native species used consistent with the MOP species list and surrounding vegetation.

5.9 Habitat Augmentation

The objective of habitat augmentation is to avoid loss of habitat for fauna, and enhance habitat where possible. Nest boxes have been installed within the VCA in accordance with the BMP.

A number of threatened species, particularly woodland bird species, have been identified within the VCA. The habitat present for the Grey-crowned Babbler, Hooded Robin and Speckled Warbler, in particular, will be managed throughout the ACP site. Long-term objectives are to create a mosaic of agricultural land and wildlife habitat.

Pursuant to the Conservation Agreement, BMP and MOP, ACOL will implement the following management practices:

- Installation of habitat boxes for native fauna in strategic locations where suitable hollows for native fauna are limited or absent. Locations and number to be determined as per the BMP and recommendations made in the bi-annual fauna monitoring reports in consultation with EES;
- Implement any reasonable measures included in recovery plans or other management guidelines for any threatened species or communities which or may be found in the VCA.
- Implement any reasonable measures to mitigate any alteration of habitat following subsidence due to longwall mining to minimise negative effects on the conservation area and in accordance with the Extraction Plan and the development consent.
- Provision of nest boxes in accordance with the conservation agreement, BMP and vegetation clearance protocol.

Table 16 outlines the performance and completion criteria for habitat and threatened species management within the VCA.

Table 16: Habitat and Threatened Species Management Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Installation of nest boxes and habitat features from disturbance areas, within the VCA in accordance FFMP.	Historically completed. If required the location of nest boxes and habitat features to be in areas where suitable habitat for native fauna are limited or absent. Locations determined through annual fauna monitoring.				Nest boxes and habitat features installed in appropriate locations and reported. Nest boxes maintained and functional.
Implementation of reasonable measures to mitigate habitat alteration following subsidence	Minimise disturbance foot print to as small as reasonable practical when under taking subsidence remediation. Where it is unavoidable and key habitat trees are impacted by remediation implement habitat replacement strategies such as instillation of nest boxes.		On rehabilitation of subsidence cracking from last seam in Longwall 1 and 2, assess the density and habitat diversity within the areas impacted by subsidence remediation activities. Where deemed necessary implement habitat replacement activities such as the instillation of nest boxes and or additional planting.		Annual fauna monitoring shows continued increase in key identified threatened species, with consideration to seasonal variation and analogue site trends.
Implementation of reasonable measures to enhance threatened species habitat	Include assessment of enhancement opportunities in annual flora and fauna monitoring,		Assess recommended enhancement recommendations and implement were determined reasonable and appropriate		Enhancement opportunities assessed. Where possible, appropriate measures implemented to enhance conservation values.
Identification of new listings and new threatened species during the bi-annual monitoring program are assessed for impacts and any management recommendations are incorporated into future relevant management plans.	Completed as required.				Impacts to newly listed or identified threatened species managed.

5.10 Revegetation and Regeneration

The objective for revegetation and regeneration within the VCA is based on the premise that natural regeneration is the preferred method, only where this is not feasible will further control methods be actively applied.

Pursuant to the Conservation Agreement, BMP and MOP ACOL will implement the following management practices:

- Thinning of regenerating indigenous species which are altering the structure of the vegetation and/or reducing conservation values. The benefits to conservation should be greater than the disturbance associated with thinning.
- Restoration of native vegetation using natural regeneration as the preferred method.
- Revegetation to establish indigenous plants, using species produced from material sourced locally and without fertilisers, where:
  - The ability to regenerate naturally within a reasonable time frame has been lost; or
  - To prevent soil erosion;
  - To aid in the establishment of species diversity and height diversity in areas dominated by single species and with depleted natural seed resources;
- Revegetation must not compromise cultural heritage and the soil surface. Prior to any proposed revegetation an archaeological assessment must be carried out. Any works which impact on cultural heritage will require a Section 90 consent under the *National Parks and Wildlife Act 1974*.
- Disturbed land is rehabilitated as soon as is practicable to a level equal to or better than the original landscape using a species mix consistent with **Table 17** (Table 24 of the MOP).

Table 17: Species Mix for Revegetation Activities within the VCA

Conservation Area Species List			
TREES	• *Angophora floribunda* (Rough-barked Apple) • *Brachychiton populneus subsp. populneus* (Kurrajong) • *Corymbia maculata* (Spotted Gum) • *Eucalyptus crebra (Narrow-leaved Ironbark)* • *Eucalyptus fibrosa* • *Eucalyptus melliodora* (Yellow Box) • *Eucalyptus moluccana* • *Eucalyptus punctata* (Grey Gum) • *Eucalyptus tereticornis* (Forest Red Gum) • *Melia azedarach* (White Cedar)	SHRUBS	• *Acacia amblygona* (Fan Wattle), • *Acacia falcata* (Sickle Wattle), • *Acacia parvipinnula* • *Acacia salicina* (Willow Wattle) • *Breynia oblongifolia* • *Bursaria spinosa* (Boxthorn) • *Daviesia genistifolia* (Broom Bitter-pea) • *Daviesia ulicifolia* subsp. *ulicifolia* • *Dodonaea viscosa* • *Hakea sericea* • *Notelaea neglecta* • *Pultenaea spinosa*
FORBS	• *Calotis dentex* • *Calotis Lappulacea* (Yellow Burr Daisy) • *Chrysocephalum apiculatum* • *Dianella revoluta var. revolute* • *Dichondra repens* (Kidney weed) • *Fimbristylis dichotoma* • *Glycine tabacina agg.* • *Lomandra filiformis* subsp. *filiformis* • *Lomandra multiflora* subsp. *multiflora* • *Pratia purpurascens* (Whiteroot) • *Rumex brownii* (Swamp Dock) • *Wahlenbergia stricta*	GRASSES	• *Aristida ramosa* (Three-awned Spear Grass) • *Austrodanthonia setacea* (Small-flower Wallaby Grass) • *Austrostipa scabra* subsp. *scabra* (Slender Bamboo Spear Grass) • *Austrostipa verticilliata* (Slender Bamboo Spear Grass) • *Capillipedium spicigerum* (Scented-top Grass) • *Chloris truncata* (Windmill Grass) • *Cymbopogon refractus* (Barbed Wire Grass) • *Cynodon dactylon* (Common Couch) • *Dichelachne micrantha* (Short-hair Plume Grass) • *Digitaria brownii* (Cotton Panic Grass) • *Eragrostis brownii* (Brown's Lovegrass) • *Lachnagrostis filiformis* (Blown Grass) • *Microlaena stipoides* var. *stipoides* (Weeping Grass)

Conservation Area Species List			
			• *Panicum effusum* (Hairy Panic) • *Sporobolus creber* (Slender Rats Tail Grass) • *Themeda australis* (Kangaroo grass)

Table 18 outlines the performance and completion criteria for the native vegetation regeneration and revegetation activities in the VCA. These performance and completion criteria are for the completion of the works.

Table 18: Restoration Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Restoration of indigenous vegetation communities within grasslands of the VCA.	Annual flora monitoring to include assessment and comment on regeneration potential of grassland areas.		Prepare plan of low regeneration potential lands and program these areas for active planting or seeding as part of final subsidence remediation in the VCA.		Native vegetation and habitat within the VCA is of equivalent or better condition upon conclusion of mining when compared to the baseline surveys.
Disturbed land (mining and ACOL land use related) is rehabilitated as soon as is practicable to a level equal to or better than the original landscape.	• Native species used consistent with **Table** 17 and surrounding vegetation. • Ecological diversity and ecosystem function will be maintained or enhanced assessed by: o Total number of threatened species observed. o Species diversity. o LFA Organisation Index. o LFA Stability Index. o LFA Infiltration Index.				Monitoring completed and results indicate key performance indicators are maintained or recording a positive trend. Species diversity is comparable to pre-mining reference sites.

5.11 Weed Control

ACOL has a requirement under the *Biosecurity Act 2015* to control listed noxious weeds on their land. Weed management within the VCA will focus on environmental and noxious weeds. A list of the environmental and noxious weeds identified within the VCA is provided in **Table 6**, **Section 4.3.5**.

Pursuant to the Conservation Agreement, MOP and BMP, ACOL will:

- Use their best endeavours to control and where possible remove all non-indigenous plants and fauna from the VCA;
- Take such reasonable measures in relation to non-indigenous plants and fauna as specified in the Conservation Agreement (and repeated below) that includes:
    - Carrying out weed control using the appropriate control methods to ensure that they do not compromise the integrity of the conservation values identified;
    - Control and monitoring of weed growth will be as determined by the ACP MOP subject to the conditions of the Agreement, and the guidelines below;
    - Ensure methods of weed control do not damage cultural heritage values;
    - Glyphosate based herbicide may be used by direct application to cut surfaces (cut and paint or scrape and paint methods);
    - Spraying of a glyphosate based herbicide can be used. This should be limited to according to the directions on the label and ensuring that there is no off-target damage;
    - Weeds can be removed by hand ensuring that all plant parts that can reproduce are removed and that soils do not become prone to erosion;
    - Other weed control methods may be used with prior written permission of the Planning Secretary;
    - Ensure control programs are commenced when timing and extent of weed removal will minimise adverse effects on wildlife (weeds may provide protection or habitat for native fauna). Removal of African boxthorn should not be undertaken during nesting periods for small birds which may nest in the plants;
    - Continue to check for weed invasion and regrowth and treat any outbreaks; and
    - Check adjacent areas for invasive plant species and remove, or control their spread; and
    - Not allow the removal of any biological or inorganic component of the conservation area.

Table 19 outlines the performance and completion criteria applicable to weed control within the VCA.

Table 19: Weed Control Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Map baseline weed distribution and density/cover across VCA.	Year 1 Complete Review and update annually.				Mapping completed over VCA area.

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Conduct annual assessment to determine effectiveness of control against targets and plan (target species, methods and areas) for coming year.	To be completed annually in conjunction within adjacent ACOL owned lands.				Annual targets / management strategy established each year, including a map that shows species present and indicative distribution.
Undertake weed control for other Environmental Weeds.	Weed distribution and density less than the baseline weed map No new weeds established within area (i.e. more than a few individuals).				Weed control completed and reported with targets met.

5.12 Vertebrate Pest Management

ACOL has a requirement under the *Biosecurity Regulation 2017* to continually monitor and control pest animals on their lands. A pest animal control program is revised annually and implemented in the VCA to supress and prevent an increase in pest animal populations.

Feral animal control will be largely consistent with that already implemented at the existing ACP. Targeted control programs and techniques used will vary depending on the on the species feral animal present and the density of each species in a specific area. The target pest species within the ACP are presented in **Table 7** (**Section 4.3.5.2**).

Pursuant to the Conservation Agreement, ACOL will:

- Monitor impacts to the VCA by feral/ pest animals and undertake on-going control program for feral animals;
- Use methods for pest animal for control can include shooting, trapping and use of poisonous baits with advice from EES and the Local Land Service (or equivalent);
- Participate in community feral animal control programs, and encourage neighbours to implement pest animal control programs. Contact the local National Parks office to find out if community control programs are occurring in the area; and
- Undertake kangaroo culling when part of a population control program for the land and only with approval by way of a Section 121 licence issued under the NPW Act. Planning for this operation should be done in consultation with the EES.

Table 20 outlines the performance and completion criteria for vertebrate pest management within the VCA.

Table 20: Vertebrate Pest Management Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Conduct routine program for vertebrate pest control within VCA in conjunction with program on surrounding ACOL lands.	No non-target species bait take (e.g. quolls).				Pest control completed and reported annually.
Evidence of damage caused by feral / pest animals in the VCA is recorded during ecological surveys.	Expected species responsible for damage identified and recorded.				Reported annually in Annual Review when observed, with recommendation for control made.
Conduct additional pest control where justified due to: - Recommendations from pest control program; - Evidence of damage by feral / pest animals; or - Increased sightings or incidents (e.g. stock damage on neighbouring properties).	Damage caused by feral / pest animals reduced or eliminated.				Pest control completed and reported where undertaken annually.

5.13 Fire Management

The objective of the fire management strategy is to regulate the fire regime within the VCA to minimize effects on revegetation success and conservation values and provide suitable access for emergency vehicles if required.

Fire management strategies for the VCA are illustrated in **Figure 8.**

Pursuant to the Conservation Agreement, and MOP, ACOL will employ the following strategies to manage fire in the VCA:

- ACOL must not light a fire within the VCA unless it complies with the *Rural Fires Act 1997* (RF Act) and:
    - The lighting of fire is for the purpose of a controlled burn in accordance with the agreement (included in this BOMP), and the MOP;
    - Is necessary for bushfire hazard reduction work carried out in accordance with a notice served on ACOL under the RF Act;
    - Life or property is immediate threat and the lighting of fire is reasonably necessary to protect life or property;
    - The fire is a camp fire subject to compliance with the RF Act; or

- The Planning Secretary of EES gives prior written consent to the lighting of fire.

- Suppression where practicable of all wildfires occurring in the VCA as quickly as possible with the aim of keeping fires to a small area.

- Undertake fire hazard reduction (including slashing, raking and controlled grazing) to protect the natural assets of the conservation area, in appropriate locations, with any required approvals.

- Use fire hazard reduction burns and controlled burning with consideration of VCA conservation aims and vegetation community types, and as permitted by the Hunter Valley RFS.

Table 21 outlines the performance and completion criteria for fire management within the VCA.

Table 21: Fire Management Performance and Completion Criteria

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Annual inspection of asset protection zones (APZs) with maintenance as required of asset protection zones.	Annual inspection and hazard reduction targets achieved. Conservation values within the VCA not compromised.				Where APZ are defined as follows: • 10m Asset Protection Zone (APZ) with ground fuel load less than 6t/ha for lower risk or higher resilience items; and • 20m APZ, no connecting canopy, less than 20% shrubs, ground cover fuel load less than 6t/ha for higher risk infrastructure. Where 6t/ha is taken to have a ground cover of less than 10cm
Fuel load reduction across VCA using mosaic low intensity burns, slashing, raking or controlled grazing.	Fuel load reduction implemented in mosaic pattern following defined fire frequencies and/or stock management as per stock management strategy. Conservation values within the VCA not compromised.				Fire and grazing records kept and reported annually in AEMR.

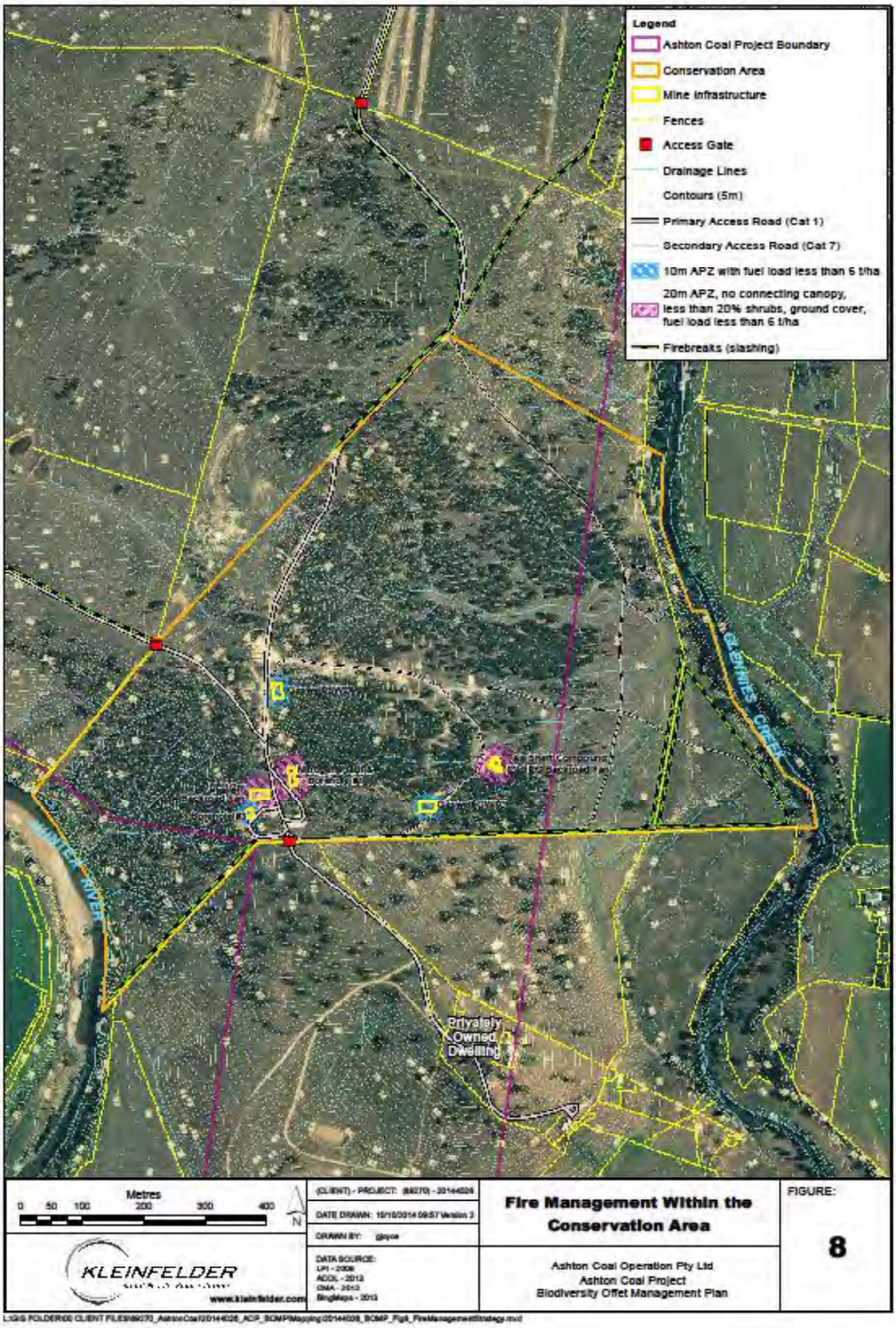


Figure 8: Fire Management within the Conservation Area

5.14 Flora and Fauna Monitoring Program

The objective of flora and fauna monitoring is to regularly determine the status of flora, fauna and habitat values within the VCA, such that the effects of underground mining and management practices can be evaluated, and where necessary actions implemented to improve conservation values.

The VCA represents the largest area of native woodland within the bounds of the ACP and has been subject to monitoring since 2004.

The methodology for the flora and fauna monitoring program is outlined in the BMP. Monitoring of the VCA is to be conducted in conjunction with monitoring activities conducted across the ACP.

Figure 9 illustrates the location of monitoring sites within the VCA, fauna monitoring locations are shown within the FFMP.

Table 22 outlines performance and completion criteria for flora monitoring within the VCA.

Table 22: Performance and Completion Criteria for Flora Monitoring

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Annual flora monitoring.	Monitoring completed each year in accordance with methods in ACP FFMP including evaluation of monitoring sites, against benchmark data (where available), and other suitable analogue sites.				All monitoring events completed for the life of the mine and post extraction operations and reported.
Vegetation Community Benchmarks Established.	Complete	Complete			Completed and BOMP targets and monitoring updated.
Revegetation monitoring of areas subject to active planting.	Monitoring of any revegetation areas indicates performance indicators progressing towards completion criteria.				Species diversity, foliage cover, height and structural composition at target levels of agreed benchmark criteria site or on trajectory to meet those parameters. All monitoring and analysis reported.
Complete EES Conservation Area Monitoring Form including taking of photographs from photo-points.	Completed annually or as directed by EES.				Evidence of annual completion of form and inclusion in AEMR.

Table 23 outlines performance and completion criteria for fauna monitoring within the VCA.

Table 23: Performance and Completion Criteria for Fauna Monitoring

Action	Performance Criteria				Completion Criteria
	Years 1 – 3	Years 4 – 6	Years 7 – 9	Years 10 - 12	
Bi-annual fauna monitoring.	Monitoring completed each year in accordance with methods in ACP FFMP.				Evidence all required monitoring completed. Trends identified and recommendations where made are implemented (or programmed for completion).
	Terrestrial fauna and habitat monitoring shows that the numbers of threatened species and the health (including recruitment) of significant populations are not declining and results are comparable or improved from the baseline surveys.				Threatened fauna species and their habitats are not adversely impacted (or values maintained).
	Monitoring shows that individuals are progressively expanding into new home ranges.				
	Monitoring shows that key fauna habitat features (foraging, nesting, refuge habitat) and structural complexity within remnant and rehabilitated/ compensatory habitat areas are not declining and results are comparable with the pre-mining surveys.				
Monitoring and management of nest boxes.	Annual monitoring in accordance with methods in the FFMP, and maintenance as required.				Monitoring undertaken and reported and maintenance conducted as required.

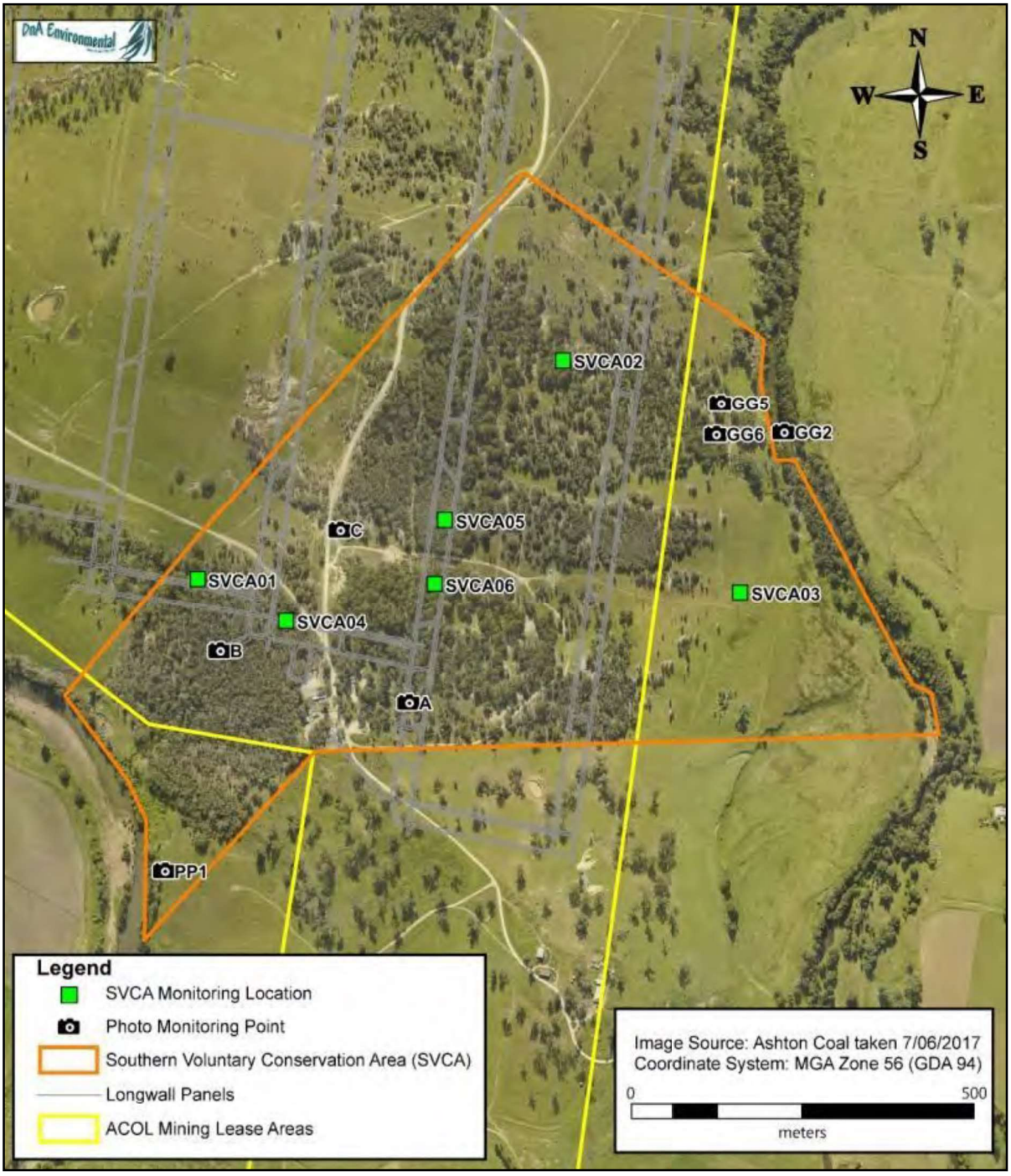


Figure 9: Flora and Fauna Monitoring Sites within the Conservation Area

6 REPORTING

Table 24 provides a summary of the reporting requirements, distribution and timing.

Table 24: Summary of Reporting Requirements, Distribution and Timing

Report	Requirements	Distribution	Trigger/Timing

Annual Review	In accordance with Condition 10, Schedule 5, ACOL will review the environmental performance of the project to the satisfaction of the Secretary, the review will include:
	• Description of works undertaken during the previous year and those expected in the coming year, with reference to:
	  ○ Fencing, rubbish, erosion, access and fire;
	  ○ Fire management;
	  ○ Habitat augmentation works;
	  ○ Revegetation works;
	  ○ Pest and weed management; and
	  ○ Flora and fauna monitoring results.
	• Evaluation of works completed against performance and completion criteria;
	• Identify any non-compliance and describe actions to ensure compliance;
	• Identify trends in the in the monitoring data over the life of the project;
	• Identify any discrepancies in between predicted and actual impacts and the potential cause of significant discrepancies;
	• Measures to be undertaken to improve environmental performance of the Project; and
	• Completed EES monitoring form for the Conservation Area.
		Website
		DPIE
		CCC Members
			Annually

EES Monitoring Form	Complete EES monitoring form.	Annual Review	Annually

Report	Requirements	Distribution	Trigger/Timing
ACOL website (www.ashtoncoal.com.au)	Among other purposes, the ACOL website is used to provide updates on the environmental management and monitoring results for the ACP. The Annual Review is included on the website that provides a summary of the progress of the BOMP measures.	Public	Annually

7 REVIEW AND PERFORMANCE

The BOMP will be reviewed and updated, where required, every three years to identify trends and opportunities for improvement to ensure continual improvement and best practice management and to update or adjust performance criteria, relative to preceding results.

7.1 Three Year Review

An Inspection and Reporting Proforma to be used in the review of the implementation of this plan is included in **Appendix C**. The proforma provides a list of all performance criteria for the first three-year reporting period and is intended to be updated for each reporting period. Information gathered from this audit will improve the management strategies within this BOMP.

8 RELATED DOCUMENTS AND REFERENCE INFORMATION

8.1 Internal Documents

- Voluntary Conservation Agreement over Southern Woodland area in Part Lot 3 DP 1114623, 16 September 2010, EES and ACOL.

8.2 External Documents

- Department of Mineral Resources NSW (DMR) 1999, *Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of NSW.* Prepared by Andrews, Neil.

- Department of Planning and Infrastructure 2014 (January 2014). *Hunter Valley Coal Mines – Best Practice Guidelines for Biodiversity Offset Management Plans.*

9 REVISION HISTORY

The version history for the BOMP is shown below:

Biodiversity Offset Management Plan Version History

Version	Version Date	Authorised/ Approved for Issue
Version A6	08/10/2014	Lisa Richards
Version A7	10/06/2015	Digby Short
Version A8	05/06/2017	Phillip Brown
Version A9	05/06/2020	Phillip Brown
Version A1-	5/11/2020	Phillip Brown

10 APPENDICES

APPENDIX A: CONSERVATION AGREEMENT

A copy of the Conservation Agreement for the VCA is available at www.ashtoncoal.com.au.

APPENDIX B: PLAN OF MANAGEMENT FOR THE VCA

The Plan of Management for the VCA is available at www.ashtoncoal.com.au.

APPENDIX C: INSPECTION AND REPORTING PROFORMA

The following tables are a guide for each three-year independent audit. The performance criteria are to be updated for the current period three-year reporting period.

Performance Indicators for Year 3 Reporting Period: Management Strategies

BOMP Section	Management Strategy	Action	Performance Criteria for Year 3 Reporting Period	Description of Current Achievements	Met/ Not Met
5.3	Aboriginal Cultural Heritage	Record and manage newly identified Aboriginal objects	To be completed as per Heritage Management Plan (HMP)		
		Archaeological assessment prior to works.	Surface disturbance activities undertaken in accordance with an AHIP or subject to a due diligence archaeological process where outside of an AHIP area.		
5.4	Fencing Gates and Signage	Review of fence mapping and update.	Completed		
		Remove redundant fence, retain timber posts where feasible for habitat.	Completed		
		Inspections of fencing conducted during monitoring, maintenance conducted as required.	Completed annually		
		Signage is erected notifying presence of Aboriginal sites on each access road.	Signage erected		

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5.5	Access Tracks	Update mapping of current access tracks, including condition (as specified below).	Completed		
		Primary access roads (as shown by **Figure 7**) will be maintained suitable for a Category 1 tanker.	Inspected and maintained annually		
		Secondary access roads (as shown by **Figure 7**) are maintained suitable for Category 7 tanker.	Inspected and maintained annually, mapping updated when does not meet standard		
		Other access roads suitable for Category 9 vehicles (e.g. Four wheel drive Land Cruiser).	Inspected and maintained annually		
		Redundant roads are closed and rehabilitated when not required.	Access roads maintained and restricted to defined roads.		
5.6	Erosion, Sediment Control and Soil Management	Inspection of VCA for signs of erosion and changes to areas of existing erosion.	Review monitoring program and ensure erosion inspections are incorporated into annual monitoring program.		
		Erosion management where recommended by annual inspection.	Recommendations for erosion management to be assessed and where they do not impact on the conservation values of the VCA to be included within in a management strategy within 6 months of the		

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			inspection, with a reasonable level of works to be scheduled to occur within the next budgeting period. Repair of erosion within the VCA does not impact on the conservation values. Management actions implemented within 6 months of inspection.		
	Erosion, Sediment Control and Soil Management (subsidence repair areas)	Survey of landform following subsidence	Survey and works completed following subsidence where required as prescribed within the Extraction Plan. Survey undertaken following decommissioning of infrastructure.		
		Review of surface drainage contours indicates landform is water shedding.	Review and works completed following subsidence where required as prescribed within the Extraction Plan. Survey undertaken following decommissioning of infrastructure.		
		Rill / sheet erosion inspections	Review and works completed following subsidence where required as prescribed within the Extraction Plan. Survey undertaken following decommissioning of infrastructure.		
		Surface disturbance/ hazards remediated	Action undertaken based on above monitoring and results of visual inspection and ongoing subsidence monitoring activities. Permanent subsidence cracking is		

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			subsidence cracking that has not closed within one month of mining.		
		Soil assessment completed within areas where a growing media needs to be re-established. Assessment should include: • Topsoil depth; • Texture; • Structure; • Emerson Aggregate test; • pH; and • EC.	Soil assessment completed following infrastructure decommissioning and surface works, where growing media is considered absent, OR where it is considered to be limiting natural regeneration.		
5.7	Stock Management	Utilisation of livestock for the purposes of hazard reduction.	Remove stock if an unacceptable level of erosion damage occurs. Stock removed if groundcover below 80%. Stock should not be present within VCA during September to end of January.		
5.8		Seed availability assessment.	Quarterly seed availability inspections documented and seed collection periods (where necessary) per year.		

BOMP Section	Management Strategy	Action	Performance Criteria for Year 3 Reporting Period	Description of Current Achievements	Met/ Not Met
	Seed Collection and Storage		Records of the vegetation communities seeds have been collected from, species targeted and weights of seed collected to be retained.		
		Seed propagation.	Records retained on what seed has been propagated and germination success rates. At least 70% success should be the target.		
		Infrastructure is decommissioned and associated areas revegetated.	Nil		
5.9	Habitat Augmentation	Installation of nest boxes and habitat features from disturbance areas, within the VCA in accordance FFMP.	Historically completed. If required the location of nest boxes and habitat features to be in areas where suitable habitat for native fauna are limited or absent. Locations determined through annual fauna monitoring.		
		Implementation of reasonable measures to mitigate habitat alteration following subsidence	Minimise disturbance foot print to as small as reasonable practical when under taking subsidence remediation. Where it is unavoidable and key habitat trees are impacted by remediation implement habitat replacement strategies such as instillation of nest boxes.		
		Implementation of reasonable measures to enhance threatened species habitat	Include assessment of enhancement opportunities in annual flora and fauna monitoring,		

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		Identification of new listings and new threatened species during the bi-annual monitoring program are assessed for impacts and any management recommendations are incorporated into future relevant management plans.	Completed as required.		
5.10	Revegetation and Regeneration	Restoration of indigenous vegetation communities within grasslands of the VCA.	Annual flora monitoring to include assessment and comment on regeneration potential of grassland areas.		
		Disturbed land (mining and ACOL land use related) is rehabilitated as soon as is practicable to a level equal to or better than the original landscape.	• Native species used consistent with **Table** 17 and surrounding vegetation. • Ecological diversity and ecosystem function will be maintained or enhanced assessed by: o Total number of threatened species observed. o Species diversity. o LFA Organisation Index. o LFA Stability Index. o LFA Infiltration Index.		

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5.11	Weed Control	Conduct annual assessment to determine target weeds and areas for the coming year.	To be completed annually in conjunction within adjacent ACOL owned lands.		
		Environmental and noxious weeds within the VCA controlled to a reasonable level.	Weed management conducted as required (determined by annual assessments). Weed densities and sprawl across the site broadly comparable to (or less than) previous surveys.		
5.12	Vertebrate pest management	Conduct annual assessment to determine feral animal management control measures required for coming year.	To be completed annually in conjunction within adjacent ACOL owned lands.		
		Feral and pest animals within the VCA controlled to a reasonable level or eliminated from site.	Pest management conducted as required (determined by annual assessments). Distribution and damage caused by pests broadly comparable to (or less than) previous surveys.		
5.13	Fire Management	Quarterly inspection of asset protection zones (APZs) with maintenance as required of asset protection zones.	Quarterly inspection and hazard reduction targets achieved. Conservation values within the VCA not compromised.		
		Fuel load reduction across VCA using mosaic low intensity burns or controlled grazing.	Fuel load reduction implemented in mosaic pattern following defined fire frequencies and/or stock management as per stock management strategy. Conservation values within the VCA not compromised.		

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5.14	Flora and Fauna Monitoring Program	Annual flora monitoring.	Monitoring completed each year in accordance with methods in ACP BMP including evaluation of monitoring sites, against benchmark data (where available), and other suitable analogue sites.		
		Vegetation Community Benchmarks Established.	Complete		
		Revegetation monitoring of areas subject to active planting.	Monitoring of any revegetation areas indicates performance indicators progressing towards completion criteria.		
		Complete EES Conservation Area Monitoring Form including taking of photographs from photo-points.	Completed annually or as directed by EES.		
		Bi-annual fauna monitoring.	Monitoring completed each year in accordance with methods in ACP BMP.		
			Terrestrial fauna and habitat monitoring shows that the numbers of threatened species and the health (including recruitment) of significant populations are not declining and results are comparable or improved from the baseline surveys.		
			Monitoring shows that individuals are progressively expanding into new home ranges.		
			Monitoring shows that key fauna habitat features (foraging, nesting, refuge habitat) and structural		

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			complexity within remnant and rehabilitated/ compensatory habitat areas are not declining and results are comparable with the pre-mining surveys.		
		Monitoring and management of nest boxes.	Annual monitoring in accordance with methods in the BMP, and maintenance as required.		