BULGA
COAL

GLENCORE

Biodiversity Management Plan

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1. Introduction

The Bulga Coal Complex (BCC) mining lease is located approximately 12 kilometres southwest of Singleton, 1 kilometre north of Broke and 1.5 kilometres east of Bulga, in the Upper Hunter Valley of NSW (refer to **Figure 1.1**). The Bulga Coal Complex is managed by Bulga Coal Management Pty Limited (BCM) and comprises Bulga Open Cut (BOC) and Bulga Underground Operations (BUO).

The Bulga Open Cut and Bulga Underground Operations have separate development consents but common ownership and both are serviced by a common coal handling and preparation plant (CHPP) and rail loading facility located in the north eastern corner of the BCC (**Figure 1.2**).

1.1 Purpose and Scope

The purpose of this Biodiversity Management Plan (BMP) is to outline the strategies to be employed for the management of remnant vegetation and fauna species within the BCC, in accordance with Schedule 3, Conditions 29 to 35 of the BOC development consent (SSD-4960) and Schedule 4, Conditions 43, 43A and 44 of the BUO development consent (DA 376-8-2003 Mod 5). The mine overburden rehabilitation component of this management plan relates to Conditions 53 to 55 of the BOC development consent and Conditions 60 and 61 of the BUO development consent.

This BMP has also been prepared to satisfy the requirements of Conditions 2 and 3 of the Commonwealth EPBC Act approval (2012/6637) for the Bulga Coal Optimisation Project and conditions 4 and 5 of EPBC Act approval 2018/8300 for development consent SSD 4960 Modification 3.

This BMP applies to all land within the BCC mining leases (refer to **Figure 1.2**) and the BOAs listed in **Section 7**.

1.2 Related Documents

This BMP provides a brief overview of mine rehabilitation activities and monitoring at BCC, however, detailed rehabilitation information is provided in the relevant Mining Operations Plan (MOP) for each operation. For BOC, the MOP also addresses the requirements of the Rehabilitation Management Plan required by the Project Approval.

1.3 Roles and Responsibilities

Relevant roles and responsibilities have been developed for the implementation of this BMP. These are outlined in **Table 1.1**.

Figure 1.1 – Locality Plan

Figure 1.2 – Site Layout

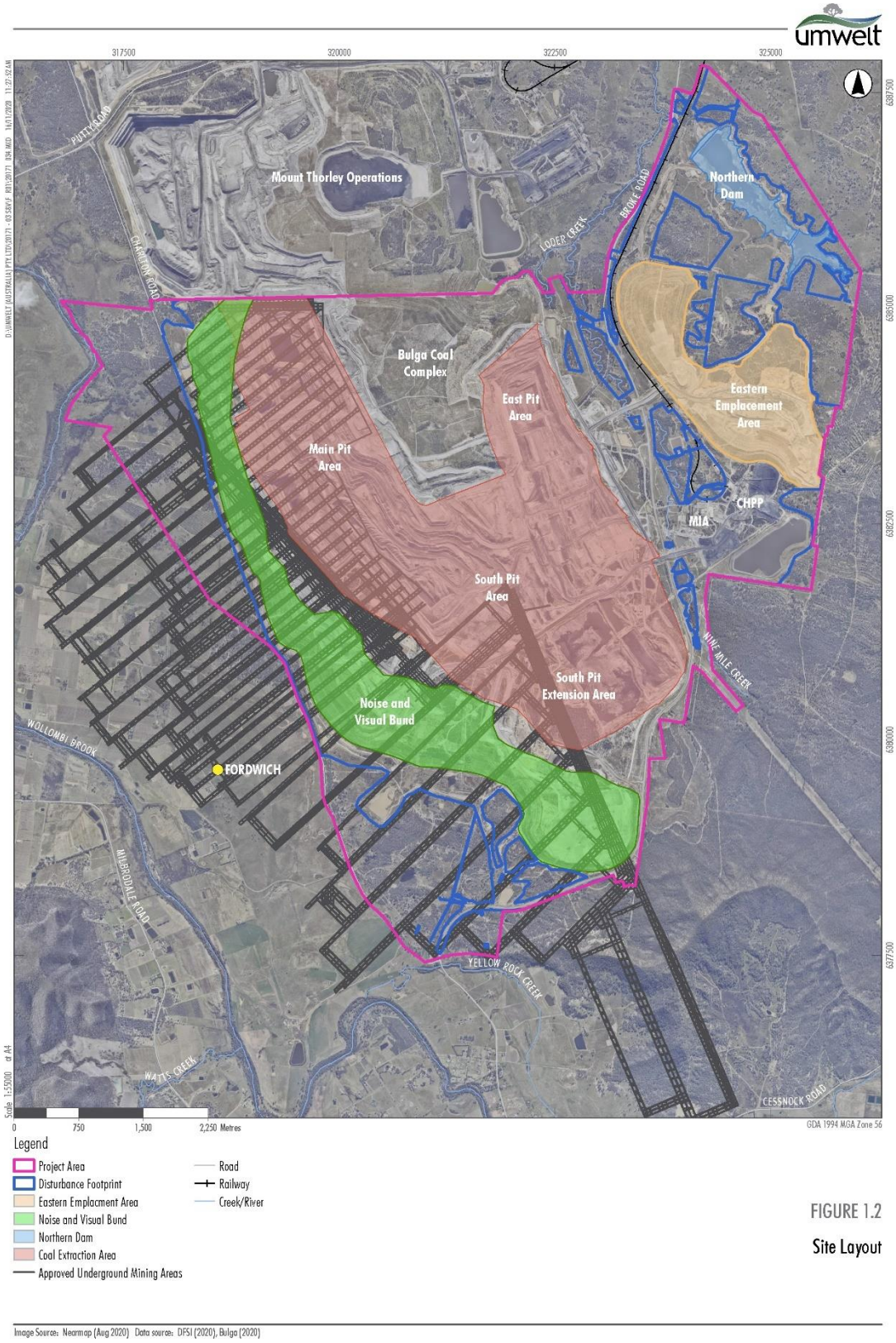


Table 1.1 – Roles and Responsibilities

Roles	Responsibilities
Operations Manager	• approve sufficient resources for the implementation of this BMP;
Environment and Community Manager	• ensure sufficient time and resources are allocated to implement the management and monitoring strategies of the BMP;
Environment and Community Coordinator	• facilitate the external reporting requirements outlined in this plan; • undertake training as required to communicate the requirements of this plan to all relevant personnel and contractors; • co-ordinate the day to day implementation of the management and monitoring strategies of the BMP; • undertake biannual inspections as required; • authorise clearing activities in accordance with the GDP process and other controls outlined in this BMP; • analyse and collate documentation for inclusion in the Annual Review; • assess the effectiveness of the management and monitoring strategies and instigate the adaptive management process as required; • ensure all internal and external reporting requirements are met; • ensure that all relevant records are effectively maintained on site; • periodically review progress against targets and performance indicators; • ensure that personnel involved in the carrying out and monitoring of the BMP activities and values are appropriately qualified, licensed and experienced to undertake the task; and • manage/control access to areas covered by the BMP.
BOC Technical Services Manager	• Allow sufficient time and resources in the mine planning process to salvage ecological resources from areas to be disturbed;
Other BCM Staff and Contractors	• ensure staff and contractors are informed and trained where relevant in relation to controls on activities within the area subject to this BMP; • receive training regarding controls on activities within the area subject to this BMP; • observe boundaries of the area subject to this BMP when undertaking work on site; and • undertake activities in line with directions from the Operations Manager and Environment and Community Manager.

1.4 Consultation

Consultation with the relevant authorities including the NSW Department of Planning and Environment (DPIE) and Commonwealth Department of Agriculture, Water and the Environment (DAWE) occurred throughout the process of developing this BMP and will continue throughout the ongoing management of the site and its BOAs as required.

2. Regulatory Requirements

2.1 Development Consent

The conditions of the relevant consents and where they are addressed in this BMP are outlined in **Tables 2.1, 2.2** and **2.3** below.

Table 2.1 – Bulga Open Cut Development Consent Conditions (SSD-4960)

<table>
<tr><th>Condition</th><th>Related Section in BMP</th></tr>
<tr><td>Biodiversity Offset Strategy
29. The Applicant shall implement the biodiversity offset strategy described in the EIS and SEE (MOD 3), summarised in Table 9 and shown conceptually in Appendix 9.
Table 9: Summary of the Biodiversity Offset Strategy
<table>
<tr><th>Area</th><th>Offset Type</th><th>Minimum Size (hectares)</th></tr>
<tr><td>Reedy Valley Offset Area</td><td>Existing vegetation to be enhanced and additional vegetation to be established, with the restoration of at least 42 ha of White Box – Yellow Box – Blakely's Red Gum Woodland and Derived Native Grassland CEEC and 44 ha of the Central Hunter Grey Box-Ironbark Woodland EEC</td><td>1,486</td></tr>
<tr><td>Broke Road Offset Area</td><td>Existing vegetation to be enhanced and additional vegetation to be established, with the restoration of at least 189 ha of the Central Hunter Grey Box-Ironbark Woodland EEC</td><td>241</td></tr>
<tr><td>Wollombi Brook Conservation Area</td><td>Existing vegetation to be enhanced and additional vegetation to be established, with the restoration of at least 10 ha of the Warkworth Sands Woodland EEC and 16 ha of the Central Hunter Grey Box-Ironbark Woodland EEC</td><td>65</td></tr>
<tr><td>Condran Property Biodiversity Offset Area</td><td>Existing vegetation to be enhanced and additional vegetation to be established, with the restoration of at least 6.9 ha of Central Hunter Ironbark-Spotted Gum-Grey Box Forest EEC</td><td>50</td></tr>
<tr><td>Vere Offset Area</td><td>Existing vegetation to be enhanced and additional vegetation to be established, including at least 81.1 ha of existing Central Hunter Valley Eucalypt Forest and Woodland CEEC and restoration of at least 33.8 ha of additional Central Hunter Valley Eucalypt Forest and Woodland CEEC</td><td>153.7</td></tr>
</table>
</td><td>Sections 6 and 7 and related Appendices.</td></tr>
</table>

Condition			Related Section in BMP
Rehabilitation Area	Vegetation to be established, with the restoration of at least 2,200 ha of Central Hunter Grey Box–Ironbark Woodland EEC, 250 ha of Central Hunter Ironbark-Spotted Gum-Grey Box Forest EEC and 50 ha of Central Hunter Swamp Oak Forest	2,500	
TOTAL		**4,495.7**	
Habitat for Threatened Fauna Species 30. The Proponent must ensure that the biodiversity strategy provides potentially suitable habitat for the following threatened fauna species, to the satisfaction of the Planning Secretary: Little Eagle, Little Lorikeet, Brown Treecreeper, Diamond Firetail, Speckled Warbler, Swift Parrot, Regent Honeyeater, Grey-crowned Babbler, Varied Sitella, Scarlet Robin, Hooded Robin, Grey-headed Flying-fox, Yellow-bellied Sheathtail-bat, Eastern Freetail-bat, Large-eared Pied Bat, Eastern False Pipistrelle, Little Bentwing-bat, Eastern Bentwing-bat, Large-footed Myotis, Greater Broad-nosed Bat and Eastern Cave Bat.			Sections 4, 5, 6 and 7
Hunter Ironbark Research Program 31. The Applicant must implement any relevant findings of the Hunter Ironbark Research Program for the Ravensworth complex during the establishment of the vegetation in the Rehabilitation Area (see Table 9 above) to the satisfaction of the Secretary.			Section 6.2
Regent Honeyeater Recovery Plan Contribution 32. The Applicant must contribute at least $200,000 over 2 years towards the implementation of actions under the National Regent Honeyeater Recovery Plan. The initial payment of at least $100,000 must be made within 6 months of the date of this consent.			Addressed under separate documentation.
Long Term Security of Offsets **33.** By the end of December 2015, unless the Planning Secretary agrees otherwise, the Applicant must make suitable arrangements to provide appropriate long-term security for the land within the Biodiversity Offset Strategy identified in Table 9 (excluding the Rehabilitation Area and Vere Offset Area), to the satisfaction of the Planning Secretary.			Section 7.1 and relevant Appendices.
33A. Within 2 years of commencing development approved under Modification 3, or other timeframe as agreed by the Planning Secretary, the Applicant must make suitable arrangements for the long-term protection of the Vere Offset Area identified in Table 9, to the satisfaction of the Biodiversity Conservation Trust.			Section 7.1 and relevant Appendix.
Rehabilitation Offsets 33B. Within 10 years of the cessation of mining operations, or other timeframe agreed by the Planning Secretary, the Applicant must make suitable arrangements for the long term protection of the 2,500 ha Rehabilitation Area identified in Table 9, to the satisfaction of the Biodiversity Conservation Trust. If the rehabilitation area does not meet the listing criteria of the targeted EEC or the completion criteria, then the Applicant must retire the relevant deficient biodiversity credits in accordance with the Biodiversity Offsets Scheme of the BC Act, to the satisfaction of the BCT.			To be addressed at relevant time.

Condition	Related Section in BMP
Biodiversity Management Plan **34.** The Applicant must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This document
(a) be prepared by a suitably qualified and experienced person/s;	Section 13.0
(b) be prepared in consultation with BCD, and submitted to the Planning Secretary for approval within 3 months of the approval of Modification 3;	Section 1.4
(c) describe how the implementation of the biodiversity offset strategy would be integrated with the overall rehabilitation of the site;	Sections 6 and 7
(d) establish baseline data for the existing habitat in the offsite biodiversity offset area and on the site;	3.0 and relevant Appendices
(e) describe the short, medium, and long-term measures that would be implemented to: • manage the impacts of clearing vegetation, including pre-clearance surveys;	Section 4 and Appendix A
• manage the remnant vegetation and habitat on the site; and	Section 5
• implement the biodiversity offset strategy;	Section 7
(f) include detailed performance and completion criteria for evaluating the performance of the biodiversity offset strategy, and include triggers for remedial action, where these performance or completion criteria are not met;	Section 7.8 and relevant Appendices
(g) include a strategy that describes how the biodiversity offset areas in Table 9 will be secured;	Section 7.1 and relevant Appendices.
(h) include a detailed description of the measures that would be implemented for: • enhancing the quality of existing vegetation and fauna habitat in the biodiversity offset areas;	Section 7.0 and relevant Appendices.
• restoring native vegetation and fauna habitat on the biodiversity areas and rehabilitation area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features (where necessary);	Section 5.6, 6, 7 and relevant Appendices.
• maximising the salvage of resources within the approved disturbance area – including vegetative and soil resources – for beneficial reuse in the enhancement of the biodiversity areas or rehabilitation area;	Section 4.2.2
• collecting and propagating seed;	See relevant Appendices
• protecting vegetation and fauna habitat outside the approved disturbance area on site;	Section 5
• minimising the impacts on fauna on site, including undertaking pre-clearance surveys;	Section 4 and 5
• managing any potential conflicts between the proposed restoration works in the biodiversity areas and any Aboriginal heritage values (both cultural and archaeological);	Section 5.9 and relevant Appendices.
• managing salinity;	Section 5.3 and relevant Appendices.

Condition	Related Section in BMP
• controlling weeds, including measures to avoid and mitigate the spread of noxious weeds;	Section 5.4 and relevant Appendices.
• controlling feral pests, with consideration of actions identified in relevant threat abatement plans;	Section 5.5 and relevant Appendices.
• controlling erosion;	Section 5.2 and relevant Appendices
• managing grazing and agriculture on site;	Section 5.1 and relevant Appendices.
• controlling access; and	Section 5.8 and relevant appendices.
• managing bushfire hazards;	Section 5.7 and relevant Appendices.
(i) include a seasonally based program to monitor and report on the effectiveness of these measures, and progress against the detailed performance indicators and completion criteria, and identify improvements that could be implemented to improve biodiversity outcomes;	Section 8 and relevant Appendices.
(j) identify the potential risks to the successful implementation of the biodiversity offset strategy, and include a description of the contingency measures that would be implemented to mitigate these risks, including provisions for alternative direct and/or supplementary offset measures where regeneration of EECs and/or the propagation/translocation of threatened flora do not meet performance and completion criteria; and	Section 7 and relevant Appendices.
(k) include details of who would be responsible for monitoring, reviewing, and implementing the plan.	Section 1.3
34A. The Applicant must not commence any vegetation clearing within the additional disturbance areas approved under Modification 3 until the Biodiversity Management Plan is approved by the Planning Secretary. The Applicant must implement the Biodiversity Management Plan as approved by the Planning Secretary.	This document and Appendices
Conservation Bond **35**. Within 6 months of the approval of the Biodiversity Management Plan, the Applicant must lodge a conservation bond with the Department to ensure that the biodiversity offset strategy is implemented in accordance with the performance and completion criteria described in the Biodiversity Management Plan.	Section 10 and relevant Appendices
Adaptive Management 2. The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity: (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;	Section 12

Condition	Related Section in BMP
(b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and (c) implement remediation measures as directed by the Planning Secretary, to the satisfaction of the Planning Secretary.	
Condition 3 – Schedule 5 - Management Plan Requirements 3. The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; • 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; (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: impacts and environmental performance of the development; • effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences; (f) a program to investigate and implement ways to improve the environmental performance of the development over time; (g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.	Section 3 Section 2 Section 7.8 and relevant Appendices Sections 4, 5 and 6 Section 8 Section 7.8 and relevant Appendices Section 8.4 Section 12 Section 11 Section 9

Table 2.2 lists the BUO consent conditions relevant to the BMP.

Table 2.2 – Relevant Consent Conditions from the BUO Development Consent

Condition	Related Section in BOMP
Habitat Creation and Conservation 43. The Applicant must: (a) take all practicable measures to minimise vegetation clearing during the development, and wherever practicable, avoid clearing the existing woodland vegetation on site; (b) establish and maintain the proposed ecological corridors on site (see Appendix 6); (c) ensure the corridors shown in Appendix 6 link to the Wollombi Brook Conservation Area; (d) conserve, maintain and enhance the existing Warkworth Sands Woodland ecological community (see Appendix 7); (e) investigate the potential distribution of the Warkworth Sands Woodland ecological community on company owned land on and adjacent to the site, and consider options for providing long-term protection to the existing and potential areas of the Warkworth Sands Woodland ecological community; (f) deleted; (g) deleted; (h) Conduct regular flora and fauna monitoring on site during the development, to the satisfaction of the Planning Secretary.	Section 4 Section 6 Section 6 Section 7.4 and Appendix E Section 8
Additional Vegetation Offsets 43A. By the end of December 2014, the Applicant must: (a) provide an area that is, in the opinion of the Planning Secretary, suitable in its quantity, quality and vegetation community to offset the clearing of 5.34 hectares of Central Hunter Grey Box – Ironbark Woodland under Modification 5; (b) provide an area that is, in the opinion of the Planning Secretary, suitable in its quantity, quality and vegetation community to offset the disturbance of 23.71 hectares of Central Hunter Grey Box – Ironbark Derived Native Grassland under Modification 5; and (c) make suitable arrangements to manage, protect and provide long-term security for these areas, to the satisfaction of the Planning Secretary.	Section 7.1 and Appendix C.
Biodiversity Management Plan 44. The Applicant must prepare a Biodiversity Management Plan for the Bulga Mining Complex to the satisfaction of the Planning Secretary. This plan must: (a) be prepared in consultation with BCD, and submitted to the Planning Secretary for approval by 31 March 2017; (b) include a detailed description of what measures would be implemented to satisfy the requirements in condition 43 and 43A of Schedule 4; (c) describe the short, medium, and long term measures that would be implemented to: • manage the impacts of clearing vegetation, including pre-clearance surveys; and	Section 1.4 Section 7.1 and Appendix C. Section 4 and Appendix A Section 5 Section 7 and relevant Appendices

Condition	Related Section in BOMP
• manage the remnant vegetation and habitat on the site; (d) include a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for: • enhancing the quality of existing vegetation and fauna habitat in the conservation and offset areas; • restoring native vegetation and fauna habitat on the biodiversity areas and rehabilitation area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features (where necessary); • maximising the salvage of resources within the approved disturbance area – including vegetative and soil resources – for beneficial reuse in the enhancement of the biodiversity areas or rehabilitation area; • collecting and propagating seed from the local area; • protecting vegetation and fauna habitat outside the approved disturbance area on site; • minimising the impacts on fauna on site, including undertaking pre-clearance surveys; • managing any potential conflicts between the proposed restoration works in the biodiversity areas and any Aboriginal heritage values (both cultural and archaeological); • managing salinity; • controlling weeds and feral pests; • controlling erosion; • managing grazing and agriculture on site; • controlling access; and • bushfire management; (e) include a seasonally-based program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria; (f) identify the potential risks to the successful implementation of the plan, and include a description of the contingency measures that would be implemented to mitigate these risks; and (g) include details of who would be responsible for monitoring, reviewing, and implementing the plan. The Applicant must implement the Biodiversity Management Plan as approved by the Planning Secretary.	Section 5.6, 6, 7 and relevant Appendices Section 4.2.2 See relevant Appendices Section 5 Section 4 and 5 Section 5.9 and relevant Appendices. Section 5.3 and relevant Appendices. Section 5.4 and relevant Appendices. Section 5.5 and relevant Appendices. Section 5.2 and relevant Appendices Section 5.1 and relevant Appendices. Section 5.7 and relevant Appendices. Section 8 and relevant Appendices. Section 7 and relevant Appendices. Section 1.3
Rehabilitation Objectives 60 The Applicant must rehabilitate the site in accordance with the conditions imposed on the mining leases(s) associated with the development under the *Mining Act 1992*. This rehabilitation must comply with the objectives in Table 17. Table 17: Rehabilitation Objectives (relevant to this Biodiversity MP) ***Feature*** / ***Objective*** Watercourses subject to / Hydraulically and geomorphologically stable with riparian vegetation that is the same of better than prior to mining.	Section 6, Mining Operations Plan/Rehabilitation Strategy.

Condition		Related Section in BOMP
subsidence impacts		
Land to be restored or maintained for agricultural purposes	Restored and maintained to: • the same or higher land capability and agricultural suitability than prior to mining; and • a landform consistent with the surrounding environment, including no greater than minor changes to flooding characteristics or ponding.	
Other land	Restore ecosystem function including maintaining or establishing self-sustaining ecosystems comprised of: • local native plant species (unless the RR agrees otherwise); and • a landform consistent with the surrounding environment, including no greater than minor changes to flooding characteristics or ponding.	
Progressive Rehabilitation 61. The Applicant must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance		Section 6, Mining Operations Plan/Rehabilitation Strategy.

Table 2.3 lists the consent conditions relevant to the BMP as required under the EPBC Act approvals 2012/6637 and 2018/8300.

Table 2.3 – Commonwealth Project Approval Conditions for the BOP

Condition	Related Section in BMP
2. To compensate for the loss of approximately 557 ha of regent honeyeater, swift parrot and grey headed flying fox habitat, 611ha of large-eared pied bat habitat and approximately 65 slaty red gum trees, the approval holder must provide for the protection of offset lands identified in the maps at Schedule 1 of this notice as: • Reedy Valley Offset Site; • Wollombi Brook Conservation Area; and • Broke Road Offset Site. These offset lands must meet the requirements of the EPBC Offsets Policy and provide for the protection of threatened species habitat on these sites for the duration of the action's impact through a legally binding conservation covenant which must be in force within 3 years of the commencement of the action. Written evidence of compliance against this condition must be provided to the Department prior to the commencement of the action including evidence that action is being taken to put in place a suitable legally binding conservation covenant.	Appendix C, D and E
3. The approval holder must submit for the Minister's approval a Biodiversity Management Plan (BMP) which provides for the offsetting of residual impacts to matters of national environmental significance including but not limited to: • Regent honeyeater;	This document and Appendix C, D and E

Condition	Related Section in BMP
• Swift parrot; • Large-eared pied bat; and • Slaty red gum. The BMP must include: a) management actions designed to improve the ecological quality of habitat for the above species on offset lands identified in condition 2 and protect these sites from ecological degradation for the duration of the action's impact on matters of national environmental significance;	
Listed threatened species and ecological community	
The objective of conditions 5 and 6 is to minimise the impacts of the **action** on **listed threatened species and an ecological community.** 5. The approval holder must comply with the State development consent conditions 29, 30, 33, 33A, 33B, 34 and 34A of Schedule 3. a. To compensate for the loss of the listed threatened species and ecological community habitat identified at condition 4, the approval holder must submit the Biodiversity Offset Strategy (specified at condition 29 of the State development consent) to the Minister for approval. i. The approval holder must not commence vegetation clearing within the modification additional disturbance area (delineated by a red boundary at Annexure 1) until the Biodiversity Offset Strategy has been approved by the Minister. ii. The approval holder must implement the Biodiversity Offset Strategy as approved by the Minister. 6. The approval holder must comply with the State development consent conditions 53, 54, 55 and 56.	Condition 5 addressed in this BMP. Condition 6 addressed in Mining Operations Plan/Rehabilitation Strategy.

3. Existing Environment

The existing environment of the BCC has been assessed in detail in a number of environmental assessments, the most recent of these being Modification 3 of the Bulga Optimisation Project consent (SSD 4960). This modification aimed to maximise resource recovery in the current BOP Project Area by extending the open cut operations to the south east into a former open cut mining area occupied by the current tailings storage facilities. This project also required modification (7) to the Bulga Underground Operations consent (DA 376-8-2003) for the relocation of underground infrastructure required to facilitate the Proposed Modification.

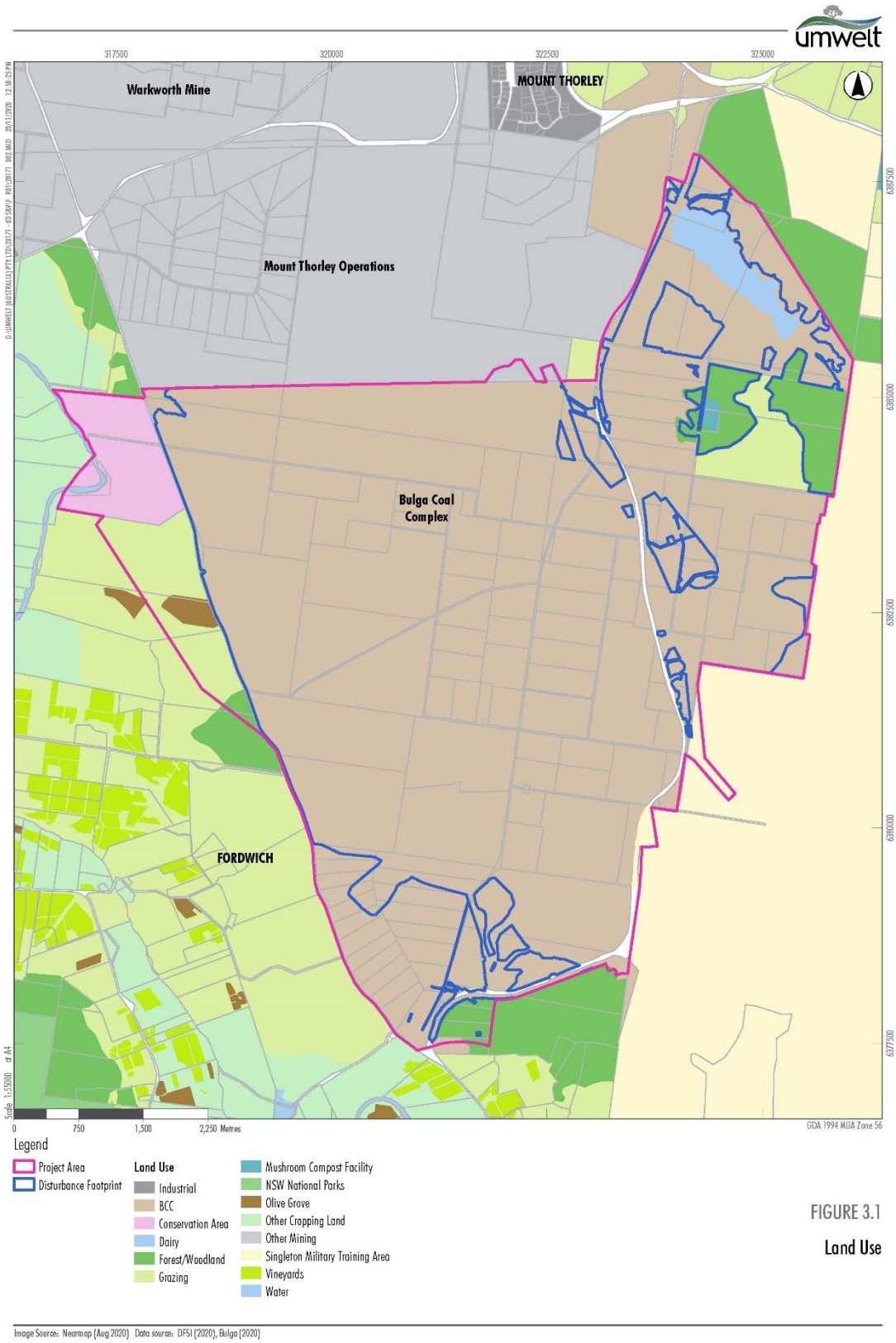
This project application was supported by a Biodiversity Assessment Report prepared by Umwelt (Australia) Pty Limited (2019). A summary of the information presented in that and previous assessments is provided in the sections below.

3.1 Land Use History

BCC is situated in a rural area, primarily surrounded by rural landholdings, agriculture, mining and defence training activities (refer to **Figure 3.1**). Adjoining the eastern boundary of the BCC is land owned by the Commonwealth of Australia which forms part of the Singleton Military Training Area (SMTA). Portions of this land have been leased to BCC for open cut mining purposes since 1998.

There are several mines located around the BCC. The closest is the Mount Thorley Operations which adjoins the northern boundary of the BOC; the associated Warkworth Mine is located to the immediate north of the Mount Thorley Operations (refer to **Figure 3.1**). Several other mines such as Wambo are located further north west and northeast of the BCC.

Figure 3.1 – Land Use



Land immediately to the northeast, west and south of the BCC is predominantly utilised for agricultural purposes. The Wollombi Brook alluvial flats are located approximately 2.5 kilometres to the west of the BCC. Due to their fertility, these alluvial flats and adjoining lower slopes support much of the agricultural activities of the area, including:

- fodder and lucerne crops;
- viticulture;
- dairying; and
- horse breeding.

The fertile footslopes of the Fordwich Sill are used for similar activities to those carried out on the Wollombi Brook alluvial flats, with cropping less prevalent on the higher slopes.

Beef cattle grazing is the dominant agricultural enterprise on the less fertile soils away from the Fordwich Sill and Wollombi Brook alluvials. A Mushroom Composting facility, Viticulture and horticulture, predominately olive growing, also occurs on the slopes away from the Wollombi alluvials.

Outside of mining, defence and agriculture, the area surrounding the BCC supports the following land uses (refer to **Figure 3.1**) including:

- small rural towns (Broke, Milbrodale and Bulga); and
- hospitality and tourist operations including short stay accommodation, winery cellar doors, restaurants/cafes and specialist retail outlets.

The Mount Thorley industrial area, located to the immediate north of the Mount Thorley Operations, is located within three kilometres of the BCC.

Mining, cattle grazing activities and past land clearance associated with previous agricultural activity has disturbed much of the BCC and surrounding areas, resulting in the vegetation being dominated by pastoral grassland with pockets of remnant and re-growth woodland. The vegetation within and surrounding the BCC is discussed further in **Section 3.4.1**.

3.2 Climatic Information

A meteorological station at the BCC continuously records rainfall, wind speed, wind direction, temperature and solar radiation. Analysis of historical wind data indicates the most common winds on an annual basis were from the south and northwest with few winds originating from the northeast. During summer, winds from the east-southeast dominate with a lesser portion of winds from the south. In autumn, winds from the south are most common. During the winter months, winds predominantly occur from the northwest with a spread of winds from the southwest quadrant. The spring windrose had a wind distribution similar to the annual windrose with winds originating from the south, northwest and southeast.

Long term temperature and rainfall data (125 years) has also been collected from the closest Bureau of Meteorology weather station at Jerrys Plains. This data indicates that January is the hottest month with a mean maximum temperature of 31.7°C and July is the coldest month with a mean minimum temperature of 3.8°C. Rainfall data showed January is the wettest month with an average rainfall of 77mm over 6.4 days and August is the driest month with an average rainfall of 36.5mm over 5.2 days.

3.3 Landform, Geology and Soils

The BCC area is typical of the central lowlands of the Hunter Valley, which are characterised by undulating to low rolling hills formed on weak sedimentary rocks with low local relief (Kovac and Lawrie 1991). Elevations within the BCC lease area range between 169 mAHD in the south-eastern corner of the complex and 50 mAHD along Loders Creek. The overall in-pit overburden emplacement area elevation is approximately 150 mAHD with some areas up to approximately 165m AHD to provide topographical relief.

Elevation in the surrounding area ranges from around 40 mAHD on the Hunter River at the junction with Wollombi Brook to around 300 mAHD at the Vere (within the Vere BOA) and over 500 mAHD along Broken Back Range. The Yengo and Wollemi escarpments to the south and west of the Wollombi Brook valley are between 250 and 400 meters AHD in elevation, intersected by deeply incised valleys. The Broken Back Range, the Vere, and Yengo and Wollemi escarpments remain heavily vegetated due to their rugged terrain and poor agricultural value. The flat alluvial plans and gently undulating terrain around the Project area has been largely cleared in the past for agricultural or mining purposes, although, as noted earlier, the lower quality agricultural land is regenerating to woodland in a number of areas.

Since the 1980's mining in the BCC area has created mining voids, overburden emplacements areas and surface facilities which are now key topographical features within the area.

The soil types occurring within the BCC are mapped on the Singleton 1:250,000 Soil Landscapes Map Sheet and described in Kovac and Lawrie (1991). Soils landscapes present include Branxton, Rothbury, Saxonvale, Warkworth and Wollombi (Kovac and Lawrie, 1991); the location of these soil landscapes is shown on **Figure 3.2**. The Branxton soil landscape dominates the site, with a smaller area of the Rothbury soil landscape in the north-east of the BCC. These soils generally have low fertility and are moderately to highly erodible. The remaining soil landscapes are located in the west of the site and only occupy a very small area (refer to **Figure 3.2**).

3.4 Flora and Fauna

3.4.1 Vegetation Communities

The vegetation within the BCC has been heavily modified due to a history of clearing and disturbance for agricultural purposes and more recently for mining. Previous surveys have identified numerous vegetation communities (or variants thereof) (**Figure 3.3**.) and disturbed or non-vegetated areas (not including mine rehabilitation). Four vegetation communities recorded in the BCC conform to endangered ecological communities (EECs) listed under the *Biodiversity Conservation Act 2016* (BC Act). The vegetation communities recorded in the area covered by the BMP include:

- Central Hunter Grey Box - Ironbark Open Woodland;
- Central Hunter Grey Box - Ironbark Woodland (EEC);
- Central Hunter Grey Box - Ironbark Derived Native Grassland (DNG);
- Central Hunter Bulloak Forest Regeneration;
- Central Hunter Ironbark - Spotted Gum - Grey Box Forest (EEC);
- Central Hunter Paperbark Soaks Woodland;
- Central Hunter Swamp Oak Forest;

- Hunter Valley Weeping Myall Woodland (EEC);
- Mixed Shrubland on Alluvial Soil;
- Riparian Derived Grassland;
- Warkworth Sands Woodland (EEC), with the following variants:
  - WSW Angophora Woodland;
  - WSW Angophora and Bulloak Open Woodland;
  - WSW Angophora and Bulloak Woodland;
  - WSW Bulloak Forest;
  - WSW Derived Native Grassland;
  - WSW Disturbed Grassland;
  - WSW Ironbark Woodland;
  - WSW Red Gum – Melaleuca Woodland
  - WSW Red Gum Woodland and
  - WSW Regenerating;
- Hunter Valley River Oak Forest.

Disturbed, planted or non-vegetated areas include:

- Disturbed;
- Exotic Grassland;
- Grassland on Alluvial Soil;
- Olive Grove;
- Planted Areas;
- Rehabilitation Grassland;
- Rehabilitation Woodland;
- Waterbody.

The Central Hunter Valley Eucalypt Forest and Woodland ecological community was listed as a critically endangered ecological community (CEEC) in 2015 under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The CEEC includes a range of vegetation communities where they occur on soils derived from the Permian sedimentary bedrock found on the valley floors and on lower hillslopes and low ridges. The vegetation communities that occur in the BCC and may conform to the CEEC Final Determination include:

- Central Hunter Grey Box - Ironbark Woodland EEC;
- Central Hunter Grey Box - Ironbark Derived Native Grassland (DNG) (where it occurs within 30 metres of the CEEC);
- Central Hunter Bulloak Forest Regeneration (in part); and
- Central Hunter Ironbark - Spotted Gum - Grey Box Forest EEC.

Detailed survey and analysis would be required to determine whether these communities meet the key diagnostic characteristics and conditions thresholds described in the Final Determination (DoE 2015).

3.4.2 Threatened Flora Species

The following threatened flora species have been recorded within the BCC, and include (as per **Figure 3.4**):

- slaty red gum (*Eucalyptus glaucina*); and
- white-flowered wax plant (*Cynanchum elegans*).

Slaty red gum is listed as vulnerable under the BC Act and EPBC Act and white-flowered wax plant is listed as endangered under the BC Act and EPBC Act.

Two endangered flora populations (EPs) have also been recorded within the BCC (**Figure 3.4**). These are:

- the weeping myall (*Acacia pendula*); and
- the tiger orchid (*Cymbidium canaliculatum*).

3.4.3 Threatened Fauna Species

A total of 20 threatened fauna species (as listed under the BC Act and/or the EPBC Act) have been recorded within or immediately adjacent to the BCC; either as part of surveys, database searches or literature reviews. The location of each of the threatened species' records is shown on **Figure 3.4**, with the species recorded being:

- brown treecreeper (*Climacteris picumnus victoriae*) – Vulnerable under BC Act;
- diamond firetail (*Stagonopleura guttata*) - Vulnerable under BC Act;
- Eastern freetail-bat (*Mormopterus norfolkensis*) - Vulnerable under BC Act;
- Eastern bentwing-bat (*Miniopterus schreibersii oceanensis*) - Vulnerable under BC Act;
- Eastern cave bat (*Vespadelus troughtoni*) - Vulnerable under BC Act;
- Eastern false pipistrelle (*Falsistrellus tasmaniensis*) - Vulnerable under BC Act;
- greater broad-nosed bat (*Scoteanax rueppellii*) - Vulnerable under BC Act;
- grey-crowned babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*) - Vulnerable under BC Act;
- hooded robin (south-eastern form) (*Melanodryas cucullata cucullata*) - Vulnerable under BC Act;
- large-eared pied bat (*Chalinolobus dwyeri*) - Vulnerable under BC Act and EPBC Act;
- large-footed myotis (*Myotis adversus*) - Vulnerable under BC Act;
- little eagle (*Hieraaetus morphnoides*) - Vulnerable under BC Act;
- little lorikeet (*Glossopsitta pusilla*) - Vulnerable under BC Act;
- masked owl (*Tyto novaehollandiae*) - Vulnerable under BC Act;
- regent honeyeater (*Anthochaera phrygia*) – critically Endangered under BC Act and endangered under the EPBC Act;

- speckled warbler (*Chthonicola sagittata*) - Vulnerable under BC Act;
- spotted harrier (*Circus assimilis*) - Vulnerable under BC Act;
- squirrel glider (*Petaurus norfolcensis*) - Vulnerable under BC Act;
- varied sittella (*Daphoenositta chrysoptera*) - Vulnerable under BC Act; and
- yellow-bellied sheathtail-bat (*Saccolaimus flaviventris*) - Vulnerable under BC Act.

3.4.4 Introduced Species

Previous surveys and inspections have identified a total of 75 introduced flora species within the BCC. This includes six species of particular importance as all are Weeds of National Significance and Priority Weeds in the Upper Hunter:

- tiger pear (*Opuntia aurantiaca*);
- creeping Pear (*Opuntia humifusa*);
- common prickly pear (*Opuntia stricta* var. *stricta*);
- green cestrum (*Cestrum parqui*);
- African Boxthorn (*Lycium ferocissimum*); and
- lantana (*Lantana camara*).

Other common introduced flora species include fireweed (*Senecio madagascariensis*), Africa olive (*Olea europaea subsp. Cuspidate*), Paddy's lucerne (*Sida rhombifolia*) and galenia (*Galenia pubescens*).

Similarly, a number of introduced fauna species have been recorded at the BCC, including dogs (*Canis lupus familiaris*), foxes (*Vulpes vulpes*), pigs (*Sus scrofa*) and rabbits (*Oryctolagus cuniculus*).

The management of these introduced species is outlined in **Section 5.4** and **5.5** below.

Figure 3.2 – Soils

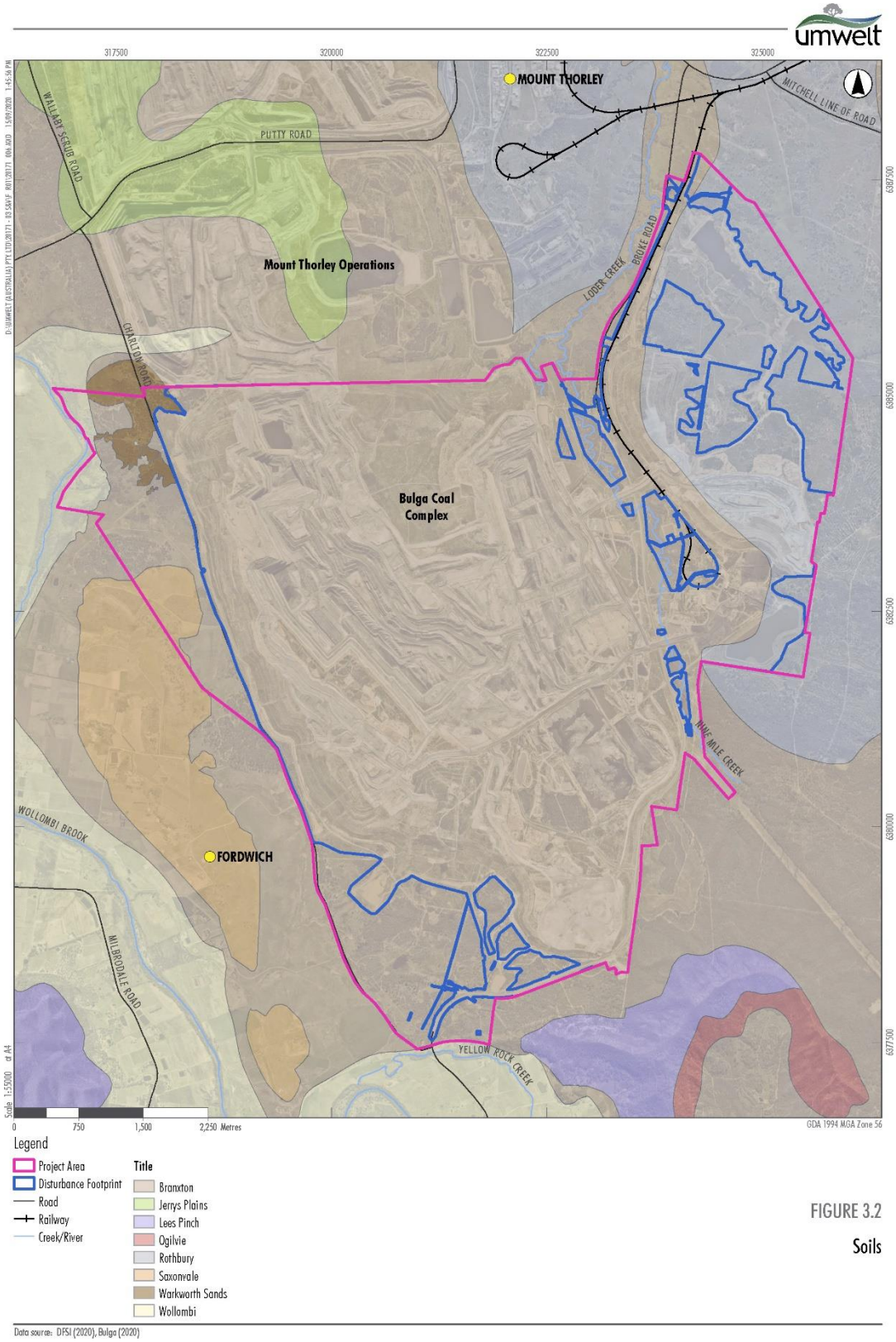


Figure 3.3 – Vegetation Communities

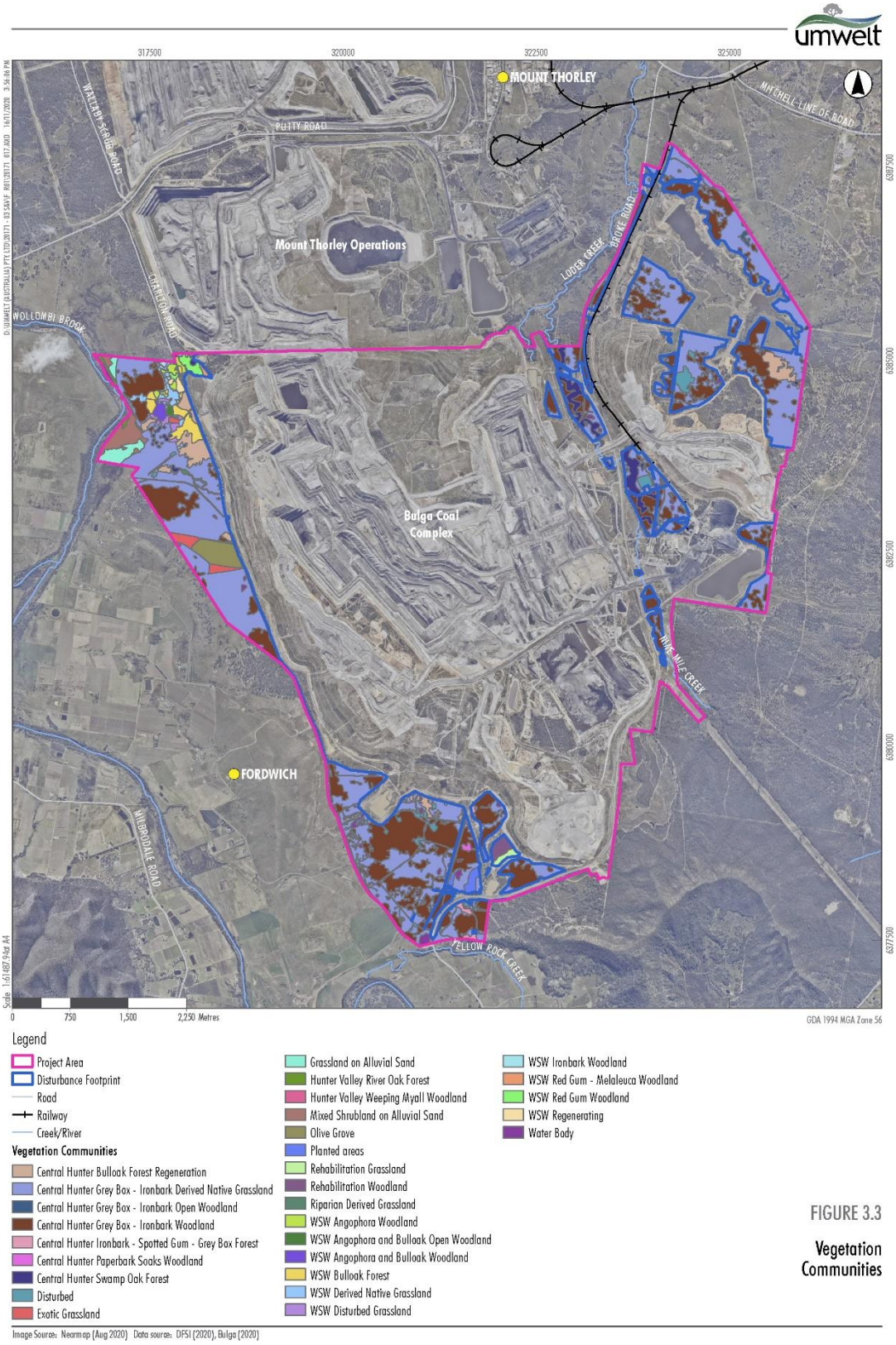
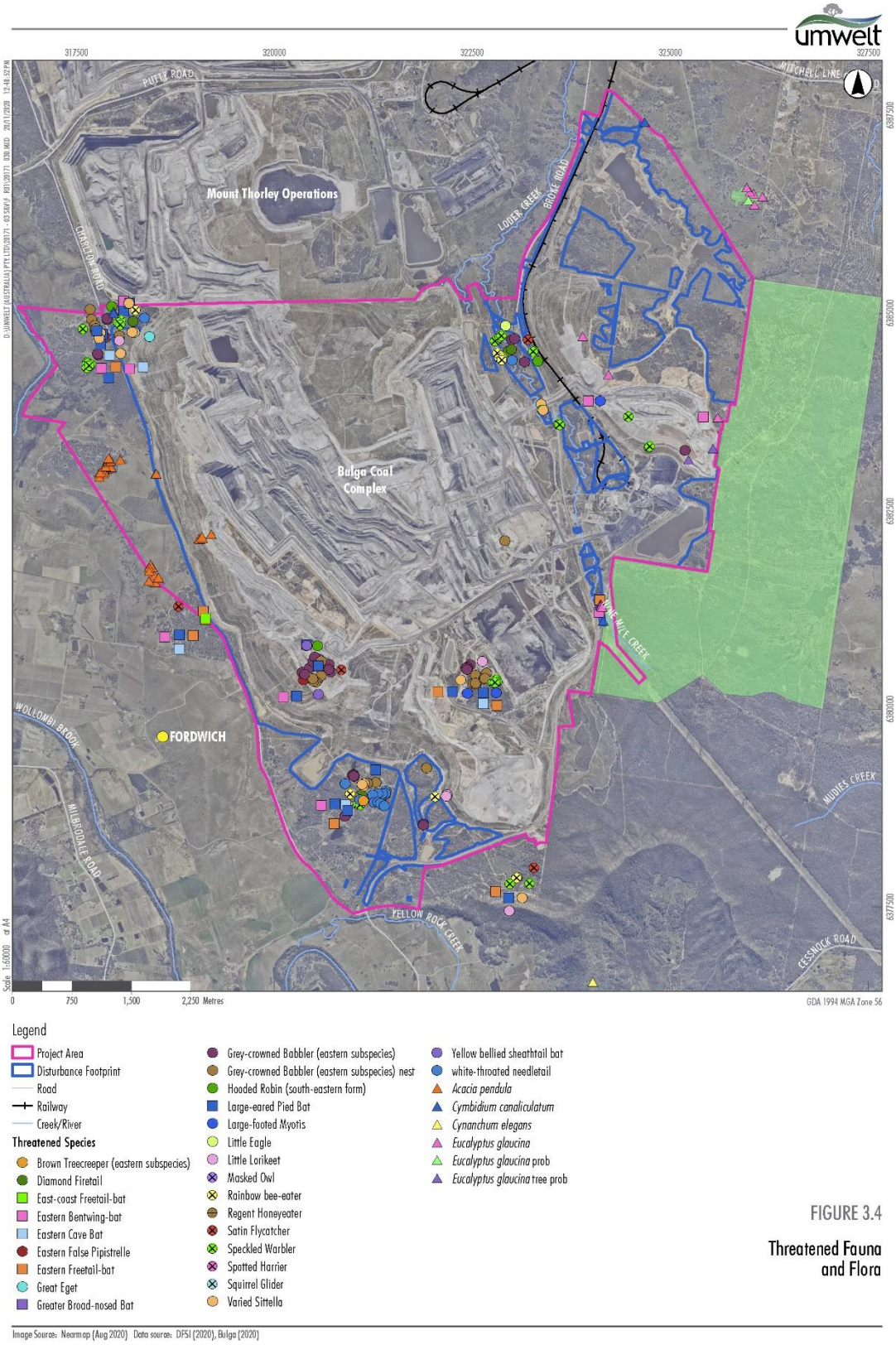


Figure 3.4 – Threatened Fauna and Flora



4. Land Clearing

The BCC approach to land clearing is to minimise impacts to flora and fauna species as much as possible. This includes particular focus on threatened species known or with the potential to occur in the habitats of the BCC.

Any ground disturbance activities (including vegetation removal) undertaken at BCC are required to be completed in accordance with a Glencore Ground Disturbance Permit (GDP). The purpose of the GDP is to identify potential environmental or community hazards associated with the proposed scope of works, and list controls to be implemented to control and minimise the hazards. Flora and fauna considerations within the GDP include:

- presence of threatened species;
- presence of endangered ecological communities;
- restriction on felling of habitat trees; and
- re-use or stockpiling of cleared vegetation.

If hazards are identified that cannot be controlled and/or the impact is not approved, the works are not allowed to proceed. If controls can be implemented to remove or control the hazard, these are listed on the GDP and communicated to personnel involved in the works.

4.1 Clearing Procedure

Clearing of remnant native vegetation will be required for the ongoing operation of the BCC. The controls that are implemented to minimise the potential impact on surrounding flora and fauna include:

- use of the Ground Disturbance Permit for all clearing activities;
- delineation of areas to be cleared in the field;
- installation of erosion and sediment controls;
- pre-clearance surveys prior to clearing any native vegetation (including grasslands);
- tree-felling procedure for remnant native woodland;
- training and communication with personnel undertaking the clearing; and
- regular inspections.

The controls are utilised for all remnant native vegetation (including grasslands). Where disturbance of previous mine rehabilitation is required, pre-clearance surveys and the tree-felling procedure will not be utilised if vegetation is not of sufficient age to provide habitat to native fauna. However, resources such as topsoil and vegetation will be salvaged where appropriate.

4.2 Pre-Clearance Surveys

A detailed pre-clearance survey form (BULOC-1104430715-6038) has been developed to minimise the impact of clearing on native species (both threatened and non-threatened), as well as significant habitat features. The pre-clearance survey aims to identify significant ecological features within areas to be cleared and provide recommendations to minimise the impact of the clearing on them.

Pre-clearance surveys are required to be undertaken before areas of remnant native vegetation (including grasslands, shrublands and open woodlands) are to be cleared. The surveys are to be undertaken by suitably qualified and experienced personnel.

The purpose of the pre-clearance survey is to:

- identify and mark habitat trees;
- identify habitat resources for salvage (hollow-bearing logs etc.);
- identify presence of any threatened fauna;
- identify potential seed collection resources;
- identify any requirements for weed control to be undertaken prior to clearing;
- recommend protocols to manage any known archaeological sites; and
- identify and mark out suitable areas for topsoil and vegetation stockpiles.

Following the completion of the pre-clearance inspection (BUL SD FRM 0369), the tree-felling procedure (**Section 4.2.1**) is to be followed.

4.2.1 Tree-Felling Procedure

The tree felling procedure is designed to minimise potential impacts resulting from clearing on native fauna species, particularly threatened species. The procedure is required when the clearing of remnant native vegetation is required. The procedure is documented in detail in **Appendix A**. A habitat tree-felling form (BULXC-2103827161-7647) has been developed to record the steps taken during the felling of habitat trees.

4.2.2 Resource Salvage

Resources that will be salvaged (where practical) from clearing activities include topsoil, vegetation and hollow-bearing trees/logs and native seed. These resources will be re-used in rehabilitation areas to improve revegetation outcomes and to augment habitat features.

Topsoil will be stripped from cleared areas in accordance with the procedures outlined in the BOC and BUO Mining Operations Plans (MOP's). Vegetation may either be mulched and incorporated into the topsoil or stockpiled separately and spread over rehabilitation areas to provide additional habitat.

Where habitat trees are felled, or significant hollow-bearing logs are identified in pre-clearance surveys, these are stockpiled separately to other vegetation stockpiles. Where appropriate habitat trees may re-erected on rehabilitation areas, or alternatively they will be placed on the ground along with hollow-bearing logs to provide habitat for ground dwelling species.

Seed resources within areas to be cleared are identified during pre-clearance surveys. Where practical, this seed will be collected from trees after they have been felled, but prior to them being stockpiled or mulched. Collected seed will be stored and either propagated to create tubestock for rehabilitation activities or incorporated into the seed mix used on rehabilitation areas (refer to **Section 6**).

5. Land and Biodiversity Management

The following sections describe the management methods that will be implemented to manage the remnant vegetation and habitat on site at BCC. This includes vegetation within operational areas, as well as the buffer lands owned by BCC surrounding its operations. The management of the BOAs is discussed in **Section 7** and **Appendices B-G**. All of these actions, in combination with the biodiversity offset strategy and rehabilitation strategy (i.e. MOP) for the post-mining areas aim to protect and enhance existing habitat on site, and to provide additional habitat as required under the approval conditions.

5.1 Grazing Management

The majority of the land owned by BCC has been destocked to facilitate the regrowth of woodland vegetation and to enhance biodiversity values. However, some buffer land owned by BCC is leased to external parties for cattle agistment.

Where cattle will continue to be grazed on BCC buffer land, formal lease agreements will be maintained with entities undertaking the grazing activities. These agreements will have strict guidelines relating to overgrazing and care will be taken to avoid overstocking which may lead to land degradation and erosion, as well as weed control. Regular inspections will be undertaken on all grazed properties.

Further details regarding the management of cattle on and surrounding the BOAs is provided in **Appendices B-G**. Briefly, the controls to be implemented include:

- cattle will be removed from all BOA areas where regeneration of native ecosystems is the primary objective;
- where practical, cattle will be removed from Glencore owned properties surrounding the BOA's to reduce the potential for cattle to access these areas;
- regular inspections will be undertaken of all fences and gates to reduce the potential for unintended cattle access onto BOAs; and
- where grazing is a secondary objective of the BOA (e.g. Reedy Valley), strict controls will be implemented to limit cattle to a permitted area.

5.2 Erosion and Sediment Control

Erosion and sedimentation issues may arise as the result of ground disturbance, vegetation removal, overstocking of cattle and from mine subsidence impacts. Erosion and sediment impacts will be managed in accordance with the strategies outlined in the BCC Erosion and Sediment Control Plan and the BCC Erosion and Sediment Control Procedure. The main controls outlined in this plan include:

- completion of a Ground Disturbance Permit prior to any land disturbance;
- temporary erosion and sediment controls to be in place prior to any construction activity outside of an existing dirty water management system;
- use of diversion structures to separate 'clean' water runoff from disturbed areas runoff, to minimise volumes of sediment-laden and mine water for management;
- using designated sediment control devices to control sediment-laden runoff;

- revegetation of disturbed areas as soon as possible following the completion of construction activities; and
- timely rehabilitation of subsided ground as required.

There are currently no major erosion issues on BCC buffer lands that require remediation or management. In the event that issues are identified, they will be managed in accordance with the plans described above.

Additionally, regular inspections are undertaken of all non-mining land to identify potential erosion issues, particularly along drainage lines.

Permanent photo monitoring points will be established at each area where there is significant erosion. In such areas, additional monitoring methods will be considered and may include drone surveys, use of LIDAR or other similar methods.

5.3 Salinity Management

The BCC has established both dirty and mine water systems to prevent environmental harm from sediment laden or saline water runoff. All areas that are exposed to runoff from coaly or other saline material are managed as part of the mine water system. This is a closed system which prevents the release of saline water to the surrounding environment unless through a licensed discharge in accordance with the Hunter River Salinity Trading Scheme (HRSTS). Water from this system is not used for any purposes outside of the system (e.g. saline water is not used for dust suppression on roads outside of the mine water system).

There are currently no salinity issues identified on BCC buffer lands.

5.4 Weed Management

As outlined in **Section 3.4.4**, several Weeds of National Significance have been recorded at BCC. These include tiger pear (*Opuntia aurantiaca*), creeping pear (*Opuntia humifusa*), common prickly pear (*Opuntia stricta* var. *stricta*), green cestrum (*Cestrum parqui*), African boxthorn (*Lycium ferocissimum*), African olive (*Olea europaea subsp. cuspidate*) and lantana (*Lantana camara*).

Both BOC and BUO prepare an annual plan which identifies the key weed areas that require treatment, and the recommended timeframes and methods for control, based on the type of weeds present.

These annual plans are monitored via regular inspections of mining and non-mining lands to monitor the effectiveness of control programs and to identify any new infestations. The presence of weeds is also recorded during annual rehabilitation and ecological monitoring programs which are conducted on both mining and non-mining lands. Weed management activities and the effectiveness of those activities to prevent seed set/dispersal or recruitment will be reported on an annual basis in the Annual Review.

5.5 Feral Animals

Section 3.4.4 identifies the feral animals which have been observed at BCC, including wild dogs, foxes, pigs and rabbits. Wild dogs, foxes and pigs are of key concern as they can predate on native fauna, and also out-compete native fauna for resources.

The presence of feral animals is identified through ecological monitoring programs and regular inspections of non-mining land. Opportunistic sightings of feral animals within operational areas are also reported to the Environment and Community Department.

Licensed contractors are engaged to conduct an annual wild dog and fox baiting program in winter. The baiting program is designed to target areas where wild dogs and foxes have been observed. Additional culling and trapping exercises for other pest animals (e.g. pigs, kangaroos etc.) are conducted as recommend by monitoring. Where possible these exercises will be coordinated with adjoining landowners (Mt Thorley Warkworth and the Department of Defence) to maximise the benefits of the programs. Feral animal control is undertaken in accordance with the relevant NSW and Federal legislative requirements with feral animal control designed to have the least impact on native wildlife. The scope and effectiveness of these programs will be reported annually in the Annual Review.

5.6 Habitat Enhancement

The protection and enhancement of the habitat within the non-impacted remnant areas of the BCC will contribute greatly to increasing the quality and quantity of fauna habitat with the site. BCC has subsequently developed a habitat enhancement program to focus on increasing the habitat available for threatened species within non-impacted remnant vegetation. The long-term aim of this program is to restore the level of fauna habitat present prior to mining operations.

This program involves the installation of nest boxes as well as the relocation of hollow bearing logs/trees and other habitat features such as fallen timber and boulders. Due to the ability of nest boxes to provide habitat for specific species, nest boxes are the most favoured approach for habitat enhancement. One nest box will be erected for each hollow bearing tree that is felled as part of the BOP project. However, due to the high rate of clearing in the first years of the project, the installation of nest boxes will be spread out over the life of the operation to ensure there is spread of nest boxes through both remnant vegetation and rehabilitation. To date, BCC has installed 665 nest boxes throughout the target habitat enhancement areas.

Further installation may be required following a review of the nest box program. Nest boxes installed will be targeted towards hollow-dependent (or potentially hollow-using) threatened fauna species, such as the following (which have been recorded in the BCC):

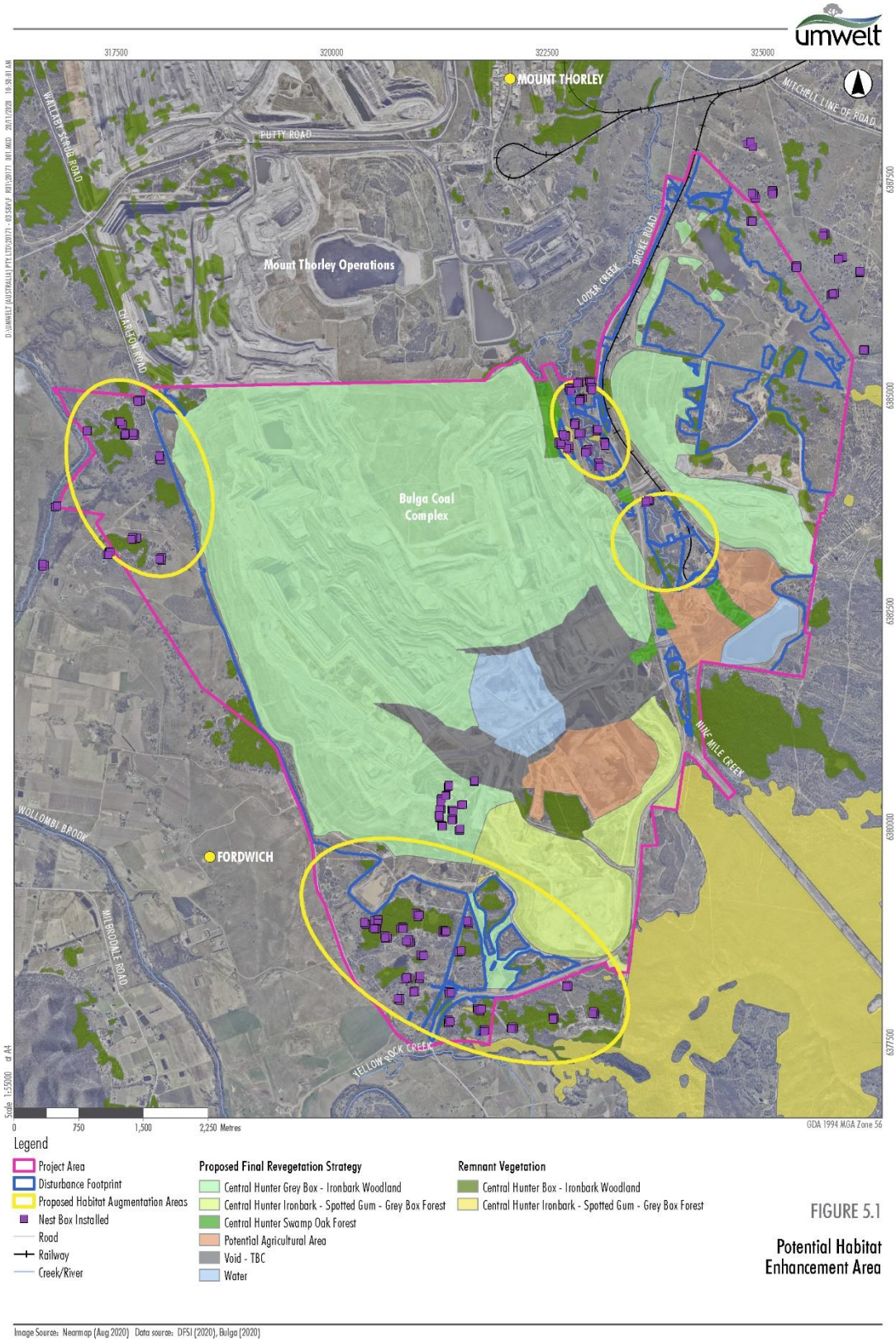
- brown treecreeper (*Climacteris picumnus victoriae*);
- Eastern freetail-bat (*Mormopterus norfolkensis*);
- Eastern bentwing-bat (*Miniopterus schreibersii oceanensis*);
- Eastern false pipistrelle (*Falsistrellus tasmaniensis*);
- greater broad-nosed bat (*Scoteanax rueppellii*);
- large-footed myotis (*Myotis adversus*);
- little lorikeet (*Glossopsitta pusilla*);
- masked owl (*Tyto novaehollandiae*);
- squirrel glider (*Petaurus norfolcensis*);
- yellow-bellied sheathtail-bat (*Saccolaimus flaviventris*).

Appropriately designed and maintained nest boxes will also benefit a number of other non-threatened species.

The areas that will be targeted for habitat enhancement are shown on **Figure 5.1**. This program will complement the habitat enhancement being undertaken on rehabilitation areas (refer to **Section 6**).

Additionally, the 2003 Bulga Underground Continued Operations EIS (Umwelt, 2003) committed to the progressive establishment of habitat corridors throughout the life of the operation. The aim of these corridors was to link the areas of remnant vegetation in the Singleton Military Training Area (SMTA) to riparian vegetation along Wollombi Brook. As a result of the BOP, the majority of the BOC area will be rehabilitated to woodland vegetation (refer to **Section 6**), creating a significantly larger corridor between the SMTA and Wollombi Brook. Additionally, a large portion of this rehabilitation will have commenced within the first four years of the project (i.e. the noise and visual bund). Therefore these habitat corridors will no longer be established as originally designed, but will be integrated into the larger BOC rehabilitation and habitat enhancement programs.

Figure 5.1 – Potential Habitat Enhancement Area



5.7 Bushfire Management

Appropriate bushfire management is required to protect life and property, while providing necessary protection to the ecological features of the area. BCC has developed a Bushfire Management Plan in consultation with the NSW Rural Fire Service (RFS). The RFS also conduct inspections of the BCC when required and provide advice regarding the ongoing bushfire management of the site.

Bushfire management controls undertaken on an annual basis include slashing of boundary fences to provide fire-breaks and access points, maintenance of fire trails and fuel load assessments. These are completed in August-September prior to the start of the bushfire season.

If controlled burning is requested/initiated by the RFS on surrounding land, BCC will assist where possible in maintaining similar fire regimes within the BCC site. However, any controlled burning will take into account the following factors:

- exclusion of bushfire from rehabilitation, revegetation and regeneration areas to allow replanted and regenerating communities to mature to a stage where they are able to withstand bushfire and regenerate naturally following such an event;
- consideration of known records of threatened species, endangered populations and EEC's; and
- asset and livestock protection.

At this stage, BCC does not propose to conduct controlled burns within woodland communities for biodiversity outcomes. The bushfire management of the BOAs is outlined in **Appendices B–G**.

5.8 Fencing/Prevention of Unauthorised Access

The external boundaries of the BCC have been fenced to exclude stock and to protect from unauthorised access and disturbance. Biannual inspections of the BCC will include an inspection of all external fences and gates, and any damaged areas will be repaired as soon as feasible.

Unauthorised access into buffer lands and remnant vegetation has the potential to impact on the biodiversity values of these areas through:

- unauthorised clearing;
- illegal waste dumping;
- weed invasion;
- erosion and sedimentation; and
- native fauna injury.

Areas of remnant vegetation surrounding the mining operations are fenced and all external gates are locked to prevent unauthorised access. Signage has been installed on all access points as needed and is inspected biannually. Regular inspections are undertaken of fence lines and gates to identify any unauthorised access and repairs are undertaken as needed.

5.9 Conflict between Biodiversity Areas and Areas of Significant Aboriginal Heritage Values

The BOAs detailed in this document contain, or have the potential to contain, areas of significant Aboriginal heritage. In particular, the Wollombi Brook Conservation Area was initially established as an offset for Aboriginal heritage purposes. The objectives of biodiversity conservation and cultural heritage protection may present conflicts where ground disturbance works are required for active regeneration works, or access is required into culturally sensitive areas. The strategies that will be implemented to manage these conflicts for each individual BOA are outlined in **Appendices B-G**.

Conflicts may also be presented in remnant vegetation areas where maintenance or enhancement works are proposed within Aboriginal heritage areas. For these areas, potential conflicts will be managed through the Ground Disturbance Permit process which will identify Aboriginal heritage sites/areas within proposed work areas. Where Aboriginal heritage sites occur, the first preference will be to relocate the proposed maintenance or enhancement works. Where this cannot be achieved, impacts on the heritage sites will be managed in accordance with the BCC Aboriginal Cultural Heritage Management Plan (ACHMP).

6. Rehabilitation

Rehabilitation of disturbed land is described in detail in the BOC Rehabilitation Management Plan / Mining Operations Plan and BUO Mining Operations Plan which have been developed in consultation with DPIE and DRE. This document outlines the detailed objectives for each mine closure domain, mine rehabilitation methodology and detailed monitoring program. This information has been summarised in the sections below, with further information relating to interactions with this document provided (e.g. re-use of natural resources on rehabilitation areas).

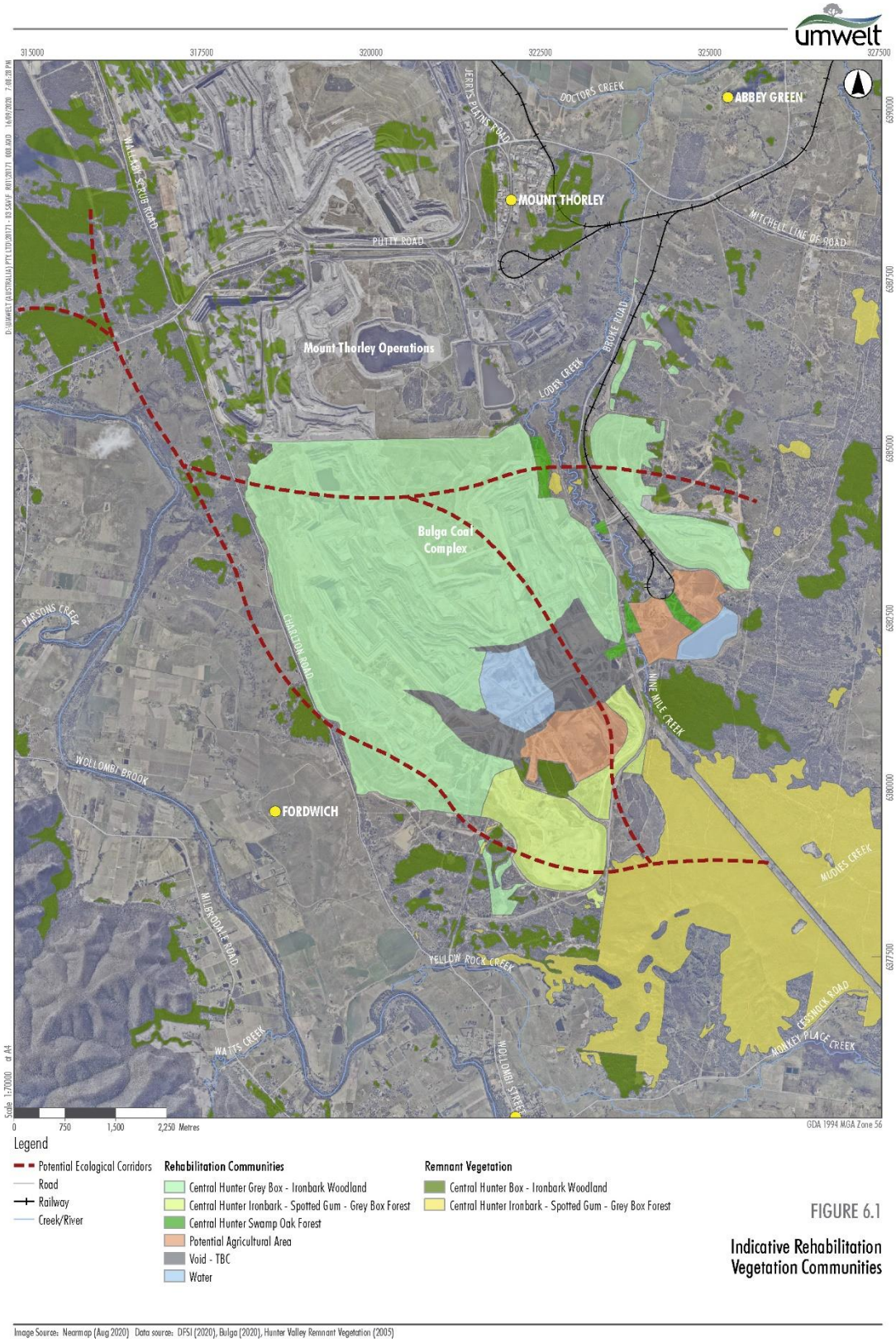
6.1 Rehabilitation Objectives and Criteria

The rehabilitation objectives for the BCC include the following:

- provide for the safety of employees and the public during and following the closure of the mining operations;
- meet the requirements of the Biodiversity Offset Strategy (**Section 7**), through the establishment of at least 2,200 ha of Central Hunter Grey Box–Ironbark Woodland, 250 ha of Central Hunter Ironbark-Spotted Gum-Grey Box Forest and 50 ha of Central Hunter Swamp Oak Forest;
- provide a sustainable final landform and use that can co-exist with the surrounding land uses;
- develop native vegetation corridors linking surrounding remnant vegetation areas to the south and east of the site and to the north through the proposed native rehabilitation areas of Mt Thorley and Warkworth mines (refer to **Figure 6.1**); and
- not to preclude other potential post mining land use options should they be determined to be viable and preferable as part of the detailed mine closure planning process.

The completion criteria are objective target levels or values that can be measured to quantitatively demonstrate the progress and ultimate success of a biophysical process. These criteria (refer to the MOPs) have been developed for each phase of the rehabilitation so that the rehabilitation success can be tracked throughout the life of the mine.

Figure 6.1 – Indicative Rehabilitation Vegetation Communities



The criteria themselves have been developed using analogue sites from surrounding remnant vegetation which form part of the rehabilitation monitoring program. An assessment of each rehabilitation area against the criteria is made on an annual basis as part of the monitoring program. This assessment is reported annually in the BCC Annual Review.

6.2 Rehabilitation Methodology

The rehabilitation methodology for both BOC and BUO are outlined in detail in the respective MOPs. Generally, rehabilitation involves the following processes:

- shaping of disturbed areas to meet approved landform;
- backfilling and repair to subsidence cracking:
- installation of drainage structures;
- deep ripping;
- rock raking;
- installation of habitat features (e.g. stag trees, woody debris);
- spreading of topsoil and/or organic matter;
- application of ameliorants;
- re-ripping of prepared surface; and
- revegetation.

As outlined in **Section 4.2**, topsoil and vegetation that has been cleared ahead of mining activities will be re-spread over rehabilitation areas to provide a more beneficial growth medium for revegetation, as well as habitat for native fauna. Habitat trees and hollow-bearing logs will also be salvaged and re-used on rehabilitation areas for habitat augmentation.

Revegetation activities will generally involve direct seeding of native woodland ecosystems using a combination of seed collected from on site, as well as that purchased from external sources. Tubestock may also be utilised in some circumstances to augment the revegetation process. The native vegetation communities that will be re-established (and the total area of each over the life of the BCC) include:

- Central Hunter Grey Box – Ironbark Woodland (minimum of 2,200 hectares);
- Central Hunter Ironbark – Spotted Gum – Grey Box Forest (minimum of 250 hectares); and
- Central Hunter Swamp Oak Forest (minimum of 50 hectares).

The arrangement of these communities within rehabilitation areas will aim to replicate the surrounding remnant vegetation. For example, Central Hunter Swamp Oak Forest will be targeted along the rehabilitated drainage lines and the Central Hunter Ironbark – Spotted Gum – Grey Box Forest will be targeted located along the southern and eastern perimeters of the site where that community is more prevalent. The indicative locations of these communities in the rehabilitated landscape are shown on **Figure 6.1**.

Relevant findings from the completed Hunter Ironbark Research Program have been incorporated into BCC processes, particularly the rehabilitation methodology. These will be reported in the Annual Review, or subsequent revisions to this BMP or the MOPs.

6.3 Active Regeneration in BOAs

The Biodiversity Offset Strategy outlined in **Section 7** requires the regeneration of derived native grasslands in most BOAs. In all cases, it is proposed to use regular monitoring to evaluate the effectiveness and appropriateness of natural regeneration processes rather than assisted regeneration. This method is preferred as active regeneration has the potential to introduce weed species through ground disturbance, and cause erosion. Further information regarding the proposed regeneration programs for each BOA is provided in **Appendices B-G** and the results of the monitoring programs will be reported in the Annual Review.

6.4 Riparian Vegetation

Underground mining by BUO is predicted to cause areas of minor erosion and ponding along the Northern and Southern Drainage Lines, and other minor unnamed drainages. Minor subsidence cracking is also predicted to occur within the drainage lines.

Minor repair works have been undertaken within the Northern and Southern drainage lines to allow ephemeral surface flows and prevent the inflow of surface water into the underground workings. The majority of the Southern Drainage line potentially impacted by subsidence is now incorporated into the Noise and Visual Bund and will be rehabilitated as per **Figure 6.1.** After BSLW1 subsidence repairs were and rehabilitation was undertaken to maintain surface flow. In relation to the Northern Drainage line, the portion east of Charlton Road will be incorporated into the Noise and Visual Bund. The remedial works presented in the Figure 7.2 of the Bulga Underground EIS, included building a diversion channel to be maintained until Year 25. However experience to date has indicated that this would create more disturbance than caused by subsidence and therefore it has been agreed not to be constructed.

For all drainage lines (including sections of the Northern and Southern lines not impacted by the bund) where shallow ponding may occur post subsidence and after heavy rainfall, assessments will be undertaken to determine if remedial works and/or enhancement of these areas with native vegetation are required to maintain surface flow, prevent flooding, maintain existing vegetation types and maintain a landform consistent with the surrounding environment. Where remediation has the potential to create more disturbance than the ponding, these aquatic habitats will continue to be monitored for change. If significant changes to vegetation is caused by changed surface hydrology then additional offsets will be required.

Aquatic habitat will also be created and enhanced through the planting of endemic riparian, aquatic and semi-aquatic vegetation. Additional habitat enhancement such as hollow bearing logs will be incorporated into the design of the rehabilitation. Monitoring will be ongoing in areas of ponding to assess seasonal changes and whether aquatic enhancement will be beneficial.

7. Biodiversity Offset Strategy

7.1 Overview

A detailed Biodiversity Offset Strategy was developed as part of the BOP EIS (Umwelt 2013) and subsequent approvals to compensate for impacts on the species, vegetation communities and ecological features that will be impacted by the ongoing operations at BCC. The objectives of the biodiversity offset strategy are to:

- provide offsets that contain as many as possible of the threatened vegetation communities, endangered flora populations, threatened flora species and threatened fauna species impacted by the BCC, particularly;
  - regent honeyeater
  - swift parrot;
  - large-eared pied bat; and
  - slaty red gum
- provide offsets that are strategically located, either close to the area of impact or in a regionally significant position;
- provide offsets in which an environmental gain can be made via appropriate management strategies;
- secure offsets in perpetuity;
- to develop a management strategy for the positive environmental management of the proposed offset sites, but with appropriate consideration of the existing rural nature of the area;
- as a minimum provide offsets that have the same ecological value as the residual impacts of the ongoing operations on threatened vegetation communities, endangered flora populations, threatened flora species and threatened fauna species; and
- where possible provide offsets that exceed the ecological value of the residual impacts of the BCC on threatened vegetation communities, endangered flora populations, threatened flora species and threatened fauna species.

The biodiversity offset strategy required as part of the current approvals comprises the following offsets:

- Reedy Valley Offset Area – 1486 hectares;
- Broke Road Offset Area – 241 hectares;
- Wollombi Brook Conservation Area – 65 hectares;
- Condran Biodiversity Offset Area – 50 hectares;
- The Vere Offset Area – 153.7 hectares: and
- Rehabilitation Areas – 2,500 hectares (refer to **Section 6**).

Conservation Agreements (under the *National Parks and Wildlife Act (1974*)) have been finalised to secure Reedy Valley, Broke Road, Wollombi Brook and Condran BOAs in perpetuity. These were

finalised in 2019, thus making that year 1 of their operation. A Stewardship Agreement (under the BC Act) is currently being prepared for The Vere BOA.

The Weeping Myall Management Areas do not form part of the biodiversity offset strategy, however have been established to conserve and manage two stands of weeping myall (*Acacia pendula*) located on the western side of the BCC.

In addition to the offsets required by the BOC development consent (SSD-4960), Condition 43A of the BUO development consent (DA 376-8-2003 Mod 5) requires the establishment of offset areas for 5.34 hectares of Central Hunter Grey Box – Ironbark Woodland and 23.71 hectares of Central Hunter Grey Box – Ironbark Derived Native Grassland. These offsets have been incorporated into the Broke Road Offset area, as discussed in **Section 7.3**.

The locations of these offset areas are shown on **Figure 7.1** and discussed in further detail in the sections below.

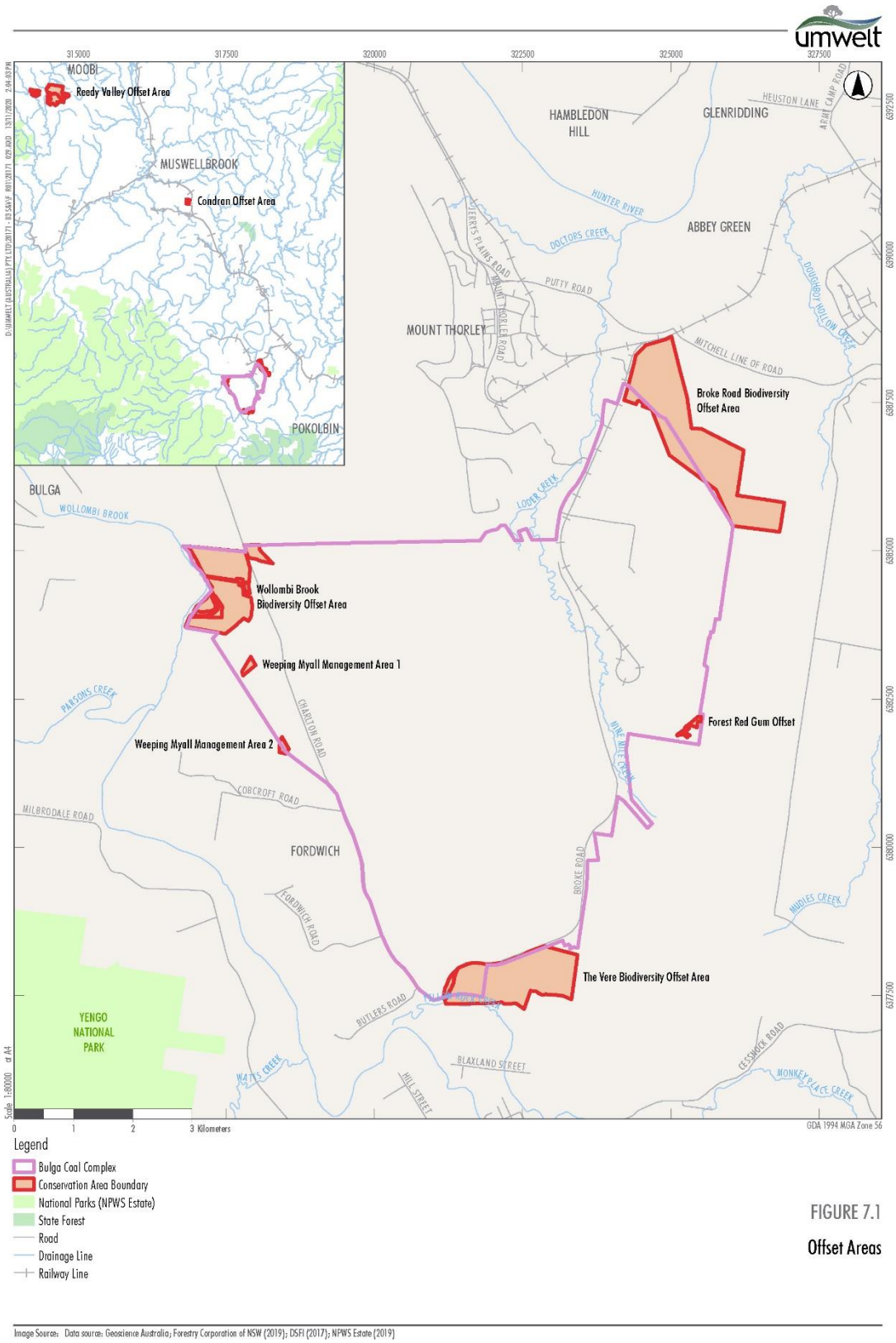
7.1.1 Risks to the Biodiversity Offset Strategy

A list of the risks and issues that may impact on the ability of BCC to successfully implement the Biodiversity Offset Strategy includes:

- Failure to meet government and community guidelines and expectations;
- Failure to meet performance criteria for BOAs;
- Insufficient resourcing to implement the biodiversity offset strategy;
- Unauthorised clearing within BOAs;
- Lack of availability of locally occurring species to be either seeded or planted in rehabilitation or regeneration areas;
- Loss of biological resources (topsoil, hollows, seed) for use in rehabilitation;
- Poor spoils/substrate material inhibiting plant establishment and growth;
- Inadequate landform design leading to unstable landform;
- Weed infestation within BOAs and rehabilitation areas;
- Feral animal species within BOAs and rehabilitation areas;
- Grazing of cattle within prohibited areas;
- Erosion and sedimentation of BOAs; and
- Unauthorised access into BOAs and rehabilitation areas.

The mitigation measures that will be implemented to address these risks are outlined in the sections below and the individual management strategies for each BOA (**Appendices B-G**).

Figure 7.1 – Offset Areas



7.2 Condran BOA

During November 2009, BOC received a modification to DA 41-03-99 which permitted the construction of a 3GL water storage dam adjacent to the BCC CHPP. Construction of the dam involved the clearing of approximately 20 hectares of Central Hunter Grey Box – Ironbark Woodland community and one hectare of Forest Red Gum Woodland. Subsequently, the modified development consent required the establishment of at least 20 hectares of 'Hunter Box – Ironbark Woodland.

Following discussions with OEH the Condran Property at Antiene, just north of Lake Liddell and 10 kilometres south-east of Muswellbrook (refer to **Figure 7.1**), was purchased to offset the 20ha of Central Hunter Grey Box – Ironbark Woodland. The Condran BOA consists of the following vegetation communities outlined in **Table 7.1**.

Table 7.1 – Condran BOA Vegetation Communities

Vegetation Community	Legal Status	Area (ha)
Central Hunter Ironbark – Spotted Gum – Grey Box Forest	EEC (BC) CEEC (EPBC)	19.5
Central Hunter Ironbark – Spotted Gum – Grey Box Forest (Red Gum variant)	EEC (BC)	5.5
River-flat Eucalypt Forest	EEC (BC)	4.5
Derived Native Grassland	-	20.5
TOTAL		**50**

One threatened flora species, the pine donkey orchid (*Diuris tricolor*) has been recorded in the BOA. This species is listed as vulnerable under the BC Act, and forms part of the Muswellbrook LGA endangered population of the species. Ten threatened fauna species have also been recorded and comprise five micro-bats and five bird species.

The long-term targets for the Condran BOA include the restoration of at least 6.9 hectares of Central Hunter Ironbark – Spotted Gum - Grey Box Forest.

The Condran Biodiversity Offset Management Plan (**Appendix B**) has been developed to document the management strategies, monitoring programs and initial performance criteria for the BOA. The results of the monitoring program, as well as a detailed description of works undertaken for this BOA will be reported annually in the BCC Annual Review. As the first three years of management and monitoring has now been completed, the management plan has been updated to include new management strategies and criteria for the next three-year period and submitted for approval by the relevant agencies.

7.3 Broke Road BOA

The Broke Road BOA is located at the northern end of Broke Road and adjoins the northern and north-eastern boundary of the BOP Project Area (refer to **Figure 7.1**). The Broke Road BOA is approximately 251 hectares in area and is dominated by derived native grasslands with smaller areas of woodland and open woodland. Of the total 251 hectares, 241 hectares is required under the BOP and 10 hectares is designated as an offset to satisfy the approval conditions for the Blakefield North Project.

The Broke Road BOA includes the following key ecological elements:

- threatened ecological community (TEC);
- habitat for threatened flora species; and
- habitat for threatened fauna species.

A summary of the vegetation communities that have been recorded on the Broke Road BOA are outlined in **Table 7.2** below.

Table 7.2 – Broke Road BOA Vegetation Communities

Vegetation Community	Legal Status		Broke Road Offset Property (ha)[1]
	BC	EPBC	
Central Hunter Grey Box - Ironbark Woodland	EEC	CEEC	24
Central Hunter Grey Box - Ironbark Open Woodland	EEC	-	22
Central Hunter Grey Box - Ironbark Derived Native Grassland	-	-	196
Central Hunter Swamp Oak Forest	-	-	2
Disturbed Land	-	-	3.6
Water bodies	-	-	3.4
Total			**251**

Two threatened flora species, slaty red gum (*Eucalyptus glaucina*) and *Cymbidium canaliculatum* have been recorded in the Broke Road BOA, as have nine threatened fauna species comprising four micro-bats, three birds, one mammal and one flying-fox species. A record of the threatened blue-billed duck (*Oxyura australis*) was recorded in 2020 from a dam close to this BOA. Additional effort to survey for this species has been added to the monitoring program for this BOA.

The long-term targets for the Broke Road BOA are to enhance the biodiversity values of the existing vegetation, to restore at least 189 hectares of Central Hunter Grey Box – Ironbark Woodland and to improve the habitat quality for the key EPBC listed species listed previously. These longer-term objectives will be achieved through the establishment of shorter-term objectives and targets which have been outlined in the Broke Road Biodiversity Offset Management Plan (**Appendix C**). This document outlines the management strategies, monitoring programs and initial performance criteria for the BOA for the next three years.

The results of the monitoring program, as well as a detailed description of works undertaken at the Broke Road BOA will be reported annually in the BCC Annual Review. As the first three years of management and monitoring has now been completed, the management plan has been updated to include new management strategies and criteria for the next three year period, and submitted for approval by the relevant agencies.

7.4 Reedy Valley BOA

The Reedy Valley BOA is located on the 2,569 hectare Reedy Valley property located in the Manobalai locality of the Hunter Valley (refer to **Figure 7.1**). The Reedy Valley BOA comprises 1,486 hectares of the Reedy Valley property, with the remaining 1083 hectares retained and managed for agricultural purposes and not subject to this plan. This BOA is required under the BOP approval.

The Reedy Valley BOA provides the following key ecological elements:

- threatened ecological community (TEC) and endangered flora population habitat areas;
- habitat for threatened fauna species;
- is located in the Great Eastern Ranges Initiative; and
- is positioned strategically within the landscape.

A summary of the vegetation communities that have been recorded in the Reedy Valley BOA are outlined in **Table 7.3** below.

Table 7.3 – Reedy Valley BOA Vegetation Communities

PCT code	Plant community type (PCT)	BC Act	EPBC Act	Area (ha)
116	Weeping Myall - Coobah - Scrub Wilga shrubland of the Hunter Valley	EEC		<0.1
1598	Forest Red Gum grassy open forest on floodplains of the lower Hunter			19.5
1612	Narrow-leaved Ironbark - Grey Gum - Native Olive woodland of Central Hunter			456.9
1691	Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter	EEC	CEEC	125.0
201	Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion			0.8
480	Black Cypress Pine - ironbark +/- Narrow-leaved Wattle low open forest mainly on Narrabeen Sandstone in the Upper Hunter region of the Sydney Basin Bioregion			359.9
485	River Oak riparian grassy tall woodland of the western Hunter Valley (Brigalow Belt South Bioregion and Sydney Basin Bioregion)			7.6
618	White Box x Grey Box - red gum - Rough-barked Apple grassy woodland on rich soils on hills in the upper Hunter Valley	CEEC	CEEC	492
624	Large-fruited Grey Gum - Narrow-leaved Stringybark open forest on sheltered sandstone hillslopes in the Scone region of the upper Hunter Valley			18.9
TOTAL				**1480.6**

No threatened flora species have been recorded in the Reedy Valley BOA to date. A total of 15 threatened fauna species have been identified in the BOA and these comprise five micro-bats, eight birds, one flying-fox and one mammal.

The long term targets for the Reedy Valley BOA include the restoration of at least 42 ha of White Box – Yellow Box – Blakely's Red Gum Woodland and Derived Native Grassland CEEC and 44 ha of Central Hunter Grey Box – Ironbark Woodland, as well as improving the habitat quality for the EPBC listed species. These longer-term objectives will be achieved through the establishment of shorter-term objectives and targets which have been outlined in the Reedy Valley Biodiversity Offset Management

Plan (**Appendix D**). This document outlines the management strategies, monitoring programs and initial performance criteria for the BOA for the next three years.

The results of the monitoring program, as well as a detailed description of works undertaken at the Reedy Valley BOA will be reported annually in the BCC Annual Review. As the first three years of management and monitoring has now been completed, the management plan has been updated to include new management strategies and criteria for the next three year period, and submitted for approval by the relevant agencies.

7.5 Wollombi Brook Biodiversity Offset Area

The Wollombi Brook BOA Area relates to 114 hectares of offset lands required under the BOP, located in the north western corner of the BOC, as shown on **Figure 7.1**. The BOA includes areas conserved for biodiversity purposes, for cultural heritage purposes and areas designated for the conservation of both. Despite these technical distinctions, the entire BOA is being managed to ensure both values are maintained and enhanced, where appropriate. The Wollombi Brook BOA provides the following key ecological values:

- Central Hunter Grey Box - Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions (EEC – BC Act)
- Central Hunter Valley Eucalypt Forest and Woodland (Critically Endangered Ecological Community (CEEC) – EPBC Act)
- Warkworth Sands Woodland in the Sydney Basin Bioregion (EEC – BC Act)
- habitat for threatened fauna species.

A summary of the vegetation communities, EEC/CEECs and threatened species recorded in the BOA is provided in the sections below.

Table 7.4 – Wollombi Brook BOA Vegetation Communities

PCT code	Plant community type (PCT)	Condition	Area (ha)
1658	Rough-barked Apple - Narrow-leaved Ironbark - Blakely's Red Gum - Bull Oak - Coast Banksia woodland on sands of the Warkworth area	Intact	21.94
		DNG	3.52
1660	Narrow-leaved Ironbark Heathy Woodland on sandstone ranges of the Sydney Basin Bioregion	Intact	0.12
		DNG	7.52
1692	Bull Oak grassy woodland of the central Hunter Valley	Intact	2.42
1691	Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter	Intact	18.58
		DNG	33.36
1731	Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley	Intact	2.67
485	River Oak riparian grassy tall woodland of the western Hunter Valley (Brigalow Belt South Bioregion and Sydney Basin Bioregion)	Intact	1.57
No comparable PCT	Exotic Grassland	-	0.7

PCT code	Plant community type (PCT)	Condition	Area (ha)
No comparable PCT	Grassland on Alluvial Sand	-	10.63
No comparable PCT	Mixed Shrubland on Alluvial Sand	-	11.05
No comparable PCT	Water Body	-	0.13
TOTAL			114.21

No threatened flora species or endangered populations have been recorded in the Wollombi Brook BOA to date. A total of 13 threatened fauna species have been identified in the BOA and these comprise eight birds, four micro-bats and one mammal.

The long term targets for the BOA are to restore at least 10 hectares of the Warkworth Sands Woodland EEC and 16 hectares of the Central Hunter Grey Box – Ironbark Woodland from DNG and to improve the habitat quality for the EPBC listed species previously described. These longer-term objectives will be achieved through the establishment of shorter-term objectives and targets which have been outlined in the Wollombi Brook Biodiversity Offset Management Plan (**Appendix E**). This document outlines the management strategies, monitoring programs and initial performance criteria for the BOA for the next three years.

The results of the monitoring program, as well as a detailed description of works undertaken at the BOA will be reported annually in the BCC Annual Review. As the first three years of management and monitoring has now been completed, the management plan has been updated to include new management strategies and criteria for the next three year period, and submitted for approval by the relevant agencies.

7.6 Weeping Myall Management Area

The Weeping Myall Management Area consists of two stands of weeping myall (*Acacia pendula*) which are located on the western side of the BCC, west of Charlton Road (refer to **Figure 7.1**). The Weeping Myall Management Areas, which occur outside of the disturbance footprint for the BOP, will be protected and managed by BCC however do not form part of a formal biodiversity offset. Management Area 1 contains relatively young trees while Management Area 2 contains very mature weeping myall trees.

A number of management measures will be implemented to preserve these stands, including stock exclusion, fencing and signage, weed management and insect and pest management. Further details are provided in the Weeping Myall Management Plan included as **Appendix F.**

7.7 The Vere Biodiversity Offset Area

The Vere BOA relates to 153.7 hectares of offset lands located to the east of the intersection between Broke and Charlton Roads in Bulga, NSW (**Figure 7.1**).

A large proportion of the Vere BOA currently comprises native vegetation and derived native grasslands (DNG) of moderate to good condition, therefore the BOMP focusses on regeneration and revegetation strategies to enhance existing communities and establish further native vegetation in degraded areas. These works will focus specifically on the critically endangered ecological community (CEEC) Central Hunter Valley Eucalypt Forest and Woodland CEEC.

The Vere BOA provides the following key ecological values:

- threatened ecological communities (TECs) and endangered flora population habitat areas;
- habitat for threatened flora species;
- habitat for threatened fauna species; and
- strategic location near to Yengo National Park and Pokolbin State Forest.

Seven vegetation communities (PCTs) have been mapped within the Vere BOA, with a number of condition classes mapped within the dominant spotted gum – ironbark community. The mapping of this BOA identified 81.1 hectares of existing Central Hunter Valley Eucalypt Forest and Woodland CEEC as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Table 7.5 – Vegetation Communities Identified Within the Vere BOA

Plant Community Type **Condition Class**	**Area (ha)**
HU815/PCT1601 Spotted Gum - Narrow-leaved Ironbark – Red Ironbark shrub - grass open forest of the central and lower Hunter *Moderate to Good*	91.6
HU815/PCT1601 Spotted Gum - Narrow-leaved Ironbark – Red Ironbark shrub - grass open forest of the central and lower Hunter *Moderate to Good Shrubland*	6.3
HU815/PCT1601 Spotted Gum - Narrow-leaved Ironbark – Red Ironbark shrub - grass open forest of the central and lower Hunter *Moderate to Good Derived Native Grassland*	28.2
HU815/PCT1601 Spotted Gum - Narrow-leaved Ironbark – Red Ironbark shrub - grass open forest of the central and lower Hunter *Moderate to Good - Previous Ground Disturbance*	8.4
HU906/PCT1692 Bull Oak grassy woodland of the central Hunter Valley *Moderate to Good*	7.0
HU812/PCT1598 Forest Red Gum grassy open forest on floodplains of the lower Hunter *Moderate to Good*	0.8
HU564/PCT922 Melaleuca decora Low Forest of the Central Hunter Valley, Sydney Basin Bioregion *Moderate to Good*	1.5
HU945/PCT1731 Swamp Oak – Weeping Grass grassy riparian forest of the Hunter Valley *Moderate to Good*	1.3
HU815/PCT1601 Spotted Gum - Narrow-leaved Ironbark – Red Ironbark shrub - grass open forest of the central and lower Hunter *Low Condition Exotic Grassland*	0.2

Plant Community Type Condition Class	Area (ha)
Cleared Land (including water bodies)	8.4
Total	**153.7**

Eight threatened fauna have been recorded in the Vere BOA (as per the Bionet Atlas) however no threatened flora or endangered populations have been recorded in this BOA to date. Threatened fauna species recorded comprise four bird and four micro-bat species.

The long-term targets for the BOA are to restore at least 81.1 hectares of existing Central Hunter Valley Forest and Woodland and restoration of at least 33.8 hectares of additional Central Hunter Valley Forest and Woodland. These longer-term objectives will be achieved through the establishment of shorter-term objectives and targets which have been outlined in the Vere Biodiversity Offset Management Plan (**Appendix G**). This document outlines the management strategies, monitoring programs and initial performance criteria for the BOA for the next three years.

The results of the monitoring program, as well as a detailed description of works undertaken at the BOA will be reported annually in the BCC Annual Review. A management plan for this BOA has been prepared to include management strategies and criteria for the first three year period, and submitted for approval by the relevant agencies.

7.8 BOA Performance Indicators and Completion Criteria

A set of performance indicators and completion criteria have been established for each BOA (see **Appendices B-G**). The performance indicators have been derived to demonstrate progress towards achieving the biodiversity management objectives and the future improvement of habitat quality scores used in the EPBC Act Offset Assessment Calculator for each applicable MNES impacted by the Project (refer to BOMP Appendices). Monitoring results identifying whether the performance criteria are being met and whether the BOAs are tracking towards the anticipated improvement in habitat quality scores will be reported annually in the Annual Review.

Preliminary completion criteria have also been developed to provide a target for the biodiversity management works in each BOA. These long-term completion criteria will be refined as further data is collected from the analogue monitoring sites within the BOA, similar to the ongoing refinement of the rehabilitation criteria described in **Section 6.5**.

8. Monitoring

BCC has developed a detailed ecological monitoring program which covers remnant vegetation areas and buffer zones of the BCC, biodiversity offset sites and mine rehabilitation areas. The scope and objectives of these monitoring programs are outlined in the sections below. Further detail on these monitoring programs can be found in the relevant BOMPs (**Appendices B-G**) and in the MOP for each operation.

8.1 Ecological Monitoring

The condition of the remnant vegetation surrounding the BCC will be monitored to identify potential deterioration in vegetation health or habitat quality as a result of mining operations. This monitoring will be undertaken annually, however if the results show negligible change over a reasonable

timeframe, the frequency of monitoring may be reduced (through consultation and modification to this BMP). Refer to **Figure 8.1**.

Figure 8.1 – Ecological Monitoring

The BCC ecological monitoring comprises the following methods:

- Flora monitoring – in 2018 this monitoring was upgraded to use the BAM (OEH 2018). Seven sites are monitored within the buffer lands surrounding the operations. This allows collection of consistent and comparable data and facilitates comparison of site data to the benchmark values defined in the BioNet Vegetation Information System (VIS)
- Fauna monitoring – this monitoring has primarily focussed on bird and bats as indicators of habitat condition. To broaden the amount and type of information collected, habitat assessments and remote cameras have been used as well. A mixture of these methods are employed across 13 sites and across various seasons
- Photo monitoring – this is included in the BAM and occurs at each end of the 50m transect. Photo monitoring at consistent points allows visual comparison of site features and condition over time.

Should any of the sites monitoring programs identify observable changes in the presence or habitat of other species (e.g. mammals, herpetofauna), or additional threatened species are identified, the monitoring program will be expanded to include these species.

In addition, nest box monitoring is completed on an annual basis where these have been installed in the BCC. The objective of the nest box monitoring program will be to identify usage and provide recommendations to improve future installations.

Results and recommendations from the ecological monitoring program will be reported annually in the Annual Review which is placed on the BCM website on 1 April each year.

8.2 Rehabilitation Monitoring

BCC has developed an annual rehabilitation monitoring program to confirm the rehabilitation objectives and performance and closure criteria are being met and also to identify opportunities for improvement. The monitoring programs have been designed to effectively monitor onsite revegetation, surrounding vegetation, species diversity and native fauna habitats. Targeted fauna monitoring of rehabilitated areas will be initiated when rehabilitated vegetation is deemed mature enough to provide sufficient habitat. The monitoring program consists of the following surveys:

- Annual Rehabilitation Walkover inspection; and
- Rehabilitation Monitoring Program.

8.2.1 Annual Rehabilitation Walkover Inspection

The annual walkover inspection covers all rehabilitation areas on site and provides a general assessment on rehabilitation health and potential emerging issues that require maintenance (e.g. weeds, erosion, poor growth rates). The walkover inspection does not review rehabilitation areas against the closure criteria, but provides management recommendations to assist the rehabilitation in moving towards the criteria.

8.2.2 Rehabilitation Monitoring Program

The BCC has recently adopted a new Glencore-wide rehabilitation monitoring program, which aims to develop actionable information regarding rehabilitation status to inform maintenance requirements and to build a demonstratable case for target post-mining land use and eventual relinquishment.

Rehabilitation monitoring will be completed as per the following categories:

- Initial Establishment Monitoring (IEM) - a rapid style assessment of young (≤3 years old) rehabilitated areas, to determine germination success and landform stability. At BCC, IEM will be undertaken for:
    - Targeted Native Vegetation Rehabilitation
- Long Term Monitoring (LTM) - undertaken on older rehabilitation areas (≥4 years old) and reference sites to evaluate progress of rehabilitation towards fulfilling agreed completion criteria, additional statutory requirements that may apply and ultimately the targeted post mining land use. LTM will be undertaken for:
    - Targeted Native Vegetation Rehabilitation
    - Non-Specific Native Vegetation Rehabilitation.

Permanent transects and photo-points are established to record changes in these attributes over time. This approach allows comparison of rehabilitation areas to suitable reference sites using quantifiable indicators and ecological targets (criteria).

Targeted fauna monitoring of rehabilitated areas will be initiated when rehabilitated vegetation is deemed mature enough to provide sufficient habitat.

An assessment of rehabilitation sites against the completion criteria will be reported annually in the Annual Review, in accordance with the MOP guidelines.

8.3 Biodiversity Offset Monitoring

8.3.1 Seasonal Monitoring Program

The Biodiversity Offset Areas will be subject to a seasonal monitoring program, which are outlined in further detail in the individual BOMP's for each area (**Appendices B-G**). These monitoring programs are similar to the rehabilitation monitoring program, where reference sites have been chosen within the BOA's to establish criteria for the regeneration areas to meet. The objectives of the monitoring programs will be generally to:

- identify any potential loss of biodiversity values over whole of BOA;
- document the ecological characteristics of remnant woodland vegetation to establish a baseline for developing accurate closure criteria for the regeneration of DNG (where relevant);
- assess the recovery of DNG areas (where relevant);
- to assess and map the presence of threats such as significant populations of pest fauna species or weed infestations; and
- identify the need for additional or corrective management measures to achieve the performance indicators and completion criteria.

The location and number of monitoring sites for each BOA and the results of the annual monitoring will be reported in the Annual Review each year.

8.3.2 Inspection Program

In addition to the seasonal ecological monitoring program, biannual inspections will be undertaken of each BOA, focussing on the following key issues:

- weed management;
- pest management;
- fence and gate condition;
- access track condition;
- erosion or sedimentation; and
- progress of regeneration areas.

The inspections will be documented on a formal inspection sheet and any actions arising from the inspections will be tracked for completion. The inspections will be undertaken in spring and autumn each year. Additionally, any corrective actions taken will be reported in the Annual Review.

8.4 Trigger Action Response Plan

The following trigger action response plan (TARP) has been developed to identify required management actions in the event of impacts to surrounding remnant vegetation areas. This TARP does not cover rehabilitation areas (addressed in the relevant MOP) or BOAs (addressed in individual BOMPs). Where necessary, management measures in this BMP will be amended accordingly with the aim of continually improving biodiversity management standards. Any actions required to be implemented as a result of the annual review of the below triggers to be undertaken by the BCC Environment and Community Manager will be reported in the BCC Annual Review, refer to **Section 9.1**.

The triggers specified within the TARP have been based upon key parameters which are monitored and have the potential to have a material impact on the community. The timeframe associated with the triggers has been set at three years to allow for natural fluctuations.

Table 8.1 – Biodiversity TARP

Aspect/ Category	Key Element	Trigger	Response
Biodiversity Values	Species diversity	Total live native flora species diversity decreases by more than 10 per cent over a period of three years or more	Undertake a review to determine the causal factors in the decline and develop an action plan to return native species diversity to previous levels.
		Exotic species diversity (weed species) is greater than 40 per cent, or increases by more than 15 per cent over a period of three years or more	Develop and implement a targeted weed action plan for the monitoring site and surrounding vegetation
	Ground Cover	Endemic ground cover decreases by 15 per cent or more over a period of three years or more	Undertake a review to determine the causal factors in the decline, and develop an action plan to return endemic ground cover to previous levels

Aspect/ Category	Key Element	Trigger	Response
	Habitat Value	Habitat assessment value falls below 7 (using assessment methodology in fauna monitoring report)	Undertake a review to determine the causal factors in the decline, and develop an action plan to improve habitat resources

8.4.1 Identification of Previously Unrecorded Threatened Species

In the event that a threatened species is identified at the BCC which has not previously been identified, a suitably qualified ecologist will be engaged and the following protocol implemented:

- Implement appropriate measures to ensure that ongoing work will not significantly impact on the species while appropriate ameliorative measures are investigated by the ecologist;
- A suitably qualified ecologist will undertake an investigation into the distribution and habitat utilisation of the species, and to identify appropriate amelioration measures as necessary; and
- Review and update this Biodiversity Management Plan to include the outcomes of the investigation and any additional mitigation measures that are required to be implemented to protect the species.

Additionally, all newly identified threatened species will be reported annually in the Annual Review.

9. Reporting and Review

9.1 Reporting

All ecological, BOA and rehabilitation monitoring results will be reported in the Annual Review. The Annual Review will include a comparison of data against previous year's results as well as a list of management recommendations derived from the monitoring reports, and a statement of compliance with EPBC approval conditions. The full monitoring reports will be made available on the BCC public website by 1 April each year.

The Annual Review will also include a qualitative assessment of the habitat quality scores according to the EPBC Offsets Assessments Guide (DSEWPC 2012) for all applicable BOAs. It is also recommended that every 10 years a revised EPBC Act Offset Calculator assessment is completed to determine the level of improvement in habitat quality scores on each BOA.

9.2 BMP Review

In accordance with Schedule 5, Condition 5 of the BOC Project Approval, this BMP will be reviewed within three months of any of the following:

- The submission of an annual review (Annual Review);
- The submission of an incident report (relating to biodiversity, rehabilitation or BOA);
- The submission of an audit report; or
- Any modification to the conditions of the Project Approval.

If this review determines that modifications are required to this BMP, a revised BMP will be submitted to DPIE for within four weeks for approval. The revised BMP will also be submitted to the Department of Environment for approval.

10. Conservation Bond and Implementation Costs

A Conservation Bond is required for management works to be completed in the BOAs and also in the BCC in accordance with Condition 35 and this has been established. The purpose of this bond is to cover the cost of the management of land required to be set aside as an offset area, should the mine consent holder be unable or unwilling to continue management of the land. The Conservation Bond value is based on all the activities identified in the relevant BOMPs and this BMP, for a period of three years, being the life of the plan.

11. Complaints Management

Bulga Coal implements a complaints hotline for handling the conflict resolution process. The conflict resolution process includes:

a) acknowledging all complaints, responding to the complainant within 24 hours, where practicable;

b) registering all complaints in CMO;

c) investigating complaints impartially giving proper consideration to the facts and the circumstances prevailing at the time;

d) implementing corrective actions if required;

e) reporting to relevant stakeholders of investigation outcomes and corrective actions taken; and

Complaints are managed in accordance with *GCAA-625378177-10296 – 10.05 Complaints Management*. This protocol provides a process to ensure that complaints received by GCAA and its operations are properly documented and handled in accordance with licence requirements and company policy.

Details of complaints received by Bulga Coal are reported to stakeholders at Community Consultative Committee meetings and in the Annual Review.

12. Adaptive Management

12.1 Adaptive Management Process

Adaptive management of the BMP will be responsive to any new and relevant data that may arise through the monitoring program, legislative change or any other studies completed at the site. This will enable a flexible approach to management commitments, allowing ongoing feedback and refinement of the BMP. Adaptive management will be a key mechanism to address the risks to the successful implementation of the BMP. Adaptive management steps include regular review of the BMP, including adaptation of performance indicators and completion criteria, recognising potential

risks to the successful implementation of the BMP and having a framework in place for corrective actions.

12.2 Review of BMP

As per the requirements of the consent, the BMP is to undergo an internal review and revision (if necessary) within 3 months of the submission of the Annual Review, an incident report, audit or modification to the conditions of consent. Where the BMP is revised, it must be submitted to the Secretary for approval within 2 months, unless an alternative timeframe is agreed.

Each review will seek opportunities to improve the management strategies and further develop and forecast the longer term performance indicators and completion criteria.

12.3 Re-Assessment of Targets and Performance Indicators

The performance indicators and completion criteria are preliminary and will need to adapt and change as targets are met and new challenges arise. Each three years they will be assessed and redeveloped as appropriate in response to monitoring outcomes and the success or otherwise of the management and improvement strategies. Modifications to the targets and performance indicators will be recorded in a revised BMP.

13. Revision History

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 11.1** below.

Table 13.1 – Revision History

Version	Date	Review team (consultation)	Change Summary
1.0	February 2015	Bulga Open Cut	Original document
2.0	March 2017	Umwelt and Bulga Open Cut	Updated to include recommendations by DoEE
3.0	April 2017	Bulga Open Cut	Formatting changes
4.0	December 2017	Bulga Open Cut	Updated to include recommendations by DPE.
5.0	November 2020	Umwelt and Bulga Open Cut	Update for three-year review and new consents.
6.0	July 2021	Umwelt and Bulga Open Cut	Updated to include comments from Internal Review and address the comments received from DPIE on 30 June 2021

Appendix A - Tree Felling Procedure

Appendix B - Condran Biodiversity Offset Management Plan

Appendix C - Broke Road Biodiversity Offset Management Plan

Appendix D - Reedy Valley Biodiversity Offset Management Plan

Appendix E - Wollombi Brook Biodiversity Offset Management Plan

Appendix F - Weeping Myall Biodiversity Offset Management Plan

Appendix G - The Vere Biodiversity Offset Management Plan