Peppertree Quarry
Biodiversity and Rehabilitation Management Plan

March 2022

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Rev No.	Date	Prepared By	Approved By	Comments
1	20th January 2011	ERM	Rod Wallace (Boral)	Landscape Rehab plan prepared as part of project approval 2007
2		Sharon Makin (Boral)	Angus Shedden (Boral)	Revision based upon Modification 3 requirements. No changes required
3	24th February 2017	Sharon Makin (Boral), Luke Baker and Craig Bagnall (Niche)	Sharon Makin (Boral)	Draft Biodiversity and Rehabilitation MP based upon Modification 4 requirements
4	28th February 2017	Sharon Makin (Boral), Luke Baker and Crag Bagnall (Niche)	Angus Shedden (Boral)	Final MP based upon Modification 4 requirements
5	5th May 2017	Sharon Makin	Angus Shedden	Final Management Plan including DPE revisions
6	10th December 2020	Mark Nolan and Emilie Mascarenhas (Cambium Group), Alaina Casey (Emergent Ecology)	Sharon Makin (Boral)	Draft Biodiversity and Rehabilitation MP based upon Modification 5 requirements.
7	10th October 2021	Mark Nolan and Emilie Mascarenhas (Cambium Group)	Sharon Makin (Boral)	Final Management Plan including Goulburn Mulwaree Council and BCD revisions
8	15th February 2022	Emilie Mascarenhas (Cambium Group), Sharon Makin	Sharon Makin (Boral)	Final Management plan with DPE review updates
9	1st March 2022	Emilie Mascarenhas (Cambium Group), Sharon Makin	Sharon Makin (Boral)	Final Management plan with DPE review updates
10	8th March 2022	Emilie Mascarenhas (Cambium Group), Sharon Makin	Sharon Makin (Boral)	Final Management plan with DPE review updates

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Abbreviations

AEMR	Annual Environmental Management Report
BCD	Biodiversity & Conservation Division within the Department
BRMP	Biodiversity and Rehabilitation Management Plan
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
DPE	Department of Planning & Environment
EA	Environmental Assessment
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	*Environmental Planning and Assessment Act, 1979*
HMA	Habitat Management Area
LGA	Local Government Area
OEH	Office of Environment and Heritage
SEPP	State Environmental Planning Policy
BC Act	Biodiversity Conservation Act 2016

1 INTRODUCTION

1.1 BACKGROUND

Boral Resources (NSW) Pty Ltd (Boral) was granted Project Approval (06_0074) in 2007 to establish and operate the Peppertree Quarry (a granodiorite hard rock quarry, formerly called the Marulan South Quarry) including all in-pit quarrying activities and supporting infrastructure such as a rail siding and loading facility, processing plant and water supply dams under Part 3A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act) in February 2007.

Planning approval PA 06_0074 has since been modified six times, with the latest Modification 6 approved in 2020. The Modifications have resulted in numerous amendments to the original Environmental Assessment Requirements (EA).

This document, the Biodiversity and Rehabilitation Management Plan (BRMP), provides an update of the approved Boral (2017) BRMP. It incorporates the requirements associated with Modification No. 5 and Mod 6 and reflects management of the landscape and rehabilitated areas associated with current quarry activities.

This BRMP has been prepared by Dr Emilie Mascarenhas and Mark Nolan of Cambium Group on behalf of Boral. Their combined experience of more than 45 years includes environmental management, rehabilitation monitoring, approvals, compliance, and land access in the resources sector.

1.2 PEPPERTREE QUARRY

The Quarry is located in Marulan South, 10 kilometres southeast of Marulan, 35 km east of Goulburn and approximately 175 km south-west of Sydney, within the Goulburn Mulwaree Local Government Area (LGA) in the Southern Tablelands of NSW (Figure 1).

Access is via Marulan South Road, which connects the Quarry and Boral's Marulan South Limestone Mine with the Hume Highway approximately 9 kilometres to the north-west.

Boral's private rail line connects the Quarry and Limestone Mine with the Main Southern Railway approximately 6 kilometres to the north.

The Quarry is located on Boral owned land approximately 650 hectares in size, which includes the approved Quarry site, approximately 70 hectares in size, additional granodiorite resources to the north and south and surrounding land. Boral own a number of properties surrounding the Quarry as shown in Figure 2.

The Quarry is bordered to the south by the Limestone Mine, to the east by Morton National Park and by rural properties to the north and west. Surrounding land uses include: mining, grazing, rural properties including an agricultural lime manufacturing facility, fireworks storage facility, turkey farm and rural residential.

The Quarry site comprises of a number of key infrastructure, including:

- Extraction resource area (the pit)
- Overburden emplacements: Western Overburden Emplacement, Southern Overburden, Emplacement, Eastern Overburden Emplacement and South Western Overburden Emplacement
- Infrastructure items: Rail loop, Processing plant, Infrastructure areas

- Habitat Management Area (HMA) (which includes additional habitat areas)

The site layout is shown on Figure 3.

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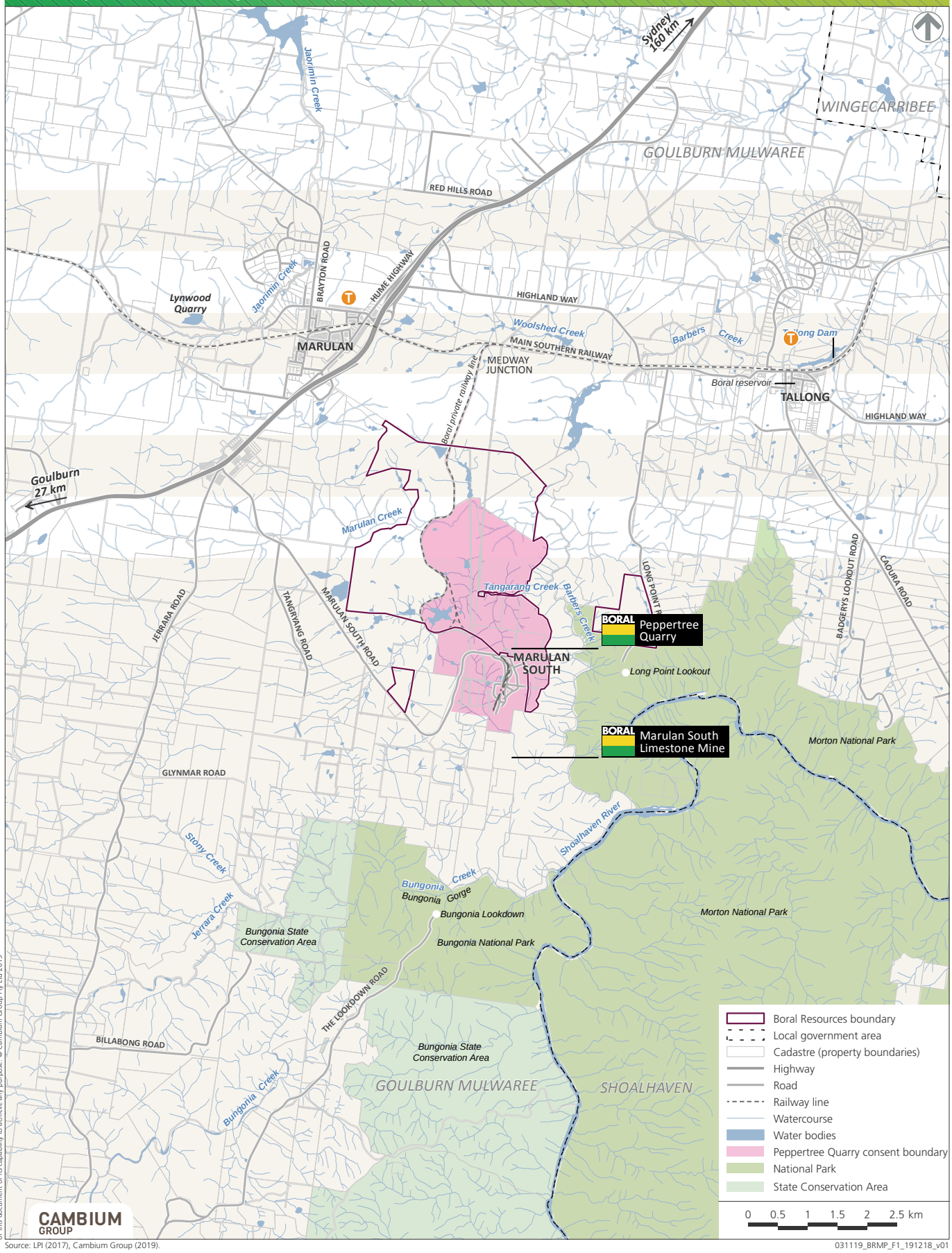
Figure 1
Locality
Biodiversity and Rehabilitation Management Plan / Peppertree Quarry



CAMBIUM GROUP

Source: LPI (2017), Cambium Group (2019).

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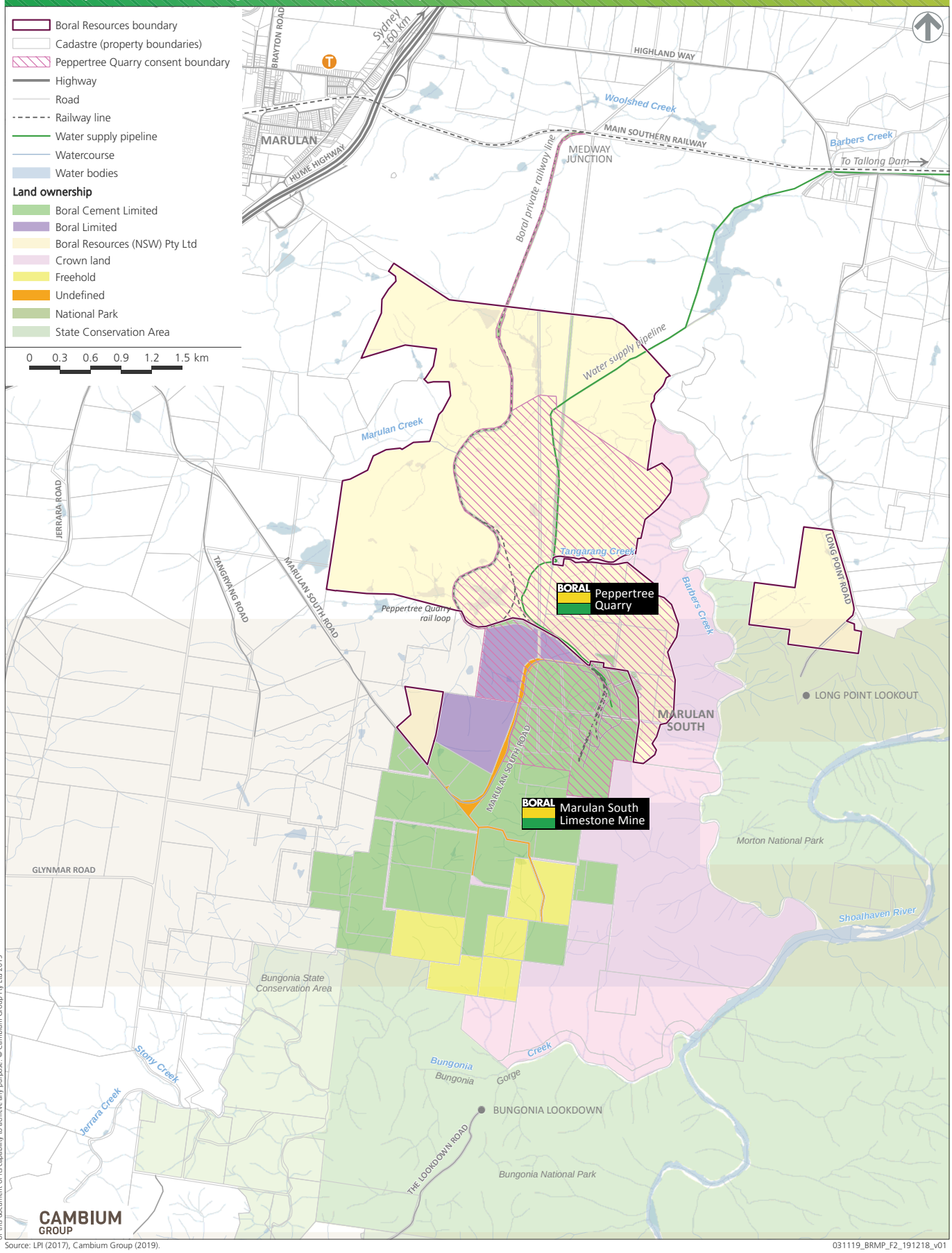
Figure 2
Landholdings
Biodiversity and Rehabilitation Management Plan / Peppertree Quarry



Source: LPI (2017), Cambium Group (2019).

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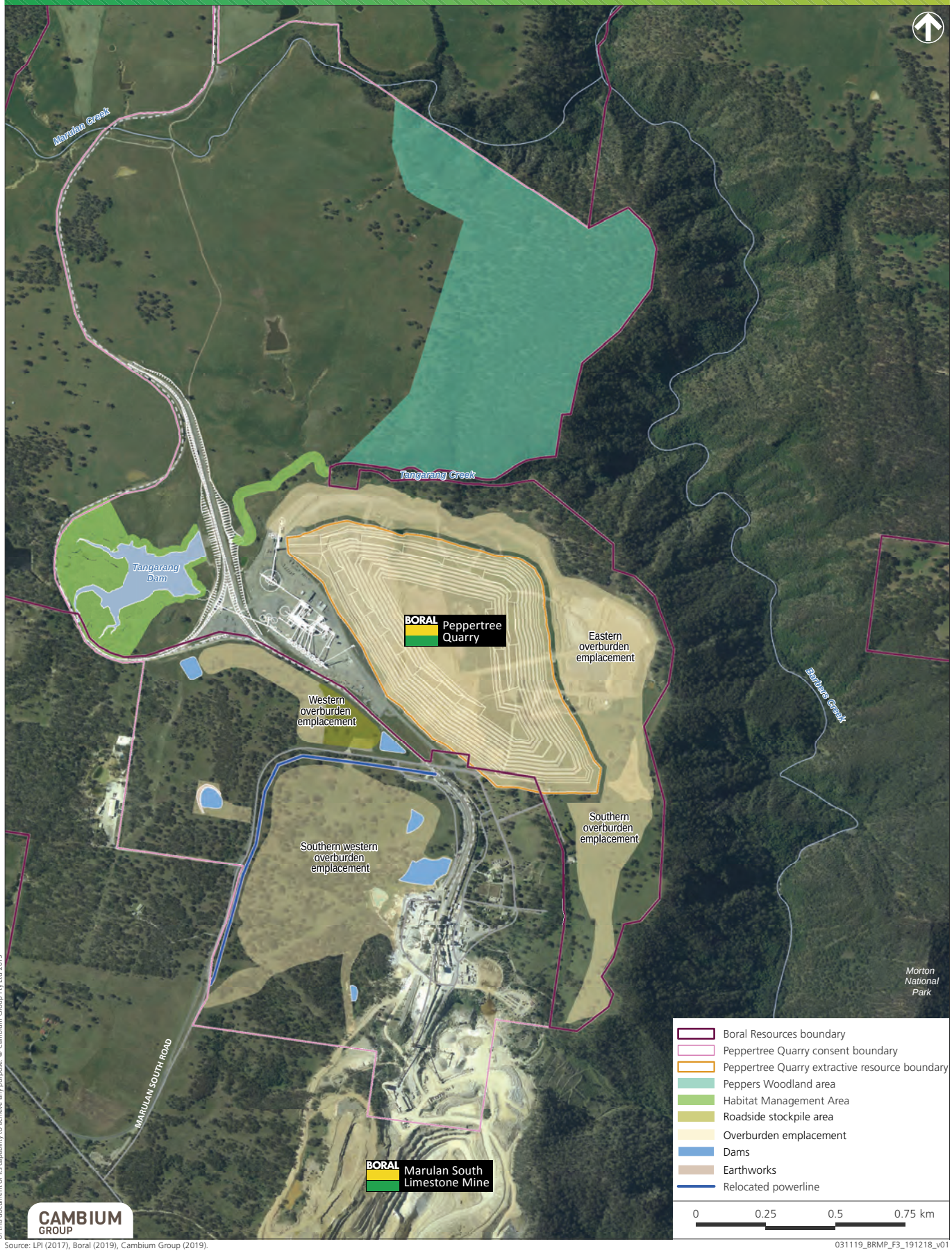
Figure 3
Site layout

Biodiversity and Rehabilitation Management Plan / Peppertree Quarry



CAMBIUM GROUP

Source: LPI (2017), Boral (2019), Cambium Group (2019).

1.3 OVERVIEW OF OPERATIONS

Peppertree Quarry has an identified resource area of approximately 250 million tonnes which, depending on extraction rates, would allow quarrying for 70 years or more over an area of approximately 104 hectares, within a 650 hectare parcel of land owned by Boral.

The 2007 Project Approval was issued for an initial operation period of 30 years. Operations commenced in the northern portion of the resource area with an area of approximately 70 hectares. This area is bordered by a densely vegetated area to the east, which flanks a steep gorge that extends into Morton National Park. A rail spur runs adjacent to the western site boundary and there are a small number of rural properties located to the north and west of the quarry. The nearest residences are located approximately 1.5 kilometre from the quarry to the west in Marulan South and to the east on Long Point Road. The Boral Cement limestone mine is located immediately south of the quarry.

Quarry construction commenced in 2011 and operations commenced in early 2014. The quarrying operations involve the stripping of overburden and the extraction of hard rock using open-cut drill and blast techniques. Overburden is stripped by dozer, loaded onto trucks using excavators and/or front end loaders and transported to the overburden emplacement areas, where it is spread and shaped by dozer.

Traditional drill and blast methods are then used to break up the hard rock. A drill rig stationed on top of each production bench drills a series of holes that are later charged with explosives, detonators and delays. Boral apply a standard practice of limiting the maximum instantaneous charge to stay within the relevant noise and vibration criteria.

Blasted rock is then processed on-site using various crushers and screens to obtain the desired product. Material is initially crushed in a primary mobile crusher located within the pit, which is currently fed by an excavator.

After passing through the primary crusher, the crushed material is taken from the pit along a series of conveyors to the first set of screens located to the northwest of the pit and material is stockpiled in a surge pile. Material in the surge pile is reclaimed and conveyed to the main processing area where it undergoes further crushing, screening and shaping. Product material is stored in the various covered storage bins prior to being dispatched off-site by train.

In October 2019, the Project Approval was modified for the fifth time (hereafter referred to as Modification 5) under Section 75W of the EP&A Act, to establish a new overburden emplacement area southwest of the existing Quarry (South-west Overburden Emplacement – SWOE) along with minor changes to the site to accommodate the proposed SWOE. No changes are proposed with respect to approved methods of extraction, blasting frequency, processing, transport or stockpiling activities.

This was followed in April 2020, with the Project Approval modified for the sixth time (hereafter referred to as Modification 6) under Section 4.55 (1A) of the EP&A Act, to allow the replacement of the existing air filtration network with two baghouse air filtration units and associated ducting attached to the existing and approved secondary and tertiary processing facilities (i.e. crushing and screening plant). The baghouses are located within the current operations plant footprint.

1.4 APPROVAL HISTORY

As discussed in section 1.1, Peppertree Quarry has been subject to a number of Modifications which have resulted in changes and additions to the EA requirements. A summary of the planning approval history, including the key biodiversity approval requirements have been presented in Table 1.

Table 1. Summary of Modification details and key biodiversity requirements

Date of Planning Approval	DA/MOD Number	Details	Key Biodiversity requirement
28 February 2007	PA06_0074	The "Marulan South hard rock quarry and associated infrastructure" project was granted approval by the Minster for Planning under Part 3A of the EP&A Act.	The approval included a requirement to establish a Habitat Management Area (HMA) within the site, to provide for ongoing management of the White Box Yellow Box Blakely's Red Gum Woodland (Box-Gum Woodland) on the site. The HMA was to incorporate an offset for an area of woodland that would be lost as a result of the proposal. The 2007 Project Approval required the preparation and implementation of a number of management plans to guide the environmental management of the quarry throughout its operational life. Summary of key rehabilitation and final landuse detailed in the EA include: - Recently stripped topsoil will be used to dress emplacements - Topsoil unable to be used immediately would be stockpiled for later rehabilitation - Rehabilitation would be limited to the northern terminal faces, perimeter bunding and overburden emplacement as it is intended that the southern portion would be used in future quarry expansion - Rehabilitation will include shaping of the bund and emplacement areas to provide drainage and irregular features for integrations with the surrounding landscape. - Revegetation and rehabilitation adjacent to the remaining woodland near Dam 1 will offset the loss of native habitat. - No detailed rehabilitation plans have been provided with the EA given the longevity of quarry operations. Should Boral not choose to extend quarrying at the end of the 30 years quarry period, the following conceptual rehabilitation principles would be expected to be implemented: - Benches will be restricted to 20 m high - All out-of-pit runoff will be directed away from pit - Final benches will be capped with a layer of overburden and topsoil and planted with trees, shrubs and ground covers of species found in the adjacent Box-Gum Woodland - All ancillary infrastructure (apart from dams) will be removed and the land rehabilitated.

Date of Planning Approval	DA/MOD Number	Details	Key Biodiversity requirement
17 March 2009	Modification 1 PA06_0074	Approved under Section 75W of the EP&A Act for the construction of an exploratory test pit to extract a suitable amount of granodiorite to test and model rock behaviour and to assist with the design of plant and equipment for the Quarry.	In accordance with the Project Approval, a Landscape and Rehabilitation Management Plan (LRMP) was first prepared by ERM for Boral in 2011.
3 November 2011	Modification 2 PA06_0074	Approved under Section 75W of the EP&A Act for infrastructure and site layout changes including the: • Construction of a new rail loop embankment and overburden emplacement; • Reduction in the water storage dam size; and • Relocation of loading facilities, processing plant and stockpiling.	The proposed rail loop embankment and reduction in capacity of Dam 1 resulted in a reconfiguration of Habitat Management Area. The proposed modification to install the new rail loop will result in some additional surface disturbance associated with the installation of the rail line Following construction activities, disturbed areas no longer required for operation will be rehabilitated. Future use of the quarry has not been determined due to the longevity of the quarry operations. Decisions about appropriate rehabilitation will be made in accordance with the requirements of stakeholder at the time. Mitigation measure to be implemented as part of the proposal for protection of flora and fauna include the: - Rehabilitation of the bunds and emplacement areas with Box-Gum Woodland species - Rehabilitation within three months of completion of the bund - Protection of Box-Gum Woodland by installation of secure fencing prior to construction of the bund - Pre-clearing tree inspection - Removal of trees in accordance with recommendations in EA (2006) - On-going management of rehabilitation areas to ensure no weeds of significance enter Box-Gum Woodland.
2 November 2012	Modification 3 PA06_0074	Approved under Section 75W of the EP&A Act for power and rail infrastructure changes including the: • Construction of a High Voltage (HV) line approximately 1km in length; and • Construction of an extension to the existing passing line on Boral's	This modification required an additional commitment to weed management within a proposed weed management area due to the removal of vegetation associated with the installation of the High Voltage Line. Statement of commitments of relevance to this Plan include: - All disturbance areas and access routes will be clearly delineated and flagged in the field so that no areas outside of those assessed will be affected by machinery or personnel. - No hollow bearing limbs or trees are to be impacted. - If bird nests are identified these will be avoided by personnel and machinery.

Date of Planning Approval	DA/MOD Number	Details	Key Biodiversity requirement
		private rail line at Medway Junction.	- Machinery will not drive over any woody ground debris and where debris is encountered, it will be moved into adjacent native vegetation by hand. - All machinery will be inspected for weed seeds and clods of soil prior to entering vegetated areas. - Ground disturbance will be minimised wherever possible. - All waste and materials used on site will be removed at the conclusion of the works. - All holes and trenches will be filled or capped overnight to prevent fauna from injuring themselves or becoming trapped/drowned. - Sites will be monitored and managed for noxious weeds in the 12 months following works and until native species have regenerated the site. - A clearing maintenance protocol will be established for the ongoing maintenance of the easement and will include protocols for the management of weeds such as Serrated Tussock and St John's Wort. - Following construction all disturbed areas will be stabilised and rehabilitated. - All waste and materials used will be removed from the disturbed areas at the conclusion of the works and disposed of appropriately. - Following construction all disturbed areas will be stabilised and rehabilitated. - Green wastes will be used for rehabilitation purposes elsewhere on site, if possible.
24 August 2016	Modification 4 PA06_0074	The Project Approval was modified under Section 75W of the Environmental Planning and Assessment Act 1979 (EP&A Act), to allow an extension of in-pit operating hours and the establishment of a new overburden emplacement area (Modification No. 4).	The Southern Overburden Emplacement will be landscaped and rehabilitated in accordance with the approved Peppertree Quarry Landscape and Rehabilitation Management Plan, in order to minimise the potential for visual, air quality, biodiversity and erosion and sedimentation impacts arising from unstabilised ground surfaces. Progressive and final revegetation and rehabilitation to create a stable landform that does not result in the sediment laden runoff, fugitive dust emissions, blends well with the adjacent natural landscapes of the Morton National Park and re-establishes a native bushland dominated by White Box Yellow Box Blakely's Red Gum Grassy Woodland species. The Southern Overburden Emplacement would be progressively rehabilitated and will eventually be entirely revegetated to a native, open woodland community, which will recreate fauna habitat, and minimise the edge effects created during its development. This modification and its subsequent approval requires a total of 225 ecosystem credits to be retired in accordance with the Framework for Biodiversity Assessment - NSW Biodiversity Offsets Policy for Major Projects, to offset the removal of 8.1 hectares of White Box Yellow Box Blakely's Red Gum Grassy Woodland. Boral

Date of Planning Approval	DA/MOD Number	Details	Key Biodiversity requirement
			proposes to use an offset area within their landholdings in the vicinity of the Quarry, which has been identified as containing White Box Yellow Box Blakely's Red Gum Woodland.
1 October 2019	Modification 5 PA06_0074	Project Approval was modified under Section 75W of the Environmental Planning and Assessment Act 1979 (EP&A Act), to develop a new overburden area, the South Western Overburden Emplacement (SWOE); extend the consent boundary to the south to encompass the SWOE; construct a new haul road from the pit to the SWOE; construct a new intersection at Marulan South Road to link the new haul road with the SWOE; amend the design of the Western Overburden Emplacement (WOE); remove the Western Earth Bund (which has not been constructed); and relocate a powerline which runs through the proposed SWOE site.	The South Western Overburden Emplacement will be landscaped and rehabilitated in accordance with the approved Biodiversity and Rehabilitation Management Plan (2017), in order to minimise the potential for visual, air quality, biodiversity and erosion and sedimentation impacts arising from unstabilised ground surfaces. The Biodiversity and Rehabilitation Management Plan (2017) will be revised to incorporate the additional SWOE and any additional management strategies to ensure temporary stabilisation of exposed surfaces, permanent stabilisation strategies, progressive rehabilitation with groundcover vegetation during overburden emplacement and final rehabilitation as soon as practical after formation of the SWOE.
3 April 2020	Modification 6 PA06_0074	The Project Approval was modified under Section 4.55 (1A) of the EP&A Act, to allow the replacement of the existing air filtration network with two baghouse air filtration units and associated ducting attached to the existing and approved secondary and tertiary processing facilities (i.e. crushing and screening plant). The baghouses are located within the current operations plant footprint.	During the operation of the quarry, no rehabilitation will be undertaken associated with the Modification 6 works as the Dust Extraction System is within the existing operations plant footprint. This area will be returned to pasture at the end of life of the quarry.
	Modification 7 PA06_0074	The project Approval was modified under Section 4.55 (1A) of the EP&A Act, to allow for the relocation of a sediment pond P2 for safety reasons.. This required the removal of a single tree.	Removal of the tree described in Modification Report (MOD 7) can occur at any time, except during winter months (June to August, inclusive), Removal of the tree is such that (i) the tree is gradually dismantled and lowered to the ground, using ropes or a crane; and (ii) any bats identified within the tree are captured and released at night; under the supervision of a suitably qualified and experienced ecologist;

1.5 BRMP Scope and Objectives

The primary objective of this BRMP is to provide guidance and direction for the management, protection and rehabilitation of areas through the operation of the Peppertree Quarry, and to meet the EA requirements.

This BRMP applies to all activities undertaken by Peppertree Quarry including quarrying, crushing, screening, stockpiling and transportation of quarries products, maintenance activities; and associated service and support functions.

The BRMP provides the framework and guidance for rehabilitation activities to be conducted in a manner that:

- complies with regulatory requirements including bio banking agreements and Bonds, the Project Approval and the EPA Environment Protection Licence (EPL)
- meets the obligations and commitments identified in the Environmental Assessment (ERM, 2006), and subsequent modifications including Modification 5 Environmental Assessment (Element Environment, 2018) and Modification 6 Environmental Assessment (Boral)
- ensures compliance with relevant environmental legislation
- ensures appropriate and representative monitoring is conducted for verification that the BRMP is effectively implemented and meeting its objectives
- ensures appropriate contingencies and resources for mitigating adverse impacts to rehabilitated and native vegetation areas.

The Plan specifically addresses the:

- conceptual final landform of the quarry void
- implementation of actions to rehabilitate disturbed areas
- short- and long-term management of the HMA
- effective management of remnant vegetation on site
- incorporation of the SWOE rehabilitation into the Plan.

The performance criteria to be used to assess the success of the management actions are identified in Table 2 and discussed further in section 5.2.

Table 2: Biodiversity and Rehabilitation Management Objectives and Performance Criteria

Objective	Performance criteria
Compliance with regulatory requirements including biobanking Agreements, Rehabilitation Bonds and Project Approval	No non compliances
Rehabilitation of identified disturbed areas	Rehabilitation undertaken and successful
Management of the Habitat Management area	Managed as per the conditions in the BRMP
Management of remnant vegetation onsite	Managed as per the conditions in the BRMP
Conduct appropriate and representative monitoring for verification that the BRMP is effectively implemented and meeting its objectives	Undertake monitoring as outlined in BRMP
Having contingencies and resources for mitigating adverse impacts to rehabilitated and native vegetation areas	Protocol as outlined in BRMP and appropriate staff training to be in place.

1.6 BORAL COMMITMENTS TO BIODIVERSITY MANAGEMENT

The Quarry operates under a Boral integrated Health, Safety, Environment and Quality Management System (HSEQMS). The HSEQMS has commitments to the Boral Environmental Policy through established standards and procedures which require internal conformance to high levels of environmental performance with continual improvement objectives.

The HSEQMS Ecosystems and Biodiversity Standard (GRP-HSEQ-8-08) requires each Boral operation quarry to protect and preserve local habitats and ecosystems from feral flora and fauna (noxious weeds and pests), and minimise the impacts of land development through considered planning, management and control measures.

1.7 ALIGNMENT WITH OTHER PLANS

A Water Management Plan and Aboriginal Heritage Management Plan have been prepared for the quarry. Both plans have identified the need for rehabilitation and reference the Biodiversity and Rehabilitation Management Plan. Biodiversity and rehabilitation outcomes included in this BRMP have been developed to complement the water management and aboriginal heritage objectives for the quarry.

This BRMP incorporates the recommendations of the Marulan South Environmental Assessment Report (EA) (ERM, 2006), the Biodiversity Assessment (Niche, 2016) that was prepared as part of the Modification 4 application to assess potential impacts on biodiversity in association with the construction of the Southern Overburden Emplacement and the Modification 5 Environmental Assessment (Element Environment, 2018). BRMP 2017 will continue to apply, until the approval of BRMP 2022 by the DPE.

1.8 CONSULTATION

Consultation on Version 5 (2017) of this BRMP had previously been undertaken with the OEH and Goulburn Mulwaree Council. The pBRMP was updated in line with the Modification 5 Approval and Version 6 (December 2020) was provided to Biodiversity & Conservation Division (BCD) within the NSW Department of Planning, and Environment (DP&E) and the Goulburn Mulwaree Council for comment in July 2021 as required by approval condition B63. A meeting was held between Boral Quarries and BCD on 27th August 2021 to discuss this Plan. This Version 8 February 2022) incorporates the comments and recommendations from Goulburn Mulwaree Council and BCD.

Feedback received from both the Council and BCD is tabulated in Appendix B.

1.9 DOCUMENT STRUCTURE

The structure of this BRMP is outlined in Table 3.

Table 3. Structure of the Management plan

Section	Content
1	Provides an overview of the project, and objectives of the plan
2	Details the statutory requirements as outlined in the conditions of consent dated April 2020
3	Describes the existing environment of the site and surrounding environment
4	Vegetation management – management of native vegetation, flora and fauna
5	Rehabilitation management
6	Rehabilitation methodology
7	Supporting actions
8	Completion criteria and Rehabilitation Monitoring
9	Risks to Successful Implementation of the BRMP
10	Financing and provision
11	Training
12	Reporting and Review
13	References
Appendix A	Biodiversity Conservation Trust BOS payment statement
Appendix B	Consultation notes
Appendix C	Species list for planting and seeding
Appendix D	Management actions applicable to removal of native vegetation and habitat
Appendix E	Management actions applicable to the rehabilitation of the HMA
Appendix F	Management actions applicable to the rehabilitation of the whole site
Appendix G	Planting locations
Appendix H	Trigger Action Response Plan
Appendix I	Three Year Plan

2 STATUTORY REQUIREMENTS AND GUIDELINES

2.1 NSW LEGISLATION

Key environmental legislation relating to biodiversity and rehabilitation that have been considered in this BRMP include:

- NSW Environment Planning and Assessment Act 1979 (EP&A Act)
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- NSW Fisheries Management Act 1994 (FM Act)
- NSW Protection of the Environment and Operations Act 1997 (POEO Act)
- NSW National Parks and Wildlife Act 1974 (NPW Act)
- NSW Biosecurity Act 2015 (BS Act)
- NSW Biodiversity Conservation Act 2016 (BC Act)
- NSW Water Management Act 2000 (WM Act)
- Mining Act 1992
- State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries 2007.

2.1.1 Environmental Planning and Assessment Act 1979 (Project Approval Conditions)

The project was declared a 'major development' under the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and State Environmental Planning Policy (Major Development) 2005. Since Project Approval 06_0074 was granted in 2007, there have been five approved modifications:

1. **Modification 1 (2009)** approved for exploratory blasting and test pitting in order to verify the design of the processing plant.
2. **Modification 2 (2011)** approved for the construction of a new rail line rather than use the existing rail facilities to the Limestone Mine.
3. **Modification 3 (2012)** approved the construction of a high voltage power line from an existing substation to the processing plant and to provide a rail siding near the junction with the Main Southern Railway Line.
4. **Modification 4 (2016)** approved for the extension of daily in-pit operating hours and Establishment of a new overburden emplacement area.
5. **Modification 5 (2019)** approved develop a new overburden area (South Western Overburden Emplacement – SWOE); extend the consent boundary to the south to encompass the SWOE; construct a new haul road from the pit to the SWOE; construct a new intersection at Marulan South Road to link the new haul road with the SWOE; amend the design of the Western Overburden Emplacement (WOE); remove the Western Earth Bund (which has not been constructed); and relocate a powerline which runs through the proposed SWOE site.
6. **Modification 6 (2020)** approved for the replacement of existing dust extraction units with two baghouses and associated duct work.
7. **Modification 7 (2021)** approved for the relocation of a sediment pond P2 for safety reasons.

The quarrying operations will continue to be subject to the provisions of the EP&A Act for any subsequent changes or modifications to the operations. The operations will need to be able to demonstrate compliance against consolidated Project Approval issued under the provisions of the

EP&A Act. Table 4 summarises the Conditions of Approval (CoA) relevant to this BRMP and a cross-reference to the location within this BRMP where the requirement is addressed.

Table 4. Consolidated Biodiversity and Rehabilitation related Conditions of Approval

CoA	Condition of Project Approval	Referenced in BRMP
	Part A Compliance	
A26	The Applicant must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this consent relevant to activities they carry out in respect of the development.	Section 11.2
	Part B Biodiversity and Rehabilitation	
	Threatened Species Protection	
B53	The Proponent must: a. clearly and securely mark out the boundaries of the WOE and the Modification 5 disturbance area prior to clearing and site preparation within those areas; b. not clear vegetation in the WOE area or the Modification 5 disturbance area unless a fauna survey of the area to be cleared has been undertaken within the prior 21 days, by a suitably qualified expert who has been approved by the Secretary; c. seek to avoid clearing of native vegetation in the WOE area and the Modification 5 disturbance area during the period August to November of any year; and d. not damage or clear any Box Gum Woodland EEC or other native vegetation located adjacent to the WOE or the Modification 5 disturbance area.	Appendix D Section 4.2
	Habitat Management Area	
B54	The Proponent must implement the Habitat Management Area in a manner that is generally consistent with the documents listed in condition A2(c) (and shown conceptually in Appendix 6), including the establishment, conservation and maintenance of at least 13.5 hectares of vegetation characteristic of Box Gum Woodland, to the satisfaction of the Secretary.	Implementation consistent with approval documents referred to throughout BRMP. HMA shown in Figure 4 discussed in section 3.7 and 6.1
B55	The Applicant must: (a) implement the SOE BOS described in EA (MOD 4); (b) within 12 months of the commencement of the construction of the SOE, retire a total of 225 ecosystem credits in accordance with the Framework for Biodiversity Assessment - NSW Biodiversity Offsets Policy for Major Projects, to offset the removal of 8.1 hectares of White Box Yellow Box Blakely's Red Gum Grassy Woodland; and (c) provide long-term security and funding for the biodiversity offset area identified in the Biodiversity Offset Strategy through a Biobanking	Section 4.5

<table>
<tr><th>CoA</th><th>Condition of Project Approval</th><th>Referenced in BRMP</th></tr>
<tr><td></td><td>Agreement under the Threatened Species Conservation Act 1995; to the satisfaction of the Planning Secretary.</td><td></td></tr>
<tr><td>B56</td><td>Within 12 months of commencing any work within the Modification 5 disturbance area, or other timeframe agreed by the Planning Secretary, the Applicant must implement the SWOE BOS, by retiring the biodiversity credits specified in Table 7 below. The retirement of credits must be carried out in consultation with BCS and in accordance with the Biodiversity Offsets Scheme of the BC Act, to the satisfaction of the BCT.</td><td>Section 4.5</td></tr>
<tr><td>B57</td><td>The retirement of the biodiversity credits specified in Table 7 must be carried out in accordance with the Biodiversity Offsets Scheme of the BC Act, to the satisfaction of the BCT.</td><td>section 4.5</td></tr>
<tr><td></td><td>Rehabilitation Objectives</td><td></td></tr>
<tr><td>B58</td><td>The proponent must rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with chapter 2.8 of the EA and must comply with the objectives in Table 8.
Table 8: Rehabilitation objectives
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>All areas of the site affected by the project</td><td>Safe
Hydraulically and geotechnically stable
Non-polluting
Fit for the intended post-quarrying operations land use(s)
Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land</td></tr>
<tr><td>Surface infrastructure</td><td>Decommissioned and removed, unless otherwise agreed by the Secretary</td></tr>
<tr><td>Quarry benches</td><td>Landscaped and vegetated using native tree and understorey species</td></tr>
<tr><td>Final Void</td><td>Minimise the size, depth and slope of the batters of the final void
Minimise the drainage catchment of the final void</td></tr>
</table></td><td>Section 5, 6, 7 and 8</td></tr>
<tr><td></td><td>Progressive Rehabilitation</td><td></td></tr>
<tr><td>B59</td><td>The Proponent must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable steps must be taken to minimise the total area exposed at any time. Interim stabilisation and temporary vegetation strategies must be employed when areas prone to dust generation, soil erosion and weed incursion cannot be permanently rehabilitated.</td><td>Section 5, 6, 7 and 8</td></tr>
</table>

CoA	Condition of Project Approval	Referenced in BRMP
	Note: This condition does not prevent further disturbance at some later stage of the development of areas that have been rehabilitated.	
	Biodiversity and Rehabilitation Management Plan	
B60	The Proponent must prepare a Biodiversity and Rehabilitation Management Plan for all land disturbed by the project to the satisfaction of the Secretary. This plan must:	
	a. be prepared by suitably qualified and experienced person/s;	(a) page i, Section 1.1
	b. be prepared in consultation with BCD and Council;	(b) Section 1.8, Appendix B
	c. describe the short, medium, and long-term measures to be undertaken to:	(c) (i) Section 4.5
	i. implement the SOE BOS, SWOE BOS and the Habitat Management Area;	(c) (ii) Section 5.2 & 5.3
	ii. comply with the rehabilitation principles in Chapter 2.8 of the EA;	(c) (iii) Section 3.1 & 6.1, Appendix E
	iii. manage the remnant vegetation and fauna habitat on the site and in any offset areas; and	(c) (iv) Section 5.2 & 5.3
	iv. ensure compliance with the rehabilitation objectives in this approval;	(d) Section 5.2
	d. provide details of the conceptual final landform and associated land uses for the site;	(e) Section 2.3 & 7.8
	e. consider actions identified in relevant Threat Abatement Plans;	(f) Section 8, Appendix H
	f. include detailed performance and completion criteria for evaluating the performance of the SOE BOS, SWOE BOS and the Habitat Management Area and rehabilitation of the site, including triggers for remedial action, where these performance or completion criteria are not met;	(g) Section 4.5
	g. describe how the implementation of the SOE BOS would be integrated with the management of the Habitat Management Area, and the overall rehabilitation of the site;	(h) Section 4,5,6,7 Section 6.1.2
	h. include a detailed description of the measures to be implemented on the site and any offset area to:	h) (i) Section 4.2, Table 7, Section 6.1.2, 7.3 & 7.4
	i. maximise the salvage of environmental resources within approved disturbance area, including tree hollows, vegetation and soil resources, for beneficial reuse in the SOE biodiversity offset area, the Habitat Management Area or for rehabilitating other areas of the site;	(h) (ii) Section 7.9
	ii. restore and enhance the quality of native vegetation and fauna habitat in the SOE biodiversity offset area, the Habitat Management Area and other areas of the site through:	(h) (iii) Section 4.2 & 4.4.2, Table 15, Appendix D
	• assisted natural regeneration;	(h) (iv) Section 4.2, 4.3 & 4.4.2
	• targeted vegetation establishment (with a particular focus on Box Gum Woodland EEC); and	(h) (v) Section 4.2 & 4.4, Table 15 Appendix D
	• the introduction of fauna habitat features;	
	iii. minimise impacts on tree hollows and termite mounds where reasonable and feasible;	
	iv. minimise impacts on fauna, including undertaking pre-clearance surveys;	
	v. manage potential indirect impacts on threatened plant and animal species, including supervision of clearing activities by a suitably	

CoA	Condition of Project Approval	Referenced in BRMP
	qualified spotter/handler;	
	vi. manage or handle animals caught or injured during clearing;	(h) (vi) Section 4.2
	vii. introduce naturally scarce fauna habitat features such as den structures, nest boxes and salvaged tree hollows, and promote the use of these introduced habitat features by threatened fauna species;	(h) (vii) Section 4.2 & 4.3
	viii. minimise the amount of clearing within the approved disturbance area where reasonable and feasible;	(h) (viii) Section 4.2 & 4.3, Section 7.2
	ix. establishing vegetation screening and landscaping the site (including the bunds and overburden emplacement areas) to minimise the visual impacts of the project on surrounding receivers;	(h) (ix) Section 5.2, Table 7, section 5.5
	x. control weeds, including measures to avoid and mitigate the spread of noxious weeds;	h) (x) Section 7.1
	xi. control feral pests, including but not limited to goats, rabbits, fox, cats and pigs, with consideration of actions identified in relevant threat abatement plans;	(h) (xi) Section 7.8
	xii. manage the collection and propagation of seed;	(h) (xii) Section 7.6, Section 6.1.2
	xiii. control access;	(h) (xiii) Section 6.1.2
	xiv. manage bushfire hazards; and	(h) (xiv) Section 7.7
	xv. progressively rehabilitate the site and minimise disturbance areas;	(h) (xv) Section 6, Appendix F
	i. include a seasonally-based program to monitor and report on the effectiveness of the above measures, progress against the detailed performance indicators and completion criteria, and identify any improvements that could be implemented to improve biodiversity outcomes;	(i) Section 8
	j. identify the potential risks to the successful implementation of the SOE BOS, SWOE BOS, Habitat Management Area and final rehabilitation, and include a description of the contingency measures to be implemented to mitigate against these risks, including provisions for alternative direct and/or supplementary offset measures where regeneration of EECs do not meet performance and completion criteria; and	(j) Section 9, Appendix H
	k. include details of who would be responsible for monitoring, reviewing, and implementing the plan.	(k) Section 12.2
B61	The Proponent must submit the Biodiversity and Rehabilitation Management Plan for approval by the Secretary, prior to commencing any work in the Modification 5 disturbance area.	Will be submitted within timeframe
B62.	The Proponent must implement the Biodiversity and Rehabilitation Management Plan as approved by the Secretary.	Once commenced
	Conservation and Rehabilitation Bond	
B63	Within six months of the approval of the Biodiversity and Rehabilitation Management Plan, the Proponent must lodge a Conservation and Rehabilitation Bond with the Department to ensure that the SWOE BOS and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the plan and the relevant conditions of this approval. The sum of the bond must be an amount agreed by the Secretary and determined by:	Section 10

CoA	Condition of Project Approval	Referenced in BRMP
	a. calculating the full cost of implementing the SWOE BOS at third party rates (other than land acquisition costs); b. calculating the cost of rehabilitating all disturbed areas of the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and c. employing a suitably qualified, independent and experienced person to verify the calculated costs. *Note: Any redundant rehabilitation bonds currently held by the Department in relation to the project will be released following acceptance of the Conservation and Rehabilitation Bond required under this condition.*	
B64	The Secretary may waive the requirement for a Conservation Bond if, in the opinion of the Secretary, the implementation of the SWOE BOS has substantially progressed.	Section 10
B65	The calculation of the Conservation and Rehabilitation Bond must be submitted to the Department for approval at least 2 months prior to the lodgement of the bond.	Section 10
B67	If the SWOE BOS and rehabilitation are completed generally in accordance with the relevant performance and completion criteria, to the satisfaction of the Secretary, or if alternate funding arrangements are provided for the SWOE BOS under a long term security arrangement (see condition B56) the Secretary will release the bond.	Section 10
B68	If the SWOE BOS or rehabilitation is not completed generally in accordance with the relevant performance and completion criteria, the Secretary will call in all, or part of, the bond, and arrange for the completion of the relevant works.	Section 10
	Part D. Environmental Management, Reporting and Auditing	
	Management Plan Requirements	
D4	Management plans required under this approval must be prepared in accordance with relevant guidelines, and include: a. a summary of relevant background or baseline data; b. details of: i. the relevant statutory requirements (including any relevant approval, licence or lease conditions); ii. any relevant limits or performance measures and criteria; and iii. the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; c. any relevant commitments or recommendations identified in the document/s listed in condition A2(c); d. a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria; e. a program to monitor and report on the: i. impacts and environmental performance of the project; and	(a) Section 3 (b) Section 2, 8 (c) Section 2.2 (d) Section 4, 5, 6, 7, 8 (e) Section 8, 12

CoA	Condition of Project Approval	Referenced in BRMP
	ii. effectiveness of the management measures set out pursuant to condition D4(d); f. a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; g. a program to investigate and implement ways to improve the environmental performance of the project over time; h. a protocol for managing and reporting any: i. incident, non-compliance or exceedance of the impact assessment criteria or performance criteria; ii. complaint; or iii. failure to comply with statutory requirements; i. public sources of information and data to assist stakeholders in understanding environmental impacts of the development; j. a protocol for periodic review of the plan; and k. a document control table that includes version numbers, dates when the management plan was prepared and reviewed, names and positions of people who prepared and reviewed the management plan, a description of any revisions made and the date of the Secretary's approval. *Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.*	(f) Section 9, 12, Appendix H (g) Section 12.5 (h) Section 12 (i) Section 12.3.4 (j) Section 12.5 (k) page i
	Adaptive Management	
D5	The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in PART B. 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 measures to ensure that the exceedance ceases and does not re-occur; 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.	Section 9
	Revision of Strategies, Plans & Programs	
D6	Within three months of: a. the submission of an incident report under condition D9; b. the submission of an Annual Review under condition D11; c. the submission of an Independent Environmental Audit under condition D13;	Section 12

CoA	Condition of Project Approval	Referenced in BRMP
	d. the approval of any modification of the conditions of this approval (unless the conditions require otherwise); e. notification of a change in project stage under condition A15; or f. the issue of a direction of the Secretary under condition A2(b) which requires a review, the suitability of existing strategies, plans and programs required under this approval must be reviewed by the Proponent.	
D7	If necessary, to either improve the environmental performance of the project, cater for a modification or comply with a direction, the strategies, plans and programs required under this approval must be revised, to the satisfaction of the Secretary and submitted to the Secretary for approval within six weeks of the review. Note: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the project.	Section 12
D8	The Proponent must continue to apply existing management plans, strategies or monitoring programs approved prior to the determination of Modification 5, until the approval of a similar plan, strategy or program following the determination of Modification 5.	Section 1.7
D9	The Applicant must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing via the Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident.	Section 12.3.2
D10	Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing via the Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.	Section 12.3.3
D11	By the end of March in each year after the commencement of development, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary. This review must: a. describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year; b. include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, including a comparison of these results against the: i. relevant statutory requirements, limits or performance measures/criteria; ii. requirements of any plan or program required under this consent; iii. monitoring results of previous years; and iv. relevant predictions in the documents listed condition A2(c).	Section 12.3.1

CoA	Condition of Project Approval	Referenced in BRMP
	c. identify any non-compliance or incident which occurred in the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence; d. evaluate and report on: i. the effectiveness of the noise and air quality management systems; and ii. compliance with the performance measures, criteria and operating conditions in this consent; e. identify any trends in the monitoring data over the life of the development; f. identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and g. describe what measures will be implemented over the next calendar year to improve the environmental performance of the development.	
D12	Copies of the Annual Review must be submitted to Council and made available to the CCC and any interested person upon request.	Section 12.3.1
D13	Within three years of the date of the commencement of construction, and every three years after, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. The audit must: a. be led by a suitably qualified, experienced and independent auditor whose appointment has been endorsed by the Planning Secretary; b. be conducted by a suitably qualified, experienced and independent team of experts (including any expert in field/s specified by the Planning Secretary) whose appointment has been endorsed by the Planning Secretary; c. be carried out in consultation with the relevant agencies and the CCC; d. assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent, any relevant EPL, water licences and mining leases for the development (including any assessment, strategy, plan or program required under these approvals); e. review the adequacy of any approved strategy, plan or program required under the abovementioned approvals and this consent; f. recommend appropriate measures or actions to improve the environmental performance of the development and any assessment, strategy, plan or program required under the abovementioned approvals and this consent; and g. be conducted and reported to the satisfaction of the Planning Secretary. Within three months of commencing an Independent Environmental Audit, or within another timeframe agreed by the Planning Secretary, the Applicant must submit a copy of the audit report to the Planning Secretary, and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the Planning Secretary.	Section 12.4.1

CoA	Condition of Project Approval	Referenced in BRMP
D16	Before the commencement of construction until the completion of all rehabilitation required under this consent, the Applicant must: *NSW Government 23 Department of Planning, Industry and Environment* a. make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website: i. the document/s listed in condition A2(c); ii. all current statutory approvals for the development; iii. all approved strategies, plans and programs required under the conditions of this consent; iv. minutes of CCC meetings; v. regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent; vi. a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; vii. a summary of the current stage and progress of the development; viii. contact details to enquire about the development or to make a complaint; ix. a complaints register, updated monthly; x. the Annual Reviews of the development; xi. audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report; xii. (xii) any other matter required by the Planning Secretary; and b. keep such information up to date, to the satisfaction of the Planning Secretary.	Section 12.3.4

2.2 STATEMENT OF COMMITMENTS

The *Marulan South Quarry Environmental Assessment Report* (ERM, 2006) and associated Modifications recommended a range of measures to avoid, manage, mitigate, offset and/or monitor the environmental impacts of the project, as set out in the Statement of Commitments. The commitments that relate to biodiversity and rehabilitation management and a cross-reference to the location within this BRMP where the commitment is addressed are set out in Table 5 below.

Table 5: Statement of Commitments

Statement of Commitment	Referenced in BRMP
Original EA requirements (ERM 2006)	
The following general rehabilitation procedures will apply: • the most recently stripped topsoil will be used to top dress emplacement areas and bunds to a depth equal to the average depth of topsoil across the site to achieve the greatest benefits from the seedbank and soil; • topsoil unable to be used immediately will be stockpiled for later rehabilitation of disturbed areas. These stockpiles will be kept to a limited size and seeded to ensure stabilisation and preservation of topsoil quality; and • rehabilitation will include shaping of the bund and emplacement areas to provide drainage and irregular features for integration with the surrounding landscape.	Section 6
If in the event that Boral chooses not to extend quarrying at the end of 30 years, the following conceptual rehabilitation principles would be expected to be implemented: • benches will be restricted to twenty metres high; • all surface runoff will be directed away from the pit; • final benches will be capped with a layer of overburden and topsoil, and planted with trees, shrubs and groundcovers indicative of species found in the adjacent Box-Gum Woodland; and • all ancillary infrastructure (apart from dams) will be removed and the land rehabilitated.	Section 5.3
Key mitigation measures designed to offset the loss of habitat, native flora and fauna, and endangered ecological communities during the project include: • installation of 40 fauna boxes in mature trees (25 adjacent to the quarry and 15 within the section of Box-Gum Woodland to be retained) to mitigate the removal of hollow-bearing trees. The boxes will be installed prior to any trees being removed; • a pre-clearance survey of all trees to be removed by an appropriately qualified person, to ensure that no animals are in the trees. An appropriately qualified person will be on site while trees are removed so that any animals inhabiting the trees can be captured and relocated; • planting of an area equal to twice the area of Box-Gum Woodland to be removed with endemic tree species characteristic of Box-Gum Woodland. Seed will be sourced from the woodland near Dam 1 and if needed, the area will be fenced to prevent human, stock and vehicular access; • where feasible, clearing within the area of Dam 1 will be timed for after flowering and seed-set by the native grasses (spring-summer) to maximise stores of seed in the soil; • where feasible, topsoil from the area of woodland near Dam 1 will be preferentially stripped and used for rehabilitation; • revegetation around the dams and the addition of semi-submerged rocky areas around the perimeter of the dams will be designed to create habitat for native frogs and reptiles; • weed management will occur throughout the quarry and associated infrastructure areas; and • release of environmental flows to Barbers Creek equivalent to 10% of average daily flows.	Section 4, 6.1 Appendix D and D
Modification 1	
In accordance with the Project Approval, a Landscape and Rehabilitation Management Plan (LRMP) was first prepared by ERM for Boral in 2011.	Section 1.7

Statement of Commitment	Referenced in BRMP
Modification 2	
Following construction activities, disturbed areas no longer required for operation will be rehabilitated. Decisions about appropriate rehabilitation will be made in accordance with the requirements of stakeholder at the time. Mitigation measure to be implemented as part of the proposal for protection of flora and fauna include the: • Rehabilitation of the bunds and emplacement areas with Box-Gum Woodland species • Rehabilitation within three months of completion of the bund • Protection of Box-Gum Woodland by installation of secure fencing prior to construction of the bund • Pre-clearing tree inspection • Removal of trees in accordance with recommendations in EA (2006) On-going management of rehabilitation areas to ensure no weeds of significance enter Box-Gum Woodland	Section 6.2
Modification 3	
• All disturbance areas and access routes will be clearly delineated and flagged in the field so that no areas outside of those assessed will be affected by machinery or personnel. • No hollow bearing limbs or trees are to be impacted. • If bird nests are identified these will be avoided by personnel and machinery. • Machinery will not drive over any woody ground debris and where debris is encountered, it will be moved into adjacent native vegetation by hand. • All machinery will be inspected for weed seeds and clods of soil prior to entering vegetated areas. • Ground disturbance will be minimised wherever possible. • All waste and materials used on site will be removed at the conclusion of the works. • All holes and trenches will be filled or capped overnight to prevent fauna from injuring themselves or becoming trapped/drowned. • Sites will be monitored and managed for noxious weeds in the 12 months following works and until native species have regenerated the site. • A clearing maintenance protocol will be established for the ongoing maintenance of the easement and will include protocols for the management of weeds such as Serrated Tussock and St John's Wort. • Following construction all disturbed areas will be stabilised and rehabilitated. • All waste and materials used will be removed from the disturbed areas at the conclusion of the works and disposed of appropriately. • Following construction all disturbed areas will be stabilised and rehabilitated. • Green wastes will be used for rehabilitation purposes elsewhere on site, if possible.	Section 6.2 Section 7.1

Statement of Commitment	Referenced in BRMP
Modification 4	
• The Southern Overburden Emplacement will be landscaped and rehabilitated in accordance with the approved Peppertree Quarry Landscape and Rehabilitation Management Plan, in order to minimise the potential for visual, air quality, biodiversity and erosion and sedimentation impacts arising from unstabilised ground surfaces. • Progressive and final revegetation and rehabilitation to create a stable landform that does not result in the sediment laden runoff, fugitive dust emissions, blends well with the adjacent natural landscapes of the Morton National Park and re-establishes a native bushland dominated by White Box Yellow Box Blakely's Red Gum Grassy Woodland species. • The Southern Overburden Emplacement would be progressively rehabilitated and will eventually be entirely revegetated to a native, open woodland community, which will recreate fauna habitat, and minimise the edge effects created during its development. • This modification and its subsequent approval requires a total of 225 ecosystem credits to be retired in accordance with the Framework for Biodiversity Assessment - NSW Biodiversity Offsets Policy for Major Projects, to offset the removal of 8.1 hectares of White Box Yellow Box Blakely's Red Gum Grassy Woodland. Boral proposes to use an offset area within their landholdings in the vicinity of the Quarry, which has been identified as containing White Box Yellow Box Blakely's Red Gum Woodland.	Section 1.7 Section 6.2 Section 4.5, 10
Modification 5	
• The South Western Overburden Emplacement will be landscaped and rehabilitated in accordance with the approved Biodiversity and Rehabilitation Management Plan (2017), in order to minimise the potential for visual, air quality, biodiversity and erosion and sedimentation impacts arising from unstabilised ground surfaces. The Biodiversity and Rehabilitation Management Plan (2017) will be revised to incorporate the additional SWOE and any additional management strategies to ensure temporary stabilisation of exposed surfaces, permanent stabilisation strategies, progressive rehabilitation with groundcover vegetation during overburden emplacement and final rehabilitation as soon as practical after formation of the SWOE.	Section 1.7 Section 6.2
Modification 6	
• During the operation of the quarry, no rehabilitation will be undertaken associated with the Modification 6 works as the Dust Extraction System is within the existing operations plant footprint. This area will be returned to pasture at the end of life of the quarry.	Section 5.2, 6.3
Modification 7	
• Removal of the tree described in Modification Report (MOD 7) can occur at any time, except during winter months (June to August, inclusive), • removal of the tree is such that (i) the tree is gradually dismantled and lowered to the ground, using ropes or a crane; and • (ii) any bats identified within the tree are captured and released at night; under the supervision of a suitably qualified and experienced ecologist;	Section 4.2

2.3 STRATEGIES, POLICIES AND PLANS

Key strategies, policies and plans relating to biodiversity and rehabilitation that have been considered in this BRMP include:

- State Environmental Planning Policy (SEPP) Koala Habitat Protection 2020
- State Environmental Planning Policy (SEPP) Koala Habitat Protection 2021
- Department of Industry Resources and Energy ESG3: Mining Operations Plan (MOP) Guidelines, September 2013
- Hygiene Protocol for the control of Disease in Frogs (DECC 2008).
- Code of Practice for Injured, Sick and Orphaned Protected Fauna (OEH 2011).

- Code of Practice for injured, sick and orphaned flying foxes (OEH 2012).
- Code of Practice for injured, sick and orphaned koalas (OEH 2011).
- Guidelines for the rehabilitation of birds of prey (DECCW 2011).
- Prevention of Cruelty to Animals Act 1979.
- Threat abatement plan for predation by European red fox (DEWHA 2008)
- Threat abatement plan for predation by feral cats (DoE 2015)
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (DoEE 2017).
- Threat abatement plan for competition and land degradation by unmanaged goats (DEWHA 2008)
- Threat abatement plan for competition and land degradation by rabbits (DoEE 2016)
- Goulburn Mulwaree Development Control Plan 2009
- Goulburn Mulwaree Local Environment Plan 2009

3 EXISTING ENVIRONMENT

3.1 NATURAL ENVIRONMENT

Land to the west, east and south of the Quarry and Limestone Mine are identified as 'Environmentally Sensitive Land – Biodiversity' under the Goulburn Mulwaree LEP and includes the Morton National Park and Bungonia State Conservation Area located to the east and south respectively.

The majority of the Quarry site has been previously used for grazing purposes and is predominantly cleared of native vegetation. However, areas of derived native pasture and patches of remnant and native regrowth occur within portion of the Peppertree site. Some of this vegetation aligns to the Threatened Ecological Community – Box-Gum Woodland which is listed as a Critically Endangered Ecological Community under the BC Act and EPBC Act.

3.2 LANDUSE, OWNERSHIP AND ZONING

The Quarry is bordered to the south by the Limestone Mine, to the east by Morton National Park and by rural properties to the north and west. Surrounding land uses include mining, grazing, rural properties including an agricultural lime manufacturing facility, fireworks storage facility, turkey farm and rural residential. The main access for these properties is via Marulan South Road. Rural residential properties are also located to the northeast of the Quarry along Long Point Road. These properties are separated from the Quarry by the deep Barbers Creek gorge.

Boral own the affected land associated with Peppertree Quarry. Much of the land is zoned for primary production.

3.3 TOPOGRAPHY

Peppertree quarry is located on a plateau in the Southern Tablelands area of New South Wales. The maximum altitude of this plain is 700 m. The deeply incised Bungonia Gorge lies immediately to the east of the quarry and rugged hilly terrain occurs beyond this.

The quarry area itself is relatively flat to gently undulating.

3.4 HYDROLOGY

Peppertree Quarry lies within the catchment of the Shoalhaven River (a drinking water supply) which is located approximately 6.5 kilometres to the south east downstream of the quarry. Other creeks within the local area include Barbers Creek 500 metres to the east, Marulan Creek 2 kilometres to the north, Kerillon Creek 3 kilometres to the south west, and Bungonia Creek 4 kilometres to the south. Small intermittent creeks run 200 metres to the south, north and west, and Tangarang Creek runs west to east bordering the quarry operations. The quarry is situated toward the edge of a plateau adjacent to steep gullies that border the Barbers Creek Gorge system.

Smaller ephemeral drainage channels cut across the footprint of the quarry and previously collected drainage from offsite.

Clean water diversion drains are now in place to manage this flow away from the site. Surface water within the Quarry site is managed in accordance with the *Peppertree Quarry Water Management Plan* (2016). The surface water management system includes a number of sediment basins that capture stormwater runoff from disturbed areas (overburden emplacements, haul roads and processing plant) which is then directed northwards (through pumping or gravity flow) into the Main Dam. Select catchments drain to the Quarry pit from where water is either used for dust suppression purposes, or

pumped to the Main Dam, which is the water supply dam for the Quarry and as required by the Project Approval, provides environmental flow downstream of the dam equivalent to at least 10% of the average daily flow.

The Main Dam is located on the main ephemeral creek, Tangarang Creek, which flows along the northern edge of the Quarry site to Barbers Creek approximately 500 metres to the east of the Quarry. Upstream of the dam, Tangarang Creek is a fourth order stream with a catchment area of approximately 615 hectares.

Other catchments within the Quarry site drain to a series of small sediment dams, mainly located on the outer edge of the northern noise bund, or the eastern side of the Eastern Overburden Emplacement, and the new Southern Overburden Emplacement Area. These dams drain either to Tangarang Creek or Barbers Creek (in large storm events).

3.5 SOILS

Acid-sodic soils occur in the Southern Tablelands area, particularly on gentle lower slopes/footslopes and relict alluvial deposits, with subsoil colours being yellow to brown with various degree of mottling. Soils within the general area are typical duplex soils with a thin topsoil A horizon and underlying clayey B horizon. On ridge crests and slopes, soils are generally skeletal and bedrock outcrops are not uncommon. In contrast, colluvial and alluvial deposition along drainage lines results in the formation of deeper soil profiles along some of these landforms although these deposits may be heavily eroded (ERM 2006).

Minimal disturbance is undertaken to soils unless necessary due to the potential for indigenous artefacts. No topsoil will be removed from the South Western Overburden Emplacement due to potential for indigenous artefacts.

3.6 SIGNIFICANT BIODIVERSITY VALUES

3.6.1 Threatened Ecological Communities

The Peppertree Quarry site supports areas containing Box-Gum Woodland, which is listed as a Critically Endangered Ecological Community under the EPBC Act and the BC Act (the listing under the BC Act also recognises derived native grasslands as part of this ecological community).

Box-Gum Woodland has been recorded predominantly in the Habitat Management Area (refer Figure 4) and throughout surrounding grazed paddocks and open areas where clumps of trees (mainly *Eucalyptus melliodora*) and native grasslands occur.

The most significant patch of Box-Gum Woodland occurs to the north-east of the Peppertree Quarry at the Peppers Woodland area, which contains 35.91 hectares of Box-Gum Woodland in good condition that adjoins Morton National Park.

3.6.2 Threatened Flora Species

One threatened flora species - *Solanum celatum*, which is listed as Endangered under Schedule 1 of the NSW BC Act. Its distribution is restricted to an area from Wollongong to just south of Nowra and west to Bungonia (NSW Scientific Committee, 2003; OEH, 2018) and it has been recorded near the Peppertree Quarry. The species was recorded:

- To the south of the Peppertree Quarry resource area near the Marulan South Limestone Mine during ERM (2006) survey. *S. celatum* was recorded immediately to the south of the total resource area, close to the boundary of the Boral Cement limestone mine and approximately 500 metres south of the 30 year quarry area. The plants were found amongst small rocky outcrops and a few trees in open pasture woodland on the edge of dry sclerophyll forest.

- Toward the east of the Southern Overburden Emplacement along the ridge top leading down to Barbers Creek during Niche (2015) surveys.
- To the south of the Marulan South lease area during Niche (2013) surveys.
- *S.celatum* was also recorded during tree clearance surveys to the north east of the quarry in an area that was gently undulating that comprised of open woodland, a grassy understorey with substantial amounts of dead timber on the ground. This area has since been fenced off as a sensitive environmental area.
- *S. celatum* has also been observed on land adjacent to the mine site to the north-east which is fenced from all mining activities

The species has a relatively extensive population in Morton National Park.

The HMA and Peppers Woodland area provide suitable habitat for this species.

No other threatened flora have been recorded during ecological surveys within the near vicinity of Peppertree Quarry since 2006.

3.6.3 Threatened fauna species

Threatened fauna were recorded from within the vicinity of Peppertree Quarry include: Diamond Firetail, Scarlet Robin, Varied Sittella, Koala, Eastern Bentwing Bat, Greater Broad-nosed Bat and Large-eared Pied Bat.

All threatened species recorded are listed as vulnerable species under the BC Act and the Large-eared Pied Bat and Koala are listed as vulnerable and endangered under the EPBC Act respectively.

There are 137 Koala records from the Bionet Atlas within a 10 km radius of the site. The majority of these records (105) are from the Bungonia National Park and Bungonia State Conservation Area (SCA) which occur approximately 1 - 4 km south of Peppertree Quarry. The Koala was not recorded during surveys for the Modification 5 areas (Niche, 2018). However, previous sighting in the area indicated that the Koala may use the habitat features of the site on occasion. The Biodiversity Development Assessment Report (Niche, 2018) mapped 27.1 ha of occupiable habitat will be cleared as part of the Modification 5 development. The offset obligation required by Modification 5 will be met by retiring credits under the BC Act from properties located remotely from the quarry site, owned by Boral and other landholders.

A number of additional threatened fauna have the potential to occur within the vicinity of Peppertree Quarry but have not been recorded, most likely due to their potential use of the study area or wider locality being limited to sporadic occurrences (e.g. nomadic birds). Such species include: Gang-gang Cockatoo, Speckled Warbler, Rainbow Bee-eater, Black-faced Monarch, Flame Robin, Rufous Fantail, Eastern False Pipistrelle and Grey-headed Flying-fox.

3.6.4 Habitat corridors

Bushland to the east of the Quarry is part of an extensive corridor of native vegetation extending into Morton National Park and Bungonia State Conservation Area.

The Peppertree Woodland area occurs to the north-east of Peppertree Quarry and consists of 75.54 hectares of native vegetation which is part of an extensive corridor of native vegetation extending along Barber's Creek into Morton National Park and Bungonia State Conservation Area. The HMA along Tangarang Creek forms a link of habitat connectivity to the Peppertree Woodland area.

3.7 HABITAT MANAGEMENT AREA

The HMA occurs to the west of Peppertree Quarry along Tangarang Creek. The Tangarang Creek corridor represents one of the few existing east-west habitat corridor links for the locality, with cleared grazing land and quarrying occurring in the landscape for a number of kilometres to the north and south.

The HMA has included the direct establishment of tree, shrub and groundcover species characteristic of Box-Gum Grassy Woodland. The establishment of these species has occurred within a 20 metre buffer around the periphery of the Main Dam, and on either side of Tangarang Creek. This area is more than 13.5 hectares in area.

3.8 PEPPERS WOODLAND AREA

The Peppers Woodland area occurs to the north-east of Peppertree Quarry located at Marulan South NSW (Figure 4). The area consists of native vegetation which is part of an extensive corridor of native vegetation extending along Barber's Creek into Morton National Park and Bungonia State Conservation Area (Figure 1).

The condition of vegetation across the Peppers Woodland area (in particular the eastern side) is in relatively good condition – with all stratum layers intact and minimal weeds. Weeds tend to occur to the west of the area, which is within or immediately adjacent to areas currently grazed. Eucalypt regeneration is extensive throughout this area signifying a resilient soil seed bank.

The Peppers Woodland area supports an area of White Box Yellow Box Blakely's Red Gum Grassy Woodland (Box-Gum Woodland), which is listed as an Critically Endangered Ecological Community under the NSW BC Act , and Critically Endangered Ecological Community under the Commonwealth Environment Protection Biodiversity Conservation Act 1999 (EPBC Act). The Peppers Woodland area also contains known habitat for threatened plant and animal species such as the Koala.

This area is used as the benchmark site for measuring the performance of the rehabilitated sites towards completion and success.

3.9 HABITAT CORRIDORS AND CONNECTIVITY

The quarry site is adjacent to Morton National Park and Bungonia State Recreation Area, which together support approximately 195,000 hectares of undisturbed and continuous eucalypt woodland.

The Habitat Management Area connects to the Peppers Woodland area to the east which provides a link to Morton National Park and Bungonia State Recreation Area.

Habitat connectivity objectives and targets are discussed further in section 6.

Further connectivity corridors will be implemented with the rehabilitation of the Eastern, Southern and South Western Overburden Emplacements and into the Final Landform Design.

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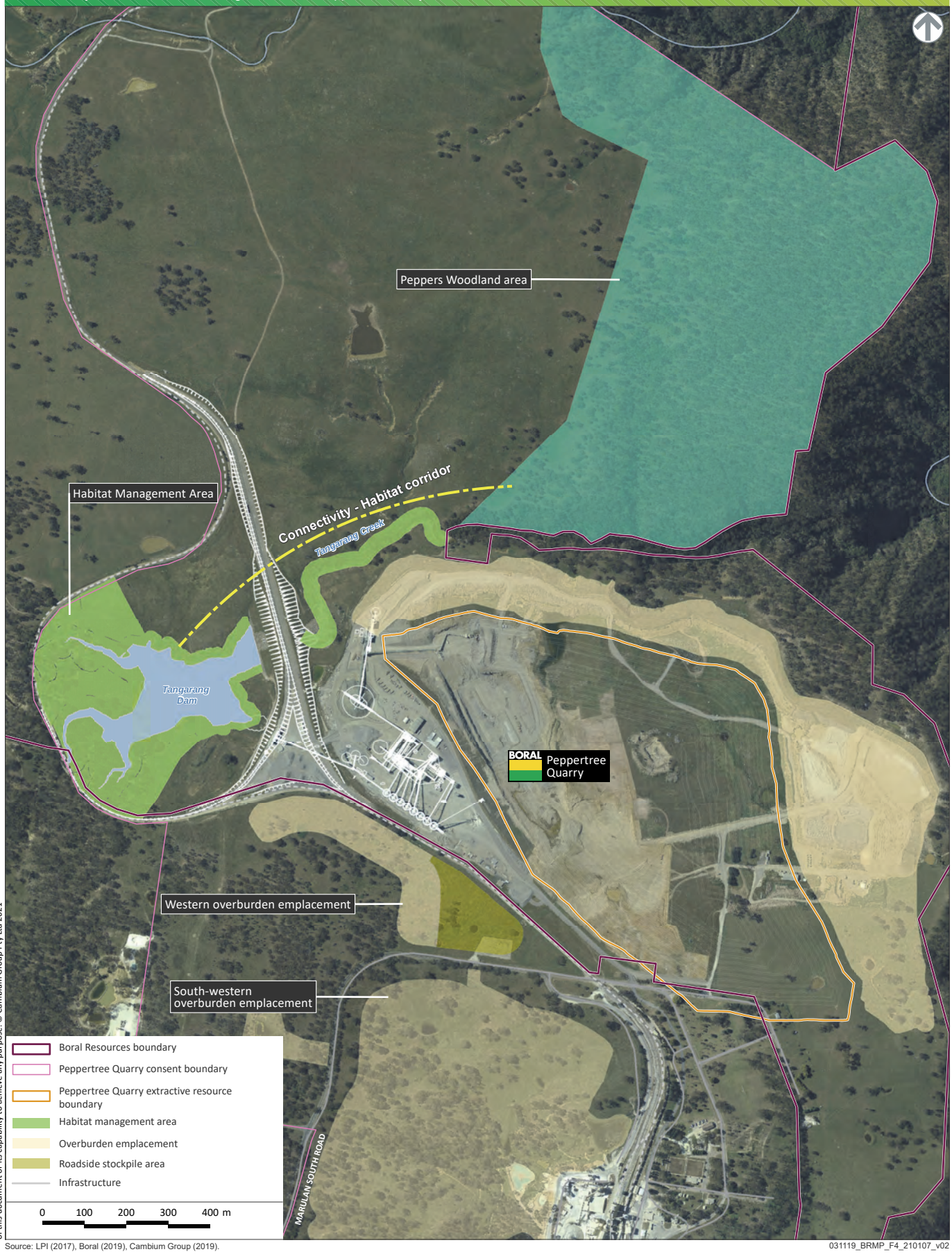
Figure 4
Habitat Management Area and Peppers Woodland area
Biodiversity and Rehabilitation Management Plan / Peppertree Quarry



Source: LPI (2017), Boral (2019), Cambium Group (2019).

4 VEGETATION MANAGEMENT

4.1 VEGETATION MANAGEMENT OBJECTIVES

The majority of the quarry site has been previously cleared for agriculture, and only scattered native trees and isolated patches of woodland remain. Development and operation of the proposed Peppertree Quarry and associated infrastructure will occur adjacent to areas of the endangered Box Gum Grassy Woodland. The remainder of the site is exotic grassland and pasture with scattered and isolated trees. Detailed are provided in associated terrestrial ecology reports submitted with the EA and Modifications.

This section of the plan details general measures to protect the native vegetation of the site (existing areas to be retained on site and the revegetated areas), and to protect native fauna habitats. The main objectives of native vegetation management are:

- to protect native trees and vegetation from inadvertent removal and disturbance during pre-construction, construction and operations
- to conserve and protect significant species and their habitats from damage and disturbance
- to provide ongoing management to ensure viability of the species at the site
- to maintain native fauna habitats at the site wherever possible.

Vegetation management actions and associated timeframes (short, medium and long term measures), purpose, priority, and responsibility are provided in Appendix D to Appendix F. All relevant contractors will be made aware of these actions as part of their induction (Section 11.1) and Safe Work Method Statement procedures.

4.2 VEGETATION CLEARING

Due to clearing and grazing over many years, the majority of vegetation to be removed within the quarry pit and dam areas comprises grassland, with scattered mature trees with no ground or shrub layers. Accordingly, the focus of fauna protection is the identification of hollow-bearing trees and ground dwelling fauna, and the safe relocation of identified fauna by a suitably qualified wildlife spotter/handler.

The following protocol has been and will be implemented during vegetation removal:

- Prior to clearing of grassland, ecologists are engaged to survey for ground dwelling fauna and to remove any flora/fauna habitats to adjacent areas that will not be further disturbed.
- Prior to clearing of remnant hollow-bearing trees, a suitably qualified wildlife spotter/handler will be engaged to supervise hollow-bearing clearing activities. All hollow-bearing trees that are accessible safely from the ground are checked and identified fauna relocated. Hollows higher up and not accessible from the ground are identified and trees felled gently by an excavator or dozer and left overnight to allow fauna to relocate.
- Any fauna displaced during clearing is captured where possible and relocated to pre-planned areas (fauna to be captured and handled only by personnel trained to do so).
- Should any fauna be injured during clearing, the animal will be captured by the suitably qualified wildlife handler onsite. The NSW Wildlife Information, Rescue and Education Service (WIRES) will be contacted to collect the animal for appropriate care and rehabilitation.

The clearing protocol was included in the construction management plans and will be used in the future when any additional clearing be required. To date, all tree vegetation on the identified footprint of the construction works and quarry pit area has been removed following the above protocol.

In addition to the steps outlined above, pre-clearance surveys for the Western Overburden Emplacement and the Modification 5 area were undertaken. The pre clearance surveys were undertaken by a suitably qualified consultant that was approved by the DPE Secretary prior to clearing and included

- Hollow-bearing trees and other habitat features were tagged in the field and mapped;
- A strategy for the salvage of habitat resources and/or installation of nest boxes was developed and is being implemented as recommended by the consultant to compensate for loss of habitat. This strategy will includes:
    - Installation of 33 nest boxes with entrances of various sizes and shapes to effectively compensate for the loss of hollow habitat in the South Western Overburden. The majority of these nest boxes should be installed in the HMA, however, Peppers Woodland could also be considered;
    - The salvage of woody debris and redistribution in the HMA noting that the amount of woody debris should not exceed benchmark values for the PCTs on site; and
    - Once installed nest boxes should be monitored for the first 5 years for evidence of use and condition. Nest boxes that have fallen or the structure of the nest box has failed should be repaired and/or replaced.
- Fauna survey will be undertaken within 21 days before clearing, including an assessment of ground-dwelling fauna in grassland areas and spotlighting surveys in woodland areas.

Management Actions relating to the removal of native vegetation are provided in Appendix D.

Additional conditions are in place for the removal of any vegetation associated with the western overburden emplacement and Modification 5 disturbance area. This is contained in condition B53 of the modification conditions of consent.

B53 The Proponent must:

a) clearly and securely mark out the boundaries of the WOE and the Modification 5 disturbance area prior to clearing and site preparation within those areas;

b) not clear vegetation in the WOE area or the Modification 5 disturbance area unless a fauna survey of the area to be cleared has been undertaken within the prior 21 days, by a suitably qualified expert who has been approved by the Secretary;

c) seek to avoid clearing of native vegetation in the WOE area and the Modification 5 disturbance area during the period August to November of any year; and

d) not damage or clear any Box Gum Woodland EEC or other native vegetation located adjacent to the WOE or the Modification 5 disturbance area.

Boral also have in place an internal approval process for the removal of vegetation to ensure only vegetation is removed that has been approved. This process will also be followed.

4.3 RETAINED VEGETATION

All native vegetation that does not have approval to be cleared and is to be retained and any indirect impacts such as sedimentation runoff and weed spread is to be managed using the recommendations in this plan.

Management actions relating to retaining native vegetation are provided in Appendix D.

The majority of mature trees in the upper reaches of the Main Dam, including all hollow-bearing trees, have been retained and managed as per the HMA objectives.

In addition, 40 fauna boxes have been installed in mature trees (25 adjacent to the quarry and 15 within the section of Box-Gum Woodland to be retained in the upper reaches of Dam 1) to mitigate the removal of existing hollow-bearing trees. The boxes were installed in April / May 2011 prior to any trees being removed.

4.4 PROTECTION OF SIGNIFICANT BIODIVERSITY

The objectives of the management of the site for significant native species are:

- to conserve and protect significant species and their habitats from damage and disturbance
- to provide ongoing management to ensure viability of the species at the site.

4.4.1 Threatened Flora

Solanum celatum was recorded on the site during ERM's initial investigation of the area in 2005. Previous records are provided in 3.6.2.

Given its extremely small population size and restricted distribution, *S. celatum* is threatened by local extinction due to environmental and demographic uncertainty. Other threats include:

- habitat loss due to clearing for agriculture and urban development
- habitat degradation, primarily by invasion of L*antana camara* and
- Inappropriate fire regimes, particularly frequent fire.

Additional plants were identified during vegetation removal practices during construction in 2012. The noise bund was modified to allow for the habitat of the plants. The area has been protected as detailed below.

To conserve and protect the *Solanum celatum* on the site the following has been undertaken:

- stock and vehicles are excluded from areas known to support *S. celatum*
- areas of known locations of *S. celatum* are fenced
- and
- any new discoveries of *S. celatum* are to be recorded with GPS, and this information provided to the Environmental Officer.

A description of the species has been included in the construction plans, so that if any additional plants are found in areas not previously identified, they can be marked and the Environmental Officer notified immediately.

Should any new plants be identified similar actions will be undertaken.

Management actions relating to the removal of threatened species and habitat are provided in Appendix D.

4.4.2 Threatened fauna

Retention of native vegetation and the revegetation of the site will enhance the likelihood of the site being used for potential foraging by threatened fauna species. As discussed in section 3.6.3, threatened fauna have been previously recorded within the vicinity of Peppertree Quarry. It is therefore important that potential harm to fauna is minimised during construction and operation activities. Key objectives in relation to threatened fauna include:

- native habitats are retained

- hollow-bearing trees outside of disturbed areas are retained on site
- the HMA is managed and natural regeneration occurs

Key management actions in relation to protection of fauna include:

- Suitably qualified ecologist to conduct a survey (species specific) of known populations and potential habitat, to provide greater insight into the current status of the species, threats to its persistence and management actions.
- An appropriately qualified person to conduct a survey of trees to identify any nesting species.
- Advise the NPWS and RFS of nesting parrots
- Fauna -sensitive lighting (high-pressure sodium lighting or luminare shields) are installed and are not directed towards the HMA.

Management actions relating to the removal of threatened species and habitat are provided in Appendix D.

4.5 BIODIVERSITY OFFSET STRATEGIES

The removal of vegetation associated with Modification 4, and Modification 5 requires Biodiversity offset strategies as per Conditions B55, B56 and B57.

The initial offset obligation for modification 4 was the establishment of the “SOE BOS” located on Boral owned land adjacent to the Peppertree Quarry. The Condition requires the retirement of 225 ecosystem credits to offset the removal of 8.1 ha of White Box Yellow Box Blakely’s Red Gum Grassy Woodland.

An application was made to the then Office of Environment and Heritage for an Assessment of Reasonable Equivalence for 165 biodiversity credits, which was approved. A copy of the statement is contained in Appendix A.

With the commencement of the Modification 4 emplacement in October 2017, it was deemed that insufficient time would be available to establish the offset as required under Condition 55. The required credits were duly retired by making a payment into the Biodiversity Conservation Fund under division 6, section 6.30 (1) of the Biodiversity Conservation Act (BC Act). Payment was acknowledged as per Appendix A.

The offset obligation required by Modification 5, Condition 56 and B57 will be met by retiring credits under the BC Act from properties located remotely from the quarry site, owned by Boral and other landholders.

Within 12 months of commencing any work within the Modification 5 disturbance area, the following biodiversity credits will be retired - .

- PCT 1334 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands (SR670) – 428 credits,
- PCT 778 Coast Grey Box – Stringybark dry woodland on slopes of the Shoalhaven Gorges – Southern Sydney Basin (SR534) – 157 credits
- Koala (*Phascolarctos cinereus*) - 487 credits
- Large-eared Pied Bat (*Chalinolobus dwyeri*) - 731 credits.

“Coolumburra”, at Nerriga has been purchased by Boral, to meet a number of required credits for the both the Peppertree Quarry and Marulan South Limestone sites.

Assessments are being finalised for what will be a 1037ha Biodiversity Stewardship site, in a formal agreement with the Biodiversity Conservation Trust. The Biodiversity Stewardship Agreement is an in-perpetuity agreement and is registered on the property title.

The retirement of credits will be carried out in consultation with BCD and in accordance with the Biodiversity Offsets Scheme of the BC Act, to the satisfaction of the BCT.

5 REHABILITATION MANAGEMENT

5.1 REHABILITATION

Reconstructive landscaping within any proposed development area will be designed to integrate the built environment with bushland. This involves selecting species that will not invade the surrounding bushland and that will provide fauna habitat. This is particularly important at the interface of the development and native bushland. Progressive rehabilitation will take place prior to, during and after construction and quarrying, with the techniques and timing at each stage dependent on their practicability.

The following principles will be applied to the site:

- minimise clearing
- re-establish native vegetation cover as soon as possible after earthworks
- apply the minimum intervention necessary for success
- assess potential for natural regeneration prior to determining whether a regeneration or reconstruction approach is necessary
- plant and or direct seed where regeneration potential is severely depleted
- collect seed, vegetative material or trans-locatable individuals within the development area, to be grown or used in rehabilitation and reconstructive landscaping.

The disturbance associated with the Quarry (existing and proposed) is situated across a diverse range of landscapes, and will comprise a variety of landforms including out of pit overburden emplacements, an open cut pit, and Project infrastructure areas.

The main objectives of rehabilitation are to conserve the geomorphic stability of overburden emplacements, establish self-sustaining native vegetation and native habitats and ensure natural regeneration of the endangered ecological community of Box-Gum Grassy Woodland and other communities consistent with the conceptual final landform and land uses for the site. This will result in:

- a net improvement in ecological value and connectivity within the site and within the locality
- an increase in the area of viable Box-Gum Grassy Woodland
- management, maintenance and enhancement of habitats for threatened species

5.1.1 Rehabilitation Strategy

The broad rehabilitation strategy for disturbed land within the Project site includes the reshaping and stabilisation of post-mining landforms, topdressing of reshaped landforms, and the establishment and development of native woodland vegetation communities as shown in the conceptual final landform. The site will be divided into rehabilitation phases to assist with detailed rehabilitation planning. These phases include:

- Decommissioning
- Landform Establishment
- Growth Medium Development
- Vegetation Establishment
- Ecosystem Development
- Relinquishment.

5.2 FINAL LANDFORM

Due to the long project life, the 2006 Environmental Assessment in support of PA06_0074, proposed that development of the most appropriate end use for the quarry is best done in the last 5 years of its operational life within the context of market, environmental and land uses in the region at such time. In accordance with CoA B69 of MOD6 (20120) and consultation with relevant agencies, Boral will progress development of the Quarry Exit Strategy which will define objectives for quarry closure; investigate future use of the site including any final void/s and describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the project. A conceptual final landform has been developed for the quarry void (Figure 5) and associated surrounding land uses for the site. This conceptual final landform for the void consists of a benched void where accessible benches are rehabilitated with trees over grass.

It is envisaged in the conceptual landform that, given the Project site's proximity to conservation lands to the west and east and the need for slope stability and visual screening, a native woodland final land use has been selected for the overburden emplacements. Infrastructure located on the less steep land will be rehabilitated to pasture as the final land use. Redundant linear infrastructure (including rail, pipeline and roads) that extends into grazing pasture will be rehabilitated to match adjacent land.

The conceptual final form design is consistent with the proposed rehabilitation principles as discussed in Section 2.8 of the original EA (ERM 2006) and the rehabilitation objectives required by CoA B 58 as shown in Table 6.

Table 6: Rehabilitation objectives

Feature	Objective
All areas of the site affected by the project	• Safe • Hydraulically and geotechnically stable • Non-polluting • Fit for the intended post-quarrying operations land use(s) • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land
Surface infrastructure	• Decommissioned and removed, unless otherwise agreed by the Secretary
Quarry benches	• Landscaped and vegetated using native tree and understorey species
Final Void	• Minimise the size, depth and slope of the batters of the final void • Minimise the drainage catchment of the final void

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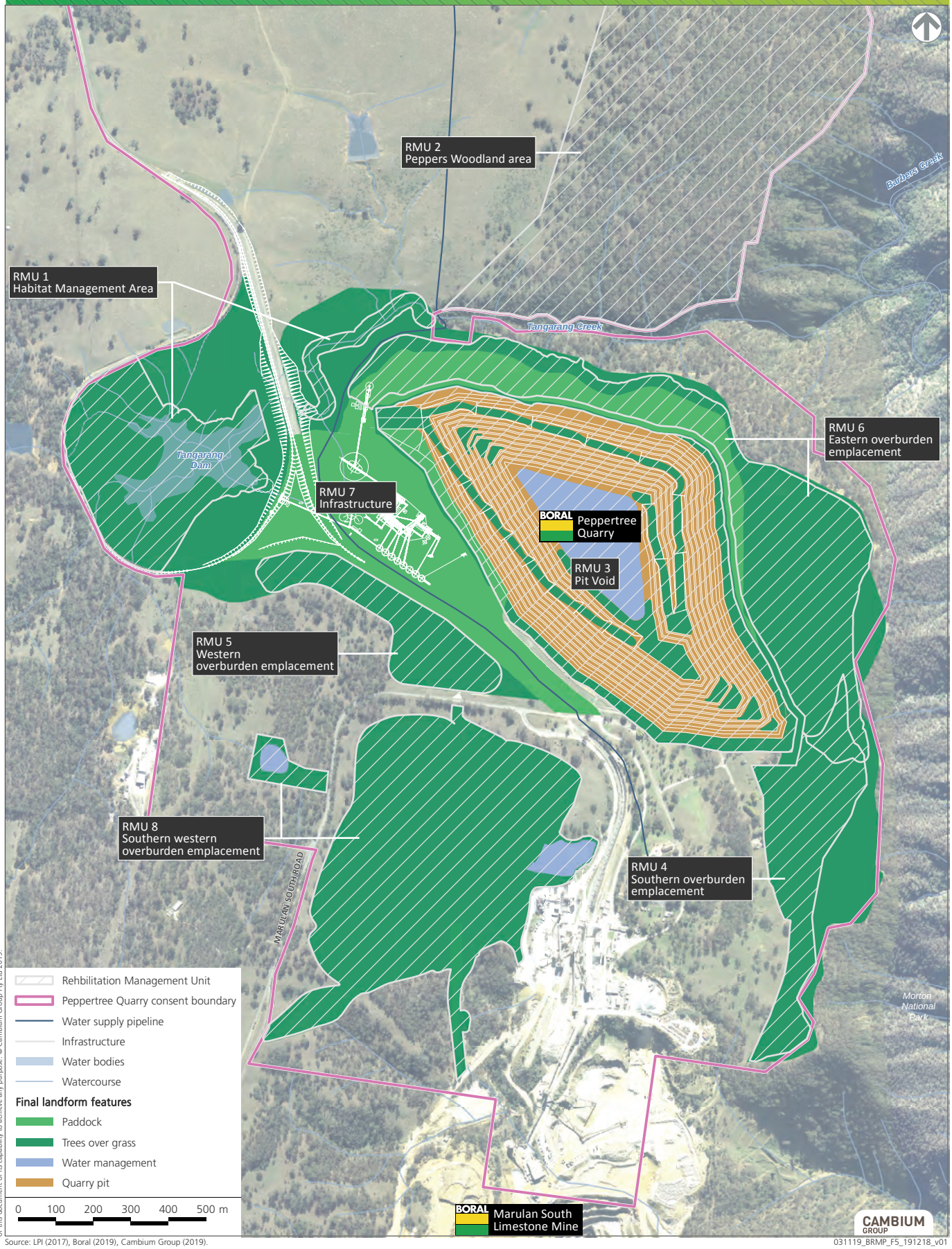
Figure 5
Final landform concept and Rehabilitation Management Units
Biodiversity and Rehabilitation Management Plan / Peppertree Quarry



Source: LPI (2017), Boral (2019), Cambium Group (2019).

CAMBIUM GROUP

5.3 REHABILITATION OBJECTIVES AND PERFORMANCE

The aim of the Biodiversity and Rehabilitation Plan is to progressively encourage a sustainable vegetation. Rehabilitation will be generally consistent with the proposed rehabilitation principles as discussed in Section 2.8 of the original EA (ERM 2006) and will comply with the rehabilitation objectives required by CoA B 58 (Table 6).

Rehabilitation management will involve:

- Progressive rehabilitation work will be undertaken when reshaped, benched and topsoiled areas become available
- The HMA will continue to be managed to ensure successful vegetation corridors are maintained

The Quarry exit Strategy is still to be developed, however the objectives and performance criteria for progressive rehabilitation during operations from short-term, medium and long-term measures will be consistent with to those provided in Table 7.

To facilitate effective long term rehabilitation planning, objectives will be selected for each rehabilitation unit. These objectives will reflect the selected final land use, and include the following commitments.

The performance criteria will be used to assess the progress of the rehabilitation management actions.

Table 7. General Rehabilitation objectives and performance criteria

Time Period	Objective	Performance Criteria
Short Term (<3-5 years)	All areas of the site affected by the project are constructed so that they are hydraulically and geotechnically stable and non-polluting	Landform design to consider stability and potential pollution risk. Construction as designed. Evidence of erosion being managed
	Minimise the environmental impact of the operation during the development and operational phases, ensuring that protection of native vegetation and habitat and erosion control works are key priorities, and to ensure progressive rehabilitation is completed as soon as practicable	Compliance with Environmental approval conditions and BRMP.
	Minimise visual impact of the operation during the operational phase as well as post-quarrying	Maintain bund wall and tree screens around the boundary.
	Ensure that site drainage and sedimentation structures remain stable, and functional and non-polluting	Minimal rilling, erosion, sediment deposition in drains and water retention basins.
	Ensure that vegetative matter and growth media is made available for the site rehabilitation	Seed and plant material required for propagation removed and appropriately stored. Native vegetation topsoil stripped and stockpiled in accordance with this plan. Suitable growth media is available in areas where topsoil isn't available.
	Guarantee that the resource is extracted and the site rehabilitated in a manner that will ensure the quality of surface runoff at all times.	No uncontrolled surface runoff or soil erosion that is unstable, degrading and/or comprises end land use objectives.

Time Period	Objective	Performance Criteria
	HMA is managed as per this BRMP	HMA is appropriately fenced (completed). HMA is planted with relevant tubestock and seed (completed). Relocation of salvageable habitat features and/or installation of nest boxes implemented in the HMA if recommended during pre-clearance surveys. Weed and pest management undertaken as per this plan. Monitoring indicates management actions are successful in attaining the performance indicators for the HMA (Table 11). Where monitoring indicates performance indicators have not been met, remedial actions (Table 11) are implemented within 12 months of monitoring.
Medium Term (6-10 years)	All areas of the site affected by the project are constructed so that they are hydraulically and geotechnically stable and non-polluting	Landform design to consider stability and potential pollution risk. Construction as designed.
	Ongoing progressive rehabilitation of the benches of the quarry pit as permitted	As above.
	HMA is managed as per this BRMP	Weed and pest management undertaken as per this plan. Monitoring indicates management actions are successful in attaining the performance indicators for the HMA (Table 11). Where monitoring indicates performance indicators have not been met, remedial actions (Table 11) are implemented within 12 months of monitoring.
Long Term	All areas of the site affected by the project are constructed so that they are hydraulically and geotechnically stable and non-polluting	Landform design to consider stability and potential pollution risk. Construction as designed. No movement / slippage of landform
	Maintenance of established rehabilitation areas i.e. vegetation and drainage work	Vegetation established and rehabilitated areas stable. Areas free of significant weed or feral animal problems.
	Produce a final “walk away” landform that is geotechnically safe and stable that blends aesthetically into the surrounding landforms, yet as far as possible does not limit possible future land uses	Removal of infrastructure associated with mine related activities. Safe and stable rehabilitation of final Voids. Landform design is integrated with existing landscape to provide visual continuity.
	HMA suitable for relinquishment	Native woodland community exhibiting ecosystem processes and habitat enhancement.

5.4 REHABILITATION MANAGEMENT UNITS

To assist with planning of rehabilitation method, the major landforms resulting from mining have been grouped into rehabilitation management units (RMUs), of similar rehabilitation risk profile and rehabilitation method. RMUs are shown on Figure 5, and a summary of these units is presented in Table 8.

Table 8. Anticipated general rehabilitation management units at the project site

Rehabilitation Unit	Area	Purpose and Objectives	Landform Type	Constituent Landforms	Rehabilitation Status
1	Habitat Management Area	• Establish Box-Gum Woodland • Expand Box-Woodland throughout the locality • Increase connectivity along Tangarang Creek • Provide fauna habitat and fauna corridor. • Provide further Koala linkage from the extensive bushland to the east of Peppertree Quarry, to the west.	Regenerating native bushland/intact bushland/ plantings	Native vegetation	Currently managed to Box-Gum Woodland
2	Peppertree Woodland area	• Analogue native vegetation monitoring site. • Contains over 66 hectares of native bushland. • Contains over 35.91 hectares of Box-Gum Woodland. • Contains Koala and fauna habitat.	Native vegetation	Native vegetation	No requirement. Used as an Analogue native vegetation monitoring site
3	Pit Void (Peppertree Quarry Resource Extraction Area)	• Accessible benches are to be landscaped and vegetated using native tree and understorey species • Minimise the size, depth and slope of the batters of the final void • Minimise the drainage catchment of the final void	Open cut void	Benched pit void	Operational - will be rehabilitated at end of mine life
4	Southern Overburden Emplacement	• Establish Box-Gum Woodland, otherwise native grasses and shrubs • Expand Box-Woodland throughout the locality • Increase connectivity along Barbers Creek • Provide fauna habitat and fauna corridor • Provide further Koala linkage from the extensive bushland to the north of Peppertree Quarry, to the south	Overburden Emplacement – steep slopes, moderate slopes, flat	Southern Overburden Emplacement	In rehabilitation establishment phase

Rehabilitation Unit	Area	Purpose and Objectives	Landform Type	Constituent Landforms	Rehabilitation Status
5	Western Overburden Emplacement	• Establish Box-Gum Woodland where possible, otherwise native grasses and shrubs • Expand Box-Woodland throughout the locality • Provide fauna habitat and fauna corridor	Overburden Emplacement – steep slopes, moderate slopes, flat	Western Overburden Emplacement	Operational - will be rehabilitated at a later time
6	Eastern Overburden Emplacement	• Establish Box-Gum Woodland where possible, otherwise native grasses and shrubs • Expand Box-Woodland throughout the locality • Increase connectivity along Barbers Creek • Provide fauna habitat and fauna corridor. • Provide further Koala linkage from the extensive bushland to the north of Peppertree Quarry, to the south	Overburden Emplacement – steep slopes, moderate slopes, flat	Eastern Overburden Emplacement	In ecosystem development phase
7	Infrastructure Footprint	• Establish pasture in line with conceptual final landform / land use	Various	Buildings, roads, rail facilities, dams, pipelines, hard stands.	Operational - will be rehabilitated at end of mine life
8	South Western Overburden Emplacement	• Establish Box-Gum Woodland or Coast Grey Box – Stringybark dry woodland • Otherwise native grasses and shrubs • Expand Box-Woodland throughout the locality • Provide fauna habitat and fauna corridor.	Overburden Emplacement – steep slopes, moderate slopes, flat	South Western Overburden Emplacement	Construction to commence in 2021

5.5 REHABILITATION MANAGEMENT UNIT OBJECTIVES

The recommended broad objectives relating to proposed final land uses are presented, by relevant rehabilitation phase in Table 9. As discussed throughout this BRMP, the objectives will be refined throughout the life of the quarry and in the Quarry Exit Strategy.

Table 9. Rehabilitation phases and objectives

Rehabilitation Unit REF	Rehabilitation Unit Name	Vegetation Community Objective	Functional Objective	Rehabilitation Phase					
				Decommissioning	Landform Establishment[1]	Growth medium Development	Vegetation Establishment	Ecosystem Development	Relinquishment
1	Habitat Management Areas	Box-Gum Woodland	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	N/A	Landform stable and no active erosion gullies. Non-polluting	Manage any areas of erosion	Direct establishment of tree, shrub and groundcover species characteristic of Box-Gum Grassy Woodland. This area will eventually be at least 13.5 hectares (ha) in area.	Key species present. Community structure consistent with Box-Gum Woodland.	Native woodland community exhibiting ecosystem processes and habitat enhancement.
2	Peppertree Woodland area	Used as an Analogue for Plant Community Types (PCTs)	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	N/A	N/A	N/A	N/A	N/A	N/A
3	Pit Void (Peppertree Quarry Resource Extraction Boundary)	Native dominated tree/shrub community (where vegetation establishment achievable)	Stable void slopes, providing water capture, holding (and treatment) capacity to prevent discharge of mine impacted water.	Preferentially available for overburden or water storage	Safe, stable and non-polluting. Stable walls, slopes and benches.	Inert weathered material used to establish growth medium on non-flooded flat surfaces	Native grass, shrub and tree mix established on non-flooded flat surfaces	Diverse native woodland community providing ecosystem value and visual screening.	Suitable for selected post-mining use (recreation or water storage)

Rehabilitation Unit REF	Rehabilitation Unit Name	Vegetation Community Objective	Functional Objective	Rehabilitation Phase					
				Decommissioning	Landform Establishment[1]	Growth medium Development	Vegetation Establishment	Ecosystem Development	Relinquishment
4a	Southern Overburden Emplacements (top of emplacement)	Native dominated tree/shrub community (where vegetation establishment achievable)	Self-sustaining vegetation community, promoting visual screening, landform stability and erosion control.	Benches and drainage structures constructed and linked.	Landform stable and no active erosion gullies. Non-polluting	Erosion of any surface layers managed and where possible good quality topsoil layer or suitable alternative growth media placed to adequate depth.	Where required the following may be implemented: - Remedial areas hydro-seeded. - Concentrated tube stock planting around erosion gullies. - Native tree/shrub mix sown on batters and benches. - Grass cover established on drainage structures	Key species present. Community structure consistent with similar surrounding communities.	Native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.
4b	Southern Overburden Emplacement (Batters)	Native dominated tree/shrub community (where vegetation establishment achievable)	Self-sustaining vegetation community, promoting visual screening, landform stability and erosion control.	Drainage structures constructed and linked.	Landform stable and no active erosion gullies.	Erosion of existing surface layers managed	Remedial areas hydro-seeded. Concentrated tube stock planting around erosion gullies.	Key species present. Community structure consistent with similar surrounding communities.	Native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.

Rehabilitation Unit REF	Rehabilitation Unit Name	Vegetation Community Objective	Functional Objective	Rehabilitation Phase					
				Decommissioning	Landform Establishment[1]	Growth medium Development	Vegetation Establishment	Ecosystem Development	Relinquishment
4c	Southern Overburden Emplacement (Outside Slopes)	Moderately dense native woodland community.	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	Stable access tracks and drainage structures constructed	Stable, free draining, non-polluting landform. No significant erosion.	Topdressing material placed to 10cm depth	Native tree/shrub mix sown on batters and benches. Grass cover established on drainage structures	Key species present. Community structure consistent with similar surrounding communities.	Diverse native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.
4d	Southern Overburden Emplacement (Surface)	Open native woodland community.	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	N/A	Surface incorporates local relief to shed water	Inert rock mulch layer established.	Native tree/shrub mix sown on level surface.	Key species present. Community structure consistent with similar nearby landforms.	Diverse native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.

Rehabilitation Unit REF	Rehabilitation Unit Name	Vegetation Community Objective	Functional Objective	Rehabilitation Phase					
				Decommissioning	Landform Establishment[1]	Growth medium Development	Vegetation Establishment	Ecosystem Development	Relinquishment
5a	Western Overburden Emplacements (top of emplacement)	Native dominated tree/shrub community (where vegetation establishment achievable)	Self-sustaining vegetation community, promoting visual screening, landform stability and erosion control.	Benches and drainage structures constructed and linked.	Landform stable and no active erosion gullies. Non-polluting	Erosion of any surface layers managed and where possible good quality topsoil layer placed to adequate depth.	Where required the following may be implemented: - Remedial areas hydro-seeded. - Concentrated tube stock planting around erosion gullies. - Native tree/shrub mix sown on batters and benches. - Grass cover established on drainage structures	Key species present. Community structure consistent with similar surrounding communities.	Native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.
5b	Western Overburden Emplacement (Batters)	Native dominated tree/shrub community (where vegetation establishment achievable)	Self-sustaining vegetation community, promoting visual screening, landform stability and erosion control.	Drainage structures constructed and linked.	Landform stable and no active erosion gullies.	Erosion of existing surface layers managed	Remedial areas hydro-seeded. Concentrated tube stock planting around erosion gullies.	Key species present. Community structure consistent with similar surrounding communities.	Native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.

Rehabilitation Unit REF	Rehabilitation Unit Name	Vegetation Community Objective	Functional Objective	Rehabilitation Phase					
				Decommissioning	Landform Establishment[1]	Growth medium Development	Vegetation Establishment	Ecosystem Development	Relinquishment
5c	Western Overburden Emplacement (Outside Slopes)	Moderately dense native woodland community.	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	Stable access tracks and drainage structures constructed	Stable, free draining, non-polluting landform. No significant erosion.	Topdressing material placed to 10cm depth	Native tree/shrub mix sown on batters and benches. Grass cover established on drainage structures	Key species present. Community structure consistent with similar surrounding communities.	Diverse native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.
5d	Western Overburden Emplacement (Surface)	Open native woodland community.	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	N/A	Surface incorporates local relief to shed water	Inert rock mulch layer established.	Native tree/shrub mix sown on level surface.	Key species present. Community structure consistent with similar nearby landforms.	Diverse native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.

Rehabilitation Unit REF	Rehabilitation Unit Name	Vegetation Community Objective	Functional Objective	Rehabilitation Phase					
				Decommissioning	Landform Establishment[1]	Growth medium Development	Vegetation Establishment	Ecosystem Development	Relinquishment
6a	Eastern Overburden Emplacement (top of emplacement)	Native dominated tree/shrub community (where vegetation establishment achievable)	Self-sustaining vegetation community, promoting visual screening, landform stability and erosion control.	Benches and drainage structures constructed and linked.	Landform stable and no active erosion gullies. Non-polluting	Erosion of any surface layers managed and where possible good quality topsoil layer placed to adequate depth.	Where required the following may be implemented: - Remedial areas hydro-seeded. - Concentrated tube stock planting around erosion gullies. - Native tree/shrub mix sown on batters and benches. - Grass cover established on drainage structures	Key species present. Community structure consistent with similar surrounding communities.	Native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.
6b	Eastern Overburden Emplacement (Batters)	Native dominated tree/shrub community (where vegetation establishment achievable)	Self-sustaining vegetation community, promoting visual screening, landform stability and erosion control.	Drainage structures constructed and linked.	Landform stable and no active erosion gullies.	Erosion of existing surface layers managed	Remedial areas hydro-seeded. Concentrated tube stock planting around erosion gullies.	Key species present. Community structure consistent with similar surrounding communities.	Native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.

Rehabilitation Unit REF	Rehabilitation Unit Name	Vegetation Community Objective	Functional Objective	Rehabilitation Phase					
				Decommissioning	Landform Establishment[1]	Growth medium Development	Vegetation Establishment	Ecosystem Development	Relinquishment
6c	Eastern Overburden Emplacement (Outside Slopes)	Moderately dense native woodland community.	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	Stable access tracks and drainage structures constructed	Stable, free draining, non-polluting landform. No significant erosion.	Topdressing material placed to 10cm depth	Native tree/shrub mix sown on batters and benches. Grass cover established on drainage structures	Key species present. Community structure consistent with similar surrounding communities.	Diverse native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.
6d	Eastern Overburden Emplacement (Surface)	Open native woodland community.	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	N/A	Surface incorporates local relief to shed water	Inert rock mulch layer established.	Native tree/shrub mix sown on level surface.	Key species present. Community structure consistent with similar nearby communities.	Diverse native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.
7	Infrastructure footprint	Establish pasture in line with conceptual final landform / land use	Establish pasture in line with conceptual final landform / land use	Unless required for post-mining use, infrastructure decommissioned and demolished	Safe, stable and non-polluting landscape.	Topdressing material placed over site	Mixture of Predominantly open native woodland species established in areas that are well connected to habitat corridors. Northern portion sown to adjacent pasture species.	Key species present. Community structure consistent with similar surrounding communities.	Open woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.

Rehabilitation Unit REF	Rehabilitation Unit Name	Vegetation Community Objective	Functional Objective	Rehabilitation Phase					
				Decommissioning	Landform Establishment[1]	Growth medium Development	Vegetation Establishment	Ecosystem Development	Relinquishment
8a	South Western Overburden Emplacement (top of emplacement)	Native dominated tree/shrub community (where vegetation establishment achievable)	Self-sustaining vegetation community, promoting visual screening, landform stability and erosion control.	Benches and drainage structures constructed and linked.	Landform stable and no active erosion gullies. Non-polluting	Erosion of any surface layers managed and where possible good quality topsoil layer placed to adequate depth.	Where required the following may be implemented: - Remedial areas hydro-seeded. - Concentrated tube stock planting around erosion gullies. - Native tree/shrub mix sown on batters and benches. - Grass cover established on drainage structures	Key species present. Community structure consistent with similar surrounding communities.	Native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.
8b	South Western Overburden Emplacement (Batters)	Native dominated tree/shrub community (where vegetation establishment achievable)	Self-sustaining vegetation community, promoting visual screening, landform stability and erosion control.	Drainage structures constructed and linked.	Landform stable and no active erosion gullies.	Erosion of existing surface layers managed	Remedial areas hydro-seeded. Concentrated tube stock planting around erosion gullies.	Key species present. Community structure consistent with similar surrounding communities.	Native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.

Rehabilitation Unit REF	Rehabilitation Unit Name	Vegetation Community Objective	Functional Objective	Rehabilitation Phase					
				Decommissioning	Landform Establishment[1]	Growth medium Development	Vegetation Establishment	Ecosystem Development	Relinquishment
8c	South Western Overburden Emplacement (Outside Slopes)	Moderately dense native woodland community.	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	Stable access tracks and drainage structures constructed	Stable, free draining, non-polluting landform. No significant erosion.	Topdressing material placed to 10cm depth	Native tree/shrub mix sown on batters and benches. Grass cover established on drainage structures	Key species present. Community structure consistent with similar surrounding communities.	Diverse native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.
8d	South Western Emplacement (Surface)	Open native woodland community.	Resilient and self-sustaining vegetation community, providing fauna habitat and movement corridor value.	N/A	Surface incorporates local relief to shed water	Inert rock mulch layer established.	Native tree/shrub mix sown on level surface.	Key species present. Community structure consistent with similar nearby landforms.	Diverse native woodland community exhibiting ecosystem processes, landform stabilisation, habitat enhancement and visual screening.

6 REHABILITATION METHODOLOGY

6.1 HABITAT MANAGEMENT AREA

6.1.1 Overview

In accordance with Development Application (06_0074) and the current EA, Peppertree Quarry is required to establish, conserve and maintain the Habitat Management Area to at least 13.5 ha of vegetation characteristic of Box Gum Woodland. The establishment of this area will occur within a minimum 20 metre buffer around the periphery of the Main Dam, and on either side of Tangarang Creek (Figure 5).

Rehabilitation management actions and relating to the HMA and associated timeframes (short, medium and long term measures), purpose, priority, and responsibility are provided in Appendix E.

6.1.2 Short-term measures

Seed collection and revegetation works

Development of the HMA has included the direct establishment of tree, shrub and groundcover species characteristic of Box-Gum Grassy Woodland. Seed has been collected from standing vegetation at the site and used for tube stock planting and direct seeding.

Areas of the HMA that are degraded, lack a native seed bank or contain large amounts of weeds, need more intensive management to ensure revegetation success. These areas were revegetated through a combination of direct seeding (using seed collected on-site) and plantings (for those species with low seed yields or that are difficult to grow by direct seeding). A qualified bushland contractor has overseen the direct seeding and replanting of the area.

Over planting of seedlings and small plants was implemented rather than the use of tree guards to assist with viability and limiting the pollution of the Main Dam and surrounds from tree guards. In addition, feral herbivore control (specifically for rabbits and hares) was implemented to reduce the grazing pressure.

Planting was undertaken in 2013 as per the attached plans (refer Appendix G). Since planting, an ongoing program of monitoring and maintenance is being implemented (Section 6.1.3).

Fencing and signage

The HMA has been fenced and will remain so, to control human, stock and vehicular access from destroying seedlings and young plants. Signs indicating that rehabilitation has been undertaken (e.g. Sensitive Environment Site), have been installed along the fence lines.

Salvaged fauna habitat features and nest boxes

An assessment of salvageable fauna habitat features (e.g. logs and hollows) will be undertaken by a suitably qualified ecologist prior to vegetation clearing in approved disturbance areas (Section 4.2). A report will be prepared by the Ecologist containing findings with recommendations being made on the suitability of salvageable habitat features for relocation, the requirement for installation of nest boxes and the most suitable locations for relocation/installation (i.e. within the HMA or other remnant vegetation within the Consent boundary). Nest boxes, if installed, will be monitored annually for a recommended period for usage and to remove pest species such as bees.

6.1.3 Medium and long term management measures

Weed and pest control

Weed and pest control is being undertaken within the HMA in accordance with Sections 7.1 and 7.8 respectively.

Weed and Pest Monitoring

Weed and Pest monitoring is undertaken in the HMA via the Rapid Visual Assessments and Ecological Monitoring outlined in Section 8.2. The monitoring commenced in the HMA in 2018 and details of the monitoring are provided in the Draft Biodiversity and Rehabilitation Monitoring Program (Cambium Group, 2017). The results of the monitoring program are assessed against the completion criteria in Table 11 and remedial action implemented as recommended in the monitoring report.

6.2 EMPLACEMENTS

6.2.1 Overview

There are four emplacement sites identified at Peppertree Quarry:

1. Eastern Emplacement
2. Southern Emplacement
3. South Western Emplacement and
4. Western Emplacement.

All emplacements are constructed with weathered granodiorite or granodiorite products such as scalpings. The Eastern Overburden Emplacement contains an associated noise bund. This landform has been completed and is being rehabilitated. The Southern Overburden Emplacement landform has also been shaped and completed, with only rehabilitation activities occurring. The landform of the Western Overburden Emplacement was amended in Mod 5 to accommodate a shared road sales stockpile area. The Western Overburden Emplacement is underdevelopment. The South Western Overburden Emplacement is due to commence construction in 2021.

Progressive rehabilitation of all these sites will be undertaken where possible throughout the life of the quarry.

Rehabilitation management actions relating to the whole of site and associated timeframes (short, medium and long term measures), purpose, priority, and responsibility are provided in Appendix F. A Rehabilitation Implementation Plan (Cambium Group, 2021) has been prepared to guide implementation strategies and actions for the 3 Year Rehabilitation Plan presented in Appendix I.

6.2.2 Landform Reshaping and Stability

The emplacements have been designed to maximise emplacement space, fit to the surrounding landform and to be stable for their lifetime.

The emplacements are completed in lifts approximately 15 - 20 metres high with a flat platform to allow for drainage.

The design is such that it will result in a stable landform, and will incorporate slopes and drainage that blend in with the surrounding natural topography.

Until an adequate vegetation cover is established, heavy rainfall may cause erosion and soil loss. To reduce erosion potential, slope length may be reduced by the construction of graded banks that intercept and divert water off the slopes.

The design is prepared by qualified engineering consultants and surface hydrological engineers are involved where an assessment of the drainage is required.

6.2.3 Vegetation cover

The establishment of a vegetation community, especially groundcover species, is essential in reducing erosion of sloping landforms. A significant contributor to successfully establishing that vegetation cover is the careful selection and placement of a growth medium.

Growth medium refers to the surface layer of inert, fertile material established over less suitable material to facilitate improved vegetation establishment. Typically, this layer consists of natural topsoil material (A1 horizon) stripped ahead of ground disturbance, but may consist of subsoils, organic mulches, weathered geological strata, or even particularly suitable overburden material as a rock mulch.

General topsoil management recommendations have been outlined in Section 7. Topsoil considerations specific to each rehabilitation unit will be assessed and reviewed based upon best practice at the time of rehabilitation.

6.2.4 Overburden Emplacement Surfaces

This rehabilitation management unit is likely to consist of the upper surfaces of emplacement areas (RMUs 4, 5, 6 and 9) where the ground is level to gently sloping.

The following may be required in the rehabilitation of the Emplacement surface:

Ground Preparation (new emplacement surfaces)

- Minimal bulk reshaping (complete for RMUs 4, 5 and 6)
- Landform ripped, trimmed and rock raking undertaken (complete for RMUs 4, 5 and 6)
- Overburden stripped from the pit will be transported by trucks along the most direct haul route possible, to the South Western Overburden Emplacement where it will be spread and shaped by dozer.
- The South Western Overburden Emplacement will be constructed out of the same material as the existing overburden emplacements on the site and will be designed to similar standards
- Rehabilitation of the new South Western Overburden Emplacement area will be undertaken progressively as each section of the emplacement is completed.
- Rehabilitation of the Eastern and sections of the Southern Overburden Emplacement areas is in the ecosystem development stage. The Western Overburden Emplacement is still under construction.

Growth Medium

- Where topsoil is available, it will be placed and spread
- Where topsoil is in deficit, alternative material may be used
- Ameliorants, if required, will be applied to the trimmed overburden surface prior to topsoil spreading.
- All topsoiled areas if necessary will be lightly contour tined or disc cultivated

Vegetation Establishment

- Vegetation establishment on emplacement surfaces may be similar to the Emplacement Outside Slopes rehabilitation unit. However, seed mix rates and composition may vary in order to reflect the lesser erosion risk and proposed post-mining vegetation.
- Surface water management structures, such as contour benches and grass-lined drains, will be sown with a pasture cover mix that will encourage rapid groundcover establishment.
- An initial inspection will be made in areas of direct seeding after establishment (e.g. four to six weeks after seeding to give plants time to germinate). Some species may take a number of months or years to germinate. Once plants have become established, their growth will be monitored and any plant losses will be replaced as soon as conditions permit. Similarly, seedling growth will be monitored and any plant losses will be replaced as soon as conditions permit.

Post-rehabilitation Management

- Following completion of rehabilitation, areas will be adequately signed and isolated from unintentional vehicle access.
- Regular inspections will be undertaken until vegetation cover is sufficiently established.
- Inspections will note remedial works such as weed and pest control, repair of wash-outs and gullies, or supplementary planting.

6.2.5 Emplacement Outside Slopes

This rehabilitation management unit (component of RMUs 4, 5, 6 and 9) occurs on the steeper outside slopes of the Southern, Western, Eastern and South Western Emplacements.

To minimise the visibility of the proposed Southern Overburden Emplacement and South Western Overburden Emplacement from views the south east in the Morton National Park, especially the eastern and southern faces, are rehabilitated progressively and as soon as practically possible, following final embankment shaping.

The rehabilitation of this unit may entail the following:

Ground Preparation

- Final trim and rock raking undertaken.
- Ripping to aid root penetration during vegetation establishment.
- Final trim to smooth out any wash-outs, rough edges, temporary access tracks, local steep topography and prepares the surface for revegetation.
- It is likely that the emplacements will be constructed in lifts, and rehabilitation works on each lift will be progressively completed as soon as practical following completion of lift reshaping, and before access is isolated by overburden emplacement on the next lift.

Growth Medium

- Prior to placement of stockpiled topsoil, an assessment of stockpile weed infestation will be undertaken to determine if herbicide application and / or “scalping” of weeds is required prior to topsoil spreading
- Where available volumes allow, topdressing material will consisting of the loamy A1 horizon topsoil stripped ahead of Project related disturbance will be used
- Where topsoil is in deficit, geochemically suitable weathered material such as decomposed granite may be used, but will be mainly confined to lower gradient slopes
- Topsoil placed and spread
- Ameliorants, if required, may be applied to the trimmed overburden surface prior to topsoil spreading.

Vegetation Establishment

- To complement natural regeneration from seed contained within the soil seed bank, a mix of native ground cover, shrub and tree species sown onto the re-contoured surface.
- A light cover crop pasture mix may also be sown in conjunction with native seed in order to assist early soil stabilisation. If used, any non-native species for establishing initial ground cover on steep slopes will use *sterilised* seed to avoid any potential for propagation, particularly in areas in proximity to adjacent conservation/sensitive areas.
- Early canopy closure will further assist in erosion control and help to visually screen exposed overburden emplacements.
- Surface water management structures, such as contour benches and grass-lined drains, may be sown with pasture species that will encourage rapid groundcover establishment.
- Hydro-mulching is the recommended method for high-risk steep slopes where equipment access is limited to benches and where rapid establishment of a vegetation cover is essential for landform stability. Hydro-mulching will be undertaken immediately after site preparation (contour ripping or notching by excavator or dozer blade) when the surface is still freshly scarified.
- Tube stock planting may also be undertaken where supplementary tree establishment is required.
- Inspection of vegetation establishment as per Section 6.2.6.

Post-rehabilitation Management

- Following completion of rehabilitation, areas will be adequately signed and isolated from unintentional vehicle access
- Regular inspections will be undertaken until vegetation cover is sufficiently established. Inspections will identify remedial works such as weed and pest control, repair of wash-outs and gullies or supplementary planting
- Once rehabilitation is suitably established, inspections will be replaced by the establishment of formal monitoring transects, as part of the monitoring program.

6.3 RESOURCE VOID AND ASSOCIATED INFRASTRUCTURE

6.3.1 Overview

The conceptual final landform introduced in section 5.2 details the proposed land uses and conceptual landform design. Rehabilitation on the majority of the extraction areas will not take place until the completion of extraction activities. Rehabilitation will be progressively undertaken, where practical, on areas such as final benches within the extraction areas and any disturbed areas beyond the final extraction area or development limits.

6.3.2 Infrastructure Footprint

This rehabilitation management unit (RMU 7) consists of the quarrying related infrastructure within the Project site that will be decommissioned and demolished at the end of quarry life (~30 years).

Infrastructure at the quarry includes a processing plant, rail loop and loading facilities, water storage dams, in-pit mobile crushing plant, product stockpiles, and staff facilities. The location of infrastructure at the Quarry is shown on Figure 3 (Site layout).

It is assumed that some key infrastructure will remain post-mining. This will be determined as the Quarry Exit Strategy is developed and confirmed.

Rehabilitation is likely to entail the following:

Ground Preparation

- The footprint of decommissioned infrastructure will be cleared of all structures and foreign material including bitumen, concrete and potentially contaminating material.
- In line with waste requirements at the time, building materials generated from the demolition will be recycled or remain onsite.
- Minimal bulk reshaping may be required during decommissioning of infrastructure.
- The land surface will be ripped with final trim and rock raking completed.

Growth Medium

- Decommissioned infrastructure areas will preferably be topsoiled with locally sourced topsoil material.
- Where topsoil is in deficit, alternative growth medium material can be used for this rehabilitation unit, depending on erosion risk and suitability to the proposed post-mining vegetation community.
- Where topsoil is available, it will be placed, spread and treated.
- Infrastructure areas proposed for rehabilitation to grazing pasture are best topsoiled with material stripped from similar areas. This will help to ensure adequate soil fertility and compatible seedbank species.

Vegetation Establishment

- Pasture establishment using direct seeding will be applied.

Post-rehabilitation Management

- Following completion of rehabilitation, all areas will be adequately signed and isolated from unintentional vehicle access.
- Regular inspections will be undertaken until vegetation cover is sufficiently established. Inspections will identify remedial works such as weed and pest control, repair of wash-outs and gullies, or supplementary planting.

6.3.3 Final Void

This rehabilitation management unit (RMU 3) consists of the residual void from the resource extraction.

At the completion of quarrying benches within the pit will remain. Accessible benches will be spread with top dressing material, and native tree and shrub species will be sown directly into these areas. The main aim will be to ensure that the pit is left geotechnically safe and stable.

At quarry closure, the final bench will be shaped and the pit floor re-profiled and revegetated in line with the final land use.

The rehabilitation stages may entail the following:

Ground Preparation

- Final void slopes will be assessed by a suitably qualified geotechnical engineer and treated as per assessment recommendations to minimise slope failure risk.
- Slopes battered and/or appropriately benched.
- Unconsolidated slopes are to be assessed and reshaped if accessible.
- Where revegetation is proposed as part of void treatment, accessible surfaces will be ripped to de-compact surface material, promote root growth and enhance water infiltration.
- Any potentially hostile geological strata exposed in void walls will be capped.

Growth Medium

- Suitable material will be placed and spread over accessible void areas proposed for revegetation. This material will be and ripped, or notched, to create seedbed micro-relief and promote infiltration.

Vegetation Establishment

- Revegetation of void surfaces such as slope benches, ramps and in-pit overburden emplacements will be undertaken in order to improve landform stability and biodiversity value, and to provide visual impact mitigation.

Post-rehabilitation Management

- Following completion of rehabilitation, areas will be adequately signed and isolated from unintentional vehicle access. Regular inspections will be undertaken to assess slope/bench integrity.
- The outer rim of the void will be adequately sign posted and protected to prevent pedestrian, vehicle or animal access.

6.3.4 Dams

Once vegetation rehabilitation has achieved the required surface cover on all the emplacements to achieve stability and negligible erosion, active management of the sediment basins will no longer be required. Sediment basins therefore could either be retained and allowed to overflow after rainfall, or demolished and the storage area rehabilitated. Consideration will be given to the ongoing lifespan of the dams if any are to be retained. Any of the dams that are not being retained onsite will be removed and the original drainage paths re-established where possible. Because of the risk of further erosion as a result of runoff flowing through the area of the former sediment basins, retention of the sediment basins is preferred.

It is expected that the Main Dam will remain operational post-mining, and will not be rehabilitated at the end of the Mine life.

6.3.5 Safety

At quarry closure, one of the main priorities for the void will be to render it safe in terms of access by humans, livestock and wildlife. The following will be considered at the time of closure to ensure that the void is left in a safe manner. These include:

- All high walls are to be left geotechnically stable.

  A barrier at a safe distance from the perimeter of the void to prevent human access will be constructed. This is to provide an engineered barrier between the pit and the surrounding area.
- Suitable signs, clearly stating the risk to public safety and prohibiting public access will be erected at 50 m intervals outside the safety fence.
- Surface runoff from land surrounding the void will be diverted from entering the void so as to prevent the instability of the walls.

7 SUPPORTING ACTIONS

This chapter details the supporting actions that are required to ensure the success of the revegetation and rehabilitation works at the site.

7.1 WEED CONTROL

Ongoing management of weeds is being implemented by a suitably qualified contractor in accordance with Boral's Weed Management Plan, (2022).
This Weed Management Plan was prepared to:

- Capture the distribution and abundance of priority and regional weeds at Peppertree Quarry using GIS mapping systems;
- Provide descriptions of the weeds and management options for on-going control, monitoring and reporting;
- Describe a general control timetable for the treatment and control of weeds over a twelve month period based on optimal times associated with flowering and fruiting seasons of relevant weeds; and
- Ensure Boral meet legislative weed control, reporting and compliance requirements for 2022.

Annual reviews will occur to assess the effectiveness of the weed control measures during the preceding years and detail any necessary changes to weed control measures. The abundance and distribution of weeds is monitored in accordance with the Biodiversity and Rehabilitation Monitoring Program (2022) as summarised in Section 8.2.

Targeted weed species and recommended management techniques for 2022 are outlined in Table 10 with further details on their distribution and an implementation schedule provided in the Weed Management Plan (2022)

Table 10. Targeted weeds and control methods

Priority weed	Initial treatment	Follow-up
African Boxthorn (*Lycium ferocissimum*)	• Cut and paint (> 5cm stem diameter) • Basal bark application (<5cm stem diameter) • Manual removal, bag and dispose (seedlings)	• Cut and paint / basal bark application • Spot spray in spring (regrowth) • Manual removal, bag and dispose (seedlings)
Blackberry (*Rubus fruticosus agg.*)	• Cut and paint • Spot spray • Manual removal, bag and dispose (seedlings)	• Cut and paint / basal bark application • Spot spray in spring (regrowth) • Manual removal, bag and dispose (seedlings)
Serrated Tussock (*Nassella trichotoma*)	• Spot spray (alternate glyphosate / flupropanate) • Chipping (where practical)	• Spot spray (alternate glyphosate / flupropanate)

Fireweed (*Senecio madagascariensis*)	• Manual removal, bag and dispose	• Manual removal, bag and dispose • Spot spray (if required)
Paterson's Curse (*Echium plantagiuneum*)	• Spot spray	• Spot spray
Various thistles	• Spot spray	• Spot spray

7.2 CLEARING AND VEGETATION MANAGEMENT PRIOR TO SOIL REMOVAL

According to the NSW Minerals Council (2007), land disturbance will be minimised by clearing the smallest practical area of land for the shortest possible times. This is achieved by:

- limiting the cleared width to that required to accommodate quarrying, processing, overburden emplacement and topsoil stockpiling;
- staging stripping to meet rock requirements;
- prior to stripping, the stripping area will be delineated on a plan and in the field (use survey pegs). Topsoil limits if required will be shown on the pegs;
- general clearing and stump removal will not be undertaken until operations are ready to commence;
- all proposed erosion and sediment control measures will be implemented in advance of, or in conjunction with clearing and grubbing;

These measures will be implemented for ground disturbance works at the quarry.

7.3 TOPSOIL STRIPPING, RECOVERY AND STOCKPILING

Revegetation can be achieved on various substrates, yet topsoil is almost always an essential factor in successful rehabilitation particularly during the period of initial plant growth. Subsoil conditions become more important in the longer term. Topsoil (or weathered surface material) generally contains seeds, nutrients and micro-organisms that are essential to plant growth and if they are lost, then the system will generally take a long time to re-establish. Topsoil recovery is undertaken ahead of major ground disturbance within the footprint of the pit void.

Topsoil stripping in association with any of the emplacements is in line with the requirements of the agreed *Peppertree Quarry Aboriginal Heritage Management plan*.

Establishment of vegetation communities, especially groundcover species, is essential in reducing erosion of sloping landforms. A significant contributor to successfully establishing vegetation cover is the careful selection and placement of a growth medium. In general terms, growth medium refers to the surface layer of inert, fertile material established over less suitable material to facilitate improved vegetation establishment. Typically, this layer consists of natural topsoil material (A1 horizon) stripped ahead of ground disturbance, but may consist of subsoils, organic mulches, weathered geological strata, or even particularly suitable overburden material as a rock mulch.

The lack of stripping under emplacement footprints will result in a deficiency of topsoil for emplacement and long term rehabilitation.

Decomposed granite at Peppertree Quarry is expected to also provide an alternative growth medium, particularly for establishing ground cover vegetation. Rocky weathered shale may also be an alternative growth medium which has been known to provide reasonable tree establishment.

In general, recovered quality topsoil is expected to be of highest value in rehabilitation at Peppertree Quarry in steeper slope areas where establishment of ground cover is most crucial.

Pre-Quarrying Soil Assessment

In general, the term 'topsoil' refers to the "A" horizon of the soil which is usually darker than the underlying soil because of an accumulation of organic matter. However, soils covering a particular area may be quite diverse and not all of them may be of value in rehabilitation for the following reasons:

- unsuitable or infertile soil type, e.g. duplex soils with an extremely thin A1 horizon underlain by a thicker, but very infertile A2 horizon;
- presence of a high proportion of stone or gravel in the profile, e.g. lithosols or skeletal soils on steep slopes or ridge crests. This applies particularly to soils developed on sandstone and conglomerate; and
- topsoil has been destroyed or removed by erosion, or affected by salinity.

Management Steps (**Pre-Stripping**):

- All new disturbance to be undertaken in accordance with requirements in this BRMP, the *Peppertree Quarry Water Management Plan* and the *Aboriginal Heritage Management Plan*
- Disturbance of the minimum area necessary for the proposed phase of work;
- Installation of sediment fencing down-slope of any proposed disturbance;
- Construction of diversion channels and sediment basins as applicable (refer *Peppertree Quarry Water Management Plan*); and
- Pre-clearance surveys and vegetation clearing in accordance with the procedures set out in Section 7.2 of this BRMP.

Management Steps (**Stripping, Recovery and Stockpiling**):

- fertile soils when identified are retained on the site (as per the *Aboriginal Heritage Management Plan*)
- fertile soils that have been stripped will be stockpiled on site in loose mounds of up to 2m wherever practicable;
- depth of stripping is determined as per the *Aboriginal Heritage Management Plan* and the identified need for the salvage of artefacts
- soils will be targeted to be stripped in a slightly moist condition to avoid being stripped in either a dry or wet condition, to maintain soil structure;
- suitable topsoil will be stripped and preferably re-spread onto reshaped areas in the quarrying sequences, equipment scheduling and weather conditions permit. Direct replacement of topsoil will give the best results because it prevents or reduces the deterioration of the biological components in the soil during storage; and
- the period of storage will be minimised in order to reduce the detrimental effects of storage on any native seed in the soil.

If stockpiling of topsoil cannot be avoided, then the following will be considered:

- plan to use the topsoil as soon as possible
- topsoil will be placed in loose stockpiles a maximum of two metres high
- the working face of the stockpile will be battered down at 30º
- stockpiles will be ripped or scarified, and immediately sown with at least a cover crop and fertilised

- a strict timetable of weed control and maintenance fertilising is required as part of a stockpile management program
- stockpile locations and design will be selected for ease of access, minimisation of rehandling, segregation from other mining activities and minimisation of soil structure degradation
- stockpiles will be clearly identified by a sign and a ditch or berm around the immediate stockpile area to reduce the likelihood of contamination and soil loss.

Further detailed guidance can be found in Soils: Their Properties and Management (Soil Conservation Service of New South Wales 1991).

Note: If any historical relics or Aboriginal and cultural heritage items are unexpectedly discovered during stripping works, all works must **cease immediately** and the Boral Environment and Community Manager contacted to address the issue in accordance with the *Peppertree Quarry Aboriginal Heritage Management Plan*.

7.4 TOPSOIL RE-SPREADING AND SEEDBED PREPARATION

Handling topsoil at optimum moisture content will reduce damage to soil structure, achieve a higher standard of revegetation and reduce maintenance requirements. Field studies in the Hunter Valley have shown that, for pasture establishment, a topsoil thickness of 5 to 10 cm is adequate. Spreading at greater thickness does not produce any significant increase in pasture growth (NSW Minerals Council 2007).

Prior to collecting topsoil from the stockpile, any weeds will be carefully scalped off the topsoil if required. Weed control will minimise the requirement, however if weeds are present then ensuring that the top 5cm deep weed-infected layer is removed and not transferred to the rehabilitated areas. Topsoil will be spread to the determined depth along the contour of emplaced material to aid runoff control, minimise erosion and increase moisture retention by dumping at the top of slopes and grading downwards and across the contour (NSW Minerals Council 2007).

Re-spread topsoil will be levelled to achieve an even surface, avoiding a compacted or over-smooth finish. The topsoil will then be incorporated into the overburden, by contour cultivation with a tined implement in preparation for sowing. Ideally, this operation will leave the soil surface in a roughened condition. Tining or ripping of topsoiled areas creates a “key” between the soil and the spoil (NSW Minerals Council 2007).

7.5 EROSION AND SEDIMENTATION CONTROL

Wind erosion may occur in areas where vegetation has been removed. Erosion removes the nutrient-rich topsoil and exposes the subsoil. This reduces the productive capacity of soil and limits plant growth. Eroded soils can also smother plants and result in the loss of some species.

Sedimentation of streams and drainage lines on the site has the potential to occur as a result of quarrying operations. High sediment loads can reduce water quality and lead to increased levels of turbidity and a loss in aquatic and semi-aquatic flora and fauna.

Erosion and sediment control measures will be implemented in accordance with the *Peppertree Quarry Water Management Plan*. During both construction and operational activities, drainage will convey water from areas of disturbed ground to “dirty water” storage dams and ultimately to storage basins in the pit to prevent sediment laden or contaminated runoff leaving the site.

7.6 SPECIES SELECTION AND SEED COLLECTION

Seed stock and vegetative material will be collected from native species on the site (from standing vegetation and from the seed bank) to maximise the recreation of the structural and floristic diversity of the existing vegetation. Seed and vegetative material collection will include a variety of flowering seasons and different years to account for annual variation, so that as many of the existing species as possible are sourced.

Collection at this early stage of quarry development will concentrate on the proposed development area, where native vegetation will be removed as well as associated sites. It is important that any seeds and vegetative material are collected from healthy, vigorous plants and that similar quantities of seeds are collected from several well-spaced plants to encourage genetic diversity. Collection will follow Florabank's Best Practice Guidelines (1999) and an accredited revegetation or rehabilitation organisation will be engaged for seed collection to ensure the best method of salvaging soil and canopy held seeds is undertaken.

7.7 FIRE MANAGEMENT

Management of fire is an important and complex issue. Management must aim to achieve long term conservation of natural communities balanced against the ongoing protection of life and property within and adjacent land. Fire regimes are a major determinant of the distribution and abundance of flora and fauna. They also affect nutrient cycles, erosion patterns and hydrological regimes. Fire regimes are the result of the dynamic interaction of human, physical, biological, spatial and temporal factors (NPWS 2001).

Any proposed fire management across the conserved and rehabilitated sites will require close consultation with the Regional Fire Service (RFS), National Park and Wildlife Service (NPWS) and BCD, due to the vegetated habitat that will be created.

The following controls may be implemented to control the risk associated with bushfire:

- Fuel reduction actions, including grazing, mowing, slashing, ploughing, flailing and manual removal as required to reduce fuel loads and fire risk in peak seasons;
- Establishment and maintenance of fire breaks, including around critical infrastructure;
- Periodic review, testing and training of relevant personnel in the site Emergency Response Procedure

A Bushfire Management Plan is in place and will be referenced for further details as necessary.

7.8 PEST MANAGEMENT

A Standard Operating Procedure (SOP) for pest management is in place which outlines the pest control strategy for the site. The SOP will be reviewed with NPWS and LLS where required and will be consistent with the relevant threat abatement plans. Feral animal monitoring is undertaken during the annual Rapid Visual Assessment and by regular observation by Boral Environmental staff.

Feral animals known from the area include rabbits, foxes, goats, pigs, cates, deer and hares.

NPWS undertakes aerial culls of feral goats on a regular basis. The practice is to advise the quarry and to herd any goats from the quarry site into the national park for culling.

The following will be undertaken:

- Annual review and /or herding and collection of goats. Goats will be herded with the use of dogs and experienced stockmen to onsite cattle yards. The goats will be tagged and transported to relevant sale yards for disposal

- This will be supported by the National Parks and Wildlife Services culling program
- Fox 1080 baiting program in line with Local Land Services and NPWS programs but at least on an annual basis initially
- Annual monitoring for the presence of pigs and
- Management of rabbits in line with Local Land Services best practice and regional programs.
- Management of wild dogs.

All feral animal control will be undertaken by trained contractors.

7.9 ASSISTED NATURAL REGENERATION, ENHANCEMENT OF FAUNA HABITATS AND REVEGETATION

Implementation of supporting actions, including weed control (Section 7.1), erosion and sedimentation control (Section 7.5), fire management (Section 7.7and pest management (Section 7.8) will assist in preventing further decline in the condition of retained native vegetation and promote natural regeneration of native vegetation and rehabilitation areas. Fauna habitats will also be naturally enhanced as the complexity of the retained vegetation and rehabilitated areas develops through implementation these measures.

As described in Section 4.2, preclearance fauna surveys will include the development of a strategy for the salvage of habitat resources and/or installation of nest boxes, which will be implemented as recommended by the consultant to compensate for loss of habitat. This strategy will include details on the number and type of habitats features to be relocated/installed, timeframes for relocation/installation, identification of a suitable location and any follow-up management and monitoring required.

As described in Section 6.1, development of the HMA has included the direct establishment of tree, shrub and groundcover species characteristic of Box-Gum Grassy Woodland. Areas of the HMA that are degraded, lack a native seed bank or contain large amounts of weeds, need more intensive management to ensure revegetation success. These areas were revegetated through a combination of direct seeding (using seed collected on-site) and plantings (for those species with low seed yields or that are difficult to grow by direct seeding). A qualified bushland contractor has overseen the direct seeding and replanting of the area.

Details on vegetation establishment measures on the emplacement and resource void are provided in Section 6.2 and 6.3 respectively. Implementation of supporting action for topsoil stripping, recovery and stockpiling (Section 7.3) and topsoil re-spreading and seedbed preparation (Section 7.4) and species selection and seed collection (Section 7.6) will also enhance the outcomes for revegetation of the emplacements and resource void. Appendix C provides the species list for planting and seeding that is targeted at establishing vegetation with Box Gum Woodland characteristics.

8 COMPLETION CRITERIA, REMEDIAL ACTIONS AND REHABILITATION MONITORING

8.1 COMPLETION CRITERIA

Rehabilitation development is periodically measured and assessed to determine whether rehabilitated communities are progressing towards the objectives. Specific and measurable progress indicators are extrapolated from the general rehabilitation objectives to assist with progress assessments.

Completion criteria, are derived from rehabilitation objectives, consist of agreed values or standards that indicate if rehabilitated land is resilient and sustainable, and considered suitable for relinquishment sign-off. At a minimum, completion criteria address landscape parameters such as stability, soils, vegetation establishment, and potential for off-site impacts and suitability for the agreed post-mining land-use.

8.1.1 Completion criteria and remedial actions for Habitat Management Area and emplacements

The objectives of the HMA include the establishment of vegetation characteristic of Box Gum Woodland, and the provision of corridor linkages and fauna habitat.

Objectives and biodiversity requirements relating to the rehabilitation of the emplacements have developed as the Project has progressed from the original EA (ERM, 2006) to the latest Modification (see Table 1). Requirements for emplacement rehabilitation have varied from the requirement for Box-Gum Woodland species to be used in rehabilitation to the requirement for re-establishment of native bushland dominated by White Box Yellow Box Blakely's Red Gum Grassy Woodland species.

To assess the attainment of these objectives, the vegetation established within the HMA and emplacements will be compared with local benchmarks for Box-Gum Woodland (PCT 1330 Yellow Box - Blakely's Red Gum Grassy Woodland on the tablelands, South Eastern Highlands Bioregion) using the Biodiversity Assessment Method (BAM).

Local analogue sites were established at Peppers Woodland Area during the baseline 2019 monitoring event. As noted in Section 3.8, Peppers Woodland Area supports Box-Gum Woodland that is in relatively good condition, particularly on the eastern side, supporting its suitability as a local analogue site for monitoring.

Following the first round of ecological monitoring in 2018 (Emergent Ecology, 2019), revision of the completion criteria was recommended including:

- Utilising standard BAM benchmarks (Composition, Structure, Function and Vegetation Integrity Scores), making for more streamlined data comparison in line with current standards;
- Addition of a criterion relating to native species composition to ensure consistency with the target Box-Gum Woodland PCT;
- Addition of a criteria relating to structure and functional habitat values (such as leaf litter, hollows, fallen logs), particularly for HMAs;
- Revision of criteria for bund/emplacement sites, which might be set too low;
- Revision and re-wording of weed targets for HMAs for clarity;
- addition of weed targets for bund/emplacement sites and include allowance for consideration of HTEs; and

- Include criteria relating to the LFA data.

The revised completion criteria and remedial actions for the HMA and emplacements are provided in Table 11 and Table 12 respectively. These criteria meet or exceed the previously approved criteria as presented in the BRMP version 7 (2017) and take into account the complexity of the substrate and slopes of the emplacements, The criteria are reasonable and feasible targets for the re-establishment, conservation and management of vegetation in the HMA and emplacements in accordance with the Approval and associated key biodiversity requirements.

8.1.2 Completion criteria and remedial actions for Infrastructure Areas

The completion criteria and remedial actions for the Infrastructure areas are provided in Table 13.

8.1.3 Completion criteria and remedial actions for the Biodiversity Offset Strategies

As stated in Section 4.5, the offset obligation for modification 4 was retired by making a payment into the Biodiversity Conservation Fund under division 6, section 6.30 (1) of the Biodiversity Conservation Act (BC Act).

The offset obligation required by Modification 5 will be met by retiring credits under the BC Act from properties located remotely from the quarry site, owned by Boral and other landholders. Detailed performance and completion criteria for evaluating the performance of the Biodiversity Stewardship site, including triggers for remedial action where these performance or completion criteria are not met, will be contained within the management plans set up under Biodiversity Stewardship Agreements.

Table 11. Completion criteria and remedial actions for HMA

Criteria (Rehabilitation phase / timeframe)	Performance measures	Performance indicator	Methodology	Remedial action*
Species selection (Vegetation establishment – medium term)	Establishment of at least 13.5 hectares of Box-Gum Woodland within the HMA.	Create a west to east wildlife corridor providing connectivity to the Peppers Woodland area and surrounding bushland. The Composition score (derived from the BAM calculator) is at least 50% of the average of scores from analogue sites. The density of native trees is at least 50% of that of the analogue site (no./ 1000m^2 plot).	Biodiversity Assessment Methodology (BAM) Rapid Visual Assessment (RVA)	Install further tube stock Establish native seed Increase weed management
Ecosystem connectivity (Ecosystem development – long term)	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	GIS Monitoring Rapid Visual Assessment	Establish species that are endemic to the surrounding area (use plant list in Appendix C)

Criteria (Rehabilitation phase / timeframe)	Performance measures	Performance indicator	Methodology	Remedial action*
Ecosystem health (Ecosystem development – long term)	The ecosystem is in a condition comparable to the local analogue sites.	The Structure score (derived from the BAM calculator) is at least 50% of the average of scores from analogue sites. The Function score (derived from the BAM calculator) is at least 50% of the average of scores from analogue sites. The Vegetation Integrity score (derived from the BAM calculator) is at least 50% of the average of scores from analogue sites. Exotic plant cover is <20%. The total cover of high threat exotic species (HTEs) is <5%. The LFA score for Stability is at least 70% of the average of scores from analogue sites. The LFA score for Infiltration is at least 70% of the average of scores from analogue sites. The LFA score for Nutrient Cycling is at least 70% of the average of scores from analogue sites. The LFA Landscape Organisation Index is at least 70% of the average of scores from analogue sites.	BAM Monitoring LFA Monitoring Rapid Visual Assessment	Plant further tubestock Establish native seed Increase weed management
Ecosystem health (Ecosystem development – long term)	Provide habitat along the dam and throughout the HMA	Revegetated areas are established and maintained around perimeter of the dam within the HMA creating a fringing wetland community. There is evidence of nest box use and boxes remain in good condition for 5 years after installation.	Rapid Visual Assessment	Continue HMA management Repair or replace damaged nest boxes.

* Remedial actions will be implemented by Boral based on the recommendations of suitably qualified consultants undertaking the monitoring.

Table 12. Completion criteria for emplacement areas

Criteria (Rehabilitation phase / timeframe)	Performance measures	Performance indicator	Methodology	Remedial actions*
Species selection (Vegetation establishment – medium term)	Establishment of Box-Gum Woodland where possible.	Create a wildlife corridor providing connectivity to the Peppers Woodland area, HMA and adjacent bushland. The Composition score (derived from the BAM calculator) is at least 30% of the average of scores from analogue sites. The density of native trees is at least 30% of that of analogue sites (no./1000m^2).	BAM Monitoring Rapid Visual Assessment	Install further tube stock Establish native seed Increase weed management
Ecosystem connectivity (Ecosystem development – long term)	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	GIS Monitoring Rapid Visual Assessment	Establish species that are endemic to the surrounding area (use plant list in Appendix C)
Ecosystem health (Ecosystem development – long term)	The ecosystem is in a condition comparable to the local analogue sites.	The Structure score (derived from the BAM calculator) is at least 30% of the average of scores from analogue sites. The Function score (derived from the BAM calculator) is at least 30% of the average of scores from analogue sites. The Vegetation Integrity score (derived from the BAM calculator) is at least 30% of the average of scores from analogue sites. Exotic plant cover is <20%. The total cover of high threat exotic species (HTEs) is <5%. The LFA score for Stability is at least 70% of the average of scores from analogue sites. The LFA score for Infiltration is at least 70% of the average of scores from analogue sites. The LFA score for Nutrient Cycling is at least 70% of the average of scores from analogue sites. The LFA Landscape Organisation Index is at least 70% of the average of scores from analogue sites.	BAM Monitoring LFA Monitoring Rapid Visual Assessment	Plant further tubestock Establish native seed Increase weed management

Criteria (Rehabilitation phase / timeframe)	Performance measures	Performance indicator	Methodology	Remedial actions*
Land form is stable (Landform establishment – short term)	Landform is stable with absence of slope failure and uncontrolled erosion.	Absence of slope failure or uncontrolled erosion. Gullies and/or rills are limited and stabilising. No areas of active gully erosion. Sediment control features are assessed in accordance with this BRMP.	LFA Monitoring Rapid Visual Assessment	Re-capping Corrective sedimentation controls installed Re-contour
Landforms to be established during rehabilitation will be constructed to match surrounding landforms, as much as possible. (Landform establishment – short term)	Elements such as drainage paths, contour drains, ridgelines, and emplacements will be shaped, where possible, in undulating informal profiles in keeping with natural landforms of the surrounding environment.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure slopes are at suitable agreed degrees. Avoidance of straight lines and angular corners in profiles of final landforms. Drainage lines to be self-sustaining and predominantly constructed of natural materials (e.g. minimise concrete).	Rapid Visual Assessment	Re-capping Corrective sedimentation controls installed Re-contour
The final landforms, batter slopes, drainage and benching will be designed to ensure the long term stability of the landform. (Landform establishment – short term)	Cover materials	Acceptable cover material for capping.	LFA Monitoring Rapid Visual Assessment	Establish greater cover for capping

* Remedial actions will be implemented by Boral based on the recommendations of suitably qualified consultants undertaking the monitoring.

Table 13. Completion criteria for infrastructure areas

Criteria (Rehabilitation phase / timeframe)	Performance measures	Performance indicator	Methodology	Remedial actions*
Species selection (Vegetation establishment – short term)	Establishment of pasture in areas shown in the conceptual landform plan	Vegetation cover is at least 80% to protect soil against erosion and sedimentation. Weeds are actively managed. The total cover of High Threat Exotic species is <20%.	Rapid Visual Assessment Modified BAM Plot	Monitor establishment
Land form is stable (Landform establishment – short term)	Landform is stable with absence of slope failure and uncontrolled erosion.	Absence of slope failure or uncontrolled erosion. Gullies and/or rills are limited and stabilising. No areas of active gully erosion. Sediment control features are assessment in accordance with this BRMP.	LFA Monitoring Rapid Visual Assessment	Re-capping Corrective sedimentation controls installed Re-contour

* Remedial actions will be implemented by Boral based on the recommendations of suitably qualified consultants undertaking the monitoring

8.2 MONITORING PROGRAM

The Biodiversity and Rehabilitation Monitoring Program has been developed to measure progress towards the completion criteria (Cambium Group, 2022). The plan includes details on monitoring methods, timing, frequency, plot locations, data analysis and assessment of performance against completion criteria and timeframes. This plan is currently being reviewed and will be updated in 2021.

The monitoring program:

- Fulfils commitments in the Development Consent and any other requirements;
- Enables the Boral to assess and manage impacts/potential impacts on biodiversity;
- Provides feedback for continuous improvements;
- Assesses the effectiveness of erosion control measures designed to protect soils, vegetation and water quality;
- Identify the need for research into specific problems, and provide relevant data; and
- Assesses when rehabilitation objectives and completion criteria have been attained, as part of the overall mine closure process.

In summary, the seasonally-based (Spring) monitoring program is undertaken by suitably qualified consultations and applies to all RMUs, including the HMA, and analogue sites at the Peppers Woodland Area. Monitoring commenced in 2018 and comprises three components to capture environmental change at differing scales:

- Vegetation connectivity – to assess changes in habitat connectivity at the landscape scale and in the medium term (5 years);
    - Baseline image April 2018;
- Ecological monitoring: Landscape Function Analysis (LFA) – to assess changes in biogeochemical functioning of landscapes at the hillslope scale and Vegetation and Habitat Monitoring (BAM) – to assess changes in the structure and composition of the vegetation and key fauna habitats in the short/medium term (2 years);
    - Emergent Ecology (2019) 2019 Ecological Monitoring Report. Prepared for Boral Resources (NSW) Pty Ltd;
    - Land Eco consulting (2021) 2020 Ecological Monitoring Report. Prepared for Boral Resources (NSW) Pty Ltd;
- Rapid visual assessments (RVA) – photo reference points and a rapid assessment of environmental condition and emerging threats in the short term (minimum 1 year);
    - LAMAC Management (2018a) Peppertree Quarry Rapid Visual Assessment March 2018. Prepared for Boral Resources (NSW) Pty Ltd;
    - LAMAC Management (2018b) Peppertree Quarry Rapid Visual Assessment December 2018. Prepared for Boral Resources (NSW) Pty Ltd;
    - LAMAC Management (2019) Peppertree Quarry Rapid Visual Assessment November 2019. Prepared for Boral Resources (NSW) Pty Ltd;
    - Cambium Group (2021a) Peppertree Quarry Rapid Visual Assessment 2020. Prepared for Boral Quarries NSW.
    - Cambium Group (2021b) Peppertree Quarry Rapid Visual Assessment 2021. Prepared for Boral Quarries NSW

An outline of the methods for Landscape Function Analysis (LFA), Biodiversity Assessment Method (BAM) and Rapid Visual Assessment is provided in Table 14. Once the completion criteria have been

confirmed as being met, the frequency of monitoring will be reviewed to ensure the health of the rehabilitation.

Table 14. Monitoring methodologies to be implemented across the rehabilitation areas

Methodology	Details	Purpose	Rehabilitation unit
Landscape Function Analysis (or similar)	Landscape Function Analysis (LFA) is a monitoring procedure developed by the CSIRO (Tongway & Hindley, 1997, last revised in 2004) that uses rapidly acquired field-assessed indicators to assess the biogeochemical functioning of landscapes at the hillslope scale. It provides a rapid, reliable, and easily applied method for assessing and monitoring landscape restoration or rehabilitation projects. LFA examines the way physical and biological resources are acquired, used, cycled and lost from a landscape. The LFA assessment consists of the following components: landscape organisation characterisation, soil surface assessment and rill survey. Measurements are converted into indices for comparison against analogue sites, and to demonstrate development towards completion criteria over time. LFA monitoring commenced in January 2019 and will subsequently be undertaken every 2 years in Spring.	To provide a methodology that can be used to assess the potential for erosion, stability and soil surface across the rehabilitation areas in comparison to benchmark. This outcome may assist management of the rehabilitation areas (e.g. erosion controls may need to be implemented in areas, additional top soil placed in rehabilitation areas etc.)	All rehabilitation units
Biodiversity Assessment Method(BAM)	The BAM is a methodology defined under the *Biodiversity Conservation Act* 2016 (BC Act) which has been developed for the consistent and streamlined assessment of biodiversity values within NSW. The BAM is described in OEH (2017) and includes survey of a range of attributes within a 20 x 50 metre plot. The attributes collected are then entered into the BAM calculator to generate scores for composition, structure, function and vegetation integrity. The scores are based on comparison with standard benchmarks for the relevant plant community type (PCT). Attributes measured by the BAM include: plant species richness in each growth form group, native vegetation cover in each growth form group, fallen logs, hollow-bearing trees, leaf litter cover, high threat exotic cover and stem size classes (regeneration). BAM monitoring commenced in January 2019 and will subsequently be undertaken every 2 years in Spring.	To provide a methodology to assess the rehabilitation in comparison to Box-Gum Woodland benchmarks. The outcomes may assist management (eg. if overstorey is lower than benchmark, this may result in further management actions such as planting tubestock).	HMA area and any other Rehabilitation Unit that is to meet a Box-Gum Woodland outcome as determined in the Final Concept Plan.

Methodology	Details	Purpose	Rehabilitation unit
Rapid Visual Assessment	Visual monitoring may entail: Species composition - The dominant species present in the monitoring area are identified to obtain a 'picture' of the species composition for a specific vegetation community. In rehabilitation areas, this allows to verify that the species establishing conform to the vegetation community being re-established in the area. Disturbance monitoring – Areas are generally inspected and assessed for: • Presence of mine rubbish. • Evidence of grazing. • Presence of animal pads. • Presence of exotic weeds and feral animal species. • Nest box condition and evidence of use. • Presence of domestic litter / rubbish. • Fire disturbance; • Evidence of nearby maintenance activities (i.e. chemical treatments, fencing, earthworks); and • Surface stability and erosion issues, including: • Eroding factor (i.e. wind, water). • Erosion type (i.e. sheet, rill/gully, pedestal, terracette, scalding (Tongway & Hindley 2004). Overall, this visual monitoring process allows for comparison between different sites and over time. It also allows for a prompt feedback system whereby disturbed revegetated areas that require maintenance works can be efficiently and objectively prioritised for remedial works. This will be undertaken annually commencing in Spring 2018.	To complement existing monitoring, and identify areas of potential disturbance across the rehabilitation areas and associated management actions to address the disturbance.	All rehabilitation units

8.2.1 Assessment of performance

Key performance measures and completion criteria for the HMA, emplacements and infrastructure areas are outlined in Table 11, Table 12 and Table 13 respectively.

The presentation of monitoring results includes as assessment of rehabilitation success as measured against the completion criteria. This assessment determines if vegetation and rehabilitation management is successfully meeting the performance indicators/completion criteria and thereby attaining the rehabilitation objectives.

If progress is not being made towards the completion criteria or it is unlikely that the criteria will be attained for relinquishment, remedial actions will be implemented in accordance with the Trigger Action Response Plan (TARP) (Appendix H) and according to the recommendations from the monitoring reports.

8.2.2 Reporting

A report outlining (as a minimum) the methods and results of the monitoring and an assessment of performance must be submitted to Boral within six months of completion of the field surveys. This will allow for adaptive management and implementation of remedial actions in accordance with the TARP (Appendix H) to improve biodiversity outcomes.

Results of the Rapid Visual Assessment and the Ecological Assessment will be reported in the subsequent Annual Review.

Actions and recommendations from these reports will be captured in the Boral Sequence system.

9 RISKS TO SUCCESSFUL IMPLEMENTATION OF THE BRMP

Condition D5 requires

"The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in PART B. 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 measures to ensure that the exceedance ceases and does not re-occur;

(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. "

Peppertree Quarry has in place an Aspects and Impacts Register which is reviewed every two years, by the Environmental and Stakeholder Advisor. This risk register identifies potential sources of risks to rehabilitation work and identifies appropriate controls.

Risks to the successful implementation of this plan include:

- Failure of responsible parties to complete required actions;
- Failure to complete adequate reviews of the plan and implement corrective actions;
- Vegetation clearing outside the Extraction Limit Boundary;
- Incompatible soils affecting revegetation success; and
- Catastrophic events that affect revegetation success, i.e. bushfire, flood, drought.

These risks will be managed through a clear definition of roles and responsibilities, adhering to regular reviews of the plan and adaptive management.

Boral have in place a Maintenance Work Order system which schedules, tracks and alerts responsible parties to undertake required works. Once works are complete, evidence is uploaded to the system, so works are closed out as complete. The Work order system is used to track the Ecological Assessment, the Rapid Visual Assessment and the need to undertake quarterly pest management works.

In the event of an unplanned or unforeseen event (such as a bushfire, flooding or drought) that has an adverse effect on the rehabilitation, management actions may need to be amended to assist the progress of rehabilitation.

A contingency plan detailed in a Trigger Action Response Plan (TARP) for potential rehabilitation risk elements is provided in Appendix H.

The Quarry Exit Strategy will include options for including provisions for alternative direct and/or supplementary offset measures where regeneration of EECs does not meet performance and completion criteria.

10 FINANCING AND PROVISION

Boral is required to establish a Rehabilitation and Conservation Bond in accordance with Conditions B63 to B68 set out below for Peppertree quarry. This is the appropriate mechanism for security of the funds for possible default in rehabilitation by the company. The figure is calculated using the area of disturbed land.

B63. Within six months of the approval of the Biodiversity and Rehabilitation Management Plan, the Proponent must lodge a Conservation and Rehabilitation Bond with the Department to ensure that the SWOE BOS and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the plan and the relevant conditions of this approval. The sum of the bond must be an amount agreed by the Secretary and determined by:

a) calculating the full cost of implementing the SWOE BOS at third party rates (other than land acquisition costs);
b) calculating the cost of rehabilitating all disturbed areas of the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and
c) employing a suitably qualified, independent and experienced person to verify the calculated costs.

Note: *Any redundant rehabilitation bonds currently held by the Department in relation to the project will be released following acceptance of the Conservation and Rehabilitation Bond required under this condition.*

B64. The Planning Secretary may waive the requirement for a Conservation Bond if, in the opinion of the Planning Secretary, the implementation of the SWOE BOS has substantially progressed.

B65. The calculation of the Conservation and Rehabilitation Bond must be submitted to the Department for approval at least 2 months prior to the lodgement of the bond.

B66. The Conservation and Rehabilitation Bond must be reviewed and if required, an updated bond must be lodged with the Department within 3 months following:

a) any update or revision to the Biodiversity and Rehabilitation Management Plan;
b) the completion of an Independent Environmental Audit in which recommendations relating to the implementation of the SWOE BOS or rehabilitation have been made; or
c) in response to a request by the Planning Secretary,

B67. If the SWOE BOS and rehabilitation are completed generally in accordance with the relevant performance and completion criteria, to the satisfaction of the Planning Secretary, or if alternate funding arrangements are provided for the SWOE BOS under a long term security arrangement (see condition B56) the Planning Secretary will release the bond.

B68. If the SWOE BOS or rehabilitation is not completed generally in accordance with the relevant performance and completion criteria, the Planning Secretary will call in all, or part of, the bond, and arrange for the completion of the relevant works.

11 TRAINING

11.1 INDUCTION

All employee and contractors working onsite will be inducted. The Peppertree Quarry induction covers the nature of the surrounding environment, the restrictions to access to the areas and the need to seek approvals before entering any sites or disturbances of vegetation.

11.2 SITE SPECIFIC TRAINING

Where identified by management representatives, additional site specific training may be developed and implemented and delivered to relevant personnel and contractors.

Tool box talks will be undertaken with all staff and contractors associated with works outlining the requirements of the relevant Consent and its conditions of consent. They will be made aware that they must comply with the conditions of consent.

12 REPORTING AND REVIEW

12.1 REGULATORY COMPLIANCE

All Boral sites will be aware of regulatory biodiversity commitments to ensure the necessary controls and monitoring is carried out for the purpose of verifying compliance.

Regulatory documents such as the following will be periodically reviewed for site compliance with biodiversity and rehabilitation management obligations:

- environmental licences
- planning consents
- All actions identified in the management plan will be included in the site's Environmental Permit Planner to manage compliance to these commitments.

12.2 RESPONSIBILITY FOR IMPLEMENTATION

The Quarry Manager carries ultimate responsibility for the implementation of this BRMP and providing the necessary resources as required.

The site Environmental and Stakeholder Advisor (ESA) is responsible for carrying out and/or coordinating the monitoring, reporting and reviewing the requirements of this plan.

Operations personnel (Quarry Supervisors) are responsible for a number of the key activities associated with the plan. Any other site personnel onsite including management, quarry plant operators, administration staff, contractors and any other person performing work or visiting the site are responsible for reporting any breaches to this plan or adverse impacts on vegetation and reporting them to the shift Supervisor.

The investigation of the breaches is the responsibility of the ESA, with reporting to the Authorities being the responsibility of the Quarry manager or his delegated representative the ESA.

Review of the BRMP is outlined in Section 12.5 and is the responsibility of the ESA.

12.3 REPORTING

12.3.1 Annual Reporting

In accordance with the requirements of CoA D11, by the end of March each year, Boral will prepare and submit a review of the environmental performance of the project to the satisfaction of the Secretary of the DP&E.

The site environmental officer is responsible for managing the environmental reporting program and arranging specialist consultants to prepare reports, as required. The activities and performance outcomes of the BRMP will be presented in the Annual Review (AR).

This will include detailed assessment of monitoring results collected over the course of the BRMP, an evaluation of any trends occurring across the site, a summary of any incidents or non-conformances with licences/criteria and recommendations for management actions.

As required by Condition D11. This review must:

a) describe the project (including rehabilitation) that were carried out in the previous calendar year, and the project that are proposed to be carried out over the current calendar year.
b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the:
    (i) relevant statutory requirements, limits or performance measures/criteria.
    (ii) requirements of any plan or program required under this approval.
    (iii) monitoring results of previous years; and
    (iv) relevant predictions in MOD5.
c) identify any non-compliance and incidents over the past calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence.
d) evaluate and report on:
    (i) the effectiveness of the noise and air quality management systems; and
    (ii) compliance with the performance measures, criteria and operating conditions in this approval.
e) identify any trends in the monitoring data over the life of the project.
f) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
g) describe what measures will be implemented over the next calendar year to improve the environmental performance of the project.

Copies of the Annual Review are submitted to Council and made available to the CCC and any interested person upon request.

A copy of the Annual Review will also be submitted to the EPA.

12.3.2 Incident Reporting

Boral has in place a procedure for the management and reporting of incidents. Once it is identified that an incident has occurred, the following actions will be taken:

- operations to be stopped until appropriate control systems can be implemented
- An investigation will be undertaken to establish the root cause.
- Subject to the findings of the investigation actions will be taken to repair, replace or change the identified cause of the incident. These actions will be completed by appropriately qualified personnel or consultants.
- The identified cause of the incident and the selected response will be formally documented in an incident response report
- Training will be undertaken, if changes are required to procedures or operations.
- DPE, EPA and if appropriate BCD and BCT will be notified of the incident/impact/potential impact once an incident has been identified

Incident notification and reporting will be conducted in accordance with Condition D9, where by "*The Proponent must immediately notify the Secretary and any other relevant agencies of any incident*".

The notification must be in writing to compliance@planning.nsw.gov.au identifying the project (application number and name) along with the location and nature of the incident.Under the Project Approval, and 'incident' is defined as:

"An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance".

'Material harm' is defined as:

"harm to the environment that:

- *involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or*
- *results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)*

This definition excludes 'harm' that is authorised under either this approval or any other statutory approval"

In accordance with Appendix 8 of the Approval

1. A written incident notification addressing the requirements set out below must be submitted via the Major Projects Website within seven days after the Applicant becomes aware of an incident. Notification is required to be given under this condition even if the Applicant fails to give the notification required under condition D9 or, having given such notification, subsequently forms the view that an incident has not occurred.
2. Written notification of an incident must:
    a) identify the development and application number;
    b) provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
    c) identify how the incident was detected;
    d) identify when the Applicant became aware of the incident;
    e) identify any actual or potential non-compliance with conditions of consent;
    f) describe what immediate steps were taken in relation to the incident;
    g) identify further action(s) that will be taken in relation to the incident; and
    h) identify a development contact for further communication regarding the incident.
3. Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, the Applicant must provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below, and such further reports as may be requested.
4. The Incident Report must include:
    a) a summary of the incident;
    b) outcomes of an incident investigation, including identification of the cause of the incident;
    c) details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
    d) details of any communication with other stakeholders regarding the incident.

Notifications of environmental harm will also be made by telephoning the Environment Line service on 131 555.

The Site Manager (or delegate) is responsible for reporting exceedances or incidents causing (or threatening to cause) material harm to the environment to the DPI&E and NSW EPA.

12.3.3 Operational Criteria Non-compliance response

Non-compliances may result due to rehabilitation activities not being undertaken or appropriate procedures not being followed as outlined in the BRMP.

A non-compliance is defined in the Project Approval, Definitions as "An occurrence or set of circumstances or development that is a breach of this approval"

Initial notification of a noncompliance and reporting will be conducted In accordance with Condition D10, Part D, where by

"*Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing via the Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.*"

Should a noncompliance be identified the following actions will be taken:

- An investigation will be undertaken to establish the root cause of the non-compliance
- Subject to the findings of the investigation, actions will be taken to minimise any reoccurrence of the / non-compliance. Remedial actions, where possible will be undertaken.
- The identified cause of the impact and the selected response will be formally documented in an incident response report.
- DPE, EPA and if appropriate BCD and BCT will be notified of the non-compliance as per Condition D10 above.

12.3.4 Community complaint response

An Environmental hotline is provided to the local community to make contact directly with the Environment and Stakeholder Advisor (ESA) of the Peppertree Quarry. This hotline is advised to the community via a monthly newsletter and on the website.

In the first instance, after receiving a complaint, the ESA will attend the location of the complaint to discuss their concerns. Investigations into the complaint will be undertaken and findings reported to the complainant.

In terms of complaints, Boral will record details of all complaints received in the organisation's Safety and Environment System and ensure that a response is provided to the complainant as soon as practicable.

Further, Boral will make available a report on complaints received to the Community Consultative Committee (CCC) and to relevant government agencies and the Councils upon request and include a summary in the Annual Review. The report shall include the number of complaints that have been resolved with or without mediation. A complaints register is also available on the Peppertree Quarry website.

12.3.5 Public Reporting

Boral will ensure that the local community is kept informed by way of periodic newsletters, leaflets, local newspaper advertisements and the Quarry web page of the progress of the Quarry, including details of the environmental hotline. A monthly Boral newsletter will be prepared by the Peppertree Quarry Environment and Stakeholder Advisor. This Newsletter will be included in the Discover Marulan local community newspaper. The Boral newsletter provides updates on operations and provides details of the environmental hotline.

A copy of the newsletter is maintained on the Boral Peppertree Quarry website.

Community Consultative Committee meetings are used to inform the committee of the general progress of rehabilitation works. These meetings are held quarterly with community and local government representatives. Minutes of the meetings are provided on the Boral Peppertree Quarry website.

The Boral Peppertree Quarry website is reviewed annually and updated quarterly with minutes, newsletters, and other supporting documents required as per CoA D16.

Community Communication is the responsibility of the Environment and Stakeholder Advisor for Peppertree Quarry.

As per Condition D 16, the following, information will be made available to stakeholders so that they can understand the environmental impacts of the development. The documents will be available via the Boral Peppertree Quarry website.

Before the commencement of construction until the completion of all rehabilitation required under this consent, the Applicant must:

a) make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website:

   (i) the document/s listed in condition A2(c);

   (ii) all current statutory approvals for the development;

   (iii) all approved strategies, plans and programs required under the conditions of this consent;

   (iv) minutes of CCC meetings;

   (v) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent;

   (vi) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;

   (vii) a summary of the current stage and progress of the development;

   (viii) contact details to enquire about the development or to make a complaint;

   (ix) a complaints register, updated monthly;

   (x) the Annual Reviews of the development;

   (xi) audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report;

   (xii) any other matter required by the Planning Secretary; and

b) keep such information up to date, to the satisfaction of the Planning Secretary.

12.4 AUDITING

Boral has an established corporate and divisional risk-based audit program that periodically assess operational sites for conformance with HSEQMS requirements.

12.4.1 Independent Environmental Audit

In accordance with the requirements of CoA D13, within 3 years of the date of the commencement of construction and every 3 years thereafter, unless the Secretary directs otherwise, Boral will commission and pay the full cost of an Independent Environmental Audit of the project. The adequacy of this BRMP will be included in the Environmental Audit. An Independent Audit of the Quarry was conducted in 2018 with the next Audit commenced at the end of 2021.

The audit must:

a) be led by a suitably qualified, experienced and independent auditor whose appointment has been endorsed by the Planning Secretary;
b) be conducted by a suitably qualified, experienced and independent team of experts (including any expert in field/s specified by the Planning Secretary) whose appointment has been endorsed by the Planning Secretary;
c) be carried out in consultation with the relevant agencies and the CCC;
d) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent, any relevant EPL, water licences and mining leases for the development (including any assessment, strategy, plan or program required under these approvals);
e) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals and this consent;
f) recommend appropriate measures or actions to improve the environmental performance of the development and any assessment, strategy, plan or program required under the abovementioned approvals and this consent; and
g) be conducted and reported to the satisfaction of the Planning Secretary.

Within three months of commencing an Independent Environmental Audit, or within another timeframe agreed by the Planning Secretary, the Applicant must submit a copy of the audit report to the Planning Secretary, and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the Planning Secretary

12.5 REVIEW OF BRMP

The BRMP will be reviewed annually by Boral Environment and Stakeholder Advisor to determine the efficacy of the BRMP and ensure it continues to fulfil its intended purpose. This will allow for and promote adaptive management through progressive stages of future quarry operations.

Reviews will be undertaken as a result of any of the following:

- major changes in site conditions or work methods.
- as a result of changes in environmental legislation applicable and relevant to the quarry operations.
- In response to the requirements of CoA D6 (Part D) of the Project Approval which requires a review of the BRMP within 3 months of:
- the submission of an incident report under condition D9;
- the submission of an Annual Review under condition D11;

- the submission of an Independent Environmental Audit under condition D13;
- the approval of any modification of the conditions of this approval (unless the conditions require otherwise);
- notification of a change in project stage under condition A15; or
- the issue of a direction of the Secretary under condition A2(b) which requires a review,

If any of the above reviews result in any revisions of the BRMP, the BRMP will be provided to the Secretary within 6 weeks for approval, as required by Condition D7. Opportunities for continual improvement relating to biodiversity and rehabilitation will be discussed internally at toolbox and operational meetings, in conjunction with Quarry personnel and contractors. These opportunities would be presented to the Quarry Manager for consideration. Any changes to operations as a result will be reported on as part of the Annual Review or, where relevant, reflected in an updated Plan.

In addition, a yearly rapid visual assessment and associated outcomes would be used as an indication of the site's management of biodiversity and rehabilitation effectiveness, with the RVA outcomes being progressively implemented.

13 SUMMARY OF MANAGEMENT ACTIONS

The Biodiversity and Rehabilitation Management Plan provide the framework and guidance for the successful rehabilitation of disturbed lands as well as the ongoing management of the Habitat Management Area.

This includes the protection of sites, pest management as well as successful establishment of local plant species.

A three year plan for each Rehabilitation Management Unit as well as general works is included in Appendix I.

14 REFERENCES

Cambium Group (2021) Rehabilitation Implementation Plan. Prepared for Boral Resources (NSW) Pty Ltd

Cambium Group (2022) Peppertree Quarry Biodiversity and Rehabilitation Monitoring Program. Prepared for Boral Resources (NSW) Pty Ltd.

Charman PEV and Murphy BW (Eds.) (1991). Soils Their Properties and Management A Soil Conservation Handbook for New South Wales Sydney University Press: Sydney.

DECC (2008) BioBanking Assessment Methodology and Credit Calculator Operational Manual, NSW Department of Environment and Climate Change, Sydney.

DEWHA (2008) Threat Abatement Plan for predation of the European red fox.

DEWHA (2008) Threat Abatement Plan for competition and land degradation by unmanaged goats.

DOE (2015) Threat Abatement Plan for predation by feral cats.

DOEE (2016) Threat abatement plan for competition and land degradation by rabbits. DOEE (2017) Threat abatement plan for the predation, habitat degradation, competition and disease transmission by feral pigs.

DPIE (2020) Biodiversity Assessment Method. Department of Planning, Industry and Environment, Sydney. (now DPE)

Element (2018) Peppertree Quarry Modification 5 – Environmental Assessment prepared by Element Environmental Consultants for Boral Resources (NSW) Pty Ltd.

ERM (2006) Marulan South Quarry- Environmental Assessment prepared by Environmental Resources Management Australia Pty Ltd for Boral Resources (NSW) Pty Ltd.

Florabank (1999) Guidelines Seed Collection from woody Plants for Local Revegetation.

Niche Environment and Heritage (2014) Peppertree Modification 4 Biodiversity Assessment Report, Prepared for Boral Resources.

Niche Environment and Heritage (2016) Peppertree BioBank Assessment, Prepared for Boral Resources.

Niche Environment and Heritage (2018) Peppertree Modification 5 Biodiversity Development Assessment Report. Prepared for Boral Resources (NSW) Pty Ltd.

NSW Minerals Council Ltd (2007) New South Wales Minerals Council Rehabilitation by Design Practice Notes NSW Minerals Council Ltd, Maitland.

NPWS (2001) Morton National Park and Budawang National Park Plan of Management NSW National Parks and Wildlife Service, Hurstville NSW.

NSW Scientific Committee (2003) *Solanum celatum* (a shrub) - Endangered species determination - final DEC (NSW) Sydney.

OEH (2018) *Solanum celatum* – Profile. https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10761

Tongway, D.J. and Hindley, N.L. (1997) Landscape Function Analysis. Understanding more about your landscape – A method for monitoring landscape productivity, CSIRO Australia, Canberra.

Tongway, D.J. and Hindley, N.L. (2004) Landscape Function Analysis: Procedure for Monitoring and Assessing Landscapes, with special reference to Minesites and Rangelands, CSRIO Australia, Canberra.

Appendix A: Biodiversity Conservation Trust – Biodiversity Offset Strategy payment statement

NSW GOVERNMENT | Biodiversity Conservation Trust

Statement confirming payment into the Biodiversity Conservation Fund for an offset obligation

Pursuant to section 6.33 of the *Biodiversity Conservation Act 2016*, the NSW Biodiversity Conservation Trust confirms that the following payments have been made into the Biodiversity Conservation Fund under section 6.30(1) of the Act to satisfy an obligation to retire biodiversity credits.

Payment made by	Boral Resources (NSW) Pty Limited
Date received	24 October 2018
Existing statutory obligation reference[1]	PA 06_0074
BCT Reference	BCF011

Biodiversity credit retirement obligations satisfied by payment to the Biodiversity Conservation Fund:

Biodiversity credit ID number	Biodiversity credit name	Number of credits	Cost per credit	Total payment per credit type
1334	Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion	165	$2,070.02	$341,553.84
Total (incl GST)				**$375,709.22** *GST of $34,155.38 is included in this amount*

Paul Elton

Executive Director and Chief Executive

Date: 30.10.18

[1] This refers to either; a development application number for a development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (**EP&A Act**), a State significant infrastructure approval under the previous Part 5.1 (now Part 5, Division 5.2) of the EP&A Act, a decision of a determining authority to carry out or approve the carrying out of an activity under Part 5 of the EP&A Act, or a biobank statement number or biodiversity certification number.

NSW GOVERNMENT | Office of Environment & Heritage

DOC18/458569

Statement of assessment of reasonable equivalence of biodiversity credits

A delegate of the Chief Executive of the Office of Environment and Heritage has determined that the number of biodiversity credits required to be retired under the *Threatened Species Conservation Act 1995* (**TSC Act**) as part of the development consent listed in Part 1, are reasonably equivalent to the number and class of biodiversity credits under the *Biodiversity Conservation Act 2016* (**BC Act**) set out in Part 2.

This document outlines that determination, made in accordance with clause 22(3) of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*.

Part 1 Existing statutory obligation to retire credits

Request made by:	Boral Resources (NSW) Pty Limited ARBN 51 000 756 507
Date received	5th June 2018
Development Consent number	PA 06_0074
Development name	Marulan South (Peppertree Quarry) hard rock quarry and associated infrastructure

Existing statutory obligation reference	Biodiversity credit name (Plant Community Type name and ID, or threatened species name)	IBRA sub region	Number of credits
PA 06 _0074	Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion	Bungonia-Southern Rivers and any IBRA subregion that adjoins the IBRA subregion in which the development occurs.	225

Part 2 Determination of reasonable equivalence

The number and class of biodiversity credits that are reasonably equivalent under the BC Act are:

Ecosystem Credits

1. **Name of Plant Community Type:** Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion (SR670/PCT 1334)

Number of ecosystem credits required	165
Offset trading group	Box Gum Woodland_ greater than or equal to 90% cleared
Vegetation class	Southern Tableland Grassy Woodlands
Vegetation formation	Grassy Woodlands
IBRA[1] subregion	Bungonia - South Eastern Highlands

This statement was issued on 21 August 2018.

Authorised by:

Jane Gilks

Delegate

Director, Ecosystem Assessment and Planning

Conservation and Regional Delivery

Office of Environment and Heritage

[1] Interim Biogeographic Regionalisation for Australia

Appendix B: Consultation Notes

Consultation - Biodiversity and Conservation Division of DPE

Relevant consent conditions	Detailed comment	Boral Response	BRMP reference
a) be prepared by suitably qualified and experienced person/s;	Condition met.		
b) be prepared in consultation with BCD and Council;	This is the first consultation with BCD in regard to Mod 5 amendments.	BRMP updated provide details on consultation.	Section 1.8
c) describe the short, medium, and long-term measures to be undertaken to: i. implement the SOE BOS, SWOE BOS and the Habitat Management Area;	Section 5 The BRMP does not describe the short, medium and long term measures to implement the habitat management area.	BRMP updated to reflect short, medium and long term measures for the HMA.	Section 6.1 and Appendix E
ii. comply with the rehabilitation principles in Chapter 2.8 of the EA; iii. manage the remnant vegetation and fauna habitat on the site and in any offset areas; and	ii) The target of 30% of Analogue site for performance on VI, composition, structure and function requires further justification against the rehabilitation requirements and to satisfy CoA B60 (h) below. (see also comments against 60 (h) below	BRMP updated to clarify and provide justification for the completion criteria.	Section 8.1.1
iv. ensure compliance with the rehabilitation objectives in this approval;	iii) No long term management measures/ or monitoring to inform such measures is proposed for remnant vegetation & habitat management areas. (only every 2 years in rehabilitation areas see Table 14).	BRMP updated to identify short, medium and long term management measures. Monitoring occurs in HMA and rehabilitation areas.	Table 7, Section 6.1 and Appendices B-D
d. provide details of the conceptual final landform and associated land uses for the site;	The plan should contain a directive to ensure that fertiliser is not applied to native plant communities.	Noted - but this will be site dependent. The BRMP notes that no topsoil will be removed from the South Western Overburden Emplacement due to the potential for indigenous artefacts, therefore there is a need for 'artificial topsoil'.	Section 3.5
e. consider actions identified in relevant Threat Abatement Plans;	No identified actions are specifically addressed – however the plan does include weed and pest management actions.	No action required.	
	The Plan states (p69) that a weed management plan is to be prepared. However there are no details of when this will occur or what this plan will provide. This plan needs to be provided within a specified timeframe from works commencing on the site (6 months seems reasonable). The weed management plan should ideally be developed in consideration of any weed control measures to date and provide an updated list of targeted weed species, control strategies, and maps for priority control areas in consideration of table 10 of the BRMP. The plan needs to include a schedule of works including appropriate	Weed Management Plan has been updated 2021. BRMP has been updated to summarise the updated Weed Management Plan and refer to this document.	Section 7.1

	monitoring and reporting requirements to inform primary, secondary and ongoing follow up actions.		
	Pest control is proposed to piggyback NPWS programs, which is considered satisfactory, provided that there is adequate monitoring to inform the TARP, as to whether any additional control measures may be required.	BRMP updated to refer to SOP for pest management. Monitoring of feral animals is undertaken during the annual Rapid Visual Assessments as well as regular walk around assessments by the sites environmental staff. The BRMP will be updated to make this clearer and the TARP revisited.	Section 7.8, Appendix H
f. include detailed performance and completion criteria for evaluating the performance of the SOE BOS, SWOE BOS and the Habitat Management Area and rehabilitation of the site, including triggers for remedial action, where these performance or completion criteria are not met;	The completion criteria for the Habitat Management Area needs further detail and justification (Table 11). At least 50% of Analogue site for performance on VI, composition, structure and function requires further justification against the rehabilitation requirements and to satisfy CoA B60 (h) below. It's not clear from the wording in Table 12 if the target is 30% *less than* the analogue site *of* 30% of the analogue site. Aiming for 70% less than analogue is not acceptable. The table needs to clarify. The performance and completion criteria for restoring fauna habitat and quality of native vegetation need further justification and must address CoA B60 (h) requirements below. Criteria should be based on the habitat requirements of target species which were impacted. Habitat requirements are provided by the TBDC. Target species should be defined in Table 11 and 12. 10% HTE is very high and will compromise the ability for the site to achieve a reasonable VI score. Specifying targets for the sub-components which comprise the VI score complicates the performance indicators. The plan should use a single VI score and undertake BAM plots to check how the rehabilitation sites are tracking. BAM monitoring and 'analogue' plots must be mapped and included in the plan.	BRMP updated to clarify and provide justification for the completion criteria. Condition doesn't specifically identify fauna habitat and implies general habitat only hence the focus. Performance indicator for HTE reduced to 5%. Details of the monitoring program, including baseline data, reference condition and maps, is provided in the Biodiversity and Rehabilitation Monitoring Program (2022) which is referenced in the BRMP, as agreed during discussions.	Section 8
	Section 8.1: The process for creating benchmark data in BioNet needs to be addressed. In order for the Peppers Woodland Area to be used as benchmark data, there needs to be justification to show that the sites used are' *Best-on-offer sites … within the contemporary landscape with higher numbers of native plant species, greater structural complexity and replete with functional components, relative to other sites within the same vegetation type and bioregion.'*	Details of the monitoring program, including baseline data, reference condition and maps, is provided in the Biodiversity and Rehabilitation Monitoring Program (2022) which is referenced in the BRMP, as agreed during discussions.	Section 8.1
	The use of 'approximately' in relation to the establishment of the HMA is unsatisfactory. Any performance criteria which are qualified by ambiguous terms like 'approximately' and 'where possible or where required' must be replaced with unequivocal commitments and defined	BRMP updated to remove ambiguous terms.	Throughout

	areas on a map to identify where those commitments will apply.		
	The TARP (p121) only includes actions to install fauna habitat such as nest boxes if the Total length of hollows/ nesting sites in Woodland – EEC areas is <20% that of analogue sites. This needs further justification as there appears to have been no mapping of hollow bearing tree resources within the site, despite there being reference to the occurrence of hollow bearing trees in the BDAR (Niche 2018).	BRMP updated to include to include pre clearance surveys to tag and map habitat features, develop a strategy to salvage/install habitat features and undertake fauna surveys within 21 days of clearing.	Section 4.2
	The triggers for the TARP must also be capable of easy measurement. Triggers like '*understory species diversity atypical compared to analogue sites'* are not suitable triggers. It should be something like '>20% of species detected do not occur on analogue site'. Ie use a numeric value in the triggers rather than qualitative values like 'typical' and 'atypical'.	TARP updated ambiguous terms removed.	Appendix H
	The plan needs to provide a reference for this baseline data or include a requirement to provide it as part of a monitoring program to allow evaluation of performance and completion criteria.	Details of the monitoring program, including baseline data, reference condition and maps, is provided in the Biodiversity and Rehabilitation Monitoring Program (2022) which is referenced in the BRMP, as agreed during discussions.	Section 8
	In Table 11, define the frog species to which the rehabilitation area will provide suitable habitat. Define their habitat features using the TBDC and 'visually' monitor those features. Ie, what specific habitat features for what specific species will be promoted? Refer to BDAR.	BRMP updated. No requirement to establish specific frog habitat. Wording in Table 11 updated to include 'fringing wetland community'.	Table 11
g. describe how the implementation of the SOE BOS would be integrated with the management of the Habitat Management Area, and the overall rehabilitation of the site;	Not provided in any detail.	Noted. No change proposed This is a drafting legacy condition. SOE BOS was not progressed for modification 4 but payment made to fund instead.	Refer to Section 4.5
h. include a detailed description of the measures to be implemented on the site and any offset area to: i. maximise the salvage of environmental resources within approved disturbance area, including tree hollows, vegetation and soil resources, for beneficial reuse in the SOE biodiversity offset area, the Habitat Management Area or for rehabilitating other areas of the site; ii. restore and enhance the quality of native vegetation and fauna habitat in the SOE biodiversity offset area, the Habitat Management Area and other areas of the site through:	i) No details are provided on salvaging habitat resources or measures proposed for restoring and enhancing the quality of native vegetation and fauna habitat in the SOE biodiversity offset area, the Habitat Management Area and other areas of the site through the introduction of fauna habitat features. The plan needs to identify resources to be retained and or protected during the pre-clearance stage and identify (mapped reference) where these resources will be re located. The BRMP must include a requirement to monitor areas where these resources are relocated for 'beneficial re-use' to improve habitat. Further details of methods proposed to introduce naturally scarce fauna habitat features such as den structures, nest boxes and	BRMP updated to include tagging and mapping of habitat features, development of a strategy to salvage/install habitat features and fauna surveys within 21 days of clearing as agreed during discussions.	Section 4.2 and Appendix D

□ assisted natural regeneration; □ targeted vegetation establishment (with a particular focus on Box Gum Woodland EEC); and □ the introduction of fauna habitat features; iii. minimise impacts on tree hollows and termite mounds where reasonable and feasible; iv. minimise impacts on fauna, including undertaking pre-clearance surveys; v. manage potential indirect impacts on threatened plant and animal species, including supervision of clearing activities by a suitably qualified spotter/handler; vi. manage or handle animals caught or injured during clearing; vii. introduce naturally scarce fauna habitat features such as den structures, nest boxes and salvaged tree hollows, and promote the use of these introduced habitat features by threatened fauna species; viii. minimise the amount of clearing within the approved disturbance area where reasonable and feasible; ix. establishing vegetation screening and landscaping the site (including the bunds and overburden emplacement areas) to minimise the visual impacts of the project on surrounding receivers; x. control weeds, including measures to avoid and mitigate; xi- control feral pests, including but not limited to goats, rabbits, fox, cats and pigs, with consideration of actions identified in relevant threat abatement plans; xii- manage the collection and propagation of seed; xiii- control access; xiv- manage bushfire hazards; and xv- progressively rehabilitate the site and minimise disturbance areas	salvaged tree hollows, or to promote the use of these introduced habitat features by threatened fauna species needs to be provided. The plan needs to provide details (mapped locations) of where nest boxes have been installed as per previous approval) as these nest boxes require monitoring not only to ensure they are properly maintained, but to determine whether they are continuing to provide satisfactory replacement habitat for lost hollows and meet the objectives of the Habitat Management Area. The TARP (p121) only includes actions to install additional nest boxes if the Total length of hollows/ nesting sites in Woodland – EEC areas is <20% that of analogue sites. This needs further justification as there appears to have been no mapping of hollow bearing tree resources or nesting resources (existing nest boxes) within the site, despite there being reference to the occurrence of hollow bearing trees in the BDAR (Niche 2018).		
	ii) Restoring and enhancing quality of native vegetation/ targeted vegetation establishment: see comments on performance measures & completion criteria which require further justification. To satisfy this condition would require regular monitoring at least every two years using BAM plots & VI scores to monitor performance against revised/justified completion criteria in tables 11 and 12. Monitoring site plot density should be consistent with the BAM requirements for plots per zone area.	Noted. Comments on performance measures and completion criteria addressed above. Monitoring is in place as described. Details of the monitoring program, including baseline data, reference condition and maps, is provided in the Biodiversity and Rehabilitation Monitoring Program (2022) which is referenced in the BRMP. Plot density may not be the same as BAM requirements as we are using BAM for monitoring purposes not site assessment.	Section 8.2
	iii) No measures/ or long term monitoring is proposed to manage remnant vegetation & habitat management areas. (only every 2 years in rehabilitation areas see Table 14).	BRMP updated to identify short, medium and long term management measures. Monitoring occurs in HMA and rehabilitation areas.	Table 7, Section 6.1 and Appendices B-D
	The BDAR (Table 12) (Niche 2018) (Appendix D of the EA 2018) indicates there is potential for hollows and hollow dependant threatened fauna including the Gang-gang Cockatoo (recorded on site) however the location of hollows within the development site or offset areas including any replacement nest boxes (referred to in the BRMP)previously installed is not provided. Habitat boxes installed in remnant vegetation must be marked/mapped and included in ongoing monitoring requirements to ensure they are functioning or determine whether maintenance or replacement is required. The maintenance or replacement of nest boxes should be included in the TARP (Appendix F).	BRMP updated to include tagging and mapping of habitat features, development of a strategy to salvage/install habitat features and fauna surveys within 21 days of clearing as agreed during discussions.	Section 4.2 and Appendix D

	Maps showing no go areas would assist contractors.	Restricted access areas communicated to contractors as part of the induction process	Section 11.1
	A weed management plan is needed – with a timeframe for preparation and implementation . Does the current weed contractor report? Or work to a plan or map of weed infested areas? How do report against a performance measure without this information?	Weed Management Plan has been updated 2021. BRMP has been updated to summarise the updated Weed Management Plan and refer to this document.	Section 7.1
	There is reliance on communications/piggy backing with NPWS programs for pest control. Needs to be monitored and included in monitoring plan/program. Needs to be reported on as part of the monitoring program /plan requirements to inform the TARP (appendix F) in case it does not occur.	BRMP updated to refer to SOP. Monitoring of feral animals is undertaken during the annual Rapid Visual Assessments as well as regular walk around assessments by the sites environmental staff. The BRMP will be updated to make this clearer and the TARP revisited.	Section 7.8, Appendix H
i. include a seasonally-based program to monitor and report on the effectiveness of the above measures, progress against the detailed performance and completion criteria, and any progressive improvements that could be implemented to improve biodiversity outcomes;	S8.2- Table 14. The BRMP states that a Landscape function analysis monitoring 'or similar' will occur every two years and that it commenced in 2019, but there are no details of what this monitoring has addressed or where it has occurred to allow a review of the methodology or to evaluate the plans performance so far. A schedule of works or implementation schedule to adhere to is required to ensure the appropriate monitoring will occur to inform management decisions, remedial actions and adequate reporting on performance. The locations/monitoring plots and specific requirements for the LFA must be provided by the plan so that they can be followed. The BORAL website does not provide any monitoring reports or results of this LFA analysis to meet this condition. Suggest the BRMP includes the requirement to develop a monitoring plan as part of the Appendix C requirements. This can incorporate the LFA, BAM plots& Visual monitoring but must detail the specific requirements to monitor & report on the items listed in 60h & S8.2 of the BRMP and must include mapped locations of photo reference points, and monitoring plots referred to in the BRMP. This plan needs to be submitted within a reasonable timeframe (6 months) to establish the baseline data and inform the TARP - particularly to justify any response/no response to short term impacts eg: items 8, 10, 19, 20 that could negatively affect the biodiversity outcomes.	Details of the monitoring program, including baseline data, reference condition and maps, is provided in the Biodiversity and Rehabilitation Monitoring Program (2022) which is referenced in the BRMP. BRMP updated to reference all monitoring reports to date. Boral's Maintenance Work Order system described, which schedules, tracks and alerts responsible parties to undertake required works. Monitoring results are captured in the annual reporting.	Section 8.2, Section 9, Section 12.3.1
	Appendix F- (3year Implementation plan)- has been deleted,& replaced with a TARP that does not consider any monitoring plan. Monitoring is	3 year plan updated and reinstated. TARP updated to directly relate to monitoring outcomes,	Appendix I, Appendix H,

	required to inform the TARP- & there needs to be a replacement implementation plan or schedule of works that schedules continued monitoring to inform the TARP, ongoing maintenance requirements and to evaluate performance as per the CoA's. The TARP must include responsibilities for actions or response-(Note Table 4 references an appendix G (this doesn't exist). The triggers for the TARP must also be capable of easy measurement. Triggers like '*understory species diversity atypical compared to analogue sites'* are not suitable triggers. It should be something like '>20% of species detected do not occur on analogue site'. Ie use a numeric value in the triggers rather than qualitative values like 'typical' and 'atypical'.	which are determined by numerical values. BRMP updated to clarify responsibilities.	Section 12.2
	Details of the ongoing monitoring and maintenance requirements is required (S 8, tables 11-14) particularly for the habitat management areas. Mapped locations for BAM plots and LFA assessments, and any photo/visual monitoring points must be provided to support the performance assessment.	Details of the monitoring program, including baseline data, reference condition and maps, is provided in the Biodiversity and Rehabilitation Monitoring Program (2022) which is referenced in the BRMP.	Section 8.2
	Nest box installation locations & monitoring requirements must be included. Nest boxes must be monitored not only to ensure they are properly maintained, but to determine whether they are continuing to provide satisfactory replacement habitat for lost hollows and meet the objectives of the Habitat Management Area.	BRMP updated to include tagging and mapping of habitat features, development of a strategy to salvage/install habitat features and fauna surveys within 21 days of clearing as agreed during discussions. Recommendation from pre-clearance surveys, including mapping the location, maintenance and monitoring of nest box is being implemented.	Section 4.2
j. identify the potential risks to the successful implementation of the SOE BOS, SWOE BOS, Habitat Management Area and final rehabilitation, and include a description of the contingency measures to be implemented to mitigate against these risks, including provisions for alternative direct and/or supplementary offset measures where regeneration of EECs do not meet performance and completion criteria; and	TARP and performance measures need to be explained – need to make clear how the TARP will be informed – ie by the monitoring plan. No supplementary offset measures are proposed. Conditions indicate that supplementary measures would include securing credits if rehabilitation fails. Failure is determined by completion criteria tables. The plan should therefore define the quantum and class of credits to be securing in the event of failure to meet rehabilitation.	TARP updated to directly relate to monitoring outcomes. No risk to credit commitment associated with failure of the rehab sites. The retirement of credits is an independent process and not linked to rehab. The bond is in place should rehab fail.	Appendix H
k. include details of who would be responsible for monitoring, reviewing, and implementing the plan	Suggest section 12.5 include the requirement to review the BRMP if monitoring results indicate the performance measures/benchmarks are not being met.	BRMP will be reviewed in accordance with condition D6.	Section 12.5
B61) The Proponent must submit the Biodiversity and Rehabilitation Management Plan for approval by the			

Secretary, prior to commencing any work in the Modification 5 disturbance area			
Part D. Environmental Management, Reporting and Auditing Management Plan Requirements D4 Management plans required under this approval must be prepared in accordance with relevant guidelines, and include:			
a. a summary of relevant background or baseline data;	Condition met.		
b. details of: i. the relevant statutory requirements (including any relevant approval, licence or lease conditions); ii. any relevant limits or performance measures and criteria; and iii. the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	Condition met.		
c. any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Condition met.		
d. a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Condition met.		
e. a program to monitor and report on the: i. impacts and environmental performance of the project; and ii. effectiveness of the management measures set out pursuant to condition D4(d);	No monitoring schedule or details to monitor and report on plan actions or success /effectiveness.	Details of the monitoring program, including baseline data, reference condition and maps, is provided in the Biodiversity and Rehabilitation Monitoring Program (2022) which is referenced in the BRMP.	Section 8.2
f. a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Condition met. TARP- however not clear how any remediation measures will be measured to re-evaluate impact levels.	TARP updated.	Appendix H
g. a program to investigate and implement ways to improve the environmental performance of the project	Condition met. Plan proposes periodic review of the plan (s12.5 p92)& submission of	TARP updated Details of the monitoring program, including baseline data,	Appendix H, Section 8.2

over time;	annual review- but there is no specific schedule or requirements for ongoing monitoring to demonstrate performance. No built in improvement mechanism- this would be dependant on a monitoring programme that monitors and reports on the plan requirements and performance measures. The TARP must be amended to consider a revised monitoring programme that is designed to evaluate & report on the BRMP performance measures at regular intervals (see comments above re monitoring plan).	reference condition and maps, is provided in the Biodiversity and Rehabilitation Monitoring Program (2022) which is referenced in the BRMP.	
h. a protocol for managing and reporting any: i. incident, non-compliance or exceedance of the impact assessment criteria or performance criteria; ii. complaint; or iii. failure to comply with statutory requirements;	Condition met.		
i. public sources of information and data to assist stakeholders in understanding environmental impacts of the development;			
j. a protocol for periodic review of the plan; and			
k. a document control table that includes version numbers, dates when the management plan was prepared and reviewed, names and positions of people who prepared and reviewed the management plan, a description of any revisions made and the date of the Secretary's approval. *Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.*	Condition met.		

Consultation - Goulburn Mulwaree Council

Feedback	Boral response	BRMP reference
Include SEPP (Koala Habitat Protection) 2020 & SEPP (Koala Habitat Protection) 2021 Include Goulburn Mulwaree DCP 2009 Include Goulburn Mulwaree LEP 2009	BRMP updated	Section 2.3
Box Gum Woodland now listed as CEEC under Schedule 2 Part 1 of the Biodiversity Conservation Act Change reference to TSC Act	BRMP updated	Section 3.6.1
Solanum celatum is listed as Endangered under Schedule 1, Part 2 Endangered species of the Biodiversity Conservation Act	BRMP updated	Section 3.6.2
Report refers to TSC Act, amend to BC Act Schedule 1, Part 2 Endangered species	BRMP updated	Section 3.6.3
The report describes the installation of nest boxes as a key mitigation measure to offset loss of habitat: "Installation of 40 fauna boxes in mature trees (25 adjacent to the quarry and 15 within the section of Box-Gum Woodland to be retained…" What fauna are these nest boxes for? Eg microbats, large parrots, small parrots, owls, greater gliders, squirrel gliders? How will the nest boxes be monitored and maintained? Who will do this? How often will they be replaced (expected lifespan <10 years)? How will pest fauna such as honeybees, Indian Mynas etc be managed?	BRMP updated to include tagging and mapping of habitat features, development of a strategy to salvage/install habitat features and fauna surveys within 21 days of clearing as agreed during discussions. Recommendation from pre-clearance surveys, including mapping the location, maintenance and monitoring of nest box is being implemented	Section 4.2
Although large parts of the site are zoned RU1 and SEPP (Koala Habitat Protection) 2020 applies, other parts are zoned E3 Environmental Management and SEPP (Koala Habitat Protection) 2021 applies. As defined in the SEPP (Koala Habitat Protection) 2021, the site has been confirmed as containing suitable Koala habitat, including the following Koala use trees listed under Schedule 2: *Eucalyptus blakelyi, Eucalyptus bridgesiana, Eucalyptus eugenioides & Eucalyptus melliodora*. BioNet Atlas shows 73 records of Koalas within 5 km of the site. The report also confirms that Koalas have been found "…from within the vicinity of the Peppertree Quarry…" (Page 26, under 3.6.3 Threatened fauna species). The BRMP should include more information on Koala habitat, Koala population locally and on site, & Koala monitoring and management.	BRMP updated to provide additional detail on the Koala. The Koala habitat at Peppertree Quarry has been studied throughout the various Environmental Assessments for the project. Targeted Koala monitoring isn't required although the annual rapid visual assessments across the site will record if Koala signs are if present.	Section 3.6.3 to Section 3.9

Feedback	Boral response	BRMP reference
No mention of grass weeds. One of the most serious weeds (arguably the most serious weed) in the local area is Serrated Tussock *Nassella trichotoma*. Other significant local grass weeds include African Love Grass *Eragrostis curvula*, Pampas grass *Cortaderia selloana* & Chilean Needle Grass *Nassella neesiana*. Grass weeds with potential to invade and establish include Parramatta Grass *Sporobolus africanus* and Coolatai Grass *Hyparrhenia hirta*. No mention of tree weeds. Tree of Heaven *Ailanthus altissima* is a problem weed in Bungonia National Park. Other potential tree weeds that could invade and establish include Radiata Pine *Pinus radiata*, Black Locust *Robinia pseudoacacia* and Honey Locust *Gleditsia triacanthos*.	Weed Management Plan has been updated 2021. BRMP has been updated to summarise the updated Weed Management Plan and refer to this document.	Section 7.1
This section needs to be expanded. Feral animals known from the area include cats, deer and hares as well as the listed rabbits, foxes, goats and pigs. The most significant pest locally is the feral goat. Annual review and/or herding and collection of goats is not adequate for protection of CEEC or of newly planted revegetation sites. Baiting of foxes and rabbits: how will native fauna be protected? For example if Pindone baits are used for rabbits, there is a risk that non-target fauna such as wallabies and wombats may be poisoned. There is also a high risk of owls, raptors and quolls being killed through secondary poisoning from predating and feeding on poisoned rabbits.	BRMP updated to refer to SOP for pest management.	Section 7.8
Need to include potential plant disease issues, eg Myrtle Rust, *Phytophthora cinnamomi*	Weed Management Plan has been updated 2021 and includes hygiene recommendations for disease management	Section 7.1
Need to include Biodiversity Assessment Method 2020	BRMP updated	
At various points in the report there are references to the use of tubestock for revegetation. Who will produce these plants? Will the plants be propagated and grown on site, or will this be handled by a subcontracted nursery? If contracted out, how will Peppertree Quarry confirm that the tubestock has been produced from local provenance seed collected from the site?	Detailed requirements will be included in contractor scope of works for the provision of tubestock from local provenance seed where applicable. No change made to BRMP.	Section 7.6
This contains some tree species that do not occur naturally in the area and that are not suitable for planting on the site: *Eucalyptus albens, Eucalyptus microcarpa & Eucalyptus quadrangulata*. The list also appears to be missing many plant species that would be expected to occur in Box Gum Woodland in this area, for example: *Acacia brownii*	BRMP updated according to species recommendations from the Ecological Monitoring and Councils comments	Appendix C

Feedback	Boral response	BRMP reference
Acacia genistifolia *Ajuga australis* *Allocasuarina littoralis* *Aristida ramosa* *Austrostipa bigeniculata* *Austrostipa densiflora* *Austrostipa rudis* *Austrostipa scabra* *Bothriochloa macra* *Chrysocephalum apiculatum* *Chrysocephalum semipapposum* *Convolvulus erubescens* *Daviesia leptophylla* *Dianella longifolia* *Dillwynia sieberi* *Eryngium ovinum* *Pimelea curviflora* *Rytidosperma pallida* *Stylidium graminifolium*		

Appendix C: Species list for planting and seeding

Species	Species
Eucalyptus melliodora	*Crassula sieberiana*
Eucalyptus bosistoana	*Cymbonotus lawsonianus*
Eucalyptus amplifolia	*Cynoglossum australe*
Eucalyptus blakelyi	*Cynoglossum suaveolens*
Eucalyptus eugenioides	*Daucus glochidiatus*
Allocasuarina littoralis	*Dianella longifolia*
Myoporum montanum	*Dichondra spp.*
Olearia viscidula	*Dichopogon fimbriatus*
Lissanthe strigosa	*Einadia hastata*
Cassinia arcuata	*Einadia nutans subsp. nutans*
Acacia brownii	*Einadia trigonos*
Acacia deanei	*Eryngium ovinum*
Acacia genistifolia	*Euchiton sphaericus*
Daviesia leptophylla	*Geranium retrorsum*
Dillwynia sieberi	*Geranium solanderi*
Pimelea curviflora	*Gonocarpus tetragynus*
Aristida ramosa	*Goodenia hederacea*
Aristida vagans	*Hydrocotyle laxiflora*
Austrostipa bigeniculata	*Hypericum gramineum*
Austrostipa densiflora	*Lagenophora stipitata*
Austrostipa rudis	*Laxmannia gracilis*
Austrostipa scabra	*Lepidium pseudohyssopifolium*
Bothriochloa macra	*Mentha diemenica*
Carex inversa	*Microtis parviflora*
Dichelachne rara	*Microtis unifolia*
Echinopogon caespitosus	*Opercularia diphylla*
Lomandra filiformis subsp. coriacea	*Oxalis chnoodes*
Microlaena stipoides	*Oxalis perennans*
Panicum effusum	*Plantago varia*
Poa meionectes	*Poranthera microphylla*
Poa meionectes	*Schenkia australis*
Poa sieberiana	*Scutellaria humilis*
Rytidosperma caespitosum	*Sebaea ovata*
Rytidosperma laeve	*Senecio quadridentatus*
Rytidosperma pallida	*Sigesbeckia orientalis subsp. orientalis*
Schoenus apogon	*Stylidium graminifolium*
Sorghum leiocladum	*Tricoryne elatior*
Sporobolus creber	*Veronica plebeia*
Themeda triandra	*Vittadinia cuneata*
Acaena echinata	*Vittadinia spp.*
Ajuga australis	*Wahlenbergia communis*
Asperula conferta	*Wahlenbergia gracilis*

Bossiaea prostrata	*Wahlenbergia luteola*
Chrysocephalum apiculatum	*Wahlenbergia stricta*
Chrysocephalum semipapposum	*Zornia dyctiocarpa var. dyctiocarpa*
Convolvulus erubescens	*Cheilanthes sieberi*

Appendix D: Management Actions applicable to removal of native vegetation and habitat

Table 15. Management actions relation to removal and retaining native vegetation across Peppertree Quarry

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Pre-Construction	1. Contractors to follow specific guidelines for vegetation removal, as follows: Construction vehicle access routes, soil stockpiles and machinery are to be located outside the Primary Root Zone (PRZ) of the remnant tree stands identified as being protected in the Environment Assessment (ERM 2006). The PRZ is generally defined as a radial offset 10 times trunk diameter. If stumps of felled trees are within the PRZ of the remnant vegetation stand, stumps are to be ground where practicable rather than completely grubbed or removed. This will enhance the long-term viability of the retained vegetation.	To avoid soil compaction and damage to the roots, stems and branches of trees to be retained	Priority 1 – High	3 months (short term)	Boral Quarries EO and or Independent Consultant
Pre-Construction	2. Pre-clearance surveys of all trees to be removed, to be undertaken by an appropriately qualified person. Hollow trees and termite mounds to be avoided/retained where possible.	To ensure no fauna are in the trees when removed. To minimise clearing of hollow trees and termite mounds	Priority 1 – High	Immediately Prior to clearing in all stages (short term)	Boral Quarries and Consultant
Pre-Construction	3. A strategy for the salvage of habitat resources and/or installation of nest boxes will be developed and implemented if this is considered necessary by the consultant undertaking the pre-clearance surveys to compensate for lost habitat. This strategy will include details on the number and type of habitats features to be relocated/installed, timeframes for relocation/installation, identification of a suitable location and any follow-up monitoring required	To ensure there are habitat features available for displaced fauna and compensate for habitat loss	Priority 1 – High	Immediately Prior to clearing in all stages (short term)	Boral Quarries and Consultant
Construction	4. An appropriately qualified person to be on site while hollows bearing trees are removed so that any fauna inhabiting the trees can be captured and relocated.	To ensure survival of all fauna on site during clearing	Priority 1 – High	During clearing in all stages (short term)	Boral Quarries
Pre-Construction - construction	5. Retention of the existing Box-Gum Grassy Woodland. The remnant of Box-Gum Grassy Woodland to be retained is to be defined by protection fencing to prohibit construction access to the area. The area within must be kept free from all building materials,	Minimise potential impact to endangered Box-Gum Woodland	Priority 1 – High	At all times (long term)	Boral Quarries Construction Contractor

Phase	Action	Purpose	Priority	Timeframe	Responsibility
	contaminants and other debris, and must not be used for storage of any building materials.				
Pre-Construction - construction	6. Majority of mature trees within the upper reaches of reservoir of Dam No. 1 to be retained, including all hollow bearing trees.	To retain existing habitats for local fauna	Priority 1 – High	At all times (long term)	Boral Quarries Construction Contractor
Construction	7. Manage protected trees throughout the construction process (particularly if a portion of the tree's root system has been disturbed by excavation).	Maintain health and maximise survival rate of vegetation to be retained	Priority 1 – High	At all times (long term)	Boral Quarries Construction Contractor
Construction	8. Minimise vegetation removal by trimming limbs rather than removing entire trees or bushes, where possible. Leave rootstock in the ground to stabilise the soil. Avoid termite mounds where and hollow trees where possible.	Minimise disturbance and damage to vegetation	Priority 1 – High	At all times (long term)	Boral Quarries Construction Contractor
Construction	9. Stockpile vegetative cuttings for respreading as mulch and soil protection and seed material for regeneration.	Aid in regeneration activities	Priority 1 – High	At all times (long term)	Boral Quarries Construction Contractor
Rehabilitation	10. Install permanent fencing around remnant bushland and re-vegetated area to prevent human, stock and vehicular access.	Minimise ongoing impacts of human activity on vegetation	Priority 1 – High	At all times (long term)	Boral Quarries

Table 16. Management actions relation to removal of threatened species habitat and retaining threatened species habitat across Peppertree Quarry

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Pre-Construction	1. Suitably qualified ecologist to conduct a survey (species specific) of known populations and potential habitat, to provide greater insight into the current status of the species, threats to its persistence and management actions.	To gain a greater understanding of the distribution of *Solanum celatum* within the area and its requirements for survival and to ensure no other plants will be impacted	Priority 1 – High	Immediately prior to clearing in all stages (short term)	Boral Quarries and Consultant
Pre-Construction	2. Vegetation clearance strategy Construction vehicle access routes, soil stockpiles and machinery are to be located outside the Primary Root Zone (PRZ) of the remnant vegetation stand identified as being protected. The PRZ is generally defined as a radial offset 10 times trunk diameter. If stumps of felled trees are within the PRZ of the remnant vegetation stand, stumps are to be ground where practicable rather than completely grubbed or removed. This will enhance the long-term viability of the retained vegetation.	To ensure no impacts during clearance activities	Priority 1 – High	Immediately prior to clearing (short term)	Boral Quarries and Consultant
Pre-Construction	3. An appropriately qualified person to conduct a survey of trees to identify any nesting species.	To ensure survival of species within the area	Priority 1 – High	Immediately prior to clearing (short term)	Boral Quarries and Consultant
Pre-construction - ongoing	4. Protect areas of known and potential habitat of *Solanum celatum* from clearing and further fragmentation.	To ensure outbreaks of weeds do not occur, affecting native species growth	Priority 1 – High	At all times (short term)	Boral Quarries
Pre-construction - Ongoing	5. Advise the NPWS and RFS of nesting parrots	To minimise potential impact from government activities, such as back-burning or clearing	Priority 1 – High	Immediately after survey is conducted (short term)	Boral Quarries
Construction	6. Install fauna -sensitive lighting (high-pressure sodium lighting or luminare shields) to be installed should not be directed towards the HMA.	To avoid disruption to fauna species in adjacent areas	Priority 1 – High	Immediately (short term)	Boral Quarries

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Construction - ongoing	7. Engage qualified weed contractors to conduct weed removal of blackberry and all exotic species/garden escapes located within potential habitat areas of *Solanum celatum*	To suppress weed growth and decrease habitat degradation from invasive species	Priority 2 - Moderate	Within 1 month of construction beginning (short term)	
Rehabilitation	8. Install permanent fencing around HMA site to prevent human, stock and vehicular access.	To minimise on going impacts to the species	Priority 1 – High	At all times (short term)	Boral Quarries
Rehabilitation – ongoing	9. Monitor weed populations by survey every six months and eradicate new weeds promptly. Weed distribution and abundance will be re-mapped and control methods and timing updated accordingly	To ensure outbreaks of weeds do not occur, affecting native species growth	Priority 1 – High	At all times (short term)	Contractor

Appendix E: Management Actions applicable to rehabilitation of HMA.

Table 17. Management Actions Relating to Habitat Corridors and Connectivity

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Pre-Construction	1. Contract a qualified rehabilitation and re-vegetation consultant to undertake rehabilitation activities.	To ensure success of rehabilitation works	Priority 1 - High	Complete	Boral Quarries
Pre-construction	2. Clearly identify and demarcate (with markers or temporary fencing) the boundaries between area to be revegetated and construction area.	Minimise disturbance and creation of informal walkways	Priority 1 – High	Complete	Boral Quarries
Pre-construction	3. Collect seed from the development area to be grown for direct planting or used for direct seeding of the HMA.	To ensure correct provenance of the species being used for revegetation and maximise survival rate	Priority 1 – High	Prior to clearing in all stages (short term)	Contractor
Rehabilitation	4. Direct establishment of tree, shrub and groundcover species characteristic of Box-Gum Grassy Woodland on either side of Tangarang Creek to connect with remnant Box-Gum Grassy Woodland and nearby Bungonia State Recreation Area and Morton National Park.	To establish connectivity with vegetation and create a biodiversity corridor for endemic species	Priority 2 - Moderate	Complete	Boral Quarries
Rehabilitation	5. Install and maintain permanent fencing around HMA site to prevent human, stock and vehicular access.	Minimise ongoing impacts of on vegetation	Priority 1 – High	Installation complete Maintenance ongoing (long term)	Boral Quarries
Rehabilitation	6. Signs indicating that rehabilitation work is occurring will be erected and maintained (e.g. 'No access – rehabilitation in progress') along HMA fence line.	To advise construction workers and other people accessing the site of works being carried out	Priority 1 – High	Installation complete Maintenance ongoing (long term)	Boral Quarries

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Rehabilitation – ongoing rehabilitation	7. Consideration of Jute matting to stabilize drainage channels or areas assessed to be a high erosion hazard to avoid run-off of top-soil and improve soil organic content.	Minimise soil erosion, and improve water retention and organic content in soil to maximise survival rate	Priority 2 - Moderate	When required post construction (short - medium term)	Boral Quarries
Rehabilitation – ongoing rehabilitation	8. Seedlings and small plants within newly established areas to be protected with tree guards.	To protect revegetation from feral predators such as rabbits	Priority 2 - Moderate	Upon establishment of seedlings and small plants or when required (short – medium term)	Boral Quarries
Ongoing-progressive rehabilitation	9. Site maintenance to be carried out. This will include maintenance of tree guards, progressive rehabilitation, halo spraying, and re-placement planting.	To ensure survival rate of revegetation	Priority 2 - Moderate	At all times (long term)	Contractor

Table 18. Management actions relating to the HMA

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Preconstruction - construction	1. Retention of the existing Box-Gum Grassy Woodland. The remnant of Box-Gum Grassy Woodland to be retained is to be defined by protection fencing to prohibit construction access. The area within must be kept free from all building materials, contaminants and other debris, and must not be used for storage of any building materials.	Minimise potential impact to endangered Box-Gum Woodland	Priority 1 – High	Complete	Boral Quarries Construction Contractor
Preconstruction	2. Collection of seed, vegetative material or trans locatable individuals within the development area to be grown or used in rehabilitation and reconstructive landscaping.	To ensure correct provenance of the species being used for revegetation and maximise survival rate	Priority 1 – High	Complete	Contractor
Preconstruction	3. Contract a qualified rehabilitation and re-vegetation consultant to undertake on-ground planning for and rehabilitation works across the subject site	To ensure success and of rehabilitation works	Priority 1 - High	Complete	
Construction following dam construction)	4. Direct establishment of tree, shrub and groundcover species characteristic of Box-Gum Grassy Woodland surrounding a 20 metre buffer around the periphery of Dam No. 1 and on either side of Tangarang Creek providing a direct offset of 12.5 ha.	To minimise potential impact to endangered Box-Gum Woodland and increase areas of woodland vegetation in the future	Priority 2 - Moderate	Complete	

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Rehabilitation	5. Revegetation around the dams and the addition of semi-submerged rocky areas around the perimeter of the dams.	To create habitat for native frogs and reptiles	Priority 2 - Moderate	Complete	Contractor
Rehabilitation	6. Tubestocks to be used in conjunction with direct seeding during establishment of the 20 metre buffer around the periphery of Dam No. 1, adjoining the remnant Box-Gum Grassy Woodland.	To ensure success and of rehabilitation works	Priority 2 - Moderate	Complete	
Rehabilitation	7. Direct Seeding to be used on bunding, (consider jute matting for high erosion areas).	To ensure success and of rehabilitation works	Priority 2 - Moderate	Complete	
Rehabilitation	8. Seedlings and small plants within newly established areas will be protected with tree guards or overplanting implemented to limit pollution of the HMA and surround from tree guards.	To protect revegetation from feral browsers such as rabbits	Priority 2 - Moderate	Complete	
Rehabilitation	9. Install permanent fencing around HMA to prevent human, stock and vehicular access.	Minimise ongoing impacts of on vegetation	Priority 1 – High	Complete	Boral Quarries
Rehabilitation	10. Signs indicating that rehabilitation work is occurring will be erected (e.g. 'No access –rehabilitation in progress') along HMA fence line.	To advise construction workers and other people accessing the site of works being carried out	Priority 1 – High	Complete	Boral Quarries
Ongoing – progressive rehabilitation	11. Site maintenance to be carried out. This will include progressive re-vegetation / rehabilitation, halo spraying, and re-placement planting.	To ensure survival rate of revegetation	Priority 2 - Moderate	At all times	Contractor

Appendix F: Management Actions applicable to the rehabilitation of whole site

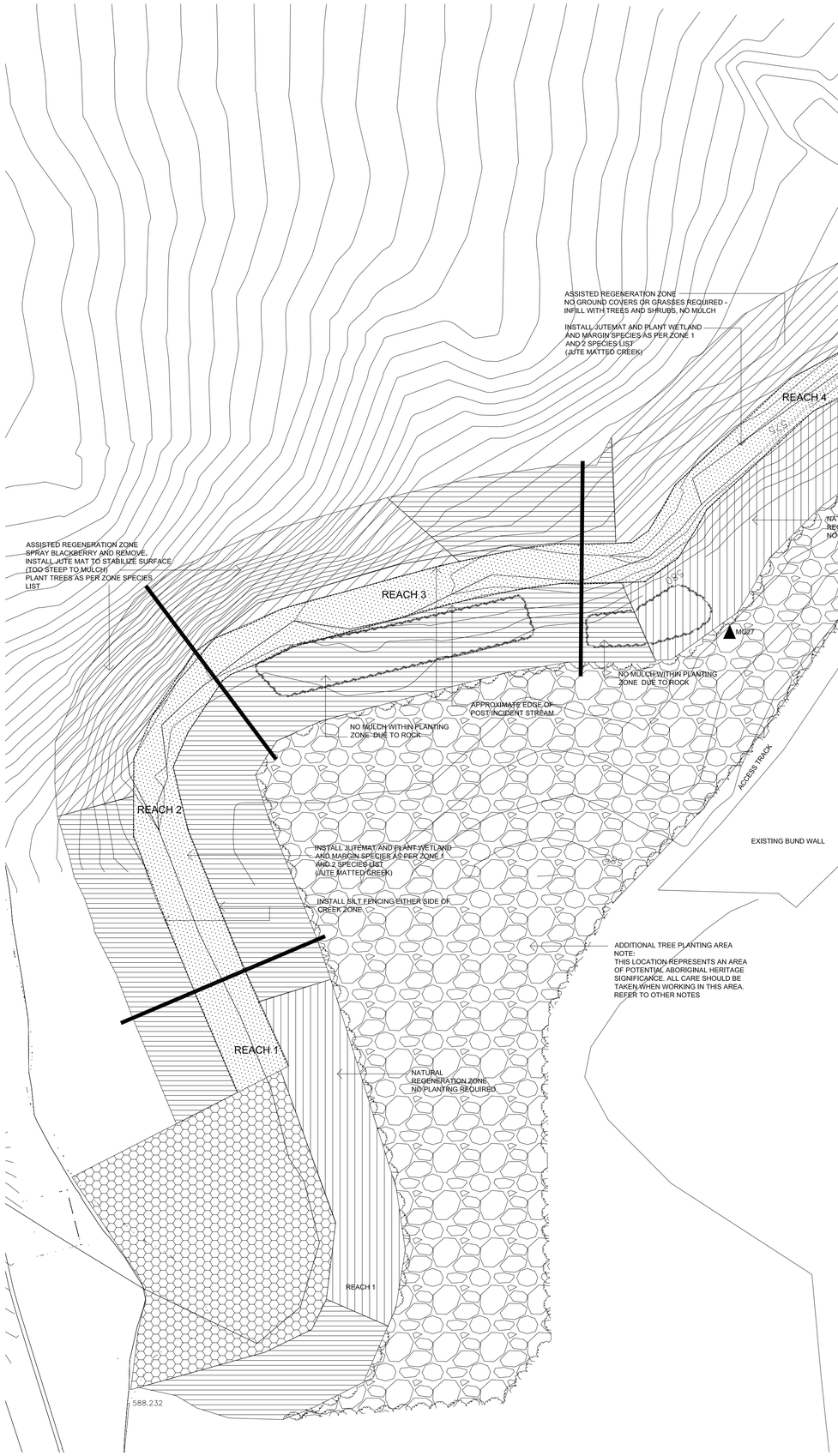
Table 19. Management Actions: Rehabilitation and Revegetation of emplacements

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Preconstruction - construction	1. Retention of the existing Box-Gum Grassy Woodland The remnant of Box-Gum Grassy Woodland to be retained is to be defined by protection fencing to prohibit construction access. The area within must be kept free from all building materials, contaminants and other debris, and must not be used for storage of any building materials.	Minimise potential impact to endangered Box-Gum Woodland	Priority 1 – High	At all times	Boral Quarries Construction Contractor
Preconstruction	2. Collection of seed, vegetative material or trans locatable individuals within the development area to be grown or used in rehabilitation and reconstructive landscaping.	To ensure correct provenance of the species being used for revegetation and maximise survival rate	Priority 1 – High	Immediately Prior to clearing in all stages	Contractor
Preconstruction	3. Contract a qualified rehabilitation and re-vegetation consultant to undertake on-ground planning for and rehabilitation works across the subject site	To ensure success and of rehabilitation works	Priority 1 - High	Immediate	
Construction following dam construction)	4. Direct establishment of tree, shrub and groundcover species characteristic of Box-Gum Grassy Woodland surrounding a 20 metre buffer around the periphery of Dam No. 1 and on either side of Tangarang Creek providing a direct offset of 12.5 ha.	To minimise potential impact to endangered Box-Gum Woodland and increase areas of woodland vegetation in the future	Priority 2 - Moderate	Within 1 month of dam completion or when practical dependent on seasonality	

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Rehabilitation	5. Revegetation around the dams and the addition of semi-submerged rocky areas around the perimeter of the dams.	To create habitat for native frogs and reptiles	Priority 2 - Moderate	Within 1 month of dam completion or when practical dependent on growing season	Contractor
Rehabilitation	6. Tubestocks to be used in conjunction with direct seeding during establishment of the 20 metre buffer around the periphery of Dam No. 1, adjoining the remnant Box-Gum Grassy Woodland.	To ensure success and of rehabilitation works	Priority 2 - Moderate	Within 1 month of dam completion or when practical dependent on growing season	
Rehabilitation	7. Direct Seeding to be used on bunding, (consider jute matting for high erosion areas).	To ensure success and of rehabilitation works	Priority 2 - Moderate	Within 1 month of construction beginning or when practical dependent on growing season	
Rehabilitation	8. Seedlings and small plants within newly established areas will be protected with tree guards or overplanting implemented to limit pollution of the HMA, National Park and surround from tree guards.	To protect revegetation from feral browsers such as rabbits	Priority 2 - Moderate	Within 1 month of dam completion or when practical dependent on growing season	
Rehabilitation	9. Install permanent fencing around HMA to prevent human, stock and vehicular access.	Minimise ongoing impacts of on vegetation	Priority 1 – High	At all times	Boral Quarries

Phase	Action	Purpose	Priority	Timeframe	Responsibility
Rehabilitation	10. Signs indicating that rehabilitation work is occurring will be erected (e.g. 'No access –rehabilitation in progress') along HMA fence line.	To advise construction workers and other people accessing the site of works being carried out	Priority 1 – High	At all times	Boral Quarries
Ongoing – progressive rehabilitation	11. Site maintenance to be carried out. This will include regular watering schedules, maintenance of tree guards, progressive re-vegetation / rehabilitation, halo spraying, and re-placement planting.	To ensure survival rate of revegetation	Priority 2 - Moderate	At all times	Contractor

Appendix G: Planting locations at the HMA (completed in 2013)



LEGEND

- NATURAL REGENERATION ZONE NO PLANTING REQUIRED
- ASSISTED REGENERATION ZONE: TREE AND SHRUB PLANTING NO MULCH, GRASSES OR GROUND COVER PLANTING REQUIRED (6,290 m2)
- RECONSTRUCTION ZONE MULCH AND FULLY STRUCTURED PLANTING REQUIRED (10,720 m2)
- JUTE MAT PLANTED WITH WETLAND AND MARGIN SPECIES (5,400 m2)
- ADDITIONALTREE PLANTING AREA 17,690 m2) WITHIN AREA OF POTENTIAL ABORIGINAL HERITAGE SIGNIFICANCE
- ABORIGINAL HERITAGE SITE
- SILT FENCING INSTALLED EITHER SIDE OF POST INCIDENT STREAM

SITE PREPARATION

Assisted Regeneration and Additional Tree Planting Areas
- Spray individual planting locations 1m diameter 14 days prior to planting

Mulched Areas
- Spray entire site twice, 21 days before mulching and again 5 days before mulching
- Spread mulch to a depth of 100mm with excavator and level with hand rakes

PLANTING

Assisted Regeneration and Additional Tree Planting Areas
- Use auger to dig holes
- Use water crystals and fertiliser in planting hole
- Install marker stake
- Water in thoroughly

Mulched Areas
- Prepare as above but no marker stake necessary for grasses and ground covers

Wetland Areas
- Do not utilise fertilizer, water crystals or marker stakes

ZONE	PLANTING SPACINGS REQUIRED	NUMBER
JUTE MATTED CREEK 5,400m2		
ZONE 1 in water (20%)		
Baumea rubiginosa	6 per sm	2,160
Bolboschoenus cardwellii	6 per sm	2,160
Schenoplectus mucronatus	6 per sm	2,160
ZONE 2 Margin (80%)		
Carex appressa	6 per sm	8,640
Juncus usitatus	6 per sm	8,640
Lomandra longifolia	6 per sm	8,640
TOTAL FOR ZONE		**32,400**

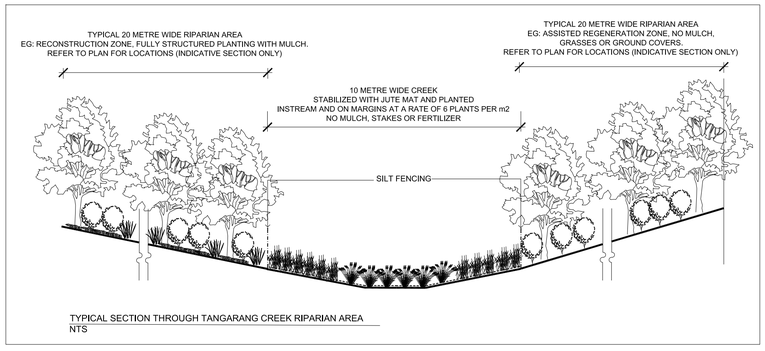
RECONSTRUCTION ZONE 10,720m2		
Fully Structured Planting		
Trees		
Acacia decora	1 per 3 sm	325
Acacia mearnsii	1 per 3 sm	325
Eucalyptus albens	1 per 3 sm	325
Eucalyptus blakeyi	1 per 3 sm	325
Eucalyptus cinerea	1 per 3 sm	325
Eucalyptus dives	1 per 3 sm	325
Eucalyptus eugenioides	1 per 3 sm	325
Eucalyptus globoidea	1 per 3 sm	325
Eucalyptus melliodora	1 per 3 sm	325
Eucalyptus muelleriana	1 per 3 sm	325
Eucalyptus viminalis	1 per 3 sm	325
Subtotal		**3,575**
Shrubs		
Acacia falcata	1 per 1.5 sm	2,382
Bursaria spinosa	1 per 1.5 sm	2,382
Indigofera australis	1 per 1.5 sm	2,382
Subtotal		**7,146**
Groundlayer Grasses and Groundcovers		
Bothriochloa macra	6 per sm	3216
Dianella caerula	6 per sm	3216
Dianella longifolia	6 per sm	3216
Imperata cylindrica	6 per sm	3216
Lomandra longifolia	6 per sm	28,944
Microlaeana stipoides	6 per sm	3216
Poa siberiana	6 per sm	9,648
Themeda australis	6 per sm	6432
Hardenbergia violacea	6 per sm	3216
Subtotal		**64,320**

ASSISTED REVEGETATION ZONE 6,290m2		
Fully Structured Planting		
Trees		
Acacia decora	1 per 3 sm	190
Acacia mearnsii	1 per 3 sm	190
Eucalyptus albens	1 per 3 sm	190
Eucalyptus blakeyi	1 per 3 sm	190
Eucalyptus cinerea	1 per 3 sm	190
Eucalyptus dives	1 per 3 sm	190
Eucalyptus eugenioides	1 per 3 sm	190
Eucalyptus globoidea	1 per 3 sm	190
Eucalyptus melliodora	1 per 3 sm	190
Eucalyptus muelleriana	1 per 3 sm	190
Eucalyptus viminalis	1 per 3 sm	190
Subtotal		**2,090**
Shrubs		
Acacia falcata	1 per 1.5 sm	1,397
Bursaria spinosa	1 per 1.5 sm	1,397
Indigofera australis	1 per 1.5 sm	1,397
Subtotal		**4,191**
TOTAL FOR ZONE		**6,281**

ADDITIONAL TREE PLANTING ZONE 17,690		
Between Bund Wall and Riparian Zone		
Trees		
Acacia decora	1 per 3 sm	536
Acacia mearnsii	1 per 3 sm	536
Eucalyptus albens	1 per 3 sm	536
Eucalyptus blakeyi	1 per 3 sm	536
Eucalyptus cinerea	1 per 3 sm	536
Eucalyptus dives	1 per 3 sm	536
Eucalyptus eugenioides	1 per 3 sm	536
Eucalyptus globoidea	1 per 3 sm	536
Eucalyptus melliodora	1 per 3 sm	536
Eucalyptus muelleriana	1 per 3 sm	536
Eucalyptus viminalis	1 per 3 sm	536
TOTAL FOR ZONE		**5,896**
TOTAL FOR PROJECT		**119,618**

NOTE: ALL POT SIZES TO BE 50X50X125 GROW TUBES

NOTE
The following will be undertaken in consideration of the Aborlginal heritage site during rehabilitation works as per the Rehabilitation Report prepared by AECOM (2012):
- Excavation or planting within flat areas adjacent to Tangerang Creek associated with MQ7 and MQ27 shall be monitored by a representative of the AMC and/or suitably qualified archaeologist
- In accordance with the AHMP (ERM, 2011), should any unexpected Aboriginal material be identified during the rehabilitation works, the AMC should be notified immediately
- Rehabilitation staff should receive cultural awareness training as part of their induction process. This would be undertaken as agree with the AMC (ERM, 2011). The induction should include the recommendations outlined within the rehabilitation report prepared by AECOM (2012) and the ERM report and the guiding principles contained within the AHMP (ERM 2011) (AHMP:Aborlginal Heritage Management Plan)



TYPICAL SECTION THROUGH TANGARANG CREEK RIPARIAN AREA
NTS

ISSUE: For Construction 05.12.12
ISSUE: For Comment 04.12.12
ISSUE: For Comment 12.11.12

REV

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PROJECT

PEPPERTREE QUARRY
SOUTH MARULAN

DRAWING TITLE

Landscape Plan
Tangarang Creek Riparian Rehabilitation

CLIENT

BORAL PROPERTY GROUP

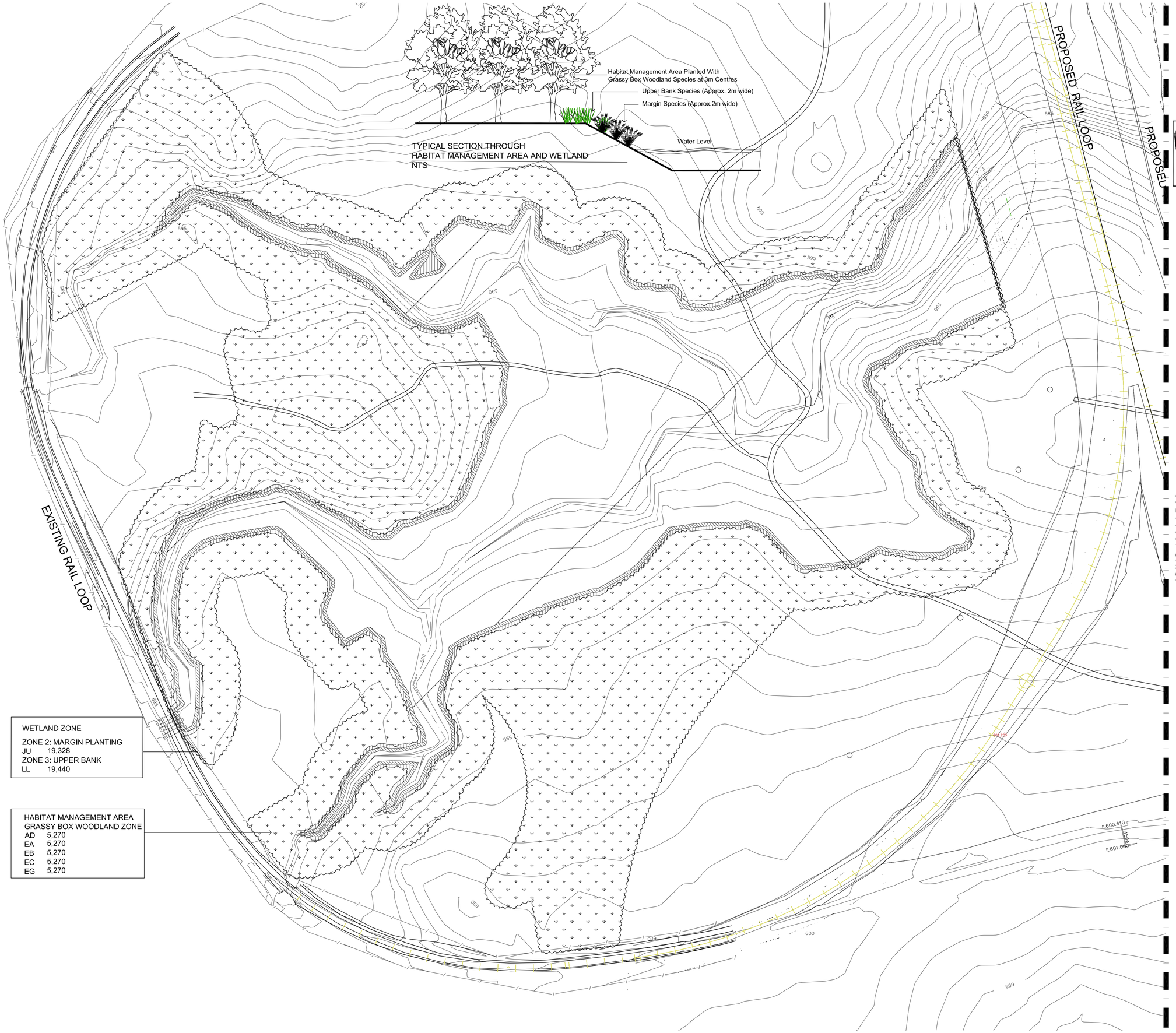
DRAWING NO.

1361-LD05 SHEET 5 of 5

SCALE: 1:750 @ A1, 1:1500 @ A3

DRAWN: MK CHECKED: TW

DATE. 09.11.12



PLAN KEY

LEGEND

ZONE 2
Margin Planting
Approximately 2m wide

ZONE 3
Upper Bank Planting
Approximately 2m wide

Habitat Management Area
Grassy Box Woodland Zone

PLANT SCHEDULE

CODE	BOTANIC NAME	No.	SPACING
WETLAND ZONE			
ZONE 2: MARGIN PLANTING (5,032 m2)			
JU	Juncus usitatus	19,328	4 per sq m
ZONE 3: UPPER BANK (5,090 m2)			
LL	Lomandra longifolia	19,440	4 per sq m
GRASSY BOX WOODLAND ZONE (109,800 m2)			
AD	Acacia deanii	5,270	1 per 3 sq m
EA	Eucalyptus albens	5,270	1 per 3 sq m
EB	Eucalyptus blakeyi	5,270	1 per 3 sq m
EC	Eucalyptus cinerea	5,270	1 per 3 sq m
EG	Eucalyptus globoidea	5,270	1 per 3 sq m

NOTE: All pot sizes to be 50x50x125 Grow tubes

ISSUE: Client Issue 15.05.12
ISSUE: For Comment 26.04.12
ISSUE: For Comment 28.02.12
REV.B: Delete Zone 1 26.04.12
REV.A: Amend planting zones and plant numbers 12.04.12

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PROJECT

PEPPERTREE QUARRY
SOUTH MARULAN

DRAWING TITLE

Landscape Plan
Wetland and Habitat Mangement Zone

CLIENT

BORAL PROPERTY GROUP

DRAWING NO.

1361-LD01B SHEET 1 OF 4

SCALE: 1:1000 @ A1, 1:2000 @ A3

DRAWN: MK CHECKED: TW

DATE.27.02.12

Appendix H: Trigger Action Response Plan

This Trigger Action Response Plan (TARP) is based on the Peppertree Monitoring Program, designed to evaluate & report on the BRMP performance measures at regular intervals. The TARP identifies the key aspects and risk elements to rehabilitation and identifies triggers based from the monitoring program that require a response to be implemented. Continued improvement actions for remediation not noted in the TARP will also be identified during regular monitoring and recommended actions from monitoring reports considered.

Boral Quarries are responsible for ensuring the monitoring program is implemented and undertaking the response actions if triggered.

Table 20. Trigger Action Response Plan

Aspect/ Category	Item	Risk Element	Trigger	Response	Monitoring timing and response action timing
Landform Stability	1	Water management structures	Rapid Visual Assessment (RVA) or routine inspections identify water management structures (sediment dams, channels, contour banks) are actively eroding &/or scouring.	Undertake remedial actions such as amelioration, revegetation or alternative scour protection. For significant failures or repeat minor failures conduct review of design criteria and construction standards. Continue to monitor in accordance with the Monitoring Program to ensure no active erosion or scouring.	Monitoring Frequency - 1. RVA annually. 2. Routine Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the annual RVA report or routine inspection. (Note. If landform stability may lead to an imminent offsite pollution incident immediate (within 24 hours) commencement or interim controls and follow up actions will be required. If an incident is triggered, reporting will be required as detailed in Section 12.3.2.
	2	Landform stability	RVA identifies slope failure or uncontrolled erosion. RVA identifies failure of sediment control features. Rill surveys are triggered under the Landscape Function Analysis (LFA) indicating rills are observed at a site level at less than 30m spacing.	Undertake a review of the landform design including; • the need for re-grading/contouring and revegetation of the area; and • the need to install appropriate corrective sediment controls. Continue to monitor in accordance with the Monitoring Program to ensure no active erosion or scouring and LFA criteria are being met in remediated areas.	Monitoring Frequency - 1. RVA annually. 2. Routine Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the annual RVA report or routine inspection. (Note. If landform stability may lead to an imminent offsite pollution incident immediate (within 24 hours) commencement or interim controls and follow up actions will be required. If an incident is triggered, reporting will be required as detailed in Section 12.3.2.

Aspect/ Category	Item	Risk Element	Trigger	Response	Monitoring timing and response action timing
Growth Medium Suitability	3	Growth medium development	RVA identifies vegetation establishment failure due to the growth medium depth (topsoil or other growth medium being is less than 100mm). Landscape Function Analysis (LFA) scores are less than 70% of scores from analogue sites.	Top dress with additional suitable topsoil resource and /or medium. For repeat growth medium thickness issues conduct review of placement procedures and operational practices. Continue to monitor in accordance with the Monitoring Program to ensure growth media is suitable for revegetation.	Monitoring Frequency - 1. RVA annually. 2. LFA biennially (ecological monitoring) Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the annual RVA report or ecological monitoring report.
	4	Chemical and nutritional properties	RVA identifies areas where rehabilitation is failing with no known cause.	Undertake appropriate soil/spoil testing. Amelioration and revegetate. Continue to monitor in accordance with the Monitoring Program to ensure rehabilitation is meeting vegetation establishment criteria.	Monitoring Frequency - 1. RVA annually. Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the annual RVA report.
Vegetation Establishment	5	Species selection	Biobanking Assessment Methodology (BAM) monitoring indicates composition score is less than 50% (HMA) or 30% (emplacements) of the average scores from analogue sites.	Depending on the age of rehabilitation and professional recommendations from the ecological report: • Install further tubestock • Establish native seed • Increase weed management in accordance with the Weed Management Plan. Continue to monitor in accordance with the Monitoring Program to ensure that the composition score is on a trajectory to be met.	Monitoring Frequency - 1. BAM biennially (ecological monitoring). Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the ecological monitoring report.

Aspect/ Category	Item	Risk Element	Trigger	Response	Monitoring timing and response action timing
	6	Overstorey species density	BAM monitoring indicates the density of native trees is less than 30% of that of analogue sites (no./1000m^2).	Depending on the age of rehabilitation and professional recommendations from the ecological report: • Install further tubestock; • Establish native seed. Continue to monitor in accordance with the Monitoring Program to ensure tree density criteria are met.	Monitoring Frequency - 1. BAM biennially (ecological monitoring). Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the ecological monitoring report.
Ecosystem Development	7	Ecosystem condition	BAM monitoring indicates the Vegetation Integrity score is less than 50% (HMA) or less than 30% (emplacements) of the average of scores from analogue sites. BAM monitoring indicates exotic plant cover is greater than 20%. BAM monitoring indicates the total cover of high threat exotic species (HTEs) is greater than 5%.	Depending on the age of rehabilitation and professional recommendations from the ecological report: • Plant further tubestock; • Establish native seed; • Increase weed management in accordance with the Weed Management Plan. Continue to monitor in accordance with the Monitoring Program to ensure criteria are being met.	Monitoring Frequency - 1. BAM biennially (ecological monitoring). Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the ecological monitoring report.
	8	Connectivity	GIS monitoring indicates no increase in connectivity of vegetation communities	Review planting locations to improve connectivity Continue to monitor in accordance with the Monitoring Program to ensure connectivity criteria are being met.	Monitoring Frequency - 1. GIS monitoring 5 yearly Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the GIS monitoring program.
General Site Management	9	Uncontrolled entry of livestock, feral animals or vehicles into rehabilitation areas	RVA identifies damage to vegetation caused by uncontrolled access by livestock or vehicles.	Undertake remedial actions such as fence installation or repairs, maintaining access tracks and sign posting. Continue to monitor in accordance with the Monitoring Program to ensure appropriate control is being achieved.	Monitoring Frequency - 1. RVA annually. 2. Routine Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the annual RVA report or routine inspection

Aspect/ Category	Item	Risk Element	Trigger	Response	Monitoring timing and response action timing
	10	Feral animal control	RVA identifies signs of feral animals in numbers that need control.	Targeted control as per the sites SOP for feral animals.	Monitoring Frequency - 1. RVA annually. Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the annual RVA report.
	11	Weed management	RVA identifies priority weed that need control. BAM monitoring indicates exotic plant cover is greater than 20%. BAM monitoring indicates the total cover of high threat exotic species (HTEs) is greater than 5%.	Increase weed management in accordance with the Weed Management Plan.	Monitoring Frequency - 1. RVA annually. 2. BAM biennially (ecological monitoring) Remediation actions to commence (commencement includes planning actions) within one month of the trigger being identified in the annual RVA report or ecological monitoring report.

Appendix I: Three Year Plan

Table 21. Habitat Management Area – RMU 1

Management Phase	Works to be undertaken	Year 2022	Year 2023	Year 2024
Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	Quarterly weed and pest management	Quarterly weed and pest management	Quarterly weed and pest management
Ecological assessment	Undertake Ecological assessment and review any required actions	Undertaken ecological assessment and review/implement any required actions	Not applicable	Undertaken ecological assessment and review/implement any required actions
Rapid Visual assessment	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions

Table 22. Peppers Woodland area – RMU 2

Management Phase	Works to be undertaken	Year 2022	Year 2023	Year 2024
Ecological assessment	Undertake Ecological assessment and review/implement any required actions	Undertake Ecological assessment and review/implement any required actions	Not applicable	Undertake Ecological assessment and review/implement any required actions
Rapid Visual assessment	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions

Table 23. Pit Void – RMU 3

Management Phase	Works to be undertaken	Year 2022	Year 2023	Year 2024
Landform establishment of batters	Trim, rake and rip where possible	Ongoing as batters become available	Ongoing as batters become available	Ongoing as batters become available
Land preparation and revegetation	Hydro mulching and seeding	Ongoing as batters become available	Ongoing as batters become available	Ongoing as batters become available
Maintenance of Rehabilitated Areas	Maintenance of areas that have been revegetated	Quarterly weed and pest management where possible	Quarterly weed and pest management where possible	Quarterly weed and pest management where possible
Ecological assessment	Undertake Ecological assessment and review/implement any required actions	Undertake Ecological assessment and review/implement any required actions	Not applicable	Undertake Ecological assessment and review/implement any required actions
Rapid Visual assessment	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions

Table 24. Southern Overburden Emplacement – RMU 4

Management Phase	Works to be undertaken	Year 2022	Year 2023	Year 2024
TOP OF EMPLACEMENT				
Land preparation	Minor reshaping.	Minor reshaping	NA	NA
Revegetation	Hydro mulching and planting	Hydro mulching March 2022 Planting October 2022	NA	NA
EAST BATTER - TOP				
Land preparation	Minor reshaping.	Minor reshaping	NA	NA
Revegetation	Hydro mulching and planting	Hydro mulching Jan 2022 Planting October 2022	NA	NA
EAST BATTER - BOTTOM				
Revegetation	Site already planted. Assess for replanting as necessary. Hydro mulch where required	Hydro mulching Jan 2022 Planting October 2022	NA	NA
WEST BATTER - TOP				
Land preparation	Minor reshaping.	Minor reshaping	NA	NA
Revegetation	Hydro mulching and planting	Hydro mulching Dec 2021 Planting October 2022	NA	NA
WEST BATTER - BOTTOM				
Revegetation	Site already planted. Assess for replanting as necessary. Hydro mulch where required	Hydro mulching Dec 2021 Planting October 2022	NA	NA
SOUTH BATTER - TOP				
Land preparation	Minor reshaping.	Minor reshaping	NA	NA
Revegetation	Hydro mulching and planting	Hydro mulching Dec 2021 Planting October 2022	NA	NA

SOUTH BATTER - BOTTOM				
Revegetation	Site already planted. Assess for replanting as necessary. Hydro mulch where required	Hydro mulching Dec 2021 Planting October 2022	NA	NA
DRAINAGE AREA				
Revegetation	Hydro mulch where required	Hydro mulching Dec 2021	NA	NA
ALL OF SOUTHERN OVERBURDEN EMPLACMENT				
Maintenance of Rehabilitated Areas	Maintenance of areas that have been revegetated	Quarterly weed and pest management	Quarterly weed and pest management	Quarterly weed and pest management
Ecological assessment	Undertake Ecological assessment and review/implement any required actions	Undertake Ecological assessment and review/implement any required actions	Not applicable	Undertake Ecological assessment and review/implement any required actions
Rapid Visual assessment	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions

Table 25. Western Overburden Emplacement – RMU 5

Management Phase	Works to be undertaken	Year 2022	Year 2023	Year 2024
Landform establishment	Minor reshaping	Minor reshaping	NA	NA
Land preparation	Application of growth media if required	NA	Composted growth media applied Jan 2023	NA
Revegetation	Hydro mulching and planting	NA	Hydro mulching March 2023 Planting October 2023	NA
Maintenance of Rehabilitated Areas	Maintenance of areas that have been revegetated	Quarterly weed and pest management	Quarterly weed and pest management	Quarterly weed and pest management
Ecological assessment	Undertake Ecological assessment and review/implement any required actions	Undertake Ecological assessment and review/implement any required actions	Not applicable	Undertake Ecological assessment and review/implement any required actions
Rapid Visual assessment	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions

Table 26. Eastern Overburden Emplacement – RMU 6

Management Phase	Works to be undertaken	Year 2022	Year 2023	Year 2024
TOP OF EMPLACEMENT				
Revegetation	Hydro mulching and planting	Hydro mulching September 2022	Planting February 2023	NA
EAST BATTER - TOP				
Land preparation	Minor reshaping.	Minor reshaping	NA	NA
Revegetation	Hydro mulching and planting	Hydro mulching September 2022	Planting February 2023	NA

EAST BATTER - BOTTOM				
Revegetation	Site already planted. Assess for replanting as necessary. Hydro mulch where required	Hydro mulching September 2022	Planting February 2023	NA
WEST BATTER (internal to pit)				
Land preparation	Minor reshaping.	NA	NA	Minor reshaping
Revegetation	Hydro mulching and planting	NA	NA	Hydro mulching Jan 2024
NORTH BATTER				
Land preparation	Minor reshaping.	Minor reshaping	NA	NA
Revegetation	Site already planted. Assess for replanting as necessary. Hydro mulch where required	Hydro mulching Dec 2021 Planting October 2022	NA	NA
NOISE BUND BATTER				
Revegetation	Site already grassed. Area to be progressively spot sprayed and planted	Ongoing	Ongoing	Ongoing
Maintenance of Rehabilitated Areas	Maintenance of areas that have been revegetated	Quarterly weed and pest management	Quarterly weed and pest management	Quarterly weed and pest management
Ecological assessment	Undertake Ecological assessment and review/implement any required actions	Undertake Ecological assessment and review/implement any required actions	Not applicable	Undertake Ecological assessment and review/implement any required actions
Rapid Visual assessment	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions

Table 27. Infrastructure – RMU 7

Management Phase	Works to be undertaken	Year 2022	Year 2023	Year 2024
Maintenance of Rehabilitated Areas	Maintenance of areas that have been revegetated	Quarterly weed and pest management	Quarterly weed and pest management	Quarterly weed and pest management

Table 28. South Western Overburden Emplacement – RMU 8 (commence construction end of 2021)

Management Phase	Works to be undertaken	Year 2022	Year 2023	Year 2024
Revegetation	Hydro mulching and planting	Hydro mulching October 2022	Hydro mulching March 2023 Planting March 2023 Hydro mulching October 2023	Hydro mulching March 2024 Planting March 2024 Hydro mulching October 2024
Maintenance of Rehabilitated Areas	Maintenance of areas that have been revegetated	Quarterly weed and pest management	Quarterly weed and pest management	Quarterly weed and pest management
Ecological assessment	Undertake Ecological assessment and review/implement any required actions	Undertake Ecological assessment and review/implement any required actions	Not applicable	Undertake Ecological assessment and review/implement any required actions
Rapid Visual assessment	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions	Undertake Rapid Visual assessment and review/implement any required actions