

Gunlake Quarry



*Rehabilitation  
and  
Biodiversity Offset Management  
Plan*

*October 2015*

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# 1. Introduction

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## 1.1 Background

This Rehabilitation and Biodiversity Offset Management Plan (the Plan) has been prepared by Gunlake Quarries Pty Ltd (Gunlake) for Gunlake Quarry (the Quarry). This Plan has been prepared in accordance Condition 29, Schedule 3 of the Project Approval for Modification 2 and updates the original Landscape Management Plan. This Plan incorporates specific changes to the biodiversity offset areas arising from liaison with OEH in conjunction with the Modification 2 approval process. The Quarry is located approximately 7 km northwest of Marulan, off the Brayton Road as shown on **Figure 1**, Appendix A.

Gunlake Quarry has made a commitment to manage the existing vegetation resources of property in the following manner:

- ❑ Minimise land disturbance to only that necessary to operate the quarry.
- ❑ Progressively rehabilitate the out of pit overburden emplacement.
- ❑ Dedicate vegetation offset areas to compensate for the temporary vegetation clearing.
- ❑ Enhance offset areas on site to improve habitat value, riparian zones and vegetation community function.
- ❑ Maintain agricultural resources in areas suitable for ongoing agricultural activities during and after quarry activities are completed.

To date, the mechanism used to compensate for the initial loss of disturbed woodland has been the dedication of biodiversity offset areas on site. For the life of quarry project, which will be the subject of future State Significant Development approval, the use of the Framework for Biodiversity Assessment (FBA) may be used to assess the biodiversity values of the entire project site and calculate offset requirements. Future biodiversity offsets may be accommodated on site, on neighbouring sites, as part of a regional strategy coordinated by the Department of Planning and Environment (DP&E), Biobanking Agreement or a combination. The finalised scheme will form part of the State significant life of quarry project.

Gunlake Quarry has already provided biodiversity offset areas on the property. These offsets provided for the original project approval were estimated prior to the BioBanking Assessment Methodology being available. As a result they were unable to be calculated or verified objectively. The original biodiversity offset comprising three areas totalling 76.54 ha of land (30.4 ha of woodland and 46.1 ha of disturbed grassland to be regenerated into woodland). This was an offset ratio of 7:1 for woodland vegetation, which was high for the time when compared to similar projects with impacts on Box Gum Woodland. The management of this original biodiversity offset was undertaken in accordance with a Landscape Management Plan (LMP) prepared for the Quarry under the original Project Approval. Condition 27, Schedule 3 of the 2015 Modification 2 Project Approval requires that the total area of biodiversity offsets be increased by 2.28 ha to a total of 78.82 ha.

## 1.2 Aims and Objectives

The overall aim of this Plan is two fold, firstly to ensure that the extent of Box-Gum Woodland (an Endangered Ecological Community [EEC]) in the Biodiversity Offset Areas is retained and improved over time in order to compensate for the loss of this community elsewhere due to clearing associated with the quarry and secondly, to maintain the agricultural resources of the site.

Specific objectives for the Biodiversity Offset Areas are to:

- retain the existing areas of native vegetation;
- improve the condition and ecological value of native vegetation;
- increase the extent of native vegetation;
- improve habitat connectivity;
- reduce the current level of weed infestation; and,
- rehabilitate creeks/drainage lines.

There are a number of potential risks to the successful rehabilitation and/or revegetation of the Biodiversity Offset Areas. These include:

- damage to stock exclusion fencing;
- poor regenerative capability of land;
- past clearing and disturbance resulting in loss of native tree, shrub and ground cover;
- vehicle/pedestrian access to vegetation offset areas;
- bushfire;
- weed invasion and feral animals;
- erosion; and
- neighbour cooperation.

This Plan aims to mitigate against these potential risks by including a comprehensive monitoring and review program in order to evaluate the success of management measures. This will allow the manager to identify which techniques are working well and tailor the rehabilitation program accordingly.

Vegetation communities within the Biodiversity Offset Areas will be managed by Gunlake Quarries in accordance with this Plan for the duration of the project.

## 1.3 Current Approval Requirements

The following tables provide the current Approval conditions relating to rehabilitation and biodiversity offsets for Gunlake Quarry.

**Table 1.1 - Rehabilitation and Biodiversity Objectives**

Condition	Feature	Objective	Where Addressed
26, Schedule 3 (Table 8)	Site (as a whole)	<input type="checkbox"/> Safe, stable & non-polluting	3.7.1
		<input type="checkbox"/> Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and has minimal visual impact when viewed from surrounding land	3.7.4
	Surface Infrastructure	<input type="checkbox"/> To be decommissioned and removed, unless DRE agrees otherwise	3.7.2
	Land identified in the	<input type="checkbox"/> Conserved and enhanced with native,	3.1.2



<p>(b) performance and completion criteria for the rehabilitation of the site and implementation of the biodiversity offset strategy;</p> <p>(c) a detailed description of the measures that would be implemented for:</p> <ul style="list-style-type: none"> <li>• progressively rehabilitating disturbed areas;</li> <li>• landscaping and vegetating the quarry pit and overburden emplacement</li> <li>• implementing the biodiversity offset strategy;</li> <li>• protecting areas outside the disturbance areas (including updating operational plans and maps to identify the location of riparian areas to be protected);</li> <li>• rehabilitating creeks and drainage lines on the site outside of approved disturbance areas (but including Chapman's Creek) to ensure no net loss of stream length and aquatic habitat;</li> <li>• undertaking pre-clearance surveys;</li> <li>• managing impacts on fauna, including establishment of habitat for threatened fauna species including the Speckled Warbler;</li> <li>• managing any unexpected threatened fauna or flora located during the project;</li> <li>• providing two nest boxes for each tree-hollow destroyed by vegetation clearing;</li> <li>• landscaping the site to minimise visual impacts;</li> <li>• excluding stock from the biodiversity offset areas (unless grazing can be demonstrated as a management tool for achieving conservation outcomes);</li> <li>• conserving and reusing topsoil;</li> <li>• collecting and propagating seed for rehabilitation works;</li> <li>• salvaging and reusing material from the site for habitat enhancement;</li> <li>• controlling weeds and feral pests;</li> <li>• controlling access; and</li> <li>• bushfire management;</li> </ul> <p>(d) a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;</p> <p>(e) a description of the potential risks to successful rehabilitation of the site and the implementation of the biodiversity offset strategy, and a description of the contingency measures that would be implemented to mitigate these risks; and</p> <p>(f) details of who would be responsible for monitoring, reviewing, and implementing the plan.</p>	<p>Table 3.3</p> <p>3.7</p> <p>3.1</p> <p>3.1.3</p> <p>3.1.3</p> <p>3.6</p> <p>3.2</p> <p>3.2</p> <p>3.2</p> <p>3.7.4</p> <p>3.1.2</p> <p>3.6.2</p> <p>3.2</p> <p>3.4</p> <p>Table 3.3</p> <p>2.1</p> <p>3.2</p>
<p><b>Condition: 29 Schedule 3</b></p>	
<p>Within 3 months of the approval of the Rehabilitation and Biodiversity Management Plan, the Proponent shall lodge a Rehabilitation and Conservation Bond for the project with the Secretary to ensure that the biodiversity offset strategy and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the Rehabilitation and Biodiversity Management Plan and relevant conditions of this approval. The sum of the bond shall be determined by:</p> <p>(a) calculating the cost of implementing the biodiversity offset strategy and rehabilitating the site, and</p> <p>(b) employing a suitably qualified quantity surveyor or other expert to verify the calculated costs,</p> <p>to the satisfaction of the Secretary.</p>	<p>Pending approval of this Plan</p>
<p><i>Note: If the rehabilitation of the site and the implementation of the biodiversity offset strategy is completed to the satisfaction of the Secretary, then the Secretary will release the bond. If the rehabilitation of the site and the implementation of the biodiversity offset strategy is not completed to the satisfaction of the Secretary, then the Secretary will call in all or part of the bond, and arrange for the completion of the relevant works.</i></p>	
<p><b>Condition: 31 Schedule 3</b></p>	
<p>Within 3 months of submitting a copy of the Independent Environmental Audit report to the Secretary (see condition 8 of Schedule 5), the Proponent shall review, and if necessary, revise the sum of the Rehabilitation and Conservation Bond to the satisfaction of the Secretary. This review must consider the:</p> <p>(a) effects of inflation;</p> <p>(b) likely cost of rehabilitating the site (taking into account the likely surface disturbance over the next 3 years of the project) and implementing the biodiversity offset strategy; and</p> <p>(c) performance of the implementation of the rehabilitation of the site and the biodiversity offset strategy to date</p>	<p>Noted</p>

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## 1.4 Responsible Personnel

Key management personnel responsible for the implementation of this Plan are listed in the following table

**Table 1.4 – Roles and Responsibilities**

<b>Personnel</b>	<b>Responsibility</b>
Ed O'Neil	Overall management of the quarry operation including environmental management
Bob Argent/Trevor Dennis	Implementation of environmental works
Kirsty Nielsen	Collection of environmental monitoring data and management

## 2. Existing Vegetation Resources

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This section describes the existing natural resources relevant to the management of rehabilitation activities, enhancing the biodiversity offset areas and agricultural resources of the Gunlake property.

### 2.1 Environmental Risks and Opportunities

The Gunlake property has the main basic elements to sustain the original vegetation communities prior to European settlement. This includes flat to gently undulating topography, original soils and ephemeral streams which combine to sustain a mixture of native grassy Box Gum Woodland and riparian forest. However, over the past 200 years the property along with the surrounding district played an important role in supplying fine wool and lamb to the growing colony of Sydney which resulted in significant land clearing and pasture improvement. The site also lies within a major state significant hard rock resource area. This presents a number of environmental risks and opportunities namely:

- ❑ The relative ease of recreating the original Box Gum Woodland through passive rehabilitation techniques;
- ❑ The ability to enhance an existing riparian woodland also through passive rehabilitation techniques;
- ❑ Suitable soils that respond well to pasture improvement that would also sustain viable agricultural activities;
- ❑ A favourable climate and topographic features that would suit both biodiversity enhancements and agricultural activities.

These risk factors have been taken into account in the development of both the agricultural and biodiversity offset strategy described in this Plan and outlined in the following sections.

### 2.2 Biophysical and Geographic Constraints

The regional topography is shown on **Figure 1**. The Project Site lies within the Wollondilly River Catchment in an area representative of the Southern Highlands of NSW. The heavily dissected Shoalhaven River Catchment lies approximately 5km to the south west and the transition to the Western Slopes and Plains occurs approximately 50km to the west.

Natural slopes within the region range from less than 1° along the flood plains of the Wollondilly River to in excess of 25° on the slopes of the many hills that occur in the region. There are slopes in excess of 45° on the sides of the Cookbundoon Range approximately 10km west of the Project Site.

Elevations in the region vary from 821m AHD at Mount Gray adjacent to Goulburn (approximately 23km west southwest of the Project Site), to approximately 636m AHD at the northern end of the Project Site. The Cookbundoon Range rises to 899m AHD west of the Project Site and isolated hills such as Stony Range Hill (762m AHD) occur in the vicinity.

The quarry is located on the upper slopes of Chapman's Creek which is a small tributary of Joarimin Creek. Joarimin Creek flows into the Wollondilly River approximately 5km northeast of the site. Elevations range from approximately 636m AHD at the northern end, up to

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approximately 700m AHD at the southern end of the site. Chapmans Creek and its minor unnamed tributaries flow south-west to north-east through the site and contain some remnant riparian vegetation along sections of its banks.

Soils tend to be poor, shallow and moderately erosive. Deeper and more fertile soils occur in adjacent to creek lines and their floodplains while the shallow more stony soils occur on ridges, particularly in the quarry footprint. The main agricultural potential occurs on the gentle slopes where deeper soils exist while the resource area tends to correspond to the poor soils with low agricultural potential.

These physical attributes have been considered in the development of this Plan. As the quarry footprint primarily includes the area not suitable for future agriculture, it will be rehabilitated to achieve a Box Gum Woodland community. Similarly, the area disturbed by the emplacement will be too steep for grazing and will also be progressively rehabilitated to a Box Gum Woodland community. The biodiversity offset areas contain a mixture of steep slopes with naturally shallow skeletal soils as well as more gently sloping spurs with deeper developed soils on colluvial material.

The location of the biodiversity offsets and the progressive rehabilitation program has been designed to minimise disruption to habitat linkages during quarrying activities and enhancing the overall biodiversity values on completion.

### **2.3 Existing Vegetation Communities and Fauna Habitat**

In the original Gunlake Quarry project, the EIS noted four main vegetation communities covering the quarry property:

- ❑ Riparian Floodplain Woodland - dominated by Cabbage Gum, Yellow Box and Argyle Apple;
- ❑ Woodland/Open Woodland - consisting of Yellow Box, Blakely's Red Gum and Stringybark;
- ❑ Open Forest/Woodland - dominated by Argyle Apple and Stringybark; and
- ❑ Grazing Pasture.

As the property has a long agricultural history, the main vegetation community is grazing pasture with isolated remnant trees and regrowth, particularly in sheltered gullies or where carrying capacity is low due to poor soils or steep terrain.

More recent vegetation surveys undertaken by Biosis for Modification 2 identified that the scattered tree clusters and some remnant vegetation contained elements of the listed Threatened Ecological Community (TEC) White Box Yellow Box Blakely's Red Gum Woodland. This community is equivalent to the Ecological Endangered Community (EEC) White box-Yellow Box –Blakely's Red Gum Grassy Woodland and Derived Native Grassland (referred to as Box Gum Woodland) as listed under the EPBC Act. This community would in effect represent the majority of the Southern Tablelands which has been cleared for over 150 years for agricultural purposes. The term regenerating as a result of lack of agricultural activity would more correctly describe the land surrounding the existing quarry.

Biosis noted that the majority of the quarry footprint occurs on cleared and highly disturbed pasture areas without trees or shrubs and therefore would not qualify as the Box Gum

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Woodland EEC, however Gunlake adopted a conservative approach by assuming that the entire area subject to disturbance relating to Modification 2 constitutes the EEC for the purpose of impact assessment and calculating the area of offsets required.

Although most of the site is grazing land, the southern area into which the pit will extend supports disturbed Box Gum Woodland remnant. It is characterised by a very rocky ground surface (26% covered by rock), with clusters of mostly scattered eucalypts, with sparse mid-storey and shrub layers. It has a simplified ground layer with low native species richness consisting of predominantly native pasture grasses. The ground layer has been subject to extensive sheep grazing for over 100 years and has low native species diversity. The habitat of this community and the particular assemblage of species indicated that the vegetation type qualifies as a marginal and degraded form of the White Box Yellow Box Blakely's Red Gum Woodland.

The rocky ground could provide suitable habitat for the Little Whip Snake and the Pink-tailed Worm Lizard which are listed as vulnerable under the NSW TSC Act and the Commonwealth EPBC Acts. The available habitat for these species is considered to be very marginal because most of the rocks are embedded rather than loose. Therefore Biosis considered that both species to have a low likelihood of occurring within the future quarry footprint.

There are three hollow bearing trees located in the approved quarry footprint to the south. The northern part into which the overburden bund wall extends supports cleared, disturbed and degraded remnant woodland with a moderate mid-storey and a grassy but not rocky ground layer. It is characterised by clusters of mostly scattered eucalypts, with a sparse mid-storey, some shrubby areas and a simplified ground layer with very low native species richness. The ground layer consists of predominantly native pasture species. The habitat of this community, together with the particular assemblage of species indicate that the vegetation type qualifies as degraded remnants of the Box Gum Woodland EEC. No particular habitat for threatened flora or fauna species was identified within this area of vegetation.

The open pasture areas between the clusters of trees at the northern and southern sectors of the area affected by the Modification 2 quarry footprint supports vegetation described as cleared open grassland and pasture. Exotic grasses and herbs occur at high densities in patches throughout. There are some native pasture species present. This category would have been much more extensive if the property had remained as active farmland. The loss of agricultural production, in this case sheep grazing, fine wool production and fattening lambs, has been considered in this Management Plan.

Fauna habitat is greater in previously uncleared steep valleys and ridges both within the quarry property and on adjacent properties particularly to the south. It is these areas that have not been cleared before for agriculture that provide an excellent base from which Gunlake Quarries will continue to enhance the biodiversity values of the property by seeking to improve the major faunal habit corridors adjacent to the property.

## 2.4 Threatened Flora

As a result of previous targeted fauna surveys, there was only one species identified, the Hoary Sunray, which is listed as Endangered under the EPBC Act. This was located along

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the route of the bypass road, not within the quarry area. No individuals of the Hoary Sunray or any other listed flora species were recorded within the potential disturbance areas or immediately adjacent habitat during the surveys undertaken by Biosis for the Modification 2 EA.

## 2.5 Fauna Species

A total of 20 bird species have been recorded during three separate surveys. None of the species are listed as threatened under NSW or Commonwealth legislation.

Three trees that contained hollows potentially suitable for use by fauna were found within the area potentially affected by the future extension. Only one tree is within the area directly affected, while the other two are in proximity to the disturbance activities and could be indirectly impacted. There is potential for resident fauna to be disturbed by activities from the quarry. Specific management techniques have been identified to manage these trees as outlined in Chapter 3.

## 2.6 Threatened Fauna

During the original surveys in 2008 the following threatened fauna species were positively or tentatively identified within the entire project area.

- ❑ Speckled Warbler
- ❑ Eastern Bentwing-bat
- ❑ Eastern False Pipistrelle
- ❑ Eastern Freetail-bat
- ❑ Southern Myotis

All of these species are listed as Vulnerable under the TSC Act.

## 2.7 Riparian Habitat

Chapmans Creek and its tributaries flow roughly from the south-west to the north-east through the quarry property. Disturbed Riparian Floodplain Woodland occurs along sections of the creek and its tributaries. A number of dams also occur, some spring-fed, and these provide habitat for some wet area plants, frogs and waterbirds. Due to past clearing and ongoing grazing, water courses within the quarry site vary from moderately to severely eroded and degraded. Specific management techniques have been identified to manage this riparian zone as outlined in Chapter 3.

## 2.8 Agricultural Resources and Capability

The Southern Tablelands district has played an important role in the early European settlement of Australia. The areas surrounding Goulburn and Marulan are ideally suited to sheep with a relatively mild climate and predominantly native grasslands requiring little vegetation clearing. The district was first developed in the 1820s supplying wool and lambs to the growing colony of Sydney. Although sheep grazing industry has reduced over the past few decades, the importance of the agricultural resources of the district has been recognised and forms part of this management plan.

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In NSW, agricultural classifications follow the guideline "Systems used to Classify Rural Lands in NSW" (Cunningham et al, 1988). This classification system uses the potential for the land to sustain certain types of agricultural uses rather than its current usage. The system uses biophysical factors such as soil fertility and erosion potential, climate, geology, topography and vegetation. A primary determining factor is soil erosion potential and the resultant eight class system is largely divided according to erosion hazard and management requirements.

The classification system nominates 8 separate classes based on the ability of the land to support various types of agricultural activities and range from Class 1 which can support regular cultivation with little or no soil conservation works through to Class 8 which has little or no agricultural capability due to either steep terrain or rocky outcrops. The land surrounding the Gunlake property generally consist of Class 4 land capability which supports grazing and occasional cultivation but responds to pasture improvement and minimal cultivation for establishing a permanent pasture.

In accordance with current government guidelines, the agricultural resources and in particular, the productive capacity of the land needs to be considered when developed any extractive industry. The Department of Primary Industry guidelines specifically require that rehabilitation is undertaken progressively and any permanent changes to productive capacity of the land are clearly justified. In accordance with these requirements, this Plan includes the provision and enhancement of agricultural capability as outlined in Section 3. These management activities take into account that parts of the property will be removed from agricultural production while quarrying occurs and parts will remain available for light grazing as required.

## 3. Management of Environmental Issues

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### 3.1 Offset Management Strategy

The aim of the Offset Management Strategy, as detailed in Table 1.2, involves the following:

- ❑ Enhancing the ecological value of 30.38 ha of existing disturbed vegetation through assisted regeneration of Box Gum Woodland EEC and Speckled Warbler Habitat in those areas;
- ❑ Regenerating a minimum of 46.16 ha of cleared pasture through natural regeneration or enhanced with species representative of pre-clearing vegetation including Box Gum Woodland EEC;
- ❑ Enhancing and maintaining 2.28 ha of Box Gum Woodland EEC
- ❑ Ensuring that the biodiversity offsets remain for perpetuity;
- ❑ Ensuring no net loss of stream length and aquatic habitat in the offset areas; and
- ❑ Provide a monitoring program to effectively measure the progress of initiatives against the performance and completion criteria.

The current Approval requires Gunlake to set aside these biodiversity offset areas totalling 78.82 ha to improve their ecological value and ultimately be preserved in perpetuity. Project Statement of Commitment requires Gunlake to return a proportion of the quarry to agricultural use. The current strategy is to maintain and in some areas enhance the agricultural carrying capacity for the remaining quarry property not identified for biodiversity offsets.

#### 3.1.1 Description of Existing Biodiversity Offsets

The current dedicated biodiversity off set areas totalling approximately 79 ha are shown on Figure 2, Appendix A. The current offset area has evolved since the original approval was granted taking into account as far as practicable concerns raised by the NSW Office of Environment and Heritage (OEH) during the approval process. These areas were identified on the basis of the existing quality of regrowth woodland which could, over time, match the structure and floristics of the EEC White Box Yellow Box Blakely's Red Gum Woodland (listed under the NSW TSC Act) or the equivalent White box-Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (as listed under the EPBC Act).

The biodiversity offset areas as described in this Plan still require final approval from the Department of Planning and Environment which may result in further refinement of the Biodiversity Strategy, particularly in light of the future life of quarry project which is yet to be approved. As a result it is expected that some additional changes may be required.

The original offset areas were fenced and surveyed in accordance with the original Landscape Management Plan. However, as these areas have changed, additional fencing may be required.

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Of the 79 ha currently identified for offset areas, approximately half represents existing disturbed Box Gum Woodland EEC, while the remainder consists of cleared land available for passive regeneration. The biodiversity offset areas have been selected where the soils, slope, vegetation floristics, structure and condition would enable regeneration to the original Box Gum Woodland with passive management consisting of stock exclusion, weed controls, and infill planting with native species if necessary.

It should be noted that the offset area of around 79 ha conservatively satisfies the estimated biobanking credit liability for the current approved quarry disturbance area which is currently proposed to be protected in perpetuity via a Biobanking Agreement. In accordance with Condition 28 Schedule 3 these areas will be secured by 30<sup>th</sup> April 2016 in consultation with the Department of Planning and Environment. The total required offset area, including the approved Modification 2, is approximately 62 ha. Gunlake has met its obligations under the current Project Approval in securing the required 79 ha of land for biodiversity offsets, which includes the additional 2.28 ha of Box Gum Woodland EEC.

### **3.1.2 Management of Biodiversity Offset Areas**

Management of the Biodiversity Offset areas commenced in 2009 following receipt of the original Project Approval and the finalisation of the 2009 Landscape Management Plan. Following consultation with OEH and the Department of Planning and Environment, there have been some modifications to the nominated areas as described in this Plan.

The proposed management activities for the biodiversity offset areas are provided in Table 3.3 and summarised below:

- ❑ All designated biodiversity offset areas will be fenced to exclude grazing stock and to restrict vehicle and general access;
- ❑ Implementation a weed control program within all biodiversity offset areas to assist with natural regeneration; and
- ❑ Maintaining a photographic record of the biodiversity areas.

The aim of the offset management strategy is to enhance the ecological value of EECs through passive regeneration methods ensuring a sustainable community is established, conserved and enhanced where necessary with native endemic vegetation to ultimately provide a self-sustaining ecosystem. The biodiversity offsets will be managed to achieve the long-term conservation outcomes described in this Plan, and protected for perpetuity via a Biobanking Agreement or similar mechanism as determined in consultation with OEH.

### **3.1.3 Riparian Zone Management**

Areas nominated for ongoing riparian zone management are shown on Figure 2, Appendix A. These areas consist of remnant Cabbage Gum / Yellow Box / Argyle Apple Riparian Floodplain Woodland which although does not constitute the Box Gum Woodland EEC, it provides valuable habitat which Gunlake will continue to manage and enhance as part of the overall biodiversity offsets. These areas are considered valuable as they are adjacent to water and therefore provide enhanced habitat value and linkages for fauna movement through the site.

A specific riparian offset area associated with Chapman's Creek has been identified on Figure 2. This creek enters the site on the south western corner after flowing through

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predominantly agricultural land. Once inside the Gunlake property, Chapman's Creek will be protected and enhanced by stock exclusion, incidental erosion repairs on banks and confluence with tributaries. The location of this area along with other biodiversity offset area will be noted on Quarry plans and included in site inductions as appropriate.

Specific management procedures and initiatives are documented in Table 3.3 and summarised below:

- ❑ Exclude stock and general access using a combination of paddock management and fencing.
- ❑ Monitor and ameliorate any bank erosion as required.
- ❑ Remove woody weeds where present and implement an ongoing weed management program.
- ❑ Implementation of an inspection program to collect comparable information about the condition of native vegetation within the offset areas and riparian zones in order to determine whether vegetation condition is improving or deteriorating over time.

#### 3.1.4 Natural Regeneration

A key management tool is the ongoing assistance to natural regeneration. Natural regeneration is the preferred approach wherever practical as it leads to a more sustainable vegetation community outcome. Excluding stock and weed management are the key tools which are being currently implemented and which will continue for the life of the project.

Natural regeneration maybe enhanced if required by artificial plantings. This will be done using locally derived seed which is also used as part of the progressive rehabilitation of the quarry and overburden emplacement area.

### 3.2 Fauna Management

Effective management of vegetation communities will enhance the habitat for native fauna species including known rare endangered species such as the Speckled Warbler. Specific management initiatives include:

- ❑ Minimising clearing at any one time as the quarry progresses;
- ❑ Increasing the available fauna habitat through the dedication of approximately 79 ha of which 40 ha will be reforested through passive rehabilitation techniques;
- ❑ Minimise the removal of native vegetation within or adjacent to riparian areas with a clearly defined 10 m buffer zone over most of Chapman's Creek as it passes through the Gunlake property;
- ❑ Salvage available cleared vegetative material for use as brush matting and habitat enhancement over rehabilitated landforms and where appropriate within the biodiversity offset areas;
- ❑ Implement pre-clearing surveys which will include marking of hollow bearing trees which will not be felled if there is a risk to fauna or active nests;
- ❑ A total of two nest boxes per hollow tree removed will be established;
- ❑ Should any threatened fauna be discovered or injured a suitably qualified carer such as WIRES will be contacted and works in that area will cease until the ecologist has given the all clear to proceed;

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- ❑ Tree removal during peak breeding seasons (between August and January) will be avoided.

The above measures are designed to minimise the impact on existing fauna on site as well as enhancing the habitat value of the property both during and after quarry extraction.

### 3.3 Agricultural Offset

All land not associated with the progressive rehabilitation areas associated with the quarry footprint, biodiversity offset areas (including any future offsets associated with the life of quarry project), riparian zones and infrastructure sites will remain available for low intensity grazing activities. Stock will be excluded from the offset and riparian zones as well as active quarry areas.

This area also includes the nominated irrigation areas which are yet to be utilised. The purpose of the irrigation area is to dispose of any excess water generated on site to ensure that there is sufficient pollution control storage and to maintain a nil discharge site. The irrigation areas will be enhanced with permanent pasture and pasture improvement practices which will assist in water take up but has the added advantage of being able to sustain a greater stock carrying capacity.

Management provisions include:

- ❑ Ongoing management of fencing and gates to ensure stock do not enter the active quarry, infrastructure or stock exclusion areas.
- ❑ Ongoing weed management, currently being undertaken annually but will continue as required to maintain control of weeds.
- ❑ Manage erosion and soil condition by maintaining adequate vegetation cover.

### 3.4 Weed and Feral Animal Control

The vegetation over most of the quarry site has been influenced past clearing, grazing and cropping/orchard activities. Most of the weed species are herbaceous and do not occur at particularly high densities, but some species of woody weed are present and are currently being actively controlled.

Five of the species of declared Noxious Weeds in the control area of Goulburn Mulwaree Council occur either on site or on neighbouring properties. These, together with their relevant control classes, are:

- ❑ Blackberry (*Rubus fruticosus*) – Class 4
- ❑ Paterson's Curse (*Echium plantagineum*) – Class 4
- ❑ Serrated Tussock (*Nassella trichotoma*) – Class 4
- ❑ St. Johns Wort (*Hypericum perforatum*) – Class 3
- ❑ Sweet Briar (*Rosa rubiginosa*) – Class 4

For Class 3, the plant must be fully and continuously suppressed and destroyed. For Class 4, the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority. Additionally for

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Blackberry and Serrated Tussock the plant may not be sold, propagated or knowingly distributed.

Gunlake implements weed control in accordance with the Goulburn-Mulwaree Council policy publications *Management Plan for the Enforcement of Class 4 Noxious Weeds* and *Noxious Weed Management Program Guidelines*. This program involves experienced weed control contractors undertaking targeted spraying exercises.

Gunlake takes the necessary precautions to prevent excessive development of weeds within the rehabilitated areas. When appropriate, this includes campaign weed spraying prior to the stripping of topsoil. The appropriate noxious weed control or eradication methods and programs are undertaken in consultation with the DPI-Agriculture and/or the local Goulburn Mulwaree Council Noxious Weeds Inspector as necessary.

The primary feral animal on site is the rabbit however there are no infestations requiring specific controls. There are also regular sightings of goats and foxes however these are transient and are not known to breed on the Gunlake properties. Should active rabbit warrens be detected they will be ripped and rehabilitated.

### 3.5 Irrigation

In order to dispose of excess site water as the quarry develops, Gunlake has approval to irrigate a total of approximately 10 ha. Although originally estimated that 50 ML per annum would be required to be irrigated, it is now estimated that a total of approximately 29.7 ML per annum will be needed to safely utilise excess water generated during extreme rainfall events. To date, irrigation of pasture has not been required but the method proposed at this stage includes:

- ❑ Identifying the areas to be irrigated and set up of an irrigation reticulation system. This would consist of an overland flexible pipe attached to a moveable/travelling sprinkler and booster pump capable of delivering up to 10 L/s.
- ❑ Irrigation water will mainly be sourced from Water Quality Control Pond (WQCP)1 and WQCP6.
- ❑ Set up of the source pump being relocatable for each of the water storages.
- ❑ Test water to be irrigated prior to commencement, the testing is to include pH and Conductivity as water quality indicators which is to be compared with complete analysis on file to determine if the water quality is suitable for irrigation. The contained water will consist primarily of recent rainfall runoff with a small volume of groundwater seepage into the ponds. WQCP6 may also contain water pumped from the Quarry pit. It is anticipated that no treatment of water prior to irrigation will be required, however some mixing and dilution with other waters on site may be undertaken if required.
- ❑ The amount to be irrigated in any specific area is not to cause runoff leaving the site. The rate of the travelling sprinkler is to be set to ensure maximum infiltration of the water.

There is the potential to pasture improve the designated irrigation area with perennial pasture should regular irrigation be available. There is also the potential for lucerne to be

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established or fodder crops which will greatly increase the carrying capacity of the remaining agricultural land. The irrigation area is almost entirely on the Bindook Road Soil Landscape. The subsoils have a moderate cation exchange capacity. With a small degree of pH adjustment the soils provide a good opportunity to support pasture growth.

A pH between 6 and 8.5 and conductivity of less than 750 uS/cm is suitable for all types of pasture and sensitive forage species such as Subterranean and White Clover. Sensitive perennial pasture and lucerne, maize, millet and sorghum can tolerate regular irrigation of up to 1,500 uS/cm while more tolerant species such as ryegrass, fescue, oats, barley and wheat can tolerate up to 3,000 uS/cm of regular irrigation water. Based on available water quality data, even the groundwater without any dilution would be suitable for irrigation.

It is not expected that irrigation would occur at a rate anywhere near what would be considered adequate for a high productive pasture. Recommended rates of between 6 to 7 ML per hectare per annum in the region would give a total water need of an approximate 60 ML per annum for the designated 10 ha area. With the estimated maximum available water being less than half this amount it is unlikely that a sustainable foraging pasture could be developed. However it would provide the opportunity to at least improve pasture yield.

Although irrigation has not been necessary to date, the ability to irrigate excess water in future provides an excellent opportunity to improve the agricultural capability of the property. In time, the amount of water needing irrigation will be more accurately determined based on a balance between the pollution control storage available, process water demands and prevailing rainfall. Maximum benefits would be derived from storing excess water following rainfall for as long as possible prior to irrigation and timing the irrigation to occur prior to the next forecast rainfall period. This method extends the rainfall equivalent for the pasture while maximising the pollution control storage needed for the operation. It also enables the operation to hold excess water in the event that extended dry periods occur.

### 3.6 Vegetation Clearing

Clearing of the vegetation within the quarry area is undertaken using a progressive campaign with the extent of clearing undertaken in each campaign being just sufficient for the subsequent months of quarry development. The bulk of the vegetation cleared to date has been pasture which is retained in the topsoil as it is collected during soil stripping activities for use in rehabilitation.

In order to prevent erosion and sedimentation, the following activities where warranted, are undertaken prior to any major vegetation clearing and surface disturbance.

- ❑ Construction of a temporary diversion bank on the upslope boundary of the area to be cleared. The diversion bank diverts clean water from the upslope areas into natural drainage lines or to designated storage dams within the project site.
- ❑ Construction of catch drains or banks on the down slope boundary of the area to be cleared. Runoff collected by the catch drains or banks is directed to sediment basins and /or storage dams from which it is drawn for dust suppression purposes.

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- ❑ Pre-clearance surveys which include mature trees to avoid impact on nesting fauna.

### 3.6.1 Soil Erosion Control

Currently sediment fencing and an earth bank (EB2) are utilised to mitigate potential impacts around the overburden emplacement bund. These features capture flows from the existing emplacement bund and convey them to WQCP5. EB2 will be extended to cover the eastern side of the larger emplacement area as approved in Modification 2.

Contour banks are progressively installed on the rehabilitated landform. The dimensions of the individual banks are determined on the basis of the individual sub-catchment areas, but are typically less than 0.7 m high and less than 3.0 m<sup>2</sup> cross-sectional area. Flumes will be constructed on the slopes of the final landform within the overburden emplacement to assist in controlling the flow of water off these slopes.

### 3.6.2 Soil Stockpiling

Soil and overburden is removed by an excavator loading into a 50t dump truck, and involves the removal of approximately 25 mm of topsoil and 2 m of overburden.

Wherever practicable, stripped topsoil and subsoil is directly replaced on completed sections of the final landform. When stockpiling is necessary, topsoil and subsoil is stockpiled separately in stockpiles not exceeding 2 m and 3 m in height respectively. Low stockpiles reduce the incidence of deterioration of the soil over time prior to reuse on prepared surfaces. The topsoil material is stockpiled at various locations, and may be moved at the discretion of the site manager in response to specific site constraints.

## 3.7 Progressive Rehabilitation

Gunlake has adopted a progressive approach to the rehabilitation of disturbed areas within the project site to ensure that where practicable, areas where quarrying or overburden placement are completed are quickly shaped and vegetated to provide a stable landform. This will ensure that the direct transfer of subsoil and topsoil is maximised and the area of land remaining to be rehabilitated at the end of the quarry life is minimised. The current overburden emplacement bund has been shaped and revegetation work has commenced.

At the completion of the 30 years of quarrying, there will still be hard rock reserves at the Gunlake Quarry. Although it is difficult to predict the proposed development at that time, it is highly likely that further quarrying will occur. Consequently, Gunlake do not propose to develop a final rehabilitation plan at this stage. If during the operation of the quarry it is decided to no longer operate, a closure rehabilitation plan would be developed at that time.

### 3.7.1 Overburden Emplacements

Rehabilitation of areas disturbed as a result of overburden placement activities will be undertaken in the following five stages:

- ❑ Stage 1: Overburden Placement and Shaping – placement and shaping of the overburden to create slopes with gradients less than 1:2.5 would be undertaken in a manner which wherever practicable ensures that any friable or weathered materials are placed below the subsoil and topsoil layers as a cover over the more competent materials. This would avoid the exposure of large rocks on the final surface. An initial

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assessment of overburden materials did not identify any risk of acid generation or soluble salt formation and consequently no specific handling or storage requirements are necessary.

- ❑ Stage 2. Subsoil and Topsoil Replacement - Subsoil and topsoil would be placed on the shaped landform in the reverse order to stripping, ie. subsoil then topsoil, with the materials being preferentially sourced from active stripping areas. If no such activity is being undertaken at the time, the soil material would be sourced from previously established stockpiles. The thickness of the topsoil and subsoil layers to be replaced would be determined on the basis of the actual volumes of these materials stripped as part of the quarrying activities. The subsoil layer would be spread on an even but roughened surface which has been ripped along the contour to break any compacted and/or smooth surfaces. Ripping would also assist the keying of the subsoil materials into the final land surface, encouraging ingress of water and minimising erosion.
- ❑ Stage 3. Drainage Installation – Contour banks would be progressively installed on the rehabilitated landform. The dimensions of the individual banks would be determined on the basis of the individual sub-catchment areas, but would be typically less than 0.7m high and less than 3.0m<sup>2</sup> cross sectional area. Flumes would be constructed on the slopes of the final landform within the overburden emplacement to assist in controlling the flow of water off these slopes. The final landform has been designed to be safe, stable and non polluting.
- ❑ Stage 4. Agricultural Land Pasture Sowing - The topsoiled surface of those areas designated for a post-quarrying agricultural land use would be sown with a mixture of pasture species appropriate for the season. Table 3.1 contains a proposed pasture mix for cool and warm seasons. The actual seed and fertilizer mix would be determined in conjunction with agronomists from the local Department of Primary Industries - Agriculture (DPI-A).
- ❑ Stage 5. Native Vegetation Establishment - The topsoil surfaces of those areas designated for a post-quarrying habitat enhancement land-use such as the quarry benches and quarry pit floor would be initially stabilised with a sterile cover crop. A selection of locally occurring tree and understorey species would then be planted on those sections. The seed for these trees would be collected from trees occurring in the Marulan District. The seed would be used to raise nursery tube stock for planting in the prepared areas. The list of suitable tree species is included in Table 3.2. These were species identified in Appendix 1 of the Flora and Fauna Impact Assessment as being suitable for revegetation. Subject to the extent of establishment of natural vegetation from replaced topsoil, seed of locally occurring shrub species will also be broadcast to encourage the re-establishment of the shrub layer.

### 3.7.2 Other Disturbed Areas

On completion of all quarry-related and associated activities, Gunlake will:

- ❑ Decommission and remove surface infrastructure unless otherwise agreed with DRE;
- ❑ remove, rip or otherwise rehabilitate all on-site roads not required for ongoing management of the property;

- ❑ rip the compacted rock on hardstand areas, shape the area to the designed landform, replace previously stockpiled subsoil and topsoil and apply seed and fertilizer;
- ❑ install appropriate drainage controls; and
- ❑ re-install fencing and gates at appropriate locations.

### 3.7.3 Revegetation Methods

Once final land profile has been completed, the surface will be deep ripped to remove compaction and toppedressed with a minimum of 20 cm of stockpiled topsoil. Depending on the amount of remaining organic matter in the soil, some mulch may be added. For areas designated as future agricultural land, the following seed and fertiliser mix will be used.

**Table 3.1 - Pasture Seed Mix**

Season	Pasture Species	Rate (kg/ha)	Fertilizer
Warm Season Grasses	Bombatsi Panic	1-2	250 kg/ha di-ammonium phosphate
	Green panic*2	2-4	
	Rhodes Grass*2	1-2	
	Purple Pigeon Grass	1-2	
Annual Legumes	Subterranean Clover	4-5	
Cool Season Legumes*1	Barrel (Sephi) medic	2-4	
	Snail (sava) medic*2	3-5	
	Wooly Pod Vetch	4-6	
	Serradella (Elagara)	1-2	
	Lucerne	0.5	
Cool Season Grasses	Phalaris (Sirolan or Holdfast)	1-2	
	Wallaby Grass	0.3-1	

Areas to be reforested will be initially direct sown at a rate of approximately 4 kg/ha of native seed. An initial sterile cover crop may be incorporated depending on the level of organic material in the available topdressing material. Table 3.2 shows the typical range of native species which will be used however depending on the availability of brush matting from nearby existing trees (falling branches which can be laid over the prepared surfaces), the mix may be modified accordingly.

**Table 3.2 - Native Species Mix**

Native Species	Common Name
<i>Eucalyptus amplifolia</i>	Cabbage Gum
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum
<i>Eucalyptus bridgesiana</i>	Apple Gum
<i>Eucalyptus cinerea</i>	Argyle Apple
<i>Eucalyptus eugenoides</i>	Thin-leaved Stringybark
<i>Eucalyptus macrorhyncha</i>	Red Stringybark
<i>Eucalyptus melliodora</i>	Yellow Box
<i>Eucalyptus rossii</i>	White Gum
<i>Eucalyptus sieberi</i>	Silver Top Ash
<i>Eucalyptus viminalis</i>	Ribbon Gum
<i>Leptospermum polygalifolium</i>	Lemon-scented Tea-tree

### 3.7.4 Final Landform

As the quarry has in excess of 30 years of life, final land use options need to remain flexible to cater for future opportunities. At this stage, the approved final landform as described in Modification 2 EA consists of two main landforms comprising the bund wall and the void representing the quarry pit. The remainder of the property will essentially retain its current landform and will be managed for flora and fauna conservation and agricultural pursuits. The final landform will integrate with surrounding natural landforms and will have minimal visual impact when viewed from surrounding land.

The bund wall will be retained and will provide shelter and light grazing for livestock. The quarry pit will be retained as a rehabilitated depression. It is unlikely to provide any ongoing grazing potential and may provide opportunity for future use for storage or deposition of a wide range of materials.

Given the quarry resource in the area, it is highly likely that quarrying will continue beyond 30 years. The quarry pit would be progressively extended and a new out of pit emplacement would be established while the existing bund wall would continue to provide screening of the rock processing area.

Once the resource is fully extracted, and the final landform is created, Gunlake would decommission and remove the aggregate processing plant, various fuel storages, workshop and site buildings, and roads not to be retained in the final landform. Prior to quarry closure, Gunlake would commission a qualified Geotechnical Engineer to certify the stability of the final landform.

### 3.7.5 Rehabilitation Monitoring and Maintenance

Gunlake would undertake an ongoing monitoring and maintenance program throughout and beyond the operation of the proposed Gunlake Quarry. Areas being rehabilitated would regularly be inspected and assessed against the short and long term rehabilitation objectives outlined in Section 1.2. During regular inspections, aspects of rehabilitation to be monitored would involve:

- evidence of any erosion or sedimentation from areas with establishing vegetation cover;
- success of initial grass cover establishment;
- success of tree and shrub plantings and direct seeding;
- adequacy of drainage controls; and
- general stability of the rehabilitation site.

Where rehabilitation success appears limited, maintenance activities would be initiated. These may include re-seeding, and where necessary, re-topsoiling and/or the application of specialised treatments such as composting mulch to areas with poor vegetation establishment. Tree guards would be placed around planted seedlings should grazing by

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native animals be excessive. If drainage controls are found to be inadequate for their intended purpose or compromised by grazing stock or wildlife, these would be replaced and/or temporary fences installed to exclude grazing of native vegetation by native or domestic fauna.

Should areas of excessive erosion and sedimentation be identified, remedial works such as importation of additional fill, subsoil or topsoil material or redesigning of water management structures to address erosion would be undertaken.

It is envisaged post-quarrying rehabilitation monitoring and maintenance would be undertaken for at least 2 years following the completion of all rehabilitation. The exact period would reflect seasonal conditions during that period. In any event, maintenance would continue until such time as the objectives have been achieved.

### 3.8 Bushfire Management

Under the *Rural Fires Act 1997*, there are a number of obligations that must be met by Gunlake with respect to managing their land. In summary, these include:

- Occupiers of land are to extinguish fires or notify fire fighting authorities immediately; and
- It is the duty of the owner or occupier of land to take practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from that land.

These issues are relevant, given the location of the quarry having native forested areas to the south and will include additional reforested areas on site. The following measures are employed at the site to ensure that these obligations under the Rural Fires Act are met:

- The main water storages on site are available for fighting purposes if required. This includes the main farm dam and WQCP1.
- Maintaining the agricultural component of the property to avoid significant quantities of long dry grass. Management activities include active grazing or slashing as required.
- Firebreaks are maintained around key infrastructure areas including the office and main access road to the site.

Fire fighting equipment is available on site at the office, workshop, and mobile equipment.

Table 3.3 – Vegetation Management

Management Issues	Objective	Actions	Performance and/or Completion Criteria
Degradation from stock grazing	Exclude stock from Biodiversity Offset Areas.	Fence off Biodiversity Offset Areas (as shown in <b>Figure 2</b> , Appendix A).	<p>1). To be completed as soon as practicable following approval of this Plan.</p> <p>2). Type of fencing to be determined by Gunlake, however where new fences are constructed, the use of plain wire rather than barbed wire is generally used. If barbed wire is necessary, at least the top strand will be plain wire (to prevent wildlife entanglement).</p> <p>3). Fencing to be maintained in good condition to exclude stock. In particular, fences in gullies/creeklines are to be checked after rain for damage and to remove debris.</p>
Existing vegetation - Biodiversity Offset Areas	Maintain sustainable Box Gum Woodland EEC and riparian vegetation communities within nominated Biodiversity Offset Areas.	<p>1). Establish structure and floristics of final target vegetation community</p> <p>2). Source local provenance seed either by collecting seed on site or from local supplier.</p> <p>3). Establish vegetation monitoring plots. Recorded monitoring data will include percentage canopy cover, germination rate, percentage erosion/bare patches, seed development, and photographs.</p> <p>4). Supplementary planting or direct seeding in areas with low natural regenerative capacity</p> <p>5). Monitor natural regeneration &amp; planting/direct seeding areas and review success of natural regeneration and any revegetation measures.</p> <p>6). Identify areas requiring infill planting or specific management tasks.</p>	<p>1). The following performance criteria apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Key indicator species present in equivalent density to target EEC or riparian vegetation.</li> <li><input type="checkbox"/> Indicator species successfully seed in two consecutive years.</li> <li><input type="checkbox"/> Canopy density greater than 30%</li> </ul> <p>2). Seed collection is undertaken in consultation with a qualified/experienced person (e.g. bush regeneration contractor or local native nursery staff). Seed collection is undertaken when needed and when available.</p> <p>3). Monitoring plots established and mapped.</p> <p>4). Additional planting/seed sowing as required (determined by success of previous activities and natural regeneration) to be undertaken in consultation with a qualified/experienced person.</p> <p>5). The results from the monitoring plots will be reported in the Annual Review submitted to the DP&amp;E in accordance with the Project Approval.</p>
Passive Regeneration areas - past clearing and	Create sustainable Box Gum Woodland EEC and riparian	1). Establish structure and floristics of final target vegetation community	<p>1). The following performance criteria apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Key indicator species present in equivalent</li> </ul>

Management Issues	Objective	Actions	Performance and/or Completion Criteria
disturbance (loss of native tree, shrub and ground cover)	vegetation communities within nominated Biodiversity Offset Areas.	<p>2). Source local provenance seed either by collecting seed on site or from local supplier.</p> <p>3). Establish vegetation monitoring plots. Recorded monitoring data will include percentage canopy cover, germination rate, percentage erosion/bare patches, seed development, and photographs.</p> <p>4). Supplementary planting or direct seeding in areas with low natural regenerative capacity</p> <p>5). Monitor natural regeneration &amp; planting/direct seeding areas and review success of natural regeneration and any revegetation measures.</p> <p>6). Identify areas requiring infill planting or specific management tasks.</p>	<p>density to target EEC or riparian vegetation.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Indicator species successfully seed in two consecutive years.</li> <li><input type="checkbox"/> Canopy density greater than 30%</li> </ul> <p>2). Seed collection is undertaken in consultation with a qualified/experienced person (e.g. bush regeneration contractor or local native nursery staff). Seed collection is undertaken when needed and when available.</p> <p>3). Monitoring plots established and mapped.</p> <p>4). Additional planting/seed sowing as required (determined by success of previous activities and natural regeneration) to be undertaken in consultation with a qualified/experienced person.</p> <p>5). The results from the monitoring plots to be reported in the Annual Review submitted to the DP&amp;E in accordance with the Project Approval.</p>
Rehabilitated Areas	Areas where quarrying or overburden placement are completed are quickly shaped and vegetated to provide a stable landform with sustainable vegetation cover.	<p>1). Following overburden placement, shaping, subsoil and topsoil replacement, contour banks are progressively installed prior to sowing with either a mixture of pasture species or native species mix depending on final landuse.</p> <p>2). Establish structure and floristics of final target vegetation community</p> <p>3). Recorded monitoring data will include percentage canopy cover, germination rate, percentage erosion/bare patches, seed development, and photographs.</p> <p>4). Monitor rehabilitation areas and review success of natural regeneration and any revegetation measures.</p>	<p>1). Direct transfer of topsoil is maximised and the area of land remaining to be rehabilitated at the end of quarry life is minimised. Final land use may comprise areas for agriculture and areas of native habitat.</p> <p>2). The following performance criteria apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Key indicator species present in equivalent density to target vegetation community.</li> <li><input type="checkbox"/> Indicator species successfully seed in two consecutive years.</li> </ul> <p>3). The results from the monitoring to be reported in the Annual Review submitted to the DP&amp;E in accordance with the Project Approval.</p>

Management Issues	Objective	Actions	Performance and/or Completion Criteria
Weeds	Control and/or reduce weeds, particularly Serrated Tussock.	<p>1). All weed control activities will be undertaken by suitably qualified contractors. Weed control activities will be subject to, and augment, revegetation work being undertaken by the bush regeneration specialist.</p> <p>2). Weed control will be monitored</p> <p>3). Gunlake will encourage neighbours to participate in a weed control program in the Chapman's creek catchment area. The level of neighbour participation and commitment will contribute significantly to the degree of success. There are populations of blackberry and serrated tussock on neighbouring properties that will need to be controlled for Gunlake's weed control program to be efficient and effective in the medium to long term</p>	<p>1). All weed control and reduction activity will be undertaken in accordance with the requirements of the Goulburn Mulwaree Shire Council.</p> <p>2). Results of weed control program and monitoring included in the Annual Review. The reporting will review the success of weed control/removal measures.</p> <p>3). Results of community activities associated with weed control reported in the Annual Review.</p>
Degradation and erosion within creeks/drainage lines.	To stabilise stream banks and gullies and to improve or restore riparian vegetation within the Gunlake property.	<p>1). Identify areas of instability and erosion within the nominated section of creekline.</p> <p>2). Maintenance – design and undertake streambed and bank rehabilitation measures.</p> <p>3). Infill planting and passive regeneration.</p> <p>4). Monitoring and review</p> <p>5). Gunlake will liaise with adjacent land owners and attempt to get participation in creek management.</p>	<p>1). Identified areas and regeneration progress to be mapped</p> <p>2). Records kept of all erosion control structures or works undertaken</p> <p>3). Additional planting/seed sowing as required (determined by success of previous activities and natural regeneration) to be undertaken in consultation with a qualified/experienced person.</p> <p>4). Results of revegetation and monitoring included in the Annual Review. The reporting will review the success of remediation works, including review of the relative success of bank stabilisation, erosion control and riparian strip rehabilitation/revegetation measures, as well as outcomes of neighbour liaison.</p>
Feral animals	Maintain or reduce feral	1). Continue current management	1). To be undertaken by the proponent (or contractor) for

Management Issues	Objective	Actions	Performance and/or Completion Criteria
	animal activity	practices in consultation with Council and local pest animal management strategy.	the life of the project.
Vehicle/ pedestrian access to Vegetation Offset Areas	Vehicle and pedestrian access to be controlled	<ol style="list-style-type: none"> <li>1). Fencing.</li> <li>2). Education and awareness.</li> <li>3). Signage.</li> </ol>	<ol style="list-style-type: none"> <li>1). As described previously above. To be undertaken by proponent (ongoing).</li> <li>2). All staff and contractors to be made aware of the location of the Biodiversity Offset Areas and the need to limit access.</li> <li>3). Clear and simple signs saying "Biodiversity Offset Area – Sensitive Environmental Site" should be attached at various points along the boundary fence of the Biodiversity Offset Areas (particularly on gates).</li> <li>4). To be completed by proponent within 1 month of completing fencing.</li> </ol>
Bushfire	Minimise the risk of bush fires occurring on, or spreading from the Gunlake property.	<ol style="list-style-type: none"> <li>1). Maintain firebreaks around key infrastructure areas including the office and main access road to the site.</li> <li>2). Maintain the agricultural component of the property to avoid significant quantities of long dry grass</li> <li>3). Extinguish fires or notify fire fighting authorities immediately in the event of a fire.</li> <li>4). Inform Rural Fire Service (RFS), staff and contractors of the need to restrict burning activities.</li> <li>5). Monitor and Review.</li> </ol>	<ol style="list-style-type: none"> <li>1). To be inspected annually and maintained as required.</li> <li>2). Active grazing or slashing as required</li> <li>3). Keep a record of fire events (to be undertaken by proponent).</li> <li>4). Review frequency of fire events and the effect on native vegetation as part of the vegetation monitoring program.</li> </ol>

## 4. Communication and Reporting

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Each Management Plan in operation at Gunlake Quarry includes ongoing consultation with government and community stakeholders.

### 4.1 Reporting

Project reporting requirements are defined in Conditions 3 and 4, Schedule 5 of the Project Approval. Condition 3 requires Gunlake to report any exceedance of the goals/limits/performance criteria or an incident causing (or threatening to cause) material harm to the environment. This report has to be submitted with the Department of Planning and Environment within 7 days of the exceedances or incident. The required contents of the report are detailed in Condition 3, Schedule 5 of the Project Approval.

Condition 4 requires Gunlake to submit an Annual Review to the Department of Planning and Environment each year. The Annual Review is also submitted to the Community Consultative Committee and relevant agencies. The contents required for the Annual Review are detailed in Condition 4, Schedule 5 of the Project Approval. The Annual Review is an important tool for measuring and documenting the success and implementation of the commitments and planning made in Gunlake's initial Environmental Assessment and subsequent modifications.

The Gunlake Quarry Environmental Protection Licence No. 12012 also specifies reporting requirements. In accordance with the Licence, Gunlake submits an Annual Return to the Environment Protection Authority (EPA) no later than 60 days after the anniversary date of the Licence. The anniversary date of the Gunlake Quarry Licence is 13 July and consequently, the Annual Return has to be submitted by 11 September each year.

The Annual Return to the EPA must include a Statement of Compliance and a Monitoring and Complaints Summary. Conditions R1.1 to R1.9 of the Licence define details of the EPA's requirements for the Annual Return.

Condition R2 of the Gunlake Quarry Environment Protection Licence also requires Gunlake and its employees to notify the EPA as soon as practicable after they have become aware of an incident causing or threatening material harm to the environment. Notification must be made by telephoning the Environmental Line service on 131 555.

### 4.2 Government Liaison

Government authority consultation has formed an integral component of the original EA studies as well as the successive modifications. The consultation process has include the following stakeholders:

- Department of Planning and Environment;
- National Parks and Wildlife Service
- Office of Environment and Heritage;
- Goulburn Mulwaree Shire Council;
- Sydney Catchment Authority;
- NSW Department of Primary Industries and

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☐ NSW Office of Water.

The consultation process has included on site meetings and correspondence which has included input into to the various environmental management plans as required.

### **4.3 Community Consultation**

Gunlake management is required keep the local community and relevant agencies informed about the construction, operation and environmental performance of the project. A Community Consultative Committee (CCC) has been formed and the first meeting was held on 6 November 2013. Information is provided CCC along with other members of the community on request.

### **4.4 Access to Data**

Gunlake provide updated environmental monitoring data and information on the activities on site through their web page. Information provided includes water and dust monitoring data in accordance with the Environment Protection Licence.

## 5. Verification and Corrective Action

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An essential component of the EMS is verification and implementation of corrective actions as required to achieve the requirements of the Project Approval and Environment Protection Licence.

### 5.1 Environmental Monitoring

As described in Chapter 3, rehabilitation and biodiversity offset management initiatives will be monitored during the quarry life. This monitoring work falls within the overall monitoring program for the site which includes surface and groundwater, traffic, dust emissions and noise. The results of this monitoring is summarised in the Annual Review each year.

### 5.2 Non-Conformance, Corrective Action and Adaptive Management

Responsibility for identifying non-conformances will rest with key management personnel to ensure that any non-conformances are identified as soon as possible. Primary responsibility rests with the Quarry Manager who is supported by the Environmental Officer although all staff have received general training in environmental awareness. All non-conformances are reported to the Quarry Manager in the first instance.

Corrective actions are implemented as soon as practicable on identification of any non-conformances, and records of such are to be maintained. Corrective actions are to be in line with current best practice within the industry and ensure that appropriate guidelines are met.

As part of the Project Approval Conditions, corrective action will be form part of the Adaptive Management process where any exceedance of the criteria and/or performance measures has occurred.

In such cases, Gunlake Quarry will at the earliest opportunity

- ❑ take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- ❑ consider all reasonable and feasible options for remediation (where relevant) and submit a report to the EPA and Department of Planning and Environment describing those options and any preferred remediation measures or other course of action; and
- ❑ implement remediation measures as directed by the EPA and/or DoPE.

### 5.3 Preventative Action Procedures

Preventative action will consist predominantly of regular inspections undertaken by the Quarry Manager, Environmental Officer or designated site personnel as well as external audits required under the Project Approval. Steps will be taken to ensure that any potential non-conformances do not occur. Any preventative actions will be commensurate with the environmental impact anticipated.

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Any changes in procedures resulting from corrective and preventive action will be documented and the appropriate personnel notified, including Gunlake's management team.

#### **5.4 Record Keeping**

Records are kept of environmental monitoring, audits and actions taken under the provisions of each Environmental Management Plan.

#### **5.5 Auditing Procedures**

The Project Approval requires that an independent environmental audit be undertaken within one year of commencing construction of the project, and every three years thereafter for the life of the mine. To date there have been independent audits completed and the results have been addressed within the ongoing management of the quarry operation. Separate internal audits are carried from time to time to ensure ongoing compliance, or to assess the effectiveness of existing environmental controls and procedures.

#### **5.6 Management Review**

An annual internal review is also be undertaken of each management plan to ensure that it conforms with planned arrangements for environmental management and the requirements of the Project Approval, Environment Protection Licence, and that the system has been properly implemented and maintained. Outcomes of these reviews can result in an update to individual management plans to be prepared. The purpose of management review is to identify any weaknesses or out of date procedures. The aim is to maintain each management plan in line with current industry and Australian standards and changes to environmental legislation.

The management review process will ensure that the necessary information is collected to allow management to carry out this evaluation and the review document.

The management review should address the possible need for changes to policy, objectives and other elements of the environmental management system, in light of environmental management system audit results, changing circumstances and the commitment to continual improvement.

#### **5.7 Continuous Improvements**

A key component of the environmental management of Gunlake Quarry is the commitment to continuous improvement. This will be measured by formal and informal criteria. Formal measures will include internal and external inspection and action plans. These reports will be used to establish trends in non-compliance and environmental performance. The level of non-compliance with both statutory and company standards will then be summarised in the AEMR.

The auditing will also provide an assessment of housekeeping and general environmental awareness of the operation, how the site has adopted new technology, maintenance of pollution control systems, preventative actions, community consultation and responded to

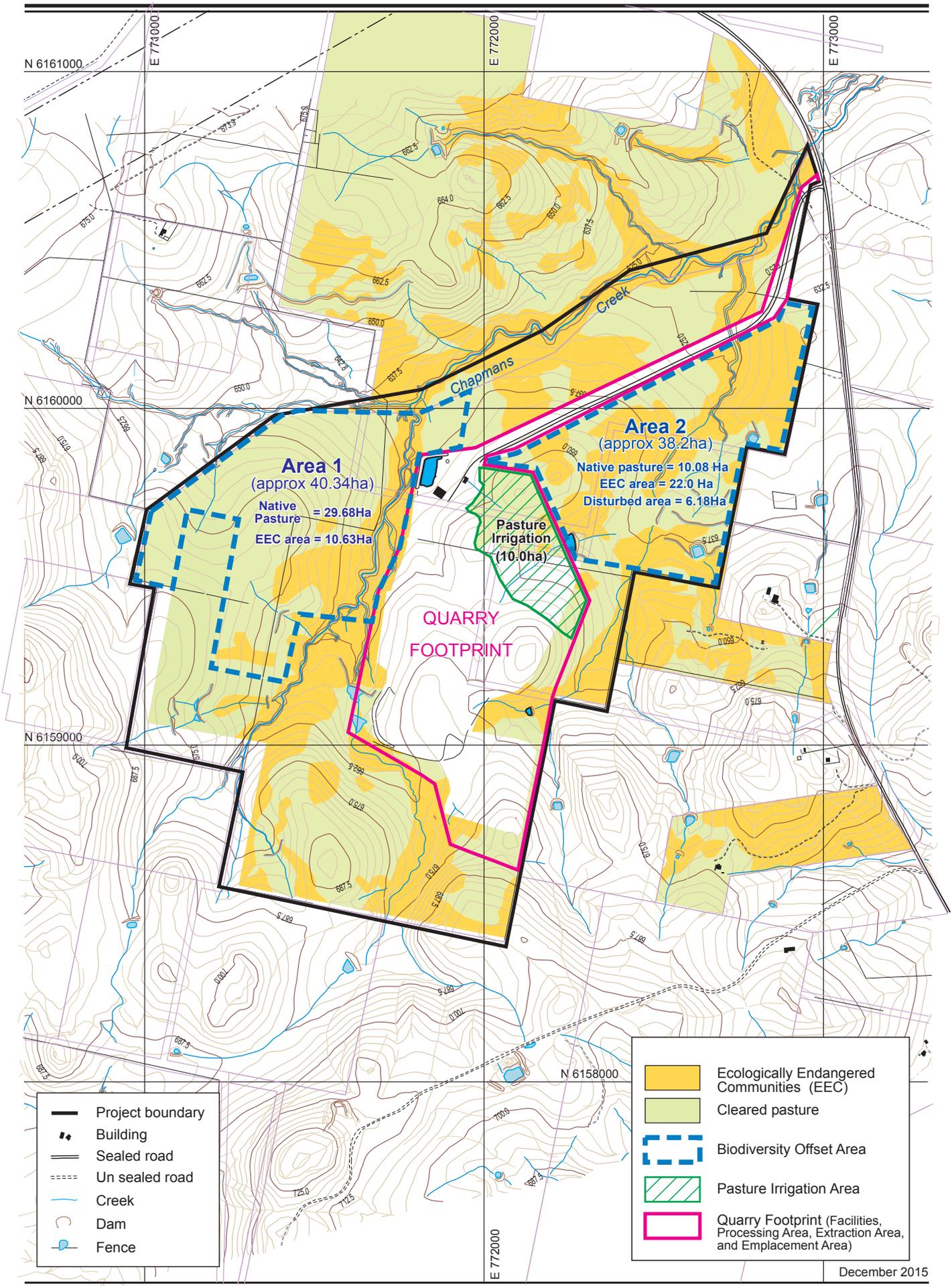
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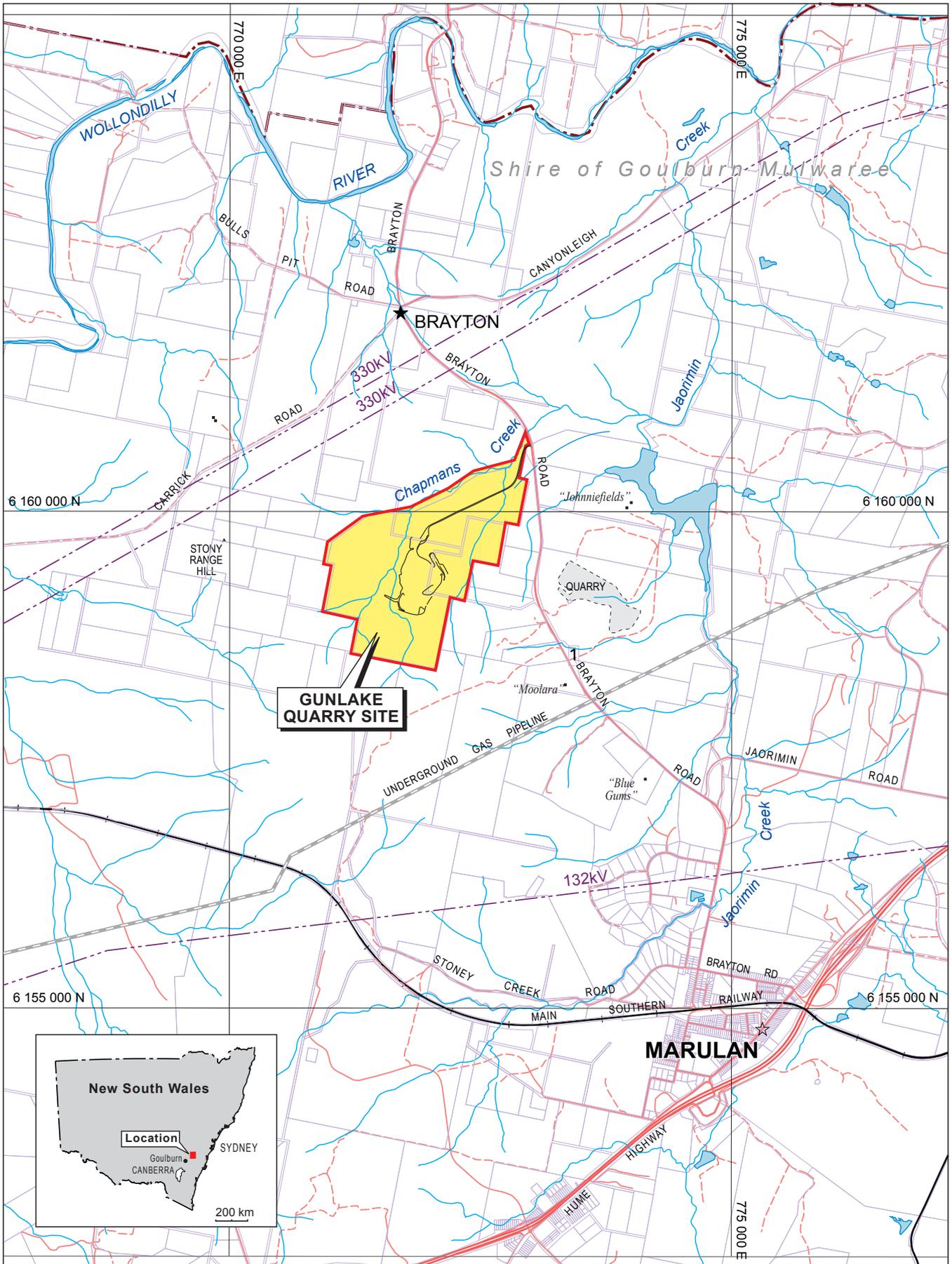
incidents and corrective action plans. This information will be used to provide a general trend in environmental performance.

## Appendix A - Plans

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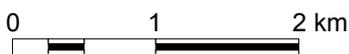
**FIGURE 2**  
**Gunlake Quarry**  
**Biodiversity Offsets**



Datum: GDA  
MGA Zone 55

Map Source: © Department of Lands, NSW

- |  |                |  |                          |  |           |
|--|----------------|--|--------------------------|--|-----------|
|  | Dam            |  | Gas pipeline             |  | Main road |
|  | River or creek |  | Electricity transmission |  | Railway   |



**FIGURE 1**  
**Gunlake Quarry**  
**Regional Location**

## Appendix B – Project Approval

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