austral bricks®

ABN: 52 000 005 550

Rehabilitation Management Plan

for the

Bowral Quarry Extension

Prepared by:

RWCorkery&co

August 2022

ACKNOWLEDGEMENT

R.W. Corkery & Co. acknowledge and pay our respects to the Traditional Custodians of the lands comprising NSW and Australia on which our projects are located. We appreciate the knowledge, advice and involvement of the Elders and extended Aboriginal community that contribute to our Projects and extend our respect to all Aboriginal and Torres Strait Islander peoples.

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Ref No. 537/49 August 2022

Summary Table

Name of Quarry		Bowral Quarry Extension		
RMP Commencement Date		14 December 2018		
Mineral Authorities		M(MO)L11	**Expiry Date**	13/12/25
Name of Leaseholder		Austral Brick Company Pty Limited		
Version	**Author**	**Purpose**	**Approved by**	**Date of Submission**
1	S. Hollamby	New Document	P. Young-Whitford	8 August 2022

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LIST OF ACRONYMS

EIS	Environmental Impact Statement
EPA	Environment Protection Authority
IALC	Illawarra Aboriginal Land Council
MEG	Mining, Exploration and Geoscience
RMP	Rehabilitation Management Plan
RWC	R.W. Corkery & Co. Pty. Limited

1. INTRODUCTION TO MINING PROJECT

This *Rehabilitation Management Plan* (RMP) for the Bowral Quarry Extension (the "Quarry") has been compiled by R.W. Corkery & Co. Pty. Limited (RWC) in conjunction with The Austral Brick Company Pty Limited ("Austral Bricks"). The Quarry is located approximately 0.7km to 1.3km south-west of Bowral's town centre on the western side of the Main Southern Railway Line (the "Quarry Site") (see **Figure 1**). The Quarry Site operates under DA267/95 and M(MO)L11.

This RMP has been prepared in accordance with the following documents and guidelines.

- *Form and Way: Rehabilitation Management Plan for Large Mines (July 2021)*
- *Form and Way: Rehabilitation Objectives, Rehabilitation Completion Criteria and Final Landform and Rehabilitation Plan for Large Mines (July 2021).*
- *Guideline 1: Rehabilitation Risk Assessment (July 2021)*
- *Guideline 2: Rehabilitation Records (July 2021)*
- *Guideline 3: Rehabilitation Controls (July 2021)*
- *Guideline 5: Rehabilitation Objectives and Rehabilitation Completion Criteria (July 2021)*

This *Rehabilitation Management Plan* covers the operational and rehabilitation activities within the area of M(MO)L11 (1.8ha), hereafter referred to as the "RMP Area". Rehabilitation of land outside of the RMP Area, namely historical surface disturbances outside the boundary of M(MO)L11 is not covered in this document unless specified.

1.1 HISTORY OF OPERATIONS

The Bowral Brick Plant has been manufacturing bricks for approximately 96 years, predominantly using clay and shale extracted from the quarry to its immediate south. When the original quarry reached its lateral and depth limits, the (then) Bowral Brickworks Pty Limited proposed a quarry extension to the southwest of the original quarry, i.e. the "Bowral Quarry Extension". A development application was lodged in 1995 with a supporting Environmental Impact Statement (EIS) (RWC, 1995). Development Consent DA267/95 was subsequently issued by Wingecarribee Shire Council on 12 October 1995 and amended on 15 October 1996.

Development Consent DA566/93 was also issued by Wingecarribee Shire Council on 18 February 1994 for the original quarry to be operated as a landfill ("the Bowral Landfill") to ultimately backfill the void with inert waste material. The landfill has been subsequently operated separately to the Bowral Quarry Extension by a separate entity although it is noted that Austral Bricks has retained a right-of-access across the landfill site to gain access to the Quarry from the Bowral Brick Plant located to the northeast (**Figure 2**).

Since approval, the Bowral Quarry Extension has supplied principally Ashford Shale together with smaller amounts of clay and sandstone material for brick manufacture. Although the Bowral Quarry Extension commenced operations in 1995, M(MO)L11 was not issued until 6 December 2018, as previous legislation did not require a mining title for the extraction of privately-owned minerals. It is noted that a setback for M(MO)L11 has been provided from residences to the south. This area does contain economic mineral resources.

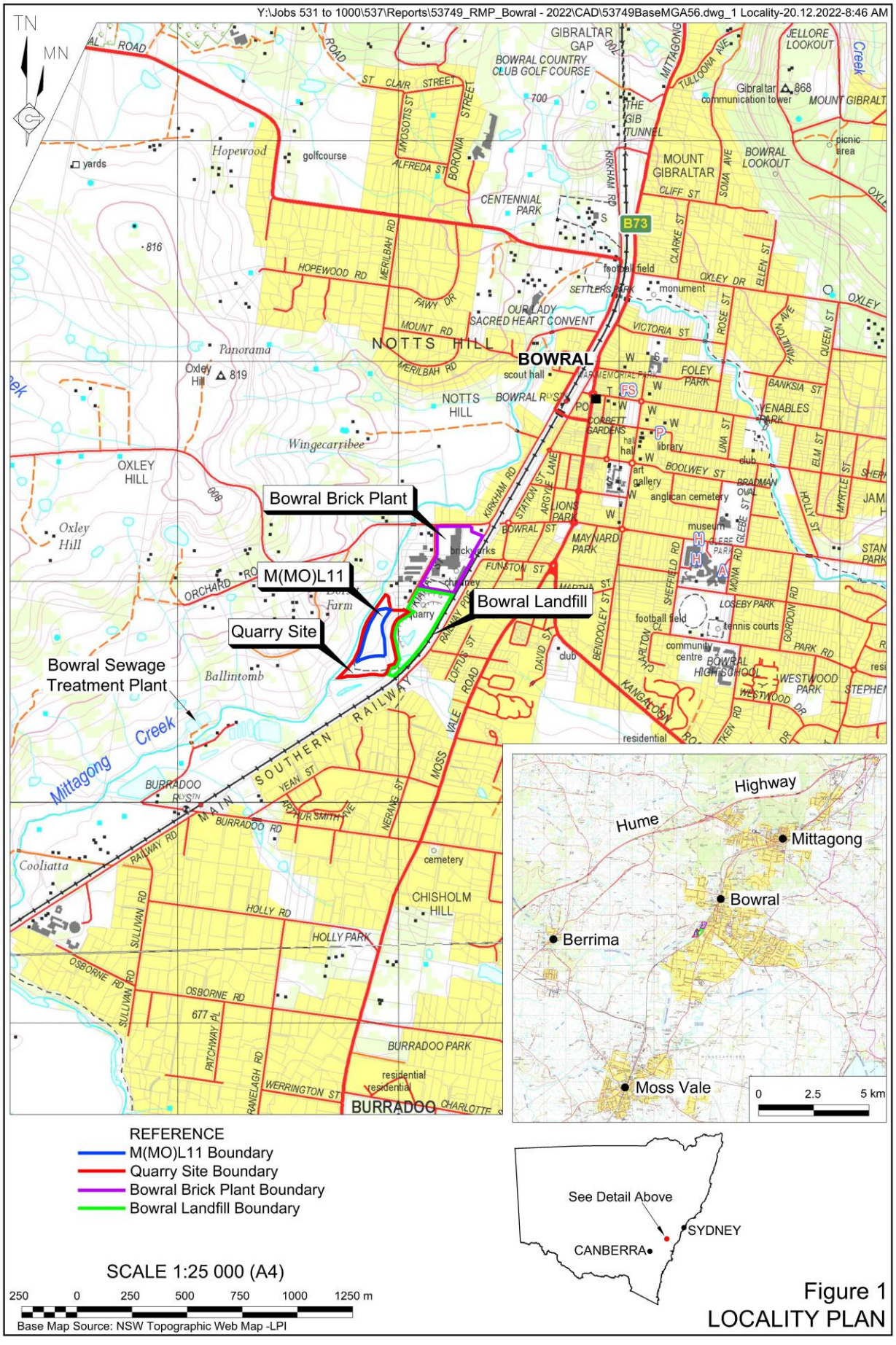

Figure 1
LOCALITY PLAN

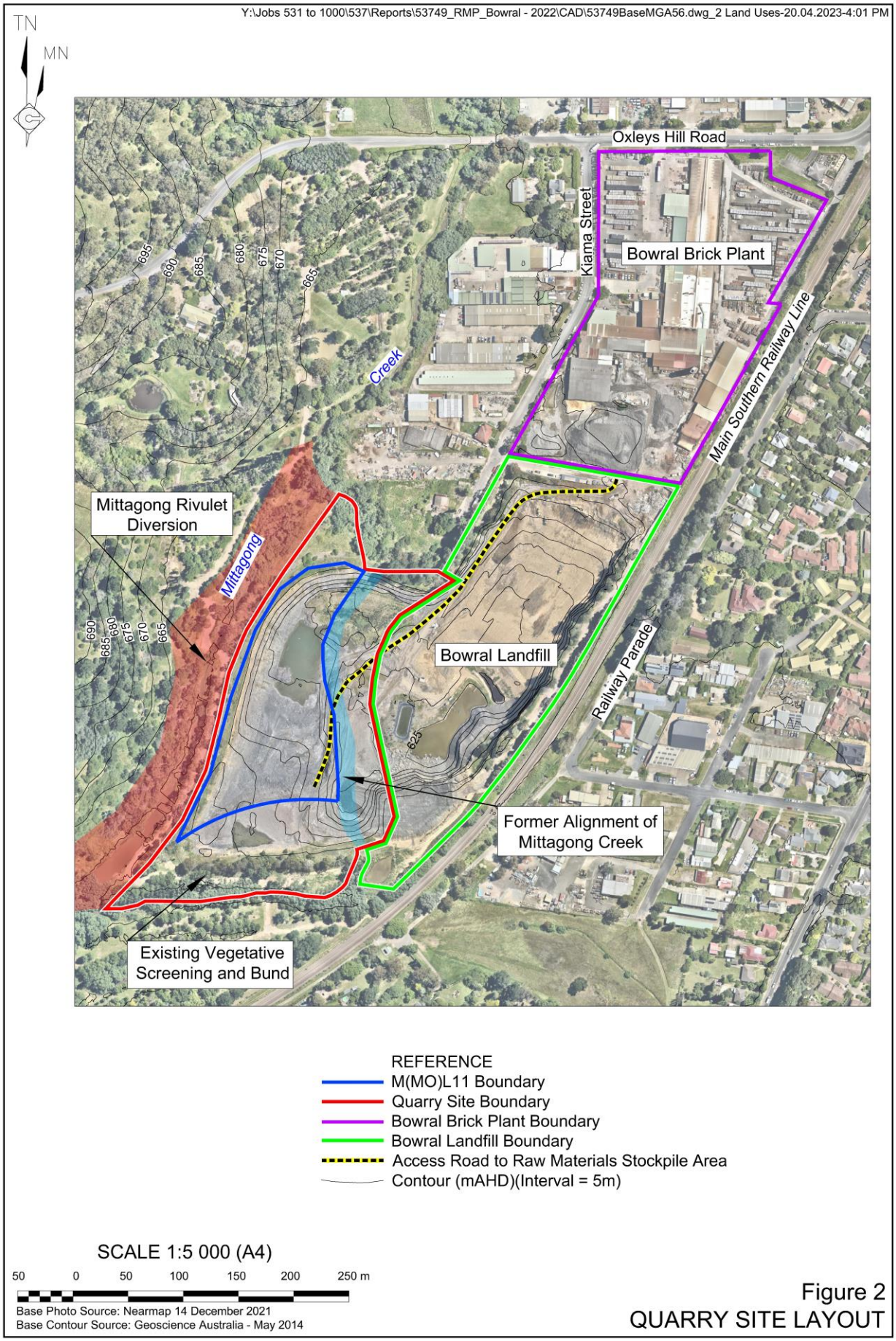

Figure 2
QUARRY SITE LAYOUT

1.2 CURRENT DEVELOPMENT CONSENTS, LEASES AND LICENCES

Table 1 provides a summary of the relevant consents, authorisations and licences held by Austral Bricks for the Quarry.

Table 1
Current Consents, Authorisations and Licences

Approval/Lease/Licence	Issue Date	Expiry Date	Details / Comments
Development Consent			
Development Consent 267/95	12/10/1995, amended 15/10/1996	Not applicable	Extension of the original shale quarry incorporating a diversion of Mittagong Creek. Issued by the Wingecarribee Shire Council.
Mining Authorisations			
M(MO)L11	06/12/ 2018	06/ 12/ 2039	This lease was granted by DRG in response to M(MO)LA29, covers an area of 1.995ha and permits mining of clay / shale, kaolin and structural clay minerals.
Other Approvals & Licences			
EPL 2073	23/09/1999	Renewed Annually 2 July	Issued by the NSW Environment Protection Authority (EPA). Current licence version dated 25/08/2016. Applicable to activities within the Bowral Quarry Extension and Bowral Brick Plant

1.3 LAND OWNERSHIP AND LAND USE

Table 2 and **Figure 3** presents land ownership within and surrounding the Quarry Site. In summary, land surrounding the Bowral Quarry Extension is principally freehold except for a Crown reserve associated with the Mittagong Creek. **Figure 4** presents land uses in the vicinity of the Quarry Site. **Figure 5** presents land zoning in the vicinity of the Quarry Site.

Table 2
Land Ownership

Lot	Deposited Plan	Tenure	Owner	Leases
Quarry Site				
32	DP1275078	Freehold	The Austral Brick Company Pty Ltd	M(MO)L11
Land Adjacent to Quarry Site				
31	DP1275078	Freehold	The Austral Brick Company Pty Ltd	N/A
33	DP1275078	Freehold	The Austral Brick Company Pty Ltd	N/A
14	DP1022146	Freehold	Bowral Waste Centre Pty Ltd	N/A
1	DP88680	Freehold	Privately Owned	N/A
5	DP1028745	Freehold	Wingecarribee Shire Council	N/A
Crown reserve associated with Mittagong Creek				

Land uses within and surrounding the Quarry Site include the following.

- Clay/shale extraction – within the Quarry Site.
- Industrial uses - including brick manufacturing at the Bowral Brick Plant, concrete batching within the concrete batching plant located to the north of Oxleys Hill Road and warehousing within the industrial estate north of the Quarry Site.
- Residential and rural-residential – to the northwest, east and southeast of the Quarry Site.
- Rail transport (Main Southern Railway) – along the rail corridor adjacent to the eastern boundary of the Bowral Landfill.

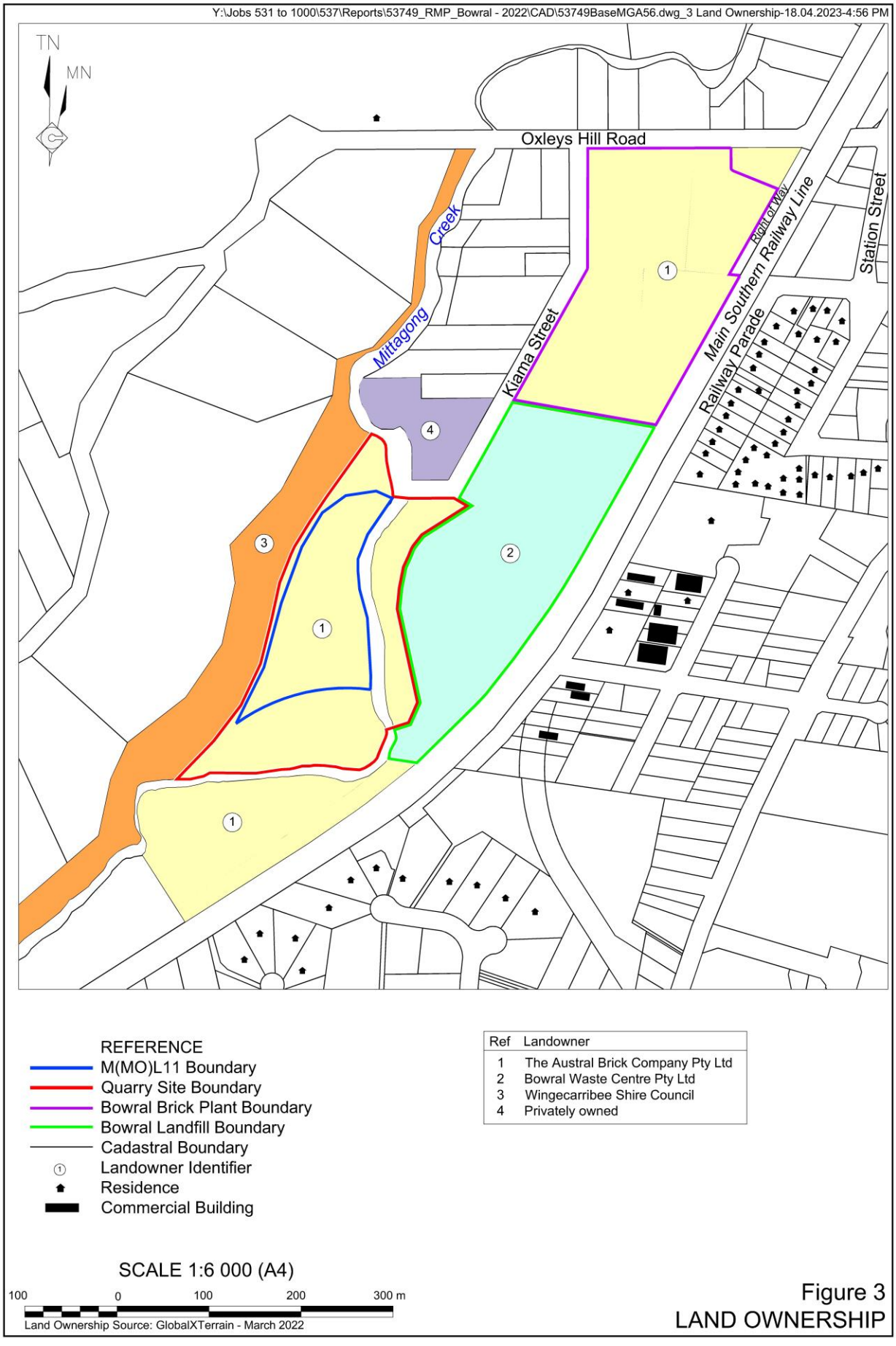

Figure 3
LAND OWNERSHIP

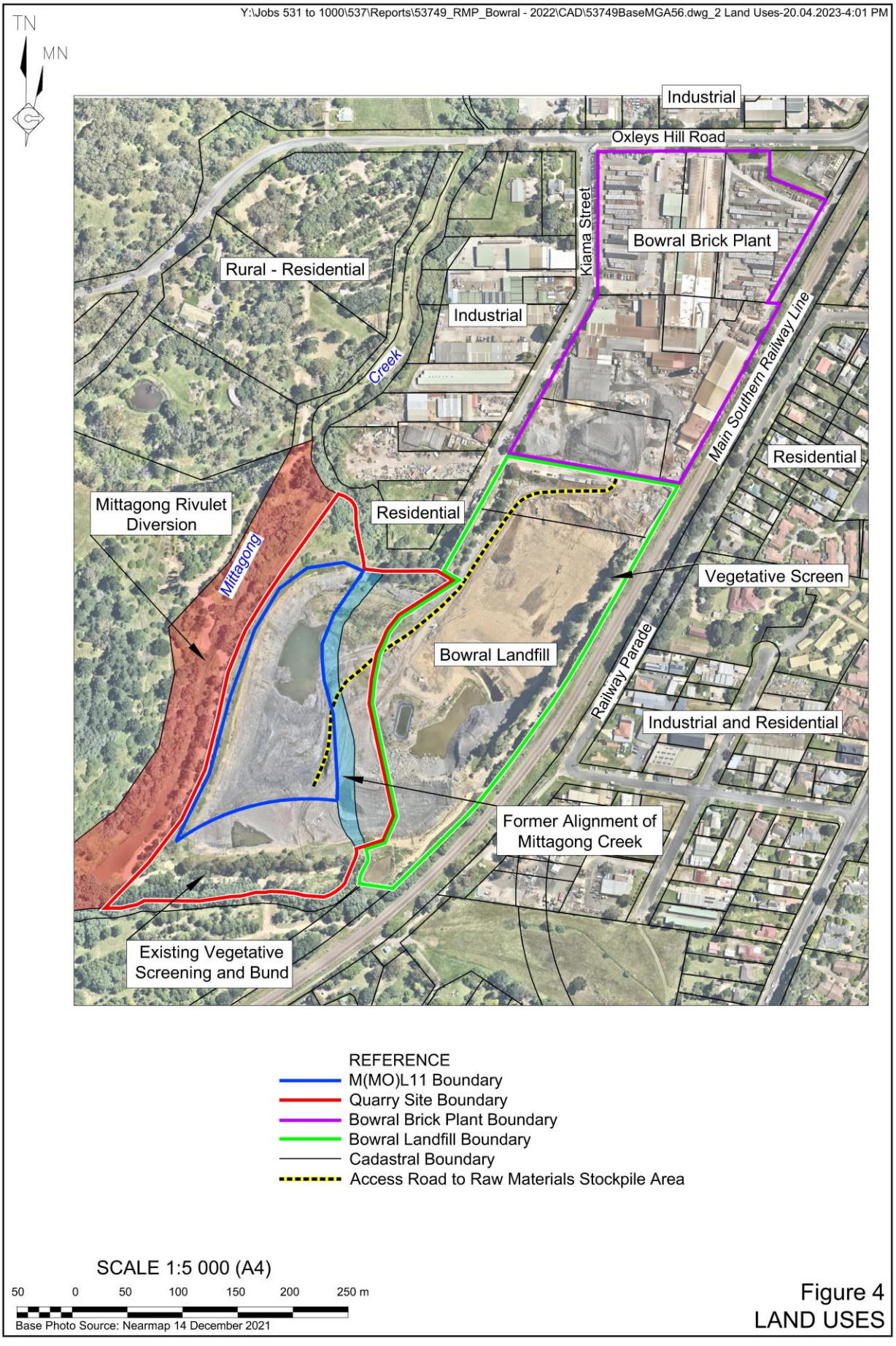

Figure 4
LAND USES

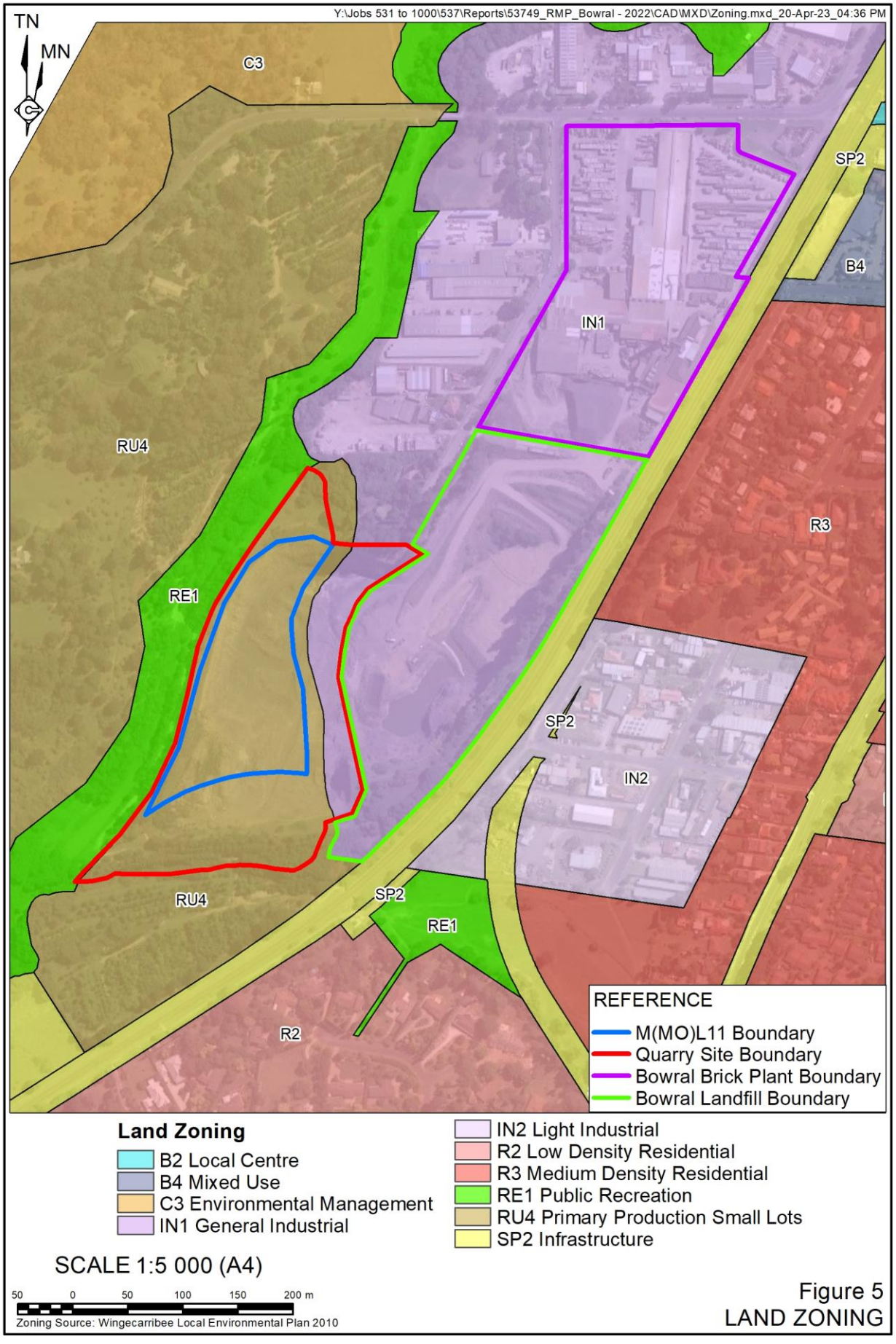

Figure 5
LAND ZONING

2. FINAL LAND USE

2.1 REGULATORY REQUIREMENTS FOR REHABILITATION

Table 3 lists the regulatory requirements relating to rehabilitation of the RMP Area and post-mining land uses. It is noted that the conditional requirements for M(MO)L11 have been adopted from Schedule 8A of the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021*, gazetted by the NSW Government on 2 July 2021. It has been assumed that conditions within M(MO)L11 relating to rehabilitation have been replaced by those identified in Schedule 8A of the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021*. In the event that there are any discrepancies between the conditions identified in this Plan and those included in M(MO)L11 following updates to rehabilitation conditions, this Plan will be updated to correct these discrepancies.

2.2 FINAL LAND USE OPTIONS ASSESSMENT

The current final land use goal as outlined within the previously approved MOP is to create a safe, stable and non-polluting final landform with established grass and occasional trees (using either selected native or suitable exotic species), essentially providing passive open space. The final landform features and final landform contours is provided in **Plans 1** and **2**.

However, as the final land use was not approved within the development consent, a final land use options assessment has been undertaken. In considering the potential land use options it is noted that the current land use zoning for M(MO)L11 is RU4 'Primary Production Small Lots' under the *Wingecarribee Local Environmental Plan 2010*. The site is adjoined to the east by land zoned IN1 'General Industrial', within which operates a landfilling operation.

The final land use of a vegetated / passive open space is permissible without consent and would meet the zone objective "*to minimise conflict between land uses within this zone and land uses within adjoining zones*" as this would not conflict with surrounding land uses in Zone RU4 or within IN1. The proposed land use would also not limit the future development potential of the Quarry and thereby is consistent with the remaining objectives of the zone which includes encouraging other compatible land uses, encouraging and promoting diversity and employment opportunities.

Table 3
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Area	Timing	Section
DA267/95	10	An amount of $20,000 shall be retained for the life of the quarry to ensure the undertaking of any maintenance and/or rehabilitation works required to maintain the integrity of the new channel [Mittagong Creek diversion].	Quarry Site	During construction, operation, and rehabilitation.	Noted
	24	To guarantee compliance with the Environmental Management and Site Rehabilitation Plan and ensure appropriate resources are available for any emergency works, a cash bond or suitable bank guarantee and associated Deed of Agreement to an amount of $200,000 shall be lodged with Council prior to any development works commencing.			Noted
	30	Within a period of 2 years from the date of consent, submit for Council's consideration a report detailing any viable alternatives that may be suitable for the site's rehabilitation.			Noted
	4	**Must prevent or minimise harm to the environment** The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise, harm to the environment caused by activities under the mining lease. In this clause – ***harm*** to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997****.***	M(MO)L11	During operation and rehabilitation.	Noted
	5	**Rehabilitation to occur as soon as reasonably practicable after disturbance** The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by mining activities under the mining lease as soon as reasonably practicable after the disturbance occurs.	M(MO)L11		Noted
	6	**Rehabilitation must achieve final land use** The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area. The holder of a mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with subclause (1). The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents a risk to the holder's ability to comply with subclause (1) **Note –** clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause. In this clause – ***final land use*** for the mining area means the final landform and final land uses to be achieved for the mining area – as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement, and for a large mine – as spatially depicted in the final landform and rehabilitation plan, and if the final land use for the mining area is required by a condition of development consent for activities under the mining lease – as stated in the condition. ***planning approval*** means – a development consent within the meaning of the *Environmental Planning and Assessment Act 1979*, or an approval under that Act, Division 5.1.	M(MO)L11	During rehabilitation.	2.2, 3

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Area	Timing	Section
DA267/95 (Cont'd)	7	**Rehabilitation risk assessment** The holder of a mining lease must conduct a risk assessment (a ***rehabilitation risk assessment***) that – identifies, assesses and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease – the rehabilitation objectives, the rehabilitation completion criteria, for large mines – the final land use as spatially depicted in the final landform and rehabilitation plan, and identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks. The holder of the mining lease must implement the measures identified. The holder of a mining lease must conduct a rehabilitation risk assessment – for a large mine – before preparing a rehabilitation management plan, and for a small mine – before preparing the rehabilitation outcome documents for the mine, and whenever a hazard is identified under clause 6(3) – as soon as reasonably practicable after it is identified, and whenever given a written direction to do so by the Secretary.	M(MO)L11	During construction, operation and rehabilitation.	3
	9	**General requirements for documents** A document required to be prepared under this Division must— be in a form approved by the Secretary, and **Note**— The approved forms are available on the Department's website. include any matter required to be included by the form, and if required to be given to the Secretary—be given in a way approved by the Secretary.			This document
	10	**Rehabilitation management plans for large mines** The holder of a mining lease relating to a large mine must prepare a plan (a rehabilitation management plan) for the mining lease that includes the following— a description of how the holder proposes to manage all aspects of the rehabilitation of the mining area, a description of the steps and actions the holder proposes to take to comply with the conditions of the mining lease that relate to rehabilitation, a summary of rehabilitation risk assessments conducted by the holder, the risk control measures identified in the rehabilitation risk assessments, the rehabilitation outcome documents for the mining lease, a statement of the performance outcomes for the matters addressed by the rehabilitation outcome documents and the ways in which those outcomes are to be measured and monitored. If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must include a proposed version of the document. A rehabilitation management plan is not required to be given to the Secretary for approval. The holder of the mining lease— must implement the matters set out in the rehabilitation management plan, and if the forward program specifies timeframes for the implementation of the matters—must implement the matters within those timeframes.			This document

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Area	Timing	Section
DA267/95 (Cont'd)	11	**Amendment of rehabilitation management plans** The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows— to substitute the proposed version of a rehabilitation outcome document with the version approved by the Secretary—within 30 days after the document is approved, as a consequence of an amendment made under clause 14 to a rehabilitation outcome document—within 30 days after the amendment is made, to reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment—as soon as practicable after the rehabilitation risk assessment is conducted, whenever given a written direction to do so by the Secretary—in accordance with the direction.	M(MO)L11	During construction, operation and rehabilitation.	11
	12	**Rehabilitation outcome documents** The holder of a mining lease must prepare the following documents ***(the rehabilitation outcome documents)*** for the mining lease and give them to the Secretary for approval— the ***rehabilitation objectives statement***, which sets out the rehabilitation objectives required to achieve the final land use for the mining area, the ***rehabilitation completion criteria statement***, which sets out criteria, the completion of which will demonstrate the achievement of the rehabilitation objectives, for a large mine, the ***final landform and rehabilitation plan***, showing a spatial depiction of the final land use. If the final land use for the mining area is required by a condition of development consent for activities under the mining lease, the holder of the mining lease must ensure the rehabilitation outcome documents are consistent with that condition.			4, 5
	13	**Forward program and annual rehabilitation report** The holder of a mining lease must prepare a program (a ***forward program***) for the mining lease that includes the following— a schedule of mining activities for the mining area for the next 3 years, a summary of the spatial progression of rehabilitation through its various phases for the next 3 years, a requirement that the rehabilitation of land and water disturbed by mining activities under the mining lease must occur as soon as reasonably practicable after the disturbance occurs. The holder of a mining lease must prepare a report (an ***annual rehabilitation report***) for the mining lease that includes— a description of the rehabilitation undertaken over the annual reporting period, a report demonstrating the progress made through the phases of rehabilitation provided for in the forward program applying to the reporting period, a report demonstrating progress made towards the achievement of the following— the objectives set out in the rehabilitation objectives statement, the criteria set out in the rehabilitation completion criteria statement, for large mines—the final land use as spatially depicted in the final landform and rehabilitation plan. If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must rely on a proposed version of the document. The holder of the mining lease must give the forward program and annual rehabilitation report to the Secretary.			8

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Area	Timing	Section
DA267/95 (Cont'd)	13 (Cont'd)	In this clause— ***annual reporting period*** means each period of 12 months commencing on— the date on which the mining lease is granted, or if the Secretary approves another date in relation to the mining lease— the other date.	M(MO)L11	During construction, operation and rehabilitation.	
	14	**Amendment of rehabilitation outcome documents and forward program** This clause applies to— a rehabilitation outcome document if it has been approved by the Secretary, and a forward program if it has been given to the Secretary. The holder of a mining lease must not amend a document to which this clause applies that relates to the mining lease unless— the Secretary gives the holder a written direction to do so, or the Secretary, on written application by the holder, gives a written approval of the amendment. The holder of the mining lease must amend the document in accordance with the Secretary's direction or approval. Nothing in this clause prevents the holder of a mining lease preparing a draft amendment for submission to the Secretary for approval.			11
	15	**Times at which documents must be prepared and given** The holder of a mining lease must do the following before the end of the initial period — prepare a rehabilitation management plan, and prepare rehabilitation outcome documents and give them, other than the rehabilitation completion criteria statement, to the Secretary for approval, and prepare a forward program and give it to the Secretary. The holder of the mining lease must prepare a forward program and annual rehabilitation report and give them to the Secretary before— 60 days after the last day of each annual reporting period, commencing with the annual reporting period in which the forward program was given to Secretary under subclause (1)(c), or a later date approved by the Secretary. A rehabilitation completion criteria statement relating to completion of rehabilitation during a period covered by a forward program must be given to the Secretary for approval when the forward program is required to be given to the Secretary. The holder of the mining lease must prepare updated rehabilitation outcome documents for the mining lease and give them to the Secretary for approval before— 60 days after a development consent is modified following an application referred to in clause 20(1)(b), or a later date approved by the Secretary. A rehabilitation completion criteria statement is not required to be given to the Secretary under subclause (4) unless a rehabilitation completion criteria statement has already been given to the Secretary under subclause (3). The Secretary may, by written notice, direct the holder of a mining lease to prepare, or give to the Secretary, a document required to be prepared under this Division at a time other than that specified in this clause.			11

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Area	Timing	Section
DA267/95 (Cont'd)	15 (Cont'd)	The holder of the mining lease must comply with the direction. In this clause— initial period means the period commencing when the mining lease is granted and ending— 30 days, or other period approved by the Secretary, after this Division first applies to the mining lease, or if this Division applies to the mining lease because of an increase in the required security deposit— when the surface of the mining area is disturbed by activities under the mining lease, or at a later date approved by the Secretary.	M(MO)L11	During construction, operation and rehabilitation.	
	16	**Certain documents to be publicly available** This clause applies to the following documents— a rehabilitation management plan, a forward program, an annual rehabilitation report. The holder of a mining lease must make a document to which this clause applies publicly available by— publishing it on its website in a prominent position, or if the holder does not have a website— providing a copy of it to a person— on the written request of a person, and without charge, and within 14 days after the request is received. If a document is published on the website of the holder of the mining lease, the holder must ensure that it is published— for a rehabilitation management plan—within 14 days after it is prepared or amended, or for a forward program or an annual rehabilitation report—within 14 days after it is given to the Secretary or amended, Personal information within the meaning of the *Privacy and Personal Information Protection Act 1998* is not required to be included in a document made available to a person under this clause.			11
	17	**Records demonstrating compliance** The holder of a mining lease must create and maintain records of all actions taken that demonstrate compliance with each of the conditions set out in this Part. **Note—** The Act, sections 163D and 163E provide for the form in which records must be kept and the period for which they must be retained.			Noted

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Area	Timing	Section
DA267/95 (Cont'd)	18	**Report on non-compliance** The holder of a mining lease must provide the Minister with a written report detailing any non-compliance with— a condition of the mining lease, or Note— The Act, section 364A contains provisions relating to the use and disclosure of information provided under this condition. a requirement of the Act or this Regulation relating to activities under the mining lease. The holder of the mining lease must provide the report within 7 days after becoming aware of the non-compliance. The holder of the mining lease must ensure the report— identifies the condition of the mining lease, or the requirement of the Act or this Regulation, to which the non-compliance relates, and describes the non-compliance and specifies the date or dates on which, or the period during which, the non-compliance occurred, and describes the causes or likely causes of the non-compliance, and describes the action that has been taken, or will be taken, to mitigate the effects, and to prevent any recurrence, of the non-compliance.	M(MO)L11	During construction, operation and rehabilitation.	Noted
EPL2073		No specific rehabilitation requirements.	NA	NA	NA
Legislation					
Protection of Environmental Operations Act 1997	s42-58	Discusses the provision of Environment Protection Licences.	Quarry Site	During operations and rehabilitation works	1.2
	s89-113	Discusses the application of Clean-up Notices.	Quarry Site	During operations	
	Chapter 5	Discusses environmental offences including water, air, noise and land pollution.	Quarry Site	During operations and rehabilitation works	
Heritage Act 1977	Part 3 (s27-30)	Discusses interim orders for items of State or local significance.	Quarry Site	During operations	6.2.1.13
	Part 3A (s31-38)	Discusses listing of items, places or buildings on the state heritage register.	Quarry Site	During operations	6.2.1.13

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Area	Timing	Section
Heritage Act 1977 (Cont'd)	Part 4	Discusses the effect of interim heritage orders and listings on the State Heritage Register	Quarry Site	During operations and rehabilitation	6.2.1.13
	Part 6	Discusses other measures for the conservation of environmental heritage.	Quarry Site	During operations and rehabilitation	6.2.1
	Division 8	Discusses controlling and restricting harm to buildings, works, relics and places not subject to interim heritage orders or State Heritage Registered listings.	Quarry Site	During operations and rehabilitation	6.2.1.13
Mining Act 1992	Division 3	Under these sections the Minister can direct a company to rehabilitate their land, or, should the company not comply with this direction, rehabilitate the land at the Ministers expense and recover the cost from the company.	Quarry Site	During rehabilitation works	Noted

Other potential post quarry land uses considered as part of the land use options assessment are summarised as follows.

1. Landfilling

   The rehabilitation of the Quarry void through backfilling with inert wastes (i.e. through extending the Bowral Landfill) was the expected post-extraction land use in the 1995 application for development consent. However, landfilling is a prohibited use in Zone RU4. Therefore, a rezoning application and development consent could be sought for landfilling. The proposed final land use would not restrict future development as a landfill.

2. Recreational Uses

   Depending upon the future surrounding land uses, the vegetated Quarry void could potentially be utilised for various recreational uses including as a passive parkland area. However, it is considered that more suitable recreational uses may include a sporting complex such as tennis and squash courts, skate park and BMX track, etc. These uses are currently permissible within Zone RU4 with development consent.

3. Residential or Industrial

   Without backfilling of the void, the Quarry void would not be suitable for residential use. However, given the relatively open and flat area, the final Quarry void would be suitable for a range of industrial uses, particularly those that may benefit from the shielding provided by the retained highwalls, bunding and vegetative screening. Following completion of the existing Bowral Landfill there may also be opportunity to integrate the Quarry void as part of that development. Industrial uses are currently not permissible within Zone RU4.

4. Water Storage

   Whilst water storage facilities are permissible within Zone RU4, given the large size, limited catchment and presence of the adjacent landfilling operation (which would present a leachate hazard), it is considered that the Quarry void would not provide a suitable water storage.

5. Nature Conservation and Agricultural Uses

   Given the limited growth medium and restricted area, it is considered that the retained Quarry void would not be suitable nor could be used sustainably for agricultural uses.

   It is also considered that revegetation of the Quarry void with native vegetation would not result in any significant nature conservation benefits. As vegetation at the base will not be connected to surrounding vegetation the habitat value would likely be low for all except highly mobile species, such as birds. The limited area and low productive value of the growth medium would also minimise the ability of less mobile species to populate this area. Both agricultural and environmental protection works are permissible without consent within Zone RU4.

2.3 FINAL LAND USE STATEMENT

The final land use within the RMP Area prior to lease relinquishment will involve a stabilised landform suitable for subsequent development (in accordance with separate development consent) or as a passive open space.

Final land use and rehabilitation plans for the RMP Area are presented in Section 5.

2.4 FINAL LAND USE AND MINING DOMAINS

2.4.1 Introduction

The *Form and Way: Rehabilitation Management Plan for Large Mines (July 2021)* guideline defines a domain as follows.

> "An area (or areas) of the land that has been disturbed by mining and has a specific operational use (mining domain) or specific final land use (final land use domain). Land within a domain typically has similar geochemical and/or geophysical characteristics and therefore requires specific rehabilitation activities to achieve the associated final land use."

2.4.2 Final Land Use Domains

Table 4 defines the final land use domains for the RMP Area as presented in **Figure 6**.

Table 4
Final Land Use Domains

Final Land Use Domain	Domain ID[1]	Domain Description
Other (Stabilising Groundcover)	Ka	This domain incorporates the entirety the RMP Area, which will be seeded with a pasture cover for stabilisation purposes prior to future development or retained as a passive open space.
Note 1: See **Plan 1**		

2.4.3 Mining Domains

Table 5 defines the mining domains for the RMP Area as presented in **Figure 6**.

Table 5
Mining Domains

Final Land Use Domain	Domain ID[1]	Domain Description
Active Mining Area (Open cut void)	5	This domain incorporates the current and planned extents of extraction within the Quarry and by extension, the entirety of the RMP Area. Temporary stockpiling of raw materials prior to transportation to the Bowral Brick Plant may also occur within this domain.
Note 1: See **Figure 6**		

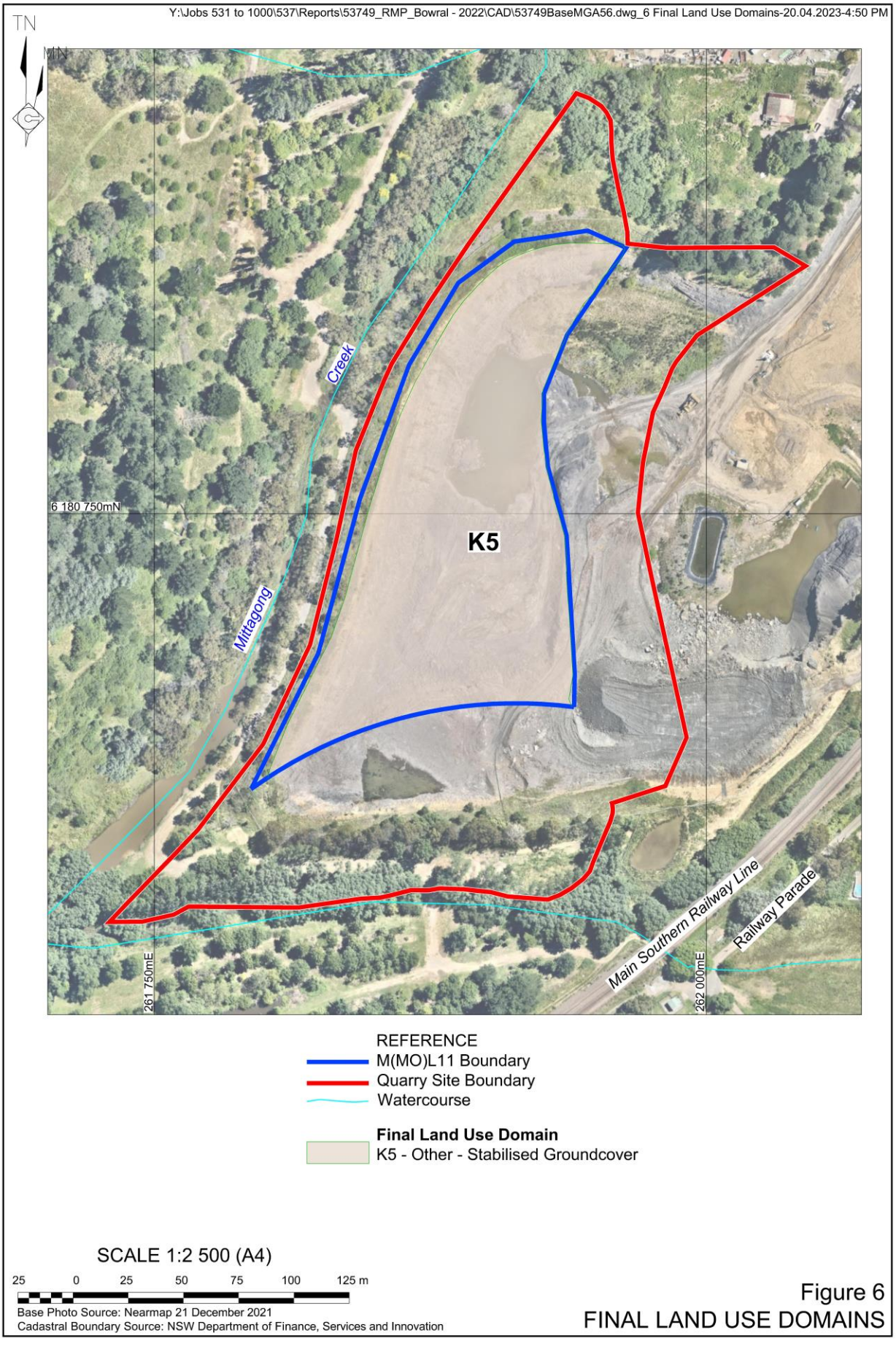

Figure 6
FINAL LAND USE DOMAINS

3. REHABILITATION RISK ASSESSMENT

The approach to the following environmental risk review was generally in accordance with *Australian Standards HB 203:2006* and *AS/NZS 4360:2004*. This environmental risk review is generally in accordance with *AS/NZS ISO 31000:2009 Risk Management – Principles & Guidelines*.

For each identified risk to rehabilitation, potential adverse outcomes were identified and allocated a risk rating based on the potential consequences and likelihood of occurrence.

Tables 6, **7** and **8** present the consequence, likelihood and risk ratings used during this review. Where risks have been determined to be unacceptable, namely those risks classified as 'moderate' or above, a Trigger Action Response Plan has been developed and is presented in Section 10.

Table 9 presents the results of the risk review assuming the implementation of standard mitigation measures and those outlined within this Plan.

Table 6
Qualitative Consequence Ratings

Level	Descriptor	Description
1	Negligible	No detrimental impact on the environment is measurable or envisaged.
2	Minor	An event which could have temporary and minor effects on the environment, such as a non-reportable environment incident.
3	Moderate	An event which would create substantial temporary or minor permanent damage to the environment, such as a reportable incident not likely to result in prosecution.
4	Major	An event which could have a substantial and permanent consequence to the environment such as an environmental incident which would result in prosecution, adverse local publicity and community complaints.
5	Severe	A major event which could cause severe damage to the environment with actual or potential loss of credibility with key stakeholders, environmental liability, regulatory intervention, national publicity/complaints, or could close the operation prematurely.
Note: Rating modified after AS/NZS ISO31000:2009 Risk Management – Principles & Guidelines		

Table 7
Qualitative Likelihood Ratings

Level	Descriptor	Description
A	Certain	Is an ongoing occurrence or will occur under all conditions
B	Almost Certain	Is expected to occur in most circumstances
C	Likely	Will probably occur in most circumstances
D	Possible	Will probably occur under favourable circumstances
E	Unlikely	May occur, but only under favourable circumstances
F	Rare	Not expected to occur, unless subject to exceptional circumstances
G	Very Rare	Theoretically possible but not expected to occur.
Source: Rating modified after HB 89:2012 – Figure B7		

Table 8
Qualitative Risk Ratings

Likelihood	Consequences				
	1 Negligible	**2 Minor**	**3 Moderate**	**4 Major**	**5 Severe**
A Certain	M	H	H	VH	VH
B Almost Certain	M	M	H	VH	VH
C Likely	M	M	H	H	VH
D Possible	L	M	M	H	H
E Unlikely	L	L	M	M	H
F Rare	L	L	L	M	M
G Very Rare	L	L	L	L	M

Source: Modified after HB 89:2012 – Figure B8

Table 9
Rehabilitation Risk Assessment

Rehabilitation Phase	Risk	Risk Control	Final Land Use Domain / Risk Ranking Domain K: Other- Stabilised Groundcover	Where Addressed in RMP
General	Insufficient skills and experience of rehabilitation personnel.	Extensive experience of management team Development and implementation of *Integrated Management Plan* documentation, including inductions, toolbox talks and Contractor Permit to Work, safety contacts and workplace inspections. Engagement of specialist consultant(s) to address specific issues if and when required.	L(F3)	7, 10
	Lack of clearly defined responsibilities.	Responsibilities as defined in the *Rehabilitation Management Plan* and Safety, Health and Environment Management System. Implementation of *Integrated Management* Plan documentation, including inductions, toolbox talks and Contractor Permit to Work.	L(G3)	7
	Insufficient funding for or prioritisation of rehabilitation activities.	Rehabilitation cost estimate and maintenance of security bond.	L(F3)	7, 10
Active Mining Phase	Inappropriate biological resource (e.g. subsoil, topsoil, vegetative material, seedbank, rocks, habitat resources) through clearing, salvage, and handling practices.	Stockpiling of growth medium in location not subject to run-on water or vehicle access. Spraying of weeds on an as needed basis. Identification of growth medium on mapping utilised for toolbox talks.	L(F3)	6.2.1.1, 6.2.1.11
	Limited pre-existing biological resources for use (e.g. topsoil, woody debris).	No further vegetation clearing or soil stripping to be undertaken. An approximately 21 000m^3 stockpile of clay material retained as growth medium which will provide an adequate growth medium depth of approximately 500mm.	NA	-
	Adverse meteorological conditions during salvage of biological resources.	No further vegetation clearing or soil stripping to be undertaken.	NA	-
	Adverse geochemical/chemical composition of materials such as overburden, processing wastes, topsoils and subsoils.	Allowance for application of gypsum and fertiliser in rehabilitation cost estimate. *Testing of growth medium following spreading but prior to application of seed to confirm rates of gypsum, fertiliser and/or other soil ameliorants required.*	L(F3)	6.2.1.6, 6.2.1.8
	Handling and containment of geochemical and geotechnically unsuitable process residue and reject materials.	No geochemically or geotechnically unsuitable process residues or reject materials generated or present.	NA	-
	Adverse surface and/or groundwater quality and quantity.	Extraction depth to remain at least 2m above the top of the interface between the base of the Ashfield Shale and the underlying Mittagong Sandstone to limit / avoid groundwater inflows. Storage of all hydrocarbons and chemicals in accordance with AS1940:2017 – The storage and handling of flammable and combustible liquids.	L(F3)	6.2.1.5, 6.2.6, 6.2.1.9, 10
Decommissioning Phase of Rehabilitation	Impacts on heritage items.	All works undertaken in non-weathered material – i.e. activities could not impact upon heritage.	NA	-
	Hazards associated with retained infrastructure.	Inspection of retained fencing and bunding.	L(F3)	
	Contamination resulting from associated activities (e.g. storage and use of hydrocarbons/chemicals, drilling fluid, spillage of dirty water, brine, sewage).	Storage of all hydrocarbons and chemicals in accordance with AS1940:2017 – The storage and handling of flammable and combustible liquids. Note: no hydrocarbons are permanently stored within the Quarry. *Visual contamination inspection and report prior to relinquishment.*	L(F3)	6.2.2.4, 6.2.2.5
	Material and waste products from the demolition process retained on the final landform.	No demolition works applicable. Removal of all equipment and any associated spares / polypipe and wastes in accordance with established protocols.	L(E2)	6.2.2.2
	Groundwater accumulation in former underground workings (e.g. potential for fill and spill or impacts on regional ground water users.	No underground workings present.	NA	-
	Exposure or access to underground workings.	No underground workings present.	NA	-
	Habitation of structures and/or underground workings by native fauna (e.g. bats).	No underground workings present.	NA	-
	Adverse surface water quality and quantity.	Storage of all hydrocarbons and chemicals in accordance with AS1940:2017 – The storage and handling of flammable and combustible liquids. *Visual contamination inspection report prior to relinquishment.*	L(F3)	6.2.2.5

Table 9 (Cont'd)
Rehabilitation Risk Assessment

Rehabilitation Phase	Risk	Risk Control	Final Land Use Domain / Risk Ranking Domain K: Other- Stabilised Groundcover	Where Addressed in RMP
Landform Establishment Phase of Rehabilitation	Unstable landform due to erosion and/or mass movement issues associated with inappropriate design and/or quality assurance during landform construction.	Establishment of safe and stable high walls during mining operations. Strata inspections as part of principal hazard controls. *Geotechnical assessment prior to relinquishment.*	L(G4)	6.2.3.2, 6.2.3.4
	Exposure or release of geochemical and/or geotechnically adverse material associated with containment design and construction, including capping/cover system.	No capping or containment systems present or required.	NA	-
	Lack of availability of suitable materials for encapsulation or capping of adverse materials.	No capping or containment systems present or required.	NA	-
	Borehole or gas well seals failure.	No boreholes or gas wells present.	NA	-
	Retained final landform is not free-draining / results unintended ponding of water.	*Shaping of extraction floor to provide suitable grades directing surface water flows to the east to the sump within the Original Quarry Area (off-lease).*	L(F3)	6.2.3.1, 6.2.3.2
	Final landform unsuitable for final land use (e.g. large rocks present affecting cultivation, unsuitable surface cover and landform settlement).	*Shaping and ripping of extraction floor to provide suitable grades and surface substrate for application of growth medium.* *Visual inspection prior to application of growth medium.*	L(F2)	6.2.3, 6.2.4, 8
	Uncontrolled public access to highwalls.	Retention of existing security fencing, bunding and warning signs.	M(F4)	6.2.3.2, 6.2.3.4
Growth Medium Development Phase of Rehabilitation	Inappropriate physical and structural properties of growth medium.	*Shaping and ripping of extraction floor to provide suitable grades and surface substrate for application of growth medium.* *Light ripping of growth medium across contours to key in to substrate, reduce surface runoff velocities, and retain seed (when spread).* Allowance for application of gypsum in rehabilitation cost estimate. *Testing of growth medium following spreading but prior to application of seed to confirm rates of gypsum and/or other soil ameliorants required.* *Restriction of vehicular access following spreading of soil material.*	L(F3)	6.2.1.1, 6.2.1.6, 6.2.1.11, 6.2.4, 8, 9.2
	Subsoil and topsoil deficit for rehabilitation activities.	An approximately 21 000m^3 stockpile of clay material retained as growth medium which will provide an adequate growth medium depth of approximately 500mm.	L(F3)	
	Substrate inadequate to support revegetation or agricultural land capability (e.g. lack of organic matter, nutrient deficiency, lack of soil biota, adverse soil chemical properties, exposed hostile geochemical materials, and any other factors impeding the effective rooting depth).	Allowance for application of gypsum and fertiliser in rehabilitation cost estimate. *Testing of growth medium following spreading but prior to application of seed to confirm rates of gypsum, fertiliser and/or other soil ameliorants required.*	L(F3)	
Ecosystem and Land Use Establishment Phase of Rehabilitation	Lack of availability and quality of target seed resources, including genetic integrity.	*Purchase of appropriate agricultural or native seed mix for ground stabilisation.*	L(G3)	6.2.5, 8
	Poor seed viability or seed dormancy.	*Purchase of appropriate agricultural or native seed mix for ground stabilisation.*	L(F3)	8
	Seed predation.	*Use of appropriate sowing and seeding techniques.* *Selection of seed mix appropriate to the season / current weather conditions so that germination occurs as soon as practicable following sowing.*	L(F3)	6.2.5, 8
	Damage to seed through revegetation process.	*Use of appropriate sowing and seeding techniques.*	L(G3)	6.2.5, 8, 9
	Poor quality tubestock.	*Purchase of suitable tube stock grown from locally collected seed and sourced from reputable supplier.*	L(G3)	6.2.5
	Weed infestation associated with both introduction and control (or lack thereof).	Implement weed inspection and control program. Implement equipment delivery protocol to ensure equipment does not import weeds.	L(E2)	6.2.1.11, 6.2.5, 8
	Adopting inappropriate or inadequate rehabilitation techniques, including equipment fleet.	Extensive experience of management team. *Engagement of experienced contractors.* *Rehabilitation personnel induction and training.*	L(F3)	9, 10
	Inappropriate revegetation species mix for targeted final land use.	*Testing of growth medium following spreading but prior to application of seed to confirm suitability of planned seed mix.* *Consult with suitably experienced expert to confirm suitability of seed mix.* *Source seed mix from reputable supplier.*	L(G3)	6.2.5, 8, 9

Table 9 (Cont'd)
Rehabilitation Risk Assessment

Rehabilitation Phase	Risk	Risk Control	Final Land Use Domain / Risk Ranking Domain K: Other- Stabilised Groundcover	Where Addressed in RMP
Ecosystem and Land Use Establishment Phase of Rehabilitation (Cont'd)	Adverse weather and climatic influences (e.g. drought; intense rainfall events; bushfire and climate change) / areas not available for revegetation during optimal seasonal conditions.	*Review long-term weather forecast prior to purchase of seed mix.* *Consult with suitably experienced expert to confirm suitability of seed mix for seasonal conditions.*	L(F3)	6.2.5
	Lack of infrastructure to support intended final land use (e.g., bunding or fences).	*Inspection of existing fencing and bunding to confirm integrity.*	L(F3)	8
	Hazards associated with retained infrastructure.	No infrastructure to be retained that represents a hazard.	NA	-
	Adverse weather and climatic influences (e.g. drought; intense rainfall events; bushfire and climate change).	*Review long-term weather forecast.* *If existing seed mix is inappropriate for current weather conditions, consult with suitably experienced expert to confirm alternative species and/or cover crop or mulch for temporary stabilisation.*	M(D3)	6.2.6
	Substrate inadequate to support revegetation or agricultural land capacity.	*If inadequate groundcover / projected foliage cover achieved, consult with suitably experienced expert in relation to confirm appropriateness of species selection or need for additional soil amelioration requirements (gypsum, fertiliser, organic matter).*	L(F3)	6.2.1.1, 6.2.6
	Post-closure water quality and quantity issues.	*Ensure adequate projected foliage cover to limit erosion / silt entrainment.* Note: water runoff will remain internally draining without ability to passively discharge.	L(E1)	6.2.6, 9.2
	Damage to rehabilitation (e.g. fauna, domestic stock, vandalism, vehicular interactions, bushfire).	Maintain existing security and stock-proof fencing. *Creation of barrier to vehicular entry to the rehabilitation area.* *Rehabilitation monitoring program.*	L(F3)	6.2.2.1, 6.2.5, 6.2.6, 9.2
	Re-disturbance of established rehabilitation areas.	*Appropriate rehabilitation planning / scheduling.* *Creation of barrier to vehicular entry to the rehabilitation area.*	L(F3)	6.2.6, 6.2.2.1
	Insufficient establishment of target species and limited species diversity.	*Rehabilitation monitoring program.* *Supplementary sowing of additional species seed mix (if required to maintain adequate projected foliage cover during all seasons).*	L(F3)	6.2.6, 8
	Erosion and failure of landform, drainage and water management/storage structures.	*Visual inspection program.* *Geotechnical assessment prior to relinquishment.*	L(G4)	6.2.3.4, 6.2.6.2
	Lack of infrastructure to support intended final land use (e.g. bunding, fences).	*Inspection of existing fencing and bunding to confirm integrity.*	L(G3)	6.2.2.1, 6.2.2.3, 6.2.3, 6.2.6
	Lack of resources for rehabilitation maintenance.	Rehabilitation cost estimate and maintenance of security bond.	L(F3)	6.2.6, 10
Other Risks (Non-Phase Specific)	Redirection of creek and river flows.	No watercourses present in M(MO)L11.	NA	-
	Subsidence cracking.	No underground mining undertaken.	NA	-
	Interconnective cracking with underground workings	No underground mining undertaken / no historic underground workings present.	NA	-

4. REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

4.1 INTRODUCTION

Performance indicators and completion criteria provide a means by which the progress of rehabilitation can be measured to quantitatively demonstrate the successful achievement of a biophysical process, i.e., the standards that are to be met by successful rehabilitation.

4.2 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

Table 10 presents the rehabilitation objectives and rehabilitation completion criteria developed for the Quarry to achieve the nominated post mining land use goals and rehabilitation objectives.

It is noted that details of monitoring completed against completion criteria will be reported through the respective annual reporting and either a final report or separate relinquishment report.

4.3 REHABILITATION Objectives and Rehabilitation Completion Criteria – Stakeholder Consultation

Austral Bricks has maintained an open-door policy with the surrounding community throughout the life of the Bowral Brick Plant and Quarry. Specific and extensive community consultation was undertaken with all surrounding landholders as part of the preparation for the 1995 EIS for the Bowral Quarry Extension. Community consultation was also undertaken as part of the 2017 Kiln Upgrade Development Application. Notably, no objections were received for the, now approved, kiln upgrade. Since the lodgement of M(MO)L11 in early 2018, representatives of Austral Bricks have also met with owners of surrounding residential properties to explain the need for a mining lease covering the Bowral Quarry Extension.

Table 11 presents a summary of consultation undertaken with relevant stakeholders with regards to the rehabilitation objectives, rehabilitation completion criteria and proposed final land uses and landforms presented in this Plan. This table will be updated with each revision to this Plan to include details of further consultation with relevant and interested stakeholders.

Table 10
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Spatial Reference	Rehabilitation Objective	Indicator	Rehabilitation Completion Criteria	Validation Method
Other-Stabilised Groundcover	Active Mining Area (Open cut void)	K5	***Decommissioning Phase***			
			All infrastructure not suitable for lawful final land use will be removed.	Infrastructure not required for final land use removed.	All relevant infrastructure removed.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			Domains safe and free from contaminated and hazardous materials.	Contaminated land identified and remediated.	Contaminated land assessment indicates contamination acceptable for final land use.	Single occurrence visual contamination assessment and report prepared by a suitably qualified person.
			Landform Establishment Phase			
			Safe, stable, and non-polluting landform established.	Access to highwalls appropriately limited.	Suitable boundary fencing and bunding remain in place.	Relinquishment inspection & report, including photographs.
				Retained highwalls and stable.	Overall highwall slope no greater than 65° or as specified in a geotechnical review.	Plan(s) prepared by surveyor and photographs included in a relinquishment report. Geotechnical report (if required).
				Presence of erosion / sedimentation controls.	No 'active' erosion or sedimentation external to the extraction area is visible.	Inspection reports, including photographs.
			Growth Medium Development Phase			
			Establish soil / growing medium suitable for establishment of grass/groundcover with occasional trees.	Extraction floor deep ripped.	Ripped extraction floor.	Photographs of ripped areas.
				Growth medium depth	Minimum growth medium depth of 500mm over areas to be vegetated.	Small 'test pits' (5 per ha) and photographed to show final depth of growth medium.

Table 10 (Cont'd)
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Spatial Reference	Rehabilitation Objective	Indicator	Rehabilitation Completion Criteria	Validation Method
Other-Stabilised Groundcover (Cont'd)	Active Mining Area (Open cut void) (Cont'd)	K5 (Cont'd)	***Ecosystem Establishment Phase***			
			Establishment of a suitable groundcover with occasional trees.	The rehabilitated area does not constitute an erosion hazard.	Total projected foliage is greater than 70% cover.	Photographs and two monitoring plots. Monitoring to be completed by suitably experienced person and a short report prepared summarising performance of the rehabilitation against the completion criteria.
				Weeds are not competing or impacting on the rehabilitated area.	Revegetation monitoring confirms that 12 months following seeding, the non-target species (weeds) represent less than 30% of projected foliage cover.	
			Ecosystem Development Phase			
			Maintenance of a suitable pasture cover or other stabilising groundcover.	The rehabilitated area does not constitute an erosion hazard.	Total projected foliage cover remains greater than 70% cover.	Photographs and two monitoring plots. Monitoring to be completed by suitably experienced person and a short report prepared summarising performance of the rehabilitation against the completion criteria
				Weeds are not competing or impacting on rehabilitated area.	Revegetation monitoring confirms non-target species (weeds) represent less than 30% of projected foliage cover.	
					Any listed weeds have been controlled in accordance with State or local weed control orders.	
			Rehabilitation Completion / Relinquishment Phase			
			Relinquish lease and return of the security lodged over M(MO)L11.	Demonstrated compliance with all performance indicators.	Demonstrated compliance with all completion criteria.	Single occurrence relinquishment report prepared by a suitably qualified or experienced person(s) prior to relinquishment.

Table 11
Consultation Undertaken

Stakeholder	Consultation Activities
Illawarra Local Aboriginal Land Council	• Form of Consultation: Letter (email transmission). • Date: 11 July 2022. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 25 July 2022.
Wingecarribee Shire Council	• Form of Consultation: Letter (email transmission). • Date: 11 July 2022. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 25 July 2022.
Environmental Protection Authority (EPA)	• Form of Consultation: Letter (email transmission). • Date: 11 July 2022. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: – The EPA responded on 26 July 2022 – Response: The EPA has reviewed the documents and have no specific comments to make.
Mining, Exploration and Geoscience (MEG)	• Form of Consultation: Letter (email transmission). • Date: 11 July 2022. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 25 July 2022.
Resources Regulator	• Form of Consultation: Letter (email transmission). • Date: 11 July 2022. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: – The Resources Regulator responded on 03 August 2022 – Response: The Resources Regulator will review, assess and determine the rehabilitation objectives statement and rehabilitation completion criteria once submitted for approval.
Landholders: Ernest Benedict	• Form of Consultation: Letter (email transmission). • Date: 11 July 2022. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: – Phillip Wythes responded on 13 July 2022 – Response: No comments other than it is a logical assessment.

5. FINAL LANDFORM AND REHABILITATION PLAN

5.1 FINAL LANDFORM AND REHABILITATION PLAN – ELECTRONIC COPY

Plan 1 presents the final landform features for the RMP Area and **Plan 2** presents the final landform contours for the RMP Area.

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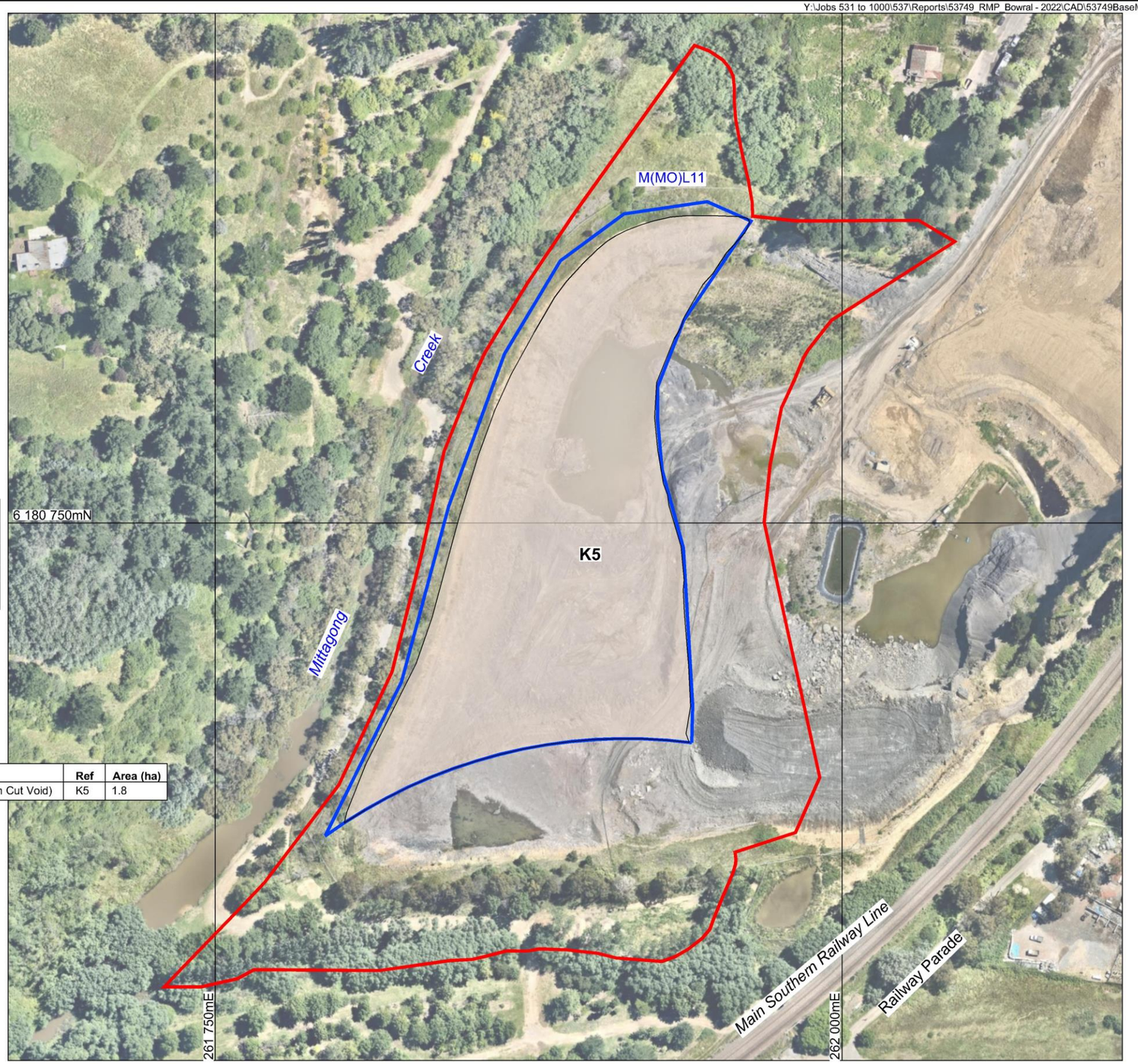
Mine Name	Austral Brick - Bowral Quarry Extension
Plan Name	Plan 1 Final Landform Features
Anticipated Year of Relinquishment	2025
Date Plan Created	21 April 2023
Data Theme Submission ID Numbers	

REFERENCE
Mining Lease Boundary
Quarry Site Boundary
Final Land Use Domain
Other - Stabilised Groundcover

Final Land Use Domain	Mine Domain	Ref	Area (ha)
Other - Stabilised Groundcover	Active Mining Area (Open Cut Void)	K5	1.8



SCALE 1:1 800 (A3)

20 0 20 40 60 80 100 m

Base Photo Source: Nearmap 21 December 2021

Plan 1
FINAL LANDFORM FEATURES

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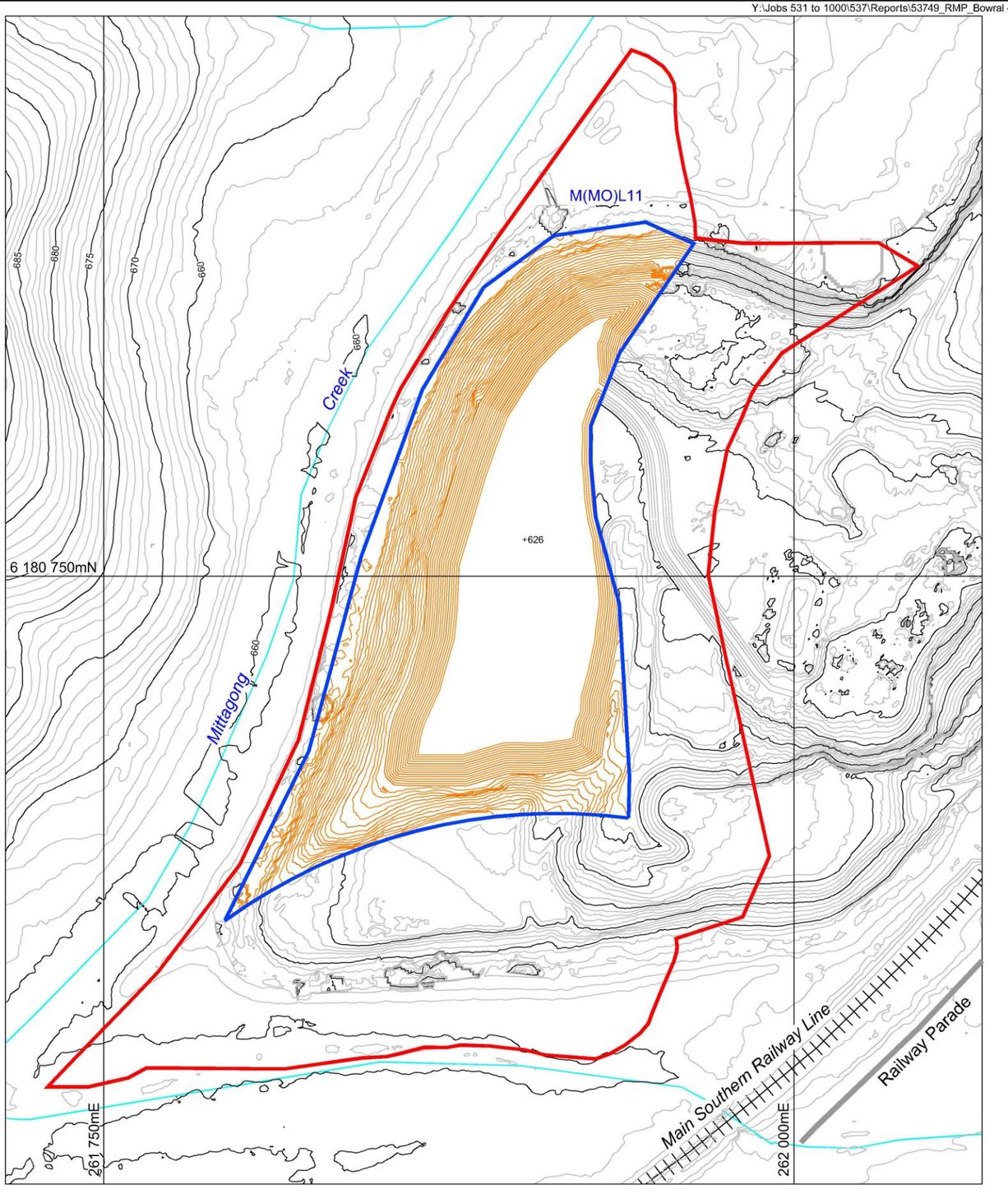
Mine Name	Austral Brick - Bowral Quarry Extension
Plan Name	Plan 2 Final Landform Contours
Anticipated Year of Relinquishment	2025
Date Plan Created	21 April 2023
Data Theme Submission ID Numbers	



REFERENCE
- Mining Lease Boundary
- Quarry Site Boundary
- Watercourse / Drainage Line
- Existing Contour (mAHD)(Interval = 1m)
- Final Landform Contour

SCALE 1:1 800 (A3)

20 0 20 40 60 80 100 m

Base Contour Source: Geoscience Australia - May 2014

Plan 2
FINAL LANDFORM CONTOURS

RWCorkery&co

6. REHABILITATION IMPLEMENTATION

6.1 LIFE OF MINE REHABILITATION SCHEDULE

Based on current production rates and the extent of known geological deposits, it is anticipated that extraction operations within the Quarry Site will be completed by 2025. It is noted that the rehabilitation of the Mittagong Creek, located west of M(MO)L11, was completed successfully in the late 1990s and has not required any ongoing maintenance to date. Vegetation screening around the boundary of the Quarry Site has also previously been planted and has successfully established without any further maintenance requirements other than spot spraying of weeds.

Plans 3 and **4** present the indicative rehabilitation schedule for the RMP Area by depicting those areas which would be rehabilitated until Quarry Relinquishment. In summary, due to the relatively small operational area within RMP Area and lack of ancillary infrastructure, the proposed rehabilitation of the RMP Area will occur following cessation of extraction operations within M(MO)L11. However, it is noted that, as operations progress, Austral Bricks will progressively check the terminal highwalls to ensure that they have been formed correctly and present no obvious safety or stability concern.

6.2 PHASES OF REHABILITATION AND GENERAL METHODOLOGIES

6.2.1 Active Mining Phase

6.2.1.1 Soils and Materials

A Soils Assessment for the Quarry Site was undertaken by AGC Woodward-Clyde Pty Limited (1995). Site investigations identified that the topsoils are predominantly dark grey clay loams with a friable structure during low soil moisture periods and more plastic in suitable conditions. The subsoils comprise a mixture of colluvial and alluvial floodplain material and are more silty with ironstone and gravel fragments. These soils were deemed suitable for rehabilitation as they are fertile and have a pH of 5.6 with low salinity (AGC Woodward-Clyde, 1995).

Given that no further soil stripping is required, there are no specific soil stripping or handling risks anticipated. It is noted that the current stockpile location is not subject to any substantial run-on water and any runoff reports to the Quarry sump.

A materials deficit is not anticipated for rehabilitation activities. Approximately 21,000m^3 of soil material and clay has been stockpiled in the northern area of the Quarry Site adjacent to the north-eastern boundary of M(MO)L11. The biological viability of the topsoil has been retained as much as possible by limiting the height of stored topsoil to less than 1.5m. Given the clay nature and long-residence time of the existing soil stockpile, provisions have been made in the Rehabilitation Cost Estimate for application of both gypsum (for soil structure) and fertiliser during respreading to enhance the establishment of vegetation.

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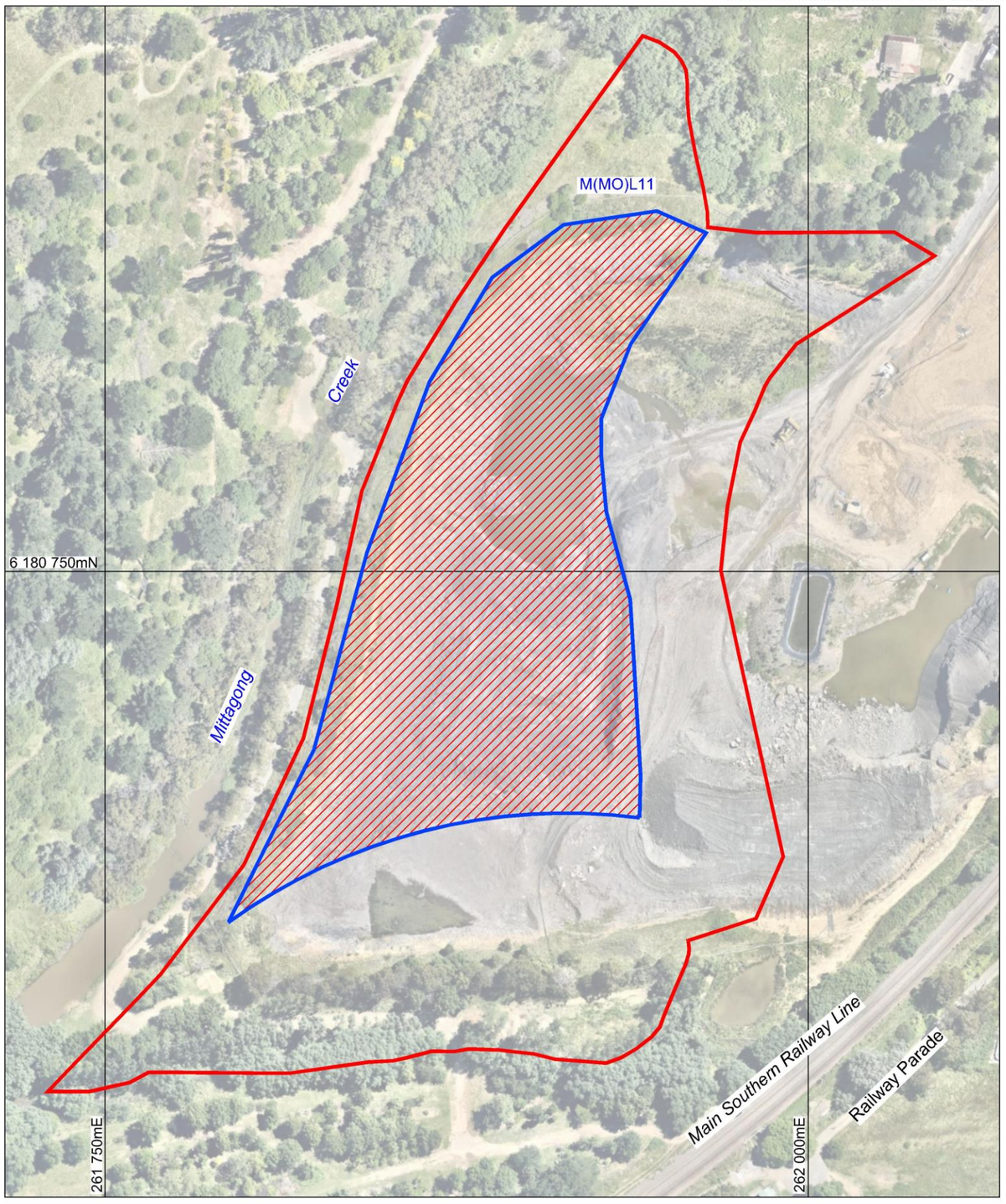

REFERENCE
Mining Lease Boundary
Quarry Site Boundary
Rehabilitation Forecast
Forecast Disturbance
Forecast Land Prepared for Rehabilitation
Ecosystem and Land Use Establishment

Mine Name	Austral Brick - Bowral Quarry Extension
Plan Name	Plan 3 Progressive Rehabilitation Schedule - Year 3
Anticipated Year of Relinquishment	2025
Date Plan Created	21 April 2023
Data Theme Submission ID Numbers	

SCALE 1:1 800 (A3)

20 0 20 40 60 80 100 m

Base Photo Source: Nearmap 21 December 2021

Plan 3
PROGRESSIVE REHABILITATION
SCHEDULE - YEAR 3

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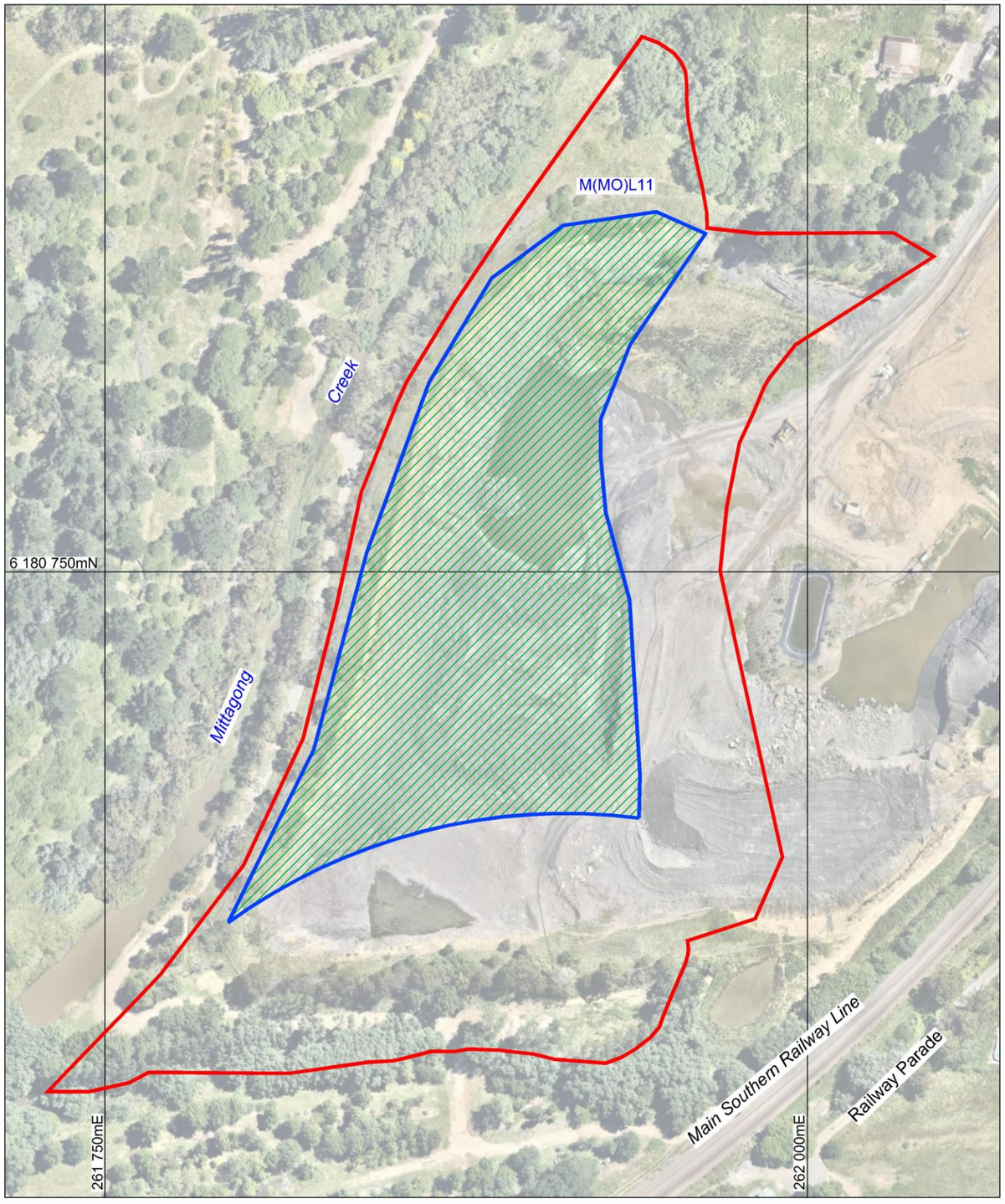

REFERENCE
Mining Lease Boundary
Quarry Site Boundary
Rehabilitation Forecast
Forecast Disturbance
Forecast Land Prepared for Rehabilitation
Ecosystem and Land Use Establishment

Mine Name	Austral Brick - Bowral Quarry Extension
Plan Name	Plan 4 Progressive Rehabilitation Schedule - Year 7
Anticipated Year of Relinquishment	2025
Date Plan Created	20 April 2023
Data Theme Submission ID Numbers	

SCALE 1:1 800 (A3)

20 0 20 40 60 80 100 m

Base Photo Source: Nearmap 21 December 2021

Plan 4
PROGRESSIVE REHABILITATION
SCHEDULE - YEAR 7

6.2.1.2 Flora

A flora and fauna survey of the Quarry Site was undertaken by Kevin Mills and Associates Pty Limited in April 1995. In summary, a large amount of introduced species (weeds) were identified as occurring within the Quarry Site and required management. No rare or threatened species were identified. As such, the risk to rehabilitation pertaining to specific plant communities or species is considered to be low.

As noted in Section 6.1 rehabilitation of Mittagong Creek, located west of the RMP Area, was completed successfully in the late 1990s and has not required any ongoing maintenance to date. Vegetation screening around the boundary of the Quarry Site has also previously been planted and has successfully established without any further maintenance requirements other than spot spraying of weeds.

The entirety of the RMP Area has previously been cleared and no further vegetation clearing is required or planned to be undertaken. Therefore, no specific management measures are currently deemed necessary.

6.2.1.3 Fauna

No endangered ecological communities, threatened fauna species or populations have been identified within the RMP Area or broader Quarry Site. Consequently, no species-specific fauna rehabilitation objectives have been established and no specific risk controls are required.

Pest management and control measures to be implemented as part of rehabilitation at the Quarry Site are provided in Sections 6.2.5 and 6.2.6.2.

6.2.1.4 Rock / Overburden Emplacement

No overburden material is expected to be encountered and therefore no overburden emplacement area is required. However, in the event that some of the raw materials are not suitable for brick manufacture, these will be spread over completed sections of the extraction area and later covered with the respread soil and clay material prior to revegetation.

6.2.1.5 Waste Management

Negligible wastes will be generated within the RMP Area or broader Quarry Site given all amenities and workshop facilities are located within the Bowral Brick Plant. The only wastes likely to be produced within the Quarry include the following.

- General wastes produced by the contactor's employees – e.g. food scraps, drink and food packaging will be collected and placed within the appropriate recycling or general waste bins located at the Bowral Brick Plant.
- Wastes such as greases, oils, filters, tyres and batteries may be generated in the event unscheduled maintenance is required to be undertaken on site. These will be removed from site by the earthmoving contractor for appropriate off-site disposal. Scheduled maintenance of mobile equipment will be undertaken off site.

There are no risks associated with waste management and no further controls are required.

6.2.1.6 Geology and Geochemistry

The resource targeted within the RMP Area is the Ashfield Shale which has a weathered profile up to 3.8m thick, below which the shale is unweathered or fresh. Locally, the shale occurs as four 'units' comprising dark grey siltstones and laminites with occasional thin sandstone units particularly in the southern side of the RMP Area.

The geological and geochemical properties of the sandstone/shale resource within the RMP Area and broader Quarry Site is well understood. No environmental or geochemical constraints from the properties of the material are known to occur and therefore no risks to rehabilitation are expected to occur.

6.2.1.7 Material Prone to Spontaneous Combustion

No material within the RMP Area or broader Quarry Site is prone to spontaneous combustion. Hence, no specific management measures are necessary.

6.2.1.8 Material Prone to Generating Acid Mine Drainage

As no material within the RMP Area or broader Quarry Site is likely to generate acid mine drainage, no management measures related to acid mine drainage are required.

6.2.1.9 Ore Beneficiation Waste Management (Reject and Tailings Disposal)

No process residues or tailings will be generated from extraction operations, therefore, no management measures related to rejects or tailings are required.

6.2.1.10 Erosion and Sediment Control

The greatest potential risk to water quality attributable to the Quarry is the flow of sediment-laden runoff. However, the RMP Area and broader Quarry Site is internally draining with runoff reporting to the sump located within the floor of the extraction area. Therefore, there is minimal risk of sediment-laden runoff leaving the Quarry Site and entering surrounding watercourses. It is noted that no off-site discharges have been required to date.

Biological resources will continue to be effectively managed with silt fencing. Biological viability of the topsoil will be retained as much as possible by limiting the height of stored topsoil to less than 1.5m.

6.2.1.11 Ongoing Management of Biological Resources for Use in Rehabilitation

The following management measures will continue to be implemented to manage biological resources within the Quarry Site.

- Construct growth medium stockpiles no more than 1.5m high, with side slopes no more than 1:3 (V:H) and stabilised immediately with suitable pasture grasses.

- Prevent vehicles from driving on growth medium stockpiles to limit compaction.
- Manage weeds on the stockpiles to minimise the potential for build-up of a weed seed bank on the stockpile.
- Testing of growth medium following spreading and prior to application of seed to confirm rates of gypsum and/or other soil ameliorants required.
- Implement equipment delivery protocol to ensure equipment does not import weeds.

6.2.1.12 Mine Subsidence

As extraction will continue to be undertaken by open cut methods, and no previous underground mining has occurred within the immediate area, no specific management measures are necessary.

6.2.1.13 Management of Potential Cultural and Heritage Issues

The Illawarra Aboriginal Land Council (IALC) has been involved during the previous soil stripping stages of construction. As no additional soil stripping is planned or required, and all planned activities will occur in previously disturbed areas, risks to rehabilitation associated with Aboriginal heritage are considered to be low and no specific risk controls have been identified beyond standard unexpected finds protocol.

Furthermore, no historic heritage is present within the RMP Area or broader Quarry Site and does not require specific management measures.

6.2.1.14 Exploration Activities

No significant exploration activities are planned for the RMP Area during the remaining life of the Quarry. Minor drilling operations may occur for quality control purposes to more accurately define local variations within the clay/shale resource. Any exploration-related disturbance outside of the current limit of disturbance will be rehabilitated in accordance with the *Exploration Code of Practice – Rehabilitation* published by the NSW Resources Regulator.

As a result, risks to rehabilitation associated with exploration activities are considered to be low and no specific risk controls have been identified.

6.2.2 Decommissioning

6.2.2.1 Site Security

Existing site security measures will be maintained during decommissioning and active rehabilitation operations within the RMP Area unless they are required to be modified for rehabilitation purposes. No public access to the operational area of the RMP Area is currently permitted. Access to the RMP Area is restricted by security fencing. Warning signs are also in

place around the boundary of the Quarry Site. Internal safety and security infrastructure is provided by bunding of roads and accessways near sensitive areas such as operational voids.

Existing security fencing that is to be retained will be structurally assessed and repaired or replaced where necessary. Temporary security bunds, fencing and/or signage will also be used where practicable during decommissioning, with the extent and location of security infrastructure reviewed on a regular basis.

During decommissioning, additional security infrastructure may be installed as required.

6.2.2.2 Infrastructure to be Removed of Demolished

As all significant infrastructure associated with the Quarry is located outside of the RMP Area (i.e., Bowral Brick Plant), there is no specific formal requirement for the decommissioning of built infrastructure.

As such, no demolition works are applicable. The only activities required to be undertaken will be the removal of mobile equipment from the RMP Area. No other services or infrastructure are present or require removal.

The removal of all equipment and any wastes will be in accordance with established protocols as identified in Section 6.2.1.5.

6.2.2.3 Buildings, Structures and Fixed Plant to be Retained

No Quarry-related infrastructure would be retained, with the exception of bunding and security fencing.

Short term risks associated with the retention of nominated infrastructure are low as these features have primarily been retained for safety purposes.

6.2.2.4 Management of Carbonaceous / Contaminated Material

Extracted material from the Quarry does not contain high enough levels of carbonaceous material to be considered contaminated or contaminating material. The extracted material is temporarily stockpiled and removed from the site within a reasonable timeframe minimising the possibility of contaminated material polluting the site. No known contaminated land is present within the Quarry Site.

A contamination assessment will be undertaken by a suitably qualified or experienced person prior to relinquishment, with any identified contaminated material excavated and transferred to a licensed facility.

6.2.2.5 Hazardous Materials Management

Regular visual inspections of operational environments during and following rehabilitation operations will be used to identify potential or actual risk from the use of hazardous materials within the Quarry Site for Quarry-related purposes.

No hazardous materials are proposed to be retained following the cessation of mining and rehabilitation operations. A hazardous materials audit of the Quarry Site will be conducted by a suitably qualified expert prior to the commencement of decommissioning activities to identify all potentially hazardous materials and any associated risks, including relevant handling and disposal practices.

6.2.2.6 Underground Infrastructure

No previous underground mining has occurred within the immediate area and therefore no specific risk controls are required.

6.2.3 Landform Establishment

6.2.3.1 Water Management Infrastructure

As identified on **Plan 1**, no water management infrastructure is proposed to be retained as part of the final landform and as such, no specific water management controls are necessary.

6.2.3.2 Final Landform Construction: General Requirements

As shown on **Plan 1**, the RMP Area will be rehabilitated to achieve a stabilised landform suitable for subsequent development (in accordance with separate development consent) or as a passive open space. **Plan 2** presents the final landform contours for the RMP Area. In summary, the final landform will include the following.

- The final void is to be retained.
- The floor of the Extraction Area will be shaped and ripped to provide suitable grades (e.g. 1:3 (V:H)) and surface substrate for the application of growth medium.
- The security fencing will be retained, along with warning signs.
- A safety bund will be retained on crest of the Extraction Area to prevent inadvertent access to the highwall and to reduce visual amenity impacts.

Following completion of rehabilitation operations, it is not expected that these areas will present any specific geotechnical or geochemical risks. Additionally, it is not expected that these areas will require specific erosion and sediment control measures following the establishment of vegetation.

6.2.3.3 Final Landform Construction: Reject Emplacement Areas and Tailings Dams

No reject emplacement area or tailings dams are approved for the RMP Area or broader Quarry Site. No processing is undertaken within the Quarry Site and therefore no tailings, fines or other processing residues are located within the Quarry Site.

6.2.3.4 Final Landform Construction: Final Voids, Highwalls and Low Walls

Key Design Features

As shown on **Plan 2**, the final landform will include the following.

- A free-draining stabilized Extraction Area approximately 1.8ha in size.
- A flat to gently east sloping floor with an elevation that varies from 662m AHD in the western section to 630m AHD in the eastern section.
- A safety bund around the crest of the Extraction Area to prevent inadvertent access to the highwall.

Water Licencing

The final Extraction Area will not intersect groundwater and will be free draining. As a result, no licences or approvals under the *Water Management Act 2000* will be required.

6.2.3.5 Construction of Creek / River Diversion Works

No creek or river diversion works will be required during the rehabilitation of the RMP Area.

6.2.4 Growth Medium Development

The growth medium development phase will principally involve the re-spreading of previously stripped and stockpiled soil and clay material following completion of extraction.

In summary, the following procedures will be implemented prior to the commencement of the growth medium development phase.

- Confirm the volume of growth medium stockpiled within the Quarry Site to ensure that the minimum required volume is available.
- Engage a suitably experienced or qualified person to assess the condition of the growth medium and provide recommendations in relation to ameliorants required.
- Establish one or more trial rehabilitation sites to test preferred rehabilitation methodologies and determine the preferred methodology.

The following procedures will be implemented during growth medium development.

- Undertake growth medium development in late summer to mid-autumn.
- Light ripping of growth medium across contours to key in substrate to permit root development, reduce surface runoff velocities and retention moisture and seed.

- Spread a minimum of 500mm of growth medium across the area to be rehabilitated.
- Apply required ameliorants as recommended.
- Implement weed control.

Topsoil will be applied using load and haul or direct placement methods within rehabilitation areas and prior to spreading.

Weed control during growth medium development will consist of inspections and control of on-site weeds prior to and during placement of growth medium. This will include visual inspections stockpiled material. All vehicles and equipment used during rehabilitation will be inspected for weed material prior to commencement of operations.

Seasonal and local meteorological conditions may present a medium risk to rehabilitation and will be monitored to identify conditions which may result in delaying vegetation establishment (e.g. drought conditions). Land preparation and growth medium spreading activities will only be undertaken where conditions are predicted to be favourable (i.e. average or above average annual rainfall) to the establishment of vegetation.

If vegetation establishment is delayed due to unfavourable meteorological conditions, additional management measures may be undertaken. This may include the application of a surface stabiliser, (e.g. polymer-based sprays) or supplementary watering using a water cart.

6.2.5 Ecosystem and Land Use Establishment

The ecosystem and land use establishment phase occurs once monitoring illustrates the achievement of a self-sustaining vegetation cover on the final landform.

Prior to application of seed, testing of the growth medium will be undertaken to determine the most appropriate species and the need for fertiliser or other ameliorants. Review of current and forecast weather conditions will also be undertaken to determine the appropriate species and application methods. A suitably experienced contractor would be utilised to undertake the testing and supply the appropriate seed mix.

Areas recently revegetated may, if required, be watered regularly until an effective cover has been properly established and/or supplementary watering is no longer required. Further application of seed and fertiliser might be necessary later in areas of minor soil erosion and/or inadequate vegetation establishment.

Frequency of weed and pest monitoring and control operations may be increased prior to, during, and following revegetation operations to reduce as far as practicable competition from weed species and negative impacts of herbivory.

Where practicable, foot and vehicular traffic will be kept away from any such rehabilitated areas. Restriction of public access to the Quarry Site will continue to be maintained throughout revegetation.

6.2.6 Ecosystem and Land Use Development

The ecosystem and land use development phase occurs once monitoring illustrates the achievement of relevant performance indicators with respect to ecosystem development and the stability and function of the final open void and safety bund. A geotechnical assessment will be undertaken prior to relinquishment and release of the security bond.

6.2.6.1 Erosion, Drainage, and General Infrastructure

Regular inspections of erosion and sediment control and security infrastructure during the Ecosystem and Land Use Development phase will be an important control during a relatively increased risk stage for ecosystem development. Information on the anticipated erosion and sediment controls during rehabilitation is provided in Section 6.2.1.10. Information on security infrastructure is provided in Sections 6.2.2.1 and 6.2.2.3.

Erosion and sedimentation risk will be elevated until the target ground cover criteria are reached. During this period, regular inspections will be undertaken to assess the performance of the existing controls, and identify potential remedial or additional actions, if required.

Inspections and maintenance of access tracks, and temporary and permanent fencing will be undertaken to enable safe and secure access to the Quarry Site during revegetation, monitoring and maintenance. Monitoring and maintenance of fences will also assist in protecting at-risk areas from damage from stock and vehicles, as far as practicable.

6.2.6.2 Weed and Pest Management and Monitoring

The following procedures will be implemented to manage and monitor weeds and pests within the rehabilitated area.

- An overview of any weed and pest management measures implemented during the reporting period.
- A list of weed species identified during rehabilitation monitoring and any other inspections completed at the Quarry Site.
- Details of any pests or evidence of grazer damage to revegetated areas identified during inspections, including a plan showing distribution within the Quarry Site, where appropriate.
- Recommendations for specific weed and pest management measures to be implemented during the subsequent 12-month period.

6.2.6.3 Environmental Management and Monitoring Program

Surface Water

As no water management structures will be retained, no monitoring of surface water will be required within the RMP Area.

Groundwater

The extraction depth is to remain at least 2m above the top of the interface between the base of the Ashfield Shale and the underlying Mittagong Sandstone to limit / avoid groundwater inflows. Groundwater is not expected to be intercepted, therefore no specific monitoring is required.

Land Capability

The rehabilitated area will be fenced to exclude stock and control grazing to manage and monitor land capability within the rehabilitated area.

Revegetation

Vegetation establishment activities within the RMP Area, including growth medium spreading and seeding operations, will occur only where favourable climatic conditions are expected to occur. Consequently, prolonged drought periods may result in extended delays to these rehabilitation conditions. Should extended drought periods occur at the Quarry Site, rehabilitation schedules will be updated to prioritise other rehabilitation activities and opportunities to prepare additional areas for revegetation once favourable conditions return will be investigated.

Seed to be used for revegetation activities will be sourced from around the Quarry Site or obtained from a local, reputable nursery or seed wholesaler and until required will be stored off-site in a cool, dry place (preferably the source nursery or wholesaler).

In the event that monitoring identifies that ecosystem and land use development is not progressing towards the nominated completion criteria, the advice of a suitably qualified rehabilitation expert or agronomist would be sought and recommended actions would be implemented as required. This may include revegetation of sections of the rehabilitated area when the initial ecosystem establishment operations have not been successful.

The results of rehabilitation monitoring, as well as records of rehabilitation activities will be included in the Annual Rehabilitation Report.

Land Management and Infrastructure Maintenance

Site infrastructure including security and stock-proof fencing, safety bunds and signage will be inspected on an annual basis.

The results of infrastructure inspections as well as records of annual infrastructure maintenance activities will be included as part of an Annual Rehabilitation Report until relinquishment.

6.3 REHABILITATION OF AREAS AFFECTED BY SUBSIDENCE

As extraction will continue to be undertaken by open cut methods until the end of Quarry life, and no previous underground mining has occurred within the immediate area, no specific management measures are necessary.

7. REHABILITATION QUALITY ASSURANCE

The following section details the rehabilitation quality assurance process for the Quarry in accordance with *Guideline 3: Rehabilitation Controls (July 2021)*. The rehabilitation quality assurance checklist included in this section is intended to be used as an indicative guide for rehabilitation operation managers and practitioners responsible for the rehabilitation of the Quarry Site. It is anticipated that rehabilitation operations within the RMP Area will occur following cessation of extraction operations at the Quarry Site.

As part of the rehabilitation quality assurance process, relevant records and documentation will be recorded in a Rehabilitation Quality Assurance Register and reported as part of the Annual Rehabilitation Report. The Rehabilitation Quality Assurance Register will, as a minimum, include a copy of the checklists presented in **Appendix 1** as well as a compliance register used to assess the status of compliance with requirements under relevant development consents, leases and licences. The Rehabilitation Quality Assurance Register will be maintained, reviewed and refined by the Raw Materials and Mining Manager and/or Environment Manager to ensure that it is reflective of current rehabilitation progress, risk controls implemented at the Quarry Site and the outcomes of any updated rehabilitation risk assessments.

Table 12 outlines key responsibilities for the Company and Quarry personnel with regards to rehabilitation operations.

Table 12
Key Roles and Responsibilities

Role	Responsibility
Raw Materials and Mining Manager / Statutory Quarry Manager	• Comply with applicable laws, regulations, licences and approvals. • Ensure all contractors, sub-contractors and service personnel are appropriately qualified and/or licenced to undertake the required work. • Ensure that appropriate resources are available to site management and personnel to enable the implementation of this Plan.
Environment Manager / Site Supervisor	• Ensure that the Rehabilitation Quality Assurance register is maintained and up to date based on site activities. • Ensure that the workforce is aware of relevant development and rehabilitation risks and management and mitigation measures, including any additional corrective and/or preventative measures. • Ensure that the rehabilitation quality assurance process outlined in Section 7 is implemented as required. • Ensure that the documentation and recording of rehabilitation risk controls occurs within a suitable timeframe. • Ensure that specialist contractors adhere to the guidelines and methodologies outlined in this RMP where required, or that the guidelines and methodologies in this Plan are updated to reflect those employed at the Quarry Site.
All Quarry Personnel	• Follow direction provided by the Environment Manager / Site Supervisor. • Notify the Environment Manager / Site Supervisor in the event that uncontrolled rehabilitation risks are identified at the Quarry.

8. REHABILITATION MONITORING PROGRAM

8.1 ANALOGUE SITE BASELINE MONITORING

As noted in Section 6.1, rehabilitation of Mittagong Creek, located west of M(MO)L11, was completed successfully in the late 1990s and has not required any ongoing maintenance to date. Vegetation screening around the boundary of the Quarry Site has also previously been planted and has successfully established without any further maintenance requirements other than spot spraying of weeds.

Considering the above, based on Austral Bricks' previous and ongoing experience with rehabilitation, the condition of vegetation adjacent to the RMP Area and the characteristics of the proposed final landform, the establishment of stabilised groundcover is considered by Austral Bricks to be unlikely to present a level of risk that would warrant a specific program of monitoring of analogue sites. However, if required, comparison of groundcover within rehabilitation areas will be made with vegetated areas adjacent the RMP Area.

8.2 REHABILITATION ESTABLISHMENT MONITORING

Rehabilitation monitoring will focus upon determining whether progress towards achieving the relevant performance indicators and completion and relinquishment criteria presented in Section 4 and **Table 10** is being achieved. This will consist of regular visual inspections until such time that total projected foliage within rehabilitated areas is greater than 70% or higher than those recorded in relevant analogue sites, namely vegetated areas adjacent to the RMP Area.

8.3 MEASURING PERFORMANCE AGAINST REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

Details of validation methods and indicators to be employed during monitoring to assess performance against the rehabilitation completion criteria for the RMP Area are provided in Section 4.1 and **Table 10**.

The Rehabilitation Quality Assurance Register will be used to record details of any additional management measures or risk controls implemented during the ecosystem development phase in response to the analysis of rehabilitation monitoring results.

An Annual Rehabilitation Report and Forward Program will be prepared for the Quarry as required under *Condition 13* of M(MO)L7 as specified by the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021*. As part of the Annual Rehabilitation Report and Forward Program, Austral Bricks will also validate and certify that the security deposit covers the estimated cost of rehabilitation liabilities each year.

9. REHABILITATION RESEARCH AND TRIALS

9.1 CURRENT REHABILITATION RESEARCH AND TRIALS

No rehabilitation trials are currently taken within the RMP Area as the rehabilitation techniques are based principally upon engineering and water management principles which are well understood. The relevant techniques have previously been used at other extraction sites on land owned by Austral Bricks that was used for clay/shale extraction.

9.2 FUTURE REHABILITATION RESEARCH AND TRIALS

Given that the proposed final landform will be revegetated to stabilised pastoral cover prior to future industrial / commercial land use or use as passive open space, future rehabilitation research and trials will not be required.

10. INTERVENTION AND ADAPTIVE MANAGEMENT

Table 13 presents the Trigger Action Response Plan for each of the rehabilitation threats and potential adverse outcomes identified in the *Rehabilitation Risk Assessment* (see Section 3) as having a risk rating of moderate or above.

Table 13
Trigger Action Response Plan

Rehabilitation Risk	Potential Adverse Outcome	Trigger	Action / Response
Landform Establishment Phase of Rehabilitation			
Uncontrolled public access to highwalls.	Public access to highwalls poses unacceptable risk to public safety.	Rehabilitation monitoring identifies potential for public access, or access by unauthorised persons is identified.	If necessary, additional security measures to be installed including fencing, suitable signage, additional bunding, etc.
Ecosystem and Land Use Development Phase of Rehabilitation			
Adverse weather and climatic influences (e.g. drought; intense rainfall events; bushfire and climate change).	Delay to or failure of vegetation establishment.	Visual monitoring during and/or after adverse weather/climatic events identifies limited opportunities for progressive rehabilitation or negative effects on vegetation establishment	Review of rehabilitation schedule and update to forward schedule. Rehabilitation areas are assessed for damage and necessary repairs and/or revegetation efforts are employed as required.

11. REVIEW AND IMPLEMENTATION

11.1 REVIEW OF THE RMP

Table 14 presents the triggers for reviewing the Plan.

Table 14
Rehabilitation Management Plan Review Triggers

Trigger	Review
Request from the Resources Regulator or other relevant government agency to review the Plan.	As required by any notice
Modification of an existing development consent.	Within 3 months
Modification of an existing Mining Lease.	Within 3 months
Preparation of a revised Rehabilitation Risk Assessment.	Within 1 month
Submission of each Annual Rehabilitation Report and Forward Program.	Within 1 month
Consultation with relevant stakeholders with significant implications for the final land use and/or final landform.	Within 3 months
Consultation with relevant stakeholders with significant implications for rehabilitation objectives and/or rehabilitation completion criteria.	Within 3 months

In addition to reviews of this Plan as outlined in **Table 16**, a Rehabilitation Quality Assurance Register will be developed and regularly maintained to ensure that mining and rehabilitation activities within the RMP Area and broader Quarry Site are being conducted in accordance with this Plan. The Rehabilitation Quality Assurance Register will include the checklist presented as **Appendix 1** as well as a compliance register used to assess the status of compliance with requirements under relevant development consents, leases and licences. Additionally, the Rehabilitation Quality Assurance Register will include:

- records of any contaminated water or hazardous materials collected at the Quarry Site and disposed of off site;
- the latest map of any contamination at the Quarry Site; and
- details of any additional rehabilitation measures and/or risk controls implemented within individual subdomains during rehabilitation operations.

12. REFERENCES

R.W. Corkery & Co. Pty. Limited (RWC) (1995). *Environmental Impact Statement for the Bowral Quarry Extension.*

AGC Woodward-Clyde Pty Limited (1995). *Soils Assessment.*

Appendix 1

Rehabilitation Risk Control Checklist

(Total No. of pages including blank pages = 10)

Table A
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
Phase: Active Mining (Production)	
Soil and Materials Management	
Develop and maintain a materials and soils balance and database to include the following information: • volume of material, topsoil and subsoil stockpiled. • location, age and quality of stockpiles. • chronology of treatments (e.g. weed control, application of cover crop) undertaken on the stockpile. • volume of material, topsoil and subsoil required for application to current disturbance areas. • an estimate of the volume of suitable alternative material required to be imported onto site to supplement potential material, topsoil and subsoil deficits. • record data on the location of the stockpiled material including date stripped, source area, indicative volume, pre-strip plant community type. Information is to be stored using site-based GIS.	
Locate soil stockpiles away from traffic areas and at an appropriate distance from watercourses.	
Locate soil stockpiles on level or gently sloping areas to minimise the potential for erosion and soil loss.	
Limit soil stockpiles to less than two to three metres high and set out in windrows to maximise surface exposure and biological activity.	
Install appropriate erosion, dust and sediment controls around soil stockpiles to reduce the potential for soil loss.	
Appropriately sign-post soil stockpiles to identify the area and minimise the potential for unauthorised use or disturbance.	
Monitor and control weed growth on soil stockpiles.	
Materials Handling	
Develop and implement an operational and rehabilitation program to ensure geochemical and geotechnical long-term stability.	
Develop and maintain a register of any contaminated sites, waste landfill sites and bioremediation areas and where they are located.	

Table A (Cont'd)
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
Phase: Active Mining (Production) (Cont'd)	
Environmental Monitoring	
Develop, maintain and document an environmental monitoring program for vegetation establishment.	
Site Services	
Electricity services to any infrastructure scheduled for demolition will be removed before the start of building demolition works.	
Telecommunications, water supply and other services will also be disconnected and removed where practical.	
Where services are buried (e.g. pipelines, cables) and their retrieval may lead to further disturbance, the infrastructure may be left in situ (subject to any necessary approvals or agreements) if they don't pose constraints to the final land use. In this situation, the location of the services will be surveyed and marked on the site plan and a suitable caveat developed to provide that they are readily identifiable for future land holders.	
Management of Contaminated Material	
Any contaminated material should be managed in accordance with relevant guidelines under the Contaminated Land Management Act 1997. Records will need to be retained to validate that contamination has been remediated or managed effectively to meet the final land use rehabilitation objectives and rehabilitation completion criteria.	
Hazardous Materials Management	
All remaining hydrocarbons such as diesel and lubricants and other hazardous materials will be either used or discarded by an authorised waste contractor.	
Removal of any oily water treatment system, following the demolition of the workshop and associated facilities.	
Storage tanks of hazardous materials will be removed and, depending on their condition, either sold or disposed at an authorised facility.	
Specific consideration should be given to managing asbestos materials, radiation devices, hydrocarbon as well as other contaminated substances/materials/soils in accordance with relevant guidelines that can be found on the Environment Protection Authority's website.	

Table A (Cont'd)
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
Phase: Active Mining (Production) (Cont'd)	
At the Completion of Exploration Activity	
Remove and lawfully dispose of all grid pegs, tags, sample bags, flagging tape, drill chips and other waste.	
Remove all drill core.	
Survey, seal and rehabilitate all boreholes.	
Remove and lawfully dispose of all plant and equipment (including surface pipelines) and imported fill material.	
Undertake a visual contamination assessment where potential pollution generation activities have occurred (e.g. hazardous substance storage, saline water storage) to identify potential signs of contamination. Where contamination is present, develop and implement a contamination remediation program to ensure that the rehabilitation objectives and rehabilitation completion criteria for the intended post-exploration land use are met.	
Phase: Landform Establishment	
Characterisation of Waste Materials (Geochemical and Geotechnical)	
Characterisation analysis is conducted and geochemical and physical properties of waste materials are understood. Consideration should be given to the following as relevant: • adopt an appropriate geological model (typically block model for metalliferous mines) to determine source of problematic material. • collect rehabilitation material erosion data for calibration of landform stability models. • establish an ongoing sampling program to identify potential changes in material properties. • develop a strategy / procedure/ management plan for selective handling and management of problematic materials (e.g. potential acid forming material, spontaneous combustion). • ensure material handling field practices are in accordance with relevant plan/procedure.	

Table A (Cont'd)
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
Phase: Landform Establishment (Production) (Cont'd)	
Landform Design/Shape	
The final landform design should build on the minimum requirements of the development consent and, wherever practicable, take into account the following: • a landform that is commensurate with surrounding natural landform and, where appropriate, incorporates geomorphic design principles. • appropriate use of landform design stability principles of reduced slope length and surface water management structures. • use of erosion models to optimise the landform design and to show where high-risk erosion areas are likely to occur (and to nominate how risk controls will be incorporated into the final landform design to appropriately treat these risks).	
Develop specific strategies (e.g. selective handling and placement) for materials management to address potential geochemical constraints for rehabilitation (e.g. need to application of gypsum) based on sampling and testing of overburden/interburden materials used to construct the final landform.	
Develop specific strategies (e.g. selective handling and placement) to address any potential geotechnical issues associated with the final landform, including seepage pathways into groundwater and surface waters, for example saline seepage. Based on risk, these strategies may need to be developed in consideration of geotechnical studies.	
Final Voids	
Where a final void is approved to remain as part of the final landform (e.g. by the development consent), the design and construction should be developed in accordance with the minimum requirements of the development consent, associated environmental assessments/environmental impact statements and in consideration of the following: • a geotechnical assessment should be undertaken to determine the likely long-term stability risks associated with the proposed final landform, including any remaining highwalls or low walls (if any). Based on the outcome of this assessment, suitable measures (e.g. bunding and highwall fences) are to be implemented to minimise potential risks to public safety as well as support the final land use(s). • updated surface and groundwater assessments should be undertaken in relation to the likely final water level in the void and post mining water take (groundwater inflows into the void and surface water capture). This should include an assessment of the potential for fill and spill, along with measures required to be implemented to minimise associated impacts to the environment and downstream water users.	

Table A (Cont'd)
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
Phase: Landform Establishment (Production) (Cont'd)	
Landform Design/Shape (Cont'd)	
The final void must address any relevant approval requirements of regulatory authorities and demonstrate the satisfaction of licensing requirements under the relevant legislation (e.g. *Water Management Act 2000*). This should include whether sufficient licence shares are available in the water source(s) to account for the water inflow into the final void(s).	
The final stabilisation and revegetation strategy associated with the final void should be designed and implemented based on the outcomes of the above assessments.	
As-Constructed Drawings	
Prepare 'as-constructed' drawings to verify that drainage and landform have been completed in accordance with design before 'growth medium development' phase.	
Phase: Growth Medium Development	
Before Commencing Rehabilitation (substrate preparation)	
Develop rehabilitation methodologies in consideration of site-specific constraints (e.g. topsoil and subsoil availability and quality, presence of contamination) required to achieve the approved, or if not yet approved, proposed rehabilitation objectives and rehabilitation completion criteria.	
Where revegetation is required, analyse representative samples to characterise the nature of the substrate (e.g. sodicity, particle size distribution, nutrient levels for planting) and determine any potential limitations to rehabilitation and sustainable plant growth. Immediately prior to application, collect and analyse samples of topsoil stockpiles to characterise material to determine any potential impacts to vegetation (e.g. sodicity, limited microbial activity, nutrients, organic matter).	
Use the results to determine specific amelioration techniques (e.g. addition of gypsum, lime, organic matter, fertiliser) that will be used to overcome potential limitations to landform stability, vegetation establishment and growth. Apply ameliorants (e.g. gypsum or lime) and organic material (e.g. mulch) based on the outcomes of the substrate characterisation analysis (as appropriate to address limitations in the revegetation substrate). Before revegetation activities, analyse the prepared substrate to determine whether amelioration measures have been successful.	

Table A (Cont'd)
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
Phase: Growth Medium Development (Cont'd)	
Before Commencing Rehabilitation (substrate preparation) (Cont'd)	
Implement suitable erosion control measures (e.g. catch drains, sediments dams, silt fences, mulches, cover crops) to minimise soil loss from areas undergoing rehabilitation.	
Preferentially schedule and undertake revegetation activities in or just before suitable seasonal conditions.	
Where permissible, should revegetation be delayed due to unsuitable seasonal conditions, undertake temporary stabilisation measures (e.g. sterile cover crops, erosion and sediment controls) to avoid erosion and further land degradation.	
Return topsoil and subsoil layers in sequential order, assuming suitability of material for the final land use.	
During Rehabilitation (general methodologies)	
Use appropriate earthmoving equipment to avoid compacting the rehabilitation substrate.	
Restore soil structure by scarifying or ripping (if soil compaction or erosion has occurred) in parallel with the contour. Apply soil ameliorants (where required) such as fertiliser to the substrate before the start of revegetation activities.	
Implement erosion and sediment controls in accordance with *Managing Urban Stormwater: Soils and Construction Volume 2E, Mines and Quarries* (DECC 2008b).	
Where direct seeding is planned, rip final surfaces parallel with the contour before the application of seed to provide for an adequate seed bed.	
Topsoil shortages are to be supplemented with suitable alternatives such as biosolids, organic growth medium or another substitute, if required. However, the risk of introducing hazards to the establishment of the preferred plant community type (e.g. non-native species, elevated nutrient levels through the application of soil ameliorants) should be evaluated.	
Phase: Ecosystem and Land Use Establishment	
During Rehabilitation (revegetation – native ecosystem)	
Native revegetation activities in rehabilitation areas should preferentially use local provenance seed for direct seeding or tube stock propagation.	
Use of seed orchards or onsite nurseries should be considered to ensure an appropriate stock is maintained for rehabilitation works.	

Table A (Cont'd)
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
Phase: Ecosystem and Land Use Establishment (Cont'd)	
During Rehabilitation (revegetation – native ecosystem) (Cont'd)	
Consider techniques such as brush-matting where disturbed areas are situated directly adjacent to mature native ecosystems/area of clearing associated with mining that provide a good source of local seed, to stabilise the site while natural recruitment occurs.	
Where adverse seasonal conditions (e.g. drought) or other factors affect the availability of local provenance seed and supplementary non-local provenance seed is required, seed stock should be purchased from reputable suppliers with quality control processes including seed viability testing. (It is good practice to record the name of the supplier and batch of seed being applied. Recording such details may assist in prevention/management of misidentified seeds).	
If revegetation is delayed due to unsuitable seasonal conditions, undertake temporary stabilisation measures (e.g. sterile cover crops, erosion and sediment controls) to avoid erosion and further land degradation.	
Undertake treatment of seed in terms to address issues such as seed dormancy and insect predation. Timing of treatment is to be aligned to timing of application with a focus on reducing the storage time of treated seed.	
Confirm the availability of seed and plant material and amend the seed mix or schedule of revegetation based on material supply.	
Spread seed as soon as possible following ripping/scarifying. If seeding is delayed following ripping/scarifying, undertake an assessment to determine whether further re-ripping/tilling is required before applying seed to ensure sufficient surface roughness (e.g. to break up any crusting that may have resulted from rainfall events).	
Develop a bushfire management plan (having regard to relevant ecological considerations and species fire tolerance) in consultation with NSW Rural Fire Service. Bushfire considerations should be factored into rehabilitation design (e.g. access tracks).	
Revegetation mix to capture species of all strata aligned to the plant community type. (If foundation species are being used, ensure that they do not compromise the attainment of the targeted plant community types).	
Use appropriate earthmoving equipment to avoid compacting the rehabilitation substrate.	
Weed/pathogen control on equipment for sensitive sites to prevent the spread of pathogens.	

Table A (Cont'd)
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
Phase: Ecosystem and Land Use Establishment (Cont'd)	
During Rehabilitation (revegetation – native ecosystem) (Cont'd)	
Rehabilitation can include direct seeding and/or tube stock planting. Seed germination and seeding/seedling rate records are to be retained so that future rates can be assessed to ensure that target densities are achieved.	
Maximise the number of target species (groundcover, mid-story and canopy) within the first round of revegetation activities to facilitate species richness. If the target plant community type requires a staged seeding approach to achieve the species mix, underrepresented species may be prioritised in subsequent revegetation rounds.	
Stock control fencing should be erected where required to protect ecological rehabilitation areas.	
Rehabilitation Establishment Inspections	
Conduct an initial establishment inspection no later than three months following the completion of each rehabilitation campaign to determine whether performance issues have occurred or are emerging, which have the potential to delay revegetation establishment.	
Conduct regular site inspections (e.g. at least quarterly) to assess soil conditions and erosion, drainage and sediment control structures, runoff water quality, revegetation germination rates, plant health and weed infestation, until vegetation has become well established and the site can be considered stable.	
Where possible, use drones or LiDAR to conduct additional inspections and analysis of developing rehabilitation.	
Record outcomes of inspections and implement any required intervention/adaptive management actions as soon as practicable after a monitoring program indicates that rehabilitation performance is unsatisfactory as part of the rehabilitation management and maintenance program.	
Rehabilitation Monitoring Programs	
Implement long-term rehabilitation monitoring program and evaluate trajectory of rehabilitation against achieving rehabilitation objectives and rehabilitation completion criteria.	
Broadly, the scope of the ecosystem rehabilitation monitoring program will be required to include indicators that measure site condition, vegetation composition and vegetation structure and ecosystem function. The range of indices should directly relate to the rehabilitation objectives and rehabilitation completion criteria identified for the specific ecological outcome.	

Table A (Cont'd)
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
Phase: Ecosystem and Land Use Establishment (Cont'd)	
Rehabilitation Monitoring Programs (Cont'd)	
While the program should be designed to be comparable between monitoring periods, the program will also need to be flexible to enable incorporating evolving best practice in monitoring techniques.	
Include the monitoring and control of changes to surface and groundwater quality over time.	
The scope of the monitoring program should usually include photographic monitoring from fixed points.	
Rehabilitation Management and Maintenance Program	
Develop and implement a rehabilitation management and maintenance program based on the needs identified in the rehabilitation monitoring program. Examples of what this program may include are as follows: • weed and feral animal control. • erosion and drainage control works. • reseeding/planting of failed rehabilitation areas (e.g. through lack of germination, high plant mortality rate). • repairing fence lines, access tracks and other general related land management activities. • regular site inspections to assess rehabilitation performance. The objective of this program is to facilitate rehabilitation progressing towards achieving the rehabilitation objectives and rehabilitation completion criteria in accordance with an approved progressive rehabilitation schedule (forward program).	
Phase: Ecosystem and Land Use Development (Management of Rehabilitated Lands)	
During Rehabilitation (revegetation – native ecosystem)	
Continue rehabilitation management and maintenance program (refer to Ecosystem Establishment Phase) until rehabilitation can be demonstrated to have achieved the approved rehabilitation objectives, rehabilitation completion criteria and (for large mines) the final landform and rehabilitation plan.	
Continue rehabilitation monitoring programs (refer to Ecosystem Establishment Phase) until rehabilitation can be demonstrated to have achieved the approved rehabilitation objectives, rehabilitation completion criteria and (for large mines) the final landform and rehabilitation plan.	
Actively manage rehabilitated lands to achieve the approved final land use(s).	