Albion Park Quarry

Rehabilitation Management Plan

18 October 2017

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Revision Register

Version No.	Date of Issue	Reason for Revision	Section or page numbers reissued	Reviewed by	Approved by
1	5/9/2017	Standalone plan developed following Modification 3 approval	N/A	Mark Hammond	
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1 INTRODUCTION

Cleary Bros (Bombo) Pty Ltd (Cleary Bros) operates a hard rock quarry and processing plant at Croom, near Albion Park in the City of Shellharbour. Under the conditional approval (MOD 3 of Application 10639 of 2005), the Development is permitted to produce up to 900,000 tonnes of hard rock products per year, with material extracted from the Quarry Extension located on the southern slope of the Wentworth Hills, separating the Lake Illawarra catchment from the Minnamurra River catchment (the Development Consent).

Cleary Bros has also constructed a haul road from the existing processing plant on the northern divide of the Wentworth Hills to the Quarry Extension, approved in 2007 by Shellharbour City Council under Development Application 614/2006 (the Council Consent). Conditions within both the Development Consent and Council Consent require Cleary Bros to develop a Rehabilitation Management Plan for the land covered by the consents. These include Lot 1 of DP 858245 (Development Consent) and Lot 2 of DP858245 (Council Consent). This Rehabilitation Management Plan has been developed to meet the requirements of both Consents, with Section 2 linking the conditions of each consent to the relevant section(s) of the Rehabilitation Management Plan.

The quarry is bordered by a number of isolated rural residences, higher density residential areas and other hard rock quarrying operations. Dairying is the pre-quarrying land use of the site, with the majority of the Extension area and haul road previously cleared for agriculture, with small remnants of disturbed rainforest previously present in some parts of the site. The quarried resource is comprised of two layers of durable latite “blue rock” each approximately 25 metres in thickness, separated by a layer of volcanic breccia (“red rock”) of lower quality up to 20 metres thickness. These units dip gently to the east, with the latite up to 70 metres below the original natural surface in the southeast corner of the deposit. The blue rock is used for a range of purposes including as a concrete aggregate, road base, railway ballast, and other specialty products requiring a hard, durable rock. The red rock is used for a variety of applications including as a filter aggregate, and blended with blue rock to create a high quality road base. Overlying the combined hard rock resource is a variable layer of topsoil and weathered basaltic overburden (“overburden”), which is either used for rehabilitation purposes or sold as a general earthworks fill material.

The Quarry Extension covers approximately 18 hectares across an amphitheatre shaped valley south of the existing processing plant, as shown in Figure 1, with extraction depth varying depending on the thickness of the resource. Activities undertaken on the site include stripping of topsoil and overburden, blasting of the hard rock resource, followed by further crushing and processing. Cleary Bros will undertake further discussions in the future with relevant stakeholders including Shellharbour City Council as to the long term use of the site, however it is the intention at this stage to progressively return the site to land use typical of pre-quarrying activities, comprised of a larger portion of gently sloping productive grazing land bordered by steeper areas of native vegetation. Note that this land use may change over time in response to further stakeholder consultation, and/or further opportunities that may be realised at the site, which would be subject to further approvals. Land to be disturbed as part of the Council Consent and Development Consent are shown as the Haul Road and Disturbance Area polygons in Figure 1.

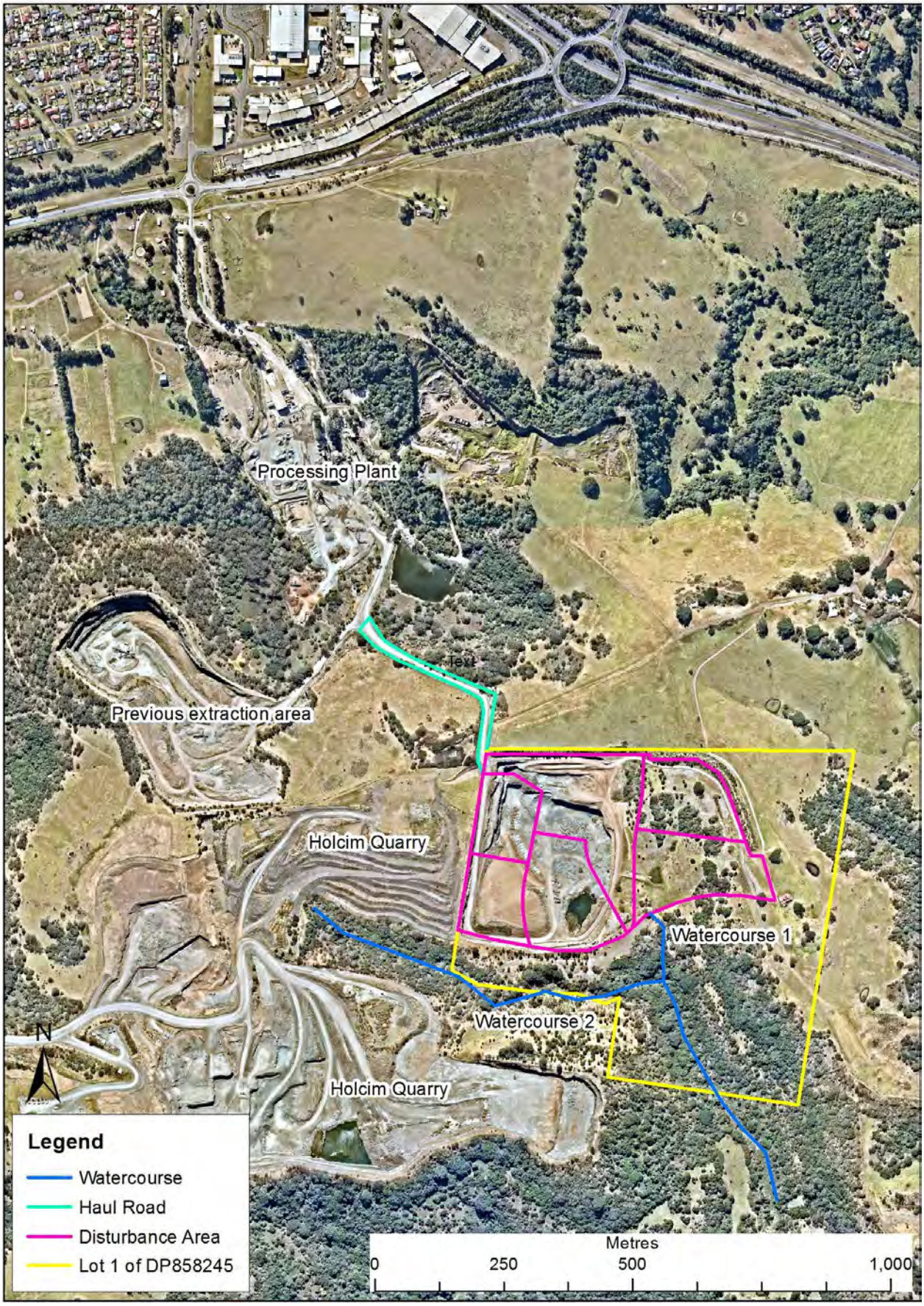

Figure 1 - Quarry Extension Area and Haul Road

1.1 Purpose and Scope

The purpose of this Rehabilitation Management Plan is to describe the proposed post-quarrying land use of the site, describe short, medium and long term rehabilitation objectives, and set achievable targets related to the rehabilitation of the site. This Rehabilitation Management Plan has also been developed to comply with Schedule 4 Conditions 38A-44 of the Development Consent and Conditions 34-35 of the Council Consent.

The scope of the Rehabilitation Management Plan is limited to the management of activities within Lot 1 of DP858245 and Lot 2 of DP858245, which are those land parcels under which the Development Consent and Council Consent respectively apply. Furthermore, only the portion of Lot 2 of DP858245 which relates to the haul road constructed by Cleary Bros is included within the scope of this Plan. All other parts of Lot 2 of DP858245 are on land owned and managed by Holcim, and are therefore excluded from this Plan.

This Rehabilitation Management Plan is focused on the management of those parts of the site disturbed by quarrying activities, and excludes the management (including revegetation) of areas subject to conservation activities as described in Schedule 4 Condition 35 of the Development Consent. While the rehabilitation activities covered by this plan aim to create a harmonious landscape, management of the conservation areas is covered separately by the Vegetation Management Plan included as an appendix to the Quarry Environmental Management Plan (QEMP).

1.2 Progress of Rehabilitation Activities

The methodologies described in this Rehabilitation Management Plan will likely involve the importation of significant quantities of clean fill materials (which may include VENM or ENM) to the site. Fill materials will only be imported where they have been certified as clean and in accordance with the Protection of the Environment Operations (Waste) Regulation 2014 and applicable Exemption Notices issued by the EPA from time to time. It is the intention to source these materials as and when they become commercially available, and as such a linear approach to rehabilitation activities may not be appropriate in this case. Nevertheless, Cleary Bros maintains a commitment to undertake the rehabilitation activities and achieve the rehabilitation objectives described in this plan.

Cleary Bros will maintain a bond held with the Department of Planning and Environment in accordance with Schedule 4 Conditions 42 and 43 of the Development Consent. The value of this bond will be revised every three years around the time of the Independent Environmental Audit required under Schedule 6 Condition 7 of the Development Consent. Cleary Bros will seek approval from the DPE prior to any variation in the value of the bond.

Rehabilitation activities undertaken to date have focused on the backfilling of Stages 1 and 2 of the Quarry Extension with surplus overburden materials. This backfilling aims to achieve the objectives of the Slope Domain described in Section 3.6 of the RMP. The profile has not yet reached the final landform surface in this area, and as such rehabilitation activities have been limited to backfilling at this time.

2 REGULATORY REQUIREMENTS

The Development Consent conditions relating to rehabilitation are summarised in Table 1, alongside the relevant section of the Rehabilitation Management Plan. Council Consent conditions relating to rehabilitation are summarised in Table 2.

Table 1 – Development Consent conditions

<table>
<tr><th>Condition No</th><th>Requirement</th><th>Relevant Section</th></tr>
<tr><td>Schedule 4
Condition 38A</td><td>Rehabilitation Objectives
The Applicant must rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EIS and the conceptual rehabilitation plan in Appendix 2 and must comply with the objectives in Table 7.
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>All areas of the site affected by the development</td><td>• Safe
• Hydraulically and geotechnically stable
• Non-polluting
• Fit for the intended post-mining land use(s)
• Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land</td></tr>
<tr><td>Surface Infrastructure</td><td>• Decommissioned and removed, unless otherwise agreed by the Secretary</td></tr>
<tr><td>Quarry benches and pit floor</td><td>• Landscaped and vegetated using native tree and understorey species</td></tr>
<tr><td>Final Void</td><td>• Minimise the size, depth and slope of the batters of the final void
• Minimise the drainage catchment of the final void</td></tr>
</table>
Table 7: Rehabilitation Objectives</td><td>Section 5.2</td></tr>
<tr><td>Schedule 4
Condition 39</td><td>Progressive Rehabilitation
The Applicant must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation.
Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to future re-disturbance.</td><td>Section 4.1</td></tr>
<tr><td>Schedule 4
Condition 40</td><td>Rehabilitation Management Plan
Within 6 months of the date of this consent, the Applicant must prepare a Rehabilitation Management Plan to the satisfaction of the Secretary. This plan must:
(a) identify the disturbed area at the site;
(aa) provide details of the conceptual final landform and associated land uses for the site;
(b) describe in general the short, medium, and long-term measures that would be implemented to ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this consent;
(c) describe in detail the measures that would be implemented over the next 5 years to rehabilitate the site;
(d) include detailed performance and completion criteria for evaluating the rehabilitation of the site (including progressive rehabilitation) including triggers for any necessary remedial action;
(e) include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria; and
(f) include details of who is responsible for monitoring, reviewing, and implementing this plan.</td><td>This plan

Figure 1
Section 3.3

Section 4

Section 4.1

Section 5

Sections 5 & 6

Section 3.1</td></tr>
</table>

Condition No	Requirement	Relevant Section
	Prior to the commencement of quarrying activities in Stages 5 and 6, the Rehabilitation Management Plan must be revised to the satisfaction of the Secretary. The Applicant must implement the approved plan as approved from time to time by the Secretary.	
Schedule 4 Condition 41	Within 5 years of providing the Rehabilitation Management Plan to the Secretary, and every 5 years thereafter, the Applicant must review and update the plan to the satisfaction of the Secretary.	Section 3.1
Schedule 4 Condition 42	**Rehabilitation Bond** Within 6 months of the date of this consent, the Applicant must lodge a suitable rehabilitation and conservation bond for the development with the Secretary. The sum of the bond must be calculated at: (a) $2.50/m2 for the total area of disturbance at the development; and (b) $3.00/m2 for the total area of the revegetation area, to the satisfaction of the Secretary. *Notes:* • *If the rehabilitation and revegetation area is completed to the satisfaction of the Secretary, the Secretary will release the rehabilitation and conservation bond.* • *If the rehabilitation and revegetation area is not completed to the satisfaction of the Secretary, the Secretary will call in all or part of the rehabilitation and conservation bond, and arrange for the satisfactory completion of these works.*	Section 1.2
Schedule 4 Condition 43	Within 3 years of lodging the rehabilitation and conservation bond with the Secretary, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant must review, and if necessary revise, the sum of the rehabilitation bond to the satisfaction of the Secretary. This review must consider: (a) the effects of inflation; (b) any changes to the total area of disturbance; and (c) the performance of the revegetation area.	Section 1.2
Schedule 4 Condition 44	**Reporting** The Applicant must include a progress report on the Rehabilitation Management Plan in the Annual Review.	Section 6

Table 2 – Council Consent conditions

Condition No	Requirement	Relevant Section
Condition 34	**Rehabilitation Management Plan** Within 6 months of the date of this consent, the applicant must prepare and subsequently implement a *Rehabilitation Management Plan* for the site in consultation with Shellharbour City Council. This plan must: (a) identify the disturbed area at the site; (b) describe in general the short, medium, and long-term measures that would be implemented to rehabilitate the site (including the decommissioning of the haul road the return to natural ground levels at the expiration of the quarrying process); (c) describe in detail the measures that would be implemented over the next 5 years to rehabilitate the site; (d) describe how the performance of these measures would be monitored over time.	This plan Figure 1 Section 4 Section 4.1 Sections 5 & 6
Condition 35	**Reporting** The Applicant must include a progress report on the *Rehabilitation Management Plan* in the AEMR.	Section 6

3 REHABILITATION OBJECTIVES

The Environmental Impact Statement for the Quarry Extension (2003) described two primary rehabilitation objectives of the project. These included:

- Shorter term management of the site to prevent environmental degradation that would compromise later rehabilitation of the property; and
- In the longer term, return the property to a land use that is:
  - A low maintenance, free draining, stable and safe landform, which maximises the area of useable land within the confines of the completed quarry;
  - As far as practicable blends with the surrounding land fabric any part of the site visible from external locations; and
  - Revegetated with tree, shrub and pasture species comparable with the pre-quarrying vegetation communities.

3.1 Responsibilities

The following persons will have responsibilities for implementing the Rehabilitation Management Plan

Table 3 - Roles and Responsibilities

Title	Responsibilities
Cleary Bros CEO	Provide sufficient resources to implement the Rehabilitation Management Plan
Quarry Production Manager	Responsible for the overall implementation of the Rehabilitation Management Plan.
Cleary Bros Environmental Officer	Responsible for rehabilitation design and planning, as well as the monitoring described in this plan, and an annual review of the effectiveness of the Rehabilitation Management Plan. Revision of the Rehabilitation Management Plan at a minimum of five yearly intervals.

3.2 Short Term Objectives

To meet the shorter-term rehabilitation objectives described above, Cleary Bros will operate the Quarry Extension in accordance with the Quarry Environmental Management Plan. This plan has recently been revised and is approved by the Department of Planning and Environment, and includes controls around the management of topsoil, overburden, waste and hydrocarbons, which could impact the later beneficial use of the site and longer term rehabilitation objectives.

3.3 Conceptual Final Landform

To meet the longer-term rehabilitation objectives described above, a final land use similar to the pre-quarrying environment is proposed, pending further discussions with Shellharbour City Council. This would include three principal rehabilitation domains, with steeper, terraced slopes in the vicinity of the final quarry highwall leading into a free-draining plain suitable for grazing. The third rehabilitation domain would be formed in western parts of the quarry extension using surplus overburden materials to form a sloping benched landscape. Due to the potential for further extraction beyond the eastern limit of the

currently approved extraction area, the final landform in this easternmost part may be subject to further review and change, depending on future quarry approvals.

The Plains domain will be rehabilitated to a cattle-grazing post-quarrying land use from the gently sloping base of the temporary final void of the quarry, which will be back-filled with available safe, stable, and non-polluting fill materials. Clean fill will be sourced from quarry overburden and other available external sources as previously described, such that no water will pond within the formerly excavated landform, other than that required for sediment control or agricultural purposes. This will require up to 25 metres of fill at the eastern extent of the quarry, where the basal contours of the basalt resource dip to the east. Following placement of fill and suitable topsoil, the Plains domain will be seeded with pasture species suitable for future cattle grazing.

The Slope Domain will form an intermediate of the two other Domains, with a series of slope batters separated by narrow benches, and will be formed from overburden and other fill materials. Batters will form a slope of up to 17° separated at 20 metre vertical intervals by benches of approximately 5 metres width, forming a geotechnically stable landform in areas of excess fill in the western portion of the development.

Each of the three domains is described in further detail below, while an overview of their arrangement is shown in Figure 2.

Figure 2 – General arrangement of post-quarrying rehabilitation domains and major infrastructure

3.4 Terrace Domain

The Terrace Domain will be constructed from the steeply sloped northern, eastern, and western extents of the quarry excavation. The stable and resistant nature of the hard rock resource will form a suitable foundation for the terraced slope. A geotechnical investigation into the stability of the rock mass was undertaken in 2017, which identified optimum geometries for the final highwall. In south facing aspects a highwall angle of up to 90° will be stable based on the measured alignment of joints in the rockmass, while western aspects will require a highwall angle of no greater than 75° due to joint alignment and the increased weathering risk in these areas. Vertical/sub-vertical heights of up to 15 metres will be utilised in this domain, separated by benches of no less than 5 metres. Overburden materials (or other suitable fill) will be placed along the benches to provide a growth medium for the developing ecosystem, while also providing water holding capacity. An idealised cross section of the Terrace Domain is shown as Figure 3.

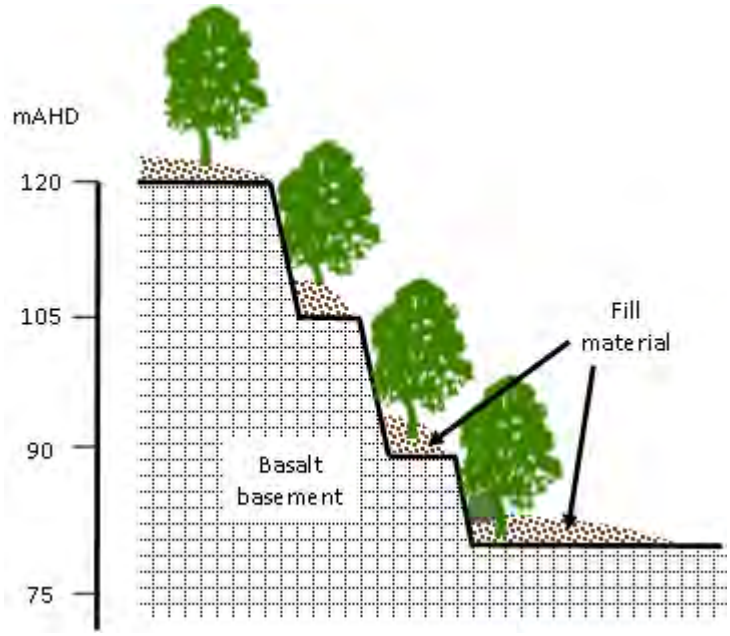

Figure 3 – Cross Section of typical Terrace Domain following rehabilitation activities

3.5 Plains Domain

The Plains Domain will be created from backfilling the void with available overburden and other imported material such that the landscape is free draining and suitable for cattle grazing. The depth of fill will vary across the domain, with up to 25 metres of fill required in the southeast corner of the project. The Plains Domain will be shaped to generally feed water to the existing overflow point of Watercourse 1, maintaining the original catchment of this waterway, and thus preserving the long term integrity of the downstream ecosystems dependent on this water resource. Anticipated grades across this Domain will range from up to 10% in areas bordering the Terrace Domain, to less than 1% particularly in the eastern portion of the void, based on an expected deficit of available fill materials.

An idealised west-east cross section through the Plains Domain is shown as Figure 4.

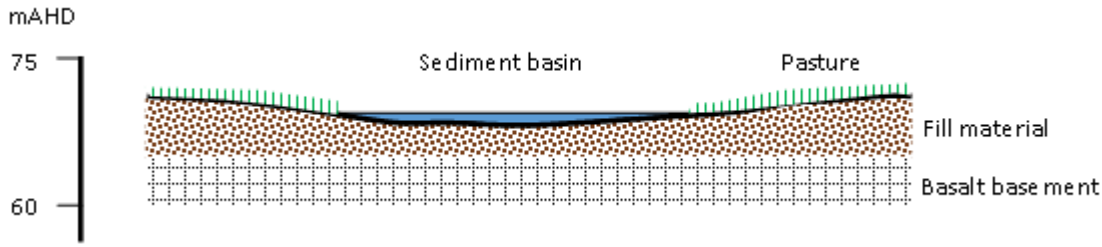

Figure 4 – Cross Section of typical Plains Domain following rehabilitation activities

3.6 Slope Domain

The Slope Domain will be constructed from the excess overburden materials that will be generated in the earlier stages of the development (more than 5 years prior to end of quarry life). Due to the sequencing of the extraction of the resource, excess material generated in these earlier periods will not be able to be placed as fill in the eastern extents of the rehabilitation without double-handling, and as such will be transformed into a benched landscape with gently sloping batters. Furthermore, it is expected that an access road will be maintained through this Domain (the former haul road), which will permit access to persons, stock, and equipment to the Plains Domain. Vegetation assemblages within this Domain will vary depending on slope, with all areas with a slope angle greater than 10% revegetated with native species consistent with the Terrace Domain, while flatter areas will be promoted for cattle grazing similar to the Plains Domain. An idealised cross section through this domain is shown as Figure 5.

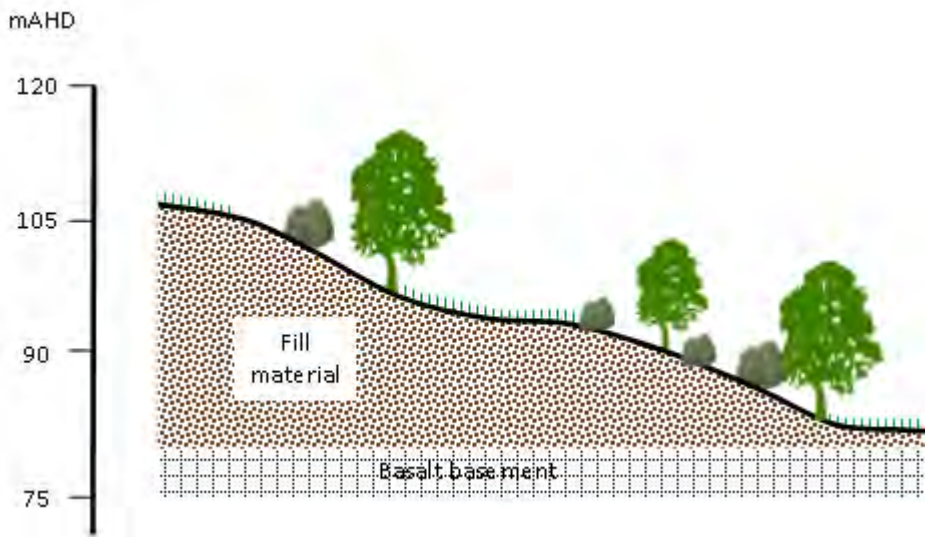

Figure 5 – Cross Section of typical Slope Domain following rehabilitation activities

3.7 Surface Infrastructure

Surface infrastructure that would be present towards the end of quarrying activities will include the haul road and supporting access roads, sediment and erosion controls, fences, groundwater monitoring bores, and the operational sump. As part of the final rehabilitation of the site, groundwater monitoring bores would be left as is to record any changes to the hydrogeological regime in the post-quarrying landscape, however any surplus groundwater monitoring bores would be safely de-commissioned. Fences will also be retained, however may be altered to suit the proposed grazing land use. Sediment and erosion controls, including the sedimentation basin at the outflow to Watercourse 1, will be retained, however sizing may

be reduced following vegetation establishment to provide a small watering point in keeping with the surrounding landscape.

Access roads will be maintained throughout the Quarry Extension where required to support access and management of the rehabilitated landscape and the post-quarrying land use. The haul road will also be maintained to support access to the site in the post-quarrying land use. All equipment and other quarry related materials will be removed from site, such that only materials or infrastructure designated for the post-quarrying land use will remain.

4 ACHIEVING REHABILITATION OBJECTIVES

This section describes the methods that will be employed in the short to long term to achieve the rehabilitation objectives, including the final landform previously described.

4.1 Short Term Measures

The following short term measures are proposed to be implemented within the next five years, prior to the next review of this Rehabilitation Management Plan. They focus on using the available resources and waste materials (overburden) to construct the Slope Domain described in the previous section. Actions to be taken during this period include:

- Stockpiling of topsoil stripped ahead of quarrying activities;
- Placement of any surplus overburden materials in Stage 1 and 2 of the Quarry extension;
- Import of available fill materials if and when they become available into Stage 1 and 2 of the Quarry Extension;
- Reprofiling of material to achieve the design contour of the Slope Domain;
- Realignment of the haul road from the existing route following the south-western boundary to a curving alignment, allowing infill of the current cut in Stage 1, and better tie-in with the desired Slope Domain profile;
- Progressive relocation of the sump and access roads to the east, freeing up additional space for spoil material; and
- Reuse and potential resale of any excess fill material.

Due to the current staging of quarrying activities, no measures would be undertaken to rehabilitate the access road approved under the Council Consent in the short to medium term and will be re-assessed in five years when this plan is reviewed.

4.2 Medium Term Measures

The medium term measures are planned outside of the five year operational window, and represent the interim measures to be undertaken to achieve the final land use of the site. They include the actions that will be undertaken up to the cessation of quarrying at the site, in order to ultimately meet the long term rehabilitation objectives. The medium term measures are aimed at integrating rehabilitation activities into

the extraction process, to limit the outstanding rehabilitation liability at the conclusion of extractive activities. Actions to be taken during this period include:

- Consultation with Shellharbour City Council to review the intended final landform and post-quarrying land use of the project;
- Progressive establishment of the terraced rehabilitation profile, including placement of available overburden material as shown in Figure 3, as the final highwall continues to the east;
- Progressive infilling of the Plains Domain from the west to achieve the design levels of the final landform;
- Topsoiling and revegetation of the Slope Domain in the western extent of the Quarry Extension, as well as other areas that become available following placement of infill materials;
- Soil and erosion control works to treat runoff from areas of establishing rehabilitation;

4.3 Long Term Measures

The long term measures are planned to occur from the cessation of quarrying on site, and represent the actions to be taken to achieve the post-quarrying land use of the project site. Actions to be taken during this period include:

- Consultation with Shellharbour City Council to review the intended final landform and post-quarrying land use of the project;
- Infill of the Plains Domain to achieve the design levels of the final landform;
- Formalisation of management approach to the easternmost part of the extraction area, in light of any future quarrying activities and approvals;
- Complete establishment of the terraced rehabilitation profile, including placement of available overburden material as shown in Figure 3;
- Revegetation of all areas of the site to achieve the post-quarrying land uses previously described;
- Implementation of soil and erosion controls to treat runoff from establishing rehabilitation;
- Removal or other management of surface infrastructure in accordance with Section 3.7.
- Monitoring of vegetation establishment in each Domain until vegetation establishment completion criteria are met;
- Monitoring of surface water overflow from the site until vegetation establishment criteria are met;
- Monitoring of groundwater levels and quality for five years following conclusion of quarrying.

5 PERFORMANCE AND COMPLETION CRITERIA

The performance and completion criteria for rehabilitation have been broken down into short, medium, and longer term criteria, in line with the previous section.

5.1 Short Term Actions (Progressive Rehabilitation)

The following table summarises the performance criteria associated with the short-term rehabilitation activities at the Albion Park Quarry. The monitoring requirements are also described, which are generally linked to the Annual Review process.

Table 4 - Short Term Actions

Topic	Action	Criteria / Triggers	Monitoring / frequency
Topsoil	All topsoil stripped ahead of quarrying reclaimed and stockpiled for future rehabilitation.	Topsoil material identified and preserved from loss.	Visual check of topsoil stockpile as part of Annual Review.
Reprofiling	Overburden and other imported fill materials placed in Stages 1 and 2 to meet desired final landform.	Fill material within design shell of final land form plan.	Annual survey verification as part of Annual Review.
Haul road alignment	Haul road realigned to allow backfilling in southwest corner of pit.	Haul road aligned to final landform plan in western approach to pit.	Survey or aerial photography undertaken prior to 5 yearly revision of Rehabilitation Management Plan.

5.2 Medium and Longer Term Criteria

The following table summarises the completion criteria of the rehabilitation activities at the Albion Park Quarry. They represent the rehabilitation criteria to be achieved prior to surrendering the Development Consent for the project.

Table 5 - Rehabilitation Completion Criteria

Topic	Action	Criteria
Final landuse	Safe and stable.	Geotechnical review confirms site is stable, with geotechnical risk at an acceptable level based on the intended post-quarrying land use.
	Non-polluting.	Untreated runoff from site meets the following criteria: • TSS < 50 mg/L or an equivalent turbidity as approved by the EPA • pH = 6.5 – 8.5
	Fit for the intended post-quarrying landuse.	Successful implementation of approved Rehabilitation Management Plan aligned with rehabilitation objectives.
	Final landform integrated into surrounding landscape.	Photographs taken from ridgeline on southeastern property boundary (Lot 1 DP 858245) demonstrate well-vegetated site.

Topic	Action	Criteria
Surface Infrastructure	Remove all surface infrastructure that is not intended to be used in the post-quarrying land use.	Approval from Secretary received for any surface infrastructure remaining on project site.
Quarry benches and pit floor	All disturbed areas of the quarry revegetated in accordance with Section 4 of this Rehabilitation Management Plan with the exception of infrastructure approved as per above.	Vegetation established and rehabilitated areas stable Areas free of significant weed or feral animal problems Survey of re-profiled surfaces demonstrates alignment with design final landform.
Final Void	Backfilling of quarry pit with available fill materials to eliminate the final void	Rehabilitation quarry footprint is free-draining, excluding suitably sized sedimentation structures or dams intended for the post-quarrying landuse.

6 MONITORING AND REVIEW

Over the next five years, monitoring of rehabilitation will be in accordance with the methodology outlined in Table 4. Monitoring will focus on the handling of waste materials to align with the long term rehabilitation objectives, including placement of overburden in designated fill areas and segregation of topsoil for beneficial reuse. This will feed into the Annual Review process undertaken at the end of each reporting year, at which point the effectiveness of the Rehabilitation Management Plan will be assessed in accordance with Schedule 6 Condition 3 of the Development Consent.

Monitoring against the completion criteria described in Table 5 will commence within the final five years of the quarry life, with detailed monitoring methodologies developed at that time.

7 THREATS AND REMEDIAL STRATEGIES

In the event that monitoring undertaken in accordance with this plan identifies that the rehabilitation objectives may be threatened, such as the exceedance of the triggers identified above, the incident will be investigated in accordance with Cleary Bros Incident Investigation and Corrective Action procedure. Cleary Bros have identified the following potential issues and possible mitigating strategies.

Table 6 - Potential Remedial Strategies

Risk Issue	Potential Response(s)
Loss of topsoil resource / inadequate topsoil available for rehabilitation	• Import of additional topsoil to the site • Investigate the use of subsoil as a topsoil substitute • Varying topsoil use in different domains to reduce demand • Fertiliser addition to boost soil fertility
Excess fill material placed within final landform shell	• Reuse of fill in toe of Terrace Domain to reduce final highwalls • Reprocessing or sale of fill material to meet external demands • Reprofiling of fill to extend Slope Domain over Plains Domain
Insufficient fill material to meet final landform	• A long term approach to rehabilitation will be employed, with significant fill material expected to be generated over the long term due to major infrastructure projects • A modification may be made to realign the spill point of the quarry catchment to reduce fill requirements
Lack of vegetation growth	• Ecological consultant may be engaged to review revegetation success • Stock and pest-proof fencing may be established during vegetation establishment • Additional planting of vegetation to replace failed growth may be necessary
Unstable / unsafe landform	• Scaling of highwalls may be undertaken • Fencing or other bunding may be established at crest of terraces