METROMIX PTY LIMITED

Biodiversity and Rehabilitation Management Plan

June 2019

Document Control

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Original (Draft 1)	28 June 2018	N. Warren (RWC)	W Sanderson	DPI, DRG, LMCC
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Approved	Date: 18 June 2019			
Next Review Due	Within 3 months of the submission of an: (a) annual review under Schedule 5 Condition 4; (b) incident report under Schedule 5 Condition 7; (c) audit report under Schedule 5 Condition 9:and (d) any modifications to the Project Approval, Note: Metromix will review, and if necessary, also revise the strategies, plans, and programs prepared in accordance with the Project Approval that are referred to in this Strategy.			

Approved by

the Secretary's nominee, Howard Reed,

on 18 June 2019

APPENDICES

FIGURES

TABLES

PLATES

COMMONLY USED ACRONYMS

DPI	Department of Primary Industries – Catchments and Lands
DPE	Department of Planning and Environment
DRG	Division of Resources and Geoscience
ENM	Excavated Natural Material
m AHD	metres Australian Height Datum
PA	Project Approval
VENM	Virgin Excavated Natural Material

1 INTRODUCTION

1.1 SCOPE

This *Biodiversity and Rehabilitation Management Plan* (the Plan) has been prepared by Metromix Pty Ltd (Metromix or "the Company") for the Teralba Quarry (the Quarry). The Quarry is located west of the suburb of Teralba, beyond the western shores of Lake Macquarie (**Figure 1**). The Plan has been prepared in satisfaction of Schedule 3 *Condition 60* and in accordance with *Conditions 27-29 and 50-59* of Schedule 3 of Project Approval 10_0183 MOD 1[1] (approved on 16 April 2018).

It is recognised that this plan is one of a number of management plans prepared for the Teralba Quarry. As a consequence, only information directly relevant to the matters nominated in the conditional requirements are covered in this document. Where appropriate, cross-references are made to the other management plans.

1.2 APPROVED ACTIVITIES

The approved activities within the Teralba Quarry are described in the document entitled "*Environmental Assessment for the Teralba Quarry Extensions"*, dated November 2011 and the "*Environmental Assessment of Modification 1 for Project Approval 10_0183 MOD 1 for the Teralba Quarry*", dated December 2017. In summary, the approved Quarry activities comprise the following, the locations of which are displayed on **Figure 2**.

- Conglomerate extraction (blasting and excavation).
  - Southern Extraction Area.
  - Mid Pit Extraction Area.
  - Southern Extension.
  - Northern Extension.
- Processing Operations (size reduction, screening and blending).
  - Existing processing plant and pugmill.
- On-site load and haul operations.
- Off-site transportation of products.
- Vehicle/equipment maintenance and ancillary activities and stores.
- Administration and product despatch.
- Progressive rehabilitation and maintenance.

[1] All Schedules in Project Approval MP 10_0183 MOD 1 are referred to as *PA Condition*

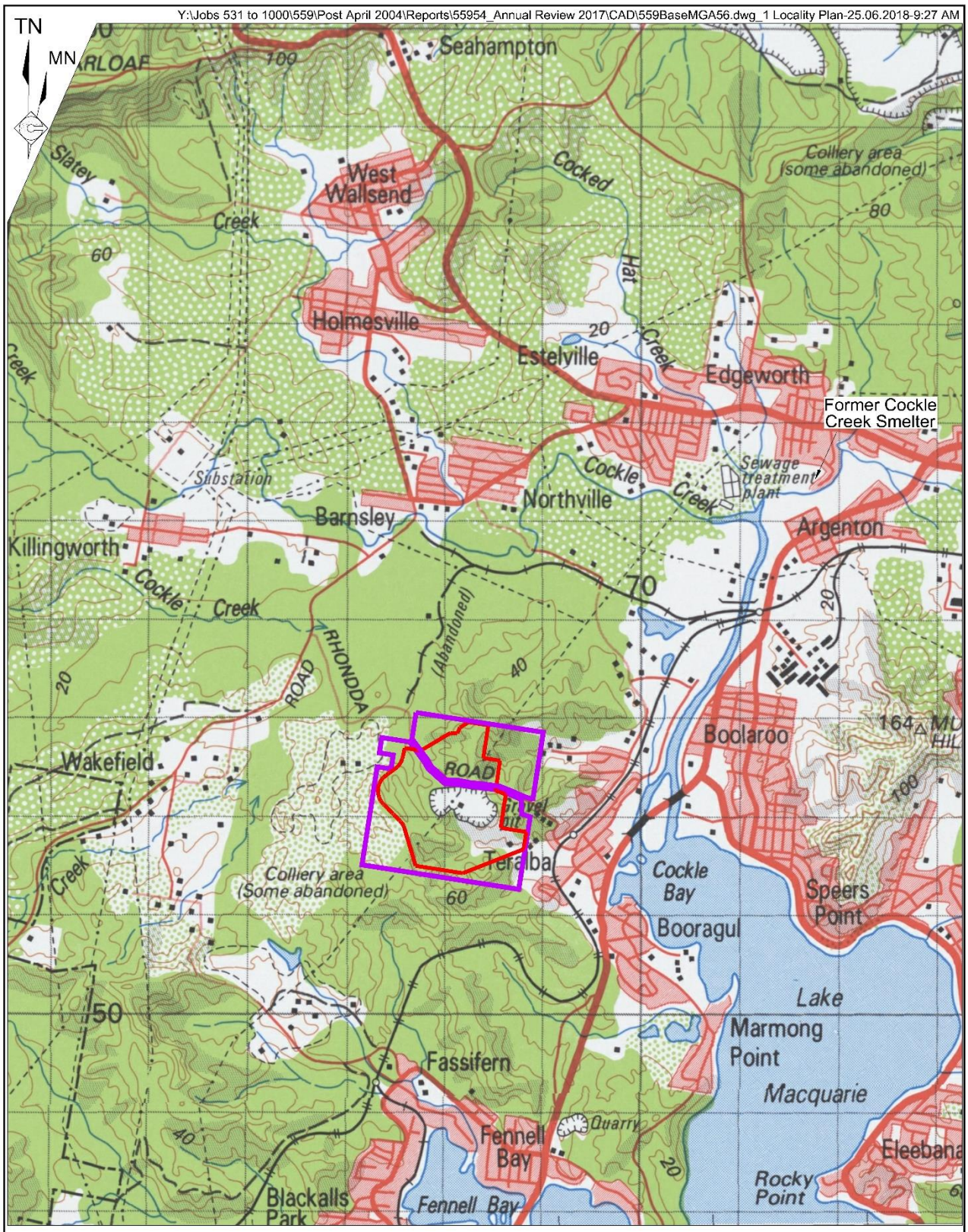
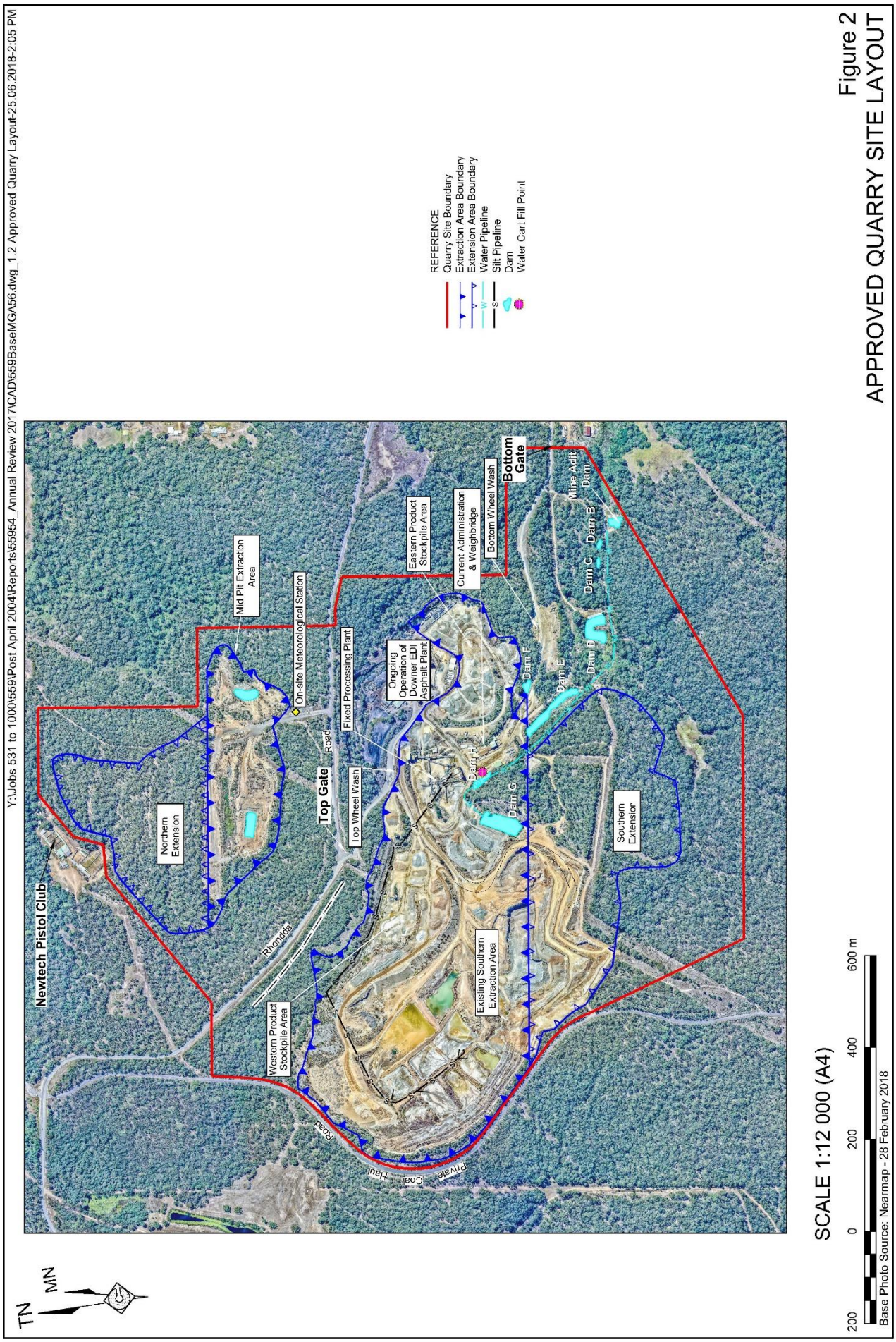


Figure 1
LOCALITY PLAN


Y:\Jobs 531 to 1000\559\Post April 2004\Reports\55954_Annual Review 2017\CAD\559BaseMGA66.dwg_1.2 Approved Quarry Layout-25.06.2018-2:05 PM
REFERENCE
Quarry Site Boundary
Extraction Area Boundary
Extension Area Boundary
Water Pipeline
Silt Pipeline
Dam
Water Cart Fill Point
Newtech Pistol Club
Northern Extension
Mid Pit Extraction Area
On-site Meteorological Station
Top Gate
Road
Fixed Processing Plant
Top Wheel Wash
Ongoing Operation of Downer EDI Asphalt Plant
Eastern Product Stockpile Area
Current Administration & Weighbridge
Bottom Wheel Wash
Bottom Gate
Mine Adit
Dam A
Dam B
Dam C
Dam D
Dam E
Dam F
Dam G
Dam H
Southern Extension
Existing Southern Extraction Area
Western Product Stockpile Area
Rhondda
Private Coal Haul Road
TN
MN
SCALE 1:12 000 (A4)
200 0 200 400 600 m
Base Photo Source: Nearmap - 28 February 2018
Figure 2
APPROVED QUARRY SITE LAYOUT

- The sequence of extraction throughout the life of the Quarry will be consistent with the staging of vegetation clearing and therefore retirement of biodiversity credits specified in Condition 54 to 56 of Schedule 3 of PA 10_0183 (MOD 1).

The relevant limitations upon the approved activities nominated in conditions within PA10_0183 MOD 1 are as follows.

- "The Proponent must not carry out quarrying operations below 20 AHD in the Southern Extension and 24m AHD in the Mid Pit Extraction Area and Northern Extension" *(Condition 6* of Schedule 2 of PA 10_0183*)*.
- "The Proponent must not extract more than 1.2 million tonnes of extractive materials from the site in any calendar year" *(Condition 7* of Schedule 2 of PA 10_0183 (MOD 1)*)*.

The approved Quarry life is until 31 December 2038 (*Condition 5* of Schedule 2 of PA 10_0183 (MOD 1)) and the approved hours of operation are set out in **Table 1** (*Condition 6* of Schedule 3 of PA 10_0183 (MOD 1)).

Table 1 Approved Hours of Operation

Day	Receipt of Concrete or VENM	Loading and Despatch of Quarry Trucks	Extraction and Processing Operations
Monday to Friday	7:00am to 5:00pm	4:00am Monday to midnight Friday	7:00am to 7:00pm
Saturday	7:00am to 2:00pm	midnight Friday to 6:00pm Saturday	7:00am to 2:00pm
Sundays and Public Holidays	None	None	None
Note: Maintenance activities may occur at any time provided they are inaudible at privately-owned residences.			

1.3 CONSULTATION

Condition 60 of Schedule 3 of PA 10_0183 requires this plan to be prepared in consultation with Lake Macquarie City Council (Council), the Department of Primary Industries (DPI) and the Division of Resources and Geosciences (DRG).

A draft version of this plan has been provided to these agencies and comments and suggestions have been sought from the respective government agencies and incorporated into the final version of this Plan.

1.4 LEGAL AND OTHER REQUIREMENTS

1.4.1 Project Approval PA10_0183 MOD 1 Conditions

This Plan has been prepared to outline how Metromix proposes to satisfy the requirements of *Conditions 27 to 29 and 50 to 59* of of Schedule 3 of PA 10_0183 (MOD 1), relating to biodiversity

and rehabilitation management. The individual sections of this document where each condition is addressed is set out in parentheses at the end of each condition.

Condition 27 *Protection of Ridgelines*

"The Proponent must ensure that any clearing of visually prominent ridgeline vegetation is done in a progressive manner, so as to provide for a maximum of 6 months of future quarrying operations." (Section 2.1 and Section 6.2.1)

Condition 28 *Protection of Ridgelines*

"The Proponent must ensure that the:

(a) eastern facing quarry benches of the Southern Extension are vegetated with native endemic understory species and trees as soon as practicable following the completion of extraction of those benches; and

(b) revegetation of the quarry benches is managed to ensure that a tree canopy is regenerated, as soon as practicable, to be consistent with and visually integrated into the surrounding tree canopy,

to the satisfaction of the Secretary." (Section 6.2.3 and Section 7.2)

Condition 29 *Operating Conditions*

"The Proponent must

(a) implement all reasonable and feasible measures to minimise the visual impacts and any offsite lighting impacts of the project (Section 7.2)*; and*

(b) maintain and improve the effectiveness of the vegetated plantings on the quarry benches, over the life of the project." (Section 6.2 and Section 8)

Condition 50 *Fauna Habitat*[1]

"The Proponent must install 20 nest boxes for microbats, 20 nest boxes for Little Lorikeets and 30 nest boxes for Sugar Gliders. These boxes must be monitored and maintained regularly over the life of the project, and re-located or replaced if not used by targeted fauna for a period of 12 months." (Section 6.2.5)

Condition 51 *Fauna Habitat*

"The Proponent must, wherever practicable, avoid clearing hollow-bearing trees. If clearing a hollow bearing tree cannot be avoided, then its removal must be offset with an additional and comparable habitat structure within the site." (Section 6.2.5)

Condition 52 *Biodiversity Offset Strategy*

"The Proponent must retire biodiversity credits specified in conditions 54 to 56 of this schedule in accordance with the Biodiversity Offset Scheme of the Biodiversity Conservation Act 2016, to the satisfaction of the Secretary and OEH.." (Section 3).

[1] A minor error was identified in Condition 3(50) in which 'Sugar Gliders' were incorrectly nominated as 'Squirrel Gliders'. This error was brought to the attention of the then DP&I and confirmed in March 2014, that this error would be updated in any subsequent Project Approval modification, with approval given for the installation of Squirrel Glider next boxes instead of Sugar Glider nest boxes.

Condition 53 The Proponent must prepare and submit a Biodiversity Offset Strategy to the satisfaction of the Secretary. This strategy must:

(a) be submitted for approval by the Secretary prior to 30 June 2018, or as otherwise agreed by the Secretary; and

(b) be prepared in accordance with the Biodiversity Conservation Act 2016; and

(c) provide for the retirement of biodiversity credits as specified in conditions 54 to 56 of this schedule. (Section 3)

The Proponent must implement the Biodiversity Offset Strategy to the satisfaction of the Secretary and OEH.

Condition 54 By 31 December 2018, unless otherwise approved by the Secretary, the Proponent must retire all biodiversity credits listed in Table 8 to the satisfaction of the Secretary and OEH. (Section 3)

Table 8: Biodiversity Credits to be retired by 31 December 2018

Credit Type	*Offset Type*	*Number of Credits*
Ecosystem Credits	*PCT1589 'Spotted Gum – Broad-leaved Mahogany – Grey Gum grass – shrub open forest on Coastal Lowlands of the Central Coast'*	*670*
Species Credits	*Black-eyed Susan (Tetratheca juncea)*	*1103*

Condition 55 Prior to any vegetation clearing in Southern Extension Stage 3 (see Figure 7 of Appendix 5) the Proponent must retire all biodiversity credits listed in Table 8a to the satisfaction of the Secretary and OEH. (Section 3)

Table 8a: Biodiversity credits to be retired prior to vegetation clearing in Southern Extension Stage 3

Credit Type	*Offset Type*	*Number of Credits*
Ecosystem Credits	*PCT1589 'Spotted Gum – Broad-leaved Mahogany – Grey Gum grass – shrub open forest on Coastal Lowlands of the Central Coast'*	*171*

Condition 56 Prior to any vegetation clearing in Northern Extension Stages 1, 2 or 3 (see Figure 7 of Appendix 5) the Proponent must retire all biodiversity credits listed in Table 8b to the satisfaction of the Secretary and OEH. (Section 3)

Table 8b: Biodiversity credits to be retired prior to vegetation clearing in Northern Extension Stages 1, 2 or 3

Credit Type	*Offset Type*	*Number of Credits*
Ecosystem Credits	*PCT1589 'Spotted Gum – Broad-leaved Mahogany – Grey Gum grass – shrub open forest on Coastal Lowlands of the Central Coast'*	*502*

Condition 57 *Long Term Security of Offsets*

Within 6 months of the approval of the Biodiversity Offset Strategy, or as otherwise agreed by the Secretary, the Proponent must make suitable arrangements for the long-term protection of any land identified in the Strategy, to the satisfaction of the Secretary. (Section 3)

Condition 58 *Rehabilitation Objectives*

"The Proponent shall rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the proposed rehabilitation strategy in the EA and Appendix 6, and comply with the objectives in Table 9." (Sections 1.5 and Section 6)

Condition 59 *Progressive Rehabilitation*

"The Proponent shall 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." (Section 6.2.3)

Biodiversity and Rehabilitation Management Plan

Condition 60 The Proponent must prepare a Biodiversity and Rehabilitation Management Plan for the project to the satisfaction of the Secretary. This plan must:

a) be prepared by a suitably qualified expert and in consultation with DRG, DPI and Council (Section 1.3)*;*

b) be submitted to the Secretary for approval within 12 months of the date of approval of Modification 1;

c) provide details of the conceptual final landform and associated land uses for the site (Section 2.2)*;*

d) describe how the implementation of the Biodiversity Offset Strategy would be integrated with the overall rehabilitation of the site (Section 3)*;*

e) describe the short, medium and long-term measures that would be implemented to:

- *manage remnant vegetation and habitat on site;*
- *implement the Biodiversity Offset Strategy; and*
- *ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval;* (Section 6)

f) include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and the rehabilitation of the site (including progressive rehabilitation), including triggering remedial action (if necessary) (Section 9)*;*

g) include a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for:

- *ensuring compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval;*
- *enhancing the quality of remnant vegetation and fauna habitat;*
- *protecting and restoring native endemic vegetation and fauna habitat within any offset areas and rehabilitation areas;*
- *maximising the salvage of environmental resources within the approved disturbance area – including tree hollows, vegetative and soil resources – for beneficial reuse in the enhancement of the biodiversity areas or rehabilitation area;*
- *collecting and propagating seed;*
- *ensuring minimal environmental consequences for the local Tetratheca juncea population;*
- *protecting vegetation and fauna habitat outside the approved disturbance area on-site;*
- *minimising the impacts on native fauna on site, including undertaking appropriate pre-clearance surveys;*
- *controlling weeds and feral pests;*
- *controlling erosion;*
- *controlling access; and*
- *bushfire management;* (Section 6)

h) include a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria (Section 8);

i) identify the potential risks to successful implementation of the Biodiversity Offset Strategy and rehabilitation of the site, and include a description of the contingency measures that would be implemented to mitigate against these risks; and (Section 5)*;*

j) include details of who would be responsible for monitoring, reviewing, and implementing the plan (Section 1.6).

The Proponent must implement the plan as approved by the Secretary.

<u>Rehabilitation Bond</u>

Condition 61 "Within 6 months of the approval of the Biodiversity and Rehabilitation Management Plan, the Proponent must lodge a Rehabilitation Bond with the Department to ensure that the rehabilitation of the site is implemented in accordance with the performance and completion criteria set out in the Biodiversity and Rehabilitation Management Plan and the relevant conditions of approval. The sum of the bond must be determined by:

(a) rehabilitating all disturbed areas of the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and;

(b) employing a suitably qualified quantity surveyor or other expert to verify the calculated costs to the satisfaction of the Secretary.

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

Condition 62 "The Rehabilitation Bond must be reviewed and, if required, an updated bond must be lodged with the Department within 3 months following:

(a) rehabilitating all disturbed areas of the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and; an update or revision to the Biodiversity and Rehabilitation Management Plan;

(b) the completion of an Independent Environmental Audit in which recommendations relating to the rehabilitation of the site have been made; or

(c) in response to a request by the Secretary. (Section 4)

<u>Schedule 5 - Management Plan Requirements</u>

Condition 3: The Proponent must ensure that the Management Plans required under this approval are prepared in accordance with any relevant guidelines, and include:

a) detailed baseline data (Section 2)*;*

b) a description of:

- *the relevant statutory requirements (including any relevant approval, licence or lease conditions)* (Section 1.4)*;*
- *any relevant limits or performance measures/criteria* (Section 9)*; and*
- *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures* (Section 9)*;*

c) a description of the measures that will be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria (Section 6)*;*

d) a program to monitor and report on the:

- *impacts and environmental performance of the project; and*
- *effectiveness of any management measures (see (c) above)* (Section 8)*;*

*e) a contingency plan to manage any unpredicted impacts and their consequences (*Section 9*);*

f) a program to investigate and implement ways to improve the environmental performance of the project over time (Section 14)*;*

g) a protocol for managing and reporting any:

- *incidents* (Section 12)*;*
- *complaints* (Section 11)*;*

- *non-compliances with statutory requirements* (Section 10)*; and*
- *exceedances of the impact assessment criteria and/or performance criteria* (Section 10)*; and*

h) *a protocol for periodic review of the plan* (Section 14).

It is noted that the Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

1.4.2 Statement of Commitments

Table 2 presents the relevant landscape-related commitments from the Statement of Commitments (Appendix 3 of PA10_0183 MOD 1) incorporated within this Plan. These and other control measures, along with and the personnel responsible for implementing these measures are provided in Section 12 of this Plan.

Table 2 Landscape-related Commitments

Commitment		Section of Plan
Terrestrial Flora and Fauna		
8.1	Prepare and implement a Site Vegetation Management Plan (as part of the overall Landscape Management Plan – see Commitment 16.7.	See 16.7 below
8.2	Clearly define the *Tetratheca juncea* sub-populations to be retained.	6.2.4
8.3	Continue the established rehabilitation practices in appropriate areas.	6.2
8.4	Retain the extracted topsoil and vegetation within the immediate area of *Tetratheca juncea* populations and relocate to easement locations.	6.2.4
8.5	Transfer biomass directly from vegetation clearing operations to rehabilitation areas. If it is not possible to transfer directly, stockpile material.	6.2.3
8.6	Control noxious weeds at all times in accordance with a Weed Management Plan (to be incorporated into the site Vegetation Management Plan).	6.2.6
8.7	Install species specific nesting boxes for fauna species displaced following clearing activities, re 20 boxes for microbats, 20 boxes for Little Lorikeets and 30 boxes for Sugar Gliders (see Footnote on Page 11)	6.2.5
Visual Amenity		
12.1	Ensure all vegetation is maintained outside the Southern and Northern Extensions to provide long term shielding.	7.2
12.2	Sequence extraction activities in the Southern Extension to limit exposure of western faces until vegetation is well established.	7.2
12.3	Progressively establish vegetation on extraction faces at 50mAHD[2] and above in western section of the Southern Extension.	7.2
12.4	Advance extraction in the eastern section of the Southern Extension in strips parallel to north-south faces.	7.2
12.5	Include Annual photographs of the progressive rehabilitation of quarry benches in each AEMR.	7.2
Documentation and Further Approvals		
16.7	Landscape Management Plan. (now Biodiversity and Rehabilitation Management Plan (Incorporating a Vegetation Management Plan for site rehabilitation and the on-site Biodiversity offset.)	This plan

[2] This Plan refers to benches above 48m AHD as the focus of revegetation for maintaining visual amenity. This is a result of the final design of the Southern Extraction Area and development of 8m high faces.

1.5 OBJECTIVES AND OUTCOMES

Table 3 presents the overall objectives and key performance outcomes for this Plan and the Quarry, with **Table 4** reproducing the rehabilitation-specific objectives for the Quarry as outlined by *Condition 58 of Schedule 3* of PA10_0183 MOD 1.

Table 3 Objectives and Key Performance Outcomes

Objectives	Key Performance Outcomes
Landscape Management	
(a) To ensure compliance with all relevant project approval conditions, statements of commitment and reasonable community expectations.	(i) Compliance with all relevant criteria and reasonable community expectations, as determined in consultation with the relevant government agencies.
(b) To implement appropriate progressive rehabilitation and landscape management and mitigation measures during all stages of the Quarry	(ii) All identified rehabilitation and landscape management and mitigation measures are implemented in a timely manner.
(c) To appropriately manage site preparation works to ensure that suitable rehabilitation material remain for rehabilitation operations during all stages of the Quarry	(iii) Sufficient, viable rehabilitation materials are available for rehabilitation operations throughout all stages of the Quarry.
(d) To ensure that the visual amenity of residences and public vantage points is not unacceptably impacted by Quarry-related activities.	(iv) Visual amenity management measures are effective and implemented in a timely manner.
(e) To establish a final landform that is consistent with that identified in the *Environmental Assessment.*	(v) Final landform is safe, stable, non-polluting and, consistent with the final land use options.
(f) To establish an appropriate final soil profile and vegetation community on the final landform	(vi) Final soil cover and vegetation is similar to that of the surrounding areas.
(g) To establish an appropriate beneficial final land use consistent with surrounding land uses.	(vii) Final landform is suitable for an appropriate beneficial land use that is consistent with surrounding land uses or Council zoning at the time of Quarry closure.
(h) To appropriately manage those sections of the Site that will not be used for Quarry-related activities.	(viii) Identified areas are managed in a manner that ensures appropriate beneficial use of that land. (ix) Weed management, pest control is extended to these areas.
(i) To implement appropriate weed, pest and bushfire management measures.	(x) Weeds, pests and bushfire risks are appropriately managed in consultation with neighbouring landholders and relevant authorities.
(j) To implement an appropriate complaint handling and response protocol.	(xi) Complaints (if any) are handled and responded to in an appropriate manner.
(k) To implement appropriate corrective and preventative actions, if required.	(xii) Corrective and preventative actions are implemented in a timely manner, if required.
(l) To implement an appropriate incident reporting program, if required.	(xiii) Incidents (if any) are reported in an appropriate manner.

Table 4 PA10_0183 MOD 1 *Schedule 3 Condition 55* Rehabilitation Objectives

Feature	Objectives
Site (as a whole)	• 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 • Minimising visual impacts when viewed from surrounding land
Surface Infrastructure	• To be decommissioned and removed, unless otherwise agreed by the Secretary.
Benched Quarry Walls	• Landscaped and revegetated utilising native tree and understorey species, ensuring that the tree canopy is restored and integrated with the surrounding canopy to minimise visual impacts.
Quarry Pit Floors and Silt Ponds	• Landscaped and revegetated utilising native flora species and felled trees from clearing. • Revegetation not required for existing and proposed industrial areas.
Other land affected by the Project	• Restore ecosystem function, including maintaining or establishing self-sustaining eco-systems comprised of: - native endemic species: and - a landform consistent with Figure 8 (Appendix 6) and the surrounding environment.

1.6 PERSONNEL MANAGEMENT

1.6.1 Roles and Responsibilities

Table 5 presents the roles and responsibilities of the personnel within Teralba Quarry for the implementation of this Plan.

1.6.2 Competence Training and Awareness

All Metromix personnel and contractors and their employees involved with undertaking rehabilitation works will undergo site specific training incorporating awareness of rehabilitation requirements and practices and the management of the biodiversity offset areas within the property boundary as part of the Quarry's Safety, Health and Environmental (SHE) program. The training will relate to the following.

- New rehabilitation areas for which approved access only is permitted.
- Areas being progressively rehabilitated, including visual bunds and vegetation screens.

The Quarry Manager will be responsible for ensuring the appropriate rehabilitation-related training, if appropriate.

Table 5 Roles and Responsibilities for Management of Biodiversity and Rehabilitation

Roles	Responsibilities
Risk Manager	• Compliance to the Biodiversity and Rehabilitation Management Plan. • Must ensure adequate resources are available to enable implementation of the Plan.
Quarry Manager	Accountable for the overall environmental performance of the Quarry operations, including the implementation of the following components and outcomes of this Plan. • Implement all short, medium and long-term management measures identified in Section 6 of this Plan. • Implement the monitoring and evaluation measures identified in Section 9 of this Plan. • Ensure all relevant information is made available to relevant government agencies and the public as described in Section 13 of this Plan. • Review of this Plan as outlined in Section 14.
Quarry Supervisors	• Assist the Quarry Manager in the implementation of the Plan, as required.
All personnel	• If appropriate, ensure training and awareness induction has been undertaken. • Comply with all procedures as outlined within this Plan, as required.

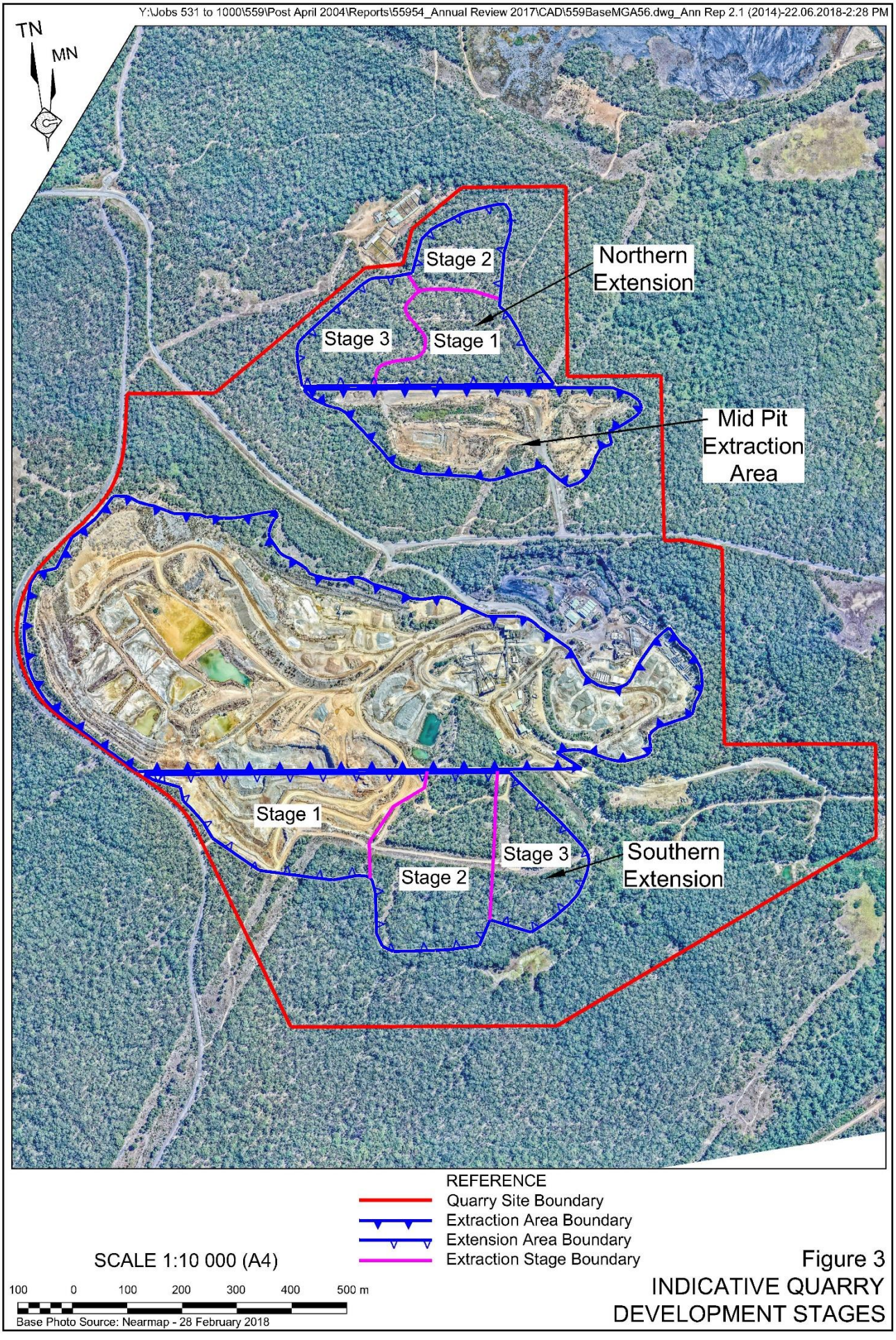
2 THE QUARRY SITE

2.1 QUARRY LAYOUT AND DEVELOPMENT

The approved layout of the Quarry Site is presented on **Figure 2**. The sequence of extraction throughout the life of the Quarry will be consistent with the proposed staging of vegetation clearing and retirement of biodiversity credits. Indicative extraction stages and timing are presented in **Table 6** and **Figure 3**. The indicative timing presented in **Table 6** reflects the timing updated to the date of preparation of this plan, recognising that operations have been occurring in the Southern Extension since February 2013.

Table 6 Staging of Extraction (as at June 2018)

Retirement Stage	Extraction Stages	Indicative Timing	Area (ha)
Stage 1	Southern Stages 1 and 2	Present - 2027	12.37
Stage 2	Southern Stage 3	2028 – 2034	3.16
Stage 3	Northern Stages 1, 2 and 3	2035 - 2038	9.27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TN
MN
Stage 2
Northern Extension
Stage 3
Stage 1
Mid Pit Extraction Area
Stage 1
Stage 3
Southern Extension
Stage 2
REFERENCE
Quarry Site Boundary
Extraction Area Boundary
Extension Area Boundary
Extraction Stage Boundary
SCALE 1:10 000 (A4)
100 0 100 200 300 400 500 m
Base Photo Source: Nearmap - 28 February 2018
Figure 3
INDICATIVE QUARRY DEVELOPMENT STAGES

For the purpose of ongoing landscape management, it is necessary to separately consider those areas of the Quarry Site that would be subject to disturbance and eventual rehabilitation and those areas within the Quarry Site that are not operational areas but are areas over which Metromix has assumed responsibility for landscape management. Non-operational areas are those within the Quarry Site that contain remnant vegetation that would not be disturbed and land within the larger property boundary that is the responsibility of Metromix under its existing lease agreement with the landowner for the purpose of weed and feral animal management.

2.2 FINAL LANDFORM

Figure 4 presents the indicative final landform of the Quarry, which is consistent with the final landform approved in PA10_0183 MOD 1, identifying the proposed final landforms outlined within the following headings. A final landform concept will be presented within a Quarry Closure and Final Land Use Plan that will be prepared separately for the Southern Extension and the Northern Extension areas three years prior to cessation of extraction activities. Extraction activities are estimated to be completed in the Southern Extension by 2034 (plan prepared by end 2031) and in the Northern Extension by 2038 (plan prepared by end 2035)

The indicative final landform has been updated to account for modifications to the proposed power line corridors located on the property. At the time that PA 10_0183 was granted it was proposed that the powerline corridor would pass to the northwest of the Quarry Site, around the Northern Extension Area. This is no longer the case as the proposed corridor is now proposed to join the existing corridor north of Rhondda Road near the entrance to the Northern Extension Area. As a result, area that would have required rehabilitation will continue to be used as a powerline corridor into the future.

North of Rhondda Road

The completed landform in the Mid Pit Extraction Area and Northern Extension will consist of a series of stepped 8m x 8m benches around the perimeter of the area extracted, a shaped overburden emplacement an approximately 9ha of floor. The stepped benches, floor and lower slopes within the extraction area will all be covered with overburden and any recovered topsoil to provide a substrate for the long-term revegetation. Surplus overburden will be progressively placed within an emplacement on the southern side of the completed extraction areas and will be shaped with a relatively flat area with profiled side slopes of between 1:3(V:H) and 1:5(V:H).

It is envisaged that this northern section of this area would provide for an excellent long-term location for the nearby Newtech Pistol Club although, this has not yet been finalised. The final land use of this area would be discussed in further detail with the Newtech Pistol Club closer to this area ceasing all extraction activities and prior to final rehabilitation occurring.

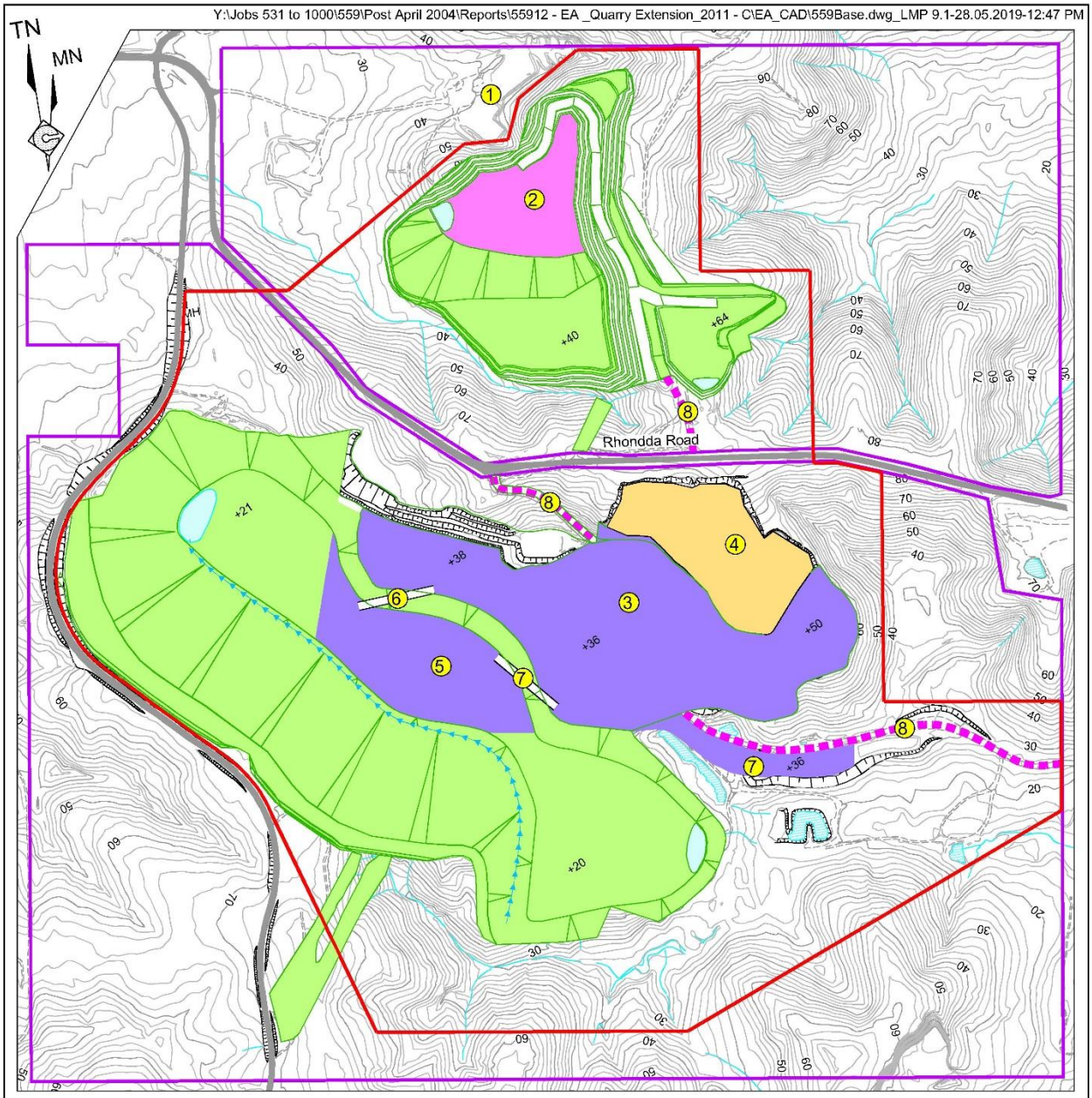


Figure 4
FINAL LANDFORM AND LAND USES

South of Rhondda Road

The eastern section of the Southern Extraction Area will be completed with at least two separate final level areas: the “upper terrace” (Area 4) and “lower terrace” (Area 6), allowing the potential use of the Quarry for industrial purposes similar to that currently undertaken by Downer EDI om Area 5 (an asphalt plant).

The final landform in the western and southern sections of the Southern Extraction Area will utilise the landform created by the silt cells established throughout the life of the Quarry and be comprised of a relatively flat central floor and re-vegetated sloped section.

The southern edges of the final landform will have silt/overburden built up against the terminal faces with the final slope typically between 1:4 and 1:6 (V:H) with a runoff collection drain across the slope positioned to allow all collected runoff to flow at non-erosive velocities to the dam on the western side of the completed extraction area. Virgin Excavated Natural Material (VENM) and Excavated Natural Material (ENM) will be regularly imported and placed against the quarry walls to reduce the grade and to achieve a better final landform. A layer of topsoil will be placed on the final slopes and then stabilised by seeding with quick cover crops such as sterile exotic grasses and/or direct-seeded native plants.

2.3 REHABILITATION DOMAINS

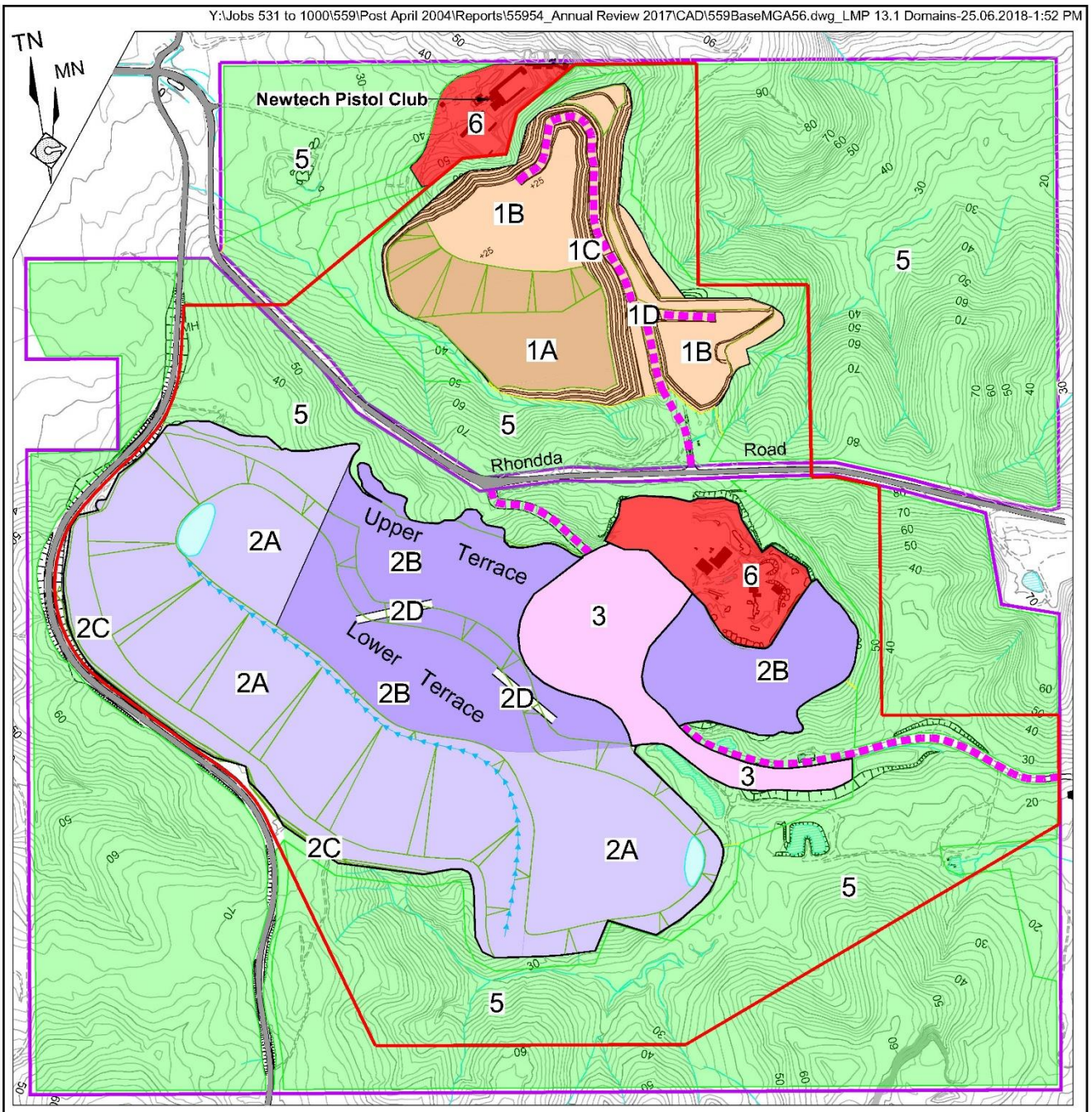
2.3.1 Introduction

Six rehabilitation domains have been recognised across the Quarry Site and are displayed on **Figure 5**. These domains have been further separated into areas in which similar rehabilitation activities would be required. This is intended to guide planning and progressive rehabilitation activities. The following sub-sections address the currently proposed final land use options (as identified on **Figure 4**) for each rehabilitation domain separately so that rehabilitation of the entire Quarry Site remains consistent with the objectives described in Section 1.5.

2.3.2 Domain 1 – Northern Extraction Areas

The area encompassing the completed Mid Pit Extraction Area and Northern Extension (Northern Extraction Areas) will comprise a singular backfilled landform, two separate flat landforms, a series of stepped 8m x 8m benches and an internal access road, as outlined in Section 9 and displayed on **Figure 5**. As each of these areas will serve a different post extraction land use, they have been differentiated as follows.

- Domain 1A – Backfilled Area.
- Domain 1B – Extraction Area Floor
- Domain 1C – Benches



REFERENCE

- Property Boundary
- Quarry Site Boundary
- Contour (m AHD)(Interval =2m)
- Drainage Line
- Sealed Road
- Unsealed Road / Track
- Final Slope
- Drainage Channel (and direction)

Rehabilitation Domains

- Domain 1 - Extraction (Mid Pit & Northern Extraction Area)
- Domain 2 - Extraction (Southern Extraction Area and Southern Extension)
- Domain 3 - Infrastructure Area
- Domain 4 - Quarry Access Roads
- Domain 5 - Non-operational Area
- Domain 6 - Exclusion Area

Note: See Section 2.3 for Domain and Sub-domain Descriptions

SCALE 1:10 000 (A4)

100 0 100 200 300 400 500 m

Base Map Source: Geo-Spectrum (Australia) Pty Ltd

Figure 5
REHABILITATION DOMAINS

- Domain 1D – Internal Access Road.

Rehabilitation works that will be undertaken over the entirety of the Northern Extraction Areas include the bunding and fencing of the upper crest of the areas to prevent inadvertent access by people and the use of appropriate sedimentation controls to ensure that the small amount of water that is not directed to the internal dam, flows off-site at an appropriate water quality. All surface water dams will be retained post extraction activities along with all power infrastructure.

Each post extraction landform identified requires specific different rehabilitation actions and as such, these rehabilitation actions are presented in the following subsections.

Domain 1A – Backfilled Area (Final Land Use – Native Vegetation): 5.2ha

Following the extraction of material to the approved depth of 24m AHD on the western side of the internal access road, overburden will be progressively placed within the southern side of the completed extraction area, to create a relatively flat landform at a nominal elevation of 40m AHD, covering a total area of approximately 2.4ha. The upper surface of the flat landform will be sloped towards the surrounding extraction faces at approximately 1:100 (V:H) to prevent runoff from flowing over the nearby batter slope. A batter slope of 1:4 (V:H) will be created from 40m AHD to 24m AHD with the entire landform revegetated with natural grasses and endemic tree and shrub species.

Domain 1B – Extraction Area Floor: 4.3ha

The base of the Northern Extraction Areas, on the eastern and western sides of the internal access road, will be shaped into two separate near flat landforms of 1.3ha and 3.0ha respectively, with appropriate sedimentation controls. The western extraction area floor will be suited to use by the Newtech Pistol Club or similar group. The eastern extraction area floor will be revegetated with native grasses and native shrub species. Following the completion of extraction, a thin base layer of overburden and/or ENM/VENM will be placed and covered with available topsoil, before being revegetation occurs. The western extraction area floor will be revegetated with native grass species only, however should the proposed recreational land use not eventuate, the revegetation strategy would be amended to incorporate native shrub species. These stabilised and revegetated landforms would provide an acceptable long-term landform consistent with the overarching rehabilitation objectives.

Domain 1C – Benches: 4.6ha

A series of 8m by 8m benches will be progressively created throughout the extraction process and require revegetation. The placement of available overburden and limited biomass will allow the revegetation of these benches to be completed progressively throughout the life of the Quarry.

Domain 1D – Northern Access Road: 0.8ha

It is proposed that the northern internal access road will remain after all post extraction activities are completed to provide access to the extraction area floor for future activities. Rehabilitation within this domain will consist of ensuring that the existing bunding and sedimentation control measures on the northern internal access road are maintained and/or upgraded to continue to provide ongoing safety and to ensure the long-term stability of the northern internal access road.

2.3.3 Domain 2 – Southern Extraction Areas

The area encompassing the completed Southern Extraction Areas will comprise a singular backfilled landform, two separate flat landforms (terraces), a series of stepped benches (8m x 8m up to an elevation of 48m AHD and 4m x 4m above 48m AHD) and an internal access road, as outlined in Section 9 and displayed on **Figure 5**. As each of these areas will serve a different post extraction land use, they have been differentiated as follows.

- Domain 2A – Silt Cells / Extraction Floor
- Domain 2B – Extraction Area Floor
- Domain 2C – Benches
- Domain 2D – Internal Access Road.

Domain 2A – Silt Cells/Extraction Floor: 30.2ha

Following the construction and filling of each silt cell section, the cells will be capped with a layer of overburden and/or ENM/VENM. The final or upper-most silt cell section below the upper surface of the final landform will also be capped with a layer of overburden and/or ENM/VENM and shaped to create a final slope of between 1:4 and 1:6 (V:H), consistent with **Figure 5**. This domain also incorporates small sections of the final extraction areas covering approximately 10ha to be incorporated into the area to be revegetated with native vegetation.

The final silt cell landform will comprise a total area of approximately 22ha and be revegetated through a combination of natural regeneration and selective direct seeding. Seed collected from the principal on-site tree and shrub species will be used in the direct seeding program.

The toe of the silt cells will incorporate a defined drainage channel to direct runoff from the final landform in a westerly direction towards a storage dam (**Figure 5**).

The final batters in the southern section of Domain 2A (i.e. not associated with the silt cells) will be shaped with overburden and ENM/VENM to achieve the required slope and revegetated through a mixture of natural regeneration and selective direct seeding program.

The extraction area floor within Domain 2A will be covered with available overburden and/or imported ENM/VENM to achieve the final land height and revegetated with a mixture of native grasses and seeded with locally collected trees and/or shrub seeds, as required.

Domain 2B – Extraction Area Floor: 17.9ha

The areas nominated as Domain 2B on **Figure 5** are planned to be used for an as-yet-undetermined industrial use, consistent with the area zoned 4(1) Industrial Core as provided by Council's Local Environmental Plan Land Zoning Map. The topographic barriers created within the Quarry and the natural topography east of the Quarry will continue to provide an excellent barrier between the proposed industrial activities and the residential properties within Teralba. To achieve this, the final extraction area floor will be completed in the central section of the Southern Extraction Area as two separate flat landforms (an 'upper terrace' and 'lower terrace'), at approximately 36m AHD and 21m AHD, resulting in 7ha and 14.2ha areas respectively. Following the completion of extraction activities, the exposed extraction area floor forming the lower terrace will be covered with a limited thickness of overburden/ ENM/VENM. The upper terrace will be created through the placement and compaction of imported VENM/ENM and materials excavated from the levelling of the area currently occupied by the processing plant.

It is planned that the completion of Domain 2B for its subsequent industrial land use will be discussed with industrial property developers prior to the cessation of quarry-related activities. These discussions would identify the extent of final drainage works and revegetation required to ensure an appropriate transition to the longer term industrial land use.

The upper and lower terraces will be separated by an approximately 50m wide batter slope, with a slope of between 1:3 and 1:6 (V:H) and a height of approximately 15m (difference in elevation between the two final flat landforms). This landform will be shaped with overburden and ENM/VENM to achieve the required slope and revegetated through a mixture of natural regeneration and selective direct seeding program.

All surface water dams will be retained post extraction activities along with all power infrastructure.

Domain 2C – Benches: 3.6ha

A series of 8m by 8m benches will be progressively created as extraction progresses. Benches above and elevation of 48m AHD would be further split to create approximately 4m x 4m benches. Split benches would be prioritised for progressive revegetation to allow vegetation to establish and cover retained faces that may be visible from distant vantage points (see Section 7). The rehabilitation of retained benches would be consistent with Domain 1C and involve placement of available overburden and limited biomass on terminal benches, followed by revegetation through the spread of native seed. Benches above an elevation of 48m AHD may be planted with tubestock to encourage faster development so that retained faces are screened.

Domain 2D – Access Road

Access between the upper and lower terraces will be provided by the formation of one or possibly two access roads (indicative location shown on **Figure 5**) and be approximately 80m long, 10m wide. The access roads will remain unsealed with appropriate drainage and bunding options installed.

2.3.4 Domain 3 – Processing and Infrastructure Area: 6.1ha

Domain 3 will incorporate an extension of the upper terrace landform (at approximately 35m AHD) with rehabilitation works consistent with that of Domain 2B and will also include the removal of the existing processing plant, the related infrastructure. Following the decommissioning of the processing plant, related infrastructure, the size of the final area within Domain 3 will be approximately 6.1ha.

The infrastructure area will also include the activities that are currently being undertaken within the existing and proposed workshop and administration area. The area adjacent to the quarry access road near the proposed new office is referred to as the eastern terrace. This area will have an elevation of approximately 48m AHD.

2.3.5 Domain 4 – Quarry Access Roads: 1.4km

Final use of the quarry access road will depend on the post-extraction land use for the Extraction and Infrastructure Areas, however, it is anticipated that the Top Gate, Bottom Gate and Mid Pit Access roads will remain in place to permit vehicular access to those areas regardless of post extraction industries existing at that time.

2.3.6 Domain 5 – Non-Operational Areas: 153.3ha

The areas identified as non-operational areas on **Figure 5** will not be disturbed and will be left to continue to exist in their natural state. The only activities to occur within these areas are related to the ongoing weed and pest management activities scheduled to occur in other sections of the Quarry Site.

2.3.7 Domain 6 – Excluded Areas: 6.2ha

The key excluded area is the land occupied for the Downer EDI Asphalt Plant. The responsibility for the decommissioning of that land and its rehabilitation will be the responsibility of the occupier of the subject land.

The area of land currently used by the Newtech Pistol Club is also an excluded area. The rehabilitation of this area is the responsibility of the club and is not covered by PA10_0183 MOD 1.

3 BIODIVERSITY OFFSET STRATEGY

Condition 52 of Schedule 3 of PA10_0183 (MOD 1) requires Metromix to retire biodiversity credits generated from the Teralba Quarry Extension Project in accordance with the Biodiversity Offset Scheme of the *Biodiversity Conservation Act 2016(BC Act)* to the satisfaction of the Secretary and

OEH. The Biodiversity Offset Strategy for the Quarry was approved by DPE on 20 July 2018 and a copy is included as **Appendix 2**. It is noted that since that time Metromix has purchased and retired biodiversity credits in satisfaction of Condition 54 of *Schedule 3* PA 10_0183 (MOD1) (confirmed by OEH on 21 December 2018). The commencement of operations in Stage 3 of the Southern Extension is currently planned to commence in 2028. Ecosystem credits required under Condition 54 *of Schedule 3* of PA 10_0183 (MOD1) would be retired prior to any vegetation clearing in this stage.

4 REHABILITATION BOND

The Rehabilitation Bond for the Quarry was reviewed, and the approved bond estimate lodged with the Department of Planning and Environment in October 2016. The Rehabilitation Bond was estimated to account for the three years of operations from October 2016 (i.e. until October 2019). This Plan does not alter proposed Quarry development or progressive rehabilitation to the extent that an update to the Rehabilitation Bond is necessary at this time. The Rehabilitation Bond will be reviewed, and if necessary an updated bond will lodged with the Department of Planning and Environment in October 2019.

5 BIODIVERSITY AND REHABILITATION RISKS

Condition 60(i) of Schedule 3 of PA10_0183 (MOD 1), requires that this Plan include a description of the potential risks to the successful implementation rehabilitation of the Quarry, along with a brief description of the contingency measures that will be implemented to mitigate these risks. This section has been prepared in satisfaction of that requirement.

For the purpose of this Plan, risk is the potential for events to occur that will have an adverse impact on the completion of progressive or final rehabilitation operations and successful implementation of the Biodiversity Offset Strategy. The following analysis of rehabilitation risks has been prepared generally in accordance with the requirements of AS/NZS ISO 31000:2009 *Risk Management – Principles and Guidelines*.

Typically, risk is measured in terms of the likelihood (or probability) of the event occurring and the consequence (or severity) if it does. This analysis results in a range of risk ratings from low to extreme.

Table 7 provides an overview of the relevant rehabilitation and landscape management risks associated with the ongoing Quarry development. For the purpose of considering ongoing risks, the likelihood and consequence have been determined without mitigation, however given the successful implementation of controls or management measures to date, and assuming these are continued, a 'mitigated' risk rating is a provided. Metromix is confident that the mitigation of rehabilitation and landscape management risks have and will continue to reduce environmental risks associated with rehabilitation of the Quarry to a low level.

Table 7 Rehabilitation and Landscape Management Risk Analysis

Risk Source / Event	Consequence	Likelihood	Unmitigated Risk Rating	Mitigation Measure or Activity(ies)	Mitigated* Risk Rating
Final slopes on rehabilitated landform too steep or do not conform with approved final landform.	**Moderate** Likely failure of rehabilitation or significant cost to rectify.	**Unlikely** Could occur but not expected.	**Moderate**	Ensure all final slopes to be revegetated are less than 1:3 (V:H). Provide appropriate training of mobile equipment operators and provision of final landform plan. Inspection and survey of final slopes prior to spreading soil.	**Low**
Ineffective sediment and erosion control.	**Minor** Potential for discharge of sediment-laden water.	**Unlikely** All extraction areas are, and will continue to be, internally draining. Could occur from infrastructure areas.	**Moderate**	Inspect sediment and erosion control structures at EPL discharge points upon their completion and regularly thereafter.	**Low**
Insufficient soil/growth medium.	**Moderate**. Potential for failure of rehabilitation and importation of soil at significant cost.	**Unlikely** Could occur but not expected (negligible natural soil in some areas).	**Moderate**	Ensure soil (where present in sufficient thickness) is stripped, handled and stockpiled in accordance with Section 6.2.1 of this Plan. Review and update (if necessary) soil inventory.	**Low**
Soil is adversely affected by long term storage.	**Minor** Potential effect on rehabilitation success without application of ameliorants.	**Unlikely** Could occur but not expected.	**Low**	Minimise long-term soil stockpiling where possible. Ensure soil is stockpiled in accordance with Section 6.2.1 of this Plan.	**Low**
Poor seed/tube stock quality or ineffective revegetation techniques.	**Minor** Potential effect on rehabilitation success without further application of seed.	**Unlikely** Could occur but not expected.	**Low**	Ensure appropriate seed and/or tube stock is obtained from a seed collection program, a reputable nursery or seed store. Ensure that revegetation techniques meet best practice.	**Low**
Inappropriate species types chosen for the type of rehabilitation.	**Moderate** Reduces biodiversity value of rehabilitation.	**Unlikely** Could occur but not expected.	**Moderate**	Ensure species utilised in rehabilitation are equivalent to those within the surrounding landscape.	**Low**
Infestation of rehabilitation area(s) by weeds.	**Minor** Potential effect on rehabilitation success.	**Possible** Could occur	**Moderate**	Undertake ongoing weed control until the rehabilitated area(s) are established and stable.	**Low**

Table 7 Rehabilitation and Landscape Management Risk Analysis (Cont'd)

Risk Source / Event	Consequence	Likelihood	Unmitigated Risk Rating	Mitigation Measure or Activity(ies)	Mitigated* Risk Rating
Infestation of rehabilitation area(s) by feral animals	**Minor** Potential effect on rehabilitation success.	**Possible** Could occur	**Moderate**	Undertake, in consultation with surrounding landholders, pest control during the life of the Quarry.	**Low**
Quarry infrastructure, including processing plant, buildings and ancillary equipment inappropriately or not completely removed.	**Minor** Unlikely to result in environmental harm.	**Unlikely** Quarry infrastructure will have residual value at the end of quarry life and will be removed to another site or for scrap.	**Low**	Appropriate contractual arrangements and close supervision of the demolition contractor. Inspection of Quarry prior to finalising payment of contractor.	**Low**
Poor visual amenity management.	**Moderate** Noticeable change in outlook from viewshed areas	**Possible** Could occur	**Moderate**	Commence rehabilitation and revegetation of upper benches as soon as practically possible to encourage vegetation screening of terminal faces. Implement measures to improve growth of vegetation on upper benches in areas that may be visible.	**Low**
* Assumes adoption of mitigation measure(s) or activity(ies)					

6 BIODIVERSITY AND REHABILITATION MANAGEMENT

6.1 INTRODUCTION

The following subsections address *Condition 60(e)* and *Condition 60(g) of Schedule 3 of* PA10_0183 (MOD 1) and outline the short, medium and long-term management measures that will be implemented to manage remnant vegetation and habitat on site and ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in PA10_0183 MOD 1. It is currently proposed that the implementation of the Biodiversity Offset Strategy would not involve on-site activities and therefore this matter is not relevant to ongoing management measures or progressive rehabilitation.

There are a range of ongoing management measures that will be implemented over the life of the Quarry. These measures are considered as short-term measures for the purpose of this document, however, it is noted that these measures will continue to be implemented over the long-term.

The management time frame for the purpose of this Plan is as follows.

- Short term: Present to 2021 (next three years).
- Medium term: 2021 to 2026 (five-year period).

- Long term: 2026 to Project completion.

The description of short term measures is intended to also satisfy *Condition 60(g) of Schedule 5 of* PA10_0183 (MOD 1) . The medium and long-term management measures relate more to longer term visual management and the ongoing rehabilitation of terminal faces and operational areas as well as the related maintenance activities for the completed quarry sections.

6.2 SHORT TERM MANAGEMENT MEASURES

The following information outlines the short-term management measures that will be undertaken immediately prior to or following any activities at the Quarry that will require rehabilitation.

6.2.1 Preparation and Vegetation Clearing Activities

As indicated in Section 2.1 and shown on **Figure 3**, the Quarry will be developed in a series of stages, each representing extraction activities within different extraction areas. The staging of operations is designed to provide specific guidance for the implementation of the Biodiversity Offset Strategy. It is not proposed that land preparation and vegetation clearing would occur over a single stage at once. It is more likely to involve progressive activities as extraction areas are developed. At a maximum, vegetation clearing will provide for six months of future quarrying in accordance with *Condition 27 of Schedule 3 of* PA10_0183 (MOD 1). The following activities will be undertaken during each preparation campaign, namely during vegetation removal, soil stripping and stockpiling and initial overburden removal. These activities will be undertaken, as required, throughout the life of the Quarry.

- Undertake a pre-clearance survey of areas to be cleared and identify and clearly mark any trees with hollows. The pre-clearance survey will be undertaken by a qualified ecologist or other person with suitable qualifications or experience to undertake the works. The pre-clearance survey will seek to determine the risk to wildlife habitats associated with vegetation clearance. It will identify those habitat features that may host fauna and therefore minimises the risk of impact by highlighting those areas that need special care or treatment, especially where hollow-bearing trees are present.

- Clearly mark on the ground all areas of approved disturbance to be cleared to ensure that all equipment operators are aware of the areas to be prepared and the areas outside of the approved areas of disturbance that are to be protected.

- Install downslope interim surface water drainage features, where appropriate, and limit stripping activities near defined drainage lines to a maximum of 20m width at any one time to minimise exposed areas.

- A suitably trained wildlife handler will be present to supervise all vegetation clearing. A survey of the area to be cleared and search of the habitat areas identified in previous survey will be

undertaken immediately prior to clearing commencing. The primary aim of this survey would be to inspect the habitats within and adjoining the clearing areas for any fauna (particularly threatened species), including arboreal searches for Koalas, terrestrial searches amongst logs and areas of dense vegetation for ground-dwelling species. This will minimise the risk of direct mortality or injury during vegetation clearing.

- Any small ground dwelling fauna would be captured and appropriately relocated into suitable habitat areas greater than 50m from the area to be cleared. If arboreal fauna are detected, a 10m construction buffer area is to be established around non-threatened fauna, while a 30m construction buffer area is to be established around significant fauna (e.g. Koalas) until the specimen voluntarily moves on. If significant non-mobile fauna or significant habitat features are identified (e.g. raptor nest), a buffer area would be established as per the above and OEH contacted immediately. The buffer area would be maintained until appropriate measures have been implemented to protect and relocate the fauna.
- Remove/pushover large vegetation (excluding hollow trees) in 20m width strips, using a bulldozer with its blade positioned just above the ground surface so as not to disturb the groundcover and topsoil.
- Leave trees with hollows for at least 24 hours after other clearing activities to allow any fauna the opportunity to vacate the hollow.
- When it comes time to remove the hollow-bearing tree, bump trees with hollows several times and wait 15 minutes before pushing over the subject trees.
- Utilise a suitably trained wildlife handler to check any hollows to remove any fauna within the felled hollows, ensuring that any fauna is either released into surrounding vegetation, or is taken to a local vet for assessment should it show signs of trauma. Any identified fauna and would be recorded for future reference.
- Stockpile (or transfer directly, if possible) large vegetation for placement in areas being revegetated for use in the active rehabilitated areas as habitat for native fauna.
- Remove surface rocks and stockpile for subsequent use during rehabilitation to re-establish habitat for reptiles and small mammals.
- Strip groundcover vegetation, available topsoil and subsoil in all areas of disturbance using a bulldozer or excavator. Topsoil, where it is present in sufficient thickness to remove, should typically be stripped.
- Strip soil materials only when they are moderately moist to preserve soil structure and prevent erosion.
- Stockpile topsoil and subsoil materials separately, i.e. if not directly transferring soil materials to a rehabilitation area.

- Construct soil stockpiles as low, flat mounds to a maximum height of 2m (topsoil) and 4m (subsoil) to maintain the available seed bank.
- Place vegetation (or equivalent sediment catching features such as silt-stop fencing or hay bales) immediately downslope of active areas to act as a sediment trap and reduce sediment-laden runoff. This activity will be undertaken as required and maintained for the duration of the disturbance.

Only vegetation in areas within the boundary of an approved Extension Area will be cleared with the remnant vegetation outside of these areas left within their natural state other than minor sections of vegetation to be removed to permit access to the boundary of the Extraction Area. It is not this disturbance will be minimal and only undertaken, when required.

6.2.2 Seed Collection Program

To assist in the rehabilitation of previously disturbed areas in which direct seeding is required, it is proposed that throughout the ongoing Quarry's operations, a seed collection program will be undertaken to collect natural seed from the principal tree and shrub species occurring on the Property. This program will involve the collection of native seed from surrounding remnant vegetation during seeding seasons, with the seed preferably sourced immediately adjacent to the areas proposed for rehabilitation. If however, this is not possible, seed will be collected from elsewhere within the Quarry Site that consists of similar vegetation community to that of the proposed final landform for future use.

The seed collection program will occur throughout the years when seed is available, ensuring that not all seed is removed from the area, allowing the remnant vegetation to continue to reproduce naturally as well as providing for the proposed rehabilitation purposes. Seed that is collected and not used immediately will be stored on site, for future use throughout the remainder of the year, where required.

6.2.3 Progressive Rehabilitation

Progressive rehabilitation (*Condition 59 of Schedule 3 of* PA10_0183 (MOD 1)*)* will be undertaken, as required, throughout the life of the Quarry, namely on final quarry benches and immediately following the cessation of extraction activities. Progressive rehabilitation will also be undertaken to reduce the potential for dust generation from exposed surfaces throughout the Quarry. It should be noted that the final land use of sections of the extraction floor south of Rhondda Road is likely to be used for industrial purposes with the remaining sections of the extraction floor marked for revegetation. Revegetation and rehabilitation of the extraction floor is also addressed in long-term rehabilitation.

In summary, the following short term progressive rehabilitation will be undertaken.

- Undertake the direct transfer (where possible) of available topsoil, subsoil and biomass onto active rehabilitation areas.

- Place weathered overburden on the final terminal benches (up to 1.3m deep) and cover with available biomass, consistent with that shown on **Figure 6.** This procedure will also be implemented on the final floor of the extraction areas, adjacent to the terminal face. The upper surface of the placed overburden will be sloped towards the adjoining terminal face.
- Spread locally sourced seed or plant tubestock within the substrate on each bench to promote the propagation of native vegetation.
- The ongoing progressive rehabilitation undertaken to date within the Quarry Site indicates that the transfer of biomass material, accompanied by bush regeneration has been relatively successful in the re-establishment of an open forest vegetation community with respect to both species present and general vegetation structure.

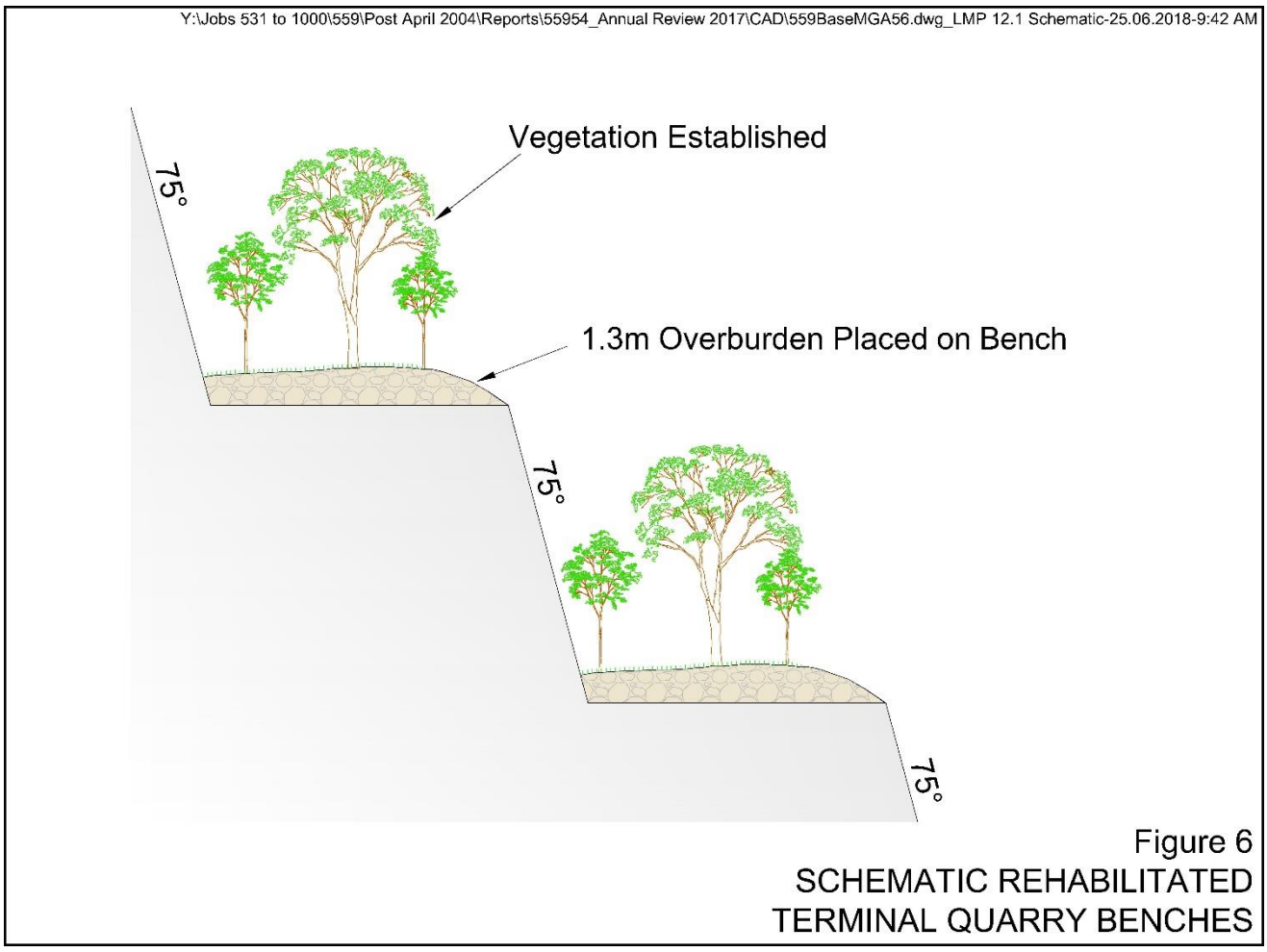


Figure 6
SCHEMATIC REHABILITATED TERMINAL QUARRY BENCHES

Revegetation activities will concentrate on restoring the Spotted Gum - White Mahogany - Grey Ironbark Open Forest & Woodland vegetation removed for development of the Quarry. **Table 8** presents indicative species and planting density for revegetation activities at the Quarry.

Table 8 Indicative Planting Species List and Density

Vegetation Community	Type	Species	Indicative Planting Density
Spotted Gum - White Mahogany - Grey Ironbark Open Forest & Woodland	Trees	*Corymbia maculata,* *Eucalyptus acmenoides* *Eucalyptus paniculata* *Eucalyptus umbra* *Angophora costata*	490 plants per hectare based on 6m spacing
	Shrubs	*Acacia implexa,* *Acacia ulicifolia* *Podolobium ilicifolium*	1 480 plants per hectare based on 3m spacing
	Groundcover	*Lomandra filiformis* *Entolasia stricta* *Imperata cylindrica* *Themeda australis*	2 470 plants per hectare based on 1.5m spacing

6.2.4 Vegetation Management

In order to ensure that the quality of existing remnant vegetation and fauna habitat within vegetated areas within the Quarry Site is maintained or enhanced, the following key short-term management measures will be implemented.

- Clearly mark on the ground all areas to be rehabilitated to ensure that all equipment operators are aware of these areas.
- Access around the site for all heavy and light vehicles will be restricted primarily to the haulage roads. All other areas will only be accessed on an as-needs basis.
- The long-standing weed management program will be continued, particularly on the edges of the cleared areas that are more prone to weed invasion.

Figure 7 displays the locations of the endangered plant *Tetratheca juncea* identified in ecological surveys for the Teralba Extensions Project. In May 2015, approximately 40 *Tetratheca juncea* that were within the Quarry Site were translocated by officers of T.E.N.T.A.C.L.E. Inc to a location outside the disturbance area (see **Figure 7**). Four months after translocation T.E.N.T.A.C.L.E. Inc. reported a survival rate of 80%. Monitoring of translocated *Tetratheca juncea* during 2017 indicated that the survival rate for translocated *Tetratheca juncea* was 75%. Annual monitoring of the translocated *Tetratheca juncea* will continue for the next three years (that is until 2020) to record the survival rate and plant condition of the translocated species. The monitoring results will be presented in each Annual Review in conjunction with reporting on bush regeneration activities.

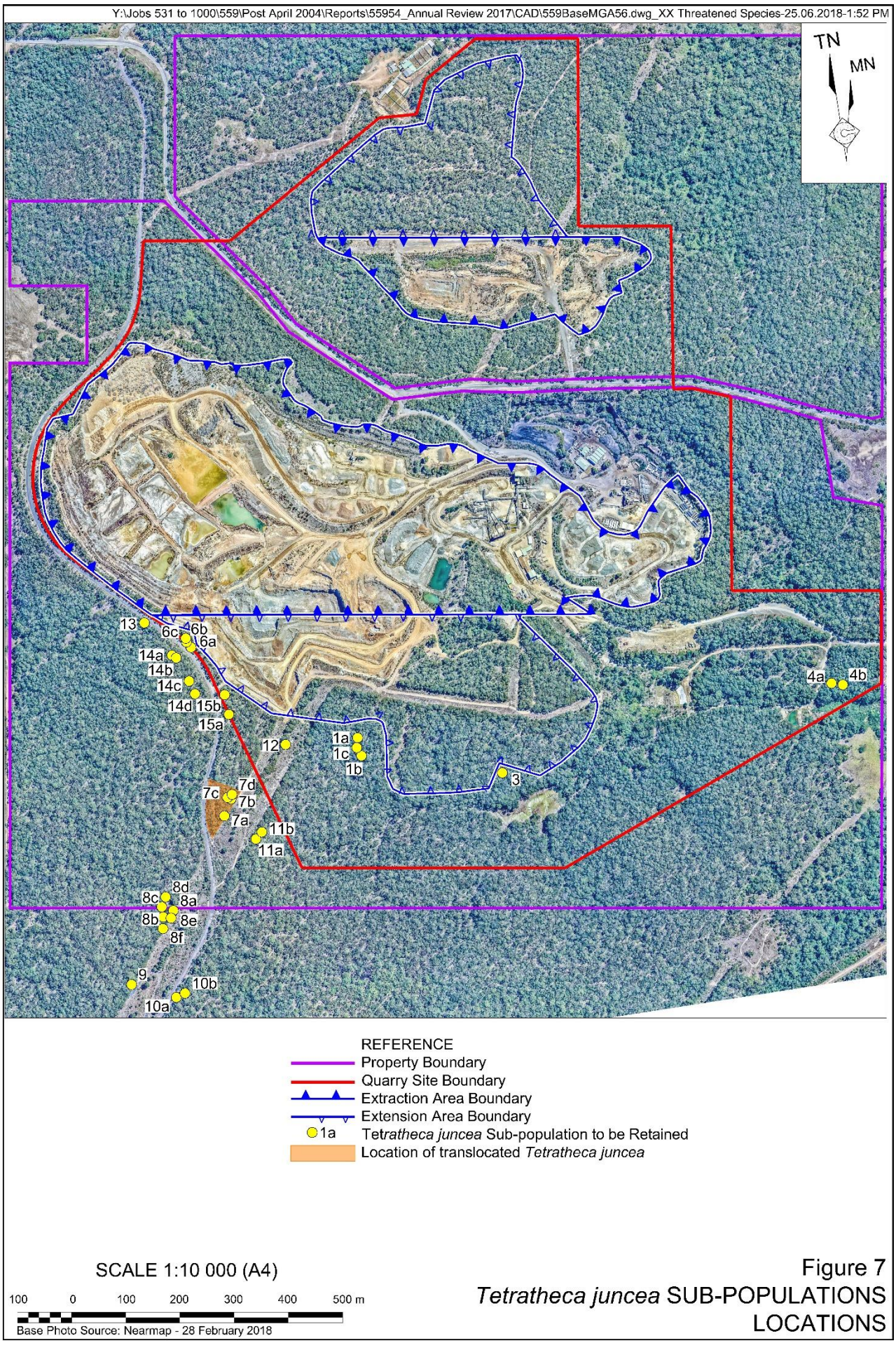


Figure 7
Tetratheca juncea SUB-POPULATIONS LOCATIONS

6.2.5 Fauna Habitat

In accordance with *Condition 50 of Schedule 3 of* PA10_0183 (MOD 1), Metromix has installed 20 nest boxes for microbats, 20 nest boxes for Little Lorikeets and 30 nest boxes for Sugar Gliders. It is noted that a clerical error in *Condition 50 of Schedule 3 of* PA10_0183 (MOD 1) mistakenly refer to Sugar Gliders, however nesting boxes for the Squirrel Glider have been installed consistent with the potential impact to habitat for this species.

To date there has been little evidence of inhabitation of the nesting boxes. The nesting boxes are monitored annually with damaged boxes replaced or boxes that are not being used relocated to encourage use.

6.2.6 Weed and Pest Management

Lantana, Crofton Weed, Camphor Laurel, Privet, and invasive exotic grasses including Pampas, Kikuyu, Paspalum, Setaria, Veldt Grass and Green Panic are weeds that have as some time been identified in the Quarry Site. The most significant of these weeds in terms of existing area of occupation and density of infestation are Lantana and Crofton Weed. They occur in both the Blue Gum – White Stringybark community and in moist protected parts of the Spotted Gum - White Mahogany - Grey Ironbark community.

Weed management at the Quarry has been undertaken throughout historic operations and included both the active areas of the Quarry and the remaining vegetation within the property that will not be disturbed for Quarry operations. It is noted that the land surrounding the active areas of the Quarry are zoned E2 – Environmental Conservation and is valued as a regional wildlife corridor. Therefore, weed and pest management in this area are intended to enhance the biodiversity values in the surrounding undisturbed areas and mitigate any edge effects of the operation. Weed management activities have been reported in the Annual Review each year and a report prepared by the contracted bush regeneration specialists.

Fauna surveys have previously identified the House Mouse, Black Rat, Brown Hare, Rabbit, Dog, Fox and Feral Cat within the Quarry Site. Metromix manages disturbed areas and particularly buildings to ensure that pest species are not encouraged. There has not been any need for feral animal control programs on the Quarry Site since operations commenced.

The following short-term management measures will continue to be undertaken, consistent with weed and pest management activities currently occurring at the Quarry.

- Implement an annual weed and pest inspection, control and reporting program. The program will be undertaken by a suitably qualified and experienced person using weed removal techniques suitable for the treatment of the identified species and with reference to the relevant regional strategic weed plans. The resulting report will provide the following.
  - An overview of the weed and pest management controls implemented since the last report.

  - The weeds identified during the site inspection, focusing particularly on priority weeds and additional species of concern for the Hunter Region and Weeds of National Significance or those on the National Environmental Alert List. These weeds will be considered 'priority' weeds for management.
  - The pests identified during the site inspection.
  - Recommendations in relation to weed and pest management measures to be implemented during the subsequent 12-month period.
  - Implement the weed and pest management measures identified in the above report, in consultation with surrounding landholders and other stakeholders, as required.
- Utilise direct transfer or stockpiling of soil and biomass from vegetation clearing operations, together with seed harvested from local trees to minimise opportunities of transfer of Myrtle Rust into the Quarry Site from outside as part of rehabilitation operations.
- Metromix uses wheel wash systems and limits access to areas outside of the Quarry Site in order to limit the potential spread of weeds on vehicles tyres or during clearing activities.

6.2.7 Quarry Access Management

Active sections of the Quarry will continue to be accessible by the Top Gate and Bottom Gate within the southern section of the Quarry and by the Mid Pit Entrance for the northern section of the Quarry. Access to other sections of the Quarry will also be provided from the Private Coal Haul Road and the Newtech Pistol Club entrance.

All gates will be locked outside of the approved operating hours with access to the Quarry outside the approved operating hours restricted to approved personnel undertaking non-audible activities only.

6.2.8 Bush Fire Management

6.2.8.1 Introduction

Management of bushfire risks within the Quarry Site will be undertaken in consultation with the local Rural Fire Service and surrounding landholders. In summary, however, when managing for bushfires, two aspects will be managed, namely:

- the risks associated with ignition and progression of a bush fire (bush fire prevention); and
- the hazards associated with managing an active bush fire either initiated within or beyond the Quarry Site.

6.2.8.2 Bush Fire Prevention

Three factors must be present for a bush fire to occur, namely oxygen, fuel and an ignition source. Other factors will affect the progress of a bush fire. While exclusion of oxygen is not feasible, each of the remaining issues will be managed as follows.

Fuel

An asset protection zone of greater than 10m has been established around all built structures within the Quarry Site, including areas where hydrocarbons are stored. Within this area, trees and shrubs are maintained in such a manner that the vegetation is not continuous.

Ignition Sources

Sources of ignition and the associated management measures that are implemented include the following.

- Mobile Equipment
  - The bulk of the Quarry-related activities will continue to be undertaken, where practicable, in cleared areas.
  - All mobile equipment will be maintained in good working order with appropriate exhaust and fire suppression systems.
  - No earthmoving equipment will be used to clear vegetation during periods when a total fire ban is in effect.
  - All mobile equipment working in vegetated areas will be inspected to ensure that they do not pose a risk of starting a bush fire. This will include inspection of exhaust and electrical systems, including, in the case of vehicles using unleaded petrol, catalytic converters.
  - Mobile equipment working in vegetated areas will not be left unattended with the engine running.
  - All mobile equipment will be fuelled in a cleared area with at least 10m of cleared ground around the point of refuelling.
- Other Operations
  - Welding or cutting operations will, as far as practicable, be conducted and confined to the main workshop area or within cleared areas in the appropriate area.
  - All work areas will be equipped with suitable fire extinguishers and their locations indicated by appropriate signage.
  - Hydrocarbons will only be stored within appropriately constructed and bunded hydrocarbon storage areas with suitable fire extinguishers, and appropriate signage, located in the vicinity.

6.2.8.3 Active Bush Fires

The following measures will be implemented to enable appropriate management of active bush fires.

- Appropriate fire fighting equipment is maintained within the Quarry, including fire extinguishers and a water truck with sprays and water cannon. Each item of earthmoving equipment is equipped with a 9 kg dry powder fire extinguisher. The presence and functionality of the extinguishers are checked every six months.
- All mobile equipment will continue to be equipped with appropriate communication equipment, including two-way radios and/or mobile telephones.

Existing pumps, stand pipes and water filling points will be maintained/upgraded in the processing plant, administration and workshop areas to enable refilling of fire fighting equipment, including Rural Fire Service equipment. The Quarry is able to provide two filling points to be compatible with Rural Fire Service standard fittings. These are located at the watercart fill point and Dam G.

6.2.9 Erosion and Sediment Control

The following short-term erosion and sediment control measures will be implemented at the Quarry during clearing, operational and rehabilitation activities.

- As vegetated areas are cleared, vegetation will be pushed to the down-slope side of the cleared area and temporarily stockpiled acting as a sediment barrier. Reliance will be placed upon collection and diversion drains formed on the edges of internal haul roads.
- Where required (as Metromix has not previously found it necessary to install erosion and sediment controls due to infiltration rates on site), silt-step sediment fences, diversion drains and turbidity barriers will be installed down slope of any disturbance, in accordance with the Blue Book (Landcom, 2004).
- Sediment dams in each operational area will be regularly inspected and cleaned, as required.

6.3 MEDIUM AND LONG TERM MANAGEMENT MEASURES

This subsection describes the measures that will be implemented in the medium and longer term, which is considered at a scale of the next 5 years (medium term) and from that time to Project completion (long term). It is anticipated that at the end of the next three years of operations, extraction will have reached Stage 2 within the Southern Extension. It is noted however, that many factors may influence the development of the Quarry following the initial three year period, including:

- the rate at which the extraction area is developed, which in turn is dependent on market conditions and the rate of extraction; and
- resource-related issues, including the distribution, availability and properties of materials within the extraction area and the demand for particular products.

As a result of these factors, the extent of the anticipated extraction operations is indicative only.

The principal activities that will occur over and above ongoing management measures include the progressive rehabilitation of the terminal benches within the Southern Extension. This will involve rehabilitation consistent with the description of progressive rehabilitation in Section 6.2.3.

It is anticipated that in the medium term (3 to 8 years) extraction will proceed to Stage 2 of the Southern Extension and eventually reach completion of the boundaries of Stage 2. At this time, revegetation of the upper benches within Stage 1 would be completed and revegetation commenced in the remaining stages of the Southern Extension. Ongoing management would involve monitoring and evaluation of vegetation development. It is anticipated that by the time the transfer and placement of overburden and/or importation of VENM or ENM material would be at a more regular rate in the lower terrace in order to establish the final landform.

The management of visual amenity within the Quarry Site is described in detail in Section 7. However, it is anticipated that in the medium and long term, the development of vegetation will progress to the extent that the upper benches (i.e. those potentially visible from distant vantage points) will be revegetated and the vegetation has reached a height of 2m to 3m by the end of year 5 and continue to a height of at least 4m (therefore screening terminal faces).

6.4 MANAGEMENT OF NON-OPERATIONAL SECTIONS OF THE QUARRY SITE

The key exclusion area, with respect to Metromix's operations within the Quarry Site, is the asphalt plant currently operated by Downer EDI. This plant has been in operation for in excess of 30 years and has an approval (through existing use rights) to produce up to 80,000 tonnes of asphalt per year. The plant operates totally independently to Metromix's operations, however, both Metromix and Downer EDI meet regularly to discuss issues of mutual interest including traffic and water management.

Both Metromix and Downer EDI and their respective customers, contractors and visitors share the same two access routes (i.e. to and from the Top Gate and Bottom Gate), although the majority of vehicles travelling to Downer EDI use the Top Gate entrance only.

Stormwater at the Downer EDI site all drains internally and reports to an Oil Separator and Silt Trap prior to the overflow being discharged into the Metromix stormwater network. It is anticipated that the ongoing management of stormwater would continue to be discussed quarterly between Metromix and Downer EDI.

In addition, Metromix will continue to undertake general landscape management activities in areas that contain remnant vegetation within the Quarry Site and within the larger property boundary. Activities in these areas would be limited to managing the spread of weeds and feral animal controls (consistent with Section 6.2.6).

7 MANAGEMENT OF VISUAL AMENITY

7.1 SURROUNDING VANTAGE POINTS

The assessment of changes to visual amenity for the *Environmental Assessment for the Teralba Quarry Extensions* (RWC, 2011) considered that it was possible that some of the upper benches within the Southern Extraction Area and Southern Extension would eventually become visible from the area described as general 'vantage points' located within 5km of the Quarry and displayed in **Figure 8**.

Under Lake Macquarie Council's *Scenic Management Guidelines*, the setting of the Quarry falls within the 'Cockle Bay Landscape Setting', which is identified as having a moderate scenic quality rating. A description of the Cockle Bay Landscape Setting provided in the scenic guidelines is as follows.

> *Small, long and narrow bay, 1km wide, situated between Speers Point and Marmong Point at the northernmost part of the Lake. Boolaroo and the junction of Lake Road from Newcastle, lie at the head of the bay with residential and associated development around the bay behind open space and the foreshore.*

A scenic feature of the Cockle Bay Landscape Setting is the vegetated ridgelines enclosing an urban foreshore setting which has amenity and scenic value.

The Quarry is located within undulating topography and situated to the west of a low north-south oriented ridge line that forms part of the foreground to the more prominent and elevated Watagan Mountains. The *Environmental Assessment for the Teralba Quarry Extensions* (RWC, 2011) identified that progressive development of the Southern Extension would expose the upper sections of this area to views from the east. As extraction activities progress to the east, the intervening ridgeline would be removed and the upper benches in the Southern Extraction Area would become visible from the vantage points in **Figure 8**. Metromix has also implemented a range of management measures to limit and mitigate potential views of the upper benches. Visual inspections from the vantage points east of Cockle Bay has identified that the small parts of the upper benches in the Southern Extraction Area have already become visible from these vantage points. However, the vantage points are more then 4km from the Quarry Site and therefore the visible sections are only a small feature of the outlook, though recognisable. Other locations at a closer proximity to the Quarry, such as Rhondda Road, are and will remain well screened due to existing vegetation and topography. **Plate 1 and Plate 2** present views of the Quarry's location from the areas east of Cockle Bay in which visibility of the upper benches will be most prominent.

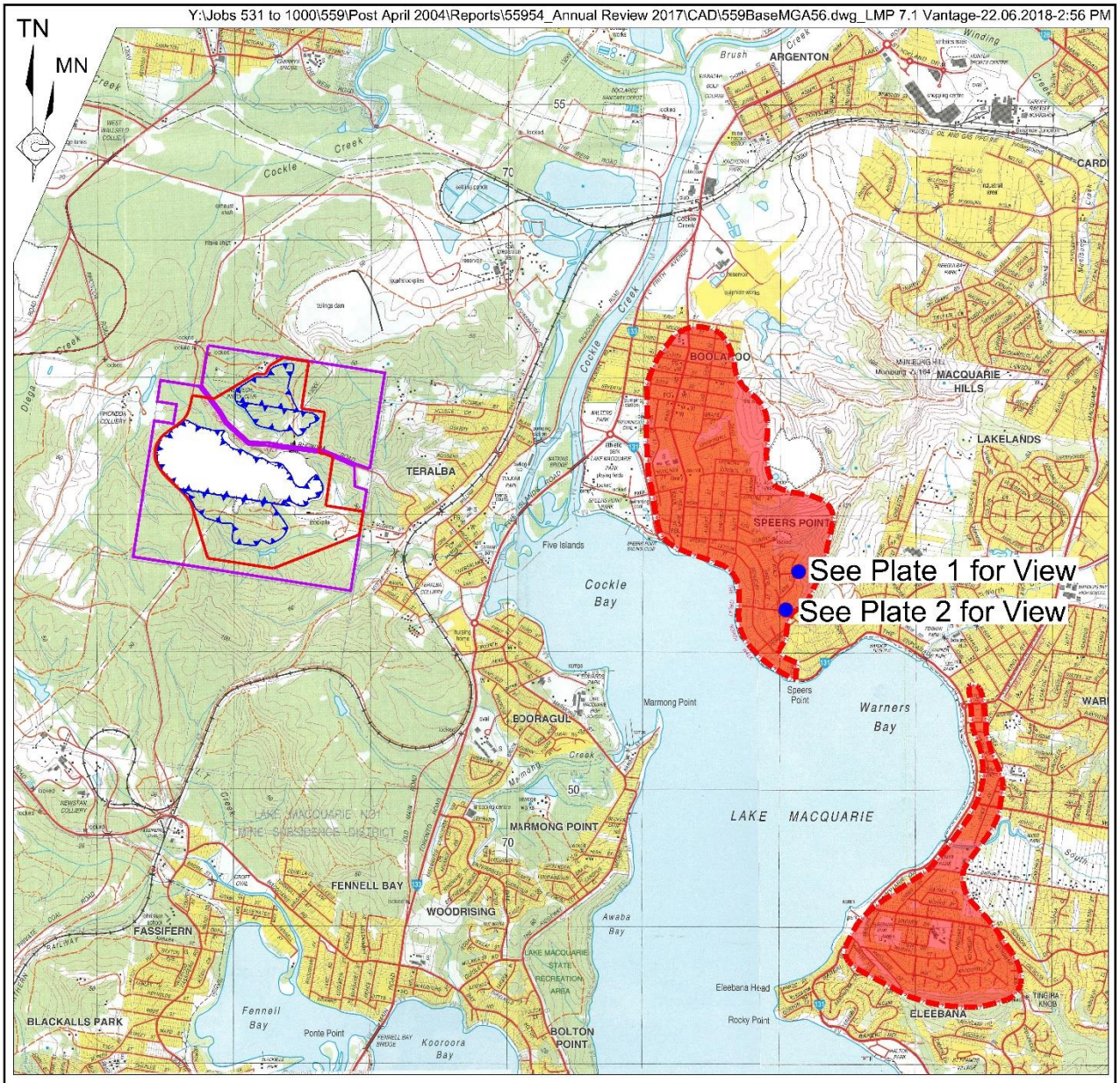


Figure 8
POTENTIAL VANTAGE POINTS

Plate 1 View of the Quarry from Speers Point (Location 1 – Thompson Street)

Plate 2 View of the Quarry from Speers Point (Location 2 – Elva Street)

Metromix has commissioned an assessment of visual amenity and potential impacts, which was undertaken by Envisage Consulting (2018). The assessment report confirmed that there would be no more than minor visual impacts from progressive Quarry development, principally due to the distance from the Quarry to the vantage points and the ongoing implementation of management measures described in the following subsections. Visual cross-sections drawn from Envisage Consulting (2018) are provided as **Appendix 1** and demonstrate the existing and progressive views of the Quarry Site as extraction operations within the Southern Extension progress.

It is noted that the Northern Extension is located to the west of an intervening ridgeline and therefore will not be visible from residential locations outside the Quarry Site.

7.2 MANAGEMENT OF VISUAL AMENITY

In order to minimise adverse visual amenity impacts associated with the Quarry during the various stages of extraction, the following management measures have and will continue to be implemented.

- Sequential development of the western section of the Southern Extension in a west-east direction, completing the easterly-facing benches initially to allow establishment of trees and shrubs on the exposed benches above 48m AHD as these benches (and accompanying extraction faces) will become exposed to the east as the eastern section of the Southern Extension is removed.
- Easterly-facing benches above 48m AHD will be split once terminal development is reached to retain approximately 4m high faces. This will ensure that a greater area of terminal faces are screened by vegetation once is established.
- Easterly-facing faces above 48m AHD that are accessible for the equipment will be sprayed with a bitumen emulsion once terminal development is reached to darken the surface and integrate it better with the adjacent ridgelines. Bitumen emulsion spraying would occur once to provide mitigation while vegetation establishes. Once rehabilitation of benches has commenced it is not possible to access the benches for additional applications. This method of visual management has already been implemented with success at the Quarry Site.
- Rehabilitation of easterly-facing benches above 48m AHD will involve the following.
  - Placement of approximately 1.3m of overburden and available biomass on each bench.
  - Shaping to form an uneven surface (with a gradual slope towards the face) to assist in water retention.
  - Placement of mulch and cleared vegetation retained from vegetation clearing activities.
  - Revegetation through a combination of tubestock and direct seeding of native tree and shrub species.

Metromix proposes to continue the use of sufficient lighting for security and safety purposes yet ensure all lighting is positioned and oriented to minimise off-site lighting impacts.

Monitoring of views of the Quarry Site from two vantage points (identified on **Figure 8**) will be undertaken annually and results reported in each Annual Review. The monitoring will consider the success of mitigation measures and any change in exposed areas over the preceding 12-month period.

8 MONITORING AND EVALUATION

In order to comply with *Condition 60(h) of Schedule 3 of* PA10_0183 (MOD 1), the following information outlines the program to monitor the effectiveness of the management measures identified in Section 6 and to compare the observations against the performance and completion criteria (see Section 9). The following identifies the biodiversity-related monitoring that will be undertaken by a qualified Bush Regenerator throughout the life of the Quarry.

- A minimum of quarterly weed and pest inspection programs will be undertaken as described in Section 6.2.6. The results of the programs, including any recommendations for management measures to be implemented during the following 12-month period, will be included in a report following completion of each inspection program. Those recommendations will be considered by Metromix and implemented, in consultation with surrounding landholders, as appropriate.
- Monitoring of bush fire/vegetation fuel loads will be undertaken annually in consultation with the local Rural Fire Service in mid to late winter and fuel reduction programs will be undertaken, as required.
- Quarterly visual monitoring: This will include visual inspections of fences, fire breaks, weed infestations, surface stability and erosion issues, and disturbance factors such as illegal dumping and unauthorised access. The results of the visual monitoring and follow-up actions will be included within each Annual Review.
- Annual nest box monitoring: This will include an annual inspection of the microbat and squirrel glider nest boxes to determine usage, species and population numbers (if possible). The results of the monitoring program will be included within each Annual Review, including any information of maintenance activities undertaken, if required.
- Visual monitoring of the rehabilitated, eastern-facing benches within the western section of the Southern Extension will also be undertaken on an annual basis, to ensure that revegetation of these benches continues to occur to the level required, resulting in a multistorey canopy comprising an understory, shrub species and established trees to act as natural vegetation screens.
- Each of the monitoring results will be compared against the performance and completion criteria and evaluated in the context of previous results. The results of the monitoring and evaluation will be presented in each Annual Review and reviewed during the various updates of the *Biodiversity and Rehabilitation Management Plan*.

9 REHABILITATION PERFORMANCE AND COMPLETION CRITERIA

In order to ensure appropriate completion of progressive and final rehabilitation operations, biodiversity and rehabilitation performance criteria are presented in **Table 9**.

For each domain and rehabilitation phase, a range of rehabilitation indicators and completion criteria are required. **Table 10** provides the identified rehabilitation domains and presents the rehabilitation performance and completion criteria, along with the likely timing of completion.

10 EVALUATION OF COMPLIANCE

Any non-compliances with statutory requirements and performance criteria recorded in this Plan would be identified and reported in the respective Annual Review together with Metromix's approach to re-establishing compliance.

The Company will incorporate the following documents with each Annual Review as required under *Condition 4 of Schedule 5 of* PA10_0183 (MOD 1) to demonstrate its compliance with this Plan.

- Copies of the representative photographs, including aerial photographs, taken during the previous 12 months, including an analysis of the status of rehabilitation when compared with photographs from previous years. Where rehabilitation has not been successful or corrective action is required, this will also be identified.
- A copy of the annual weed and pest inspection reports, as well as actions undertaken to implement the recommendations of that report.
- A summary of the development within each extraction area and subsequent bench rehabilitation activities, as well as a summary of the overall Quarry Site rehabilitation activities. The area of the Quarry Site dedicated to each of these activities would be described.
- A summary of proposed rehabilitation-related activities to occur over the following Annual Review reporting period (annual).

11 COMPLAINTS HANDLING, COMPLAINTS RESPONSE AND INCIDENT REPORTING

Metromix will continue to advertise the community inquires/complaints line 02 4950 6640 as a minimum in the local phone directory and adjacent to the Top Gate.

Metromix will respond to any registered community inquiries or complaints received by this number as described in the Rapid Online Reporting System.

The following flowchart shows the process that Metromix will follow in the event a complaint is received relating to biodiversity and rehabilitation management.

Table 9 Rehabilitation and Landscape Management Performance Criteria

Management Measure	Frequency	Performance Indicator	Response and Corrective Actions	Targets / Completion Criteria
Marking out and management of vegetation to be cleared that may be fauna habitat including pre-clearance survey.	Ongoing during vegetation clearing activities	Pre-clearance survey of intended clearing completed prior to clearing activities. Any native fauna within areas to be disturbed is given an opportunity to vacate habitat.	Suitably experienced person to manage pre-clearance survey and relocation of native fauna present in area to be cleared.	No clearing undertaken outside of approved boundaries. Any identified native fauna is relocated.
Stockpile and eventually transfer large vegetation and surface rocks for use in rehabilitation.	Ongoing during vegetation clearing activities	Stockpiled material are placed on final landforms for ongoing rehabilitation activities.	Where available and suitable for use, mulch, large tree trucks and sections of any hollow-bearing trees to be placed in final landform to aid success of rehabilitation activities.	Cleared vegetation and selected surface rocks are placed in rehabilitating areas.
Soil management through appropriate stockpiling of topsoil and subsoil material so that it is in a suitable condition for rehabilitation activities	Ongoing	Ensure soil (where present in sufficient thickness) is stripped, handled and stockpiled in accordance with Section 6.2.1 of this Plan.	Visual inspection of stockpile areas to guide actions to remediate incorrectly applied stockpiling protocols.	Sufficient soil resources are available for rehabilitation. The locations quantities of stockpiled soil resources will be recorded in each Annual Review.
Install and maintain approximately 20 nest boxes for microbats, 20 nest boxes for Little Lorikeets and 30 nest boxes for Squirrel Gliders	Ongoing	Monitoring of nest boxes indicates use of boxes by intended species.	Relocate or replace damage or unused nesting boxes.	Nesting boxes are working as intended to provide habitat to intended species.
Weed management programs by a person suitably experienced in weed identification and involving spraying and manual weed removal.	At minimum bi-annual (or more frequent, if needed)	Maintenance weeding records demonstrate regular activity.	Commission weed management program immediately should priority weeds be identified or if regular weed maintenance has not occurred.	Priority weeds removed completely. Weed coverage in areas not to be disturbed by extraction to have a weed coverage of less than 5% of foliage cover.
Visual monitoring for feral animal presence during landscape management and weeding programs.	During weed management programs.	Bush regeneration contractors to report on feral animal presence.	Should feral animals be identified that require removal programs, liaise with Council and OEH regarding a suitable feral animal management program, preferably in conjunction with surrounding landowners.	Feral animal presence is restricted.

Table 9 Rehabilitaiton and Landscape Management Performance Criteria (Cont'd)

Management Measure	Frequency	Performance Indicator	Response and Corrective Actions	Targets / Completion Criteria
Commission a local nursery or supplier to develop a program to propagate plants suitable for revegetation activities.	Ongoing	Suitable native species available for revegetation activities	Annual planning for revegetation activities to be discussed with a local nursery or supplier.	Sufficient plants available for rehabilitation activities.
Maintain setback distances between remnant vegetation and Quarry infrastructure to limit bush fire hazard risk.	Ongoing	Reduce fuel load and potential radiant heat levels, flame contact and ember and smoke attack on life and property.	Consult with the local Rural Fire Service and initiate management programs in accordance with RFS (2006) and Section 6.8.	Potential damage from and spread of fire is limited.
Translocate *Tetratheca juncea* located within Quarry disturbance area.	Complete	Survival rate of translocated plants identified through monitoring.	Habitat improvement as recommended by bush regeneration contractor.	Quarry activities are not adversely impacting translocated plants. Ideally, achieve at least 50% success in translocation with 2 years.
Progressive rehabilitation of completed benches and disturbed areas no longer required for operations.	As completed	Review of species composition against species list and density targets (see Table 8).	Undertake revegetation activities in conjunction with local nursery or supplier.	For upper benches of easterly facing areas, vegetation provides screen to views of terminal faces. For remaining benches, vegetation density and species selection is consistent with adjacent remnant vegetation.
Maintenance or replacement of unsuccessful shrub or tree planting.	As needed	Failed revegetation identified and remediated.	Undertake revegetation activities in conjunction with local nursery or supplier.	Identified tubestock failure and remediate within 12 months (i.e. next round of planting).
Potential views of the completed upper faces within Southern Extension are mitigated as much as practically possible.	Annual visual inspections.	Views of the completed upper faces within the Southern Extension from distant vantage points are resulting in no greater than minor visual intrusion.	Review vegetation planting for upper (or otherwise visible) benches. Remediation planting to be implemented.	No greater than minor visual intrusion with terminal upper faces screened by trees.
Implement erosion and sediment controls, as needed, during clearing, operational and rehabilitation activities.	As needed	Visual inspection of erosion evidence following periods of heavy rainfall (greater than 50mm/day).	Implement erosion and sediment controls, as needed.	Limited evidence of erosion or movement of sediment-laden water within Quarry Site or no evidence of sediment-laden water beyond the Quarry Site.

Table 10 Rehabilitation Completion Criteria

Domain (Sub-domain)	Final Land Use	Rehabilitation Phase	Objective/Indicator	Completion Criteria	Timing
Domain 1A – Backfilled Area	Native Vegetation	Decommissioning	All Quarry-related infrastructure and equipment removed	All mobile equipment and other infrastructure removed	Completion of extraction.
			Unauthorised/inadvertent access prevented	Safety bund and fence installed	Installed following clearing undertaken on the perimeter of the approved extraction area.
		Landform establishment	Placement of surplus overburden	Final batter to a maximum slope of 1:3 (V:H). Final upper surface directed towards extraction faces.	Progressive
			Drainage on final upper surface directed towards extraction faces	No runoff from final upper surface over batter	Progressive
		Growth medium development	Available topsoil/biomass placed on final landform	Up to 0.2m of topsoil/biomass placed.	Following creation of final landform
			Vegetation growth	Direct transfer biomass from clearing activities to rehabilitation areas	Progressive
		Ecosystem establishment and development	Vegetation re-introduced with natural grasses and endemic tree and shrub species through seeding and natural revegetation	Vegetation self-sustaining. Tree heights >3m within 5 years. Foliage cover of approximately 70% or consistent with remnant vegetation in the surrounding property.	Following creation of final landform
Domain 1B – Extraction Area Floor	Sporting/recreational facilities e.g. Relocated Newtech Pistol Club or Industrial Storage Purposes.	Decommissioning	All Quarry-related infrastructure and equipment removed	All mobile equipment and other infrastructure removed	Completion of Extraction
		Landform establishment.	Remove all oversize material from landform surface	Final landform free of oversize material	Within final stages of extraction in the subject area
			Runoff directed to sump (seepage area) on final floor	Collect all runoff water	Progressive
		Growth medium development	Placement of overburden and selected topsoil on final floor	Up to 1m of overburden and 0.2m of topsoil/biomass placed	Following creation of final landform
		Ecosystem establishment and development	No ecosystem establishment planned consistent with potential use.	None relevant	None relevant

Table 10 Rehabilitation Completion Criteria (Cont'd)

Domain (Sub-domain)	Final Land Use	Rehabilitation Phase	Objective/Indicator	Completion Criteria	Timing
Domain 1C – Benches	Safe stable and non-polluting. Revegetated	Decommissioning	Unauthorised/inadvertent access prevented	Safety bund and fence installed	Installed prior to commencement of extraction
		Landform establishment	Terminal benches and batters stable	Terminal benches and batters free of active failures (approximately 8m x 8m	Progressively created throughout extraction program
		Growth medium development	Overburden placed on terminal benches	Up to 1m of overburden and available topsoil/biomass placed.	Progressive
			Vegetation growth	Direct transfer biomass from clearing activities to rehabilitation areas	Progressive
		Ecosystem establishment	Vegetation established on all terminal benches	Vegetation self-sustaining. Tree heights >3m within 5 years. Foliage cover of approximately 70% or consistent with remnant vegetation in the surrounding property.	Progressive.
Domain 1D Northern Internal Access Road	Ongoing use for access to Domain 1B.	Decommissioning	Unauthorised/inadvertent access prevented until all rehabilitation tasks are completed	Fences and lockable gate installed	Already installed
		Landform establishment	Final landform consistent with long term use	Ensure roadside erosion and sediment control structures are to sufficient standard for long term use.	Completion of extraction
		Growth medium development	Not applicable		
		Ecosystem establishment	Not applicable		

Table 10 Rehabilitation Completion Criteria (Cont'd)

Domain (Sub-domain)	Final Land Use	Rehabilitation Phase	Objective/Indicator	Completion Criteria	Timing
Domain 2A – Silt Cells and Extraction Area Floor	Native Vegetation	Decommissioning	All Quarry-related infrastructure and equipment removed	All mobile equipment and other infrastructure removed	Completion of Extraction and Final landform profiling
			Unauthorised/inadvertent access prevented	Safety bund and fence installed	Installed following clearing undertaken on the perimeter of the approved extraction area.
		Landform establishment	Cap successive silt cells with overburden (see Typical Section on EA Figure 2.13) and place/shape upper surface with overburden and ENM/VENM	Cover silt cells and shape landform to a maximum of 1:3 (V:H)	Progressively following completion of intermediate and upper silt cells
			Remove all oversize material from landform surface.	Final landform free of oversize material	Within final stages of extraction in the subject area
			Runoff directed to dams at eastern and western side of extraction area.	Collect all runoff water for seepage into substrate	Progressive
		Growth medium development	Topsoil placed on final landform	Up to 0.2m of topsoil/biomass placed	Progressively following completion of final landform section
			Vegetation growth	Direct transfer biomass from clearing activities to rehabilitation areas	Progressive
		Ecosystem establishment and development	Vegetation re-introduced with natural grasses and endemic tree species through seeding and natural revegetation	Vegetation self-sustaining. Tree heights >3m within 5 years. Foliage cover of approximately 70% or consistent with remnant vegetation in the surrounding property.	Progressive
			Runoff directed to seepage area on final floor	Collect all runoff water	Progressive

Table 10 Rehabilitation Completion Criteria (Cont'd)

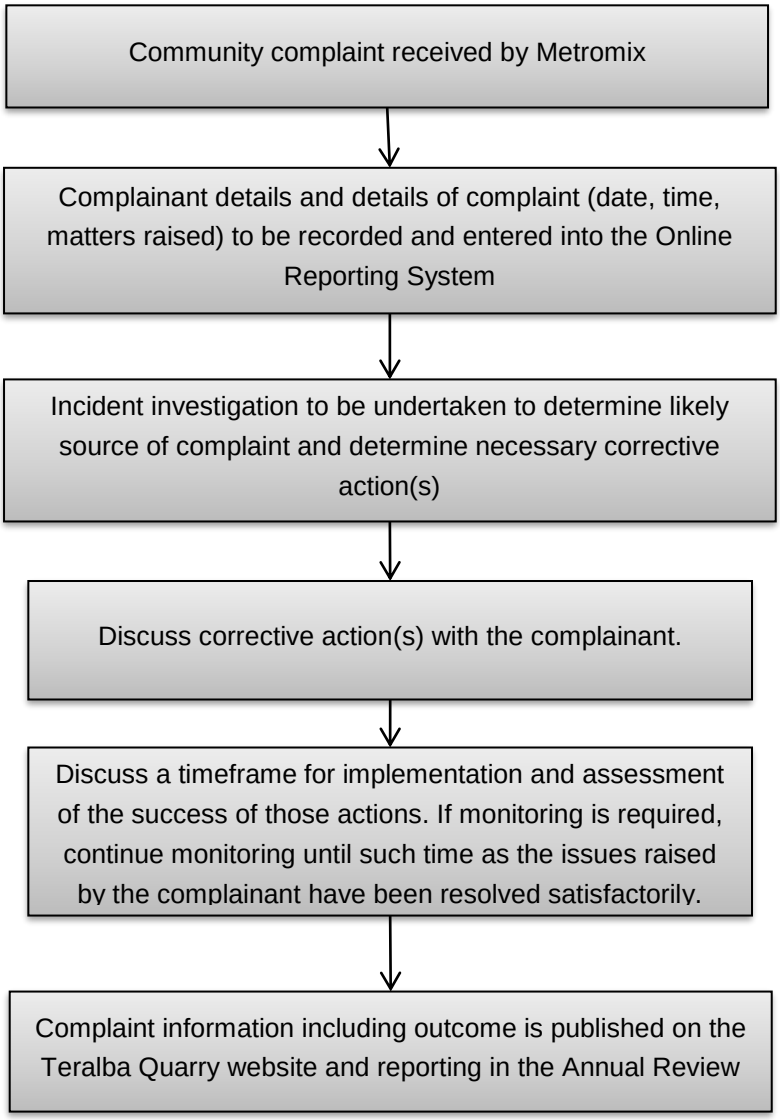
Domain (Sub-domain)	Final Land Use	Rehabilitation Phase	Objective/Indicator	Completion Criteria	Timing
Domain 2B – Extraction Area Floor	Industrial (proposed for both Upper and Lower Terraces)	Decommissioning	All Quarry-related infrastructure and equipment removed	All mobile equipment and other infrastructure removed	Completion of Extraction and Final landform profiling
			Unauthorised/inadvertent access prevented	Safety bund constructed at top of batter and fence/bund installed between Domains 2A and 2B.	Installed prior to commencement of extraction
		Landform establishment (Terraces)	Final floor stable	Floor free of failures into underlying voids	Progressive
			Runoff directed to dams at eastern and western side of extraction area	Collect all runoff water for seepage into substrate	Progressive
		Landform establishment (battered slope)	Place and shape battered slope between upper and lower terraces with overburden and ENM/VENM	Shape landform to a maximum of 1:3 (V:H)	Progressively during final landform creation.
			Vegetation growth	Direct transfer of biomass from clearing activities to rehabilitation areas	Progressively during final landform creation.
			Runoff directed to dams at eastern and western side of extraction area	Collect all runoff water for seepage into substrate	Progressive
		Growth medium development	Placement of overburden and selected topsoil on final floor	Up to 1m of overburden and 0.2m of topsoil/biomass placed	Following creation of final landform
		Ecosystem establishment and development	No ecosystem establishment planned consistent with potential use.	None relevant	None relevant

Table 10 Rehabilitation Completion Criteria (Cont'd)

Domain (Sub-domain)	Final Land Use	Rehabilitation Phase	Objective/Indicator	Completion Criteria	Timing
Domain 3 – Processing And Infrastructure Area	Industrial (Upper Terrace only)	Decommissioning	All Quarry-related infrastructure and equipment removed	All mobile equipment and other infrastructure removed	Completion of Extraction and Final landform profiling
			Unauthorised/inadvertent access prevented	Safety bund and fences installed, where required	Installed prior to commencement of extraction
		Landform establishment	Final floor stable	Floor free of failures into underlying voids	Progressive
			Runoff directed to a dam on the Upper Terrace (location yet to be defined).	Collect all runoff water for seepage into substrate	Progressive
		Growth medium development	No ecosystem establishment planned consistent with potential use.	None relevant	None relevant
		Ecosystem establishment and development	No ecosystem establishment planned consistent with potential use.	None relevant	None relevant
Domain 4 – Quarry Access Roads	Ongoing use for access to Domain 2.	Decommissioning	Unauthorised/inadvertent access prevented until all rehabilitation tasks are completed	Fences and lockable gate installed	Already installed
		Landform establishment	Final landform consistent with long term use	Ensure roadside erosion and sediment control structures are to sufficient standard for long term use.	Completion of extraction
		Growth medium development	Not applicable		
		Ecosystem establishment	Not applicable		

Table 10 Rehabilitation Completion Criteria (Cont'd)

Domain (Sub-domain)	Final Land Use	Rehabilitation Phase	Objective/Indicator	Completion Criteria	Timing
Domain 5 Non-operational Areas	Ongoing nature conservation. Exclusion Zone	Decommissioning, landform establishment, growth medium development, ecosystem establishment and development	Not applicable. The only activities to occur will be related to the ongoing weed and pest management activities scheduled to occur in other sections of the Quarry Site.		
Domain 6 – Excluded Areas	Ongoing Industrial Use	Decommissioning / landform establishment / growth medium development / ecosystem establishment and development	Not applicable.		



12 INCIDENT REPORTING

In the event of an incident relating to biodiversity, rehabilitation or visibility-related issues, Metromix personnel will attempt to locate the source of the incident and control it. If they cannot control the incident, then they are to report the incident to their supervisor/manager.

The incident is to be recorded using the “Rapid Online Reporting System” that is available through the Metromix intranet website. The Risk Manager is to be notified as soon as possible to assist in determining corrective actions and the need for reporting.

The relevant contacts at the Department of Planning and Environment are to be notified of any incidents immediately. Within seven days of the incident a report detailing the incident must be provided to the Department of Planning and Environment and any other relevant agencies and must

include the time and date of the incident, details of the incident, measures implemented to prevent re-occurrence and must identify any non-compliance with the relevant conditions of approval.

13 PUBLICATION OF MONITORING INFORMATION

Metromix will include the results of all biodiversity and rehabilitation monitoring reports as appendices within each Annual Review. That document, once approved by the DPE, will also be published on the Teralba Quarry website.

Finally, the Company will also provide the Community Consultative Committee with a copy of all monitoring reports. The Quarry Manager will be responsible for publication of monitoring information.

14 REVIEW

In accordance with *Condition 5 of Schedule 5 of* PA10_0183 (MOD 1), this Biodiversity and Rehabilitation Management Plan will be reviewed and, if required, revised within 3 months of:

- the submission of an annual review under PA Condition 4 *of Schedule 5 of* PA10_0183 (MOD1),;
- the submission of an incident report under PA Condition 7 *of Schedule 5 of* PA10_0183 (MOD1),;
- the submission of an audit report under PA Condition 9 *of Schedule 5 of* PA10_0183 (MOD1); and
- any modification to the conditions of PA10_0183 MOD 1.

The Quarry Manager will be responsible for the review of this Plan and, when necessary, the aspects relating to the biodiversity offset will be reviewed by an experienced ecological consultant.

The Quarry Manager would also be responsible for the implementation of this Plan.

15 REFERENCES

AS/NZS ISO 31000:2009 *Risk Management – Principles and Guidelines*.

RWC, 2011 *Environmental Assessment*. Prepared on behalf of Metromix Pty Ltd.

Landcom (2004). *Managing Urban Stormwater: Soils and Construction (The Blue Book)*. 4th Edition. New South Wales Government, Sydney.

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Appendix 1

Visual Cross Sections – Envisage Consulting (June 2018)

(Total No. of pages including blank pages = 13)

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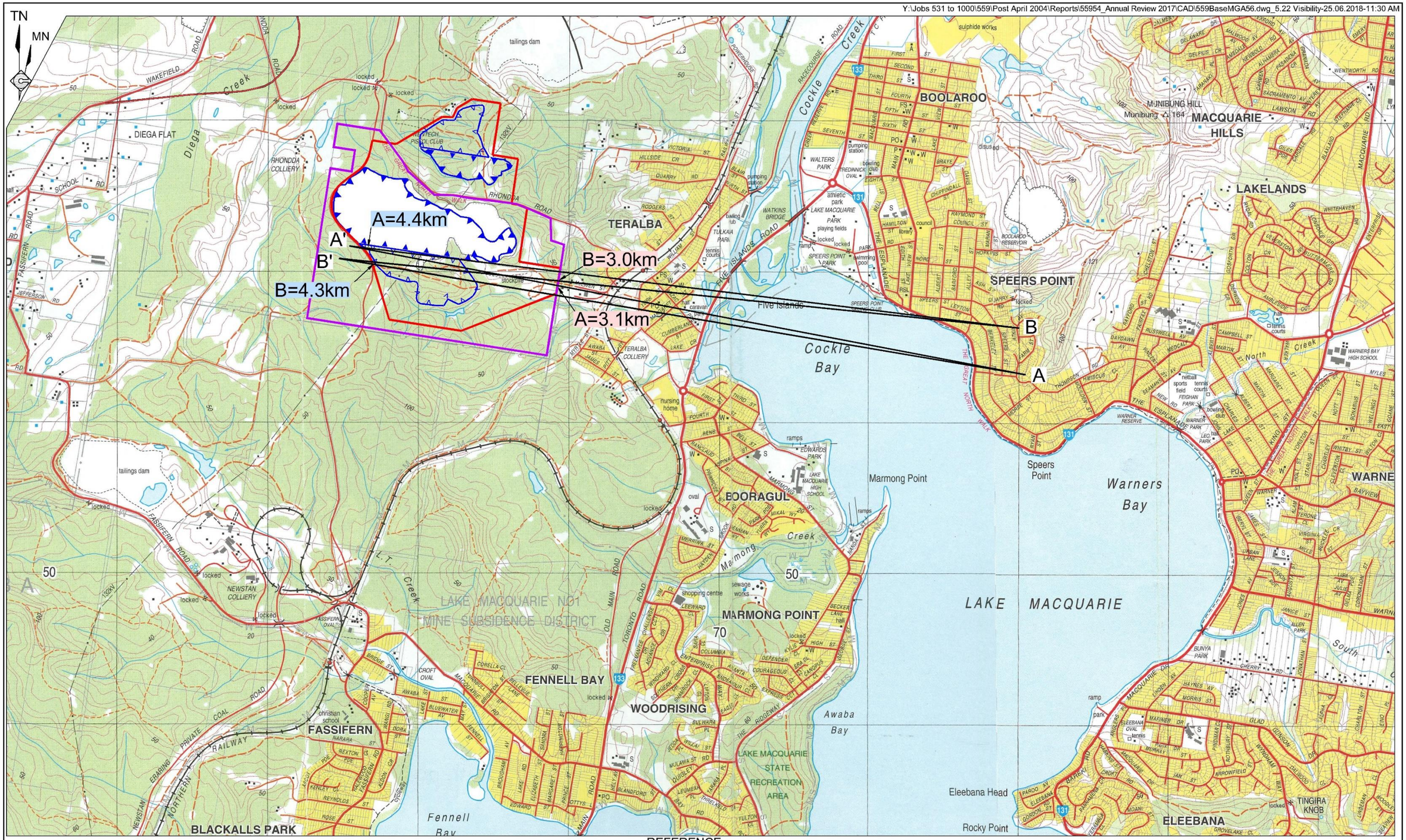

Figure A1-1
CROSS SECTION LOCATIONS AND DISTANCE FROM VANTAGE POINTS

APPROVED JUNE 2019

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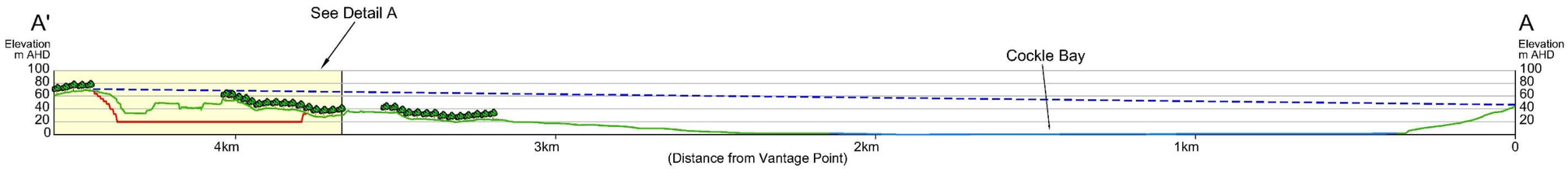
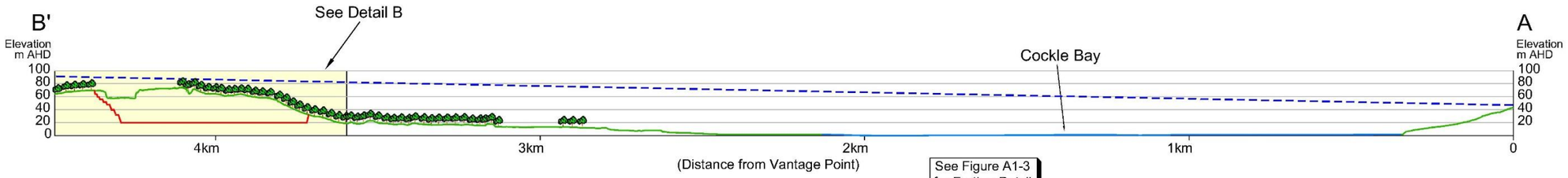
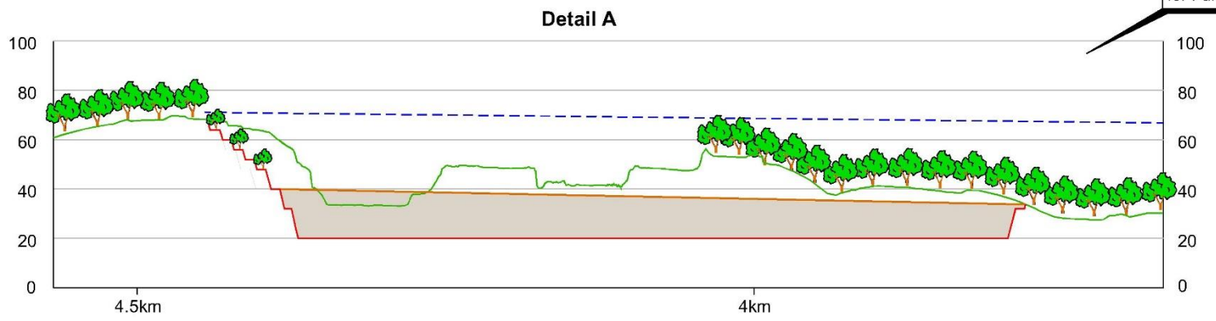
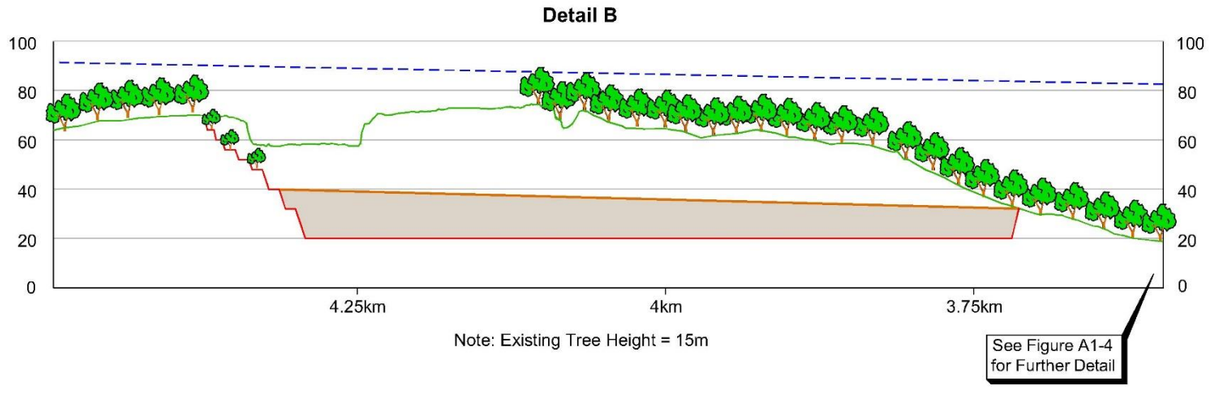
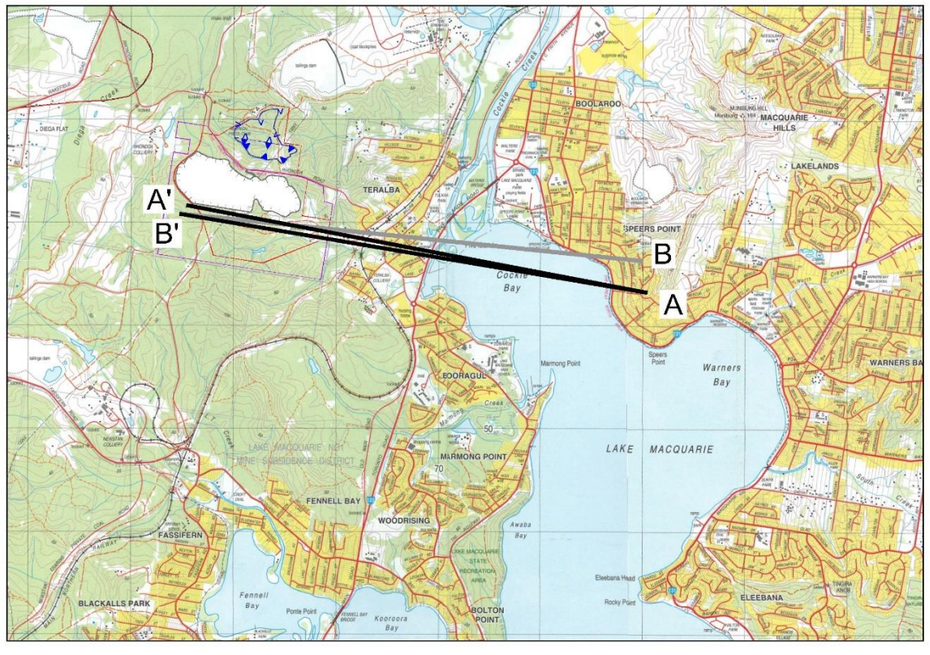










REFERENCE
- Existing Landform
- Proposed Extraction Profile
- Final Landform
- Area Backfilled

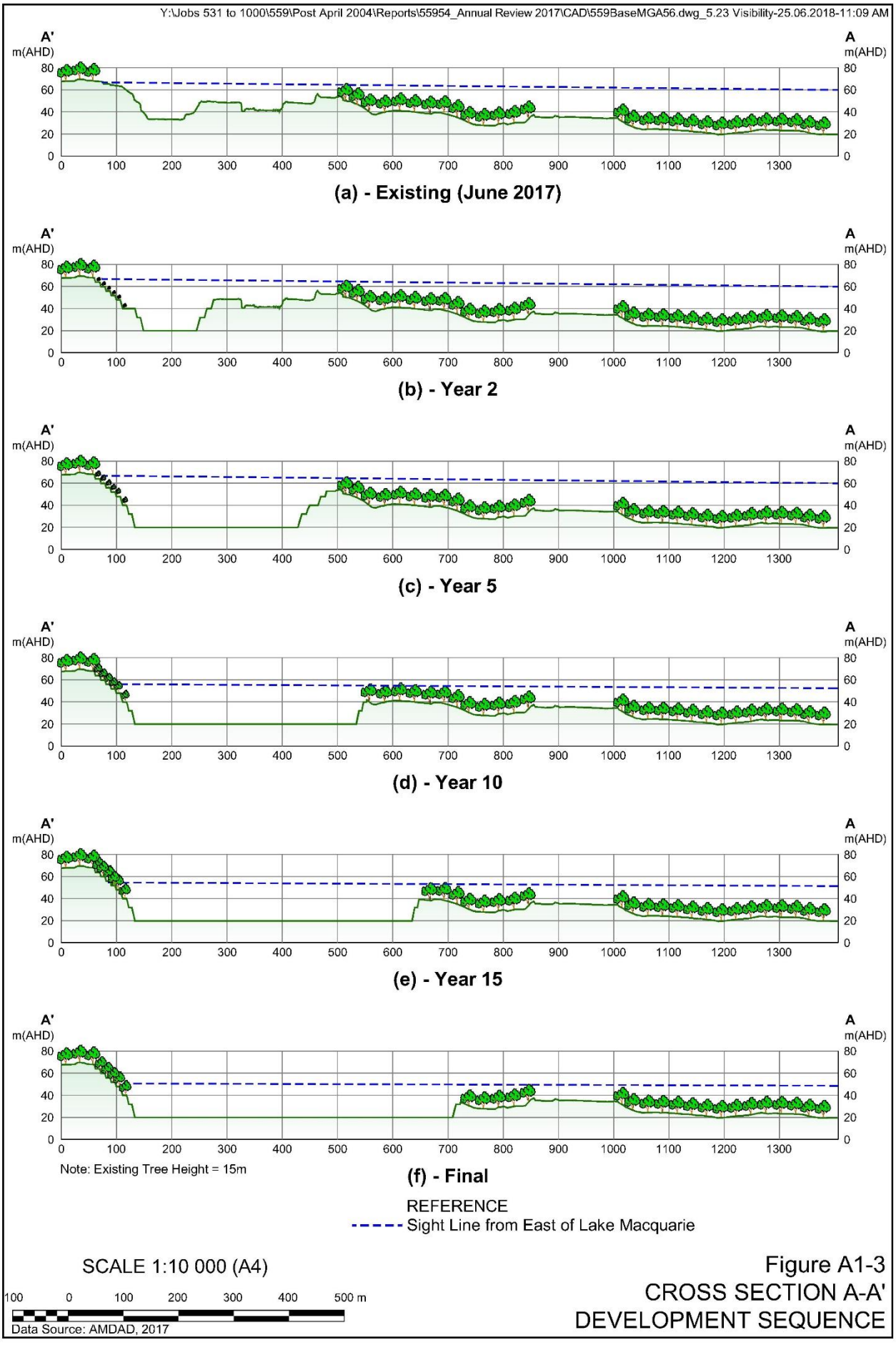
SECTION SCALE 1:15 000 (A3)
DETAIL SCALE 1:5 000
(Vertical Exaggeration = 2)

250 0 250 500 750 m

Source: AMDAD, 2017

Figure A1-2
EXISTING CROSS SECTIONS - VIEW POINT A

APPROVED JUNE 2019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A'
m(AHD)
A
m(AHD)
0
20
40
60
80
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
(a) - Existing (June 2017)
(b) - Year 2
(c) - Year 5
(d) - Year 10
(e) - Year 15
(f) - Final
Note: Existing Tree Height = 15m
REFERENCE
Sight Line from East of Lake Macquarie
SCALE 1:10 000 (A4)
100 0 100 200 300 400 500 m
Data Source: AMDAD, 2017
Figure A1-3
CROSS SECTION A-A'
DEVELOPMENT SEQUENCE

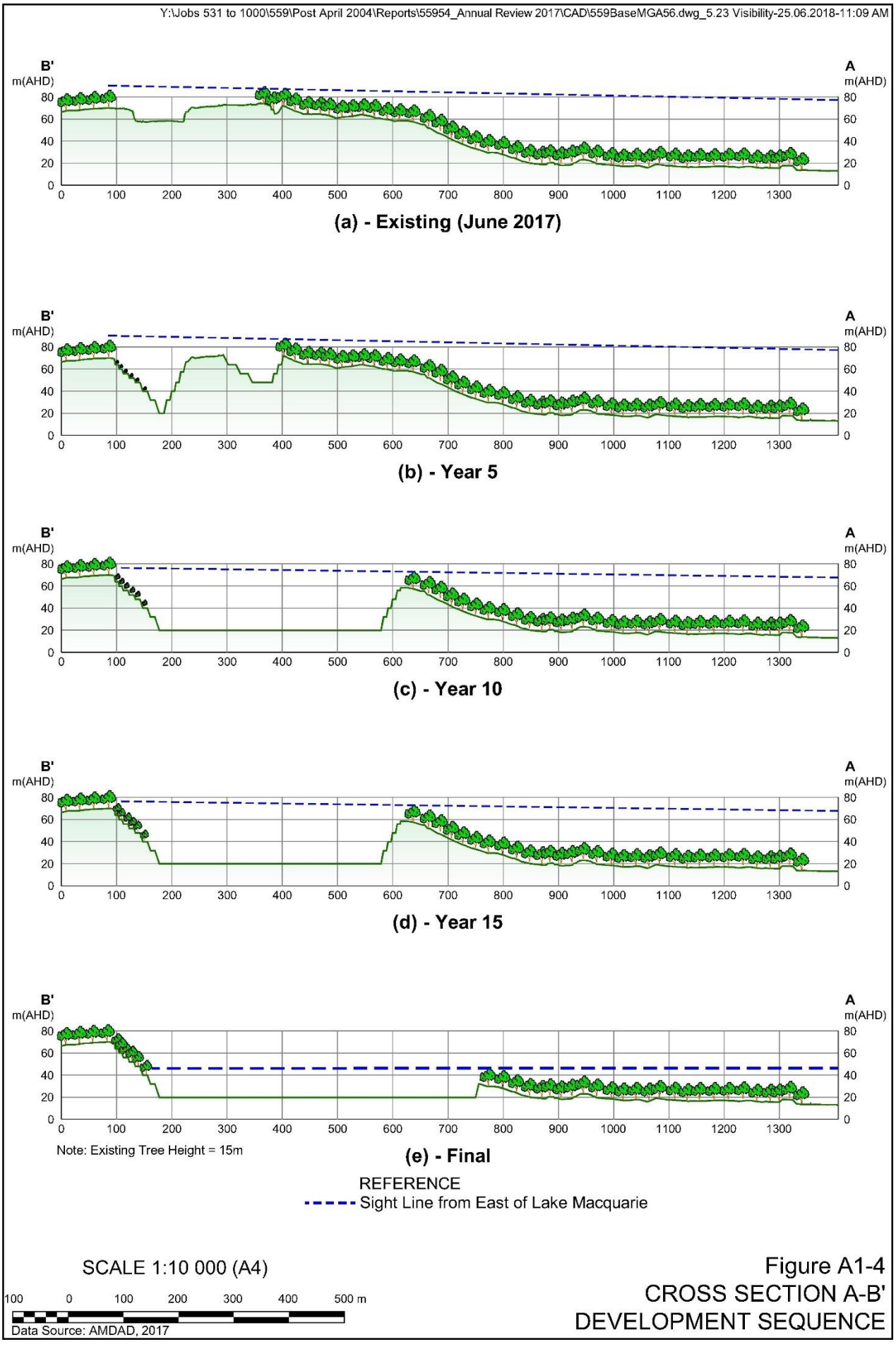

Figure A1-4
CROSS SECTION A-B'
DEVELOPMENT SEQUENCE

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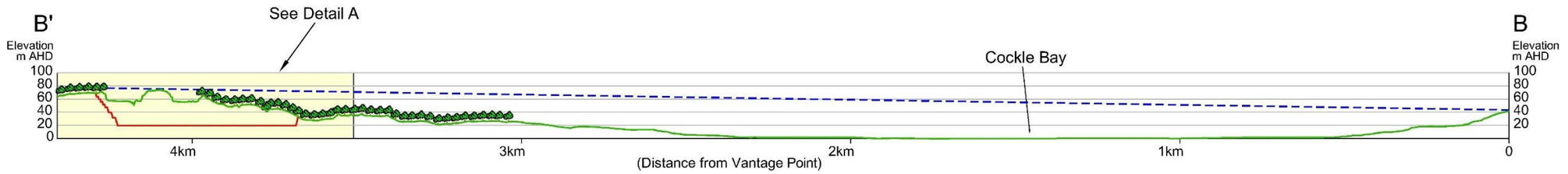
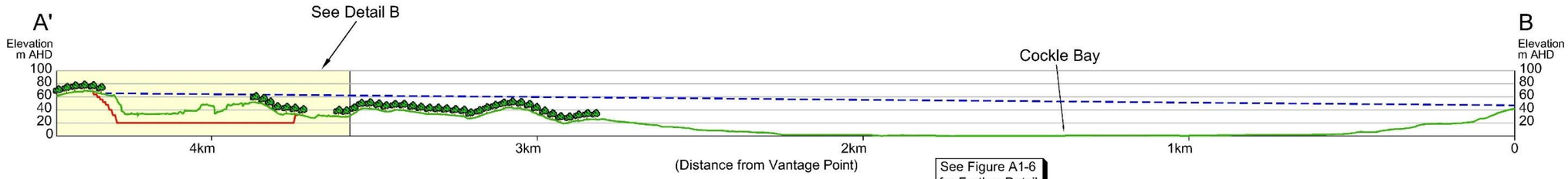
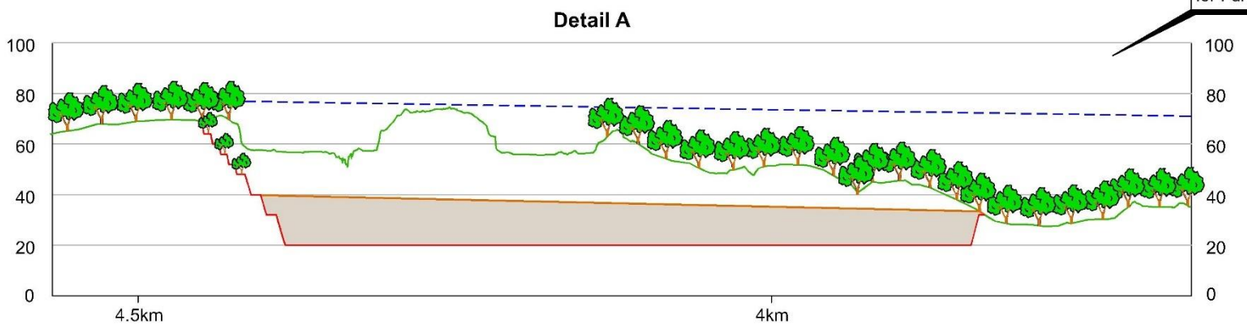
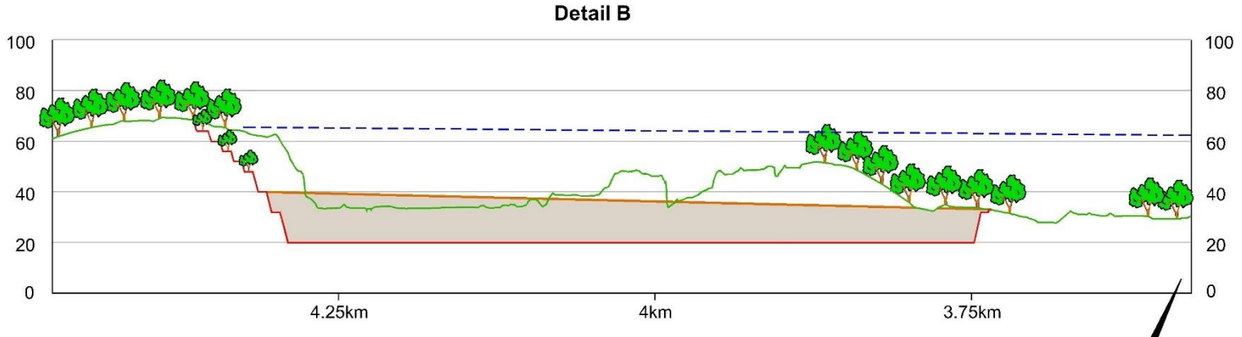




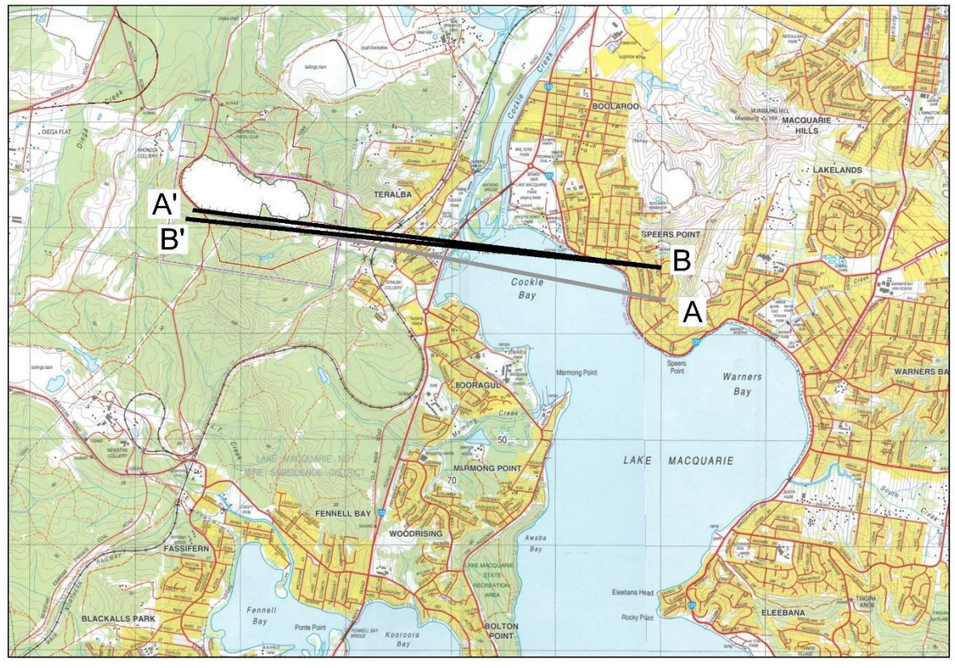




Note: Existing Tree Height = 15m

See Figure A1-6 for Further Detail

See Figure A1-7 for Further Detail



REFERENCE
- Existing Landform
- Proposed Extraction Profile
- Final Landform
- Area Backfilled

SECTION SCALE 1:15 000 (A3)
DETAIL SCALE 1:5 000
(Vertical Exaggeration = 2)

250 0 250 500 750 m

Source: AMDAD, 2017

Figure A1-5
EXISTING CROSS SECTIONS - VIEW POINT B

APPROVED JUNE 2019

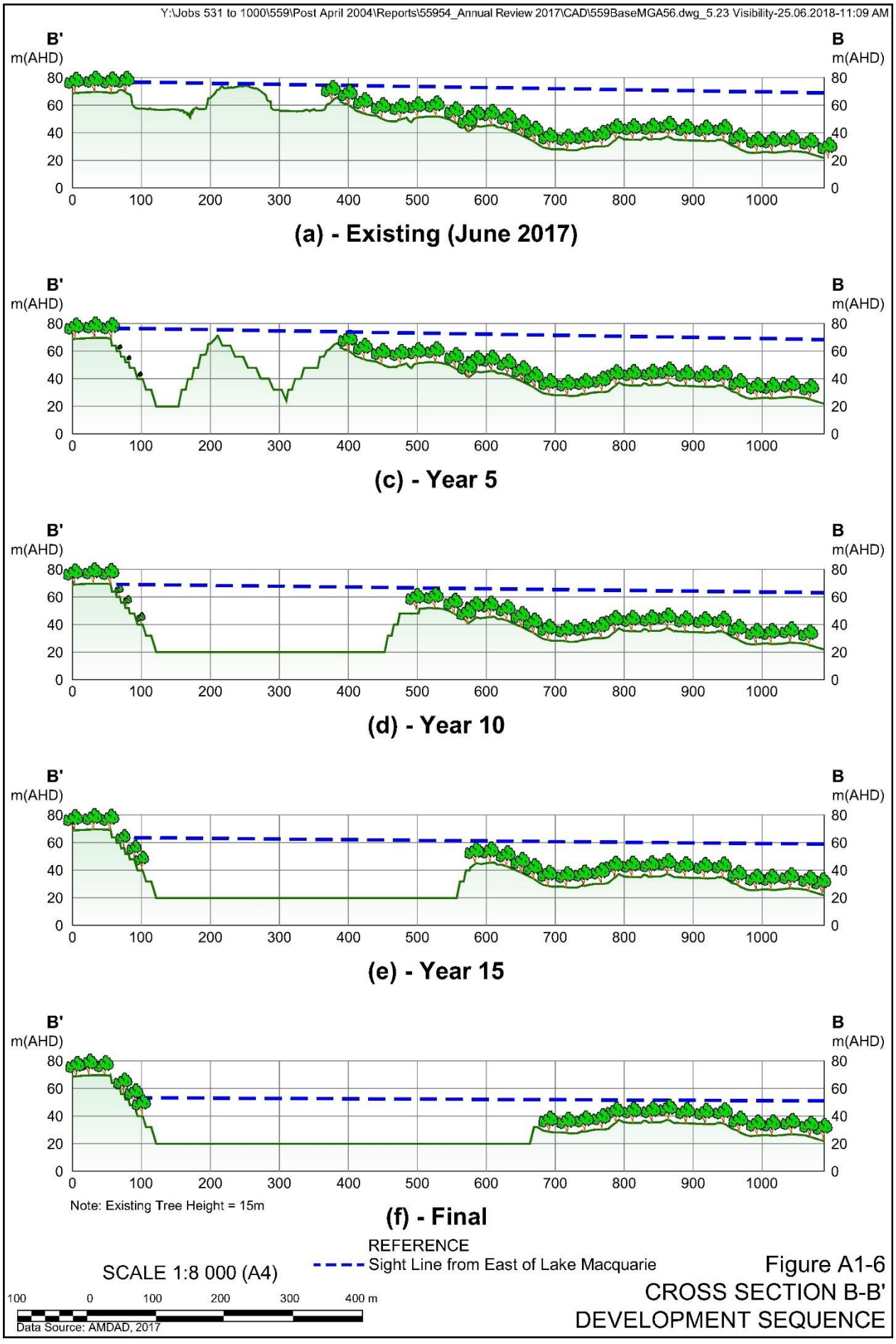
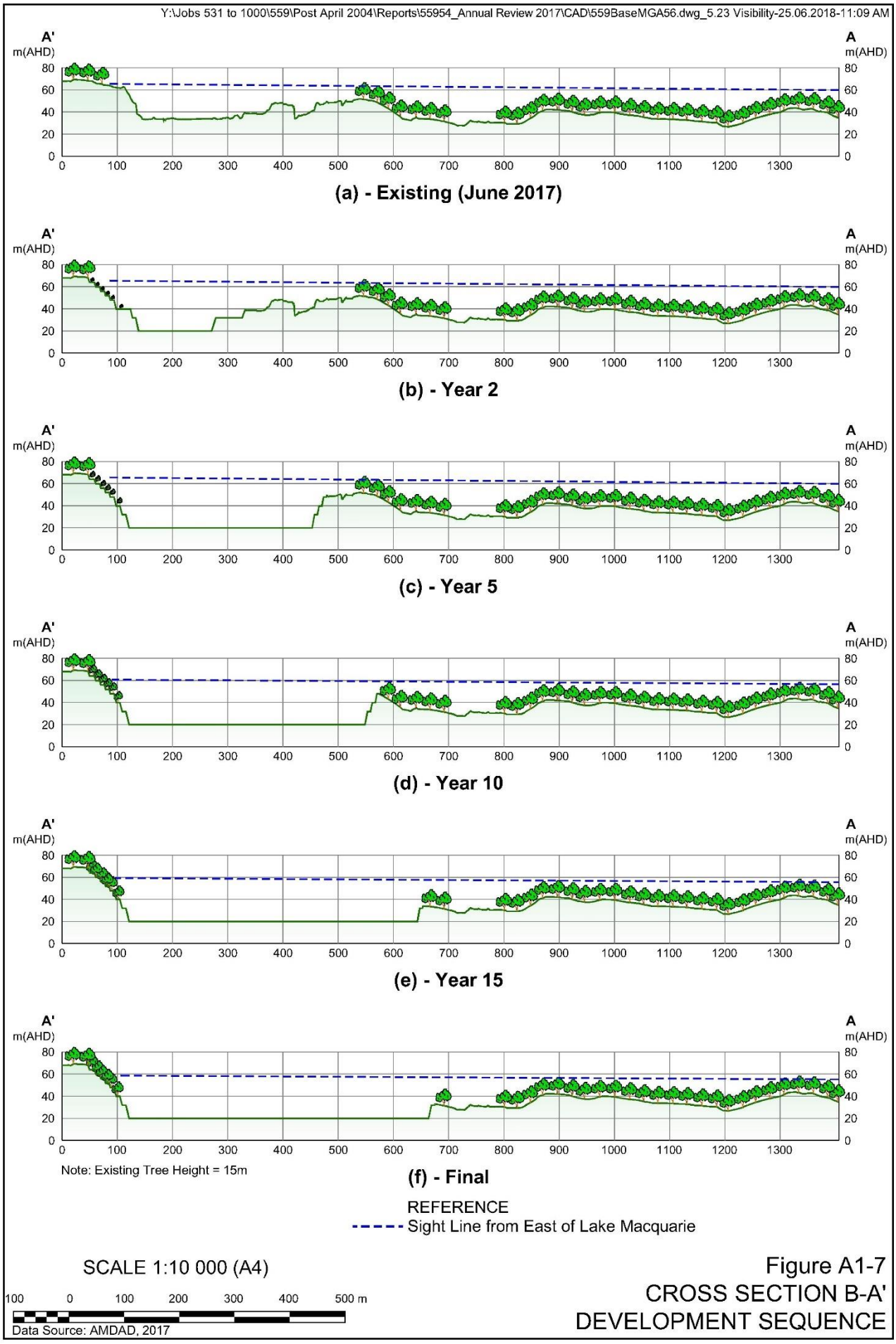


Figure A1-6
CROSS SECTION B-B'
DEVELOPMENT SEQUENCE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A'
m(AHD)
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m(AHD)
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20
40
60
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100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
(a) - Existing (June 2017)
(b) - Year 2
(c) - Year 5
(d) - Year 10
(e) - Year 15
(f) - Final
Note: Existing Tree Height = 15m
REFERENCE
Sight Line from East of Lake Macquarie
SCALE 1:10 000 (A4)
100 0 100 200 300 400 500 m
Data Source: AMDAD, 2017
Figure A1-7
CROSS SECTION B-A'
DEVELOPMENT SEQUENCE

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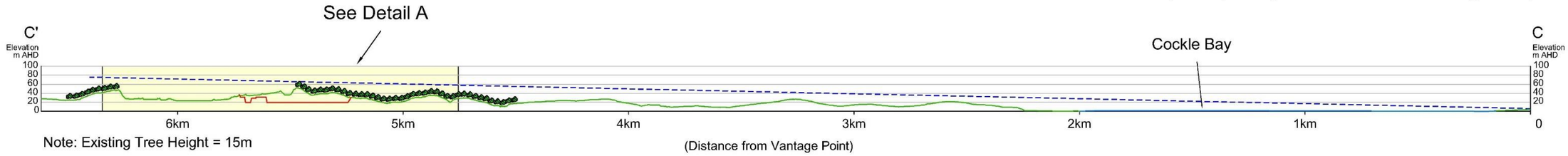
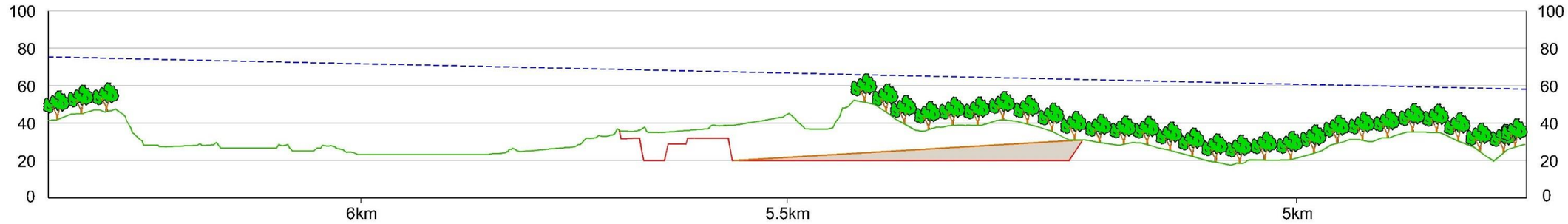


Detail A



REFERENCE
- Existing Landform
- Proposed Extraction Profile
- Final Landform
- Area Backfilled

SECTION SCALE 1:20 000
DETAIL SCALE 1:5 000
(Vertical Exaggeration = 2)

MAP SCALE 1:40 000 (A3)

400 0 400 800 1200 1600 2000 m

Source: AMDAD, 2017

Figure A1-8
VIEW POINT C

Appendix 2

Biodiversity Offset Strategy (July 2018)

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METROMIX PTY LIMITED

Teralba Quarry - Biodiversity Offset Strategy

July 2018

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Condition 52 of *Schedule 3 of* PA10_0183 (MOD 1), Project Approval (PA) 10_0183 (MOD1) requires Metromix to retire biodiversity credits generated from the Teralba Quarry Extension Project in accordance with the Biodiversity Offset Scheme of the *Biodiversity Conservation Act 2016* (BC Act) to the satisfaction of the Secretary and OEH. Metromix will retire the biodiversity credits in a staged manner aligned with the proposed Quarry development and vegetation clearing activities as indicated in Tables 8, 8a and 8b of PA 10_0183 MOD 1. Credits associated with the development of Stage 1 and Stage 2 in the Southern Extension will be retired by 31 December 2018, in accordance with *Condition 54 of Schedule 3 of* PA10_0183 (MOD 1), . Vegetation clearing in future development stages will not commence until the relevant credits for that stage (in accordance with *Condition 55* and *Condition 56 of Schedule 3 of* PA10_0183 (MOD 1)) have been retired to the satisfaction of the Secretary of DPE and OEH.

Metromix has reviewed the options available under the Biodiversity Offset Scheme and intends to retire the ecosystem and species credits described in Table 8, Table 8a and Table 8b of PA10_0183 MOD 1 by the purchase and retirement of 'like for like' credits consistent with the BC Act from registered Biobank sites and/or Biodiversity Stewardship sites or through payment to the Biodiversity Conservation Trust (BCT).

Eco Logical Australia has been commissioned to act as a broker on behalf of Metromix to facilitate negotiations for credit purchase. Metromix considers that Mr Robert Humphries of Eco Logical Australia is a 'fit and proper person' to act in this regard.

Table 11 provides a summary of the total biodiversity credit requirements and the currently available offset type options following a review of the public register of biodiversity credits. The selection of offset type options are based on the variation rules of the Biodiversity Offset Scheme that specify that variation options to the offset type must be within the same IBRA region, the same vegetation formation and the same or higher offset trading group. Consideration must also be given to the presence of hollow-bearing trees, which are present in the vegetation to be cleared within the Quarry Site.

Table 11 Credit Requirements and Offset Options

Credit Type	Offset Type Required	Number of Credits Required	Offset Type Options*
Ecosystem Credits	PCT1589 'Spotted Gum – Broad-leaved Mahogany – Grey Gum grass – shrub open forest on Coastal Lowlands of the Central Coast'	1 343	PCT1589 'Spotted Gum – Broad-leaved Mahogany – Grey Gum grass – shrub open forest on Coastal Lowlands of the Central Coast'
			PCT1178 'Slaty Red Gum grassy woodland on hinterland foothills of the southern North Coast'
			PCT1601 Spotted Gum - Narrow-leaved Ironbark-Red Ironbark shrub - grass open forest of the central and lower Hunter
Species Credits	Black-eyed Susan (Tetratheca juncea)	1 103	Black-eyed Susan (Tetratheca juncea)
* Offset type options are based on the variation rules of the Biodiversity Offset Scheme.			
Source: Eco Logical Australia			

Initial investigations regarding credit availability have indicated that sufficient credits of PCT1589 '*Spotted Gum – Broad-leaved Mahogany – Grey Gum grass – shrub open forest on Coastal Lowlands of the Central Coast'* will be available for retirement by 31 December 2018 to satisfy the requirements described in Table 8 of PA10_0183 MOD 1 (i.e. 670 credits), however this remains subject to final agreements. In addition, there are sufficient credits available to satisfy species credit requirements for the Black-eyed Susan (*Tetratheca juncea*) described in Table 8 of PA 10_0183 MOD 1 (i.e. 1 103 credits) which will also be retired by 31 December 2018.

Metromix has verbally agreed and plans to secure (via an options agreement) the purchase of 670 PCT1589 credits from Biobank sites BA329 and 330 located at Ebsworth Road, Clarencetown that were registered in June 2018. These credits are of a like for like PCT (and do not require any variations) and are thus consistent with the BC Act and will be retired prior to the end of December 2018.

Negotiations are also underway to secure the 1,103 Tetratheca credits from BB214 (which has 5,076 credits available) or BA 223 (which has 18,891 credits available) at Limeburners Creek. Metromix is confident that these credits will be able to be secured prior to the end of December 2018 and is also investigating the option of purchasing these credits through the BCT.

Should sufficient credits not be available, Metromix may use the option of payment into the BCT. It is noted that before payments may be made into the Trust, Metromix would need to apply to OEH for an assessment of 'reasonable equivalence' of biodiversity credits due to the differences between BioBanking credits (BBAM credits) and the new Biodiversity Assessment Methodology Credits (BAM credits).

It is currently anticipated that development of Stage 3 of the Southern Extension will commence from 2028. Biodiversity credits associated with Stage 3 of the Southern Extraction Area would be retired before any vegetation clearing commences in this area (in accordance with Table 8a of PA 10_0183 MOD 1.

Once this Plan and the Biodiversity Offset Strategy are approved by DPE, Metromix will finalise arrangements to satisfy credit obligations resulting from the development of Stage 1 and Stage 2 of the Southern Extension.

The implementation of the Biodiversity Offset Strategy would not involve on-site activities and therefore this matter is not relevant to ongoing management measures or progressive rehabilitation within the Quarry Site. There is therefore no necessary integration of offsetting activities with rehabilitation.