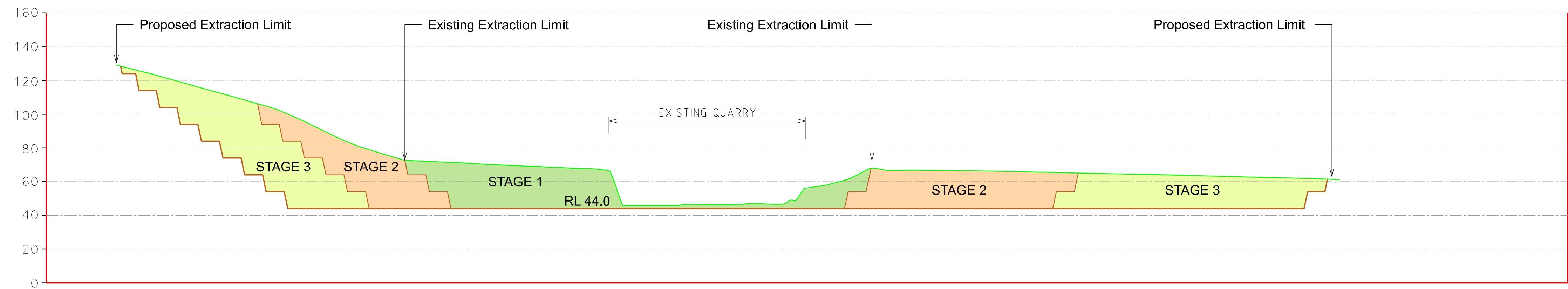


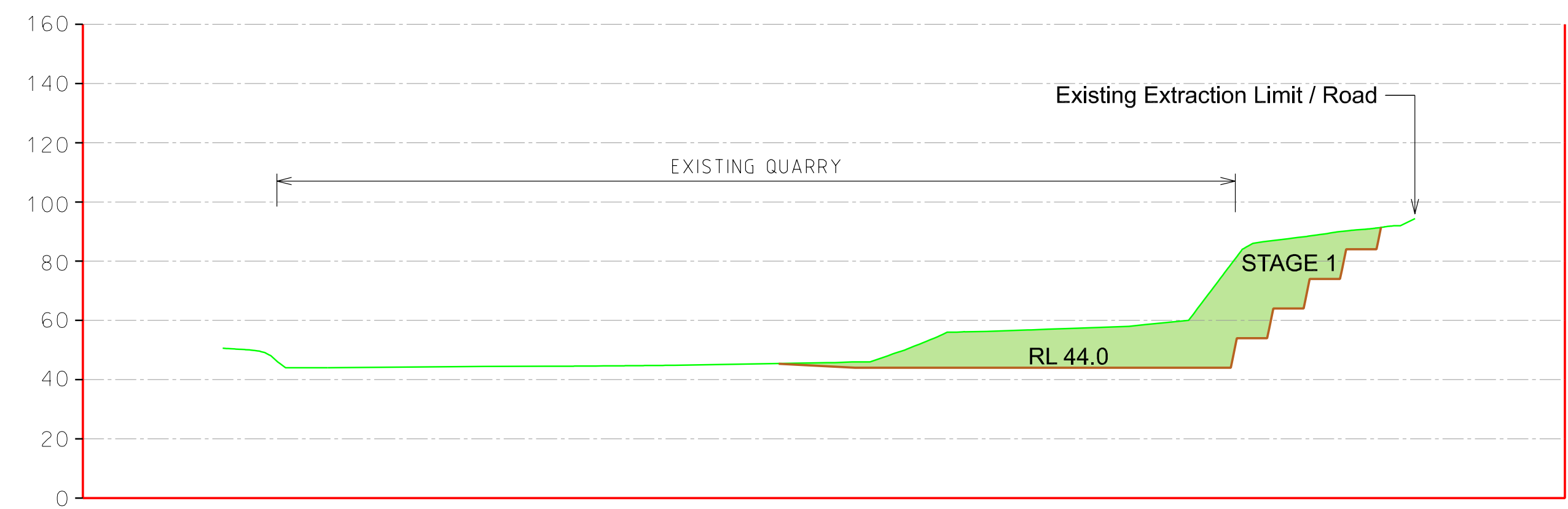
Appendix A Quarry Plans



				 Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmali@ghd.com.au W www.ghd.com	DO NOT SCALE		Drawn S. Verhellen	Designer	Client	Newman Quarrying Slys Quarry Proposed Quarry Expansion	
							Drafting Check	Design Check	Project		
							Approved (Project Director)		Title		
							Date				
							Scale AS SHOWN		Original Size		
									A1		
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing		Drawn	Job Manager	Project Director	Date		Drawing No: 22-17528-001		Rev:
This Drawing must not be used for Construction unless signed as Approved											



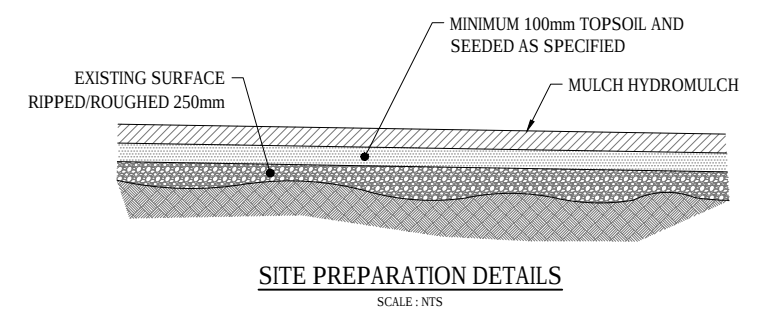
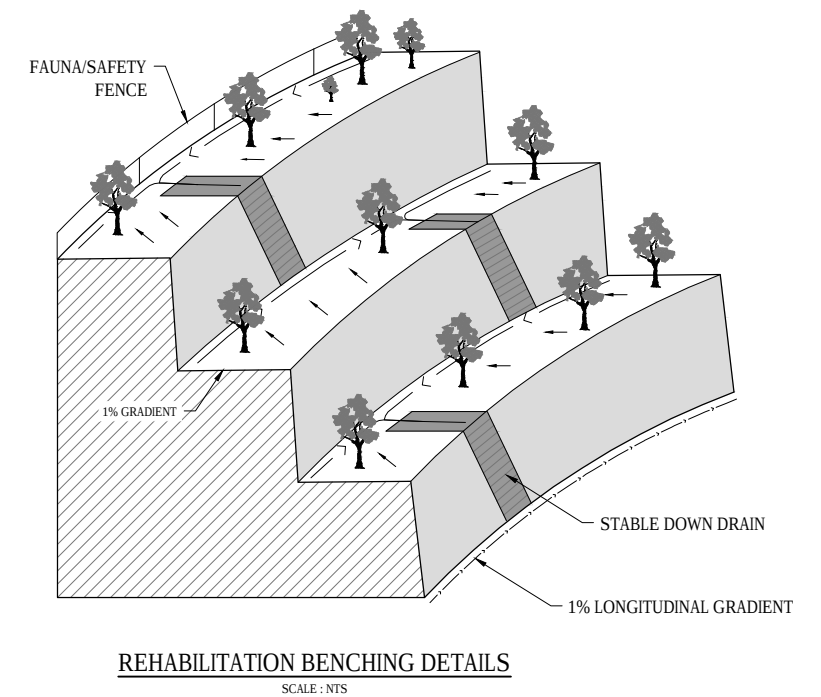
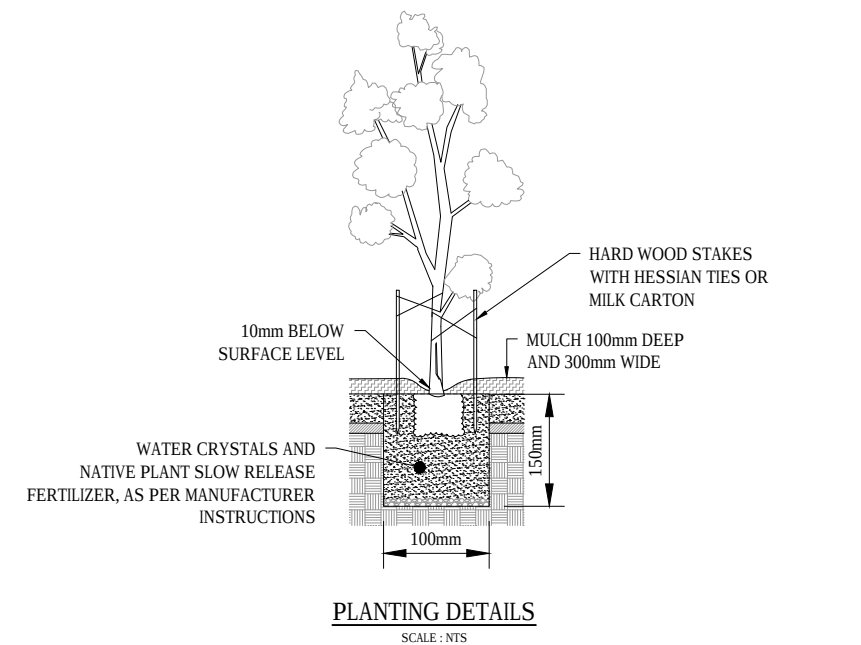
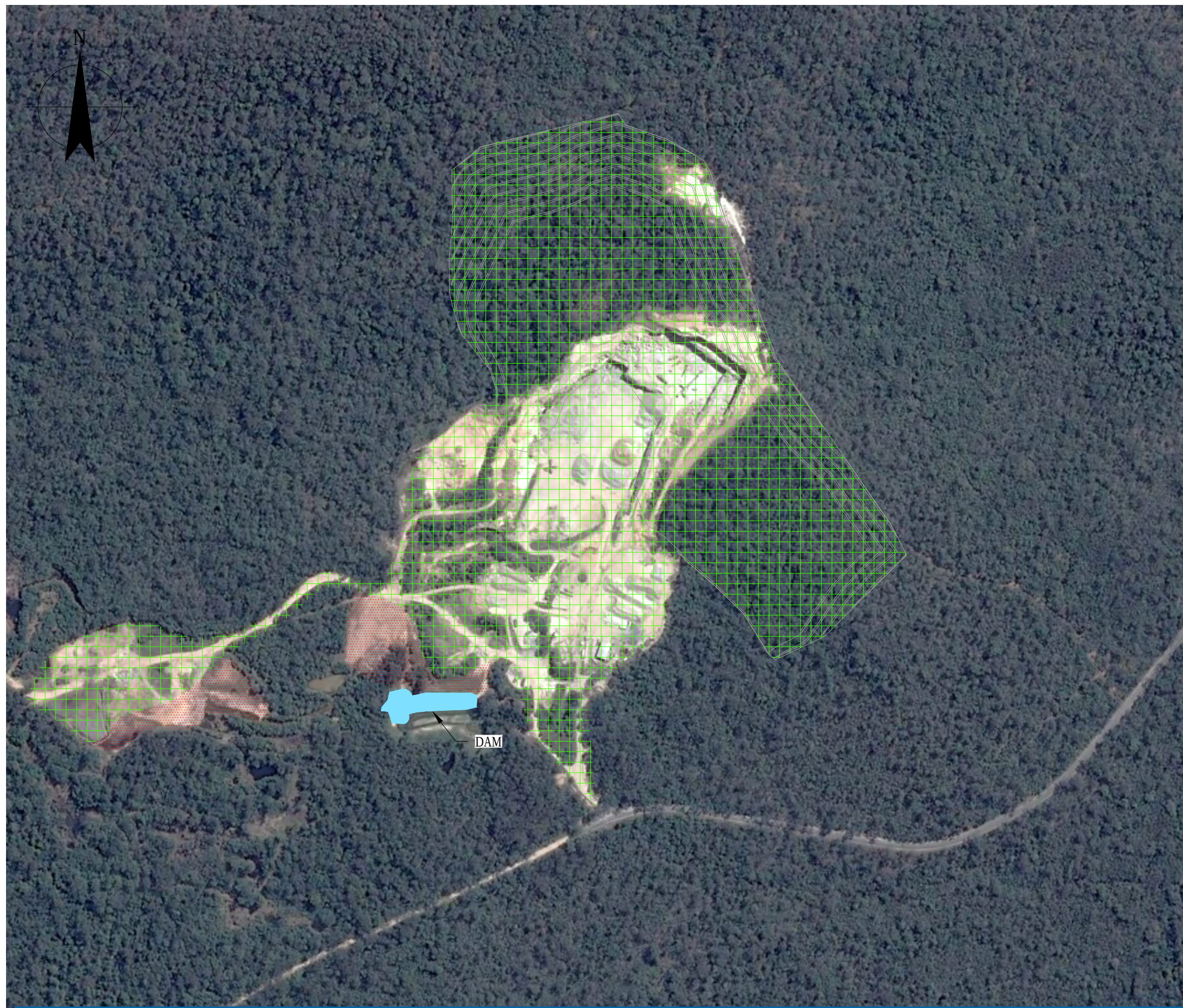
SECTION A - A



SECTION B - B



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0 50 100 150m
SCALE 1:5000 AT ORIGINAL SIZE

ZONE A
ZONE B



PRECISION INDUSTRIES PTY LTD
NEWMANS QUARRY

REHABILITATION PLAN

Job Number 22-17528
Revision A
Date FEB. 2015

Figure 01

Rehabilitation Plan

Aim

To provide a plan to improve the environmental condition of the site after quarrying activities have ceased.

Objectives

The objectives of the rehabilitation plan are to:

- Describe topsoil stripping and stockpiling methods
- Describe the site preparation, revegetation and weed control methods required
- Describe the maintenance activities
- Provide a schedule for the proposed works

Topsoil Stripping and Stockpiling

The following measures should be adopted for soil stripping and stockpiling:

- Soils should be stripped in a slightly moist condition (neither too dry nor wet) thus reducing dust generation and deterioration in topsoil quality
- Topsoil should be stockpiled only when disturbed areas are not available for immediate rehabilitation
- Soil stockpiles should be constructed to minimise the stockpile area in a discrete two metre high (maximum) pile, with a working face battered down at 30 degrees
- Stockpiles should be trimmed, deep ripped to 500 mm, immediately sown with permanent pasture species, and fertilised

Site Preparation

- The perimeter of the quarry should be fenced for safety and to exclude fauna. Fencing should include ‘one-way fauna gates’ which allow fauna to escape from the former quarry area
- To delineate the restoration area, temporary fencing should be installed until restoration is completed. No machines will be allowed inside the restoration area other than for works associated with planting and weeding
- Benches should be constructed with in fall drainage, a non-erodible longitudinal grade (approximately 1%) and stable down drains
- The benches are to be ripped/roughed to a depth of 250mm to key in topsoil
- Topsoil stripped from the site prior to the quarry operations commencing should be respread across the benches to form a minimum of 100mm deep layer
- Sediment and erosion controls should be maintained until the site is stable

Revegetation

The area to be revegetated has been divided into two zones:

- Zone A is the disturbed area to be revegetated following the completion of the quarry.
- Zone B is swampy disturbed area to be revegetated following the completion of the quarry.

The extent of the two zones is to be confirmed onsite based on site conditions, prior to commencing revegetation works. Revegetation in Zones A and B will be via a mix of planting tube stock or hiko cells and seeding.

Seeding and planting details are provided below. The desired density of each stratum is provided in the species table. This may be altered in consultation with CVC.

Seeding

Seed is to be purchased from local suppliers or collected locally. All seed collection, management, cleaning and storage will be in accordance with *Guideline 5: Seed Collection from Woody Plants for Local Revegetation (FloraBank, 1999)*.

Seeding should be done prior to planting. Seed broadcasting is to be done by hand or mechanical means at the sowing rates indicated below. The seed should be raked following sowing to cover the seed and improve success rates. The seed should be watered weekly until established.

Planting

Ideally, planting should be done at the start of autumn but due to the mild climate of the area, planting at any time during the year should not cause a significant problem. The tube stock, where possible, should be sourced from nurseries that use local seed stock, ideally from within the Clarence Valley area.

The planting method includes:

- Soak all plants before planting.
- Make a hole large enough for the tube stock.
- Add water crystals and a slow release fertiliser suitable for native species.
- Remove the plant from the container being careful not to damage the roots.
- Insert the plant into the hole so that the base of the stem is a little below the surrounding ground
- Firm the soil around the root ball to remove air gaps.
- Water the plant with at least 2L of water
- Mulch the plant using native tree mulch, weed mats or saw dust. Make sure the mulch is not against the stem of the plant.
- Install a protective guard using wooden/bamboo stakes or milk carton.
- Water weekly for the first month. Further watering may be required if there is no rain.

Species List

Recommended species and planting densities are provided below. The recommended species are based on those to be removed. If the recommended species are unavailable consult CVC for suitable replacement species

Recommended Species for Zone A

Species List	Seed Rate ¹	Plant Number ^{1, 2}	Desired Density ¹
Upper storey/canopy	2 kg/ha	2030	1/15m ²
Blackbutt (<i>Eucalyptus pilularis</i>)			
Red Mahogany (<i>Eucalyptus resinifera</i>)			
Pink Bloodwood (<i>Corymbia intermedia</i>)			
Turpentine (<i>Syncarpia glomerata</i>)	2 kg/ha	3040	1/10m ²
Mid storey			
Black Wattle (<i>Acacia leiocalyx</i>)			
Red Ash (<i>Alphitonia excelsa</i>)			
Cheese Tree (<i>Glochidion ferdinandi</i>)	4 kg/ha	6080	1/5m ²
Lower storey/groundcover			
Blue Flax-lily (<i>Dianella caerulea</i>)			
Rough Saw Sedge (<i>Gahnia aspera</i>)			
Many-flowered Mat-rush (<i>Lomandra multiflora</i>)	10 kg/ha	NA	NA
Sterile Cover Crop			
Rye (<i>Lolium rigidum</i>)			
Japanese Millet (<i>Echinochloa esculenta</i>)			

¹ This relates to the storey not the individual species.

² This assumes the desired density will be achieved by seeding and natural regeneration.

Recommended Species for Zone B

Species List	Seed Rate ¹	Plant Number ^{1, 2}	Desired Density ¹
Upper storey/canopy	2 kg/ha	125	1/15m ²
Swamp Mahogany (<i>Eucalyptus robusta</i>)			
Brush box (<i>Lophostemon suaveolens</i>)			
Broad Leaved-paperbark (<i>Metaleuca quinquenervia</i>)			
Turpentine (<i>Syncarpia glomerata</i>)	2 kg/ha	190	1/10m ²
Mid storey			
Cheese Tree (<i>Glochidion ferdinandi</i>)			
Lily Pilly (<i>Acmena smithii</i>)			
Cabbage Palm (<i>Livistona australis</i>)	4 kg/ha	380	1/5m ²
Red Ash (<i>Alphitonia excelsa</i>)			
Lower storey/groundcover			
Saw-sedge (<i>Gahnia clarkii</i>)			
Rainbow Fern (<i>Calochlaena dubia</i>)	10 kg/ha	NA	NA
Harsh Ground Fern (<i>Hypolepis muelleri</i>)			
Sterile Cover Crop			
Rye (<i>Lolium rigidum</i>)			
Japanese Millet (<i>Echinochloa esculenta</i>)			

¹ This relates to the storey not the individual species.

² This assumes the desired density will be achieved by seeding and natural regeneration.

Maintenance and Monitoring

Regular maintenance activities will include:

- Follow-up watering
- Repairing damaged tree guards
- Monitoring survival rates and installing replacement plants where required to achieve the densities above
- Weed control and continued follow-up spot spraying, hand removal, etc as required

Weed Control

Weed control is vital to the success of the revegetation. The noxious and environmental weed species likely to be at the site and their recommended control method are provided below.

Scientific Name	Common Name	Noxious	Control Methods				
			Cut and paint ¹	Scape and Paint ¹	Direct Inject ¹	Spot Spraying ¹	Manual Remove
<i>Ageratina adenophora</i>	Crofton Weed	Class 4				v ^{2, 4, 7}	v
<i>Ageratum houstonianum</i>	Blue Billy Goat Weed					v	v
<i>Baccharis halimifolia</i>	Grounse! Bush	Class 3	v ⁴			v ²	v ³
<i>Bidens pilosa</i>	Farmers Friends					v	v
<i>Cinnamomum camphora</i>	Camphor Laurel	Class 4	v		v		
<i>Eragrostis curvula</i>	African Love Grass	Class 4				v	
<i>Ipomoea indica</i>	Morning Glory			v ⁴		v	v
<i>Lantana camara</i>	Pink/Red Lantana	Class 4	v			v	v
<i>Ligustrum lucidum</i>	Large Leaf Privet	Class 4	v ⁴		v ⁴	v ^{2, 8}	v ¹¹
<i>Ligustrum sinense</i>	Small Leaf Privet	Class 4	v ⁴		v ⁴	v ^{2, 8}	v ¹¹
<i>Pennisetum clandestinum</i>	Kikuyu					v	
<i>Rubus fruticosus</i>	Blackberry	Class 3				v ⁸	
<i>Senecio madagascariensis</i>	Fireweed					v ¹¹	v
<i>Senna pendula</i> var. <i>glabrata</i>	Eastern Cassia/Senna		v		v ⁴	v ¹	
<i>Solanum mauritianum</i>	Tobacco Bush		v				

¹ Glyphosphate unless specified; ² Seedlings; ³ Saplings; ⁴ Mature plants; ⁵ Large infestations; ⁶ Small infestations; ⁷ Grazon; ⁸ Metsulfuron-methyl; ⁹ Glyphosate & Metasulfuron-methyl mix, ¹⁰ Penetrant, ¹¹ Bromoxynil

Reporting

Reporting may be required at the following stages:

- Completion of initial planting
- After each maintenance and monitoring period
- At completion of 5 year maintenance and monitoring period

Revegetation Schedule

The following table provides an indicative schedule for the revegetation works. Revegetation works commence at the completion of the proposed quarry. Completion of the revegetation works is the responsibility of the landowner but it is recommended that a qualified bush regenerator contractor be engaged to do the works.

Task*	Year 1			Year 2			Year 3			Year 4			Year 5		
Site Preparation															
Seeding/Planting															
Maintenance/Monitoring															

* See details for requirements of each task



PRECISION INDUSTRIES PTY LTD
NEWMANS QUARRY

Job Number | 22-17528
Revision | A
Date | FEB. 2015

CONCEPT REHABILITATION NOTES

Figure 02