



Anderleigh Quarry

Source Material Assessment Report

Prepared for Department of Transport and Main Roads

December 2015

AUQ00030

EXECUTIVE SUMMARY

The Anderleigh Quarry Resource area consists of slate, sandstone and quartzose sandstone. The quarry is essentially a brownfields project which is currently operating under a Mining Lease (ML 50283) and a local government approval for extraction of up to 1,000,000 t/a of quarry material under Environmentally Relevant Authority (ERA) 16 2 (b) and 16 3 (b).

The previous Resource assessment (2009) identified an estimated 1.8Mt which is sufficient for the immediate production with opportunities to expand the known resource within the property. Two main material types have been identified on site as:

- Sandstone material with varying properties (white sandstone is strong and hard, coloured sandstone is weaker and softer).
- Quartzose material with consistent properties.

Significant testing has been carried out on the Anderleigh materials to date to assess its suitability as a road base, aggregate and gabion material.

This Source Material Assessment Report indicates the suitability of the Anderleigh Quarry material for the following uses and certification for these products is being sought:

- Road base <35mm. Type 2.5 and Type 3.5 (Sandstone material).

However, the site have capability of producing the following based on the previous testing data and certification from DTMR.

- Drainage Rock (80-140mm) (Quartzose material).
- Gabion Rock retaining wall rock (RWR) (Quartzose material, White Sandstone material).
- Aggregates (Quartzose material).

Discs photos from core samples for Unconfined Compressive Strength (UCS) of the white sandstone, coloured sandstone and quartzose material are supplied with the hard copy of this report.

Alan Robertson, RPEQ 5642

Director,

Ausrocks Pty Ltd


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DOCUMENT REVIEW AND SIGN-OFF

Name	Position	Role	Signature	Date Issued
Alan Robertson RPEQ 05642	Director (Ausrocks)	QA & RPEQ Certification		02/12/2015

This document has been prepared for the exclusive use of the client on the basis of instructions, information and data supplied by the Client as at December 2015. This document has been prepared by Ausrocks Pty Ltd, Ausrocks has no financial association with the Client other than carrying out this report as requested by the Client.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	
1 INTRODUCTION	1
1.1 ANDERLEIGH QUARRY COMPANY DETAILS	1
1.2 SITE NAME	1
1.3 LOCATION AND ACCESS.....	1
1.4 REAL PROPERTY DESCRIPTION	1
1.5 OWNERSHIP AND TENURE.....	1
1.6 LICENSES, PERMITS AND APPROVALS	1
1.7 NOMINATED PRODUCTS	1
1.8 OBJECTIVE	6
1.9 QUALITY POLICY STATEMENT	6
2 GEOLOGICAL SETTINGS	7
2.1 REGIONAL GEOLOGY	7
2.2 SITE GEOLOGY	9
2.3 SOURCE ROCK	9
2.4 CURRENT RESOURCE ROCK AREAS	9
2.5 PETROGRAPHIC ANALYSIS.....	9
3 EXTRACTION OF MATERIAL.....	10
4 METHODOLOGIES FOR IDENTIFICATION & RISK MITIGATION STRATEGIES	11
4.1 IDENTIFICATION METHODOLOGY	11
4.2 RISK MITIGATION	11
5 PRODUCTION PROCESS.....	11
6 STOCKPILE MANAGEMENT & CONTROL.....	11
7 SAMPLING & TESTING	12
8 METHODOLOGY FOR TEST DATA RECORDING AND ANALYSIS	12
9 METHODOLOGIES FOR CONSISTENTLY AND UNIFORMLY ACHIEVING NOMINATED PRODUCT QUALITY	12
10 SUPPLYING, LOADING, RECORDING & INVOICING	12
10.1 INTERNAL AUDITS.....	12
10.2 DTMR AUDITS OF SMAP	13
10.3 DTMR SURVEILLANCE OF CONTRACT	13
10.4 REVISION OF THIS SOURCE MATERIALS ASSESSMENT REPORT	13
11 REFERENCES.....	15

APPENDIX A PERMITS, LICENSES AND APPROVALS	16
APPENDIX B QUARRY PLAN	17
APPENDIX C TEST RESULTS	18
APPENDIX D PETROGRAPHIC	19

TABLES

VERSION INFORMATION	I
DOCUMENT CHANGE CONTROL	I
DOCUMENT REVIEW AND SIGN-OFF	I

FIGURES

FIG 1.1 SITE LOCALITY MAP	2
FIG 1.2 SITE ACCESS MAP FROM GYMPIE	3
FIG 1.3 AERIAL PHOTO OF EXTRACTION AREA	4
FIG1.4 PLAN SHOWING MINING LEASE AREA AND PROPERTY BOUNDARY	5
FIG 2.1 REGIONAL GEOLOGY	8
FIG 2.2 SOURCE ROCK SAMPLE	9
FIG 3.1 EXTRACTION FACE	10

LIST OF APPENDICES

EXECUTIVE SUMMARY	
DOCUMENT CONTROL	I
APPENDIX A PERMITS, LICENSES AND APPROVALS	16
APPENDIX B QUARRY PLAN	17
APPENDIX C TEST RESULTS	18
APPENDIX D PETROGRAPHIC	19

DEFINITIONS/ABBREVIATIONS

Ausrocks: Ausrocks Pty Ltd, Consulting Mining Engineers

CAR: Corrective Action Request

Anderleigh Quarry: Anderleigh Enterprises Pty Ltd

General Manager: Anderleigh Quarry person responsible for SMAP (Dave Peacock).

SMAR: Source Material Assessment Report (This document)

Operations Manager: Anderleigh Quarry person directly responsible for Quarry production (Dave Peacock Anderleigh Quarry).

DTMR: Queensland Department of Transport and Main Roads ("the Client")

DEHP: Department of Environment and Heritage Protection

Other

(Note: Abbreviations for standard metric (SI) units or in common usage are not listed)

ERA Environmentally Relevant Activity

bcm bank cubic metres

m³ Cubic metre of product

ML Mining Lease

Mt Million tonnes

Mtpa Million tonnes per annum

RWR Retaining wall rock

UCS Unconfined Compressive Strength

1 INTRODUCTION

1.1 ANDERLEIGH QUARRY COMPANY DETAILS

David Peacock

Director/Quarry Manager

Anderleigh Enterprises Pty Ltd

270 Sorenson Road QLD 4270

ABN: 12 144 928 281

Email: admin@anderleighquarry.com

1.2 SITE NAME

The site name is: Anderleigh Quarry.

1.3 LOCATION AND ACCESS

The quarry is accessed from Gungalda on the Bruce Highway, located approximately 25 kilometres north of Gympie. Access from the Bruce Highway is via Anderleigh Road and then south via Four Mile Road then into Sorensen Road which terminates at the north-western corner of the property. The site is located on 460528E, 7121395N (26° 01' 33.0151" S, 152° 36' 19.8337" E), site coordinate system is on UTM/GDA 94 in AHD

Anderleigh Road is a two way sealed road while Four Mile Road and Sorensen Rd are two way unsealed dirt roads. The Quarry is approximately 40km by road from the nearest town Gympie. Refer Figure 1.2

1.4 REAL PROPERTY DESCRIPTION

Anderleigh Quarry is located on Lot 2 RP171364 (54.068ha) at 270 Sorensen Road, Gungalda. Approximately 9.34 ha of the property is was previously covered by Mining Lease (ML) 50283 but the new Mining Lease covers 41.41ha (about 77% of the land property). See Figure 1.4

1.5 OWNERSHIP AND TENURE

The property is owned by a Joint Venture initiative between Anderleigh Quarry Pty Ltd & Indigenous Business Australia.

1.6 LICENSES, PERMITS AND APPROVALS

As stated earlier ML 50283 covers about 41.41 ha of the property. Current extractive industry approvals are:

- ERA 16 2 (c) – Extracting of rock or other material >100,000 t/a – 1 Mt/a.
- ERA 16 3 (b) – Screening of rock or other material >100,000 t/a – 1 Mt/a.

Copies of these documents are provided as required in Attachment A.

1.7 NOMINATED PRODUCTS

- Unbound Paving Material (Type 2.5 and Type 3.5)

FIG 1.1 | SITE LOCALITY MAP



FIG 1.2 | SITE ACCESS MAP FROM GYMPIE

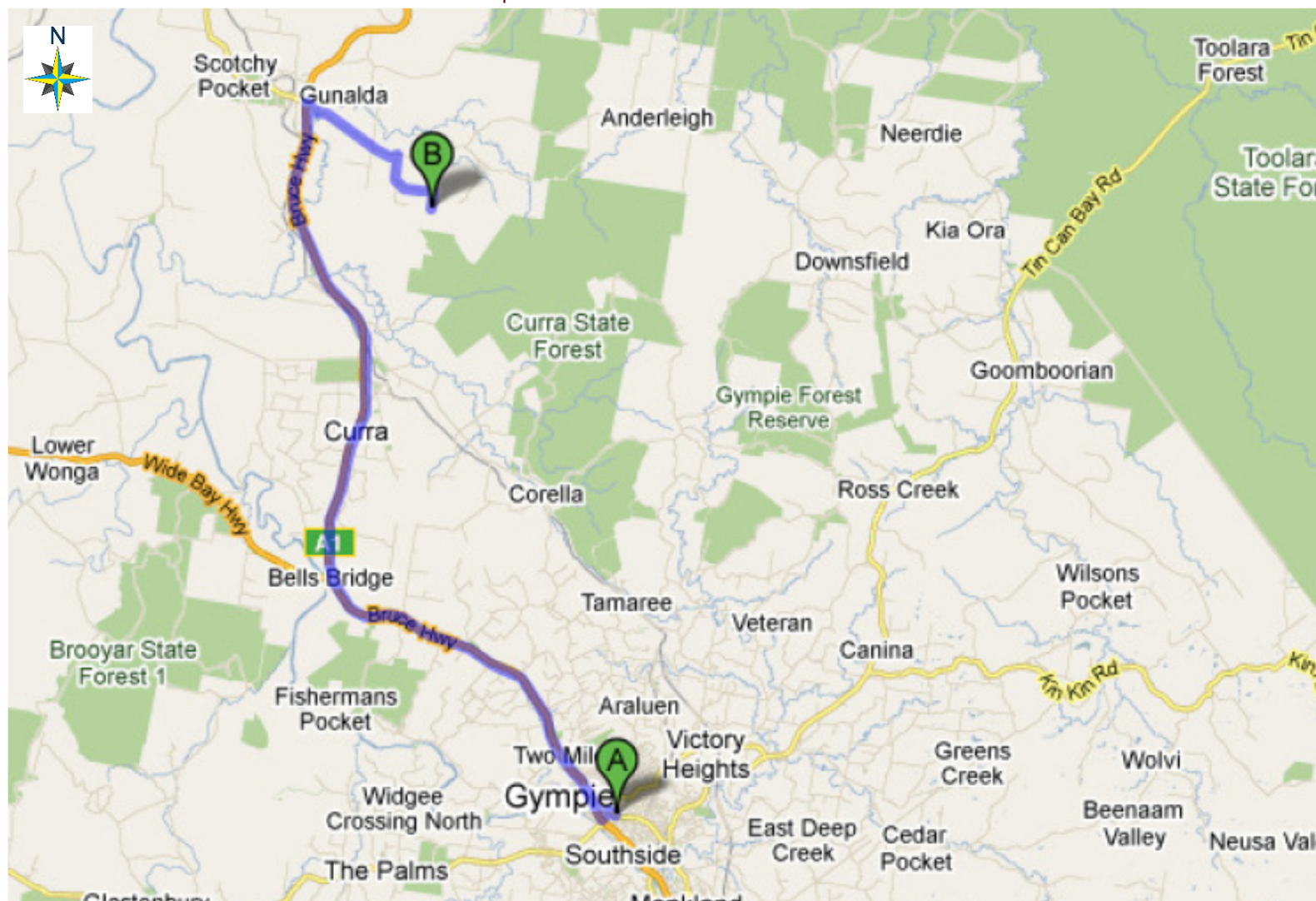


FIG 1.3 | AERIAL PHOTO OF EXTRACTION AREA

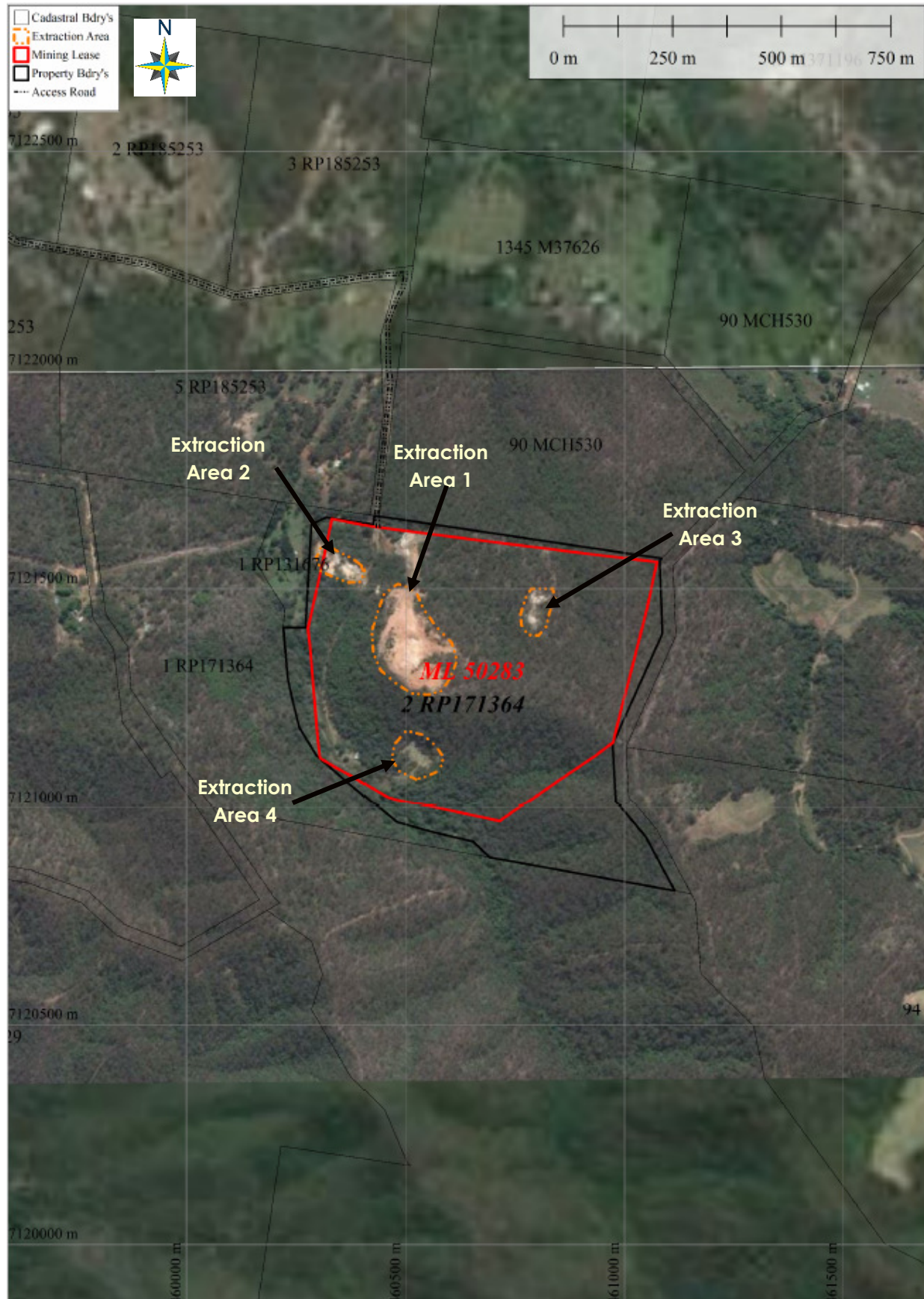


FIG1.4 | PLAN SHOWING MINING LEASE AREA AND PROPERTY BOUNDARY



1.8 OBJECTIVE

This document has been created to ensure that materials supplied to customer and for DTMR projects by Anderleigh meets and continues to meet, the technical requirements of those products as described in the relevant DTMR Technical Standard, and also any other technical requirements designated by DTMR in relating to the materials supplied from site.

1.9 QUALITY POLICY STATEMENT

It is the policy of Anderleigh Quarry that the client needs be fully satisfied by working within the framework of contractual and regulatory requirements. A direct consequence of this is the implementation of an effective Quality System.

This Source Materials Assessment Report has been prepared to document the Quality System specifically developed for Supply of Crushed and Screened Products from Mobile Plants. The screened and crushed products manufactured are generally produced to meet Department of Transport and Main Roads Technical Standard for Unbound Pavements (MRTS05). Products meeting other specifications may also be produced from time to time.

The Source Material Quality is guaranteed at all times which involves dedication, support and co-operation of all Company staff. It is the Company's policy and management's responsibility to ensure that the Material Quality is understood and maintained by all employees through effective training. The General Manager fully endorses the Material Quality plan that has been developed and committed to by Anderleigh Quarry.

2 GEOLOGICAL SETTINGS

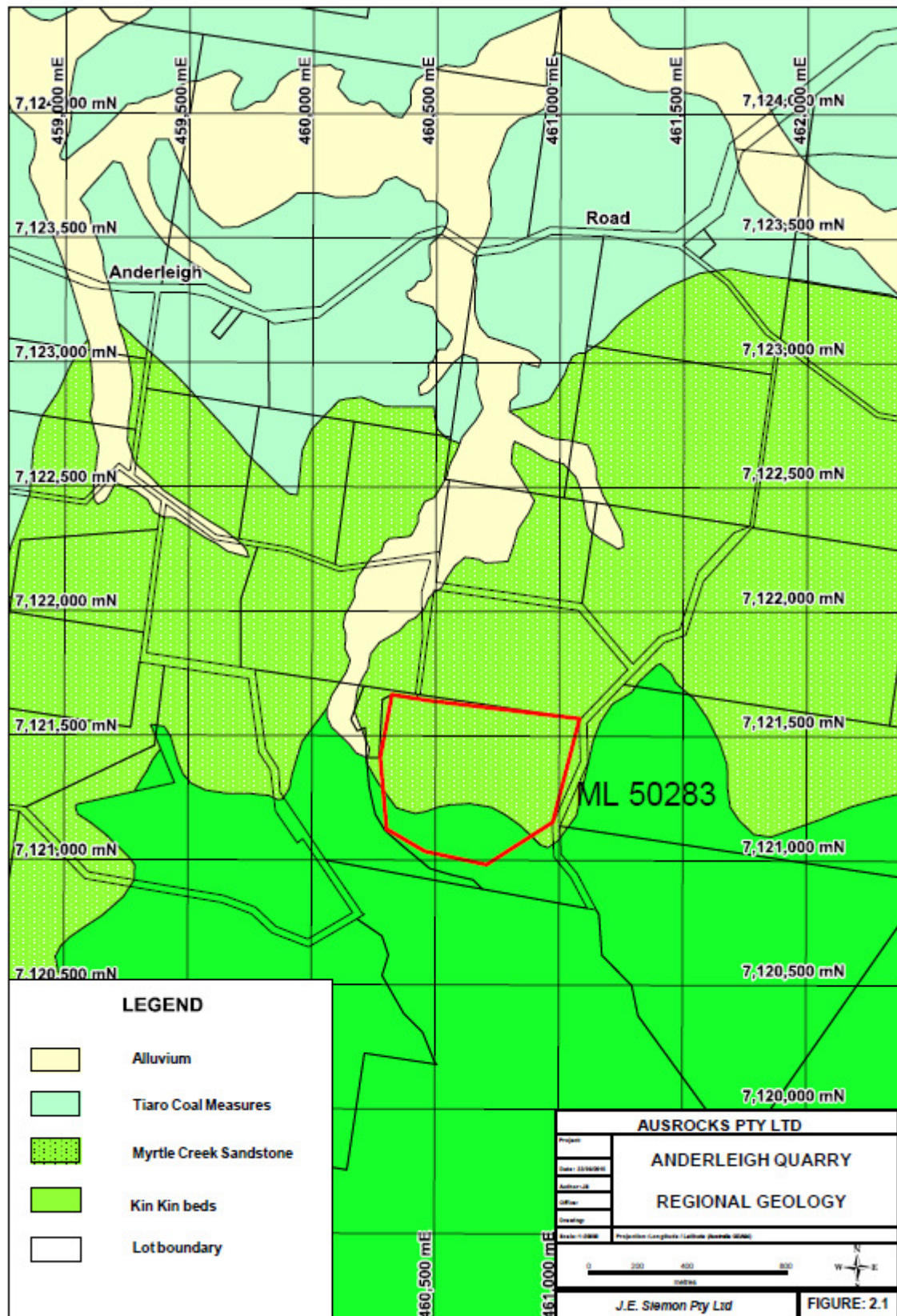
2.1 REGIONAL GEOLOGY

Figure 2.1 shows the regional geology map for the larger area around the project site. Geological mapping by the Department of Natural Resources and Mines has indicated that the principal rock types in the vicinity are sediments belonging to the Early to Middle Triassic Kin Kin beds which are overlain by the Latest Triassic to Jurassic Myrtle Creek Sandstone which comprise the lower part of the Duckinwilla Group.

ML 50283 straddles the boundary between the Kin Kin beds of Early to Middle Triassic age and the overlying Late Triassic to Early Jurassic Myrtle Creek Sandstone. The Kin Kin beds comprise a sequence of arenite, argillite, phyllite; the phyllite in some areas is described as slate. The Myrtle Creek Sandstone contains quartzose sandstone, orthoquartzite, sublabile to labile sandstone, siltstone, and shale.

The upper part of the sequence north of Anderleigh Quarry comprises the Late Triassic to Early Jurassic Tiara Coal Measures which contains lithic, to feldspathic and quartzose sandstone, siltstone, shale, coal, ferruginous oolite marker. The major drainage lines contain alluvium derived from the soft sedimentary units.

FIG 2.1 | REGIONAL GEOLOGY



2.2 SITE GEOLOGY

Figure 2.1 shows the regional geology map for the larger area around the project site, the majority of the sandstone is located within the Myrtle Creek Sandstone with Extraction Area 1 in the centre of the operation, Extraction Area 2 (white pit) to the NW. There is also slate associated with the Kin Kin Beds to the south (Extraction Area 4) and competent quartzose sandstone further to the east (Extraction Area 3). Refer Figure 1.3 for the extraction areas. Similar material types may be encountered between Extraction Area 1 (main quarry) and Extraction Area 4 (slate area).

2.3 SOURCE ROCK

FIG 2.2 | SOURCE ROCK SAMPLE



Laboratory test results are also provided in Attachment C.

2.4 CURRENT RESOURCE ROCK AREAS

The current extraction pit has been regularly operated for over 5 years by Anderleigh Quarry and is currently progressing in a southerly direction. A preliminary Resource assessment has been completed in 2010 based on exposures from extraction. The Resource has been estimated at 1.8Mt. This Resource is sufficient for over 10 years of production. It is proposed to complete another resource drilling campaign on the site in the next 12 months if required. This may increase the Resource at depth and confirm the variability of the materials.

2.5 PETROGRAPHIC ANALYSIS

A Petrographic analysis has been undertaken by Geochempet Services on the materials from the site in 2008 and 2010 respectively, a copy of the reports are included in Attachment D. The petrographic description describes the rock as moderate durable. A quartzose sandstone tightly cemented by internal network of Clay– that is the rock has been cemented by clays and this will result in reduced

wet strength, which means that the materials will be disaggregated in constant wetting cyclic. Based on the previous petrographic result and current material test carried out by SES in 2015, it appeared to be moderate durable **“The rock is predicted to have potential for mild or slow deleterious alkali-silica reactivity in concrete. It contains 12% moderately strained quartz.”** The report concluded that the material is moderately durable to durable and is adequate for use as a roadbase material.

3 EXTRACTION OF MATERIAL

There are minimal geotechnical risks or concerns identified with the extraction process on site, as the extraction pit contains mostly a single bench with a height less than 6m in operating pit. Due to the nature of the geology, there is currently no need for drill and blast activities on site as all material is won by using excavator to free dig and bench angles are kept low (approx 70 degrees).

FIG 3.1 | EXTRACTION FACE



The rock is loaded directly onto a grizzly screen or crushed and screened using mobile plant as required. The crushed and screened material is then stockpiled appropriately.

Attachment B shows the current Site Layout Plan.

4 METHODOLOGIES FOR IDENTIFICATION & RISK MITIGATION STRATEGIES

4.1 IDENTIFICATION METHODOLOGY

Due to the existing experience of the operators at the site a system for identifying different quality materials has been established. This system involves identifying the colour of the rock, clay content and any other abnormalities. All operators of plant have instructions to notify either the General Manager if a notable change of colour or clay content in the source rock occurs. These materials will then be extracted and processed separately so they may be individually tested for compliance.

4.2 RISK MITIGATION

An appropriate method for risk mitigation during the early stages of certification for quarry products is to increase the frequency of testing to ensure product consistency. Once a steady consistency is developed, in conjunction with the colour identification specified in section 10.1, ongoing testing can follow the confirmation principle described in the CCAA Code of Practice - Testing Frequencies and TMR Document QRS4: Assigning Quarry Specific Testing Frequencies for Source Rock Tests.

For the initial stages of testing, a high testing frequency shall be implemented. Freshly processed material is stockpiled separately and sample taken for material testing for compliance. If deemed compliant, then this stockpile will be merged with the main stockpile for that material SubType. If deemed non-compliant, two check tests shall be obtained from the same lot. If 2 out of the 3 tests are non-conforming the material stockpile will be moved to a "general fill" stockpile and more frequent testing will be initiated. This should prevent the main stockpile from receiving any quantity of non-compliant material.

5 PRODUCTION PROCESS

Material is split into various production processes by their boulder size and colour identification as specified in Section 4.1. Material that meets boulder wall specification is loaded from the quarry face (following the free dig operation) by an excavator that lifts material into a separate stockpile and remaining excavated materials to the grizzly for initial separation of gabion rock. In some case some of the materials will be loaded into mobile crushing plant for processing.

The materials crushed for producing roadbase is feed into Terex I-130RS impactor crusher & screener to produce 2.5mm which then feeds onto a mobile radial stacker to be stockpiled in the main processing area. The materials are then stockpiled and tested for compliance with the specification and subsequently loaded out for delivery.

6 STOCKPILE MANAGEMENT & CONTROL

Various areas are designated on site for stockpiles and at least 1 vehicle width will be left in between stockpiles to prevent cross contamination. The location of stockpiles will be clearly marked on a site plan displayed in the office and updated as required. Each stockpile shall be uniquely identified with a sign board showing lot number and commencement/completion dates.

Freshly processed material is stockpiled separately in 2 lots of 500t per material type, from which samples are taken and the material tested for compliance. If deemed compliant, then this stockpile

will be merged with the main stockpile for that SubType. If deemed non-compliant, additional testing will be carried out as per Section 7.

7 SAMPLING & TESTING

Sampling of materials for DTMR compliance testing is carried out using DTMR methods Q050 and Q060 as specified by MRTS05. These samples will be tested by an approved NATA laboratory in accordance with the appropriate Australian Standard tests or other tests as recommended by the Client.

Regular testing is to be carried out on freshly processed materials at 500t intervals, from two stockpiles that are kept separate from the main compliant stockpile until lab data can verify conformance.

8 METHODOLOGY FOR TEST DATA RECORDING AND ANALYSIS

A record keeping system has been established to ensure that all test results are stored suitably, in paper and electronic format.

Test data is then placed in an Excel spreadsheet that has been developed for each material Subtype where it is checked for compliance against MRTS05 (See Appendix C).

9 METHODOLOGIES FOR CONSISTENTLY AND UNIFORMLY ACHIEVING NOMINATED PRODUCT QUALITY

It is the responsibility of the General Manager and Quarry Manager to ensure the consistency of material to be sold. Material that has not been previously used or tested (including notable changes in material colour and texture during extraction) shall be sent to a NATA Registered Laboratory and tested to the specification of the Technical Standard, and additionally including tests for density and water absorption.

Testing of freshly extracted and processed material shall be undertaken every 500t, and the materials initially separately stockpiled and marked. Once test results confirm conformance of this material, it shall then be merged with a larger stockpile of the same type. If conformance is not achieved, then this material will be merged with another stockpile for non-DTMR use.

A new Petrographic analysis will be carried out on rock sampled from the main quarry face every 6 months at minimum to prove mineralogical consistency.

10 SUPPLYING, LOADING, RECORDING & INVOICING

Loaders have scales which are calibrated twice yearly. Loading of trucks takes place in the main stockpiling area (see Quarry Plan, Appendix B). Records of all loads are kept in the site office and are correlated on a weekly basis.

10.1 INTERNAL AUDITS

The General Manager will prepare an Internal Audit Schedule and arrange these audits. The first will be 6 months from certification.

If the results of this are satisfactory to the General Manager, subsequent internal audits will be at yearly intervals, or more frequently if deemed necessary by the General Manager.

Audits will assess whether DTMR's directives, specifications and contract requirements are accurately reflected in the activities performed by Anderleigh Quarry in accordance with the SMAR documentation.

Deficiencies either in the SMAR or in Anderleigh Quarry's adherence to it, if found, will be recorded as a report. A timeline for rectifying these deficiencies will be formulated. This report may also be accompanied by one or more Anderleigh Quarry issued corrective action require (CARs) to which the Anderleigh Quarry General Manager will respond by rectifying the deficiency and putting in place corrective action to ensure the deficiency does not reoccur. The completed CAR will be returned to the Anderleigh Quarry General Manager within 5 working days of its receipt or sooner if the Anderleigh Quarry General Manager so indicates. Anderleigh Quarry is responsible for coordinating this action.

10.2 DTMR AUDITS OF SMAP

The DTMR contract management team will formally (through audits), review Anderleigh Quarry's SMAR at intervals as determined by the DTMR Representative.

The DTMR Representative will normally provide 5 days' notice of any formal Audit, however, should a major potential problem be identified, the DTMR may conduct an audit without notice.

After the initial audit, if any element of the SMAR does not comply with the contract document or approved practice, Anderleigh Quarry anticipates Corrective Action Requests ("CAR") will be issued.

Anderleigh Quarry will resolve any issues as indicated on the CAR as soon as reasonably possible.

10.3 DTMR SURVEILLANCE OF CONTRACT

Anderleigh Quarry anticipates:

- The DTMR will conduct regular surveillance,
- A surveillance plan will be prepared by the DTMR Surveillance Officer ("SO") in accordance with the DTMR Surveillance Officer's Handbook and
- The weekly or fortnightly works schedule provided by Anderleigh Quarry.

Directions given by the DTMR to the Anderleigh Quarry's General Manager at the time of these visits will be recorded by the DTMR on Surveillance Visits Reports.

Copies of the Surveillance Visits Reports will be retained on file by Anderleigh Quarry.

Deficiencies, if found, will be recorded. A timeline for rectifying these deficiencies will be formulated.

If Non Conformance Reports ("NCR") have not been received, the report may be accompanied by one or more CARs and / or Nonconforming Product or Service Notifications ("NPSN") to which Anderleigh Quarry will respond by rectifying the deficiency, putting in place corrective action to ensure the deficiency does not reoccur and reporting to the DTMR.

Anderleigh Quarry is responsible for coordinating this action.

10.4 REVISION OF THIS SOURCE MATERIALS ASSESSMENT REPORT

Anderleigh Quarry will review this SMAR frequently to meet TMR testing regime to ensure it is appropriate and is being implemented effectively. Changes may arise from a change of scope, DTMR audits or from opportunities for improvement.

This Plan will then be updated to reflect any changes which have occurred.

The revised document will be reviewed and approved by the Anderleigh Quarry General Manager and forwarded to the DTMR Representative if required.

11 REFERENCES

- Department of Transport & Main Roads, Engineering Note EN10: Guideline for Quarry Assessment and Registration, September.
- Department of Transport & Main Roads, Policy EP108 Guide: Guideline for Quarry Assessment and Certification.
- Main Roads Technical Standard, MRTS05: Unbound Pavements, April 2011.

APPENDIX A | PERMITS, LICENSES AND APPROVALS

Our Ref: 2010-2055 MKM/KJS1044 Minute P06/12/11

20 December 2011

Anderleigh Enterprises Pty Ltd
Colston Surveyors and Planners
PO Box 500
COOLUM BEACH QLD 4573

ATTENTION: WENDY WOOD

Dear Madam,

**RE: Development Application for Material Change of Use –
Extractive Industry and Environmentally Relevant Activity
(ERA#16 Extractive and Screening Activities 2 (c)100,000 to
1,000,000 Tonnes Per Annum)
over Lot 2 RP171364 - 270 Sorensen Road, Gunalda**

With reference to the above application, Council at its General Meeting held on 14 December 2011 resolved to approve the application. Please find enclosed a Decision Notice relating to this matter.

Please read through the conditions of approval on the Decision Notice and if you require any clarification please contact Council's officer nominated below.

Please find attached a copy of an extract of the *Sustainable Planning Act 2009* detailing your rights of appeal to the Planning and Environment Court. You also have the right to negotiate any of the conditions imposed by Council as Assessment Manager under Section 361 of the Sustainable Planning Act.

Should you not wish to appeal to the court nor negotiate any of Council's conditions it is suggested that you advise Council of your intentions in this regard so that Council can help to expedite any further processing of your proposal.

Should you require any further information please contact Marcus Matthews of Council's Planning & Development Department on (07) 5481 0644.

Yours faithfully,



**for B. J. SMITH
CHIEF EXECUTIVE OFFICER**

Enc.

c/c Department of Environment & Resource Management

Gympie Regional Council

Development Application 2010-2055 Decision Notice

Issued under the Sustainable Planning Act 2009 (S334 and S335)

The Development Application 2010-2055 for the purpose of Material Change of Use of Premises – Extractive Industry and Environmentally Relevant Activity (ERA#16 Extractive and Screening Activities 2 (c) 100,000 to 1,000,000 Tonnes Per Annum) was assessed and:-

Approved with Conditions

The decision was made by Gympie Regional Council on **14 December 2011**

Unless the use has commenced beforehand, this permit will lapse on 14 December 2015

Local Government Area: *Gympie Regional Council*

The following schedule provides all the relevant details.

PROPERTY DETAILS

Street Address & Locality: *270 Sorensen Road, Gunalda*

RPD: *Lot 2 RP171364*

Parish: *Curra*

APPLICANT'S DETAILS

Name: *Colston Surveyors and Planners*

Postal Address: *PO BOX 500, COOLUM BEACH QLD 4573*

REFERRAL AGENCIES

Concurrence Agencies

- 1) Development Application Lodgement
Department of Environment and Resource Management
GPO Box 15155
CITY EAST QUEENSLAND 4002

APPLICABLE CODES

Codes for which self assessable aspects of this development must comply with:

- Nil.

Gympie Regional Council

Development Application 2010-2055 **Decision Notice**

CONDITIONS

Assessment Manager's Conditions

SECTION 1.0 – Conditions to be Satisfied Prior to the Commencement of the Approved Use

- 1.1 The development shall be generally in accordance with the plans submitted with the application (Plan Nos. 39049 drawn by Hedges Geomeasure and dated 20 September 2010; Plan No. AUQ00030_013 unauthored and dated 28-Sep-10; Plan No. AUQ00030_021 unauthored and dated 28-Sep-10; and Plan No. AUQ00030_016B unauthored and dated 28-Sep-10).
- 1.2 A declared plants clearance is required to be obtained from Council and/or a satisfactory management plan approved. The enclosed Notification of Compliance Form is to be completed and lodged with Council as evidence that this has been undertaken.
- 1.3 A rehabilitation plan detailing measures to re-profile and re-vegetate extracted areas to a standard commensurate with the natural characteristics of the surrounding areas is to be submitted to and approved by Council.
- 1.4 Undertake at no cost to Council, the alteration of any public utility mains (eg. Electricity, water, sewerage, gas etc.) or other facilities necessitated by the development of the land or associated construction works external to the site.
- 1.5
 - (i) Attachment 3 of the Noise Assessment Report prepared by Noise Mapping Australia submitted with the application is to be amended to clearly nominate the requirements of the noise barriers required for the screening and sawing areas.
 - (ii) Amended Attachment 3 is to be submitted and accepted by Council.
 - (iii) Noise attenuation measures are to be implemented in accordance with amended Attachment 3 of the Noise Assessment Report prepared by Noise Mapping Australia submitted with the application.
 - (iv) Battered areas of the bund walls are to be landscaped in accordance with an approved landscape plan.
- 1.6 The development herein approved may not start until written confirmation is provided to Council that Department of Environment and Resource Management conditions attached to this Development Permit are substantially completed/fulfilled to the satisfaction of the Department of Environment and Resource Management.
- 1.7 All cleared vegetation is to be suitably processed or removed from the site at no cost to Council. Prior to the commencement of clearing works on site the preferred means of disposal of cleared vegetation is to be approved by Council's Chief Executive Officer. The following means of disposal are acceptable, but are not limited to:
 - (i) Processing through a woodchipper.
 - (ii) Disposal for firewood.
 - (iii) Disposal for landscaping.
 - (iv) Transport to alternative site for breaking down materials.Burning off is not an acceptable means of disposal and will not be approved.
Note: Bulk green waste is no longer accepted at any Council landfill site.

Gympie Regional Council

Development Application 2010-2055 **Decision Notice**

- 1.8 The development herein approved may not start until:
- (i) the following development permit has been issued and complied with as required -
 - (d) Development Permit for Operational Work (Roadworks and Stormwater Drainage);
and
 - (ii) development authorised by the above permit has been completed to the satisfaction of Council's Chief Executive Officer.

SECTION 2.0 – Conditions Relevant to the Issue of Development Permit for Operational Works (Roadworks and Stormwater Drainage)

- 2.1 Provide a Basic Right Turn treatment (BAR) to Anderleigh/Sorensen Roads intersection as per Department of Transport and Main Roads Road Planning and Design Manual Figure 13.58.
- 2.2 Provide 7 metre sealed width to Sorensen Road with associated drainage, signage and delineation works.
- 2.3 Provide widening and bitumen seal to 7 metres sealed width on Anderleigh Road between the Bruce Highway and Sorensen Road where existing seal width is less than 6 metres with associated drainage , signage and delineation works.
- 2.4 Erosion prevention measures are to be employed during and after construction of dams and ponds to ensure silt run-off does not occur.
- 2.5 Erosion and sediment control measures are to be designed and provided in accordance with the International Erosion Control Association (Australasia) 2008's "*Best Practice Erosion and Sediment Control for Building and Construction Sites*". The design shall be submitted to Council for approval with subsequent development applications for operational work.

SECTION 3.0 – General Conditions of Approval

- 3.1 Any plans for operational works, water supply and sewerage works and drainage works required by this development permit, are to be surveyed, designed and constructed in accordance with Council's Infrastructure Works Code.
- 3.2 In carrying out your activity you must take all reasonable and practicable measures to ensure that it does not harm Aboriginal cultural heritage (the "cultural heritage duty of care"). You will comply with the cultural heritage duty of care if you are acting in accordance with the gazetted cultural heritage duty of care guidelines. An assessment of your proposed activity against the duty of care guidelines will help determine whether or to what extent Aboriginal cultural heritage may be harmed by your activity. Further information on cultural heritage, together with a copy of the duty of care guidelines and cultural heritage search forms, may be obtained from the Department of Environment and Resource Management ~ phone (07) 3238 3838 or website www.derm.qld.gov.au.

Gympie Regional Council

Development Application 2010-2055 Decision Notice

Amenity Issues

- 3.3 The development is to be carried out in accordance with the plans and reports submitted with the application, specifically:
- (i) Extraction is limited to the removal of material located within the extraction areas nominated on Hedges Geomeasure drawing, plan reference number 39049-PRO entitled "Site Plan" and dated 20 September 2010.
- 3.4 The contractor is required to limit any dust emission from the site to the absolute minimum by implementing such measures as limiting work areas, establishing grass cover, regular watering of the site.
- 3.5 The use is not to produce noise levels greater than background levels plus 5 dB(A) when measured at a sensitive receiving environment. This condition does not apply to noise generated by development traffic on public roads.
- 3.6 No blasting is to occur on the site.
- 3.7 All operations conducted on the site shall be carried out in accordance with the Environmental Protection Act 1994 and other relevant Acts, Regulations and Local Laws.
- 3.8 Rock sawing operations are not to start before 9:00 am on any day.
- 3.9 Any filling or other development works undertaken on the site shall be carried out so as not to cause the ponding of water on any adjoining lands or the blockage or interference with any natural watercourse.
- 3.10 Noise attenuation measures required by the amended Noise Management Plan as accepted by Council are to be maintained at all times.

Roads and Traffic

- 3.11 Quarry traffic is to use the existing access to the site.
- 3.12
- (i) Where any works associated with this development approval are to be carried out on Council controlled land, such as road, park, drainage reserves, or the like, a Traffic Management Plan shall be submitted to Council for review prior to the pre-start meeting for such works.
 - (ii) The Traffic Management Plan shall be constantly reviewed and revised throughout the construction phase of the project until the works are accepted "On-maintenance" by Council.
- 3.13 Loading/unloading operations shall be conducted within the site and vehicles waiting to be loaded/unloaded shall stand entirely within the site.
- 3.14 Signage and upgrading works are to be provided/constructed along the haul route in accordance with the recommendations in Parts 6, 7 and 8 of Hayes Traffic Engineering report dated October 2010 and the Works Cost Summary Table included in this report. (Copies to be attached to the development permit).

Gympie Regional Council

Development Application 2010-2055 Decision Notice

- 3.15 Institute a road watering program as per Ausrocks P/L Quality Management Plan.

Hours of Operation

- 3.16 Permitted hours of operation are 0700 hours to 1800 hours Monday to Friday and 0700 hours to 1500 hours on Saturdays. There are to be no operations on Sundays or Public Holidays.

Note: Administrative/maintenance work may be done outside the approved hours. Any change to these approved hours for noise generating activities will require prior approval from Council.

Environmental

- 3.17 Rehabilitation work is to be carried out progressively throughout the development in accordance with the approved rehabilitation plan.

Concurrence Agency's Conditions

Conditions applicable to this approval imposed by the following Concurrence Agencies:

1. The Department of Environment and Resource Management is a concurrence agency with regard to this development approval. The attached concurrence agency response from this department, dated 29 September 2011, forms part of this Decision Notice.

APPROVAL TYPE

Development Permit

FURTHER DEVELOPMENT PERMITS REQUIRED

Development Permit for Operational Work (Roadworks and Stormwater Drainage).

RIGHTS OF APPEAL

See attached extracts from the Sustainable Planning Act 2009 for Rights of Appeal.

ASSESSMENT MANAGER

Name: Gympie Regional Council

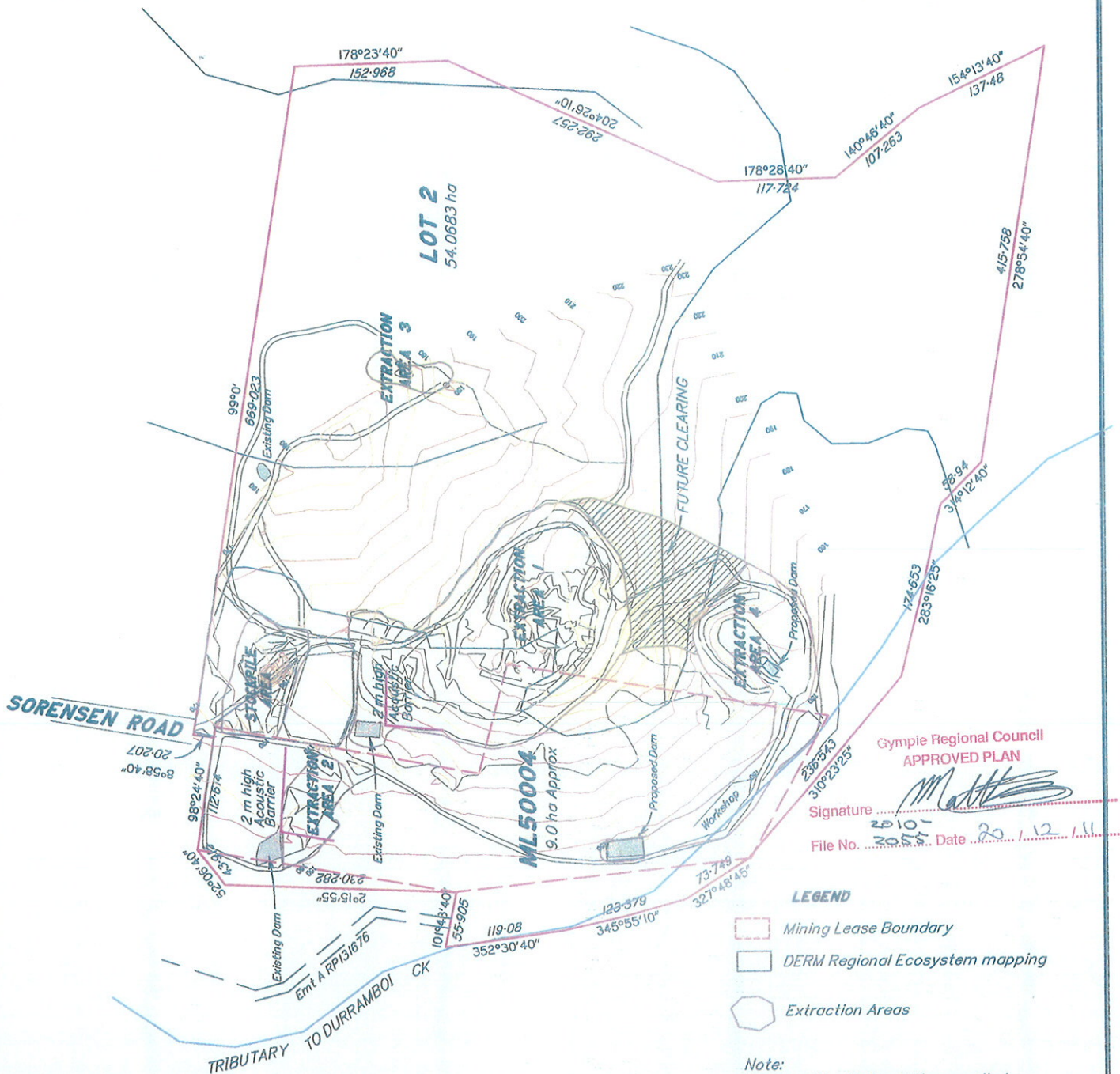
Signature: 

Date: 20 December 2011

TANIA STENHOLM
AUTHORISED DELEGATE
MANAGER DEVELOPMENT AND COMPLIANCE

SITE PLAN

over
LOT 2 ON RP171364
at
270 SORENSEN ROAD
GUNALDA

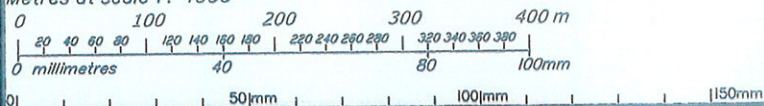


Gympie Regional Council
APPROVED PLAN

Signature: *[Signature]*
20/10/10
File No. 20/10/10 Date 20/12/11

SCALE 1 : 4000

Metres at scale 1 : 4000



Note:
Topographical Information supplied
by Ausrocks Pty Ltd.
DERM Regional Ecosystem boundary and
Cadastral boundaries are approximate only
and are subject to survey.

AUSROCKS PTY LTD

SITE PLAN
ANDERLEIGH QUARRY

PARISH CURRA
COUNTY MARCH
LOCALITY GUNALDA
LOCAL AUTH. GYMPIE REGIONAL COUNCIL
DATE: 20 September 2010

Colston Surveyors and Planners
PO Box 500 Coolool Beach
110 Yandina-Coolool Road
cnr Yungar Street, Coolool Beach
Queensland 4573

Phone (07) 54 71 71 44
Fax (07) 54 71 71 33
email cccpl@bigpond.com

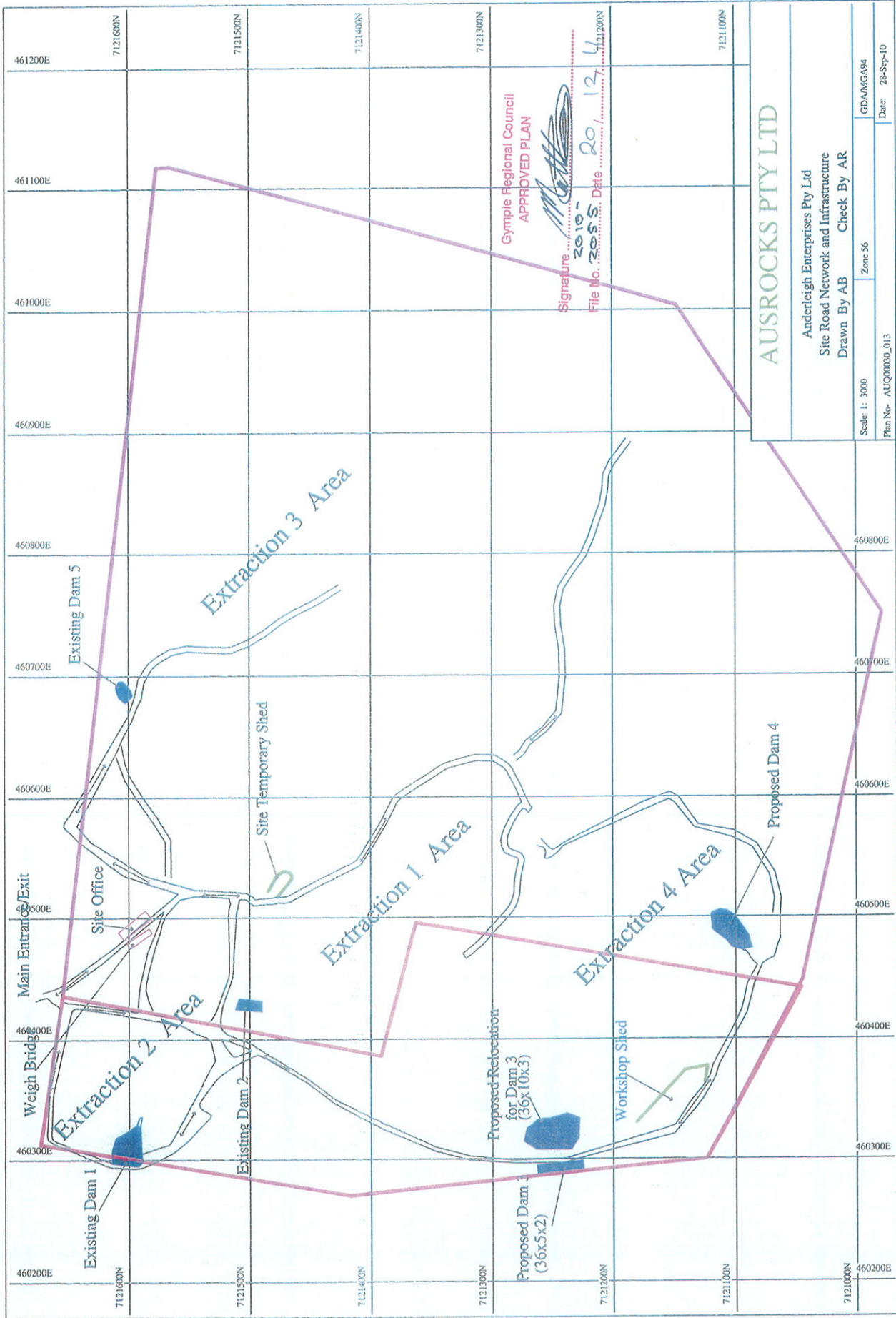
REVISIONS

A	Original Issue	13.10.10
B	Extraction areas altered	16.12.10

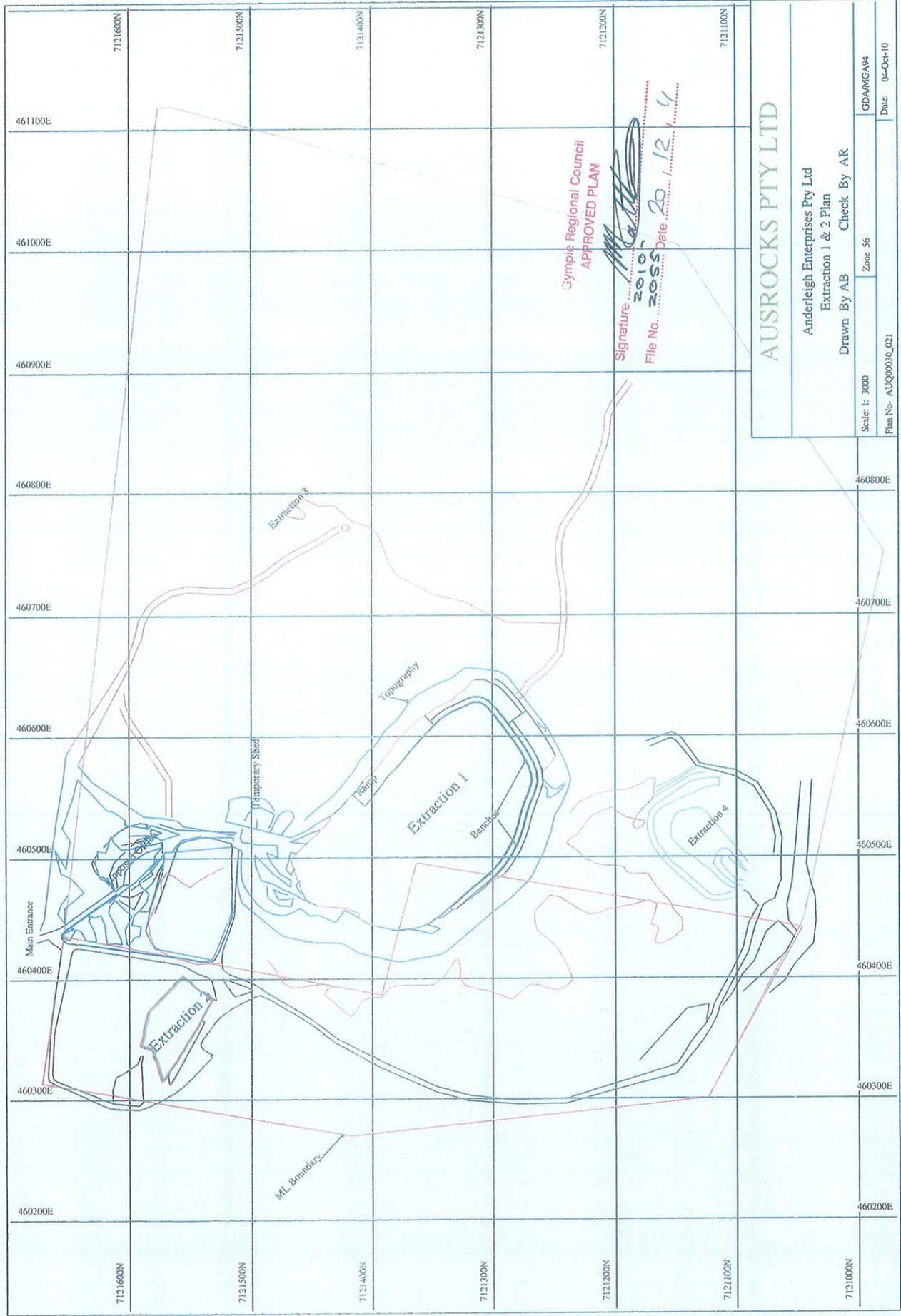
HEDGES
GEOMEASURE

SURV: Level Datum SCALE 1: 4000 Contour Interval 5.0 m JOB No. 39049
FB: Property and Development Consultants Mapping and GIS Specialists
Project Management Resource Development Consultants

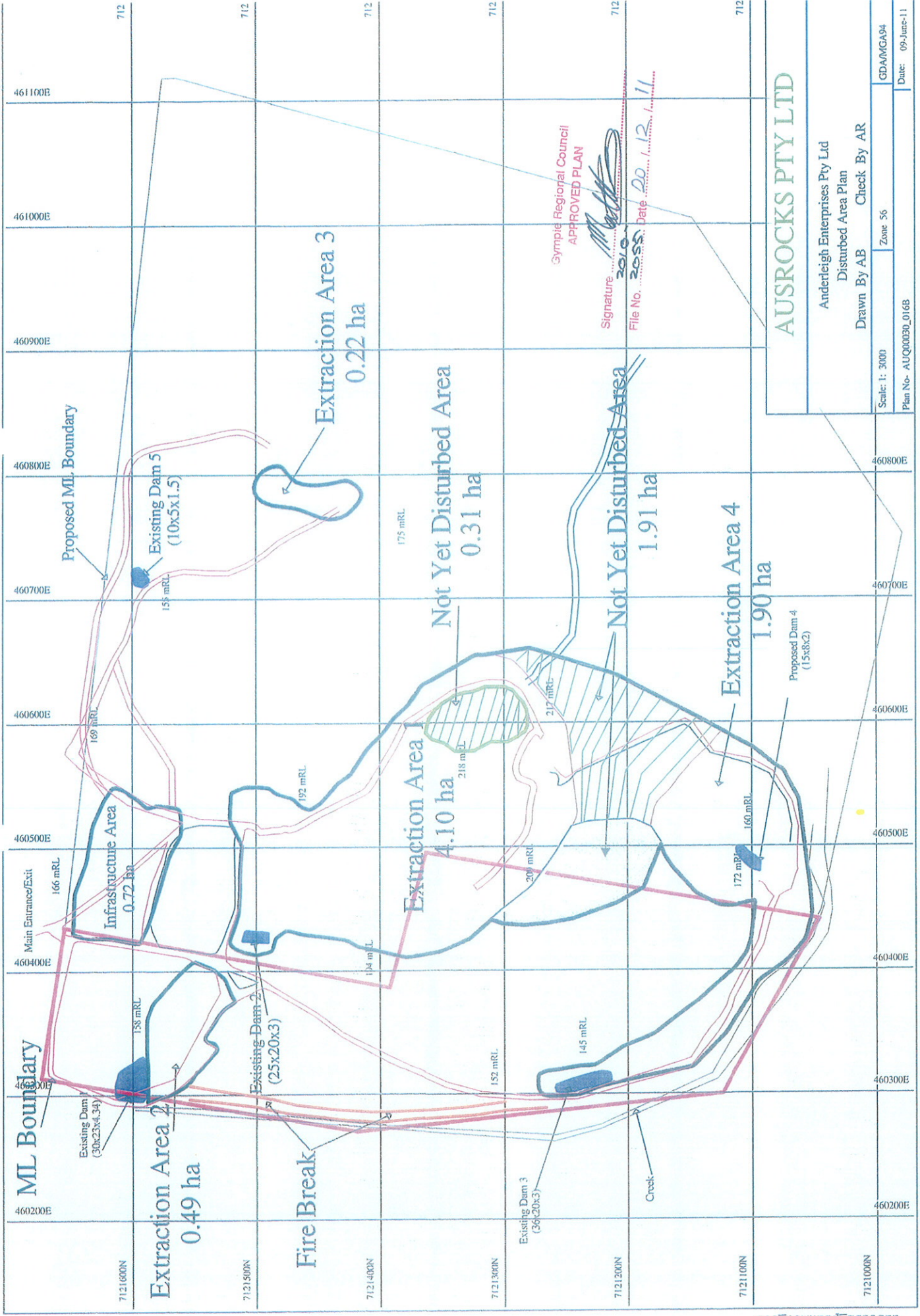
39049-PRO



site_infras_str



site.plt_cuts.str



disturb_planmod_str

AUSROCKS PTY LTD

Andertleigh Enterprises Pty Ltd
Disturbed Area Plan

Drawn By AB Check By AR

Scale: 1: 3000	Zone 56	GDA/MGA94
Plan No- AUQ00030_0168	Date: 09-June-11	



Department of
**Environment and
Heritage Protection**

16-FEB-2015

To: Anderleigh Enterprises Pty Ltd
C/- Indigenous Business Australia
GPO Box 10906
BRISBANE CITY QLD 4000

Our reference: 169433

Application details

I refer to the application that was received by the administering authority on 09-FEB-2015.

Land description: 270 Sorensen Road, GUNALDA QLD 4570 Lot 2 Plan rp171364.

Decision

Your application has been approved and your environmental authority (reference EPPR02912115) is attached.

Should you have any further enquiries, please contact Shari Sievers on telephone 1300 130 372 (option 4).

Yours sincerely

A rectangular box containing a handwritten signature in black ink, which appears to read "Jodie Brackenbury".

Signature

A rectangular box containing the date "16-FEB-2015" in a standard sans-serif font.

Date

Jodie Brackenbury
Department of Environment and Heritage Protection
Delegate of the administering authority
Environmental Protection Act 1994

Shari Sievers
Permit and Licence Management
Department of Environment and
Heritage Protection
GPO Box 2454
BRISBANE QLD 4001
Phone: 1300 130 372
Fax: (07) 3330 5875
Email: palm@ehp.qld.gov.au
Website www.ehp.qld.gov.au
ABN 46 640 294 485

Enclosed

Permit - environmental authority (reference EPPR02912115)

Environmental authority

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Permit¹ number: EPPR02912115

Environmental authority takes effect on 16-FEB-2015.

The first annual fee is payable within 20 business days of the effective date.

The anniversary date of this environmental authority is the same day each year as the effective date. An annual return and the payment of the annual fee will be due each year on this day.

Environmental authority holder

Name	Registered address
Anderleigh Enterprises Pty Ltd	Indigenous Business Australia Level 5, Bonner House, West Neptune Street WODEN ACT 2606

Environmentally relevant activity and location details

Environmentally relevant activity	Location
16-(2b) Extractive >100000t but <1000000t yr	270 Sorensen Road and GUNALDA QLD 4570 - Lot 2 Plan rp171364

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority is issued is a restatement of the ERA as defined by legislation at the time the approval is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an environmental authority as to the scale, intensity or manner of carrying out an ERA, then the conditions prevail to the extent of the inconsistency.


An environmental authority authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the authority specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

¹ Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation

Contaminated land

It is a requirement of the EP Act that if an owner or occupier of land becomes aware a notifiable activity (as defined in Schedule 3 and Schedule 4) is being carried out on the land, or that the land has been, or is being, contaminated by a hazardous contaminant, the owner or occupier must, within 22 business days after becoming so aware, give written notice to the chief executive.



Signature

Jodie Brackenbury
Department of Environment and Heritage Protection
Delegate of the administering authority
Environmental Protection Act 1994

16-FEB-2015

Date

Enquiries:
Shari Sievers
Permit and Licence Management
Department of Environment and Heritage
Protection
GPO Box 2454
BRISBANE QLD 4001
Phone: 1300 130 372
Fax: (07) 3330 5875
Email: palm@ehp.qld.gov.au

Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Conditions of environmental authority

CONDITIONS

Agency Interest: General

PG1 Prevent and/or minimise likelihood of environmental harm.

In carrying out an ERA to which this approval relates, all reasonable and practicable measures must be taken to prevent and / or to minimise the likelihood of environmental harm being caused.

PG2 Maintenance of Measures, Plant and Equipment.

The operator of an ERA to which this approval relates must:

- (a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this approval; and
- (b) maintain such measures, plant and equipment in a proper and efficient condition; and
- (c) operate such measures, plant and equipment in a proper and efficient manner.

PG3 Site Based Management Plan.

From commencement of an ERA to which this approval relates, a site based management plan (SBMP) must be implemented. The SBMP must identify all sources of environmental harm, including but not limited to the actual and potential release of all contaminants, the potential impact of these sources and what actions will be taken to prevent the likelihood of environmental harm being caused. The SBMP must also provide for the review and 'continual improvement' in the overall environmental performance of all ERAs that are carried out.

The SBMP must address the following matters:

- (a) Environmental commitments - a commitment by senior management to achieve specified and relevant environmental goals.
- (b) Identification of environmental issues and potential impacts.
- (c) Control measures for routine operations to minimise likelihood of environmental harm.
- (d) Contingency plans and emergency procedures for non-routine situations.
- (e) Organisational structure and responsibility.
- (f) Effective communication.
- (g) Monitoring of contaminant releases.
- (h) Conducting environmental impact assessments.
- (i) Staff training.
- (j) Record keeping.
- (k) Periodic review of environmental performance and continual improvement.

PG4 The site based management plan must not be implemented or amended in a way that contravenes any condition of this approval.

PG5 Notification.

Telephone the Department of Environment and Resource Management's Pollution Hotline or local office as soon as practicable after becoming aware of any release of contaminants not in accordance with the conditions of this approval.

PG6 Information about Spills.

A written notice detailing the following information must be provided to the Department of Environment and Resource Management within 14 days of any advice provided in accordance with condition PG5:

- (a) the name of the operator, including their approval / registration number;
- (b) the name and telephone number of a designated contact person;
- (c) quantity and substance released;
- (d) vehicle and registration details;
- (e) person/s involved (driver and any others);
- (f) the location and time of the release;
- (g) the suspected cause of the release;
- (h) a description of the effects of the release;
- (i) the results of any sampling performed in relation to the release,
- (j) actions taken to mitigate any environmental harm caused by the release; and
- (k) proposed actions to prevent a recurrence of the release.

PG7 Monitoring.

A competent person(s) must conduct any monitoring required by this approval.

PG8 Equipment Calibration.

All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this approval must be calibrated, and appropriately operated and maintained.

PG9 Records.

Record, compile and keep all monitoring results required by this approval and present this information to the administering authority when requested.

PG10 All records required by this approval must be kept for 5 years.

PG11 Trained / Experienced Operator(s).

The daily operation of the storm water treatment system and pollution control equipment must be carried out by a person(s) with appropriate experience and/or qualifications to ensure the effective operation of that treatment system and control equipment.

PG12 Spill Kit.

An appropriate spill kit, personal protective equipment and relevant operator instructions/emergency procedure guides for the management of wastes and chemicals associated with the ERA must be kept at the site, and in each vehicle used if the activity is a mobile ERA.

PG13 Spill Kit Training.

Anyone operating under this approval must be trained in the use of the spill kit.

PG14 Authorised Activities

This approval does not authorise extraction of any material defined as a *mineral* under the *Mineral Resources Act 1989*, including rock mined in block or slab form for building or monumental purposes.

Agency Interest: Air

- PA1 Nuisance.**
The release of noxious or offensive odours or any other noxious or offensive airborne contaminants resulting from the activity must not cause a nuisance at any nuisance sensitive or commercial place.
- PA2 Dust Nuisance.**
The release of dust and/or particulate matter resulting from the ERA must not cause an environmental nuisance at any nuisance sensitive or commercial place.
- PA3 Dust Monitoring**
When requested by the administering authority, dust and particulate monitoring must be undertaken to investigate any complaint of environmental nuisance caused by dust and/or particulate matter, and the results notified within 14 days to the administering authority following completion of monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place and at upwind control sites and must include:
- a) for a complaint alleging dust nuisance, dust deposition; and
 - b) for a complaint alleging adverse health effects caused by dust, the concentration per cubic metre of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere over a 24hr averaging time.
- PA4** Any dust and particulate monitoring required by a condition of this approval must be carried out in accordance with the following requirements:
- dust deposition must be monitored in accordance with Australian Standard AS 3580.10.1 of 2003 (or more recent editions);
 - the concentration per cubic metre of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere must be monitored in accordance with:
 - a) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or
 - b) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.
- PA5** In the event of a complaint about dust, and at the request of the administering authority, the Registered Operator must, within four weeks, develop a dust management plan. The dust management plan must address at least, but not be limited to, the following matters:
- (a) identification of dust sources and activities at the place(s) which impact on nuisance sensitive places;
 - (b) the control or abatement measures that can be undertaken to reduce identified dust sources;
 - (c) the handling of future dust complaints;
 - (d) community liaison and consultation; and
 - (e) training of staff in dust management practices.
- PA6** Upon the completion of the dust management plan it must be submitted to the administering authority.
- PA7** After the administering authority has provided comment on the dust management plan, the registered operator must have due regard to any comments made by the administering authority, and must implement the plan as soon as practicably possible.
- PA8** Water sprays must be employed as required on stockpiles and any fixed material handling plant and equipment to ensure that the moisture content of the material being processed is suitable to minimise

dust during crushing and material handling.

Agency Interest: Land

PL1 Preventing Contaminant Release to Land.
Contaminants must not be released to land.

PL2 Spillage of all chemicals and fuels must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.

NOTE: All petroleum product storage's must be designed, constructed and maintained in accordance with AS 1940 - Storage and Handling of Flammable and Combustible Liquids.

PL3 Area of Disturbance

The total of all disturbed areas on the site (excluding areas that have been subject to rehabilitation in accordance with condition PL5) must not exceed 10 hectares.

PL4 Land Rehabilitation

Rehabilitation of disturbed areas must take place progressively as works are staged and new areas of extraction are commenced.

PL5 The site (including all disturbed areas such as slopes, borrow pits, stockpile and screening areas) must be rehabilitated in a manner such that:

- (a) suitable species of vegetation are planted and established (as far as practicable native species must be used);
- (b) potential for erosion of the site is minimised;
- (c) the quality of stormwater, other water and seepage released from the site is such that releases of contaminants such as suspended solids, turbidity, total dissolved salts, pH, total iron, total aluminium, and total manganese are not likely to cause environmental harm;
- (d) the likelihood of environmental nuisance being caused by release of dust is minimised;
- (e) the water quality of any residual water body meets relevant criteria for subsequent uses and does not have potential to cause environmental harm;
- (f) the final landform is stable and not subject to slumping; and
- (g) any actual and potential acid sulfate soils in or on the site are either not disturbed, or are submerged or treated, so as to not be likely to cause environmental harm.

Agency Interest: Noise

PN1 Blasting activities are not to be conducted on site.

PN2 Noise Nuisance.

Noise from the ERA must not cause an environmental nuisance at any nuisance sensitive place or commercial place.

PN3 Noise from the ERA must not exceed the levels specified in Table 1 – Noise limits at any nuisance sensitive place or any commercial place.

Table 1 - Noise limits at any nuisance sensitive place or any commercial place

Noise level dB(A) measured as	Monday to Saturday			Sundays and public holidays		
	7am - 6pm	6pm - 10pm	10pm - 7am	9am - 6pm	6pm - 10pm	10pm - 9am
	Noise measured at a 'Noise sensitive place'					
L _{A10} , adj, 10 mins	BG [*] + 5 dB(A)	BG [*] + 5 dB(A)	BG [*] + 0 dB(A)	BG [*] + 0 dB(A)	BG [*] + 0 dB(A)	BG [*] + 0 dB(A)
L _{A1} , adj, 10 mins	BG [*] + 10 dB(A)	BG [*] + 10 dB(A)	BG [*] + 0 dB(A)	BG [*] + 0 dB(A)	BG [*] + 0 dB(A)	BG [*] + 0 dB(A)
	Noise measured at a 'Commercial place'					
	L _{A10} , adj, 10 mins	BG [*] + 10 dB(A)	BG [*] + 10 dB(A)	BG [*] + 5 dB(A)	BG [*] + 0 dB(A)	BG [*] + 0 dB(A)
	L _{A1} , adj, 10 mins	BG [*] + 15 dB(A)	BG [*] + 15 dB(A)	BG [*] + 10 dB(A)	BG [*] + 0 dB(A)	BG [*] + 0 dB(A)

** Note: BG in the above table refers to the background noise level for the stated period*

- PN4 Notwithstanding condition PN3, the environmentally relevant activity must be carried out by such reasonable and practicable means necessary to prevent the emission of noise that constitutes an unreasonable intrusive noise. The reasonable and practicable measures adopted by the registered operator must be incorporated into the relevant procedure(s) implemented under the Site Based Management Plan and may include but not necessarily be limited to the following noise abatement measures:
- (a) ensure that any new equipment to be used on the site is assessed for potential noise nuisance impacts and appropriately attenuated;
 - (b) ensure that all plant and equipment is operated and maintained in a proper and efficient manner;
 - (c) ensure that engine cowlings and high efficiency silencers are fitted to all the engines of all plant and equipment identified as impacting on noise sensitive receivers;
 - (d) ensure that all reasonable and practical measures to minimise noise generating activities in close proximity to nuisance sensitive places are undertaken, including scheduling these works at times when disturbance can be minimised;
 - (e) ensure that where noise abatement barriers are used they are sited such that they effectively intercept the sound transmission path between the sources of noise and receptor premises;
 - (f) where operation of reversing beepers is likely to cause environmental nuisance, taking measures to ensure mitigation of the nuisance, for example by de-tuning the reversing beepers, replacing the reversing beepers with other warning devices and/or replacing reversing beepers with alternative reversing beepers which adjust their noise level output in accordance with the prevailing background noise level.
- PN5 Hydraulic or pneumatic rock breakers and rock sawing equipment must not be used prior to 9am on weekdays and Saturdays and not be used after 5pm on weekdays or after midday on Saturdays. Hydraulic or pneumatic rock breakers and rock sawing equipment must not be used at any time on Sundays or public holidays.
- PN6 Hydraulic or pneumatic rock breakers and rock sawing equipment must not be used at any time in the area described as "Extraction Area 2" as indicated on Figure 2 or at any other point on the site within 200m of a dwelling or other nuisance sensitive place.

PN7 Permanent noise control barriers with sufficient height and constructed of suitable materials must be installed on site where required to ensure that the noise limits specified in condition PN3 are complied with. This includes, but is not limited to installation of permanent noise control barriers in the following locations:

- (a) a permanent 7 metre high (relative to the existing natural ground level) noise control barrier on the northern and western boundaries of Extraction Area 2 (as indicated on Figure 1 below);
- (b) a permanent 2 metre high (relative to the existing natural ground level) noise control barrier on the western boundaries of Extraction Area 1 (as indicated on Figure 1 below).

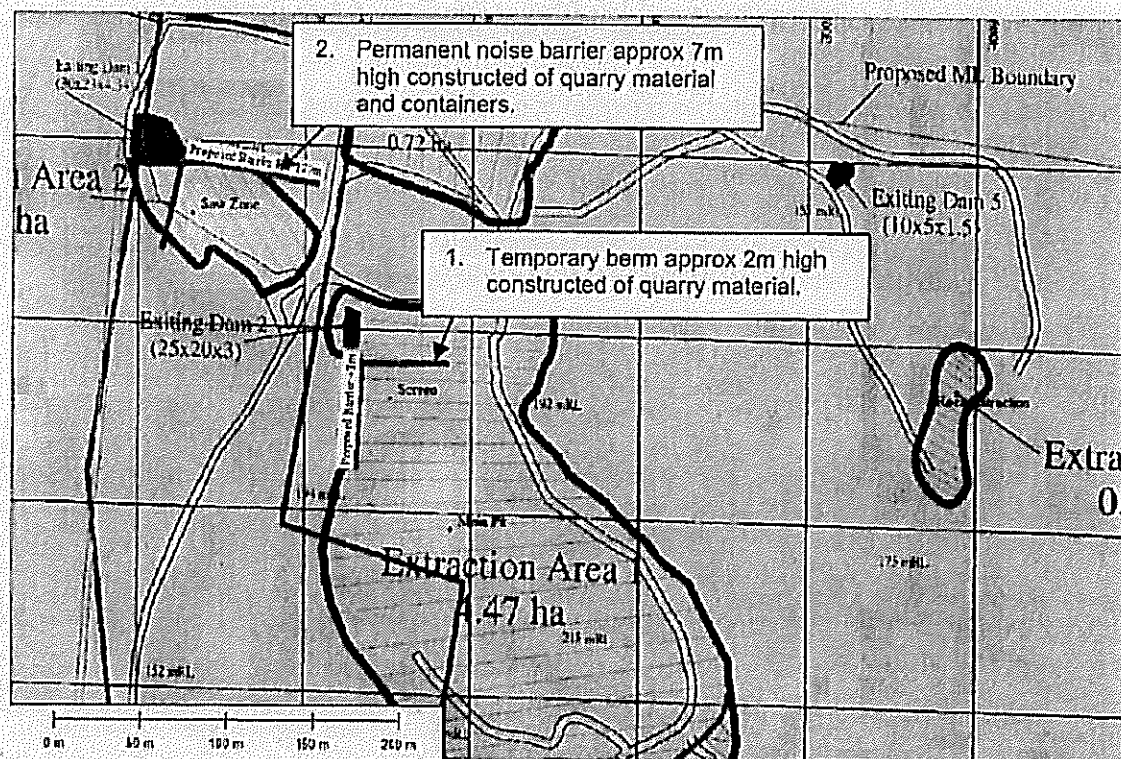


Figure 1 – Location of required noise control barriers

PN8 Noise Monitoring.

When requested by the administering authority, noise monitoring must be undertaken to investigate any complaint of noise nuisance, and the results notified within 14 days to the administering authority.

Monitoring must include:

- background noise levels;
- L_A 10, adj, 10 mins ;
- L_A 1, adj, 10 mins ;
- the level and frequency of occurrence of impulsive or tonal noise;
- atmospheric conditions including wind speed and direction;
- effects due to extraneous factors such as traffic noise; and
- location, date and time of recording.

PN9 In the event of a complaint about noise, and at the request of the administering authority, the Registered Operator must, within four weeks, develop a noise management plan. The noise management plan must address at least, but not be limited to, the following matters:

- (a) identification of component noise sources and activities at the place(s) which impact on nuisance sensitive places;
- (b) the measured and/or predicted level of these noise sources and activities at nuisance sensitive

- places;
- (c) the control or abatement measures that can be undertaken to reduce identified intrusive noise sources;
- (d) the level of noise at nuisance sensitive places that would be achieved from implementing these measures;
- (e) the handling of future noise complaints;
- (f) community liaison and consultation; and
- (g) training of staff in noise management practices.

- PN10 Upon the completion of the noise management plan it must be submitted to the administering authority.
- PN11 After the administering authority has provided comment on the noise management plan, the registered operator must have due regard to any comments made by the administering authority, and must implement the plan as soon as practicably possible.
- PN12 The method of measurement and reporting of noise levels must comply with the latest edition of the Department of Environment and Resource Management's Noise Measurement Manual.

Agency Interest: Social

PS1 Complaint Response.

The operator of the ERA must record the following details for all complaints received and provide this information to the administering authority on request:

- (a) Time, date, name and contact details of the complainant;
- (b) reasons for the complaint;
- (c) any investigations undertaken;
- (d) conclusions formed; and
- (e) any actions taken.

Agency Interest: Water

- PW1 Activities must be conducted in a manner that, as far as reasonable and practicable, minimises the area of land that is subject to disturbance.
- PW2 Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment.
- PW3 Suitable banks and/or diversion drains must be installed and maintained to exclude stormwater runoff from areas upstream of any disturbed area from entering the disturbed area.
- PW4 All stormwater from disturbed areas must report to sedimentation dams for settling/treatment prior to release from site in accordance with condition (PW6).
- PW5 The size of any sedimentation dam must be sufficient to contain runoff expected from the catchment served by the dam for a storm of 24 hour duration with an average recurrence interval of 1 in 5 years.
- PW6 **Stormwater release limits**
Settled/treated stormwater runoff must only be released in compliance with the release limits listed in

Table 2 - Stormwater release limits to water, from the following discharge locations:

- Dam 1 - namely release of settled/treated stormwater from Dam 1 at dam discharge point.
- Dam 2 - namely release of settled/treated stormwater from Dam 2 at dam discharge point.
- Dam 3 - namely release of settled/treated stormwater from Dam 3 at dam discharge point.
- Dam 4 - namely release of settled/treated stormwater from Dam 4 at dam discharge point.
- Dam 5 - namely release of settled/treated stormwater from Dam 5 at dam discharge point.

These locations are indicated on Figure 2.

PW7 Stormwater release monitoring

Monitoring must be undertaken and records kept of contaminant releases to waters at each of the discharge points specified in condition PW6 for the quality characteristics and not less frequently than specified in Table 2 - Stormwater release limits to water.

All determinations of the quality of contaminants released must be made in accordance with methods prescribed in the latest edition of the Department of Environment and Resource Management's Water Quality Sampling Manual.

Table 2 - Stormwater release limits

Monitoring point	Discharge location	Quality characteristics	Release limit			Monitoring frequency
			Minimum	50th Percentile	Maximum	
M1	Dam 1	pH	6.0	N/A	8.5	Not less than once every calendar month in which water is released from the sedimentation dam. Where practicable, the above mentioned samples must be collected during a storm event.
		Suspended Solids (mg/L)	N/A	30	50	
M2	Dam 2	pH	6.0	N/A	8.5	
		Suspended Solids (mg/L)	N/A	30	50	
M3	Dam 3	pH	6.0	N/A	8.5	
		Suspended Solids (mg/L)	N/A	30	50	
M4	Dam 4	pH	6.0	N/A	8.5	
		Suspended Solids (mg/L)	N/A	30	50	
M5	Dam 5	pH	6.0	N/A	8.5	
		Suspended Solids (mg/L)	N/A	30	50	

PW8 Contaminants other than settled/treated stormwater runoff waters must not be released from the site to surface waters or the bed or banks of surface waters.

Agency Interest: Waste

PWA1 Waste Records.

A record of all waste materials generated and removed from the site must be kept detailing the following information:

- (a) date of pickup of waste;
- (b) description of waste;
- (c) quantity of waste;
- (d) origin of the waste; and
- (e) destination of the waste.

Note: Trackable wastes as listed in Schedule 1 of the Environmental Protection (Waste Management) Regulation 2000 are not covered by this condition. Trackable wastes have similar recording requirements to this condition in accordance with a waste tracking system established under the above Regulation.

Definitions

Words and phrases used throughout this permit¹ are defined below. Where a definition for a term used in this permit¹ is sought and the term is not defined within this permit¹ the definitions provided in the relevant legislation shall be used.

"administering authority" means the Department of Environment and Resource Management or its successor.

"annual return" means the return required by the annual notice (under section 316 of the *Environment Protection Act 1994*) for the section 73F registration certificate that applies to the development approval.

"approval" means 'notice of development application decision' or 'notice of concurrence agency response' under the *Integrated Planning Act 1997*.

"approved plans" means the plans and documents listed in the approved plans section in the notice attached to this development approval.

"authorised place" means the place authorised under this development approval for the carrying out of the specified environmentally relevant activities.

"background noise or sound level" means either:

- $L_{A90, T}$ being the A-weighted sound pressure level exceeded for a relevant the time period measured in the absence of the noise under investigation, using fast response, or
- $L_{A90, T}$ being the arithmetic average of the minimum readings measured in the absence of the noise under investigation during a relevant time period, using fast response.

"blasting activities" means any use of explosives while conducting the specified environmentally relevant activities.

"commercial place" means a place used as an office or for business or commercial purposes.

"dwelling" means any of the following structures or vehicles that is principally used as a residence –

- a house, unit, motel, nursing home or other building or part of a building;
- a caravan, mobile home or other vehicle or structure on land;
- a water craft in a marina.

"Department of Environment and Resource Management" means the department or agency (whatever called) administering the *Environmental Protection Act 1994*.

"ERA" means Environmentally Relevant Activity as defined under the *Environmental Protection Regulation 2008*.

"intrusive noise" means noise that, because of its frequency, duration, level, tonal characteristics, impulsiveness or vibration –

- is clearly audible to, or can be felt by, an individual; and
- annoys the individual.
- In determining whether a noise annoys an individual and is unreasonably intrusive, regard must be given to Australian Standard 1055.2 – 1997 Acoustics – Description and Measurement of Environmental Noise Part 2 – Application to Specific Situations.

" $L_{A 10, \text{adj}, 10 \text{ mins}}$ " means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 10% of any 10 minute measurement period, using Fast response.

" $L_{A 1, \text{adj}, 10 \text{ mins}}$ " means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 10 minute measurement period, using Fast response.

" $L_{A, \text{max adj}, T}$ " means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over any 10 minute period, using Fast response.

"land" in the "land schedule" of this document means land excluding waters and the atmosphere.

"mg/L" means milligrams per litre.

"nuisance sensitive place" includes –

- a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- a motel, hotel or hostel; or
- a kindergarten, school, university or other educational institution; or
- a medical centre or hospital; or
- a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or
- a public thoroughfare, park or gardens; or
- a place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

"quarry material" means material on State coastal land, other than a mineral within the meaning of any Act relating to mining. Material includes for example stone, gravel, sand, rock, clay, mud, silt and soil, unless it is removed from a culvert, stormwater drain or other drainage infrastructure as waste material.

"regulated waste" means non-domestic waste mentioned in Schedule 7 of the *Environmental Protection Regulation 1998* (whether or not it has been treated or immobilised), and includes -

- for an element - any chemical compound containing the element; and
- anything that has contained the waste.

"site" means land or tidal waters on or in which it is proposed to carry out the development approved under this development approval.

"watercourse" means a river, creek or stream in which water flows permanently or intermittently-

- in a natural channel, whether artificially improved or not; or
- in an artificial channel that has changed the course of the watercourse.

"waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

"works" or "operation" means the development approved under this development approval.

"you" means the holder of this development approval or owner / occupier of the land which is the subject of this development approval.

"50th percentile" means not more than three (3) of the measured values of the quality characteristic are to exceed the stated release limit for any six (6) consecutive samples for a release/monitoring point at any time during the environmental activity(ies) works.

END OF CONDITIONS

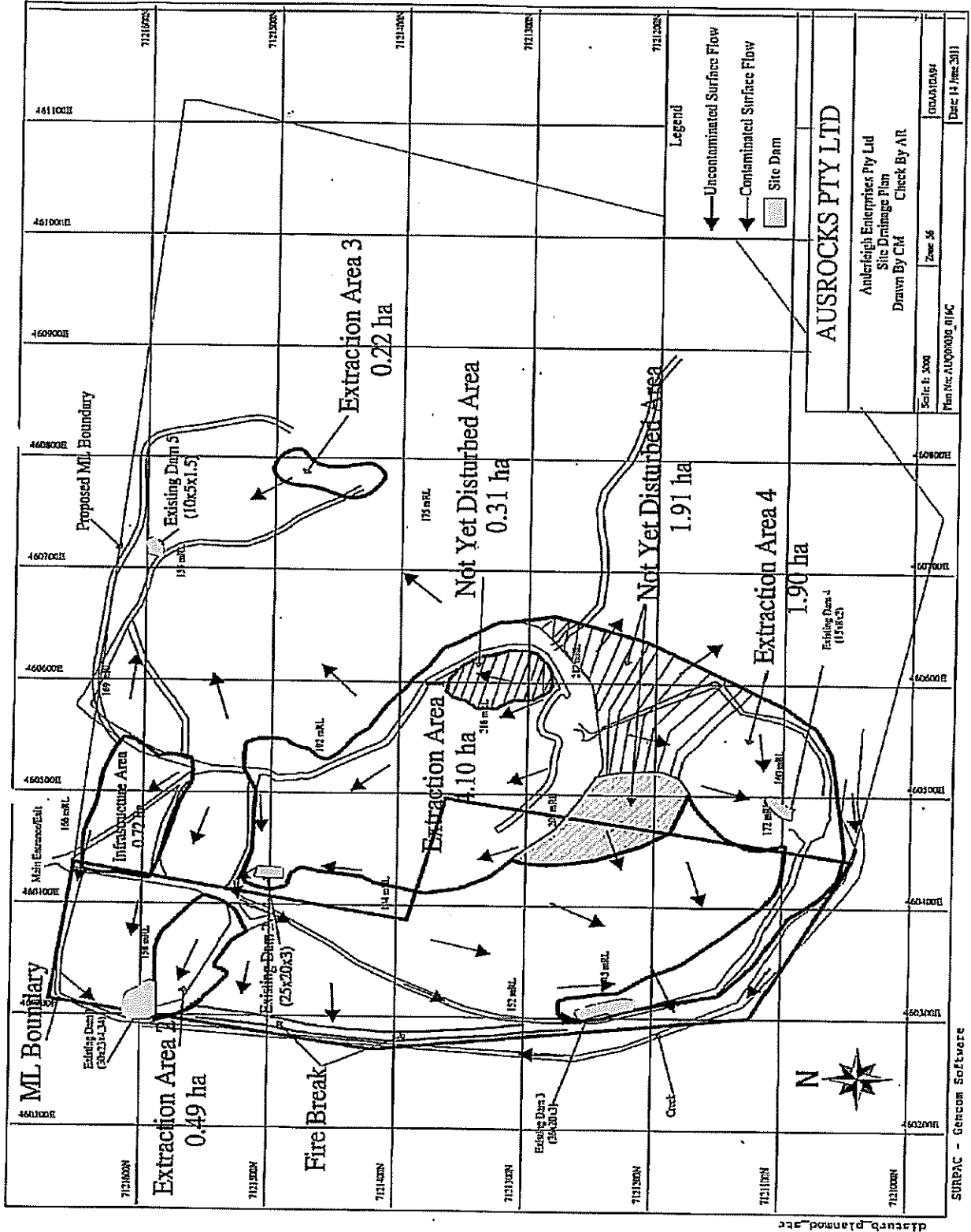


Figure 2 – Site Layout showing location of Stormwater Dams

Department of Environment
and Resource Management

Sustainable Planning Act 2009

DERM Permit ¹ number: 2011/001894

Assessment manager reference :	Gympie Regional Council 2010- 2055 MKM/SAG01206
Date application received:	25 March 2011
Permit type:	concurrence agency response
Date of decision:	25 July 2011
Decision:	Conditions that must attach to any development approval.
Relevant laws and policies:	<i>Sustainable Planning Act 2009</i> <i>Vegetation Management Act 1999</i> State policy for vegetation management
Jurisdiction(s):	Material change of use - Clearing vegetation under the <i>Sustainable Planning Regulation 2009</i> - Schedule 7, table 3, item 10.

Development Description

Property/Location		Development
270 Sorensen Road Gunalda, Qld 4570	Lot 2 RP171364	Material Change of Use – Extractive Industry Extension to Quarry operations

Reason(s) for inclusion of conditions

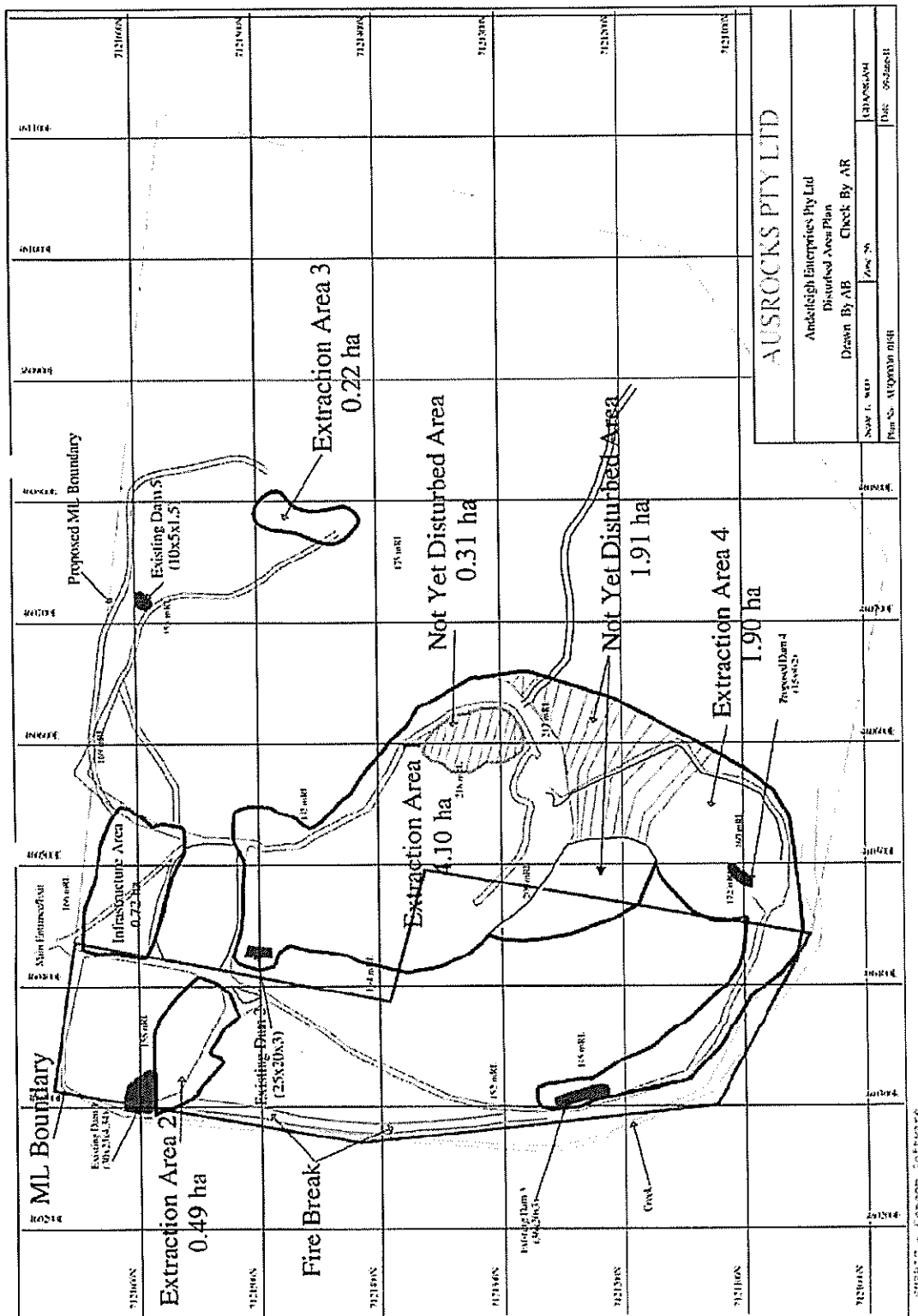
The conditions are included pursuant to section 287 of the *Sustainable Planning Act 2009*.

CONDITIONS

- The location of infrastructure as a result of this Material Change of Use approval shall be in accordance with the submitted Proposed Plan, Ausrocks Pty Ltd: *Anderleigh Enterprises Pty Ltd Disturbed Area Plan, Plan No.AUQ00030_016b* Dated: 09-June-11

END OF CONDITIONS

Proposed Plan, Ausrocks Pty Ltd: *Anderleigh Enterprises Pty Ltd Disturbed Area Plan, PI*
No.AUQ00030_016b Dated: 09-June-11



Statement of Reasons

The following Statement of Reasons is provided pursuant to section 289(1) of the *Sustainable Planning Act 2009*

Introduction

1. The Department of Environment and Resource Management (DERM) received an application from Anderleigh Enterprises Pty Ltd on 25 March 2011
2. The application is for a MCU (Concurrence) on Lot 2 RP171364 – Gympie Regional Council.
3. An Assessment Report was sent to the Delegate of the Chief Executive, David Williamson, on 20 July 2011
4. The Delegate determined the Referral Agency Response on 25 July 2011

Evidence

1. Application received 25 March 2011.
 - a) Completed Form 1, Form 5, Form 8, Form 11
 - b) Property Vegetation Management Plan.
2. *Sustainable Planning Act 2009* and *Sustainable Planning Regulation 2009* (Schedule 3 and Schedule 7)
3. *Vegetation Management Act 1999*
4. Department of Environment and Resource Management *Concurrence Agency Policy for Material Change of Use* dated 21 October 2009
5. *State Planning Policy (SPP) 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire, and Landslide*.
6. Environment and Resource Management (SPA) delegation (No. 1) of 2011
7. Aerial Photography 9346 Wide Bay Frame 83, Run 83, 10 September 2010, approximate scale 1:33333
8. 2009 Spot imagery
9. Spot imagery SG5610, 2005/2006
10. Assessment Report dated 20 July 2011
11. Tiaro Shire Planning Scheme 21 October 2005
12. Regional Ecosystem Mapping version 6.0b;
13. Shapefiles derived by GIS (ArcMap™ Version 9.3 ESRI 1999-2009) of the application area

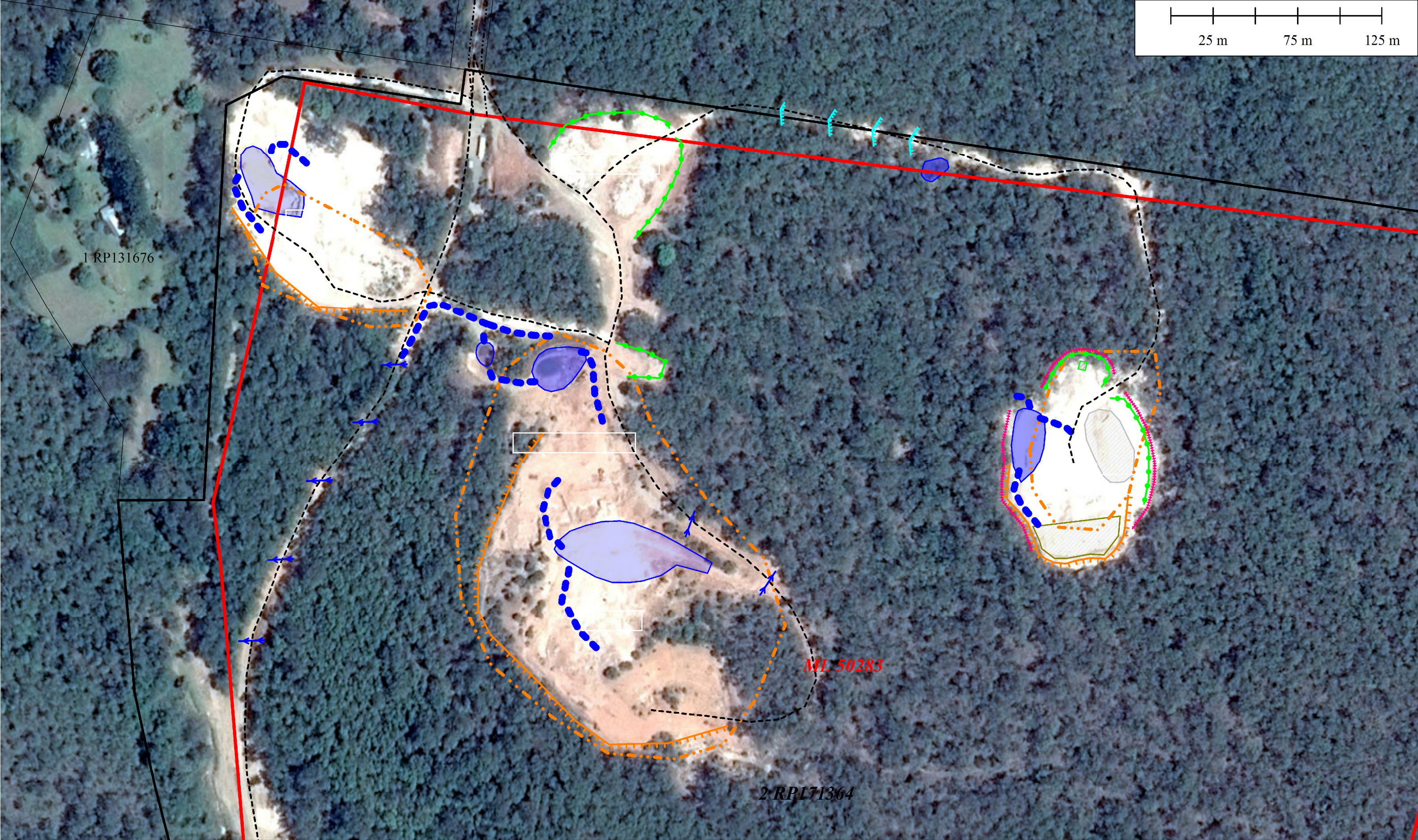
Findings of fact

1. The application involves a Material Change of Use for an extension to a quarry on freehold land
2. Regional ecosystem mapping Version 6.0b maps Lot 2 RP171364 as containing *Least Concern* regional ecosystems 12.11.3a, 12.11.5e, 12.9-10.17b, and non-remnant vegetation
3. The application was mapped as involving the clearing of *Least Concern* regional ecosystem 12.9-10.17b
4. The application was therefore assessed against Criteria Table F - 2 of the *Concurrence Agency Policy for Material Change of Use* 21 October 2009
5. The application meets the Performance Requirements in Criteria Table F - 2 of the *Concurrence Agency Policy for Material Change of Use* 21 October 2009

Reasons

1. The application meets Criteria Table F - 2 of the *Concurrence Agency Policy for Material Change of Use* 21 October 2009
2. The purpose of the *Vegetation Management Act 1999* is to regulate the clearing of vegetation in a way that (among other outcomes) conserves remnant *endangered* regional ecosystems, remnant of *concern* regional ecosystems and remnant *least concern* regional ecosystems.
3. The *Concurrence Agency Policy for Material Change of Use* 21 October 2009 achieves the purpose of the *Vegetation Management Act 1999*.
4. To ensure that a decision regarding the application is consistent with the purpose of the *Vegetation Management Act 1999*, it is required that the above condition be included

APPENDIX B | QUARRY PLAN



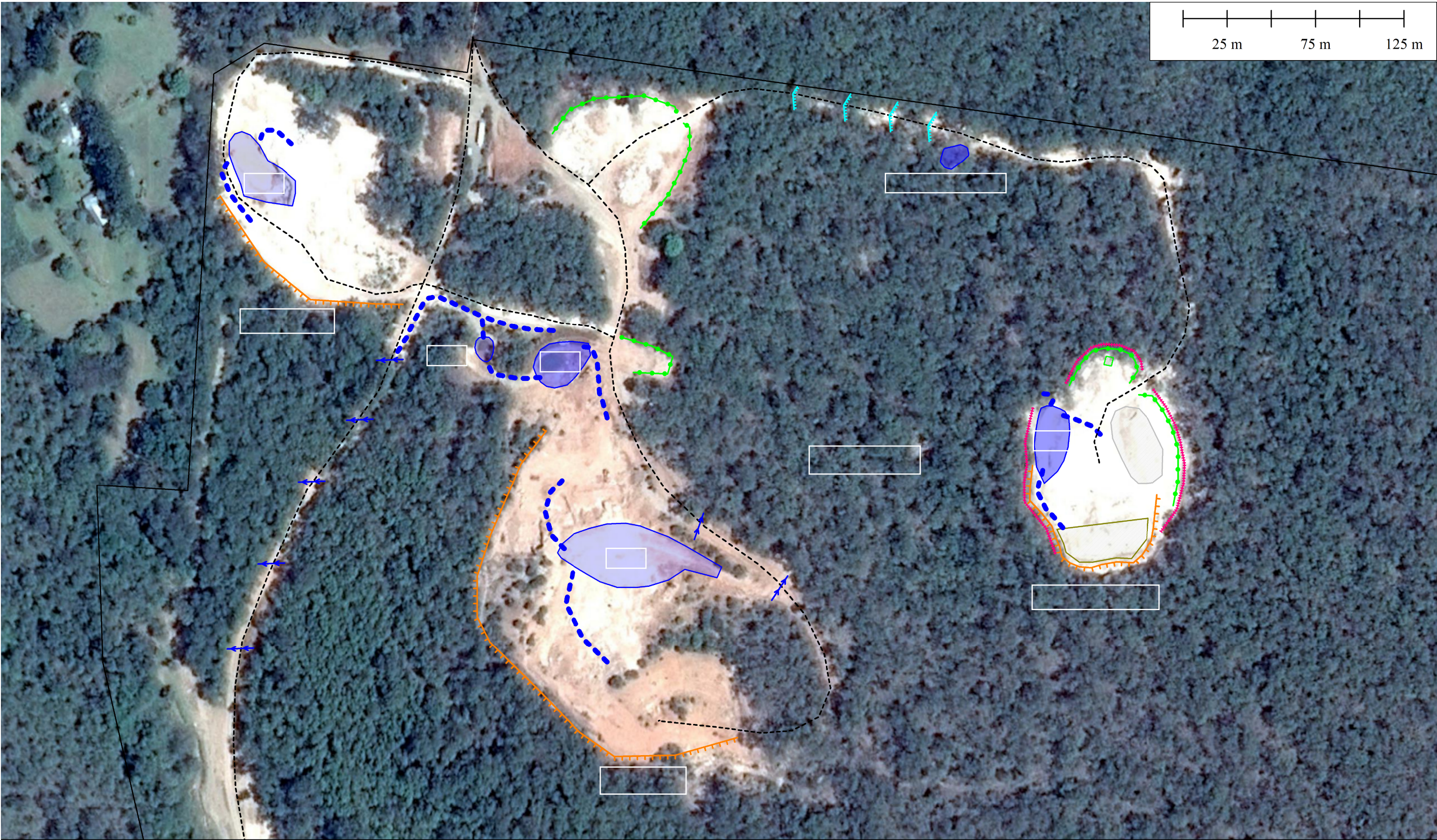
AUSROCKS

CONSULTING MINING ENGINEERS

Ausrocks Pty Ltd
PO Box 1007
Toowong BC
QLD 4066

Phone: (07) 3376 6839
Mobile: 0402 445 418
www.ausrocks.com.au
ABN: 64 056 939 014

Title	
Project No	Drawing No
Drawn	Checked
Scale	Datum
Date	Status



AUSROCKS

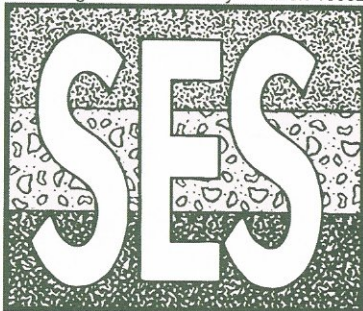
CONSULTING MINING ENGINEERS

Ausrocks Pty Ltd
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Phone: (07) 3376 6839
Mobile: 0402 445 418
www.ausrocks.com.au
ABN: 64 056 939 014

Title	
Project No	Drawing No
Drawn	Checked
Scale	Datum
Date	Status

APPENDIX C | TEST RESULTS



SOUTH EAST SOIL TESTING
A.B.N. 71 066 665 147

PO Box 1225, Nambour QLD 4560
PH (07) 5442 2860 FAX (07) 5442 2840
Mob 0429 674 334



ACCREDITED FOR
TECHNICAL
COMPETENCE

Accredited for compliance with ISO / IEC 17025

For All Civil Testing
Servicing South East Queensland

TEST REPORT

Project: Quality Testing on Gravel

Requested By: O/N

Client: Anderleigh Quarries

Date Tested: 23-10-15

Report No. 746

Laboratory Test Procedure:	QT Q205A, Q205B, Q205C
Date Sampled:	
Sample method:	By Client
Source:	Anderleigh Quarry
Sample Description:	Unbound Pavement Type 2
Lot No:	1
Was there any deleterious mat.:	No
Rock Type:	Sedimentary Dura crust

Report No:- **746.1**

Wet Strength(KN): **44**

Wet/Dry Variation (%): **18.5**

Nata Lab No.: 10602

ABN 71 066 665 147

Mill Lane Nambour

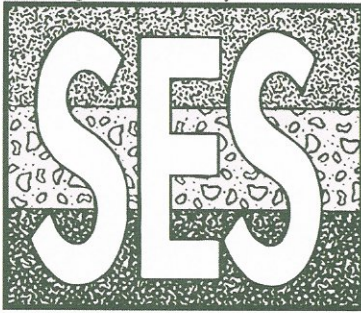
Form 23B December 2010

Signatory:

C. Templeton

Date:

23-11-15



SOUTH EAST SOIL TESTING

A.B.N. 66 665 147 **Project Quality Testing on Gravel**Client: **Anderleigh Quarries**

PO Box 1225, Nambour QLD 4560
 PH (07) 5442 2860 FAX (07) 5442 2840
 Mob 0429 674 334

ACCREDITED FOR
TECHNICAL
COMPETENCE

Accredited for compliance with ISO / IEC 17025

PAVEMENT QUALITY REPORT

Requested Service: **ON** **For All Civil Testing**
 Date Tested: **23-10-15**
 Report No. **746**

Field Test Procedure: Sampled by Client
 Laboratory Test Procedure: QT Q103A, Q104A, Q105, Q106, Q208A, Q201A
Lot 1
 Material Classification:- Unbound Pavement Type 2 Grading:- "b"
 Remarks:

Properties	<u>SPECIFICATION</u>		<u>RESULTS</u>
	Type2		Sample Number
Laboratory Number	2.5		746.1
Liquid Limit(%)	Max	40	31.5
Plasticity Index	Max	14	13.2
Linear Shrinkage(%)	Max	7.5	5.0
PI* %P .425	Max	N/A	523
Degradation Factor		N/A	11.5
Flakiness Index		N/A	10.8
LS*%P .425	Max	N/A	198
Fines Ratio		N/A	.66

A.S. GRADING LIMITS % PASSING
 SIEVE(% Passing)
 In mm c

37.50	100	
19.00	80-100	100
9.50	55-90	93
4.75	40-70	70
2.36	30-55	52
.425	12-30	40
.075	2-20	26

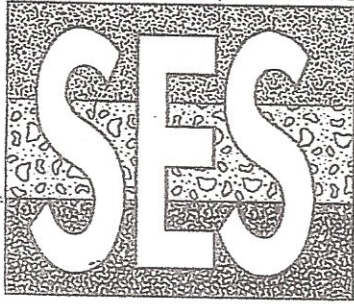
Page 1 of 3
 Nata Lab. No.:- 10602
 ABN 71 066 665 147
 Mill Lane Nambour
 Form 17c March 2003

Signatory:

C. Templeton
 C. Templeton

Date:

23-11-15



SOUTH EAST SOIL TESTING

A.B.N. 71 066 665 147

PO Box 1225, Nambour QLD 4560
 PH (07) 5442 2860 FAX (07) 5442 2840
 MOB 0429 674 334



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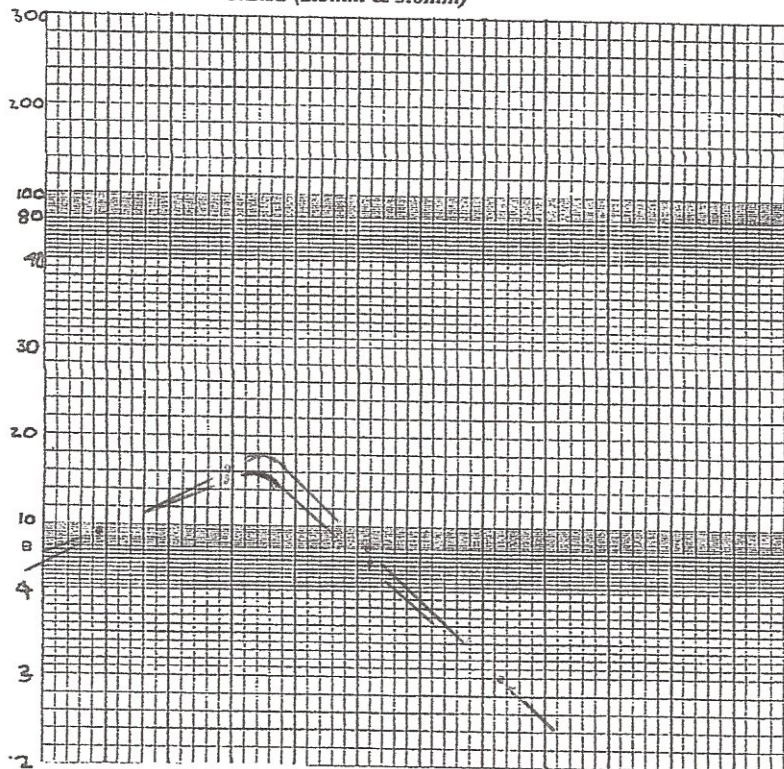
For All Civil Testing
 Servicing South East Queensland

PROJECT: Quality Testing on Gravel AUTHORIZED BY: O/W.

CLIENT: Anderleigh Quarries DATE TEST: 23-10-15
 REPORT No.: 746

Compaction Moisture Content (%)	Dry Density (t/m ³)	C.B.R. 2.5mm	C.B.R. 5.0mm	Swell (%)	Average M.C. after Soaking (%)
7.9	1.859	9	8	N/A	N/A
9.9	1.956	15	16	N/A	N/A
12.2	1.941	7	8	N/A	N/A
14.3	1.886	3	3	N/A	N/A

C.B.R. (2.5mm & 5.0mm)



Compaction Criteria

Type of compaction
 Dynamic ☒
 Static ☐

Compactive Effort

Standard ☒
 Modified ☐

Degree of Compaction

100%

Compaction Moisture Content

Various ☒
 % of O.M.C. ☐

Curing

Soaked ☒
 Unsoaked ☐

Test Results

C.B.R. (2.5mm) 15
 C.B.R. (5.0mm) 18
 O.M.C. (%) 10.6
 M.D.D. (t/m³) 1.972

Remarks:

uneventful
fill type 2.5
sample supplied.

Signature

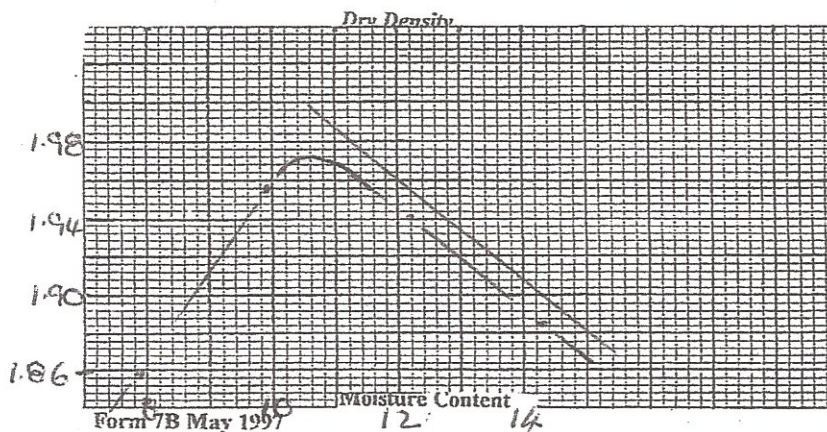
C. J. [Signature]
 Date

7-11-15

Test Method

Q113A, Q113B

lab no 746
 sample supplied.



Form 7B May 1997

12 14

Site Nominees

Anderleigh Quarry

Description of Test Methods and Results

Roadbase

Test method	Specification No.	Acceptable Level SubType 2.5	23/10/2015				SubType 2.5	Description	Comments
10% Fines Wet [kN] Min	Q205B	NR	NR				NR		
10% Fines Dry [kN]		NR	NR				NR		
Wet/Dry Strength Variation [%] Max	Q205C	NR	18.5				NR		
Degradation Factor Min	Q208B	NR	11.5				NR	Material rotated in Canister and degradation measured. Used for Typ1 1,2 and Asphalt Agg	
Flakiness [%] Max	Q201A	NR	10.8				NR		
Grading	Q103A	B,C,D,E	B					Fine fraction washed from coarser material	
Grading	Q103B	NR	NR				NR		
Ratio of 0.075:0.425		NR	NR				NR		
Atterberg LL [%]	Q104A	40	31.5				Passes	The boundary between liquid and plastic states. It is give as the water content at which the sample has such a small shear strength that it flows to close a groove when it is jarred. A high liquid limit indicates a high compressibility and shrink and swell tendencies	
PL [%]	Q105	NR	NR				NR	The boundary between plastic and semi-solid states. Expressed as the water content at which the sample begins to crumble when it is rolled into fine threads.	
PI	Q105	14 max	13.2				Passes	The plasticity index is calculated by subtracting the plastic limit from the liquid limit. A high plasticity index indicates low shear strength.	
Weighted PI		NR	523				NR		
LS [%]	Q106	7.5 max	5				Passes	The boundary between semi-solid and solid states. Measured by the water content that will fill the pores when the sample is at the minimum volume attained by drying.	
Weighted Linear Shrinkage (%)	MRTS05	NR	198				NR		
Density/APD	Q109	NR	NR				NR	The apparent volume is the volume of the sample excluding the open pores but including internal pores	
Density/GPD	Q214A	NR	NR				NR		
Density/DD		NR	NR				NR		
Water Absorption Max	Q214B	-	-				NOT TESTED		Not required by the standard, but requested by DTMR for certification
CBR Soaked	Q113A	15 min	15				YES	Measures the pressure required to penetrate a road subgrade sample with a plunger of standard area. It is a ratio of the required pressure to penetrate a soil sample divided by the pressure required for equal penetration in the desired crushed rock sample	Tests carried out as "soaked" CBR value

NR=Not Required

Note: Acceptable Levels indicated are based on the Sedimentary Duricrust material group



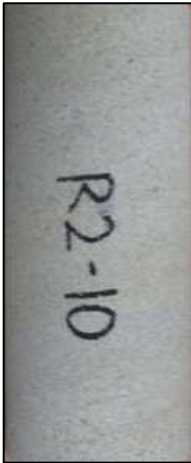

Testing not Required for subtype

Test shows compliance with technical standard

Test shows failure to meet technical standard minimum

PARTICLE SIZE DISTRIBUTION (<70mm)				
Sieve Size (mm)	23/10/2015			
106				
75				
53				
37.5	100			
19	100			
9.5	93			
4.75	70			
2.36	52			
0.425	40			
0.075	26			

uniaxial compressive strength

client: <i>AUSROCKS PTY LTD</i>			job no: INFONHIL 00927AA			
address: <i>PO BOX 1007 TOOWONG DC, QLD, 4066</i>			laboratory: <i>Notting Hill</i>			
project: <i>MATERIAL TESTING - QUARRY MATERIAL</i>			report date: <i>10 August 2011</i>			
location: <i>ANDERLEIGH QUARRY</i>			borehole:			
test procedure: <i>AS 4133.1.1.1 and 4133.4.2.1</i>			date received: <i>8 August 2011</i>			
test apparatus: <i>Avery with 200 kN CAS load cell S/N 080LSOO602001</i>			page 1 of 1			
QESTLAB work order ID	depth	date tested	height average diameter	uniaxial compressive strength MPa	wet density moisture content	sample description bedding/foliation
QESTLab sample ID	test duration		height/dia ratio			failure mechanism
<i>NHIL11W02228</i>	<i>9 Aug 11</i>	<i>142 mm</i>	<i>55.2 mm</i>	31.0	2.2 t/m³	<i>corse sanstone</i>
<i>NHIL11S08414</i>	<i>10.47 min</i>	<i>2.57:1</i>			0.5 %	<i>Massive.</i>
<i>NHIL11W02228</i>	<i>9 Aug 11</i>	<i>142 mm</i>	<i>55.0 mm</i>	39.6	2.3 t/m³	<i>medium sandstone</i>
<i>NHIL11S08415</i>	<i>8.83 min</i>	<i>2.58:1</i>			0.9 %	<i>Lenticular Bedding.</i>
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <div style="border: 1px solid magenta; padding: 5px; margin-bottom: 10px;"> NHIL11S08414 R110 Orange </div>   </div> <div style="text-align: center;"> <div style="border: 1px solid magenta; padding: 5px; margin-bottom: 10px;"> NHIL11S08415 R210 Grey </div>   </div> </div>						

GLEN---UCS---RPT---002---2010



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Accredited for compliance with ISO/IEC 17025
The results of the tests, calibrations, and/or measurements included in this document are traceable to Australian/national standards.

NATA Accredited Laboratory

No. 431

Authorised Signature:

Philip Warnes

Associate Geotechnician

Date:

10 Aug 2011

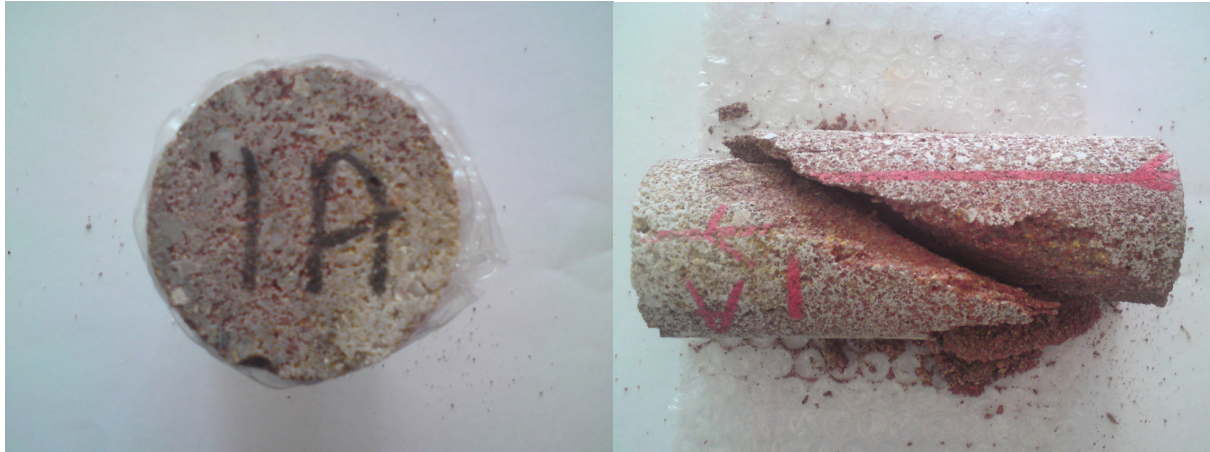
Anderleigh Quarry – UCS Test Results

Sample 1:



Sample 1	Value	Unit
Height	148.55	mm
Diameter	54.9	mm
Weight	0.7749	kg
Fail	53.7	kN
UCS (given)	22.67	N/mm ²
UCS (calculated)	22.68	MPa
Mode of Failure	Axial Splitting	
Colour	Beige/Pink	

Sample 1-A:



Sample 1-A	Value	Unit
Height	148.57	mm
Diameter	54.86	mm
Weight	0.78413	kg
Fail	69.9	kN
UCS (given)	29.62	N/mm2
UCS (calculated)	29.57	MPa
Mode of Failure	Axial Splitting	
Colour	Pink	

Sample 2:



Sample 2	Value	Unit
Height	148.65	mm
Diameter	54.95	mm
Weight	0.80359	kg
Fail	119.5	kN
UCS (given)	50.46	N/mm2
UCS (calculated)	50.38	MPa
Mode of Failure	Axial Splitting (2 way failure)	
Colour	White	

Sample 2-A:



Sample 2-A	Value	Unit
Height	148.65	mm
Diameter	54.94	mm
Weight	0.79327	kg
Fail	109.4	kN
UCS (given)	46.19	N/mm2
UCS (calculated)	46.14	MPa
Mode of Failure	Axial Splitting	
Colour	White/Pink	

Sample 3:



Sample 3	Value	Unit
Height	148.7	mm
Diameter	55.2	mm
Weight	0.8278	kg
Fail	151.1	kN
UCS (given)	63.11	N/mm2
UCS (calculated)	63.13	MPa
Mode of Failure	Axial Splitting (with crumbling)	
Colour	Beige	

APPENDIX D | PETROGRAPHIC

GEOCHEMPET SERVICES, MALENY

Geochempet Services

ABN 980 6945 3445

PETROLOGICAL and GEOCHEMICAL CONSULTANTS

Principals: K.E. Spring BSc(Hons), MAppSc and H.M. Spring B.Sc



19 Centenary Drive
MALENY Q 4552

Telephone: (07) 5494 2055

Fax: (07) 5494 3288

Email: geochempet@bigpond.com

PETROGRAPHIC REPORT ON A DRILL CORE SAMPLE FROM ANDERLEIGH QUARRY

prepared for

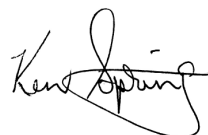
**AUSROCKS PTY LTD
ROCKDALE**

Order Number: Alan Robertson

Invoice Number: 00003140

Client Ref:

Issued by



K. E. Spring B.Sc.(Hons), MAppSc
31 May 2010

GEOCHEMPET SERVICES, MALENY

<u>Sample Label</u> :	Not Supplied	<u>Date Sampled</u> :	Not Supplied
<u>Sample Type</u> :	Drill core	<u>Source</u> :	Anderleigh Quarry
<u>Assigned Fmn.</u> :	Myrtle Creek Sandstone (Late Triassic – Early Jurassic)		
<u>Work Requested</u>	Petrographic report in relation to suitability for use as aggregate cover rock (gabion)		
<u>Methods</u>	Adapted from ASTM C 295 Standard Guide for <i>Petrographic Assessment of Aggregates for Concrete</i>		
<u>Identification</u>	Fine quartzose sandstone		

Description

The sample is a small piece of drill core of pale pink to light grey, slightly weathered, subtly bedded, fine sandstone: with a tendency to split along bedding planes or joint surfaces as well as irregular fractures: all are coated by secondary iron oxide. The sandstone is currently robust and non-friable and it can only be very lightly scratched with a steel tool – implying high dry strength. The rock is very slightly porous, and when struck emits a ringing tone.

A thin section was prepared to permit detailed microscopic examination in transmitted, polarised light of the drill core. An approximate composition of the sandstone, expressed in volume percent and based on a brief count of 100 widely spaced points in thin section, is:

Mineral grains

62% quartz grains
14% feldspar grains
3% secondary iron oxide (hematite)
1% leucoxene (after opaque oxide)
trace other mineral grains (including rutile and zircon)

Rock fragments

15% lithic clasts of acid volcanic rock
<1% lithic clasts of quartzite

Cement

4% cement of sericitic clay

Porosity

1% pores

GEOCHEMPET SERVICES, MALENY

For engineering purposes it may be useful to summarise and present the above information as follows:

Robust, durable components (95%)

80% quartz, feldspar, hematite, leucoxene, and
traces of rutile and zircon grains

15% acid volcanic lithic clasts and quartzite clasts

Weak, soft or otherwise non-durable components (4%)

4% cementing sericitic clay

<1% detrital mica flakes

Porosity (1%)

1% pores

In thin section the sandstone displays moderately well sorted, densely packed and tightly cemented, generally sub-rounded sand clasts which are mainly about 0.1 to 0.2 mm in size (with a range from at least 0.05 to 0.4 mm); but some rare grains are up to 1 mm in size. There is a subtle preferred orientation of the long axes of the clasts. The banding observed in hand specimen is seen in thin section to be subtle bedding, which is not sharply delineated and which are attributable to variations in grainsize variations.

About 62% of the rock consists of simple unstrained to faintly strained quartz grains: the outer portions of which are now recrystallized and sutured. Other robust mineral grains amount to an additional 18%: they comprise 14% slightly sericitized and clouded feldspar, 3% secondary iron oxide and about 1% of miscellaneous heavy mineral grains (including leucoxene, mica, rutile and zircon).

Sand-sized rock fragments (alternatively known as lithic clasts) amount to about 15% of the sandstone. They include 15% of robust fragments (acid volcanic rock and very minor quartzite).

The sandstone retains about 1% of optically detectable pores of similar size to grains and rimmed by hematite: it is tightly cemented by a thin interstitial network of a sericitic style of clay intermingled with finely microcrystalline quartz and feldspar.

Comments and Interpretations

This drill core specimen of sandstone from Anderleigh Quarry may be described as fine quartzose sandstone. The rock shows evidence of metamorphic modification by recrystallization or substantial overgrowth by quartz.

For engineering purposes the supplied rock sample may be summarised as:

- **fine quartzose sandstone**, a sedimentary rock type
- subtly bedded
- slightly porous (about 1% pores)

GEOCHEMPET SERVICES, MALENY

- slightly weathered
- tightly cemented by an interstitial network of clay and fine quartzofeldspathic material
- containing about 95% of robust, durable components (various mineral grains and rock fragments)
- containing about 4% of weak, soft or otherwise non-durable components (sericitic clay and <1% mica flakes)
- **hard**
- **apparently strong**

The sandstone is predicted to be essentially durable.

The rock is predicted to be **innocuous in relation to alkali-silica reactivity**. It contains approximately 62% free silica in the form of common quartz grains which are neither excessively fine nor substantially strained and 5% finely microcrystalline quartz in acid volcanic clasts.

Thus, sandstone of the type represented by the supplied sample **may well be suitable for use as cover aggregate (gabion rock)**.

Free Silica Content

The free silica content is about 67%.

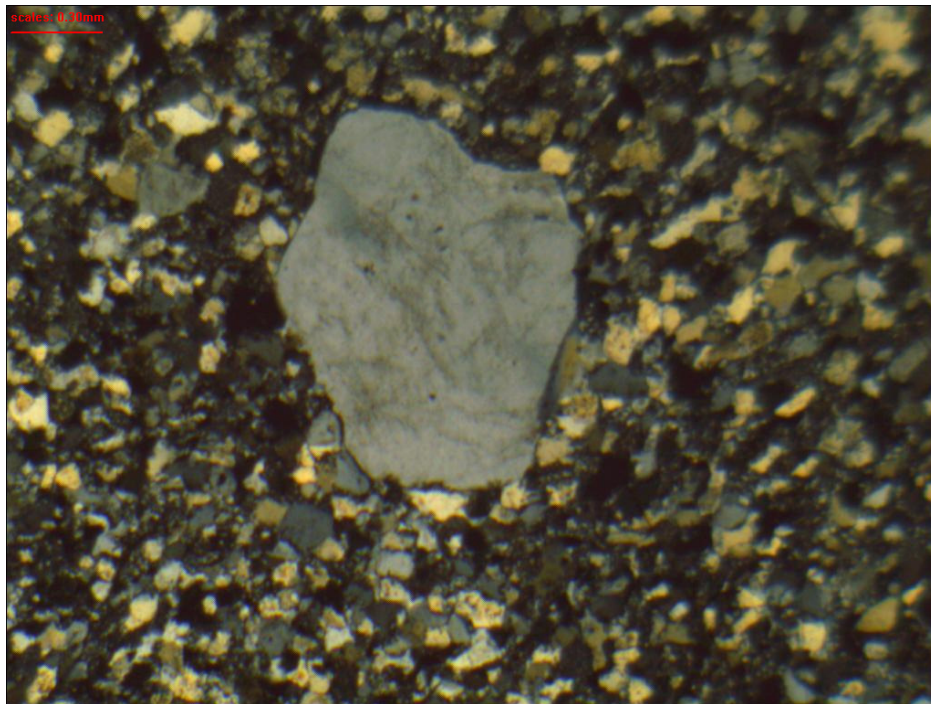


Plate 1. A low magnification, cross-nicols image of a larger quartz grains floating in a graded silty matrix of mainly quartz and feldspar grains. *Image width corresponds with 2.96 mm.*