Cherrabah Granite Mine
Dimension Stone Pre-feasibility Study
2nd February 2017
AUQ00196
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GLOSSARY OF TERMS

**Bank Cubic Metres (BCM or bcm):** The net quantity of a material prior to excavation. Often referred to as in-situ, or undisturbed.

**Bedding:** The smallest division of a geological formation or stratigraphic rock series marked by well-defined divisional planes, separating it from the layers above and below.

**Bench:** The horizontal or near horizontal profile/s of a Mine surface that is excavated primarily to catch rocks falling from above and provide a drainage path for rainwater and seepage water. The main bench parameters are the width, the height between benches and the batter angle.

**Berm/Bund:** An earth wall often created by equipment for the purposes of safety. As a rule of thumb a safety bund should be constructed to half the height of wheel of the largest piece of equipment. A fall berm on the Mine floor or a bench is a berm that will safely catch any rock falling from a bench above. No persons should enter the area between a fall berm and the toe of a bench.

**Campaign Mining:** Intense mining strategy which involves utilising equipment for a short duration of time to achieve a large output that is stockpiled and sold slowly. Often used in conjunction with crushing and screening contracts.

**Competent Person:** A competent must be a member of fellow of The Australasian Institute of Mining and Metallurgy, or of the Australian Institute of Geoscientists, or of a ‘Recognised Professional Organisation’. The person must have a minimum of five years’ experience working with the style of mineralisation or type of deposit under consideration and relevant to the activity which that person is undertaking.

**Geotechnical:** In engineering terms this is a branch of civil engineering concerned with the engineering behaviour of earth materials.

**In-situ:** A Latin phrase that translates to “in original position”. Often referred to with BCM.

**JORC Code:** Joint Ore Reserves Committee (JORC) Code set the minimum standards for Public Reporting of minerals Exploration Results, Mineral Resources and Ore Reserves.

**Loose Cubic Metres (LCM):** The gross quantity of a material after excavation from an in-situ setting (BCM). Often due to a “swell” in the material as a result of the excavation often lowering the density of a material.

**LiDAR:** A remote sensing technology that measures distance by illuminating a target with a laser and analysing the reflected light. The term LiDAR was created from combining the words “light” and “radar”.

**Overburden:** Non-marketable soil and rock that overlies a mineral deposit.

**Petrographic:** A division of petrology that focuses on detailed description of rocks. The mineral content and the textural relationships are described in detail.

**Processing Area:** The area in a Mine or mine in which raw material is processed by either physical or chemical means to produce a final product. In terms of Mining this usually entails a crushing and screening system, stockpile stacker and

**Reserve:** A mineral deposit that is of value legally, that is technically economic and feasible to extract. Defined by the JORC Code, a Reserve can be either Probable or Proved with the latter an increased level of mining, processing, metallurgical, infrastructure, economic, marketing, legal, environment and social factors.

**Resource:** A mineral deposit that is potentially valuable, and for which reasonable prospects exist for eventual economic extraction. Defined by the JORC Code, a Resource can be either Inferred, Indicated or Measured which are assessed based on increasing levels of geological knowledge and confidence.

**Weathered/Weathering:** The process by which rocks are broken down into small grains and soil. It can occur through rainfall, ice formation, or the action of living things, such as algae and plant roots which forms part of the geological cycle.
INTRODUCTION

1.1 OVERVIEW

Ausrocks Pty Ltd (Ausrocks) has been commissioned by the Trustee for The Joyful View Unit Trust (JVUT) to complete a prefeasibility study for the proposed granite dimension stone mine at the Cherrabah property. The initial exploration works have been completed on site to examine the granite outcrop. Initial stages of exploration consisted of site visits and detailed site investigation which resulted in an Exploration Permit application for all Minerals other than coal (EPM26250). Following the EPM Approval, Ausrocks was requested to undertake a drilling program and material testing at the preferred Site 3 (Figure 2.1), known locally as “Flat Rock” (in conjunction with a drilling program of the Cherrabah Gold Diggings) to further evaluate the Stanthorpe Granite for dimension stone applications.

The initial site survey was carried out by Ausrocks on the 14th of December 2016 using an Unmanned Aerial Vehicle (UAV) Drone which provided imagery that was processed using photogrammetry to produce the survey data. The survey coordinate system is in GDA94 (zone 56) on UTM Projection/Australian horizontal datum. This site-specific topography data was used in conjunction with topographic data sourced from the NSW globe database. The site resource estimation and pit design was completed using Surpac software (version 6.6.1) and Global Mapper GIS Software (version 15).

1.2 SITE DESCRIPTION

The Cherrabah Granite Mine is located approximately 25km south of Warwick at Lot 1000 SP268215, within Southern Downs Regional Council. The proposed mine site also referred to as Flat Rock is a large exposed Granite outcrop which lies approximately 4km west-southwest of the Cherrabah Resort, close to the western property boundary. The Cherrabah property covers a total area of 1988ha, however the proposed site operations, will only take place on approximately 17.42ha (less than 1%) of the total land area. Access to the Cherrabah property and proposed Cherrabah Granite Mine (CGM) is though Keogh Road via O’Deas Road.

The CGM site is currently accessed by a property track that borders the outcrop to the north and the western sides, however there is proposed track that will be utilised as a primary means of egress on the eastern side. The outcrop is a vertically elongate north to south exposure, approx. 60m wide x 150m upslope (~30°) i.e. growing in elevation approximately 40m. This 60m x 150m exposure can be arbitrarily divided into the lower (northern) and upper (southern) sections.

Detailed site and testing investigations have centred primarily on the lower (or northern) section of this exposure. The exploration has been completed in this region as it is the easiest area to establish access to the lower level benches. Beyond this initial 60m x 150m exposure, the outcrop extends a further 200m to the southeast to a peak where the outcrop terminates. This presents a future opportunity to extend the mine life further within the Mining Lease (ML) should the lower resource be exhausted.
1.3 SITE INFORMATION

The following table provides an overview of site information:

<table>
<thead>
<tr>
<th>TABLE 1.1 - SITE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locality</td>
</tr>
<tr>
<td>Property Description</td>
</tr>
<tr>
<td>Name of Mine</td>
</tr>
<tr>
<td>Contact</td>
</tr>
<tr>
<td>Telephone</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>Local Government</td>
</tr>
<tr>
<td>Site Plan details</td>
</tr>
</tbody>
</table>

1.4 EXISTING SITE CONDITIONS

The property is quite large and therefore has a large variety of conditions including heavily vegetated hills, barren granite outcrops and historically cleared slopes. The site contains rolling hills with the highest point at the southern boundary, and the lowest at the northeast boundary. Small intermittent watercourses drain to the north and form the headwater of the Condamine River. There is evidence of mineral fossicking in the surrounding area, but the proposed ML area mostly contains virgin granite outcrop and surrounding Eucalyptus woodland. A significant portion of the property contains remnant ‘least concern’ and ‘of concern’ vegetation including the ML area and approximately half of the internal access road.

At present a resort has been developed on the north-eastern area of the site which is equipped with a camping ground, tennis courts, lake, stable, airstrip and accommodation. A development application (DA) to significantly expand the resort has been withdrawn. However, an initial stage in the northeast corner of the property has been approved.

1.5 SCOPE OF WORKS

The Scope of Work (SOW) for the Pre-feasibility Study is to investigate the site for a potential dimension stone operation. This involves preliminary drilling, field investigation and material testing to evaluate the competency and likely material specification. In addition, the pre-feasibility study will assess the project risk and feasibility with multiple operating scenarios.

The Field Evaluation/investigation for dimension stone was carried out in phases as follows:

1. Source Suitability;
   Desktop study, initial site investigation and evaluation.
2. Site Works and Sample Collection;
   Surveying and mapping of selected or preferred site(s), surface (slab excavation) and subsurface (diamond drilling) sample collection.
3. Detailed Stone Testing: Extensive laboratory testing of the stone samples across four key specifications – strength, stain resistance, resistance to abrasion and durability.
4. Pre-feasibility; project potential and risk evaluation.

1.6 PROJECT EXCLUSION AND ASSUMPTIONS

There are various assumptions made during this prefeasibility assessment of CGM which have been based on the dimension stone industry expertise of Ausrocks Pty Ltd Consulting Mining Engineers. The project has been completed to a Pre-Feasibility accuracy with the data that was available as at the time of the study (January 2017). It should be highlighted that Ausrocks Pty Ltd does not specialise in the spot sale price of export materials and have had to base sales prices, exchange rates and Consumer Price Index (CPI) data on long-term trends. Assumptions of the market demand have been made based on the marketing report completed as part of the desktop study and given as indicative or target numbers only.
2 GEOLOGY AND GEOTECHNICAL

2.1 REGIONAL GEOLOGY

The proposed CGM regionally occurs within the Stanthorpe Granite which is early Triassic (250Ma) in age. The geology has been mapped in detail by the Queensland Geological Survey at 1:250,000 (Warwick Sheet SH56-2) and 1:100,000 (Warwick Sheet 9341) scales. More recently the geology and structural framework, including details of the Stanthorpe Granite, have been comprehensively described in the “Geology of Queensland” (2013, Jell P.A., Editor).

Granite underlies the entire Cherrabah property, often exposed throughout the property as very large discernible outcrop zones, devoid of any significant vegetation. Elsewhere, mainly dense tall eucalypt forest is present. The topography comprises of ridge lines and slopes, non-perennial creeks draining north and in elevation the property rises moderately steeply to the south of the resort and the Mine site. The topography (and property) is a watershed draining north eventually to the Condamine River tens of kilometres away, with the property’s southeast margin bordering NSW. The proposed Mine site occupies one of the large discernible outcrop zones.

2.2 SITE GEOLOGY

2.2.1 EXPOSURE

Granite is extensively exposed and is essentially fresh at surface, with near surface spalling and boulder tors common in places. The granite exposures form large flat continuous surfaces on a 10 to 30 degree sloping topographic surface. Whilst the rock is essentially fresh at surface, drilling reveals iron-stained joints as deep as 15m below surface, reflecting water movement.

2.2.2 ROCK TYPE

The granite is hard, robust, finely speckled, broadly light greyish to pinkish, fine to medium-grained crystalline igneous rock of typical granitic appearance. Close inspection reveals light greyish to pinkish feldspar, colourless and clear quartz and dark biotite.

Drill core and petrographic examination describes the rock as porphyritic micro-granite (an intrusive acid igneous rock) with varying ranges of the dominant primary minerals.

Primary minerals include:
- Quartz  20-40%
- Orthoclase  20-40%
- Plagioclase  27-33%
- Biotite  1-6%

Secondary minerals include muscovite, epidote, chlorite, limonite and tourmaline making up to 3% of the rock. Weak, soft or non-durable minerals, specifically biotite, plus the secondary minerals sericite, muscovite and chlorite make up to 9% of the rock.

Variations in primary minerals as irregular or random patches in the rock give perceptive colour changes, for example, more orthoclase the rock is more pinkish, more biotite and/or plagioclase the rock it is more greyish. Overall the rock is hard and strong.
2.2.3 STRUCTURAL DISCONTINUITIES

Principally, fine echelon vertical dipping fractures striking 300° mag. spaced approx. +5m apart can be traced on surface for up to 10m. The fractures are represented as fine lines with no obvious fracture fill. They eventually step, link or appear sometimes to terminate. A prominent fracture striking 300° and dipping shallowly at 20° north divides the outcrop in the northern part of the initial exposure or Mine. Low scrubby vegetation in part marks its alignment.

Fracturing below surface is evidenced in drill core as broadly spaced occasional horizontal joints and as steep joints at 15 degrees to the core axis. More typically 3m core runs of continuous solid core were returned. Microfracturing, (petrographic thin sections), has not been evidenced.

Discontinuity spacing is broad enough to allow crude dimension blocks to be extracted whereby typical final cut stone of 240-330cm x 120-190cm x 70-80cm dimension should be readily be achieved.

FIGURE 2.1 – AERIAL PHOTOGRAPH OF THE SITE

Granite exposure (proposed resource area), showing drill rig (centre) at drill hole site CH01
2.3 FIELD WORK

2.3.1 STONE CHARACTERISTICS/ASSESSMENT

The rock readily identifies itself as a variety of granite, common as a dimension stone, marked by its fine to medium grain size and matrix composition of the primary minerals quartz, orthoclase, feldspar and biotite. The rock is hard, strong and durable. It exhibits a characteristic but variable grey-pinkish colour and will assume its own identity in the marketplace.

2.3.2 SITE INVESTIGATIONS & TESTING

Essentially there has been three phases of work, firstly initial reconnaissance mapping, secondly the drilling of two cored holes plus a cut bulk sample, and, lastly extensive off-site laboratory testing.

Initial reconnaissance mapping focussed on the excellent and continuous outcrop exposures of granite. The granite is essentially fresh at surface although shallow surface spalling, commonly 50-100mm but up to +300mm is prominent. The granite matrix is grey-pink in colour and is very consistent throughout the exposures. Rare black coloured xenoliths up to 100mm in size also occur. Wide spaced fine fracture discontinuities are present, mainly dipping sub vertical to vertical.

Two cored drill holes were drilled vertically 15.0m and 26.4m respectively into the granite to test the integrity of the granite below surface and importantly to provide samples for laboratory testing. With one exception of one core run, full core recovery was achieved throughout, often with solid 3m core sticks from consecutive 3m drill runs achieved.

Comprehensive testing (based on CSIRO Recommendations for dimension stone and granite) on selected core samples has been independently undertaken by a NATA registered laboratory to Australian and International Standards. Testing has included bulk specific gravity, compressive strength, water absorption, abrasion resistance, dimensional stability, coefficient of thermal expansion, chemical and stain resistance, Mohr’s hardness and flexural strength. Additionally, independent petrographic mineralogical work was undertaken to support the testing work. Detailed petrographic assessment result sheets are attached in Appendix 5 and drilling logs note is as shown in the Table 2.1 below.

<table>
<thead>
<tr>
<th>Hole No.</th>
<th>Collar Coordinates</th>
<th>Elevation (ASL)</th>
<th>Bearing (Mag. Nth)</th>
<th>Declination (Degrees)</th>
<th>Hole Depth (m)</th>
<th>Commenced / Finished</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 01</td>
<td>407425</td>
<td>6853667</td>
<td>0</td>
<td>-90</td>
<td>15</td>
<td>27/06/2016 to 28/07/2016</td>
<td>Collared closest to access road and on the lower part of the granite sub-crop</td>
</tr>
<tr>
<td>CH 02</td>
<td>407416</td>
<td>6853630</td>
<td>0</td>
<td>-90</td>
<td>26.4</td>
<td>29/06/2016 to 5/07/2016</td>
<td>Collared higher up on the granite sub-crop (to the south), further away from access road</td>
</tr>
</tbody>
</table>

Besides, a bulk sample of 750mm long 450mm wide and 600mm high was cut from near surface by an excavator driven diamond saw (rock saw) and has been tested for the key parameters such as;

- Flexural Strength – 10 tests (5 wet & 5 dry);
Below is the summary of testing result and detail of tests document are included in Materials Testing Report – Appendix 5

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk Specific Gravity (kg.m⁻³)</td>
<td>Core</td>
<td>7</td>
<td>ASTM C97-15</td>
<td>2615 (2612-2633)</td>
<td>2560 (min.)</td>
<td>SI AR0716-1, 6 Aug 2016</td>
</tr>
<tr>
<td>Water Absorption by Weight %</td>
<td>Core</td>
<td>7</td>
<td>ASTM C97-15</td>
<td>0.11 (0.10-0.12)</td>
<td>0.40 (max.)</td>
<td>SI AR0716-1, 6 Aug 2016</td>
</tr>
<tr>
<td>Compressive Strength (MPa)</td>
<td>Dry</td>
<td>7</td>
<td>C170-15</td>
<td>122 (116-147)</td>
<td>112 (96-124)</td>
<td>SI AR0916-1, 12 Oct 2016</td>
</tr>
<tr>
<td></td>
<td>Soaked</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modulus of Rupture (Dry, Mpa)</td>
<td>Core</td>
<td>10</td>
<td>BS EN-12372-2006</td>
<td>15.4 (13.2-19.4)</td>
<td>10.3 min.</td>
<td>SI AR0916-1, 12 Oct 2016</td>
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<tr>
<td>Abrasion Resistance</td>
<td>Core</td>
<td>3</td>
<td>ASTM C1353-15</td>
<td>112.3 (107-116)</td>
<td>25 min.</td>
<td>SI AR0916-1, 12 Oct 2016</td>
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<tr>
<td>Dimensional Stability</td>
<td>Core</td>
<td>3</td>
<td>Si-DIM-15</td>
<td>0.002</td>
<td>0.004</td>
<td>SI AR0916-1, 12 Oct 2016</td>
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<tr>
<td>Dimensional Change Upon Soaking (%)</td>
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<td></td>
<td></td>
<td></td>
<td>0.01</td>
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<tr>
<td>Dimensional Change Upon Drying (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Dimensional Change After 10 Cycles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Resistance to Salt Attack (Durability)</td>
<td>Core</td>
<td>5</td>
<td>AS/NZS-4456.10:2003</td>
<td>&lt; 0.1 (0.04-0.06)</td>
<td>None Visible AA</td>
<td>SI AR0916-1, 12 Oct 2016</td>
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<tr>
<td>Weight Loss (%)</td>
<td>Core</td>
<td>3</td>
<td>Si-TLE-15</td>
<td>6.7 (5.6-7.7)</td>
<td></td>
<td>SI AR0916-1, 12 Oct 2016</td>
</tr>
<tr>
<td>Mode of Decay</td>
<td>Core</td>
<td>3</td>
<td>CTIA B1.1 (R:98)</td>
<td>6.7</td>
<td></td>
<td>SI AR0916-1, 12 Oct 2016</td>
</tr>
<tr>
<td>Durability Grade</td>
<td>Core (Cut)</td>
<td>3 X 6 (stain type)</td>
<td>6.7</td>
<td>4.0 (4.0-5.0)</td>
<td></td>
<td>SI AR0916-1, 12 Oct 2016</td>
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<tr>
<td>Chemical &amp; Stain Resistance</td>
<td>Core (Cut)</td>
<td>3 X 6 (stain type)</td>
<td>6.7</td>
<td>5.0 (5.0-5.0)</td>
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<tr>
<td>Mean Scratch Hardness</td>
<td>Core</td>
<td>5</td>
<td>SI-STAIN-09</td>
<td>4.0 (4.0-5.0)</td>
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<tr>
<td>Molar’s Hardness</td>
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<tr>
<td>Flexural Strength</td>
<td>Dry (Mpa)</td>
<td>5</td>
<td>ASTM C880-15</td>
<td>10.2 (9.6-15.1)</td>
<td>9.8 (9.5-10.5)</td>
<td>SI Report ASR1116-1, 7 Dec 2016</td>
</tr>
<tr>
<td></td>
<td>Soaked (Mpa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Flexural Strength</td>
<td>Prism Slab-Sawn</td>
<td>5</td>
<td>ASTM C99-15</td>
<td>13.6 (12.4-15.1)</td>
<td>14.5 (14.4-14.7)</td>
<td>SI Report ASR1116-1, 7 Dec 2016</td>
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<tr>
<td>Flexural Strength</td>
<td>Prism Slab-Flamed</td>
<td>6</td>
<td>EN4158:2004</td>
<td>3.2 (2.0-4.0)</td>
<td></td>
<td>SI Report ASR1116-1, 7 Dec 2016</td>
</tr>
<tr>
<td>Impact Resistance</td>
<td>Core</td>
<td>7</td>
<td>BS EN12371</td>
<td>135 (117-146)</td>
<td>131 (86-157)</td>
<td>SI Report ASR1116-1, 7 Dec 2016</td>
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<tr>
<td>Rupture Energy (Joules)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>131 min.</td>
<td>SI Report ASR1116-1, 7 Dec 2016</td>
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<tr>
<td>Frost (Freeze-Thaw) Resistance</td>
<td>Core</td>
<td>7</td>
<td></td>
<td>135 (117-146)</td>
<td>131 (86-157)</td>
<td>SI Report ASR1116-1, 7 Dec 2016</td>
</tr>
<tr>
<td>with frost cycling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>131 min.</td>
<td>SI Report ASR1116-1, 7 Dec 2016</td>
</tr>
<tr>
<td>without frost cycling (control) net decrease in strength</td>
<td>Core</td>
<td>7</td>
<td>RS EN12371</td>
<td>135 (117-146)</td>
<td>131 (86-157)</td>
<td>SI Report ASR1116-1, 7 Dec 2016</td>
</tr>
<tr>
<td>Maximum Anisotropy (%)</td>
<td>Prism Slab-Sawn</td>
<td>5</td>
<td>Si (unspecified)</td>
<td>2.6</td>
<td>0.7</td>
<td>SI Report ASR1116-1, 7 Dec 2016</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-3.4</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.4</td>
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</table>
2.4 PRELIMINARY GEOTECHNICAL ASSESSMENT

During the site investigation, a preliminary geotechnical assessment was carried out by Ausrocks to identify any potential geotechnical issues at various locations around the principal outcrop area focused on identifying any discernible foliation and fault zones, or defects.

This assessment included recognition of the role of fracture orientation versus extraction direction and block stability within the Mine, and, the potential intersection of groundwater and associated flow rates and stability matters. In general, the rock appeared competent with minimum fractures along the surface. There is no obvious evidence of various foliation along and across the plains.

Further assessment is planned. Any foliation or fault zone identified will be put into consideration in the final pit design and extraction plan.
The site resource assessment was based on the initial information gathered during the investigations and interpretation from the drilling data. The resource conforms with Mineral Resource Report Standard of Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (JORC). According to the JORC definition of mineral resources “a ‘Mineral Resource’ is a concentration or occurrence of solid material of economic interest in or on the Earth’s crust in such form, grade (or quality), and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade (or quality), continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories”. (JORC, 2012)

The resource volume or quantity is manifest as several discrete, but continuous or connected (outcrop) zones. Only the lower or northern zone has been drilled, tested and analysed in detailed, thereby allowing a Resource volume to be determined (JORC).

Other zones, higher in elevation and to the south, are yet to be proven to a certain level of confidence required. This can only be achieved by drilling additional optimally located drillhole(s), to verify the resource depth, material consistency, fracture and mapping of any other geological factors that might impede the suitability of the materials.

Below is general relationship between exploration results, mineral resource and ore reserves according to JORC reporting standards.

![FIGURE 3.1 –MINERAL RESOURCES CONFIDENT INDICATION CHART](image)

Source: JORC 2012

### 3.1 ESTIMATED POTENTIAL RESOURCES

The investigation area was split into two areas primarily based on level of information collected on site. These two areas were designated as: Indicated Resource area and Exploration target area. Exploration Targets and Resources were reported and estimated using information from the survey (topography and mapping area including physical observation) and drilling data. Refer Figure 3.2 entitled Investigated area and resource area delineation plan.
3.1.1 RESOURCE MODELLING

Resource Modelling was undertaken using a combination of Surpac and Global Mapper software. The model was built from a combination of the following datasets.

- Borehole coordinates, collar heights, total depth of each hole,
- Geological logs of each hole, layer information – top and base depths RL,
- Topographic survey using UAV Drone survey,
- Google Earth with QLD and NSW Globe, and UAV Drone images.

Using this data, the boundaries of the different resource area boundary were estimated, based on the resource area boundary defined in the previous section. Cross sections were constructed for evaluation of the continuity of the rock profile. The resource was estimated using surface to surface volume method from wireframe DTM generated from topography survey and drilled hole base interpolated wireframe in Surpac mining software to generate a resource volume. The base of the resource estimate was set at 755mRL due to drill depth limitations.

(Figures 3.3 to 3.5). Note: The southern part of Line A’ A” shown on Figure 3.4 comprises the Exploration Target area described in 3.1.

3.1.2 INDICATED RESOURCES

The lower or northern investigated area has been classified as an In-situ Indicated Mineral Resource due to it having enough holes (CH01 and CH02) to provide sufficient coverage of the Resource for the intended purposes. Geological logging indicated that they all appeared to have a similar composition although there was variable mineralogy but petrographic analysis and slab excavation sample test indicates that the resource is suitable for dimension stone products and a range of quarry products subject to marketability.

Estimated initial Resource within the indicated Resource area is estimated to be approx. 180,000 cubic metres. This was based on Surpac surface to surface volume estimate. This volume is considered sufficient for a medium scale dimension stone operation.

3.1.3 EXPLORATION TARGET AREA

The south end or higher elevation resource area has been classified as an Exploration Target as there has been no detailed investigation in this area. Although the outcrop exhibits continuous physical similarity, this area is higher and wider than indicated resource area and with more potential of opportunity to operate a wider working area.

Potential additional resource in this area based on similar estimation approach is approx. 675,000 cubic metres of uncut stone. This could double should further drilling and source rock testing be carried out to confirm the significance of this deeper area.
FIGURE 3.2 – DRILLHOLE LOCATION AND RESOURCE BOUNDARY

- Proposed Mining Lease Boundary
- Indicated Resource Area
- Resource Boundary
- Exploration Target Area

FIGURE 3.3: SECTION PLAN
FIGURE 3.4: SECTION AA’_AA”.

FIGURE 3.5: SECTION BB’_BB”.

Cherrabah Granite Mine February 2017
3.2 COMPETENT PERSON STATEMENT – BRICE K MUTTON (FAUSIMM, FAIG)

The data in this report that relates to Mineral Resources for the Cherrabah Granite is based on information evaluated by Mr. Brice Mutton who is a Fellow of The Australasian Institute of Mining and Metallurgy (FAusIMM) and a Fellow of the Australian Institute of Geoscientists (FAIG) and who has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking, to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the “JORC Code”). Mr. Mutton is an industry consultant and was at the time of the report Principal of Brice Mutton & Associates Pty Ltd and he consents to the inclusion in the report of the Mineral Resource in the form and context in which they appear.
Extraction of dimension stone can be facilitated by various methods. For granite it typically involves line drilling the perimeter of the block then rock breaking or blasting to split the blocks. However, with the development of new diamond technology, equipment tolerances and automation, more options are becoming available to customise the extraction process. The mining methods utilised in the extraction of dimension stone range from relatively simple and low technology methods to very technologically advanced and automated methods.

In general, due to the hardness of granite dimension stone mining, operations tend to utilise simple drilling and splitting technologies. Although due to the increasing availability and cost competitiveness of cutting technologies this trend is changing. For modern operations in Australia the most common means of granite block extraction of stone involves traditional perimeter drilling combined with either cutting by using diamond wire, or by splitting the stone using hydraulic splitters or small explosive charges. Figure 4.1 below shows a typical processing flow chart for a dimension granite operation. Table 4.1 shows different extraction methods for dimension stone and the technologies that are involved.
### TABLE 4.1 EXTRACTION METHODS FOR DIMENSION STONE

<table>
<thead>
<tr>
<th>Extraction Method</th>
<th>Technology involves</th>
<th>Application</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting</td>
<td>Disc cutter, Chain saw, Diamond belt, Water jet and Diamond wire etc</td>
<td>Marble, granite, limestone</td>
<td>This is most common method on granite dimension stone cutting</td>
</tr>
<tr>
<td>Splitting</td>
<td>Hydraulic wedges, plug and feather, Blasting and Detonating cords.</td>
<td>Marble, granite, limestone (note explosive is generally not acceptable in marble splitting)</td>
<td></td>
</tr>
<tr>
<td>Blasting</td>
<td>Explosive; low to medium strength.</td>
<td>Paving stones and construction blocks, kerbs or slabs or slate</td>
<td></td>
</tr>
</tbody>
</table>

### 4.2 EXTRACTION METHODS EVALUATION AND RECOMMENDATION

The following options were considered; Drill & Blast, Drill & hydraulic splitting, Drill & diamond wire cutting, and Diamond sawing & hydraulic splitters.

#### 4.2.1 OPTION 1

**Drill & blast:** this is done by line drilling (using closely spaced holes) the perimeter of each block and splitting/popping with the use of light explosives. The combination of drill and blast is one of the most common methods of dimension stone extraction in countries where labour costs are low and resources are plentiful. The method is relatively cheap and quick to split but can cause significant damage to the structure of the block and cause significant wastage, particularly if the explosive quantity is not accurately measured. This method is not suitable for marble but is used widely in granite stone production. If processing facilities are located on site this method is considered favourable as offcuts and misshapen blocks can more easily be dealt with. Depending on the environmental impacts, blasting may not be allowed at some sites.

#### 4.2.2 OPTION 2

**Drill & splitting:** this method is very similar to option 1 but substitutes the use of explosives for either manual splitting techniques or hydraulic pressure. The low tech method is to use a feather and plug to complete the splitting of the rock mass but low production rates are expected. A hydraulic splitter can be either mounted on an excavator or handheld and can be used to split the rock along the line of drilling at a much higher production rate.

In recent times this method has been modified to reduce the requirement for manual labour by using mechanised equipment and significant force to split the block. The common trend involves both vertical and horizontal drilling using advanced drill rigs with the ability to drill multiple holes at a time (up to 4). However,
using this method still results in a relatively high consumable cost and high wastage with rough edges of the block especially where two split corners intersect due to natural variations in the stone.

**4.2.3 OPTION 3**

Drill & diamond wire cutting: this method is considered the most common modern method and involves various wire cutting techniques including plunge cuts. Wire cutting produces more smooth edges which commands a higher product price and reduces waste. However, the cost of consumables should be closely monitored and the cutting layout should be carefully planned to avoid the need to constantly shift the wire saw. The introduction of wire cutting also requires a more detailed stormwater treatment facility to deal with the cutting fines. Below is a schematic layout of a drilling and diamond wire cutting operation.
4.2.4 OPTION 4

Diamond sawing & diamond wire cutting: this method is very common in softer materials such as sandstone dimension stone but is not as common in harder rock such as granite. It is similar to the previous method but uses a large diamond saw blade to cut the vertical surfaces in a criss-cross pattern followed by wire sawing the base. This produces more fines which requires environmental management but produces the least wastage and highest value cut product. This method requires a uniform resource to allow long cutting planes as saws and blades are not very flexible to natural variation in the stone. This method has limitations on the depth of cut (governed by saw blade diameter) and requires long uniform benches to allow the most efficient sawing setup. Below is a disc sawed bench which is more common in sandstone mining.

FIGURE 4.4– TYPICAL ROCK SAW OPERATION

4.2.5 RECOMMENDATIONS

The most common commercial extraction method for granite dimension stone is drill and diamond wire sawing. Based on the current industrial trends and site location (availability of access to new technology development in Australia) drill and diamond wire sawing is considered to be most suitable mining method for this site.

However, we believe the site will have access to advanced technologies as they become available and although the initial operations may start with the selected method, the progression of development will allow new technologies to be introduced. It is likely that the site could possibly move to a diamond sawing and diamond wire cutting method once the operational area is fully developed.
4.3 INFRASTRUCTURE AND PERMITS

As part of the pre-feasibility assessment, infrastructure issues were reviewed including access road, power supply, water as well as permit and licence requirements.

Access is a crucial component of any mining project and effective transportation to the market will improve the competitiveness in the marketplace. The access to the CGM site is primarily via the existing access road used by the Cherrabah resort (Refer Traffic Report). The current access via Warwick is via Warwick-Killarney Road, Cullendore Road, O’deas Road then Keogh Road. It is then proposed that a new internal access road is developed from the gate to the Cherrabah Resort directly to the mining lease. The new access will need to be constructed to a gravel road standard. The external roads are considered to be appropriate for low volume truck haulage but depending on the ultimate output from the mine they may need to be upgraded.

The operation is expected to run off generated power for the initial stages, however at some point a source of power supply via the Cherrabah Resort is likely to be developed. This connection is not considered to be difficult but is likely to require installation of a transformer and around 4km of power poles.

There are several existing dams on site including two within close proximity to the mining lease. The property contains one very large dam close to the resort which could be used for water in emergencies. There is also potential for bore water subject to appropriate approvals. The project will be required to install sediment basins to control stormwater, the excess water can be re-used for site operations or discharged if it meets the release criteria of the EA. The base of the extraction pit will also be developed to capture stormwater runoff and allow pumping to a storage dam if required.

Obtaining appropriate permits and licencing for the site is primarily via state government Mining Lease approval with referral to various state agencies for assessment. Ausrocks has undertaken a pre-lodgement meeting with the Environment and Heritage Protection (EHP) and no major issues were raised but appropriate management of various state & federally listed fauna and flora species needed to be shown. Therefore consultants have been engaged to assess the impacts and propose mitigation measures for these issues. Due to the significant distance between the operation and nearby residents, the community impact should be minimal and a good relationship with neighbours will be maintained. There is however a risk that the project could receive opposition by various ‘anti-mining’ groups that have been established in QLD but due to the scale of development any issues raised are likely to be overcome by careful management and negotiation with the relevant state department.
5 MARKETING

5.1 PRODUCTS

5.1.1 DIMENSION STONE GRANITES

Dimension stone is a product which is quarried for the purpose of obtaining blocks or slabs that meet the specifications to size in width, length and thickness. Ideally material for dimension stone should be free of any defects to ensure that the material can be used for its intended end use i.e. monuments, tiles and slabs. Dimension stone is a high value product as the material is utilised for both its physical and architectural characteristics.

If managed carefully, the operation can generate minimal waste and improve the business bottom-line. Offcuts that cannot be repurposed would in practice be crushed to form aggregates. The overall cost to produce aggregates will be minimal (just crushing and screening) as the extraction cost is paid for by the dimension stone operation.

5.2 DIMENSION STONE DEMAND

5.2.1 INTERNATIONAL DIMENSION STONE

Dimension stone markets are largely dominated by China, Indian and Italy. The worldwide dimension stone market is worth almost US$40 Billion per annum with an estimated production rate of 142Mt per annum in 2013 which is the last year for which the data is available. The following FIGURE 5.1, has been sourced from the United States Geological Survey (USGS) 2016 Commodity Report which has been sourced from data in 2014.

FIGURE 5.1: DIMENSION STONE BY TYPE SOLD IN USA.

As the chart shows, approximately a quarter of the dimension stone market within the USA for 2014 was the sale of Granite. Demand for Granites and the subsequent sale price is determined by a number of specific properties such as but not limited to:

1. Colour
2. Texture
3. Grain
Within the sub-group of Granite Dimension Stone there are a number of different products that are categorised predominantly by the feature colour in the stone and the region the material is sourced from. An example of the various type of Granites is shown in TABLE 5.1.

<table>
<thead>
<tr>
<th>Picture</th>
<th>Colour/Description</th>
<th>Pricing Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Type 1: Absolute Black" /></td>
<td>Type 1: Absolute Black</td>
<td>$930 - $300 AUD per tonne</td>
</tr>
<tr>
<td><img src="image2" alt="Type 2: Baltic Brown" /></td>
<td>Type 2: Baltic Brown</td>
<td>$400 - $280 AUD per Tonne</td>
</tr>
<tr>
<td><img src="image3" alt="Type 3: Dakota Mahogany" /></td>
<td>Type 3: Dakota Mahogany</td>
<td>$510 - $350 AUD per Tonne</td>
</tr>
<tr>
<td><img src="image4" alt="Type 4: Giallo Vicenza" /></td>
<td>Type 4: Giallo Vicenza</td>
<td>$490 - $320 AUD per Tonne</td>
</tr>
<tr>
<td><img src="image5" alt="Type 5: Juparana Bourdeaux" /></td>
<td>Type 5: Juparana Bourdeaux</td>
<td>$300 - $180 AUD per Tonne</td>
</tr>
</tbody>
</table>
As can be seen from TABLE 5.1 there is a large variation between the various types of Granites. Black, Blue and Green Granites are subject to higher volatility in the market place as they are generally bought as bulk items for commercial use. The price can also differ greatly due to the quality of a particular piece of dimension stone as shown. The Cherrabah granite exhibits mostly the features of the Type 4 granite above.

Below FIGURE 5.3, shows the relationship between Production, Supply, Demand and the Price. An increased demand in the 1990’s and subsequent price increase were followed by a catch up in the supply to meet the demand. From the start of the millennium place decreased to approximately $400 USD per cubic metre. Also, the figure demonstrates the wide use and exportability of the product.

Source: THE DIMENSION STONES SECTOR new perspectives in the international mining standards reporting
While a higher price can be fetched on the international market for Cherrabah Granite there is also an opportunity to supply stone locally. Cherrabah Granite could be sold to a number of stone masons for use in feature walls, benches, tiles, statues and even headstones. A number of potentially interested parties located in the surrounding area of Cherrabah are as follows:

- JH Wagner and Sons - Master Stone Masons, are a privately owned and operated Stonemasonry Company which undertakes all aspects of building and monumental masonry. The company is a specialist provider of Australian Helidon Sandstone, Granite, Basalt, Porphyry and Marble. The company owns and operates an advanced manufacturing facility in Toowoomba and has a distribution centre that is based in Brisbane. At present the company stocks 15 types of Granite of which there is little similarity to Cherrabah Granite.

- W.E.E. Colledge & Son – Monumental Masons, Warwick: Family owned and operated business located in the nearby town of Warwick, which specialises in creating and renovating Memorials, Plaques and Vaults using Bronze Granite and Sandstone. Warwick is only located approximately 30 minutes from the proposed site which puts CGM at a haul advantage to supply.

- T. Wrafter & Son Pty Ltd – Stonemasons & Stonework, are a family owned and operated company based on the north side of Brisbane that specialise in monuments and memorials, public memorials, artworks, commercial work and domestic work. The site has an existing relationship with the company due to initial slab cutting being performed at their workshop.

- Brisbane Granite and Marble – High Quality Stone Installations, features a factory with state of the art equipment at the leading edge of technology. The North Brisbane located facility specialises in completing counter and table tops, cabinet tops and direct supply in slab form. They stock a significant number of coloured granites that are all dissimilar to Cherrabah Granite.

- Haag Monumental Masons are a specialist headstone and monument manufacturer located in Ipswich approximately 1 hour 45 minutes from the proposed site location. There would be an opportunity to supply with offcut material as majority of their work is for headstones.

It should also be noted that there is significant stone that bares a strong resemblance to the Cherrabah Granite that is located in the Queen Street Mall in Brisbane Street Mall which was installed as part of the major renovations in 1999. This material was supplied by Australian Granites out of Mount Isa, the colour being Midnight Rose. Processing of the cut block was by JH Wagner and Sons and this including cutting blocks into 50mm thick pavers and exfoliating the surface to minimise slip for pedestrians. Some pavers were finished with a bright etched finish for directional signs, braille directions and insignias. The total paved area (which included feature paving inlays of Adelaide black granite) was 12,500 sqm and the paving remains in excellent condition after 17 years of high density pedestrian traffic.

Demand in the future could spike for the domestic supply should this part of the Mall undergo a renovation or expansion, much similar to the increase in demand for Helidon Sandstone that is to be required as part of the Queens Wharf Plaza complex (2017 - 2024).
5.3 CONSTRUCTION MATERIAL DEMAND

5.3.1 POPULATION GROWTH

The proposed Cherrabah Granite Mine is located in the central eastern area of the SDRC, which had a population of 36,415 when the data was collected in 2011, with a growth rate of 1.6 percent or 565 people per annum. The Population and Dwelling Profile released by the Office of Economic and Statistical Research projected the population for the next 20 years from the report release date. A summary of these projections is summarised and shown in Table 5.3.

<table>
<thead>
<tr>
<th>Year</th>
<th>Projected Population</th>
<th>Average Annual Change (Medium Series)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Series</td>
<td>Medium Series</td>
</tr>
<tr>
<td>2011</td>
<td>36,247</td>
<td>36,415</td>
</tr>
<tr>
<td>2016</td>
<td>38,088</td>
<td>39,125</td>
</tr>
<tr>
<td>2021</td>
<td>39,856</td>
<td>41,824</td>
</tr>
<tr>
<td>2026</td>
<td>41,658</td>
<td>44,581</td>
</tr>
<tr>
<td>2031</td>
<td>43,463</td>
<td>47,402</td>
</tr>
</tbody>
</table>

The population statistics exhibited in Table 5.3 show that there is an increasing population growth in the SDRC over the next 20 years which will require additional roads, infrastructure and housing to accommodate the influx. It is estimated that per capita in Australia approximately 8 tonnes of quarry and construction materials (5.5 tonnes of aggregates, 2.5 tonnes of fine aggregates) will be “consumed” each year. An increase in population requires that there be an increase in the demand for quarry and construction materials. At current growth rates the increase in demand estimated is illustrated in FIGURE 5.6 as follows with total increased demand in the period 2016-2031 being in the range 210,000t (low) to 285,000t (high).

The marketability of a project also depends on the major infrastructure requirements which are often indicative of population movements.
5.3.2 MAJOR INFRASTRUCTURE AND WORKS

Cherrabah Granite is located in the Southern Downs Regional Council (SDRC) which spans from the Toowoomba Region and Texas in Queensland to the New South Wales (NSW) Border. Information from the SDRC website shows that the council needs to maintain:

- 1337km of Sealed Roads
- 1542km of Gravel Roads
- 195km of Dirt Roads
- 48 Road Bridges
- 4 Pedestrian Bridges

In addition to the roads that are maintained by SDRC, the QLD State government maintains a further 601km of Main Roads. In a budget review for the 2016/2017 financial year, SDRC released the major road projects that would be undertaken within the region with the list as follows:

- $24,000,000 Mt Lindesay Road Upgrades.
- $1,470,000 Connells Road Bridge Replacement.
- $1,260,000 Boxes Road Bridge Upgrade.
- $840,000 for widening and improvement of Kenilworth St.
- $500,000 Stanthorpe Aerodrome Safety Improvements.
- $500,000 Warwick Aerodrome Safety Improvements.
- $690,000 Development of Rogers Street Carpark, Stanthorpe.
- $450,000 Nundubbermere Road improvements, rehabilitation and widening.
- $400,000 Old Stanthorpe Road Safety Improvements.
- $235,000 Connolly Dam Road, South East Warwick.
- $183,000 Sugarloaf Road, Stanthorpe.
5.3.3 QUARRY COMPETITORS IN THE REGION

To determine the marketability of Cherrabah Granite aggregate material the current supply in the surrounding region was assessed. Utilising the DTMR (Department of Transport and Main Roads) supplier database and a visual aerial inspection of the area with Google Earth, quarries in nearby regions were labelled on map surrounding Cherrabah Granite. This was compared with various radii at 25km, 50km and 75km and is exhibited in FIGURE 5.7.

As is shown in the image there are two main competitors for the distribution of course aggregates with a 25km radius. The main competitor is Braeside Quarry (Payne’s Quarry), located on the New England Highway 15km south of Warwick, which is Department of Transport and Main Roads (TMR) Registered for Cover and Concrete Aggregates in addition to Type 2 and Type 3 Roadbases. It is estimated that the annual production from this particular quarry is in the vicinity of 80,000t – 100,000t per annum. The main difference between the materials produced at Braeside Quarry (Paynes) is that the granite material mined, although it is a Granite, the colour is more of a brown granite which isn’t as strong and is fractured. Hornfels is also extracted from the quarry, this being the main production source of quarry material.

The other quarry operating within the 25km radius is Cherrabah is Walls Sand and Gravel which is located next to Braeside Quarry. Walls Sand and Gravel sells a wide range of products varying from fine aggregates (sand), to course and fine blends to washed and screened decorative aggregates. As this is a gravel pit style quarry (with weathered granite or deco), the products significantly differ from those likely to be produced from Cherrabah Granite.

Another Quarry located outside of the 25km radius from Cherrabah is Hutchinson’s Quarry located approximately 10 km west of Warwick. Hutchinson’s Quarry is a hornfels material and is also TMR certified to produce Cover and Concrete Aggregates in addition to Type 2 and 3 Bases. A comparison has been made between Cherrabah Granite and the nearby Braeside and Walls Quarries, a haulage comparison has been undertaken. A comparison between Cherrabah Granite and nearby Braeside and Walls Quarries based on a haulage rate of $0.2/t.km) is shown in Table 5.4.

<table>
<thead>
<tr>
<th>Location</th>
<th>Cherrabah Distance (km)</th>
<th>Braeside/Walls Quarry Distance (km)</th>
<th>Cherrabah Savings ($/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warwick</td>
<td>31.3</td>
<td>23.7</td>
<td>-1.52</td>
</tr>
<tr>
<td>Stanthorpe</td>
<td>47.0</td>
<td>36.6</td>
<td>-2.08</td>
</tr>
<tr>
<td>Ballandean</td>
<td>67.0</td>
<td>56.7</td>
<td>-2.06</td>
</tr>
<tr>
<td>Killarney</td>
<td>28.8</td>
<td>52.2</td>
<td>4.68</td>
</tr>
<tr>
<td>Brisbane</td>
<td>186.0</td>
<td>180.0</td>
<td>-1.20</td>
</tr>
<tr>
<td>Toowoomba</td>
<td>115.0</td>
<td>108.0</td>
<td>-1.40</td>
</tr>
<tr>
<td>Beaudesert</td>
<td>152.0</td>
<td>146.0</td>
<td>-1.20</td>
</tr>
</tbody>
</table>
6.1 PROJECT RISK

To determine the overall risk of the project a SWOT Analysis was completed. This is a structured planning method used to evaluate the project which analyses the effects of internal and external factors determining if they are helpful or harmful. The SWOT Analysis of Cherrabah Granite is provided in Table 6.1.

### Table 6.1: SWOT Analysis of Cherrabah Granite

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
</table>
| - Dimension Stone is a high value product.  
- High Quality rock that meets specification for dimension stone  
- Large quantity of Resource likely.  
- Relatively low startup costs.  
- Relatively isolated from neighbours.  
- Proximity to Township of Warwick.  
- EPM (Exploration Permit for Minerals) is in place and company owns the land. Lease approval should not be difficult. | - Significant haulage distance to the Port of Brisbane (216km)  
- Owner limited management experience in the operation of a Dimension Stone Mine.  
- Currently no sales contracts in place.  
- Detailed Geological Data only covers a relatively small area.  
- High operating costs in Australia.  
- Low recovery rates for high value products depending on mining method. |
<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
</table>
| - Unique color feature for construction and architecture works.  
- Chance to sell offcut material from dimension stone and manufacture as alternate extractive industry products.  
- Dimension stone contractor located nearby which could provide valuable experience in developing the mine.  
- Low cost processing of waste material into aggregates for local supply.  
- Chance for vertical integration if tile and slab factory is purchased in China. | - Geological structure; Faulting and jointing could limit the dimension stone block size.  
- Global Market; Susceptibility to currency volatility in export markets.  
- Fluctuations in demand for product and thus product price.  
- Unforeseen heritage or ecology issues  
- Fussy markets resulting in limited demand |

From the SWOT analysis, it has been concluded that the project at this stage will be considered high risk.

A number of tasks could be completed to reduce the overall project risk and thus increase the confidence and the validity of the project, these are listed as follows:

- Increase geological knowledge:
  - Additional geological mapping and investigation over a larger area and to a greater depth.
- Firming up international dimension stone prices and product validity:
  - This could be completed in the form of future sales contracts, indicative product pricing or letters of interest from stone merchants.
- Gather experienced project management team:
  - Appointment of experienced dimension stone contractor will assist to close the gap in technical and mine operation experience.
- Establishment additional markets for waste rock/offcuts:
  - Obtain an extractive industry permit and supply to the local construction material market.
3.2 FINANCIAL ANALYSIS SCENARIOS

Three various production scenarios we analysed for the purposes of the Pre-Feasibility Study, these were:

- Scenario 1: Operation of Cherrabah Granite Mine selling Dimension Stone using an owner operator model.
- Scenario 2: Operation of Cherrabah Granite Mine selling Dimension Stone using contractor model.

The option to lease the Cherrabah Granite Mine Project to a prospective client was not investigated for the purposes of this Pre-Feasibility Study. This could be examined once all approvals are in place and operational works have been completed.

The costs presented here do not include detailed pricing from contractors or detailed costs on total tonnes extracted and are based on Ausrocks experience in dimension stone operations and quarries in south-east Queensland. The dimension stone operations are sandstone (Bextons, Ablatio, Gosford etc) and there are no current granite operations in south-east Queensland.

6.3 SCENARIO 1 – DIMENSION STONE OWNER OPERATOR

6.3.1 ASSUMPTIONS

Scenario 1 is based on the implementing an owner operator model to undertake all site establishment, extraction with an appropriate haulage contractor appointed loading and transportation of dimension stone to market. The following assumptions were made to complete the Financial Analysis for Scenario 1.

- Cherrabah Granite Mine is owner operated by a Quarry Manager/Operator and a Plant Operator.
- Transport and Loading to the Port of Brisbane for export to the Chinese Market is undertaken by a haulage contractor.
- Base Production Rate.
  - 7,500 tonnes per annum (t/a) export dimension stone, ramping up from Year 1 - 1,500 t/a, Year 2 - 2,500 t/a, Year 3 - 5,000 t/a, Year 7 - 5,625 t/a, Year 12 - 6,250 t/a, Year 17 - 6,800 t/a, Year 22 onwards 7,500 t/a.
  - 1,500 tonnes per annum (t/a) Australian dimension stone, ramping up from Year 1 - 250 t/a, Year 2 - 500 t/a, Year 3 - 1,000 t/a, Year 7 - 1,125 t/a, Year 12 - 1,250 t/a, Year 17 - 1,350 t/a, Year 22 onwards 1,500 t/a.
- 30-Year Production Life.
- Saleable Material Recovery Rate: 30%
- Royalty fees: $1 for each tonne of dimension stone.
- Sale Prices (conservative estimate subject to market appraisal)
  - Export Dimension Stone - $300
  - Australian Dimension Stone - $220

A more detailed list of start-up costs for Scenario 2 can be found in APPENDIX 5.

It is proposed that Operational Works and Construction commences in the 2017/2018 Financial Year.

It should be noted that all inputs are specific to Scenario 1 in January 2017.
6.3.2 NET PRESENT VALUE

Using a discounted cash flow model in January 2017, Ausrocks estimated the Net Present Value (NPV) of the project (Attachment 2) with approvals in place, established markets with annual sales peaking at 9,000t/a is estimated -$0.55M after tax, with the following projected:

- Average 30 Year Operating cost of $252.57/t
- Average 30 Year Product price ex-bin: $286.70/t
- Significant CAPEX in:
  - Year 1: $1,585,000
  - Year 8: $195,000
  - Year 11: $600,000
  - Year 15: $195,000
  - Year 21: $620,000
  - Year 22: $195,000
  - Year 29: $215,000
- Estimated Total Investment Required over 30 Years: $55.91 M
- Estimated Total Revenue Over 30 Years: $67.87 M
- Estimated Total Profit/Loss Over 30 Years: $5.33 M
- Payback Period: 11.61

The discount rate is estimated as follows:

- Interest based on 10 Year Bonds. Currently 2.69%. Use 3%.
- Political Risk. (takes into account Government Policy, Native title, competing land use issues, project location):
  - Low political risk: 2-3%.
  - Medium to high political risk: 4-5%
  - Extremely high political risk: 6-10%

A political risk of 6% is recommended.

- Project Risk (takes into account complexity of extraction of material, operator competency, material quality, market competition):
  - Very Low to Low project risk: 2-3%.
  - Medium to High project risk: 4-5%.
  - High to Very High project risk: 6-10%

From the SWOT analysis it has been concluded that the project will be considered high risk 7%. The minimum discount rate is therefore estimated at 16% based on the above assumptions.
6.3.3 SENSITIVITY ANALYSIS

Sensitivity Analysis was conducted by varying the different input parameters in the financial model. This is to test the profitability of the project due to changes in the market condition. Each of the key parameters such as the Production Rate, Pricing, Fixed Cost, Variable Cost and Total Cost are increased/decreased to determine to show each specific parameters effect on the Project.

PRODUCTION

<table>
<thead>
<tr>
<th>TABLE 6.2: SCENARIO 1 – PRODUCTION SENSITIVITY ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Value (AFTER TAX)</td>
</tr>
<tr>
<td>Discount Rate</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>14.00%</td>
</tr>
<tr>
<td>15.00%</td>
</tr>
<tr>
<td>16.00%</td>
</tr>
<tr>
<td>17.00%</td>
</tr>
<tr>
<td>18.00%</td>
</tr>
</tbody>
</table>

PRODUCTION PRICING

<table>
<thead>
<tr>
<th>TABLE 6.3: SCENARIO 1 – PRODUCT PRICING SENSITIVITY ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Value (AFTER TAX)</td>
</tr>
<tr>
<td>Discount Rate</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>14.00%</td>
</tr>
<tr>
<td>15.00%</td>
</tr>
<tr>
<td>16.00%</td>
</tr>
<tr>
<td>17.00%</td>
</tr>
<tr>
<td>18.00%</td>
</tr>
</tbody>
</table>

CAPITAL COSTS

<table>
<thead>
<tr>
<th>TABLE 6.4: SCENARIO 1 – CAPITAL COSTS SENSITIVITY ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Value (AFTER TAX)</td>
</tr>
<tr>
<td>Discount Rate</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>14.00%</td>
</tr>
<tr>
<td>15.00%</td>
</tr>
<tr>
<td>16.00%</td>
</tr>
<tr>
<td>17.00%</td>
</tr>
<tr>
<td>18.00%</td>
</tr>
</tbody>
</table>
OPERATING COSTS

**TABLE 6.5: SCENARIO 1 - OPERATING COSTS SENSITIVITY ANALYSIS**

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>Project Value (AFTER TAX)</th>
<th>Change in Operating Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-20%</td>
<td>-10%</td>
</tr>
<tr>
<td>14.00%</td>
<td>$1,408,419</td>
<td>$373,818</td>
</tr>
<tr>
<td>15.00%</td>
<td>$1,206,777</td>
<td>$236,555</td>
</tr>
<tr>
<td><strong>16.00%</strong></td>
<td><strong>$1,030,089</strong></td>
<td><strong>$117,339</strong></td>
</tr>
<tr>
<td>17.00%</td>
<td>$874,534</td>
<td>$13,353</td>
</tr>
<tr>
<td>18.00%</td>
<td>$736,969</td>
<td>-$77,714</td>
</tr>
</tbody>
</table>

**TOTAL COSTS**

**TABLE 6.5: SCENARIO 1 - TOTAL COSTS SENSITIVITY ANALYSIS**

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>Project Value (AFTER TAX)</th>
<th>Change in Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-20%</td>
<td>-10%</td>
</tr>
<tr>
<td>14.00%</td>
<td>$1,709,237</td>
<td>$548,302</td>
</tr>
<tr>
<td>15.00%</td>
<td>$1,501,602</td>
<td>$406,952</td>
</tr>
<tr>
<td><strong>16.00%</strong></td>
<td><strong>$1,319,505</strong></td>
<td><strong>$283,997</strong></td>
</tr>
<tr>
<td>17.00%</td>
<td>$1,159,038</td>
<td>$176,575</td>
</tr>
<tr>
<td>18.00%</td>
<td>$1,016,990</td>
<td>$82,335</td>
</tr>
</tbody>
</table>

**6.3.4 SCENARIO SUMMARY**

For majority of the parameters and the sensitivities under the assumptions and conditions of Scenario 1 have returned with a negative NPV. With a base case NPV of -$0.55M using a discount rate of 16%, the range of values for the sensitivity ranges from -$2.41M to $1.32M.

Sensitivities conducted on the amount of capital cost yielded no positive NPV’s for the range of discount rates and also shows the smallest range of values ( -$0.88M to -$0.20M) for the base case discount rate. This smaller range of values shows that variation in the Capital or Fixed Costs has less of an effect on the feasibility of the project. An increase in the product pricing provided a large range or positive NPVs ($1.25M), as did a decrease in the operating costs and fixed costs ($1.32M) with the lowest discount rate.

Analysing Scenario 1 without completing Discount Cash Flow (DCF) Analysis it was projected that the project would receive $67.87 M in revenues at a total cost of $55.91 M with an after tax profit of $5.33M over the 30 year cash flow projection. From these inputs it is estimated that it would take 11.61 years for the project to payback the initial investment, with a total return of 9.53% on investment over the 30 years (0.32% pa).
6.4 SCENARIO 2 – DIMENSION STONE CONTRACT OPERATOR

6.4.1 ASSUMPTIONS

Scenario 2 is based on the implementing a contractor model to undertake all site establishment, extraction, loading and transportation of dimension stone to market. The following assumptions were made to complete the Financial Analysis for Scenario 2:

- Contractor campaign operates at Cherrabah Granite Mine, undertaking all site establishment, block extraction, processing, loading to the Port of Brisbane for export to the Chinese Market.
- Transport and Loading to the Port of Brisbane for export to the Chinese Market is undertaken by a haulage contractor.
- Base Production Rate.
  - 7,500 tonnes per annum (t/a) export dimension stone, ramping up from Year 1 - 1,500 t/a, Year 2 - 2,500 t/a, Year 3 - 5,000 t/a, Year 7 - 5,625 t/a, Year 12 - 6,250 t/a, Year 17 - 6,800 t/a, Year 22 onwards 7,500 t/a.
  - 1,500 tonnes per annum (t/a) Australian dimension stone, ramping up from Year 1 - 250 t/a, Year 2 - 500 t/a, Year 3 - 1,000 t/a, Year 7 - 1,125 t/a, Year 12 - 1,250 t/a, Year 17 - 1,350 t/a, Year 22 onwards 1,500 t/a.
- 30-Year Production Life.
- Saleable Material Recovery Rate: 30%
- Royalty fees: $1 for each tonne of dimension stone.
- Sale Prices
  - Export Dimension Stone - $300
  - Australian Dimension Stone - $220

A more detailed list of start-up costs for Scenario 1 can be found in APPENDIX 6.

It is proposed that Operational Works and Construction commences in the 2017/2018 Financial Year.

It should be noted that all inputs are specific to Scenario 2 in January 2017.
6.4.1 NET PRESENT VALUE

Using a discounted cash flow model in January 2017, Ausrocks estimated the Net Present Value (NPV) of the project (Attachment 2) with approvals in place, established markets with annual sales peaking at 9,000t/a is estimated - $0.52M after tax, with the following projected.

- Average 30 Year Operating cost of $273.94/t
- Average 30 Year Product price ex-bin: $286.70/t
- Significant CAPEX in:
  - Year 1 $1,205,000
  - Year 11: $350,000
  - Year 21: $370,000
  - Year 22: $195,000
- Estimated Total Investment Required over 30 Years: $60.64 M
- Estimated Total Revenue Over 30 Years: $67.57 M
- Estimated Total Profit/Loss Over 30 Years: $2.59 M
- Payback Period: 13.77

The discount rate is estimated as follows:

- Interest based on 10 Year Bonds. Currently 2.69%. Use 3%.
- Political Risk (takes into account Government Policy, Native title, competing land use issues, project location):
  - Low political risk: 2-3%.
  - Medium to high political risk: 4-5%
  - Extremely high political risk: 6-10%

A political risk of 6% is recommended.

- Project Risk (takes into account complexity of extraction of material, operator competency, material quality, market competition):
  - Very Low to Low project risk: 2-3%.
  - Medium to High project risk: 4-5%.
  - High to Very High project risk: 6-10%.

From the SWOT analysis it has been concluded that the project will be considered high risk 6%. This is a reduced risk from the other two Scenarios as there is an element of project risk that is assumed by the contractor. Furthermore there is a reduced rate of Capital Investment that is required from the 30 year projected cash flow which has been offset by higher operating costs. The minimum discount rate is estimated at 15% based on the above assumptions.
6.4.2 SENSITIVITY ANALYSIS

Sensitivity Analysis was conducted, by varying the different input parameters in the financial model. This is to test the profitability of the project due to changes in the market condition. Each of the key parameters such as the Production Rate, Pricing, Fixed Cost, Variable Cost and Total Cost are increased/decreased to determine the project NPV.

PRODUCTION

### TABLE 6.7: SCENARIO 2 – PRODUCTION SENSITIVITY ANALYSIS

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>-20%</th>
<th>-10%</th>
<th>0%</th>
<th>+10%</th>
<th>+20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.00%</td>
<td>$791,634</td>
<td>$610,430</td>
<td>-$430,823</td>
<td>$241,982</td>
<td>-$62,569</td>
</tr>
<tr>
<td>14.00%</td>
<td>$812,402</td>
<td>$645,529</td>
<td>-$480,238</td>
<td>$306,079</td>
<td>-$140,970</td>
</tr>
<tr>
<td>15.00%</td>
<td>$829,258</td>
<td>$674,950</td>
<td>-$522,205</td>
<td>$360,921</td>
<td>-$208,347</td>
</tr>
<tr>
<td>16.00%</td>
<td>$842,873</td>
<td>$699,636</td>
<td>-$557,943</td>
<td>$408,011</td>
<td>-$266,476</td>
</tr>
<tr>
<td>17.00%</td>
<td>$853,787</td>
<td>$720,356</td>
<td>-$588,446</td>
<td>$448,574</td>
<td>-$316,811</td>
</tr>
</tbody>
</table>

PRODUCT PRICING

### TABLE 6.8: SCENARIO 2 – PRODUCT PRICING SENSITIVITY ANALYSIS

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>-20%</th>
<th>-10%</th>
<th>0%</th>
<th>+10%</th>
<th>+20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.00%</td>
<td>-$2,910,747</td>
<td>-$1,576,413</td>
<td>-$430,823</td>
<td>$737,758</td>
<td>$1,702,451</td>
</tr>
<tr>
<td>14.00%</td>
<td>-$2,761,456</td>
<td>-$1,535,314</td>
<td>-$480,238</td>
<td>$604,103</td>
<td>$1,494,102</td>
</tr>
<tr>
<td>15.00%</td>
<td>-$2,629,185</td>
<td>-$1,497,819</td>
<td>-$522,205</td>
<td>$487,727</td>
<td>$1,312,305</td>
</tr>
<tr>
<td>16.00%</td>
<td>-$2,511,350</td>
<td>-$1,463,441</td>
<td>-$557,943</td>
<td>$385,914</td>
<td>$1,152,888</td>
</tr>
<tr>
<td>17.00%</td>
<td>-$2,405,830</td>
<td>-$1,431,773</td>
<td>-$588,446</td>
<td>$296,440</td>
<td>$1,012,434</td>
</tr>
</tbody>
</table>

CAPITAL COSTS

### TABLE 6.9: SCENARIO 2- CAPITAL COSTS SENSITIVITY ANALYSIS

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>0%</th>
<th>-10%</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.00%</td>
<td>-$141,526</td>
<td>-$290,011</td>
<td>-$430,823</td>
<td>-$570,798</td>
<td>-$710,881</td>
</tr>
<tr>
<td>14.00%</td>
<td>-$198,624</td>
<td>-$343,231</td>
<td>-$480,238</td>
<td>-$616,557</td>
<td>-$752,979</td>
</tr>
<tr>
<td>15.00%</td>
<td>-$247,560</td>
<td>-$388,636</td>
<td>-$522,205</td>
<td>-$655,206</td>
<td>-$788,306</td>
</tr>
<tr>
<td>16.00%</td>
<td>-$289,655</td>
<td>-$427,499</td>
<td>-$557,943</td>
<td>-$687,917</td>
<td>-$817,986</td>
</tr>
<tr>
<td>17.00%</td>
<td>-$325,989</td>
<td>-$460,858</td>
<td>-$588,446</td>
<td>-$715,646</td>
<td>-$842,934</td>
</tr>
</tbody>
</table>
### OPERATING COSTS

#### TABLE 6.10: SCENARIO 2- OPERATING COSTS SENSITIVITY ANALYSIS

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>Change in Operating Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-20%</td>
</tr>
<tr>
<td>13.00%</td>
<td>$1,518,261</td>
</tr>
<tr>
<td>14.00%</td>
<td>$1,325,879</td>
</tr>
<tr>
<td>15.00%</td>
<td>$1,158,025</td>
</tr>
<tr>
<td>16.00%</td>
<td>$1,010,847</td>
</tr>
<tr>
<td>17.00%</td>
<td>$881,188</td>
</tr>
</tbody>
</table>

#### TOTAL COSTS

#### TABLE 6.11: SCENARIO 2- TOTAL COSTS SENSITIVITY ANALYSIS

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>Change in Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-20%</td>
</tr>
<tr>
<td>13.00%</td>
<td>$1,750,318</td>
</tr>
<tr>
<td>14.00%</td>
<td>$1,552,997</td>
</tr>
<tr>
<td>15.00%</td>
<td>$1,380,717</td>
</tr>
<tr>
<td>16.00%</td>
<td>$1,229,546</td>
</tr>
<tr>
<td>17.00%</td>
<td>$1,096,264</td>
</tr>
</tbody>
</table>

### 6.4.3 SCENARIO 2 SUMMARY

For majority of the parameters and the sensitivities under the assumptions and conditions of Scenario 2 have returned with a negative NPV. With a base case NPV of -$0.52M using a discount rate of 15%, the range of values for the sensitivity ranges from -$2.63M to $1.38M.

The sensitivities accurately reflect a contractor based model which has a decrease in Capital Costs due to the lack of equipment purchase required but is offset by higher Operating Costs. Sensitivities completed on the Production and Capital Costs produced no positive NPV Values for the range of discount rates, meaning that each of these parameters have less of an effect on the project.

A decrease in the Operating Costs and Total Costs show a positive NPV’s for a range of discount rates. Utilising the base case discount rate of 15% a positive NPV was calculated with a 10% discount in Total Costs. Additionally when the Product Pricing was increased by 10%, positive NPV’s were calculated for the range of discount rates.

Analysing Scenario 2 without completing Discount Cash Flow (DCF) Analysis it was projected that the project would receive $67.57 M in revenues at a total cost of $60.64 M with an after tax profit of $2.59M over the 30 year cash flow projection. From these inputs it is estimated that it would take 13.77 years for the project to payback the initial investment, with a total return of 4.27% on investment over the 30 years (0.14% pa).

It should be noted that Scenario 1 and 2 have similar NPVs, but have significantly different profit after tax and payback periods. The reason is that these financial indicators do not take into consideration the risk of the project and the time-value depreciation of money. A large amount of operational and financial risk is mitigated through the use of a contractor at a higher operational cost, hence the longer Payback Period and lower profitability.
6.5 SCENARIO 3 – DIMENSION STONE AND BY-PRODUCT SALE OWNER OPERATOR

6.5.1 ASSUMPTIONS

Scenario 3 is based on the implementing an owner operator model to undertake all site establishment, extraction with an appropriate haulage contractor appointed loading and transportation of dimension stone to market. The following assumptions were made to complete the Financial Analysis for Scenario 3:

- Cherrabah Granite Mine is owner operated by a Quarry Manager/Operator and a Plant Operator.
- Transport and Loading to the Port of Brisbane for export to the Chinese Market is undertaken by a haulage contractor.
- Crushing and Screening is contracted out for Bulk and Decorative Aggregates using current industry rates. This will be conducted on a campaign basis.
- Base Production Rate.
  - 7,500 tonnes per annum (t/a) export dimension stone, ramping up from Year 1 - 1,500 t/a, Year 2 - 2,500 t/a, Year 3 - 5,000 t/a, Year 7 - 5,625 t/a, Year 12 - 6,250 t/a, Year 17 - 6,800 t/a, Year 22 onwards 7,500 t/a.
  - 1,500 tonnes per annum (t/a) Australian dimension stone, ramping up from Year 1 - 250 t/a, Year 2 - 500 t/a, Year 3 - 1,000 t/a, Year 7 - 1,125 t/a, Year 12 - 1,250 t/a, Year 17 - 1,350 t/a, Year 22 onwards 1,500 t/a.
  - 19,500 tonnes per annum (t/a) bulk aggregates, ramping up from Year 1 - 3,250 t/a, Year 2 - 6,500 t/a, Year 3 - 13,000 t/a, Year 7 - 14,625 t/a, Year 12 - 16,250 t/a, Year 17 - 17,875 t/a, Year 22 onwards 19,500 t/a.
  - 1,500 tonnes per annum (t/a) decorative aggregates, ramping up from Year 1 - 250 t/a, Year 500 t/a, Year 3 - 1,000 t/a, Year 7 - 1,125 t/a, Year 12 - 1,250 t/a, Year 17 - 1,350 t/a, Year 22 onwards 1,500 t/a.
- 30-Year Production Life.
- Saleable Material Recovery Rate: 30%
- No drilling and blasting
- Royalty fees: $1 for each tonne of dimension stone.
- Sale Prices
  - Export Dimension Stone - $300/t
  - Australian Dimension Stone - $220/t
  - Bulk Aggregates (including gabion rock, rip-rap rock) - $23/t
  - Decorative Aggregates - $100/t

A more detailed list of start-up costs for Scenario 3 can be found in APPENDIX 7.

It is proposed that Operational Works and Construction commences in the 2017/2018 Financial Year.

It should be noted that all inputs are specific to Scenario 3 in January 2017.
6.5.2 NET PRESENT VALUE

Using a discounted cash flow model in January 2017, Ausrocks estimated the Net Present Value (NPV) of the project (Attachment X) with approvals in place, established markets with annual sales peaking at 30,000t/a is estimated $0.12M after tax, with the following projected:

- Average 30 Year Operating cost of $ 88.90/t
- Average 30 Year Product price ex-bin: $106.00/t
- Significant CAPEX in:
  - Year 1 $1,660,000
  - Year 8: $495,000
  - Year 11: $300,000
  - Year 15: $495,000
  - Year 21: $320,000
  - Year 22: $495,000
  - Year 29: $515,000
- Estimated Total Investment Required over 30 Years: $67.76 M
- Estimated Total Revenue Over 30 Years: $82.82M
- Estimated Total Profit/Loss Over 30 Years: $10.16 M
- Payback Period: 6.93

The discount rate is estimated as follows:

- Interest based on 10 Year Bonds. Currently 2.69%. **Use 3%**.
- Political Risk. (takes into account Government Policy, Native title, competing land use issues, project location):
  - Low political risk: 2-3%.
  - Medium to high political risk: 4-5%
  - Extremely high political risk: 6-10%

**A political risk of 6% is recommended.**

- Project Risk (takes into account complexity of extraction of material, operator competency, material quality, market competition):
  - Very Low to Low project risk: 2-3%.
  - Medium to High project risk: 4-5%.
  - High to Very High project risk: 6-10%.

From the SWOT analysis it has been concluded that the project will be considered **high risk 7%**. The minimum discount rate is estimated at 16% based on the above assumptions.
6.5.3 SENSITIVITY ANALYSIS

Sensitivity Analysis was conducted, by varying the different input parameters in the financial model. This is to test the profitability of the project due to changes in the market condition. Each of the key parameters such as the Production Rate, Pricing, Fixed Cost, Variable Cost and Total Cost are increased/decreased to determine the project NPV.

PRODUCTION

**TABLE 6.12: SCENARIO 3- PRODUCTION SENSITIVITY ANALYSIS**

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>Change in Production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-20%</td>
</tr>
<tr>
<td>14.00%</td>
<td>-$802,329</td>
</tr>
<tr>
<td>15.00%</td>
<td>-$860,632</td>
</tr>
<tr>
<td>16.00%</td>
<td>-$910,036</td>
</tr>
<tr>
<td>17.00%</td>
<td>-$951,987</td>
</tr>
<tr>
<td>18.00%</td>
<td>-$987,665</td>
</tr>
</tbody>
</table>

PRODUCT PRICING

**TABLE 6.13: SCENARIO 3- PRODUCT PRICING SENSITIVITY ANALYSIS**

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>Change in Product Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-20%</td>
</tr>
<tr>
<td>14.00%</td>
<td>-$1,932,113</td>
</tr>
<tr>
<td>15.00%</td>
<td>-$1,905,695</td>
</tr>
<tr>
<td>16.00%</td>
<td>-$1,880,293</td>
</tr>
<tr>
<td>17.00%</td>
<td>-$1,855,876</td>
</tr>
<tr>
<td>18.00%</td>
<td>-$1,832,402</td>
</tr>
</tbody>
</table>

FIXED COSTS

**TABLE 6.14: SCENARIO 3- FIXED COST SENSITIVITY ANALYSIS**

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>Change in Capital Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-20%</td>
</tr>
<tr>
<td>14.00%</td>
<td>$781,907</td>
</tr>
<tr>
<td>15.00%</td>
<td>$622,625</td>
</tr>
<tr>
<td>16.00%</td>
<td>$483,985</td>
</tr>
<tr>
<td>17.00%</td>
<td>$362,773</td>
</tr>
<tr>
<td>18.00%</td>
<td>$256,351</td>
</tr>
</tbody>
</table>
### VARIABLE COSTS

#### TABLE 6.15: SCENARIO 3 – VARIABLE COST SENSITIVITY ANALYSIS

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>Change in Operating Costs</th>
<th>Project Value (AFTER TAX)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-20%</td>
<td>-10%</td>
</tr>
<tr>
<td>14.00%</td>
<td>$2,400,952</td>
<td>$1,552,491</td>
</tr>
<tr>
<td>15.00%</td>
<td>$2,118,915</td>
<td>$1,331,397</td>
</tr>
<tr>
<td>16.00%</td>
<td>$1,871,597</td>
<td>$1,137,754</td>
</tr>
<tr>
<td>17.00%</td>
<td>$1,653,682</td>
<td>$967,351</td>
</tr>
<tr>
<td>18.00%</td>
<td>$1,460,795</td>
<td>$816,727</td>
</tr>
</tbody>
</table>

#### TOTAL COSTS

#### TABLE 6.16: SCENARIO 3 – TOTAL COST SENSITIVITY ANALYSIS

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>Change in Total Costs</th>
<th>Project Value (AFTER TAX)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-20%</td>
<td>-10%</td>
</tr>
<tr>
<td>14.00%</td>
<td>$2,712,988</td>
<td>$1,712,126</td>
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<tr>
<td>15.00%</td>
<td>$2,424,110</td>
<td>$1,487,704</td>
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<tr>
<td>16.00%</td>
<td>$2,170,624</td>
<td>$1,291,056</td>
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<tr>
<td>17.00%</td>
<td>$1,947,119</td>
<td>$1,117,926</td>
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<tr>
<td>18.00%</td>
<td>$1,749,139</td>
<td>$964,813</td>
</tr>
</tbody>
</table>

#### 6.5.4 SCENARIO 3 SUMMARY

The sensitivity analysis produced a large range of both positive and negative values for each of the parameters. With a base case NPV of $0.12M using a discount rate of 16%, the range of values for the sensitivity ranges from -$1.88M to $2.25M.

The increase in the NPV from the previous Scenarios is due to selling Quarry Products that are produced from dimension stone off-cut material. As the base case for Scenario 3 already has a positive NPV, any favourable changes in sensitivity have resulted in higher positive values. As with the other scenarios the product pricing, operating costs and subsequent total costs are the most volatile parameters. Small increases in either of these aforementioned inputs can result in a significant upside. An increase to product price by just 10% increases the NPV of the project by approximately $1.2 M and with a decrease in operating costs yielding an increase in the NPV of approximately $1M. A product price increase of 20% is unlikely, however if CGM establishes itself in the Granite Dimension Stone market increase production by 10% is possible which has a large upside (NPV $1.29M-$0.91M).

Decreasing the Operating and Total Costs is difficult due to a large amount of the production costs being transportation of product to the market. Once the business is established there may be an opportunity to establish a haulage company to reduce freight costs to the port however contract rates are extremely competitive in this market and this offers small upside.

Analysing Scenario 3 without completing Discount Cash Flow (DCF) Analysis it was projected that the project would receive $82.82 M in revenues at a total cost of $67.76 M with an after tax profit of $10.16M over the 30 year cash flow projection. From these inputs it is estimated that it would take 13.77 years for the project to payback the initial investment, with a total return of 15.00% on investment over the 30 years (0.5% pa).
CONCLUSIONS

The Pre-Feasibility Study for Cherrabah Granite Project has made a number of assumptions to draw conclusions regarding the overall viability of the project. The scope of works with the feasibility was to analyse the Mining Method, Basic Resource Assessment, Marketing Assessment, Projected Cashflow and Net Present Value Analysis to produce bulk dimension stone and/or quarry material from the site.

From the various Mining Methods assessed the most appropriate to this particular material with the information provided was using a combination of Drilling and Diamond Wire Saws. Due to the hardness in granites this is often the preferred method, with a low Capital Cost required and maximum resource recovery. The only downside to this method is the Operating Costs of replacing the Diamond Wire which wears faster on hard granites than softer materials.

The preliminary resource assessment focussed on the previously drilled northern area of flat rock. From this estimate it was determined that there is an Indicated Resource of approx. 180,000 cubic metres. This was based on a Surpac surface to surface volume estimate. This volume is considered sufficient for a medium scale dimension stone operation.

The marketing assessment showed that the price of Cherrabah Granite would be approximately $300 AUD per tonne in the Chinese export market. The marketing report provides a background for the assumed production rates. A total of three NPV Scenarios were analysed as follows:

- **Scenario 1:** Operation of Cherrabah Granite Mine selling Dimension Stone using an owner operator model. With a base case NPV of -$0.55M using a discount rate of 16%, the range of values for the sensitivity ranges from -$2.41M to $1.32M.
- **Scenario 2:** Operation of Cherrabah Granite Mine selling Dimension Stone using a contractor model. With a base case NPV of -$0.52M using a discount rate of 15%, the range of values for the sensitivity ranges from -$2.63M to $1.38M.
- **Scenario 3:** Operation of Cherrabah Granite selling Dimensions Stone and associated extractive industry by-products using an owner-operator model. With a base case NPV of $0.12M using a discount rate of 16%, the range of values for the sensitivity ranges from -$1.88M to $2.25M.

From the Financial Analysis the most feasible operation of Cherrabah Mine was using the Scenario 3 assumptions. This Scenario includes applying for an Extractive Industries permit once the Mining Lease has been granted to produce Quarry Materials such as Aggregates and Roadbases using a campaign method whereby contract machinery is brought on site once or twice a year. Quarry Materials are produced using the offcuts from the dimension stone production to provide an additional revenue stream and hence increase the project viability. This reduces the cost of rehabilitation of the site.
From the conclusions that have been drawn from the Pre-Feasibility report there are a number of recommendations that Ausrocks can make as an external third party consultant. The results show that at a Pre-Feasibility stage that the Cherrabah Granite Mine Project can be feasible and profitable under a certain set of circumstances. In all cases the major product is bulk dimension stone (generally in 10t-12t blocks) which has a significant “value add” potential, particularly when processed into blocks, tiles, benchtops and architectural forms. Typical values for these products are in excess of $A4,000/t.

A significant discount rate was used when completing Cash flow Forecasts and NPV calculations to account for the large amount of risk. To decrease the risk of the project the following recommendations are made:

- **Sales Contracts**: Discussions with prospective clients will enable CGM to gain a real product value for the Cherrabah export dimension stone. The Pre-Feasibility study has used an assumed market value based off of current material rates with a sales contract increasing the certainty in the product price. This should be completed for both Export and Australian Dimension Stone.

- **Geological Exploration**: There is a large degree of geological uncertainty in the southern area of the proposed lease area. It is recommended that one long drill hole (60m – 80m) be geologically logged in this area to ensure continuity in the resource throughout the lease, following the approval of the Mining Lease.

- **Operating Costs**: Confirm with contractors and equipment suppliers of appropriate costing prior to commencement. This adds updated real data to the Financial Analysis. This includes costs for port haulage and site extraction. Obtain contractor quotes for site establishment and processing area establishment once Mining Lease is approved. This will ensure estimates completed are to a higher degree of accuracy.

- **Staffing**: Appointment of General Manager with experience in Granite Dimension Stone Mining.

From the Financial Analysis, it is clear that the project has increased profitability with the application of an Extractive Industry permit and operating the site as a joint mine/quarry. Although some of this has been covered with the work completed with the Mining Lease application there would be an additional application required to be submitted to the SDRC and possibly additional traffic or environmental studies.

Should Cherrabah Granite Mine Project advance further, inputs from these recommendations would form key inputs into a full project feasibility and increase the Financial Analysis and Cashflow projection significantly. Apart from the negotiation of Sales Contracts, each of these additional recommendations should be undertaken subject to the approval of the Mining Lease Application.

This Pre-Feasibility report has been compiled on assumptions from the experience of the Ausrocks employees and research that has been commissioned as part of this report. Data and assumptions are valid as at January 2017 and are subject to change in the future.
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