

# MINING PLAN

(Under Rule 16 of Granite Conservation and Development Rules 1999)

## GUDEM COLOUR GRANITE QUARRY

(3.0 Ha.)

S.NO. 171 OF GUDEM VILLAGE,  
TEKKALI MANDAL, SRIKAKULAM DIST.

OF

M/s.SOUTHERN ROCKS & MINERALS (P) LTD  
ONGOLE



Dr. G. Prabhakar

Recognised Geologist

D.M.G.Reg.No.RQP/DMG/HYD/058/2002

I.B.M. Reg.No. RQP/IBM/HYD/226/2003/A

Flat No.104, Prime Castle Apaartment,

Opp: St.Joseph Public School, Gate No.3,

Ravindra Nagar, Habsiguda,

Hyderabad.

APPROVED

**CERTIFICATE**

This is to certify that the Mining Plan in respect of our Q.L. area for Colour Granite situated in Survey No. 171 of Gudem village, Tekkali Mandal, Srikakulam District, over an extent of 3.0 Ha. Has been duly prepared by Dr. G. Prabhakar RQP/DMG/HYD/056/2002 and we agree to follow the same in accordance to the Provision of Law.

Date : 25-8-2004

Applicant

Ch. Rama Rao  
G.P.A. Holder

Place : Hyderabad

for M/s. SOUTHERN ROCKS & MINERALS (P) LTD.



## CERTIFICATE

The provisions of Granite Conservation and Development Rules, 1999 have been observed in the mining plan of Gudem Village Colour Granite Quarry over an extent of 3.0Ha. In Survey No. 171 of Gudem Village, Tekkali Mandal, Srikakulam District of Andhra Pradesh State leased to M/s. Southern Rocks & Minerals (P) Ltd., and whenever specific permissions are required the applicant will approach the concerned authorities.

Date :

Place :

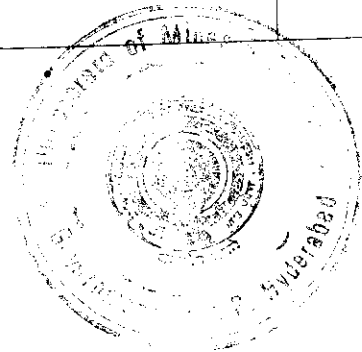


Dr.G.Prabhakar.  
RQP/IBM/HYD/226/2003/A



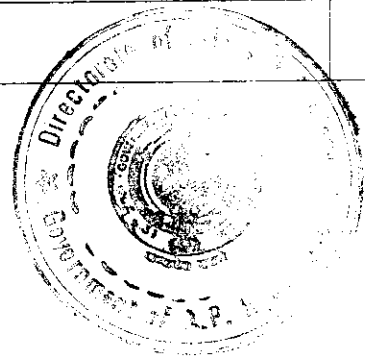
## LIST OF CONTENTS

CHAPTER NO.	CONTENTS	PAGE NO.
I	GENERAL	
II	LOCATION AND ACCESSIBILITY	
III	GEOLOGY AND RESERVES	
IV	EXPLORATION	
V	RESERVES	
VI	MINING	
VII	SCHEME OF WASTE MANAGEMENT PLAN	
VIII	ENVIRONMENT MANAGEMENT PLAN	
IX	ANY OTHER INFORMATION	



## LIST OF PLATES

SL. NO.	PLATES	PLATE NO.
1	LOCATION PLAN	1
2	LEASE SKETCH	2
3	SURFACE GEOLOGICAL PLAN	3
4	GEOLOGICAL SECTIONS	3A
5	DEVELOPMENT AND PRODUCTION PLAN FOR I -- V YEARS	4
6	DEVELOPMENT AND PRODUCTION SECTIONS	4A
7	ENVIRONMENT PLAN	5



LIST OF ANNEXURES

SL. NO.	ANNEXURE	ANNEXURE NO.
1	CATEGORY WISE COLOUR GRANITE RESERVES	I
2	MINEABLE RESERVES AND WASTE CALCULATION	II
3	YEAR WISE DEVELOPMENT AND PRODUCTION CALCULATION FOR FIVE YEARS	III
4	NOTICE FROM DMG., HYD.	IV



**MINING PLAN OF GUEDEM COLOUR GRANITE QUARRY  
(3.0 HECTORS)  
OF M/s. SOUTHERN ROCKS & MINERALS (P) LTD.**

**INTRODUCTION:**

This mining plan encompasses scientific and systematic assessment of the Colour Granite deposit and includes details of conservation of the deposit and the protection of environment in and around the mining area, M/s. Southern Rocks & Minerals (P) Ltd., is a granite company from Ongole, A.P. M/s. Southern Rocks & Minerals (P) Ltd., has applied Q.L for Colour Granite occurring at Sy.No. 171 of Gudem Village, Tekkali Mandal, Srikakulam District over an extent of 3.0 Hect..

The Director of Mines & Geology granted Q.L. for Colour Granite over an extent of 3.0 Hect., in Sy. No. 171/1 of Gudem (V), Tekkali, (M), Srikakulam Dist. In favour of M/s. Southern Rocks & Minerals Pvt. Ltd., vide proceedings No. 39626/R1-3/2003, dt. 28-01-2004 for a period of 20 years (upto 23-03-2024).

The Q.L. orders were executed Vide Proceedings No.1976/Q/2003 on 25-03-2004 respectively before the ADMG, Tekkali. Since then the quarry operations were under taken in these prospects.

The applicant is submitting Mining plan for approval under rule 16 of GCDR, 1999 since it is a direct Q.L. The present mining plan is prepared strictly adhering to the guidelines laid down by the DMG.

This Mining Plan is Approved subject to the  
Conditions/Stipulations Indicated in the

Mining Plan Approval Letter No .....

14761/MP-1/2004....., dated 28-08-2004



**APPROVED**

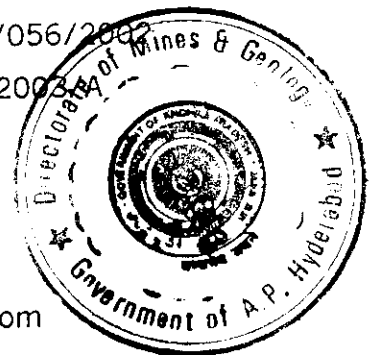
*Dr. P. Dayasankar*

**Dr. P. DAYASANKAR**  
DIRECTOR

**DEPT. OF MINES & GEOLOGY  
GOVT. OF A.P., HYDERABAD,**

1. **GENERAL:**

- a) Name of the Applicant : M/s. Southern Rocks & Minerals (P) Ltd.,  
Address : Adjacent Industrial Estate ,  
Kurnool Road,  
Ongole – 523 002.  
  
Phone No. :
- b) Status of the Applicant : Managing Director
- c) Granite Type / Colour : Colour Granite
- d) Period of Quarry Lease  
Granted : 20 years
- e) Name of the RQP : Dr. G. Prabhakar  
Address : Flat No.104, Prime Castle,  
Opp: St.Joseph Public School, Gate No.3,  
Ravindra Nagar,  
Habsiguda, Ramanthapur,  
Hyderabad.
- RQP Registration  
Number : RQP/DMG/HYD/056/2002  
RQP/HYD/226/2003
- Tele Phone No./Fax No. : 9440549259
- E-mail. : dgp@indiainfo.com





## LOCATION AND ACCESSIBILITY:

a) Location Map: Location map enclosed vide plate no.1

b) Details of Area :

Toposheet No. 74B/2 (scale 1:250000), Longitude: 84° 44' 20"  
Latitude: 18° 34' 30"

Sl No	District	Mandal	Sl. No. & Village	Lease Area in Ha.	Type of Land				ADM&G Surveyed Map	Remarks
					GL	PL	FL	TL		
1	Srikakulam	Tekkali	171	3.0 Ha	3.0 Ha	-	-	-	Lease sketch duly signed by ADMG enclosed vide Plate No. 2	Govt. land

## INFRASTRUCTURE:

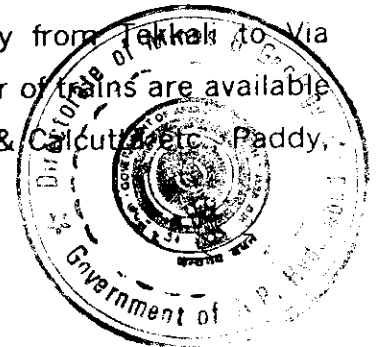
(Forest, Agriculture, Grazing, Barren)

Availability of Electricity, Postal, School, Market Facility.

The Quarry Lease area is located at a distance of about 2.0 Km from Gudem Village to its South Western side. The Q.L area is connected by and B.T road with internal earthen road. The Q.L area is at a distance of 5 Km from the Tekkali Mandal, 58 Kms from Srikakulam town. The nearest Railway Station is Srikakulam at a distance of 58 Km from the Q.L. Area. The detailed location plan is given at Plate No.1.

Electricity and telecommunication facilities are available at Gudem Village. The main source of water in the area is open wells and bore wells. An Elementary School up to 5<sup>th</sup> standard is available at Gudedm Village. Postal, Educational and medical facilities are available at Tekkali and Srikakulam towns. The telegraphic facility is also available at Tekkali & Srikakulam.

Regarding transport a number of APSRTC buses ply from Tekkali to Gudem. The nearest rail head is at Srikakulam where number of trains are available to reach Hyderabad, New-Delhi, Vijayawada, Vishakapatnam & Calicut etc. Paddy, Cotton, Chilli are the major crops grown in the lands.



**The lease land is bound by the following boundaries:**

**North :-** The land part of S.No. 171

**South :-** The land part of S.No.53, Q.L. granted in favour of

M/s.Southern Rocks and Minerals (P) Limited

**East :-** The land of S.No. 171

**West :-** The land Part of S.No. 171

## **II. GEOLOGY AND RESERVES:**

### **a) Brief Description of Topography:**

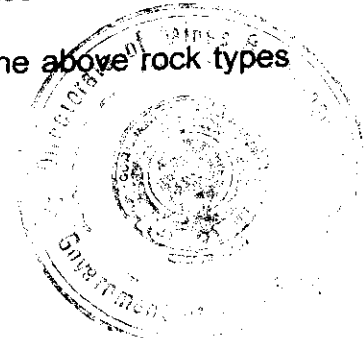
The Q.L. area is an undulating terrain interspersed with a number of hills and hillocks which are mostly covered by rock boulders. These boulders are of irregular shapes and vary widely in sizes and shapes. The hill feature is a result of weathering and denudation and raise in height from the general ground level is about 60mts. The area thus presents a rugged topography.

The vegetation seen at Q.L. area comprises of Shrubs on hill rock.

The general Soil cover in the area comprises of brown clayey type with Kankary encnstations. The Q.L. area is devoid of any forest or tree cover and the only vegetation seen comprises of shrubs. There are no agricultural lands on the applied are. The surrounding lands has been converted to form lands and are owned by local residents.

### **Regional Geological Setup:**

The mine property forms a part of the Eastern Ghats Mobile Belt and is occupied by the Khondalite and charnockite suite of rocks and garnet – ferrous gnessic granites of Archean age. These rocks have been subjected to poly phase deformation with attendant granulate facies metamorphism and migmatiation. The above rock types are capped by laterite over large areas.





Stratigraphic sequences established in the area as follows:

**Cenozoic**

**Laterite**

**Pan African 1000Ma**

**Pegmatite & quartz vein charnokite formed due to charnokitisation processes.**

**Early to Middle proterozoic**

**Younger  
Intrusives**

**Gabbro  
Leptynite  
Porphyritic  
Garnatirous**

**Migmatite  
group**

**Garnite, Rapakivi granite  
Migmatite after charnockite  
Migamtic after khondalite**

-----Unconformity-----

**Archean**

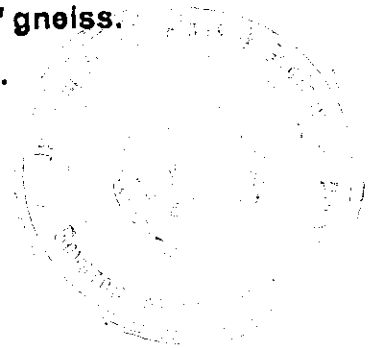
**Charnockite  
Group**

**i. Medium grained, greasy,  
grey acid to intermediate  
charnockites and  
charnokite gneiss**

**Khondalite  
Group**

**iii. Calcgranulite, Cordierites  
silliminite,  
pyrozenegneiss, sappirine  
granulite, garnet ferrous  
quarterzled pathi silli  
manite of gneiss.**

**iv. Quartzite.**



## **SRIKAKULAM BLUE (MIGMATITE / MIGMATISED CHARNOCKITE):**

The migmatite and migmatised charnockite are the predominant rock types exposed in Srikakulam District. Srikakulam Blue Granite is extensively quarried in Narasannapeta – Polaki, are in the Kotabommali – Tekkali – Saravakota triangle. Active quarries are located around Tekkali, Ravivalasa, jarjangi, pathupuram, Kurudu, Danta, Kottapalli, Sativada, Sidhi, Botu etc. the total area of operation is about 100 Sq. Km. Spread over five blocks. Viz. Tekkali, Kotabommali, Saravakota, Narasnnapet and Bontu – Pedalamba.

Migmatite and Migmatised Charnockite mostly occurs as hill type deposit, it is quarried locally as Srikakulam Blue – Dark, Medium and light.

### **c) Local Geology:**

Migmatities and migmatised charnockites called in the trade circle as Srikakulam Blue Granite are seen in the North Eastern part of Srikakulam District. They are mostly hill type features. The hill boulders are covered by weather soil(pure waste). It is a result of weather denudation. The boulders are of irregular shape and widely in sizes . Colour Granite consists essentially of blue quartz and bluish grey to light grey feldspars and accessory amounts of mafic like, hypersthene, hornblende, biotite etc. it being basically a migmatite, displays wavy banding, pyroclastic folding of bands and conspicuous mineral lineations, which impart added beauty to the stone after cutting and polishing. Numerous quarries of Srikakulam blue granite exist at Tekkali, Pathapatnam and surrounding villages. The trend of the deposit in the E-W direction, the length of the colour granite 273m and 110 m width.

d) **Brief Description of litho units:**

**Migmatite / Migmatized Charnockite with granite gneiss as the host rock.**

i) **Petrographic Description:**

**Megascopy:**

The Quarry Lease area is a melanocratic rock, compact nature. Migmatite is of ten coarsely gneissose with some bands and patches consisting largely of quartz and hornblends and have a crystalloblastic

appearances. Migmatites thus have the aspect of being formed of a mixture of igneous and metamorphic elements. They are commonly seen in area of high-grade regional metamorphism in the export building trade industry these rocks are called "SRIKAKULAM BLUE GRANITE" it is only a trade name.

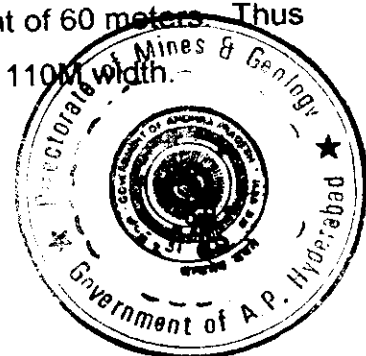
**Microscopy:**

Mineralogical composition of colour granite (migmatite charnockite) microcline, quartz, Oligoclase and hyporsthene. In addition magnetite biotite, and hornblende. Migmatite charnockite shows a typically granulitic texture. However in hand specimen a uniform medium grained is exhibited.

The lighter areas in migmatite are rich in quartz and feldspar the darker portions are richer in mafic constituents.

III. **EXPLORATION:**

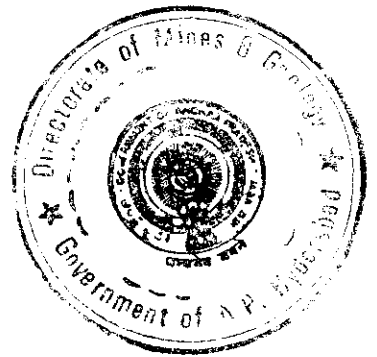
a) **Present Status:** A surface geological map with the massive body marked on it is prepared after conducting a topographical survey. Since the quarry is under exploitation the body is exposed over a height of 60 meters. Thus colour Granite is exposed over a length of 273 M and 110M width.



Pit	Length - M	Width - M	Depth - M	Lithology	Excavation in M <sup>3</sup>	Pure waste @30% - M <sup>3</sup>	Granite reserves - M <sup>3</sup>	Recovery granite - M <sup>3</sup>	Rock waste - M <sup>3</sup>	Total waste - M <sup>3</sup>
P-1	35	20	5	0.5m weathered boulders, soil and insitue boulders	3500	1050	2450	10	2440	3490
				Total	3500	1050	2450	10	2440	3490

**PROSPECTING PIT DIMENSIONS**

It will be observed from the above table that a total volume 3500M<sup>3</sup> mass was extracted out of which pure waste is 1050M<sup>3</sup>, granite reserves 2450M<sup>3</sup>, salable granite won amounted to 10M<sup>3</sup> from Granite reserves only. Since this hillock is covered by boulders the recovery has been less than 1.0% but recovery by and large, has been observed to improve as depth advances.



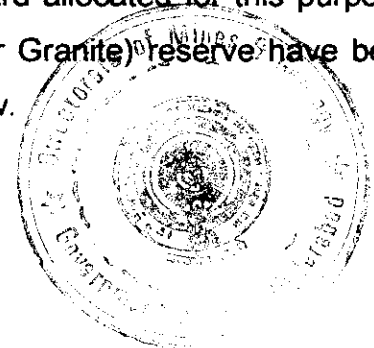
b) Future Programme: In future it is proposed to advance the North – Eastern pit towards West direction – In this quarry the colour granite is already exposed. Thus the future exploration is not required.

#### IV. RESERVES:

Balance recoverable grade reserves (supported by standard method of estimation with reference to present status of Mining):

The geological reserves have been estimated using cross sectional method. The proved / measured category are those reserves which are exposed in three dimensions by actual trial mining/exploration. The probable/indicating reserves are those which are exposed in two dimension with good level of confidence. In the present case, Migmatite deposit is exposed in its strike direction as well as across the strike. 60 Mtrs. depth is assigned for proved / measured category and depth of 15 Mtrs. below proved category is assigned for probable / indicated category. The last category i.e. possible/inferred has also been assumed as having a further depth of 15 mtrs. below the probable / indicated category.

Cross sections have been drawn along the strike length at A-A', B-B', C-C', D-D', E-E', F-F'(R.F. Plate Nos. 3&4). The cross sectional area reserves have been measured and the volume of the geological reserves arrived by multiplying the sectional area with the influence at cross section. From the experience at actual mining all the rock available does not qualify for the export. It is estimated from the past experience that only 3% of the rock excavated will result in marketable colour granite block. Therefore, the volume of rock is multiplied with a recovery factor of 3% to obtain geological reserves, the balance 97% shall account for sub or marginal grade. This can be termed as rock waste and dumped in the yard allocated for this purpose. The details of calculations for Migmatite (Colour Granite) reserve have been given vide Annexure-1 and summarised as below.





**Table-2.** Summary of category-wise geological reserve at Gudem Colour Granite Quarry lease.

Category	Geological Reserves (Cu.m.)
Proved / Measured	18358
Probable / Indicated	9536
Possible / Inferred	9536
<b>TOTAL</b>	<b>37430</b>

**Mineable Reserves and life of the Mine:**

The total quantity of mineable reserves are estimated leaving the safety slopes quantity blocks. Same is shown in Section plate No. 4A. In this way a total mineable reserves of 25135M<sup>3</sup> (Annexure II) is available at the Q.L. area. As the mine is proposed to produce 512M<sup>3</sup> (Annexure-III) in one year of operations, the life of the mine's calculated as detailed below:

$$\frac{\text{Total Minerable reserves}}{\text{Actual anticipated annual production}} = \frac{25135 \text{ M}^3}{512 \text{ m}^3}$$

$$\text{Life of the mine} = 49 \text{ Years}$$

**V. MINING**

**a) Types of Mining:-**

Opencast / Mechanised / Semi Mechanised / Manual

➤ Opencast semimechanised

To cut down cost and for achieving targeted production of granite, the operations are planned to be carried out partly manually and partly by deploying in machinery listed in para. The use of various machinery listed is explained under method of working. The pocklain is to be deployed for over burden removal. The other pneumatic tools like jackhammers, etc., will be deployed for shot hole drilling and for drilling in sheet rock for taking out large blocks of granite. The jackhammers will be used in primary cutting of mother rock.

Over burden mining consist of soil, hard morum and weathered rock. The weathered rock and useless boulders can be drilled by jack hammers to fragment them into pieces to facilitate their removal. The excavator will load the waste into the tipper and then transported to the dump yard.

After removed of O.B. workable boulders of medium and small size are exposed. These boulders are split into two or three pieces, so that blocks can be made out of them. Usually the advantages of natural joint present in the boulders is taken for splitting them a line of drill holes are drilled and split it with the help feathers and wedges. Feather and wedges are placed I series of holes drilled for splitting the boulder.

The separated pieces are examined for defects and lines, then the block or blocks are marked in clear area and holes are drilled along the line of marking, with the help of feathers and wedges the waste portions are separated forming a rectangular blocks. A perfect block is that all sides shall make with each other 90 degrees.

**a) Briefly describe the existing method of working involved in**

➤ The following operations are being conducted

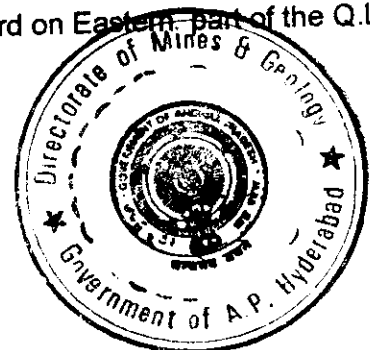
Drilling	-	Hand held jackhammers
Blasting	--	Occasionally using gunpowder
Loading	-	Use of hydraulic excavators are made
Hauling	-	By using tippers

- Attach Photos of present Scenario

Two photographs has been taken top depict natural extent of exploratory faces developed are enclosed as Fig.3 & 4.

- Removal/Excavation of O.B. and other quarry waste:

➤ The O.B. consist of soil and weathered black granite boulders of various sizes. They shall be loaded into tippers by using excavators. The waste is then hauled to the predesigned dump yard on Eastern part of the Q.L. area.



- Separation of Primary Blocks from Mother Rock
- After removal of the overburden the insitue boulders are exposed. Then either naturally occurring vertical / inclined joint plane i.e., attempted to develop a working face. After exposing the working face the rock splitting is effected by using jack Hammers operated by compressed air for putting line-holes for wedging. Alternatively, the rock splitting also can be effected by natural joints (both epi and syngenetic) joints are also helpful in primary rock separation from the mother rock. Separation of primary blocks from mother rock and obtained the block size 300x200x150cm to 320 x 200 x200 cms

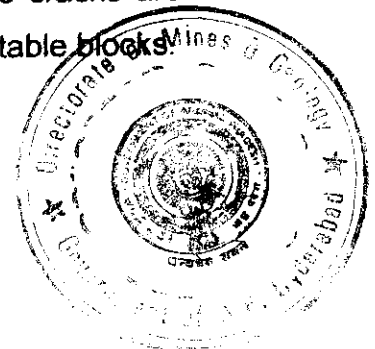
#### **Sub-division of large primary blocks in to secondary block**

After primary separation the rock mass will be carefully examined to avoid hair-line rocks, mineral seggnegations and veinsetc; the dressing of the rough blocks will be made by clipping the edges and geometrically equaling the edges of the block at the dressing yard. The rough blocks obtained after primary cut need to be dressed for obtaining good geometric shape. from one primary block two numbers of secondary blocks can be made dimensional shape of 1.0 to 3.0 M<sup>3</sup> in size, and the same measurements are 180x 100 x60 to 200x150x100.

#### **Machinery deployed:**

1) Poclains	1-No.
2) Tippers-	2-No`s.
3) Compressors-	4-No`s
4) Jack-Hammers	12-No`s
5) Generator	1-No

- Production of Commercial Block
- The main idea is to bring the block to proper dimension after chipping the rough corners. It is done manually using hand held wedges. Flaws like black lines, fractures and penetrative cracks are taken care of at this stage of forming commercially marketable blocks



Details of Production so far mined from beginning of quarry:

Year	Production Cu.m	Dispatches Cu.m	Size-wise recovery % Different commercial blocks
March-April-2004	10	5-0	180 x100 x60cms to 200 x150 x100 cms

1) Mining Program for first five years:

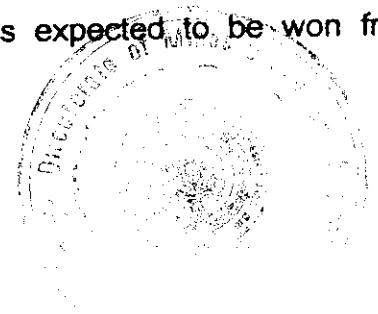
The Scheme of development and production for the first five years has been planned taking into consideration the development of the quarry is confined between 100-140sRL's enclosed five years working plan this area is demarked (Refer plate No. 4)

a) Year wise Development:

As a first step towards regular production schedule. The weathered rock boulders will be scrapped and removed. In this manner the insitue boulders are exposed. It is envisaged to produce 512M<sup>3</sup> of salable granite each year and to raise. This volume of rock, 24360M<sup>3</sup> of total rock & soil mass has to mined. Projections are made for a five year period and the year wise figure and the quarry development schedule is detailed below. The year wise productions in shown in Annexure – III and development details are shown in plate No. 4.

**1<sup>st</sup> year:** The quarry face will extend, to Western side it falls under X-Y' section, bench level 114-100m, sectional area 108 sq.m, Sectional influence 100. The bench will be developed as described earlier and the anticipated quantity 10800M<sup>3</sup> of rock and soil mass will be extracted, ( pure waste 3240 M<sup>3</sup> and granite reserves 7560 M<sup>3</sup> )with 3% recovery 227M<sup>3</sup> of salable granite be recovered from granite reserves .

**2<sup>nd</sup> year:** The second year development will be between 120-100 bench level west side section X-Y' sectional area 170, sectional influence 100 in by this way, a total of 17000M<sup>3</sup> of rock and soil mass will be extracted (pure waste 5100 M<sup>3</sup> and granite reserves 11900) In this manner 357M<sup>3</sup> of salable granite is expected to be won from Granite reserves.



**3<sup>rd</sup> year:** The third year development will be between 127-100 bench level towards West, section X-Y' sectional area 250 sq.m sectional influence 100m, the total quantity of rock mass 25000M<sup>3</sup> (Pure waste 7500 M<sup>3</sup> and granite reserves 17500 M<sup>3</sup> )Will be extracted 3% recovery 525M<sup>3</sup> of salable granite be recovered from granite reserves

**4<sup>th</sup> year:** The fourth year development will be between 134-100 bench level towards west, comes under section X-Y', sectional area 300 sq.m, sectional influence 100m during 4<sup>th</sup> year 30000M<sup>3</sup> rock mass will be extracted(pure waste 9000 M<sup>3</sup> and granite reserves 21000 M<sup>3</sup>) anticipated recovery 3% of 630M<sup>3</sup> salable granite be recovered granite reserves

**5<sup>th</sup> year:** A bench will be formed between 140-100 section. Comes and X-Y' bench level, its sectional influence 100m, sectional area 390sq.m. The total excavated rock mass 39000M<sup>3</sup> (pure waste 11700 and granite reserves 27300 M<sup>3</sup>)in this anticipated salable granite rock of 3% of 819M<sup>3</sup>.

This summarize it maybe stated that during the first five years of operations a total quantity of 2558M<sup>3</sup> at salable granite is expected be recovered from the mines (Annexure-III).

➤ Details of given vide Annexure-III and summarised as below:

Year	Total waste Cu.m	Production Cu.m
2004-05	10573	227
2005-06	16643	357
2006-07	24475	525
2007-08	29370	630
2008-09	38181	819
<b>TOTAL</b>	<b>119242</b>	<b>2558</b>

b) Quantum of Excavation (OB& Granite):

- The total overburden/intercalated waste and Granites blocks of 121800cu.m shall be handled during the present plan period.

c) Production Schedule:

- During the first five years plan period, it is planned to produce granite blocks @ 512 cu.m per annum.

d) Maganize, Type and Capacity:

- No maganize has been established.

e) Description of Processing Plant if any:

- No Processing plant has been established.

f) Marketing Analysis:

Sri.P.Rama Rao has developed a very strong net-work of operating quarries---and established wide contacts with marketing agency both in India and outside.

The applicant is well equipped by efficient executives and technocrats with up to date knowledge on quarrying technology, advances in processing techniques, marketing strategies and financial management.

Sri.P.Rama Rao has well-established contact with the buyers from Chennai, Bangalore, New Delhi, Hyderabad and Rajasthan. The sale of the granites at the international marketing is different from the marketing of other products. Applicant has plans to enter international market in a big way by purchasing sophisticated equipment for quarrying and processing.



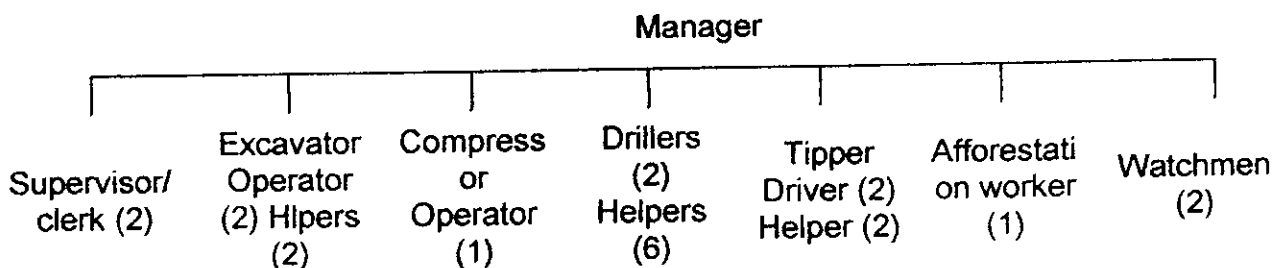
**Following factors govern the marketing: -**

- i) In view of demand in the international / domestic market the block produced @ 512M<sup>3</sup> / annum will not have any problem in marketing. Depending on the demand, the applicant can indigenously process in his or her own processing units.
- ii) The lessee is well organised and well equipped earned the reputation for maintaining schedules of supply.
- iii) Most of the material is exported to international market, with attractive Price, through agents.

Apart from the buyers and agents of Indian market, frequently the applicant also visit foreign countries, attending international Trade Fairs at Italy, Germany, USA, China, Japan etc. so as to directly interact with the foreign buyers to sustain the clientele and helpful in clearly comprehending the taste, standards and requirements of international market.

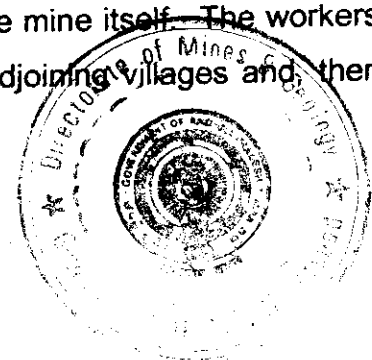
**g) Organisation Chart:**

➤ The subject lease will have the following manpower organisation.



**h) Site Services:**

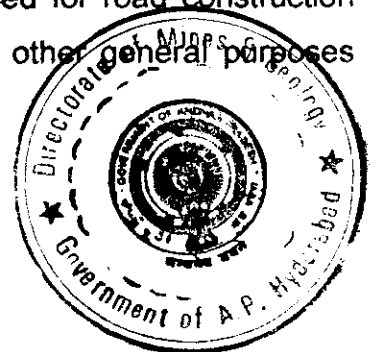
➤ Regarding site services, a mine office has been established at the mine and other statutory constructions of rest shelter, drinking water supply, and first aid facilities have been provided. Routine maintenance and minor repairs shall be undertaken at the mine itself. The workers shall be communicating for work from the adjoining villages and therefore, no colony shall be maintained.



**VI. SCHEME OF WASTE MANAGEMENT PLAN (SOLID AND LIQUID):**

a) In view of that has been stated above, a huge waste dump will be built up and is likely to attain unmanageable proportion. It is necessary to plan the dumping yard as well, it will be possible to utilize the waste material for other uses like back filling of the excavated area. For building roads, and for some other general purpose, from the partly weathered rocks, a fair amount of unweathered rock material could be salvaged for the manufacture of flooring tiles. Small ornamental and decorative pieces etc. thus market exists certainly for partial utilization of the salvaged material from the mine wastes, thus reducing the quantum of mine waste and the management is aware of this and will make all efforts for utilization of mine generated waste to the extent possible. By this way the handling at a large quantity of solid wastes is expected to be minimised.

b) Solid Wastes for First Five years: As explained in the previous para it is planned to produce and market  $512M^3$  marketable granite in one year. As recovery rate of only 3% is considered. To win possible  $512M^3$  Granite Blocks, it will be necessary to handle  $7308M^3$  soil and  $17052M^3$  rock of thus about 97% waste from rock amounting to about  $16540M^3$  waste and  $7308 M^3$  pure waste will be generated over period of one year. Such kind of waste will be dumped at the dumping yard. So in first five years the quantity of such kinds of waste will be about  $119242M^3$ . Much of the solid waste will be disposed for road construction back filling mine excavation and some other general purposes as enunciated above.





Year	Solid waste(Pure waste ) Cu.m.
2004 – 05	10573
2005 – 06	16643
2006 – 07	24475
2007 – 08	29370
2008 – 09	38181
<b>TOTAL</b>	<b>119242</b>

**Dumping site particulars:**

- The dumping site is located on the Eastern part of the QL area.

Estimated Waste Quantity that will be generated over the entire period:

- From Annexure – II, it may be generated shall be 1171744cu,m during the entire life of the mine.

Utilisation of Waste if not prevented:

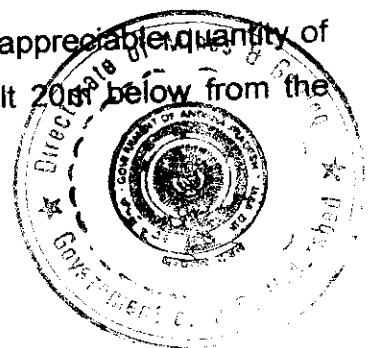
- Small sized waste shall be used as a road metal or for foundation filling etc., so that the material need not be left in the dump. Unusable material can be disposal off to local building or road metal making contractors.

- c) Estimated waste quantities that will be generated over the entire life period of 53 years.

Envisaging a production of anticipating 25135M<sup>3</sup> dimensional granite, during in the lease period of 49 years, the material to be handled for winning this quantity will be of about 119689M<sup>3</sup>. As explained in pervious para 97% of the rock handled for production is anticipated to be waste is 812677M<sup>3</sup> and 100% of the soil handled for production is to be waste i.e., 359067M<sup>3</sup>

- d) Liquid wastes:

The operation of the mine will not generate any appreciable quantity of liquid waste. The ground water table in this belt 20m below from the



surface and since the quarry depth will not react upto this depth in the near future, flooding by ground water is not anticipated. However during rainy months, there is a possibility of wet conditions developing in the working pit. This will be minimized, if not altogether eliminated, by adopting simple techniques like digging trenches all round to train off rain water and preventing surface run off from entering and flooding working pit. The mine drainage can be effectively managed and the pit kept dry to keep up the production schedule.

## VII. ENVIRONMENT MANAGEMENT PLAN:

- An environment plan is enclosed covering 500m area around the QL area vide Plate No.7.

### 1. Base Line Information:

#### a) Land use pattern:

- The lease area bearing the colour granite shall be utilised for quarrying. There are agricultural lands at a distance of 70m.

#### b) Water Region:

- Ground water is exploited more for irrigation purpose than domestic. Drinking water is drawn from open wells and tube wells.

There are no perennial sources in and around the applied area with in 500m radius. The rain water flows throught the slopes of the area and rained off through a seasonal stream water drain.

#### c) Floral and Fauna:

- The floral species in the area are of common varieties. Like neem, palm tree, tumma and bushes like tangedu, mango plantation is very common. Agricultural crops like cotton, paddy and chilies are major crops in the locality.

Domesticated animals like cows, buffaloes, sheep are common. Snakes like cobra, krait are common. Aves like eagle, common crows, sparrows, bats, pigeons are found in this area. There are no endangered or rare species in this area.

**d) Quality of ambient air, noise level and water:**

- The subject area is isolated from any habitation and other human industrial activities. As such the quality of ambient air, noise levels and water are good.

**e) Climatic Conditions:**

- The quarry lease area is situated in an arid zone, which has extreme climates. During summer season (April to June) the mercury touches 46°C. The predominant rainy months are July to Sept. experiencing South-West monsoon. The return monsoon is rather weak. The predominant wind directions are SW and NE and wind speeds reach 15 Kms/hour. The area experiences more than 10 sunshine hours per day for most part of the year.

**f. Human Settlements:**

- The applied area is surrounded by 4 villages with in the radius of 5.0 Km. The details of villages, location, distance and population is given in following table.

S.No.	Village	Direction	Distance	Population
1	Gopalapuram	West	3Kms	1000
2	Raghunadhapuram	South	5Kms	1500
3	Anianapuram	West	2Kms	1000
4.	Gudem	Noth-East	2Kms	500

**f) Public Buildings, Places of Worship and Monuments:**

- There are no public buildings, places of worship and historic monuments in the vicinity. The structures have been shown in the Environment plan vide Plate No. 7.

**g) Attach Plans showing the locations of sampling stations:**

- No sampling stations have been fixed.
- i) Does area (partly or fully) fall under notified area under water (Prevention and Control of Pollution) Act, 1974.

**(Prevention and Control of Pollution) Act, 1974**

- The area falls under notified area under Water (Prevention & Control of Pollution) Act, 1974.

## 2. Environmental Impact Assessment:

### **i) Land Degradation:**

- Quarry commences in the eastern part of the Quarry lease (i.e. Sy.No. 171) and the proposed development of quarry is E-W as shown in plate No.4. during the course of quarrying, sizing and dressing generation of waste rock is inevitable.
- Due to the proposed quarrying activity, Eastern part of the QL area shall be excavated in order to collect useful colour granite blocks.
- During the quarrying activity for first 5 years. 25 mtrs. Depth of land is to be degraded by excavating 24360M<sup>3</sup> of rock and soil for total life 49 years, 90 mtrs. Depth of land is to be degraded by excavating 1196891M<sup>3</sup> of granite. During quarrying whatever solid waste is generated shall be dumped at dumping site. The quarrying activity is an elevated hillocks, the impact of the land degradation is limited and the waste generated from the quarrying will be useful for construction activity like foundation filling, road metal, concreting metal, reverting the water reservoir bunds. Infact the quarrying activity will be contributing for developing plain land which can be used for wild plantation. Eventually, there will not be any noteworthy impact in degrading the existing scenario of the land.

### **ii) Air Quality :**

- Quarrying operations are semi mechanised to mechanised but there is involvement of labour too is not ruled out. During the course of over burden removing drilling and hauling dust is likely to be generated and also emissions of diesel vehicles such as No<sub>2</sub>, S, Co etc. Blasting of shoot holes using gun powder also adds to noxious gases. The concentrations of all these gases are within a permissible limits as laid down by CPCB.

## AIR QUALITY

	<b>Base Level</b>	<b>Permissible Level</b>
SPM=	140µg/m <sup>3</sup>	360µg/m <sup>3</sup>
RSPM=	60µg/m <sup>3</sup>	120µg/m <sup>3</sup>
SO <sub>2</sub> =	40µg/m <sup>3</sup>	80µg/m <sup>3</sup>
NO <sub>2</sub> =	40µg/m <sup>3</sup>	80µg/m <sup>3</sup>
CO =	1.0µg/m <sup>3</sup>	5.0µg/m <sup>3</sup>

### iii) Water Quality:

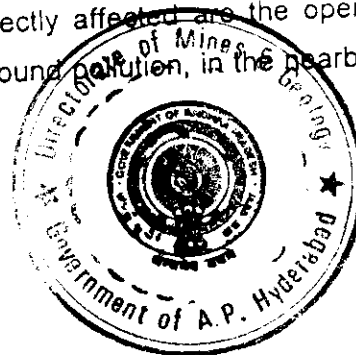
- Effect of quarrying activities on the ground water regime are meagre and deterioration of ground water quality is ruled out as quarrying operations are in a small scale. The dumping yard may contribute by way of leaches during rainy season only, but every measure will be taken to stabilise the waste dumps.

### IS 10 500 -1994

Sl.No.	Characteristic	Desirable limit	Maximum permissible limit
1	Colour	5	25
2	Order & Taste	Un objectionable	
3	Turbidity	5 NTU	10 NTU
4	pH value	6.5 to 8.5	No relaxation
5	TDS	500 mg.per ltr.	2000 mg.per ltr.
6	Total Hardness	300 mg.per ltr.	600 mg.per ltr.

### iv) Noise Levels:

- Noise levels range between 60dB to 90dB are to the use of Heavy Earth moving Machinery. No. of personnel directly affected are the operators of these machines. Otherwise, there is no sound pollution, in the nearby village where is more than 1Km. from the quarry.



Permissible noise exposure for different period of time is given below:

Duration per day (Hrs)	Sound level dBA
16	80
8	85
4	90
2	95
1	100
1/2	105
1/4	110
1/8	115

v) **Vibration Levels (due to Blasting):**

- As explained above villages are located more than 1.0 kms away. It is proposed to use gun powder occasionally. This mode of blasting does not contribute to much vibrations. Thus the impact of vibrations due to blasting because of quarrying shall be negligible.

vi) **Water Regime:**

- No effect on water regime.

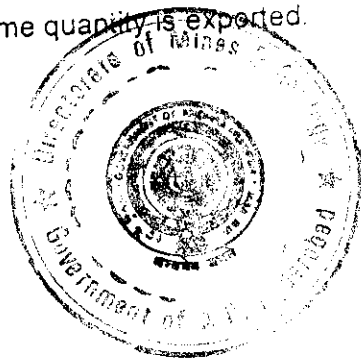
vii) **Socio-Economics:**

- The impact shall be positive 24 number of people shall be employed directly and equivalent number of persons shall be employed indirectly in transportation and other allied activities. Therefore, about 50 number of families can have sustenance.

The quarrying activity also helps in improving the quality of life by improved transport and communications and purchasing power. The State Govt. And Central Govt. Will also earn revenue, which can flow back to improve the facilities of neighboring locality. The much-needed foreign exchange is also earned as some quantity is exported.

Historical Monuments etc.,

Not applicable.



3. **Environmental Management:**

a) **Temporary storage and utilisation of top soil:**

➤ Generation of top soil is meagre, however, the top soil generation will be stacked separately for use in reclamation of mined areas at a later date.

b) **Year wise proposal for reclamation of land affected by mining activities during first years:**

➤ During first 5 years, no reclamation of the pit will be possible. However, the dumped out area can be reclaimed by planting tree saplings and bushes.

➤ Reclamation of the pit cannot be taken within 5 years. Once the depth reaches that it makes the quarrying an economic then the reclamation of pits will be taken up with prior intimation.

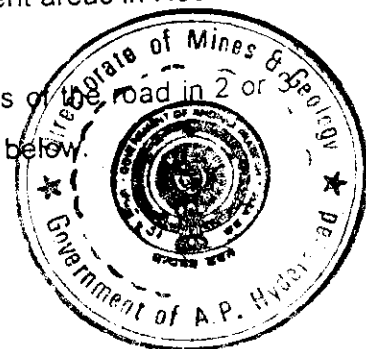
c) **In case abandoned quarries/pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilisation of such water be given:**

➤ In future once the economically viable depth is reached in a part of the area, back filling shall be adopted. Alternately, the excavated pit shall be left for water storage.

Conceptually, the worked out pit will be of the size of 0.0962 Ha with an average depth of 20m, this can hold 1.9 mcm of water, provided its gets filled. Taking only the rainfall of 1m avg., this can store 962 cu.m. of water every year. This water can be utilised for afforestation purposes.

d) **Programme of afforestation, year wise for the initial five years. Indicating number of plants with name of species to be afforested under different areas in Hectares.**

➤ It is proposed go for avenue plantation along both sides of the road in 2 or 3 rows. Every year 150 plants shall be planted as shown below.



Year	Name of Plant sps.	No. of Plants	Area Spacing	Area Covered Ha	Survival %
2004-05	Neem, Tamarind, Palm, Mango	150	3m x 3m	0.06	70
2005-06	Neem, Tamarind, Plam, Mango	150	3m x 3m	0.06	70
2006-07	Neem, Tamarind, Plam, Mango	150	3m x 3m	0.06	70
2007-08	Neem, Tamarind, Plam, Mango	150	3m x 3m	0.06	70
2008-09	Neem, Tamarind, Plam, Mango	150	3m x 3m	0.06	70
	<b>TOTAL:</b>	<b>450</b>		<b>0.3</b>	

c) Stabilisation and vegetation of dumps along with waste dump management year wise for the first five years:

➤ Waste dumps will be stabilized using top soil and planting grass / bushes to hold the dumps and to prevent erosion leaches.

f) Measures to control erosion/sedimentation of water courses:

➤ Only during monsoon season surface water is to be protected which is the precipitation water. For this steps like, garland drains, having a retention wall along the dump bottom and check dams, wherever required, shall be constructed.





g) Treatment and disposal of water from mines:

➤ Not applicable as the quality and quantity does not warrant any special measures.

h) Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity:

➤ Blasting is practiced using small dia, shot holes using gun powder, and the No. of holes blasted will be few which will not be produce any ground vibrations. However, to avert fly rock, muffle blasting will be practiced.

i) Protective measures for ground vibrations:

➤ Not applicable as explained in the para on impact assessment.

j) Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity:

➤ Not applicable as there are no historical monuments in the vicinity requiring protection. No rehabilitation is required.

k) Remedies proposed for Air quality:

➤ Thus the air pollution has an adverse effects upon the health of human beings as well as ecology. Control the air pollution concentrations with development of green belt around the lease area, offices, all along the approach and internal roads.

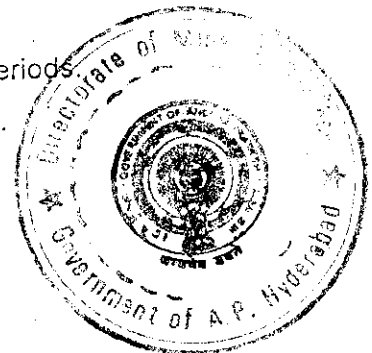
The plants are used as indicators of pollutants in air and to monitor their concentrations. Closely planted woody plants of growing along the roads help in reducing the contamination of lead from automobiles exhaust.

➤ During the drilling pollution control devices such as settling chambers, bag filters, need to be used.

➤ Roads may be frequently sprayed with water therefore polluted air will not spread and rise around the mine.

➤ Conduct blasting during less breezy periods

➤ Properly designed blasting operations.



- l) Remedies proposed for minimizing Noise levels.
  - > A machinery function will be stopped when there is no work. Much of the noise may be due to in efficiency of the machinery e.g. damaged from blades, blunt saws, worn bearing and some times loose metal sheets. These defects will be repaired, then noise level will be decreased to a great extent.
  - > The noise is an essential part of their machines used there, and a worker is continuously exposed to sound hazards for long, he may suffer from annoyance, loss of efficiency and damage to hearing. It has become necessary that employees be given ear defenders ( or ear plugs) to protect them from such losses.
  - > A lot of noise can be absorbed by planting those trees, which are capable to absorb sound.
  - > One of the easiest way to control noise and vibration from heavy vehicles by maintaining properly approach and internal roads of mine.
- m) Socio-economic benefits arising out of mining:
  - > Impact of quarrying is positive on socio-economic front. Following are the benefits:
    1. Infrastructure development.
    2. Improved employment
    3. Improved health, hygiene, education, communications for the community.
    4. Revenue for govt. and local bodies.

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**ANNEXURE - I**

**CATEGORY WISE RECOVERABLE GRANITE ( DIMENSION STONE) RESERVES  
AT GUEM VILLAGE, S.No.171 (Ext.3.0 Hect) of  
M/s.SOUTHERN ROCKS & MINERALS (P) LTD.,**

**Proved**

Section	Sectional Area mtrs.	Sectional Influence mtrs.	Total Volume - M <sup>3</sup>	Pure waste @30% in - M <sup>3</sup>	Volume of Granite Reserves M <sup>3</sup>	Volume of Reserves @3% recovery M <sup>3</sup>	Rock waste M <sup>3</sup>	Total Waste M <sup>3</sup>
A-A'	1000	50	50000	15000	35000	1050	33950	48950
B-B'	3270	50	163500	49050	114450	3433	111016	160066
C-C'	4130	50	206500	61950	144550	4336	140214	202164
D-D'	4060	50	203000	60900	142100	4263	137837	198737
E-E'	3420	50	171000	51300	119700	3591	116109	167409
F-F'	3490	23	80270	24081	56189	1685.0	54504	78585
			874270		18358			

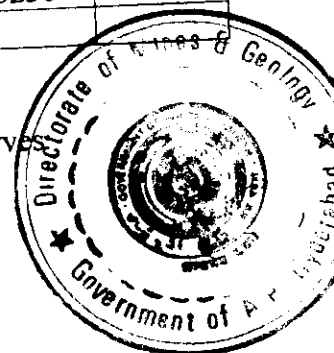
**PROBABLE**

A-A'	1770	50	88500	26550	61950	1858	60092	86642
B-B'	1680	50	84000	25200	58800	1764	57036	82236
C-C'	1560	50	78000	23400	54600	1638	52962	76362
D-D'	1680	50	84000	25200	58800	1764	57036	82236
E-E'	1620	50	81000	24300	56700	1701	54999	79299
F-F'	1680	23	38640	11592	27048	811.0	26236	37828
						9536		

**POSSIBLE**

A-A'	1770	50	88500	26550	61950	1858	60092	86642
B-B'	1680	50	84000	25200	58800	1764	57032	82236
C-C'	1560	50	78000	23400	54600	1638	52962	76362
D-D'	1680	50	84000	25200	58800	1764	57036	82236
E-E'	1620	50	81000	24300	56700	1701	54999	79299
F-F'	1680	23	38640	11592	27048	811.0	26236	37828
			874270		18358			

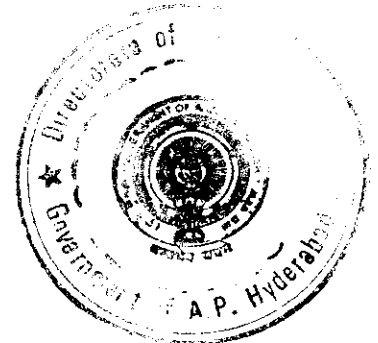
Proved + Probable + Possible = Total Recoverable Granite Reserves  
18358 + 9536 + 9536 = 37430 M<sup>3</sup>



ANNEXURE - II

**MINEABLE GRANITE (DIMENSION STONE) RESERVES AND WASTE CALCULATIONS  
AT GUEDEM VILLAGE, S.No.171(Ext.3.0 Hect) OF  
M/s.SOUTHERN ROCKS & MINERALS(P) LTD.,**

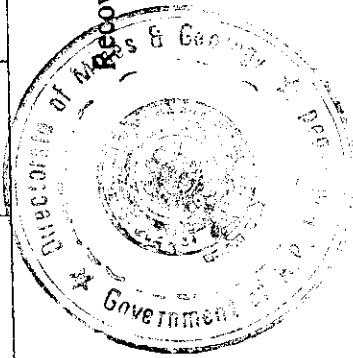
Section	Sectional area mtrs.	Sectional Influence mtrs.	Total Volume - M <sup>3</sup>	Pure waste @30% in - M <sup>3</sup>	Volume Granite Reserves - M <sup>3</sup>	Volume of Reserves @30% recovery - M <sup>3</sup>	Rock waste - M <sup>3</sup>	Total waste - M <sup>3</sup>
A-A'	3885	42.5	165112	49534	115578	3467	112110	161644
B-B'	5352	50	266250	79875	186375	5591.0	18078.4	260659
C-C'	5090	50	254500	76350	178150	5345	172796	249146
D-D'	4565	50	228250	68475	159775	4793	154982	223457
E-E'	4290	50	214500	64350	150150	4505	145645	209995
F-F'	4405	18.5	68277	20483	47794	1434	46360	66843
			1196889	359067		25135	812677	1171744



**ANNEXURE -III**

**SCHEME OF YEAR WISE DEVELOPMENT AND PRODUCTION FOR FIVE YEARS  
AT GUEDEM VILLAGE, S.No.171(Ext.3.0Hect) OF  
M/s.SOUTHERN ROCKS & MINERALS (P) LTD.,**

Year	Section	Bench Level m.	Sectional Area Sq.m.	Sectional influence mtrs	Total volume - M <sup>3</sup>	Pure waste @30% - M <sup>3</sup>	Granite Reserve s - M <sup>3</sup>	Recovera ble Granite - M <sup>3</sup> @3%	Rock Waste - M <sup>3</sup>	Total Waste- M <sup>3</sup>
2004-05	X-Y	114-100	108	100	10800	3240	7560	227	7333	10573
2005-06	X-Y'	120-100	170	100	17000	5100	11900	357	11543	16643
2006-07	X-Y'	127-100	250	100	25000	7500	17500	525	16975	24475
2007-08	X-Y'	134-100	300	100	30000	9000	21000	630	20370	29370
2008-09	X-Y'	140-100	390	100	39000	11700	27300	819	26481	38181
					121800	36540	85260	2558	82702	119242



Recoverable Granite Per Year = 2558 M<sup>3</sup>  
5 years = 512 M<sup>3</sup>



Fig-1. Photograph showing the occurrence of Colour granite cut across the granite gneiss to above surface level.

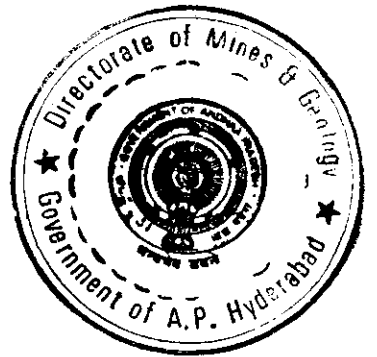


Fig-2. Photograph showing the dimension stones of top layer size vary in dimension 1 - 2M<sup>3</sup>.



Fig-3. Photograph showing the development of exploratory face at North-Eastern side of the dyke.

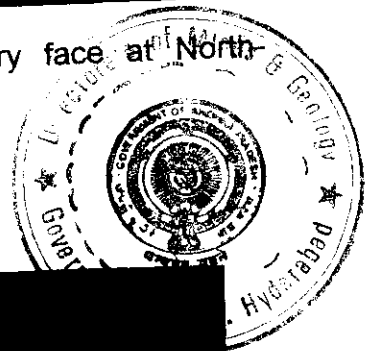


Fig-4. Photograph showing the development of exploratory face at North-Eastern side of the dyke.