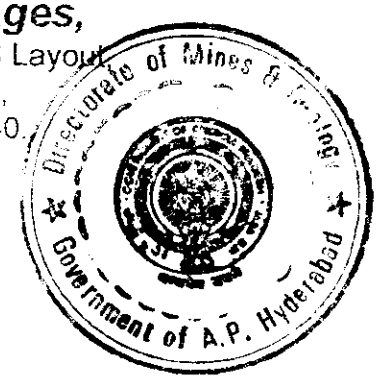
MINING PLAN FOR COLOUR GRANITE

Over an extent of 1.21 Hect, Located in S.No. 316,
of Kasturipadu (V), Kotabommali (M), Srikakulam District.

Applicant

M/s Rock Ages,
H. No: 139, CHBS Layout,
Vidyanaga,
Bangalore-40.



PREPARED BY

Y.THIMMAIAH,
(RQP / DMG / HYD/10 /2001),
102, Kavya Deluxe Apartments,
Madhuranagar
HYDERABAD - 38.

APPROVED

Under Rule 17of G.C.D.R.1999

DECLARATION

This is to certify that the enclosed mining plan for Colour Granite over an extent of 1.21 hector, located in S.No: 316 of Kasturipadu (V), Kotabommali (M), Srikakulam Dist. is prepared by the RQP in accordance with various provisions under Granite Conservation & Development Rule- 1999, Director of Mines & Geology, Govt. of A.P. guidelines, Mines Act, Mines Rules, Metaliferous Mines Regulation, in consultation with me and I understood for implementation of the same.

Date:

Place:

For M/s Rock Ages

MANAGING PARTNER

Signature of the Applicant

Government of A.P.

CERTIFICATE

This is to certify that the provisions of Granite Conservation & Development Rule – 1999 & Director of Mines & Geology, Govt. of A.P guidelines have been observed in mining plan preparation for Colour Granite over an extent of 1.21 hector, located in S.No: 316 of Kasturipadu (V), Kotabommali (M), Srikakulam Dist, A.P. of M/s Rock Ages have agreed to implement the same.

The provisions of other Acts & Regulations as applicable have been observed in the mining plan. However any specific permission if required, the applicant will approach all such authorities including Director General of Mines Safety.

Certified further that the information furnished in the Mining Plan is in agreement with that supplied by applicant.

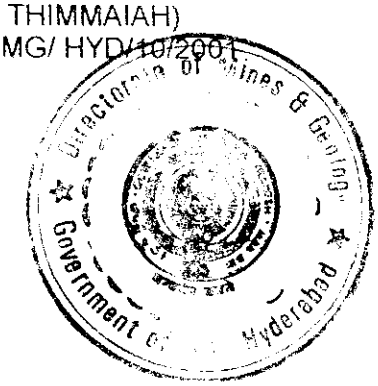
Date: 4-4-2005

Place: Hyderabad

Signature of RQP

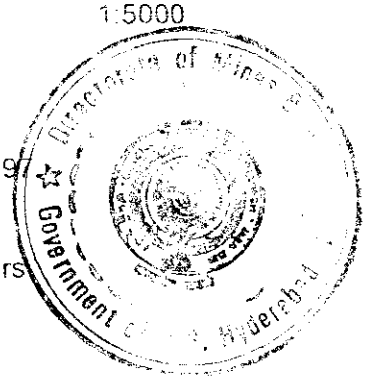
(Y. THIMMAIAH)

RQP/ DMG/ HYD/10/2001



LIST OF PLATES

LIST OF ANNEXURES



This Mining Plan is Approved subject to the Conditions/Stipulations Indicated in the Mining Plan Approval Letter No. 29883/MP-1/2004 dated, 12-05-2005

MINING PLAN FOR COLOUR GRANITE OVER AN EXTENT OF 1.21 HECT. IN S.NO.316 OF KASTURIPADU (V), KOTABOMMALI (M), SRIKAKULAM DISTRICT

INTRODUCTION: The first Quarry lease was granted for colour granite infaour of Sri J. R. Richards for 5 years from 18-11-91 to 17-11-96 and later the lease was transferred to M/s Rock Ages, in which Sri J.R. Richards is one of the partners. After five years the same company have filed for 1st renewal of Q.L., The Director of Mines and Geology has granted 1st renewal of quarry lease in favor of M/s Rock Ages, vide Proceedings No. 18968/R1-3b/96 for a period of 15 years 12-12-96 to 11-12-2011. Accordingly the Asst. Director of Mines & Geology has executed the Q.L. vide Proceedings No. 396/Q/97, dt.5-06-1997 (Ref: Annex- I). Since it is a working quarry, the mining plan is prepared under rule 17 of GCDR-1999.

APPROVED

N. Subramanyam
Joint Director
Dept. of Mines and Geology
Govt. of A.P. Hyderabad.

I **GENERAL:**

a) Name & Address of the Applicant: M/s Rock Ages,
No. 139, CHBS Layout,
Vidyanagar,
BANGALORE -40.

b) Status of the Applicant : Partner ship firm

c) Type (s) of Granite : Colour Granite

d) Period for which the Quarry Lease is required: Q.L. was for 15 years (12-12-96 to - 11-12-2011)

e) Name & Address of RQP : Y.Thimmaiah (RQP / DMG / HYD/10 /2001),
102, Kavya Deluxe Apartments,
Maduranagar,
Hyderabad- 38, Ph: 23733478 & 23735373

f) Name & Address of the Prospecting Agency: The area is being operated for last thirteen years. After the Q.L. was granted about 484.454 m^3 of granite blocks were recovered during first five years of lease period and about 928.282m^3 of granite blocks were recovered after renewal the Q.L. (Ref: Annexure-IV).

Directorate of Mines & Geology
Government of A.P. Hyderabad

II LOCATION AND ACCESSIBILITY:

a) **Location**:

The area is located on Topo Sheet No. 74 / B / 2 (1:50,000 Scale) at the junction of Latitude of 18^0 30' 05" and Longitude of 84^0 07' 25" (Plate-1).

b) **Details of the area**:

District & State	Mandal	Village	Sy. No.	Area in hectares	Type of Land	Ownership & occupancy
Srikakulam & A.P	Kotabommali	Kasturipadu	316	1.21 Het/ 3.0 acres	Govt. Land	Existing Q.L

c) **Infrastructure**:

i) The area is located at a distance of 0.5km from the village Jarjangi due west. Jarjangi is located by the side of N.H-5 between Srikakulam & Tekkali at a distance of 16km from Tekkali due south. Kotabommali is the mandal head Quarters and it is located close to N.H-5 and at a distance of 5km from the subject area due NE. The area can be approached by B.T. road over a length of 0.5km from Jarjangi and 200m length of the cart track is connecting to the area. Kotabommali is the mandal headquarters and it is the nearest place for School, Market, Hospital and for other facilities and It is located at 5.0km from the subject area. The nearest Railway Station is Kotabommali and it is located at 5km from the Q.L. area on Southeastern Railway line between Srikakulam and Palasa. The nearest airport and seaport is located at Vishakapatnam. Electricity is available in the vicinity of subject area. The subject area is belonging to part of hilly terrain and consisting of only bushes (without any trees) on the slopes of the area.

ii) Boundaries: The subject area is located in Sy No: 316 of Kasturipadu (v), Kotabommali (M). Cultivation lands are located on southern & western sides of the area. There is a working quarry of M/s Vivek Granites, located on eastern & northern sides to M/s Rock... Ages in S.No 316.

III GEOLOGY:

a) Topography:

The area is marked on Topo Sheet No. 74 / B / 2 (1:50,000 Scale) at the junction of Latitude of 18^0 30' 05" and Longitude of 84^0 07' 25" (Plate-1). The subject area is belonging to part of the hill. It is elevated on eastern side and sloping towards west & southern directions. There is a maximum relief of 51m from west to east. Due to rocky terrain, the area does not have any vegetation except scattered bushes on the slope of the hill. There are no prominent natural drainage channels in and around this area. But there is a seasonal watercourse passing in outside area.

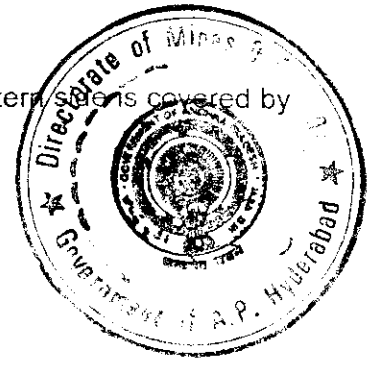
b) Regional Geology:

During the Late- Archaean, along the eastern margin of the Dharwar Craton, intense deformation and high-grade grnulite facies metamorphism of a pile of volcano-sedimentary rocks and sub- volcanic intrusive formed in long, linear, rift-relatyed basin resulted in the development of a typical suite of rocks comprising Khonndalite, calc-granulite and charnokite represented by Eastern Ghats.

c) Local Geology:

Hypersthene Granulite (charnokite) is occurring in most of Q.L. area as hillock. This rock type is formed as large size boulders on top of the hill without much overburden. But the sheet rock is covering on the slope of the area on eastern side. This rock type might have been derived from high-grade granulate facies metamorphism of a pile of volcanic intrusive. The rock is formed in E – W trend & this type of material is being excavated for last more than thirteen years from this area as "*Blue Granite*". During last thirteen years period about 1,413m^3 of Granite blocks were excavated from this area to the domestic and international market @ 33% recovery. Due to old workings, a pit has been formed on southern slope of the area. The pit has occupied 70m length, 10m width and to an average height of 6m. Based on the surface features and the data collected from working pit, the geological plan of this area is prepared and enclosed as plate-3. Four geological sections are drawn across the trend of the granite formation and enclosed as pate-3A.

Soil with float: The foothill of the Q.L. area on southern and western sides is covered by the red soil with float boulders of granite.



Blue Granite (Charnokite): Most of the Q.L. area is formed by blue granite (Charnokite) and this type of granite is well exposed as large boulders at higher altitudes i.e. on top of the hill. This granite is well exposed in W-E trend as sheet rock, on southern slope of the area without any overburden. Except the blue granite, there area no other litho units available in this area. Blue granite has fine to medium grain size, massive in nature. It has gray to blue in colour and other properties of this granite are described in following paras.

d) **Parameters for evaluation of the deposit:**

i) Frequency of Occurrence of Fissures & Joints: The deposit shown widely spaced joints of fissures from surface it self. As such a large size of granite blocks are being recovered from this area.

ii) Occurrence of folds and faults: No folds or faults are observes from this granite area.

iii) Variation in strike: No variations are observes in the strike direction of the formation.

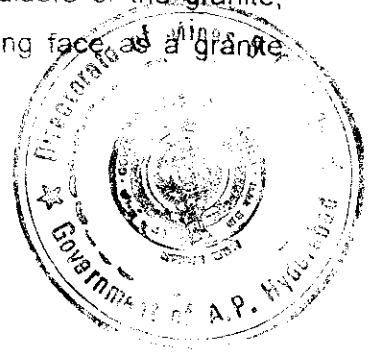
iv) Splitting pattern of the stone: the granite blocks will be split into rectangular blocks of various sizes depend on boulder size and based on spacing between the joints available in the sheet rock.

v) Foliation: The colour granite does not show any foliation.

vi) Occurrence of Intrusive: No intrusive is noticed in this blue granite area.

vii) Extent of weathering: The Q.L. area belongs to hillock with large and massive boulders on top of the hill and sheet rock is exposed on southern slope of the hill. So, these boulders and sheet rock is being converted into gang saw size blocks from surface it self.

iii) Amount of O.B to be removed: Since small & float boulders with soil are covering the foothill of the Q.L. area on southern side and this southern portion is not economical for quarry. So this southern side of the area is selected for waste dumping. During previous quarry operation about 67% of the material has generated as waste from total excavated material of 4200m^3. The material, exposed to surface are not weathered and they give good quality granite from surface it self. However the small boulders of the granite, located between the large boulders will be removed from working face as a granite waste.



e) **Parameters for evaluation of the Stone Quality**:

i) Texture & Grain Size: It is massive granite and it has medium-grain size. It is hard, compact and light gray to dark blue in colour. It shows equi-granular texture consisting of medium grained plagioclase Feldspar, Quartz and garnet.

ii) Colour & Aesthetic Beauty of the Stone: This granite stone shows light gray to dark blue in colour. This granite attains good glossy finish. The minerals available in this granite show the uniform grain size and it has good aesthetic value with mixture of colour combinations of gray, brown and blue.

iii) Hardness: The hard ness of this granite around 6 on Moh's scale.

iv) Mineral Composition: This granite has uniform grain size of different mineral of plagioclase Feldspar=40%, Quartz=37%, garnet10% and Biotite=8%, CPX-3%.

v) Density / Specific Gravity: The Specific Gravity of this granite varies from 2.8 to 2.9.

vi) Water absorption Capacity: It is less than 0.12%.

vii) Porosity: The Porosity of this granite is about 0.34%.

viii) Compressive Strength: The compression strength of this granite is about 1864kg/m^2.

ix) Abrasiveness: It has the Abrasiveness of 6.7.

x) Permeability: Due to Compactness, it doses not has permeability.

xi) Rock Quality Designation (RQD): Compressive Strength & Yongs Modulus of Elasticity of the rock are furnished. From these values the RQD is established to be good with RQD% between 75 to 90.

xii) Yongs Modulus of Elasticity: It is about 5.76 (15` 5kg/cm^2).

xiii) Degree of Weathering: Under hand lens/ Microscope: This granite is not weathered.

xiv) Glossiness: it takes nice polish and gives glossiness surface due to equigranular of grain size in this rock.

IV EXPLORATION:

a) **Present Status**: The Q.L area is a hilly terrain and consisting of large granite boulders on top of the hillock and the slope of the area is covered by sheet rock. Where as the foothill of the area is covered by soil & float material of small boulders on southern side. For last thirteen years the quarry workings are being carried out in this area and about 1,413m^3 blocks of granite has been recovered from this area. Due to these old workings, a pit has been formed on slope of the area over a length of 70m, width of 10m & to an average depth of 6m. The locations of the pit and dumps are shown on geological plan of plate-3.

b) **Future Programme**: The Granite is well exposed and formed as hill to a height of about 50m from normal ground level. Since the granite is being excavated for last thirteen years from this area and it well exposed in working pit. Since the workings are being carried out from out crops of the area, on exploratory pits or boreholes or geophysical survey works are proposed to prove the existence of granite in this area. To know the thickness of float and soil thickness, it is proposed to dig two trial pit to a size of 5x 5m & to a depth of 3m in third year after the mining plan is approved. The locations of these pits are shown on Plate-3.

V Reserves:

The Q.L area is formed by granite boulders and sheet rock without much overburden on top and slope of the hill and it is exposed to a height of 6m in working pit. So, the reserves of granite are calculated by taking the following parameters.

- Total Extent of The Q.L area = 3.00 acres or 1.21 hect / 12100m^2
- Extent of Granite exposed zone in Q.L area = 5894 m^2
- Average depth of the working pit = 6m
- No overburden is available in this area but soil and float is covering the southern side of the area.
- About 1413m^3 of blocks were excavated from working pits @ 33% recovery.

i) Economic/Marketable Reserves:

The working pit, which is available in this area shows the granite availability to a thickness of about 6m and the granite is extending further depth from pit bottom. The pit sections show no overburden or weathered rock on the surface. The pit depth is shown on plate No. 3A. The colour granite reserves are calculated by cross sectional method under Proved, Probable, and Possible categories. The sectional area calculated by the graphical method. As stated earlier this area form as a hillock where the outcrops of the granite is well exposed as large boulders and sheet rock. The granite was excavated to an average thickness of about 6m from working pit and proved that the 6m granite is useful for commercial blocks. So the reserves, which are exposed up to 6m thickness from the surface, are considered for proved reserves. Since the granite is extending further depth only 3m depth is taken for each category of probable & possible because at deeper levels the grain size and colour patter of granite will change and it may not useful for commercial purpose. The reserves are estimated by multiplying the cross sectional area with influence distance of sections. From in-situe granite reserves, the recovery of blocks is taken as 33% for each category after leaving the remaining percentage for voids and defected material. The calculations of reserves for colour granite are given in table-1.

Table-1

Category	Section & Its Influence Dist.	Sectional Area (m^2)	Volume of Insitue rock (m^3)	R.F	Reserves (m^3) Granite	Waste
Proved	A-A' – 22	106	2332	0.33	769	1562
	B-B' – 25	336	8400	0.33	2772	5628
	C-C' – 25	342	88550	0.33	2821	5728
	D-D' – 32	420	13440	0.33	4435	9005
					10797	21923
Probable	A-A' – 22	159	3498	0.33	1154	2343
	B-B' – 25	168	4200	0.33	1386	2814
	C-C' – 25	204	5100	0.33	1683	3417
	D-D' – 32	219	7008	0.33	2312	4695
					6535	13269
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	C-C' – 25	204	5100	0.33	1683	3417
	D-D' – 32	219	7008	0.33	2312	4695
					6535	13269

Total recoverable reserves of Granite = 23,867 m^3, Total waste generation = 48,461 m^3

Mineable reserves: The granite reserves will be blocked under final pit slope on two sides of the area i.e. on northern & eastern sides of the area. So the non mineable reserves of granite is given below:

Length of final pit slope x cross sectional area of pit slope x recovery factor of granite = 145 x 72 x 0.33 = 3,445 m^3. *Mineable reserves* = 23,867 - 3,445 = **20,422** m^3

Life of the Quarry: Based on the previous production obtained during last thirteen years from this area, it is proposed to raise the production of about 500m^3 of granite blocks per annum. At this rate of production the expected life of the Quarry is about 40 years.

VI **MINING:**

a) i) Type **of Mining**:

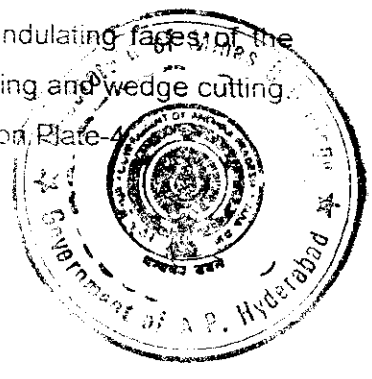
The subject area was granted for Q. L to quarry colour granite for a period of 5 years and later it was renewed for another 15 years. During last thirteen years of the lease period the mining operations are being carried out by opencast method with the help of hired machinaries like excavator, tippers, compressor, and jackhammer drills. The same machinery will be used in balance lease period also. During the last thirteen years, the workings were carried out from a single pit, located on southern slope of the area and obtained about 1413m^3 of granite blocks. So it is proposed to continue the workings on northern side of the existing pit, in one bench of 6m height. For granite quarry, the following machinery is being used in this area and the same will be continued for balance lese period.

ii) **Type of Mechanization required**:

An excavator (Tata Hitachi -200LC) is being hired occasionally to remove the waste material, consisting of small & loose boulders from working face. Two tippers are deployed to shift the waste and secondary blocks from working face to stockyard along with an excavator. To cut the big boulder in to primary & secondary blocks, three jackhammers and one compressor (CP 325) is being used. For loading the dressed & marketable granite blocks in to trucks, the excavator will be used.

b) **Brief description of the Existing method of workings**:

An excavator (Tata Hitachi -200LC) is being used to remove the waste material of small & shapeless boulders, available in working face and then this waste will be loaded into tippers for transportation to dump/stockyard. Free face will be developed around the large boulders or sheet rock with the help of an excavator by removing the waste. Simultaneously, the excavated waste material will be loaded into tippers and then this waste will be transported to dump yard, which is proposed on southern side of the area. The free-faced boulders will be drilled with the help of jackhammers in a row at closer interval, vertically and it will be cut in to secondary blocks by using gunpowder or wedge cutter. Where as the sheet rock will be drilled vertically & horizontally with the help of jackhammer for primary block separation. The drill holes will be filled with gunpowder up to 3/4 depth and thickness of the holes will be stemmed with muck and then the charged holes will be fired to cut the rock along the line of drill holes. These primary blocks will be removed from its *insitue* position with the help of excavator. The primary block size should be around 10m x 6m x 2m to 6m x 3m x 2 m. The primary block will be observed carefully on six faces for defects, shape and size. Later it will be cut in to secondary blocks with the help of jackhammer drilling and wedge cutting to various sizes of 3 x 2 x 2m to 1.6 x 1.2 x 0.6 m depend on primary block size. While cutting primary block in to secondary blocks some under size blocks or defected material or shape less blocks will generate. This type of unmarketable material will be treated as waste and this waste material will be shifted to dump yard with the help of excavator and tippers. The secondary blocks will be shifted to stockyard by tippers and then these blocks will be dressed to perfect sizes before transportation to market. The undulating faces of the secondary blocks will be dressed with the help of jackhammer drilling and wedge cutting. The proposed year wise workings and dump locations are shown on Plate-4.



c) **Details of Production obtained from this area during lease period**:

Year	Machinery Deployed	Workers Employed	Production m^3	Sizes of different commercial blocks
1991 - 96	Excavator: 1,Tippers: 2, Compressor: 1, J.H: 3	5 Nos / d	484.454	3.1 x 2.6 x 1.8 to 1.6 x1.20 x 0.60 m
1996-97	,, ,, ,,	10 Nos / d	250.132	,, ,,
1997-98	,, ,, ,,	,, ,, ,,	225.858	,, ,,
1998-99	,, ,, ,,	,, ,, ,,	248.784	,, ,,
1999-2000	,, ,, ,,	5 Nos / d	83.217	,, ,,
2000-01	,, ,, ,,	,, ,, ,,	22.872	,, ,,
2001-02	,, ,, ,,	,, ,, ,,	32.040	,, ,,
2002-03	,, ,, ,,	,, ,, ,,	23.040	,, ,,
2003-04	,, ,, ,,	,, ,, ,,	23.746	,, ,,
2004-05	,, ,, ,,	,, ,, ,,	18.633	,, ,,

d) **Mining program for first five years**:

i) Year wise workings: It is proposed to carry out the workings on northern face of the exiting pit. The northern face of the pit will be advanced towards north in one bench of 6m height each. There is no separate overburden in proposed mining area. The waste material, which is available around the boulders or on the sheet rock, will be removed by the excavator and free face will be developed around the boulders to separate the primary and secondary blocks from workings.

1st year: First year workings will be carried out over a length of 40m, width of 6.5m and to a height of 6m, in one benches of 6m height on NW side of the old pit. About 515m^3 of granite blocks and 1045m^3 of mineral waste will generate during this year.

2nd year: In second year, the northern face of first year workings will be advanced towards north to a length of 40m, width of 6.5m and to a height of 6m and obtained About 515m^3 of granite blocks and 1045m^3 of mineral waste.

3rd year: In third year, the NE face of old pit will be advanced towards north to a length of 25m, width of 10m and to a height of 6m and obtained about 495m^3 of granite blocks and 1005m^3 of mineral waste.

4th year: In fourth year, the northern face of 3rd year workings will be advanced towards north to a length of 32m, width of 8m and to a height of 6m and obtained about 506m^3 of granite blocks and 1029m^3 of mineral waste.

5th year: In fifth year, the northern face of 2nd year workings will be advanced towards north to a length of 32m, width of 8m and to a height of 6m and about 506m^3 of granite blocks and 1029m^3 of mineral waste. The bench wise production details of each year are given in Annexure-III.

e) **Quantum of excavation (O.B & Granite)**:

Removal / Excavation of O.B and other Quarry Waste if any and its Disposal: The quarry operations will be continued from the existing pit towards north. In this operation, the granite waste consisting of small and shapeless boulders or blocks will generate along with production. In every about 250m^2 area will be excavated to a depth of 6m and about 500m^3 of production and 1000 m^3 of waste will be obtained. During this five years about 5153 m^3 of waste will be generated from this area.

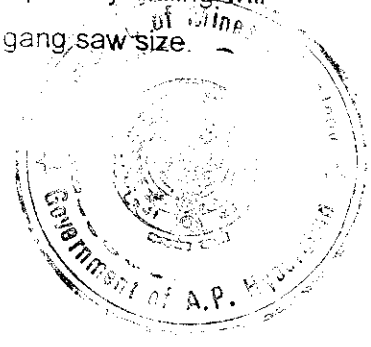
f) **Production & Marketing**:

It is proposed to obtain about 500m^3 of granite blocks of different sizes from 3.0 x 2.6 x 1.8 to 1.6 x1.10 x 0.60m per year in this five years program. The owners are doing the granite marketing for last thirteen years. The agents come from Chennai, Bangalore, Jaipur will purchase the raw blocks. The partners have invested some money and deployed necessary machinery and men at mine. There by they are able to supply granite in time to their consumers. Presently the company is concentrating to sell about 60 % of the granite production in India and balance 40% of granite production will be marketed in international market.

VII DRILLING & BLASTING:

Jackhammer drilling and gunpowder blasting is being used in the mine to obtain the primary blocks and secondary blocks. There is a microwave station, located on western side at 300m distance and some dwellings are located on eastern side at 400m distance from this Q.L. area. A public road is passing on northern side at 150m distance and labour huts are located on western side at 200m distance from the area. So all precautionary measures are being taken care to sage guard the above public places from blasting.

a) **Board Blasting Parameters**: Uniform, single line, equidistant holes will be drilled for separation of blocks from mother rock. In the case of sheet rock the primary drilling will be in the form of equidistant and vertical holes to take out blocks of gang saw size.



b) **Drilling pattern**:

i) Drill Holes Diameter: 74/Pmm

ii) Depth and inclination of the blast holes: 3m in case of separation of primary blocks depend on the block size. The drill holes will be vertical.

iii) Spacing and burden: 1.5 x 3m.

iv) Stemming and charging of the blast holes: The blast holes will be charged with 100 grams of gunpowder and filled with ammonium nitrate, subsequently the shot holes will be stemmed using stemming road.

v) Explosive type: (1) Packed Ammonium Nitrate, (2) Gunpowder as per requirement.

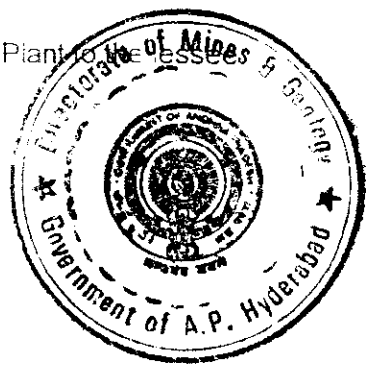
c) **Safety Precautions to be taken for protection of Microwave Station, huts and road.**

Since the village Jarzangi & Microwave Station are located at more than 300m distance from the working area, there will not be any effect on these two places due to blasting. Since the proposed working are facing towards south, the through of the blast material will be towards south and the fly rocks towards western and northern sides will be negligible and the impact of blasting on the road and on huts will be minimum. So the blasting will be carried out with all precautionary measures by giving siren and displaying red flags at 300m from blasting site before going to blasting to alert the labours and passenger, passing through this road.

d) **Magazine, Type and Capacity**:

At present, the Applicant does not have any explosives license and they are getting the gunpowder from local market. So, it is proposed to obtain the explosive license for storage the explosive at mine site as per the provisions of Indian Explosives Act for their procurement and transportation. To minimise the crack development in granite blocks and to bring down the wastage of mineral, the explosive like gunpowder is being used in this quarry to cut the primary blocks from mother rock. In coming Q.L period also it is proposed to use the same type of explosive or slurry based small dia explosive.

e) **Description of processing Plant if any**: There is no of processing Plant to the lessee



f) **Organization Chart**: Agent

Mines Manager/ Mines Foreman

Supervisor	Mate
Register Keeper	Excavator Operator: 1 No
	Truck Driver: 2 Nos
	Drillers: 3 Nos
	Compressor Operator: 1 No
	Workers : 4 Nos

VIII SCHEME OF WASTE MANAGEMENT PLAN (SOLID & LIQUID):

a) Solid waste: About 67% of the granite production is going to be generated as solid (granite) waste. In every about 1000m^3 of waste will generate on an average and about 5153m^3 of waste will generate during next five years and about 40844 m^3 of waste will generate during life of the mine. The particulars of wise waste generation for 5 years are given in anneure-III.

b) **Liquid waste**: The quarry workings are located at higher levels than the ground level on the slope of the hill. So there will not be any water seepage in this working pit and no water will be discharged form this quarry.

c) **Dumping site Particulars**: The southern portion of Q.L. area has non-mineralised zone. So the waste dumping is being carried on southern side of the area. For next five years also the, waste will be dumped on SE corner over a length of 30m to a width of 28m and to a height of 6m (Ref: Plate -4).

d) **Utilization of waste, if not prevented**: The waste material is being stocked on southern side of the area. The waste will be used with the permission of ADMG for development of N.H-5, for formation local road and for construction of building.

IX ENVIRONMENT MANAGEMENT PLAN:

a) **Baseline Information**:

i) Land Use Pattern: The subject area is a Govt. wasteland and it is being used for mining. Due to previous workings about 700m^2 area is occupied by the pit.

ii) Water Regime: There are no perennial water sources in and around the applied area within 500m radius. The surface rainwater of the area flows through the slopes of the area and joins to seasonal watercourse, which is located on northern side the area and there is a pond located on northern side within 500m distance of the area.

iii) Flora and Fauna: Since the area is a rocky terrain, it doses not contain any trees or bushes. But the foothill of the area has scattered bushes. There is no report of existence of wild animals in this region.

iv) Quality of Air, Water and Ambient Noise Level: The subject area is away from industries and villages. So the air and water are fresh and unpolluted in this area.

v) Climatic Conditions: The area has a tropical climate. The peak summer will be in the month of May. Highest temperature of 45^0 is recorded in this area during the month of May and the lowest temperature of 13^0 is recorded in the month of January. During 2002-2003 the rainfall in this area is about 240mm.

vi) Human Settlement: The following villages are located within 5km radius of the applied area. The population, distance and direction of the villages with respect to the applied area are given in the following table and their locations are shown on plate-1.

Name of the Village	Population	Distance(km)	Direction
Kotabommali	4200	5.0	NE
Jarjangi	1500	0.5	E
Kasturipadu	1200	4.0	NW
Regulapadu	1600	4.5	W
Harichandrapuram	1550	2.5	S

vii) Public Building, Places of Worship and Monuments: There are no Public Building, Places of Monuments within or near by the area.

b) **Environmental Impact Assessment (next five years)**:

i) Land Degradation: In addition to old pit, about $1282m^2$ area will be occupied by the proposed workings to a depth of 6m and waste dump will occupy an area of $840m^2$, the mine roads will occupy an area of $360m^2$ and the plantation will occupy an area of $750m^2$ (Ref: plate-4).

ii) Quality of Air: There are chances for air pollution at the time of jackhammer drilling and at the time transportation of Mineral & waste. But this air pollution will be controlled to the ambient air quality standards (24 hours) i.e. SO_2 =120ug/m^3, NO_2 = 120ug/m^3, Suspended Particulate Mater (SPM) =500ug/m^3, Respirable Particulate Mater (size <10um) (RPM)=150ug/m^3, CO=5mg/m^3 and Pb =1.5ug/m^3 by providing dust collectors at drill site. The mine roads will be sprayed with water, before starting the transportation of Mineral & wastes to minimise air pollution and the road on either sides will be planted.

iii) Water Quality: There will not be any change in Quality of water due to granite mining, which is located at higher levels than the groundwater table. The surface rain water flow through the seasonal watercourse as usual.

iv) Noise: the noise of excavator, compressors & Jackhammer drilling will be minimised to permissible limits between 95dB(A) to 105 dB (A) by operating equipment at different place and by carrying periodical maintenance regularly to these machinery.

v) Vibration Levels: There will not be any vibration due to jackhammer blasting.

vi) Water Regime: Quarry operations will be carried out at higher levels. Hence, neither groundwater table nor the surface drainage pattern is going be affected.

vii) Socio-Economics: The inhabitancies of the surrounding villages are mainly depending on agriculture. Quarrying is on small scale, limited to 8 members. Hence there will not be much impact on Socio-Economics of the local inhabitant.

c) **Environmental Management Plan:**

i) Storage and Utilisation of Topsoil: No separate topsoil is going to be generated from this mining.

ii) Proposal for Reclamation of Land Effected by Mining: No reclamation is proposed in this area because the bottom material ha to be recovered in coming plan period.

iii) Afforestation Programme: The southern buffer zone of the area will be planted in these five years. Every year about 25m length x 6m width of the area will be planted on southern side with 16 plants at 3m grid interval. Year-wise plantation area is shown on plate-4.

iv) Stabilisation and Vegetation of Dumps: About 5153m^3 of waste material will generate during this five years period. This waste will be dumped on SE side of the area in non mineralised zone and the dumps will be stabilized by retaining wall.

v) Measure to Control to Erosion / Sedimentation of Watercourses: There is no surface erosion in the subject area because the surface area is covered by the hard granite.

vi) Treatment and Disposal of Water from Mine: No water will be disposed from mine.

vii) Measures for Minimising Adverse Effects on Water Regime: No adverse effects are anticipated on water regime.

viii) Measures for Protecting Historical Monuments and Rehabilitation of Human Settlements likely to be disturbed due to Mining Activity: There are no Historical Monuments or Human Settlements within or near by the area.

ix) Socio Economic Benefits Arising out of Mining: Few labors will get employment and the state Government and village Panchayathi will get royalty due to mining activity.

X ANY OTHER RELEVANT INFORMATION:

The granite quarrying is being carried out by following GCD Rules 1999.

FOR ROCK AGES

MANAGING PARTNER

Signature of the Applicant

APPROVED

N. Subramanyam

Joint Director

Dept. of Mines and Geology

Govt. of A.P. Hyderabad.

Reg: RQP/HYD/

GOVERNMENT OF ANDHRA PRADESH
DEPARTMENT OF MINES AND GEOLOGY

ANNEXURE-I

PROCEEDINGS OF DEPUTY DIRECTOR OF MINES AND GEOLOGY:VISAKHAPATNAM FULL ADDITIONAL CHARGE OF ASST.DIRECTOR OF MINES AND GEOLOGY::::: SRIKAKULAM.

(Present: SRI J.SUBBA RAO,M.Sc.,MMGI,MMEA)
Dy.Director.

Proceedings No.398/Q/97, Dated 5-6-97.

Sub: MINES AND QUARRIES - Ist Renewal of Quarry Lease for Colour Granite over an extent of 3-00 Acres in S.No.316 of Kasturipadu Village, Kotabommali Mandal, Srikakulam District - Application of M/s ROCKAGES - Renewal Granted - Execution of Lease Deed - Work Orders issued - Regarding.

DESPATCHED
No. 1335 (Q) 97
Dated 5/6/97

Ref: 1.Proc.No. 28968/R1-3b/96, Dt.09-01-1997 from the Director of Mines and Geology, Hyderabad.
2.Proc.No. 18968/R1-3b/96, Dt.22-3-97 from the Director of Mines and Geology, Hyderabad.
3.Lr.D.Dis.2411/97, dt.16-5-97 from the District Collector, Srikakulam.
4.Proc.No.18968/R1-3b/96, Dt. from the Director of Mines and Geology, Hyderabad.
5.Letter dated 4-6-97 from M/s ROCKAGES, BANGALORE.

* * *

O R D E R:

The Ist Renewal of quarry lease granted in favour of M/s ROCKAGES, Bangalore for colour granites granted in S.No.316, of Kasruripadu Village, Kotabommali Mandal, Srikakulam District over an extent of 3-00 Acres for a period of 15 years has been executed on 5-6-97 by the undersigned. The Quarry Lease is renewed for a further period of 15 years from 12-12-96 to 11-12-2011.

M/s ROCKAGES, Bangalore is hereby permitted to continue the quarrying operations under the provisions of A.P.M.M.C.Rules, 1966 and conditions laid down in G.O.Ms.No.317, Industries and Commerce Department,dt.9-7-92 and subsequent instructions issued on the matter from time to time. The lessee should submit the Quarterly returns to the Asst.Director of Mines and Geology, Srikakulam, Dy.Director of Mines and Geology,Visakhapatnam and the Director of Mines and Geology, Hyderabad. This work order is issued subject to the condition that the Government reserve the right to cancel the quarry lease granted and executed under A.P.M.M.C.Rules, 1966 without assigning any reasons and giving notice and the conditions imposed in the grant order and agreement.

Dy.Director of Mines and Geology,
Visakhapatnam (F.A.C) Asst.Director of Mines and Geology, SRIKAKULAM.

To

M/s ROCK AGES,
No.139, CHBS Layout,
Vidyanagar,
BANGALORE-40.

Copy submitted to the Director of Mines and Geology,Hyderabad

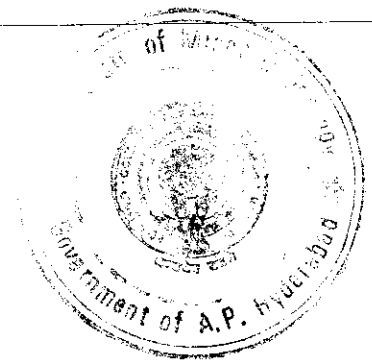
Photograph shows the Granite boulders exposed on top of the hill in Q.L. area belongs to M/s Rock Ages, Located in S.No: 316 of Kasturipadu Village, Kotabommali (M), Srikakulam Dist.

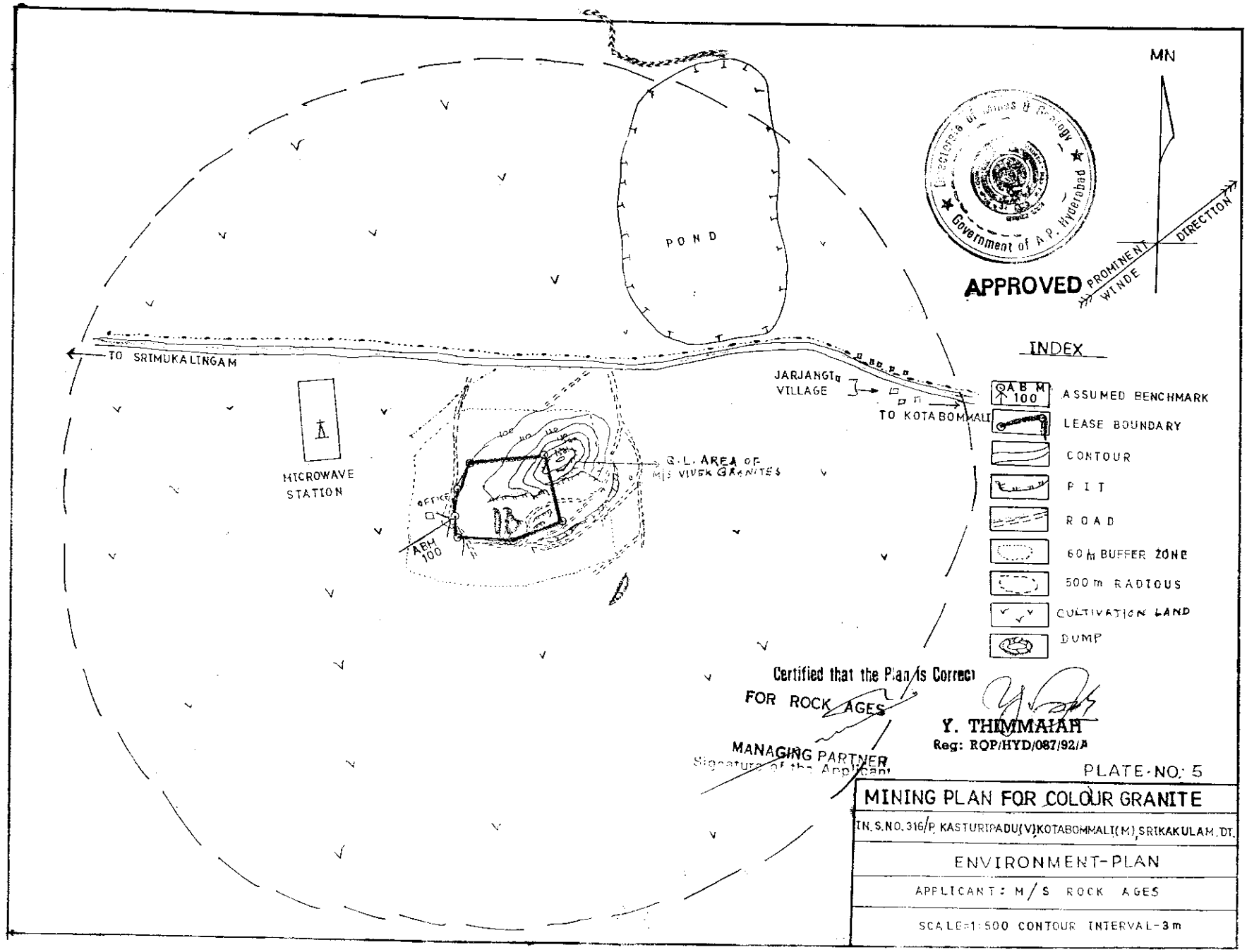
Photograph shows the Granite Sheet rock exposed on eastern side of the Q.L. area belongs to M/s Rock Ages, Located in S.No: 316 of Kasturipadu Village, Kotabommali (M), Srikakulam Dist.

Year- Wise Granite Production

Annexure -III

Year	Bench No.	Working Areas m^2	Bench height	Volume m^3	R.F	Production m^3 Granite	Waste
I	1st	40x 6.5 = 260	6m	1560	0.33	515	1045
II	1st	40x 6.5 = 260	6m	1560	0.33	515	1045
III	1st	25 x 10 = 250	6m	1500	0.33	495	1005
IV	1st	32 x 8 = 256	6m	1536	0.33	506	1029
V	1st	32 x 8 = 256	6m	1536	0.33	506	1029




MN
POND
TO SRIMUKALINGAM
JARJANGI VILLAGE
TO KOTABOMMALI
MICROWAVE STATION
G.L. AREA OF M/S VIVEK GRANITES
OFFICE
ABM 100
DIRECTION
PROMINENT WINDE
APPROVED
Government of A.P. Hyderabad
INDEX
ABM 100 ASSUMED BENCHMARK
LEASE BOUNDARY
CONTOUR
PIT
ROAD
60 m BUFFER ZONE
500 m RADIOUS
CULTIVATION LAND
DUMP
Certified that the Plan is Correct
FOR ROCK AGES
MANAGING PARTNER
Signature of the Applicant
Y. THIMMAIAH
Reg: RQP/HYD/087/92/A
PLATE-NO: 5
MINING PLAN FOR COLOUR GRANITE
IN S.NO. 316/P, KASTURIPADU(V)KOTABOMMALI(M), SRIKAKULAM DT.
ENVIRONMENT-PLAN
APPLICANT: M/S ROCK AGES
SCALE=1:500 CONTOUR INTERVAL-3m

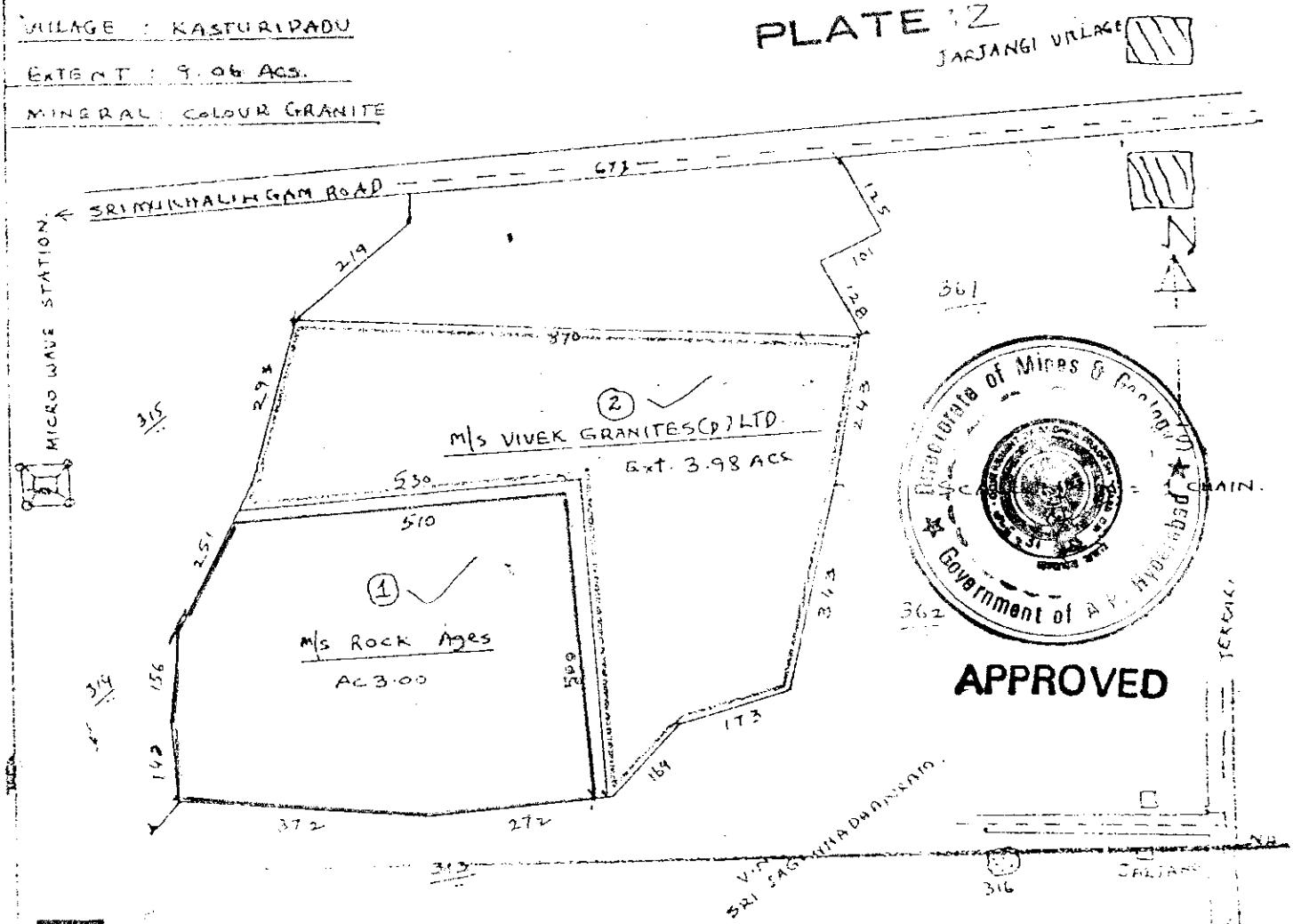
MANDAL : KOTHAGUDEM

VILLAGE : KASTURIPADU

EXTENT : 9.06 ACS.

MINERAL : COLOUR GRANITE

PLATE : 2



1 LEASED AREA OF M/s ROCK AGES 3.00 ACS.

Mining plan

2 AREA SURVEYED TO M/s VIVEK GRANITES PVT LTD 3.98 ACS [1.61 Hect]

Certified that the Plan is Correct

FOR ROCK AGES

MANAGING PARTNER

Signature of the Applicant

Y. THIMMAIAH
Reg: RQP/HYD/087/92/A

For Vivek Granites (P) Ltd.

SURVEYOR
C/o THE DDM&G
VISAKHAPATNAM

APPLICANT

DEPUTY DIRECTOR
MINES & GEOLOGY

DIRECTOR
MINES & GEOLOGY