EXECUTIVE SUMMARY

Tmt.K.SANGEETHA ROUGH STONE QUARRY

NAME OF PROPOSED PROJECT PROPONENT

Code	Proponent Name	Extent (Ha)
P1	Tmt.K.Sangeetha	2.36.5

"B1" CATEGORY/ MINOR MINERAL /CLUSTER/ NON-FOREST LAND/ PATTA LAND

*** CLUSTER EXTENT = 5.55.0 Ha**

* Cluster Calculated as per MoEF & CC Notification – S.O. 2269(E) Dated: 01.07.2016

ToR Obtained vide

Lr No.SEIAA-TN/F.No.8886/ToR-1116/2022 Dated: 23.03.2022 - P1

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS

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Baseline Monitoring Period - December 2022-February 2023

Environmental Lab

EHS 360 LABS PRIVATE LIMITED

(Approved by ISO/IEC 17025:2017)

10/2, Ground Floor, 50th Street, 7th Avenue, Ashok Nagar, Chennai – 600 083, Tamil Nadu, India.

July 2023

1.0 INTRODUCTION

Rough Stone are the major requirements for construction industry. This Draft EIA/EMP report is prepared by proposed quarry of Tmt.K. Sangeetha Rough Stone Quarry (2.36.5Ha) in Vadapudur Village, Kinathukadavu Taluk Coimbatore District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

This EIA Report is prepared in compliance with ToR obtained for the below proposals in Table 1.1 and the Baseline Monitoring study has been carried out during the period of Dec2022-Feb 2023.

TABLE 1.1: ToR OBTAINED PROJECT

CODE	Name of the proponent	Extent (Ha)	Terms of Reference (ToR)
P-1	Tmt.K. Sangeetha	2.36.5	Lr No. SEIAA-TN/F.No.8886/ToR-1116 /2022 Dated: 23.03.2022

Source: ToR Letters of the respective project proponent.

"Draft EIA report prepared on the basis of ToR Issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu"

1.1 DETAILS OF PROJECT PROPONENT

PROPOSAL – P-1	
Name of the Company	**Tmt.K.Sangeetha**
Address	W/o. Kumaresh, No.13, Nethaji Street, Bagavathipalayam, Kinathukadavu, Coimbatore District – 642109
Mobile	+91 98423 76783
Status	Proprietor (Individual)

The project proponent is an individual.

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRIES				
CODE	**Name of the Proponent and Address**	**S.F. Nos, Village & Taluk**	**Extent in Ha**	**Status**
P-1	**Tmt.K.Sangeetha**	423/2 (P), Vadapudur Village, Kinathukadavu Taluk	2.36.5	Obtained ToR vide, Lr No.SEIAA-TN/F.No.8886/ToR-1116/2022 Dated: 23.03.2022
P-2	**Thiru.S.Ramesh**	423/1(P) Vadapudur Village, Kinathukadavu Taluk	1.52.0	Obtained ToR vide, Lr No.SEIAA-TN/F.No.8463/SEAC/ToR-1008/2021 Dated: 28.07.2021
P3	**Thiru. A.Kandasamy**	424/3, Vadapudur Village, Kinathukadavu Taluk	1.66.5	-
	Total		**5.55.0**	
EXISTING QUARRIES				
CODE	**Name of the Proponent and Address**	**S.F.Nos , Village & Taluk**	**Extent in Ha**	**Lease Period**
NIL				
ABANDONED QURRIES				
CODE	**Name of the Proponent and Address**	**S.F. Nos, Village & Taluk**	**Extent in Ha**	**Lease Period**

A-1	Thiru.V.Marimuthu	131/1C2A, Vadapudur Village,	1.27.0	04.05.1999 to 03.05.2004
	Total		**1.27.0**	
EXPIRED QURRIES				
CODE	**Name of the Proponent and Address**	**S.F. Nos, Village & Taluk**	**Extent in Ha**	**Lease Period**
Ex1	Thiru.K.Ramalinga Gounder	148/1 (P), Kinathukadavu Taluk	1.45.0	03.03.2016 to 02.03.2021
		Total	**1.45.0**	
TOTAL CLUSTER EXTENT			**5.55.0**	

TABLE 1.3: SALIENT FEATURES OF THE PROPOSED PROJECTS IN CLUSTER

SALIENT FEATURES OF PROPOSAL "P-1"		
Name of the Mine	Tmt.K.Sangeetha Rough stone quarry	
Land Type	Patta Land (Patta No.116), jointly registered in the name of applicant (Tmt.Sangeetha) and Miss.Ananthavinothini	
S.F. No.	423/2 (P),	
Extent	2.36.5 Ha	
Previous quarry operation details	Operated by • The quarry lease was previously granted in the favour of Tmt.K. Sangeetha, over an extent of 3.78.0hectares vide Rc.No.312/Mines/2015, Dated: 23.09.2016for the period of five years from 23.09.2016 to 22.09.2021 • the applicant has obtained Environmental Clearance from the SEIAA, Tamil Nadu vide Lr. No. SEIAA-TN/F.No.3857/1(a)/ECNo.3397/2015, Dated: 25.07.2016for quarrying of rough stone. • The applicant has once again applied a quarry lease on 19.10.2020, over an extent of 2.36.5hectares of Patta land in S.F.No.423/2 (P) of Vadapudur Village, Kinathukadavu Taluk, Coimbatore District for the period of five years.	
Maximum dimension of the existing quarry pit (as per AD letter Rc.764mines/2020, 22.09.2021)	260m (L) x 82m (W) x 10m Agl (D)	
Depth	41m bgl (1m topsoil+ 40m Roughstone)	
Geological Resources	**Rough Stone**	**Topsoil**
	7,54,307m^3	2,340 m^3
Mineable Reserves	**Rough Stone**	**Topsoil**
	2,28,084 m^3	-
Proposed production for five years	2,28,084 m^3	-
Mining Plan Period / Lease Period	5 Years	
Ultimate Pit Dimension	260m (L) x 82m (W) x 41m Bgl (D) (16m Agl +25m Bgl)	
Toposheet No	58 - B/13	
Latitude	10°48'34.52"N to 10°48'41.61"N	
Longitude	76°59'43.58"E to 76°59'52.08"E	
Highest Elevation	344m AMSL	
Water table depth	The Ground water occurrence in this area is 73-68m depth below the ground level.	
Machinery	Jack Hammer	6
	Compressor	2
	Excavator with Bucket and Rock Breaker	1
	Tippers	3
Blasting	Usage of Slurry Explosive with MSD detonators	
Manpower Deployment	28Nos	
Total Cost	Project Cost	Rs. 61,11,000/-

	EMP Cost	Rs. 3,80,000/-
	Total	Rs. 64,91,000/-
CER cost	Rs.5,00,000/-	
Water Requirements	Total water requirement for 3.3KLD from water vendors & nearby Bore well.	
Nearest Habitation	1000m-E	

Source: Approved Mining Plan of the respective proposals

1.4 STATUTORY DETAILS

Project – P-1

- The proponent applied for Rough Stone Quarry Lease Date from 19.10.2020
- The precise area communication letter was received from the Assistant Director, Department of Geology and Mining, Coimbatore District vide Rc.No.764/Mines/2020, Dated: 03.08.2021.
- The Mining plan was approved by the Assistant Director, Department of Geology and Mining, Coimbatore vide Rc.No. 764/Mines/2020 Dated: 22.09.2021.
- Proponent applied for ToR for Environmental Clearance vides online Proposal No. SIA/TN/MIN/69057/2021, Dated:11.11.2021
- The proposal was placed in 251st SEAC meeting held on 04.03.2022 and the committee recommended for issue of ToR.
- The proposal was considered in 495th SEIAA meeting held on 23.03.2022 and issued ToR vide Letter No Lr No. SEIAA-TN/F.No.8886/ToR-1116/2022 Dated: 23.03.2022

2. PROJECT DESCRIPTION

The proposed project is site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarries. Rough Stone proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Nearest Roadway	NH 83 - Coimbatore -Pollachi Road -2.0km-E SH26 - Nattukal-Velamthavalam Road – 12.0km-NW MD165- Kinathukadavu-Kattampatti Road-4km-NE
Nearest Village	Bhagavathipalayam – 1.0Km- E
Nearest Town	Kinathukadavu – 2.2Km – NE
Nearest Railway	Kinathukadavu Railway station – 4Km - NE
Nearest Airport	Coimbatore Airport – 24Km - NE
Seaport	Kochi- 127Km-SW

Source: Survey of India Toposheet

2.2 LAND USE PATTERN OF THE PROPOSED PROJECT

LAND USE PATTERN OF PROJECT – P-1		
Description	**Present area in (ha)**	**Area at the end of life of quarry (Ha)**
Area under quarrying	1.61.0	1.61.0
Infrastructure	Nil	0.01.0
Road	0.02.0	0.02.0
Green Belt	Nil	0.15.0
Unutilized area	0.73.5	0.57.5
Grand Total	**2.36.5**	**2.36.5**

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

OPERATIONAL DETAILS FOR PROJECT – P-1		
PARTICULARS	**DETAILS**	
	Rough Stone (m^3) (5Year Plan period)	**Topsoil (m^3)**
Geological Resources	7,54,307m^3	2,340 m^3
Mineable Reserves	2,28,084 m^3	-
Production for five years Plan	2,28,084 m^3	-
Mining Plan Period / Lease Applied Period	5Years	
Number of Working Days	300 Days	
Production per day	152	-
No of Lorry loads (6m^3 per load)	25	-
Total Depth of mining	41m bgl (1m topsoil+ 40m Roughstone)	

FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA

SATELLITE IMAGERY OF P-1

FIGURE – 2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)

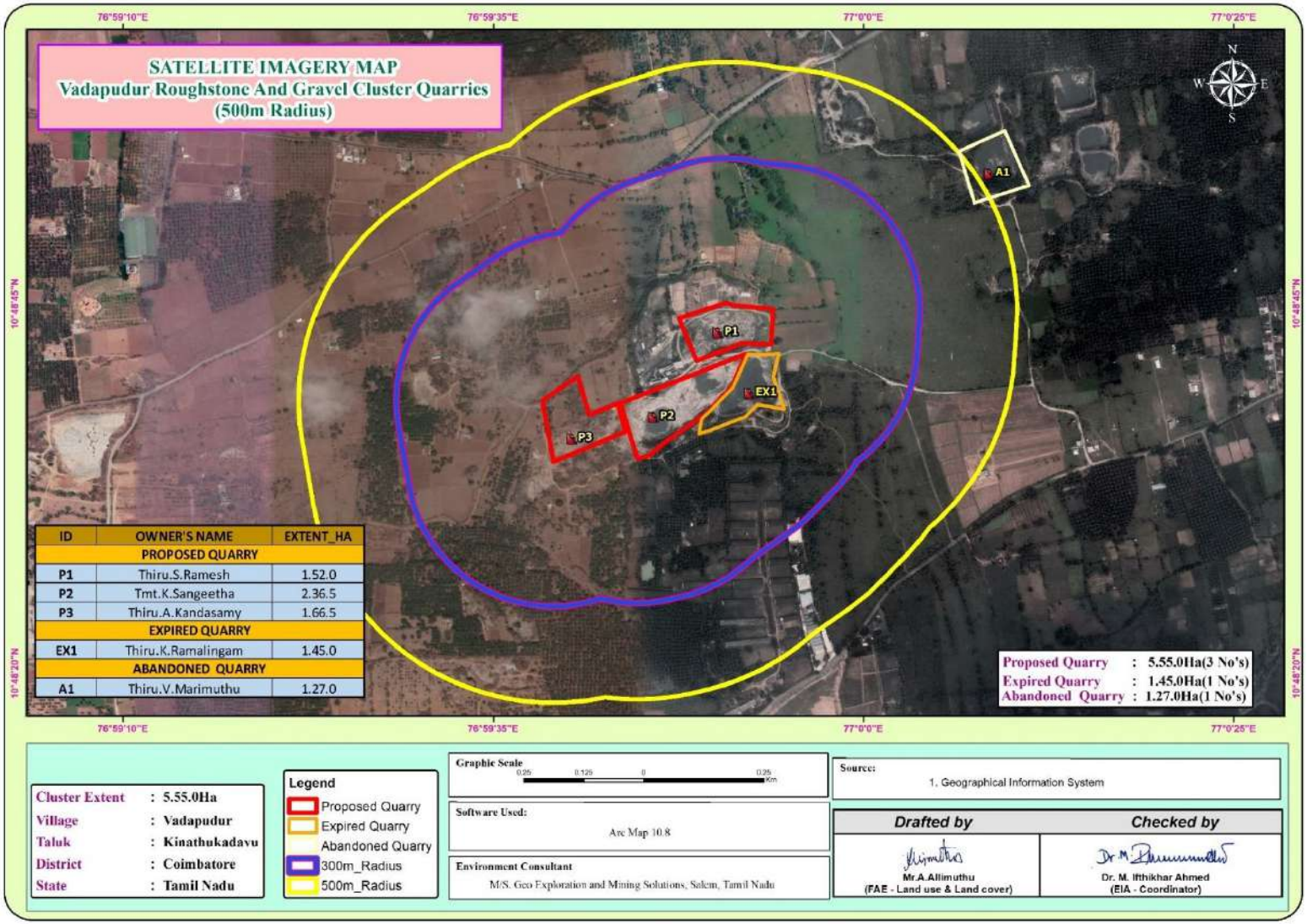


FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS

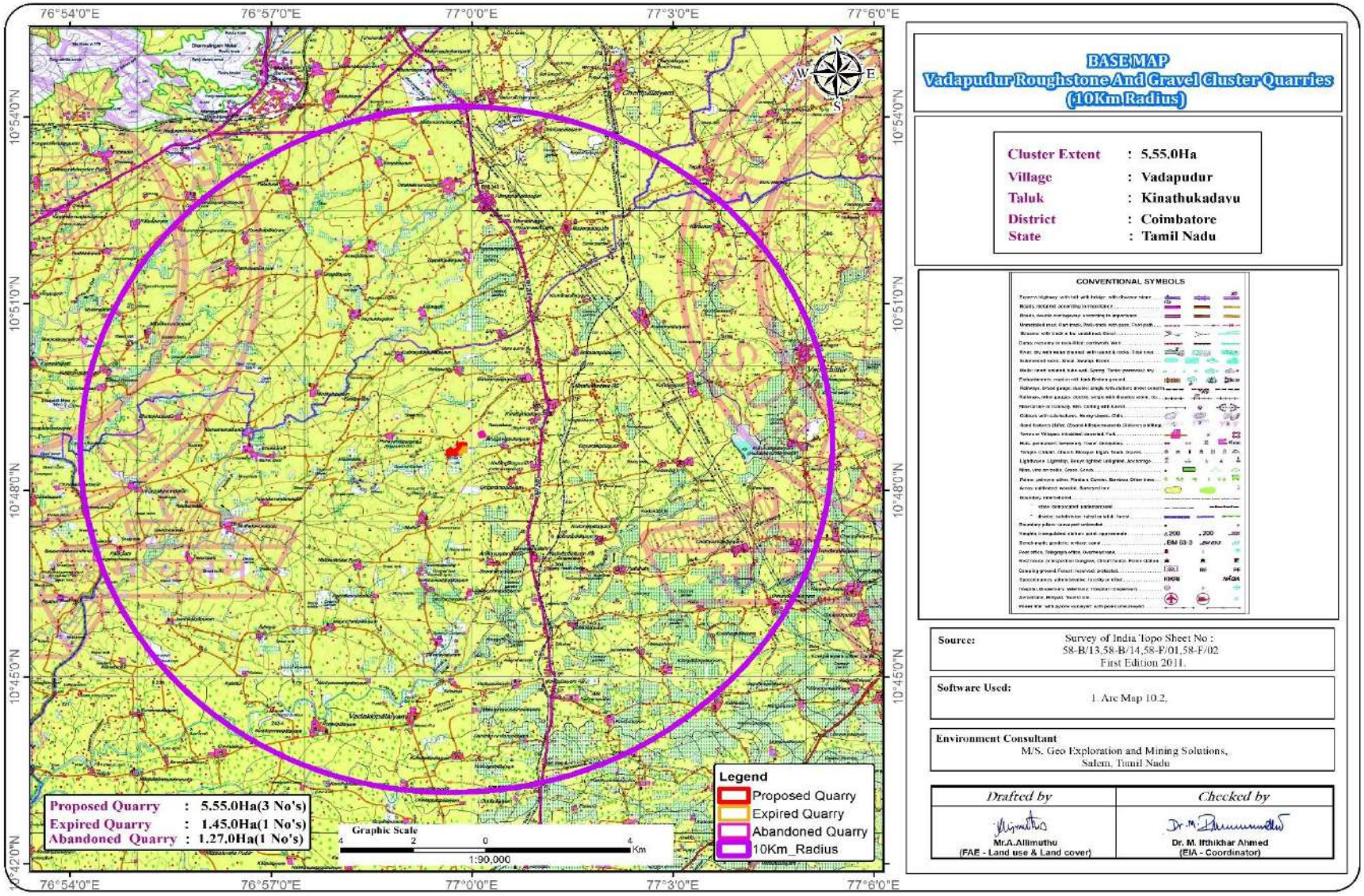
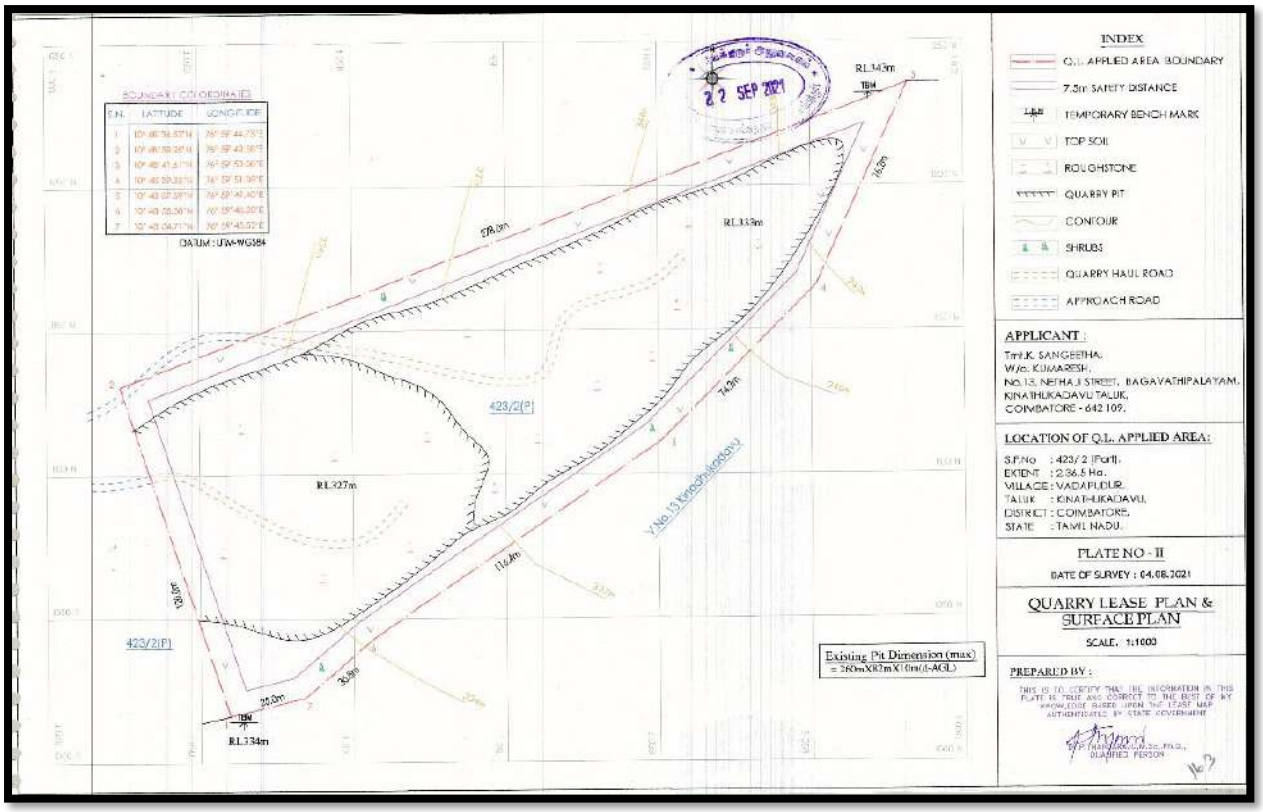


FIGURE – 4: QUARRY LEASE PLAN & SURFACE PLAN

P1– Thiru. Tmt.K.Sangeetha



2.4 METHOD OF MINING

Opencast Mechanized Mining Method is being proposed by formation of 5.0-meter height bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act – 1952.

The top layer of Topsoil will be Excavate directly by Hydraulic Excavators and preserved all along the safety barrier to facilitate greenbelt development during Mine Closure Stage. The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

2.5 PROPOSED MACHINERY DEPLOYMENT

PROPOSAL P-1				
S.NO.	**TYPE**	**NOS**	**SIZE/CAPACITY**	**MOTIVE POWER**
1	Jack hammers	6	1.2m to 2.0m	Compressed air

2	Compressor	2	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker Unit 4	1	300 HP	Diesel Drive
4	Tippers	3	20 Tonnes	Diesel Drive

2.6 WATER REQUIREMENTS

PROPOSAL – P-2		
***Purpose**	**Quantity**	**Source**
Domestic & Drinking purpose	0.8KLD	From Existing, bore wells and drinking water will be sourced from Approved Water vendors.
Dust Suppression	1.5KLD	From Existing bore wells from nearby area
Green Belt	1.0KLD	From Existing bore wells from nearby area
Total	**3.3 KLD**	

2.7 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.,

2.8 ULTIMATE PIT DIMENSION

Code	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
P-1	260	82	41 m Bgl

3.0 DESCRIPTION OF THE ENVIRONMENT

The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering December 2022 -February 2023 as per CPCB & MoEF & CC guidelines.

3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Data's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (2 core & 4 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (1 surface water & 5 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station

*Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2 NO_X, Fugitive Dust	24 hourly twice a week (Oct – Dec 2022)	8 (2 core & 6 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	8 (2 core & 6 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

3.2 LAND ENVIRONMENT

To study the land use pattern of the core as well as a buffer zone, land use/land cover details have been identified/ maps have been prepared in accordance with the Standard ToR point**.** A visual interpretation technique has been adopted for land use supervised classification based on training site by Level III classification with 1:50,000 scale for the preparation of land use mapping. Land use pattern of the area was studied through **LISSIII** imagery of **NRSC-Bhuvan** The 10 km radius map of study area was taken for analysis of **Land use/Landcover.**

TABLE 3.1: LAND USE / LAND COVER TABLE 10 KM RADIUS

S.No	Classification	Area_Ha	Area_%
BUILTUP			
1	Builtup Urban	71.00	0.22
2	Builtup Rural	890.80	2.73
3	Builtup Mining	228.78	0.70
AGRICULTURAL LAND			
4	Crop Land	11782.91	36.07
5	Agricultural Plantation	10683.94	32.70
6	Fallow Land	8618.85	26.38
BARREN/WASTELAND			
7	Barren Rocky	35.02	0.11
8	Scrub Land	308.70	0.94
WATERBODIES			
9	Waterbodies	50.523741	0.15
		32670.52	100.00

LU/LC Interpretation:

- The 10 km radius study area mainly comprises of Crop land & Agriculture Plantation land accounting of 36.07% & 32.70% of the total study area. The study area also consists of fallow land of 26.38%.
- The buffer zone studied has no ecological sensitive area (National Park, Wildlife Sanctuary, Biosphere Reserve/ etc.).
- Water Bodies such as Odai, ponds/ lakes comprise of 0.15% of the total buffer area. There are some lake found in the study area like Odai (60m-N), Kothavadi lake (7km-E), Koraiyur River (5km-SE) of the total study area.

- The Scrub land accounts of 0.94%. As per the primary survey, it was observed the scrub land is mainly occupied by the stony waste and left-over domestic waste generated by the nearby areas.
- The Barren rocky area covered is about 0.11% in buffer zone.
- 0.70% of the total study area is occupied by the mine industries. The area occupied by Mainly Rough stone of the total buffer area. As also observed within the primary survey, the 10 km buffer area is also occupied by the medium scaled rough stone and small Brick kiln industries also located in the study area.
- 0.22% of the area is covered under the Builtup Land including rural area. The nearest village within the 3km from the project site boundary is observed to be villages Muthur, Sankarayapuram, Kallapuram and Vadapudur villages etc.

The project site falls under the Rough stone region. Therefore, the area is appropriate for developing Road development and building etc., it shows that the region has good prospects in the future. Due to proposed Rough stone quarry in this region, economic condition of locals is expected to be improved directly & indirectly. Hence project will prove to be the best economic proposal for the coming times.

3.3 SOIL ENVIRONMENT

The samples were analysed as per the standard methods prescribed in "Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India". The important properties analysed for soil are bulk density, porosity, infiltration rate, pH and Organic matter, kjeldahi Nitrogen, Phosphorous and Potassium

Interpretation & Conclusion

- The nature of soil is slightly alkaline to strongly alkaline in nature with pH range 7.46 to 8.12
- The available Nitrogen content range between 351 to 412 mg/kg
- The available Phosphorus content range between 1.24 to 358 mg/kg
- The available Potassium range between 25.8 to 39.1 mg/kg

Whereas, the micronutrient as zinc (Zn), iron (Fe) and copper (Cu) were found in the range of 1.11 to 2.21mg/kg; 2.68 to 2.94 mg/kg and ND

3.4 WATER ENVIRONMENT

The study area is studded with few tanks that serve as the source of drinking water and also their surplus feeds adjoining tanks. The rainfall over the area is moderate, the rainwater storage in open wells and trenches are in practice over the area and the stored water acts as source of freshwater for couple of months after rainy season.

Surface Water

The pH of surface 8.32 while turbidity found within the standards. Total Dissolved Solids 536 mg/l and Chloride 149.9mg/l. Nitrates 13.8 mg/l, while sulphates 58.6 mg/l.

Ground Water

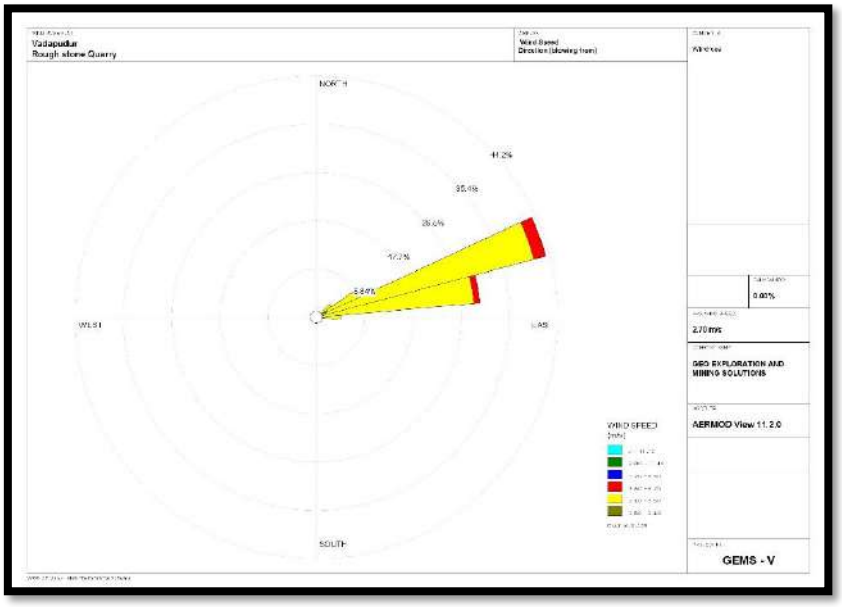
The pH of the water samples collected ranged from 7.32 to 7.84 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. on Turbidity, the water samples meet the requirement. Total Dissolved Solids were found in the range of 232- 498 mg/l in all samples. The Total hardness varied between 54.5 – 180 mg/l for all samples.

On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits.

3.5 AIR ENVIRONMENT

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the proposed quarry forms the baseline information.

FIGURE – 6: WIND ROSE DIAGRAM



3.6 SUMMARY OF AMBIENT AIR QUALITY

As per monitoring data, PM_{10} ranges from 31 µg/m^3 to 47.8µg/m^3, $PM_{2.5}$ data ranges from 21 µg/m^3 to 28.3 µg/m^3, SO_2 ranges from 5.0 µg/m^3 to 8.8 µg/m^3 and NO_2 data ranges from 17 µg/m^3 to 29.3 µg/m^3.

The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB. The minimum & maximum concentrations of PM_{10} were found to be 31.0 µg/m^3 in Core area & 43.6 µg/m^3 in Vadakkipalayam Village respectively.

The minimum & maximum concentrations of $PM_{2.5}$ were found to be 21.0 µg/m^3 in core zone and Vadakkipalayam Village respectively & 28.3 µg/m^3 in Kallapuram Village area respectively. The maximum concentration in the core zone is due to the cluster of quarries situated within 500m radius.

3.7 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 (eight) locations around the project area considering cluster quarries. Noise levels recorded in core zone during day time were from 41.8 – 42.6 dB (A) Leq and during night time were from 37.0-38.0 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 36.1 – 39.1dB (A) Leq and during night time were from 34.0 – 35.9 dB (A) Leq.

The values of noise observed in some of the areas are primarily owing to quarrying activities due to cluster of quarries within 500m radius, movement of vehicles and other anthropogenic activities.

Noise monitoring results reveal that the minimum & maximum noise levels at day time were recorded in the range of 30.2 dB(A) in Nallattipalayam Village and 46.5 dB(A) in Core area respectively. 31.2 dB (A) Muthur, Sankarayapuram, Nallattipalayam, Kinathukadavu and Kallapuram Village respectively minimum noise levels in night time. 40.2dB(A) maximum noise levels in night time for Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.8 ECOLOGICAL ENVIRONMENT

The study involved in the collection of primary data by conducting a survey in the field, examination of floral and faunal records in previously published reports and records. Analysis of the information is the view of the possible alteration in the environment of the project site. For the survey of fauna, both direct and indirect observation methods were used.

There is no schedule I species of animals observed within study area as per wildlife protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area. Hence this small operation over short period of time will not have any significant impact on the surrounding flora and fauna.

3.9 SOCIO ECONOMIC ENVIRONMENT

It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

The socio-economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis.

The proposed project will aim to provide preferential 28 persons to the local people there by improving the indirect employment opportunity for 100 persons and in turn the social standards will improve.

4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction.

4.1 LAND ENVIRONMENT:

ANTICIPATED IMPACT

- Permanent or temporary change on land use and land cover.
- Change in Topography: Topography of the ML area will change at the end of the life of the mine.
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.
- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.

- If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course.

MITIGATION MEASURES

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development of greenbelt etc.,
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area
- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt.
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.
- In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m safety barrier and other safety provided) so as to help minimise dust emissions.
- Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.2 SOIL ENVIRONMENT

IMPACT ON SOIL ENVIRONMENT

Erosion and Sedimentation (Removal of protective vegetation cover; Exposure of underlying soil horizons that may be less pervious, or more erodible than the surface layers; Reduced capacity of soils to absorb rainfall; Increased energy in storm-water runoff due to concentration and velocity; and Exposure of subsurface materials which are unsuitable for vegetation establishment).

MITIGATION MEASURES FOR SOIL CONSERVATION

- Run-off diversion – Garland drains will be constructed all around the project boundary to prevent surface flows from entering the quarry works areas. And will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before runoff is discharged from the quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- Retain vegetation – Retain existing or re-plant the vegetation at the site wherever possible.
- Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season

4.3 WATER ENVIRONMENT

ANTICIPATED IMPACT

- The major sources of water pollution normally associated due to mining and allied operations are:
  - Generation of waste water from vehicle washing.
  - Washouts from surface exposure or working areas
  - Domestic sewage
  - Disturbance to drainage course in the project area
  - Mine Pit water discharge
- Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of Oil & grease, suspended solids.
- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining
- Abstraction of water may lead to depletion of water table

MITIGATION MEASURES

- Garland drain, settling tank will be constructed along the project area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;

4.4 AIR ENVIRONMENT

ANTICIPATED IMPACT

- Garland drain, settling tank will be constructed along the proposed mining lease area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system.
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines

- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic (every 6 month once) analysis of quarry pit water and ground water quality in nearby villages.
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.
- Regular monitoring (every 6 month once) and analysing the quality of water in open well, bore wells and surface water.

MITIGATION MEASURES

Drilling – To control dust at source, wet drilling will be practiced. Where there is a scarcity of water, suitably designed dust extractor will be provided for dry drilling along with dust hood at the mouth of the drill-hole collar.

Advantages of Wet Drilling:-

- In this system dust gets suppressed close to its formation. Dust suppression become very effective and the work environment will be improved from the point of occupational comfort and health.
- Due to dust free atmosphere, the life of engine, compressor etc., will be increased.
- The life of drill bit will be increased.
- The rate of penetration of drill will be increased.
- Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

Blasting –

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face.
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas.
- Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day. i.e., at the time lunch hours, controlled charge per hole as well as charge per round of hole.
- Before loading of material water will be sprayed on blasted material.
- Dust mask will be provided to the workers and their use will be strictly monitored.

Haul Road & Transportation –

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with taurpaulin
- The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & loading points will be carried out twice a day

- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-metalled haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials

Green Belt

- Planting of trees all along main mine haul roads and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/trucks
- Green belt of adequate width will be developed around the project areas

Occupational Health

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical check-ups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers & tipper drivers
- AAQ monitoring will be conducted six months once to assess effectiveness of mitigation measures proposed

4.5 NOISE ENVIRONMENT

ANTICIPATED IMPACT

Noise pollution poses a major health risk to the mine workers. Following are the sources of noise in the existing open cast mine project are being observed such as Drilling, & Blasting, Loading and during movement of vehicles.

MITIGATION MEASURES

- Usage of sharp drill bits while drilling which will help in reducing noise;
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders;
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained;
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured though training and awareness.
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.

4.6 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

There is no Forest land, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km.

There are no migratory corridors, migratory avian-fauna, and rare endemic and endangered species. There are no wild animals in the area. No breeding and nesting site were identified in project site. No National Park and Wildlife Sanctuary found within 10km radius. The dumps / bunds around the mine itself act as a good barrier for entry of stray animals. In the post mining stage, barbed wire fencing is proposed all around the mined-out void to prevent fall of animals in the mine pits.

MITIGATION MEASURES

Keeping all this in mind the mitigations have been suggested under environmental management plan. With the understanding of the role of plant species as bio-filter to control air pollution, appropriate plant species (mainly tree species) have been suggested conceding the area/site requirements and needed performance of specific species. The details of year wise proposed plantation program are given in Table 4.13.

The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas

In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly in proposed areas falls in the cluster earmarked for plantation program as per Approved Mining Plan in different phases. This habitat improvement program would ensure the faunal species to re-colonize and improve the abundance status in the core zone.

The objectives of the green belt cover will cover the following:

- Noise abatement
- Ecological restoration
- Aesthetic, biological and visual improvement of area due to improved vegetative and plantations cover.

4.7 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

- Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.
- Approach roads can be damaged by the movement of tippers.
- Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region.

MITIGATION MEASURES

- Good maintenance practices will be adopted for all machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Air pollution control measure will be taken to minimize the environmental impact within the core zone.
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules.

- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc.., from this project directly and indirectly.
- From above details, the quarry operations will have highly beneficial positive impact in the area

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

No alternatives are suggested as all the mine sites are mineral specific

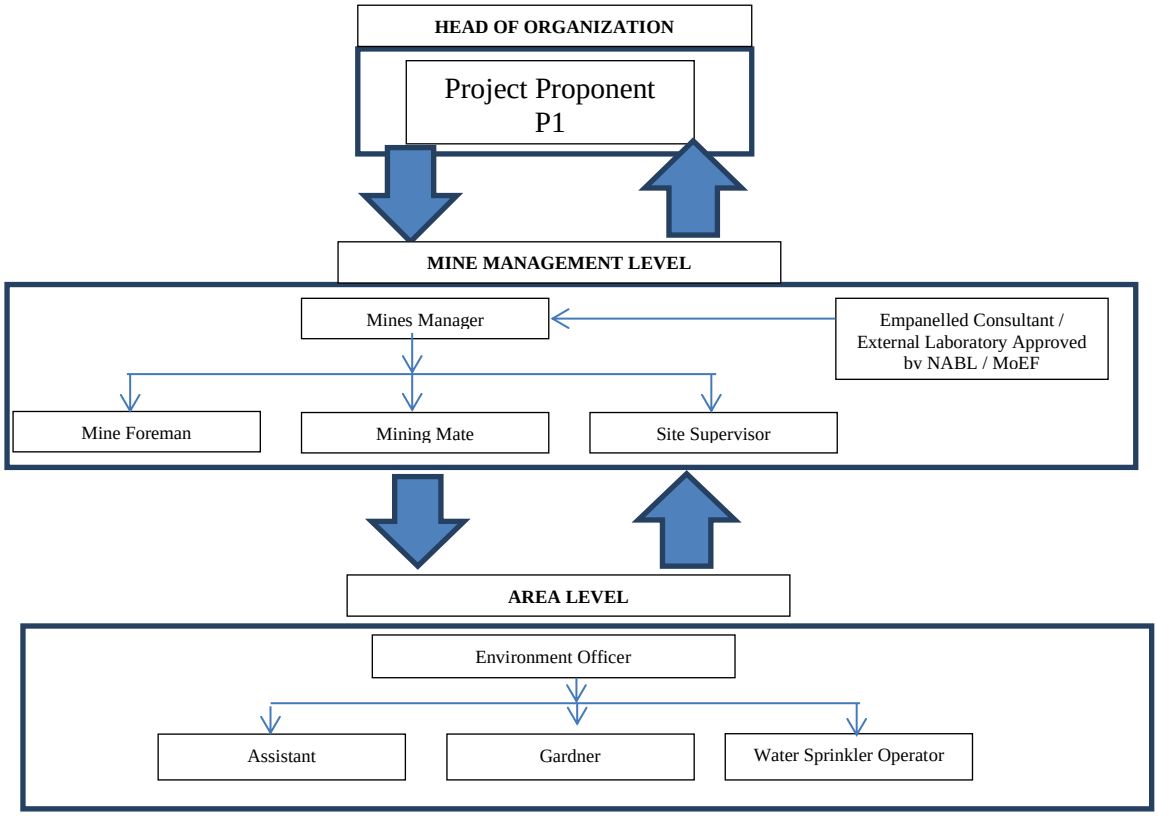
6. ENVIRONMENT MONITORING PROGRAM

An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in all the proposed quarries.

The responsibilities of this cell will be:

- Implementation of pollution control measures
- Monitoring programme implementation
- Post-plantation care
- To check the efficiency of pollution control measures taken
- Any other activity as may be related to environment
- Seeking expert's advice when needed.

6.1 ENVIRONMENTAL MONITORING CELL



6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, $PM_{2.5}$, PM_{10}, SO_2

					and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

7. ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities.

The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening

7.2 DISASTER MANAGEMENT PLAN

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone III. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated.

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- Rescue and medical treatment of casualties;

- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

7.3 CUMULATIVE IMPACT STUDY

CUMULATIVE PRODUCTION LOAD OF ROUGH STONE IN CLUSTER

Quarry	Production for five-year plan period	Per Year Production in m^3	Per Day Production in m^3	Number of Lorry Load Per Day @ $6m^3$ per load
P1	2,28,084	45617	152	25Trips /Day
P2	1,79,931	35986	120	20Trips /Day
Total	**4,08,015**	**81603**	**272**	**45Trips /Day**

CUMULATIVE PRODUCTION LOAD OF GRAVEL IN CLUSTER

Quarry	Mineable Reserves in m^3	Per Year Production in m^3	Per Day in m^3	Number of Lorry Load @ $6m^3$ per load
P1	-	-	-	-
P2	3294	1098	4	1Trips /Day
Total	**3294**	**1098**	**4**	**1 Trips\ day**

PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER

Location ID	N1	N2	N3	N4	N5	N6	N7	N8
Maximum Monitored Value (Day) dB(A)	46.5	45.6	43.2	45.9	40.2	42.3	44.2	39.2
Incremental Value dB(A)	47.30	52.14	34.08	27.64	35.49	27.04	32.14	30.56
Total Predicted Noise level dB(A)	46.30	53.01	43.70	45.96	41.47	42.43	44.46	39.76
NAAQ Standards	**Industrial**		**Day Time- 75 dB (A)**			**Night Time- 70 dB (A)**		
	Residential		**Day Time– 55 dB (A)**			**Night Time- 45 dB (A)**		

EMISSION ESTIMATION FROM CLUSTER MINES

EMISSION ESTIMATION FOR QUARRY "P1"- Tmt.K.Sangeetha,				
	Activity	**Source type**	**Value**	**Unit**
Estimated Emission Rate for PM_{10}	Drilling	Point Source	0.083649640	g/s
	Blasting	Point Source	0.000990683	g/s
	Mineral Loading	Point Source	0.041366904	g/s
	Haul Road	Line Source	0.002489834	g/s/m
	Overall Mine	Area Source	0.055330281	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000546691	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000028788	g/s
EMISSION ESTIMATION FOR QUARRY "P2"- Thiru.S.Ramesh				
	Activity	**Source type**	**Value**	**Unit**
Estimated Emission Rate for PM_{10}	Drilling	Point Source	0.078833537	g/s
	Blasting	Point Source	0.000736495	g/s
	Mineral Loading	Point Source	0.040713052	g/s
	Haul Road	Line Source	0.002488703	g/s/m
	Overall Mine	Area Source	0.046148981	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000443997	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000015659	g/s

SOCIO ECONOMIC BENEFITS

Location Code	Employment	Project Cost	CER
P1	28	Rs. 64,91,000/-	Rs.5,00,000/-
P2	26	Rs. 52,70,000/-	Rs.5,00,000/-
Total	**54**	**Rs 1,17,61,000/-**	**Rs.10,00,000/-**

8. PROJECT BENEFITS

Tmt.K. Sangeetha Rough stone quarry Project at Vadapudur Village aims to produce 2,28,084m^3 Rough Stone over a period of 5 Years & Topsoil nil. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits

- Increase in Employment Potential
- Improvement in Socio-Economic Welfare
- Improvement in Physical Infrastructure
- Improvement in Social infrastructure

9. ENVIRONMENT MANAGEMENT PLAN

The Environment Monitoring cell discussed formed by the mine management will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level.

The said team will be responsible for:

- Monitoring of the water/ waste water quality, air quality and solid waste generated.
- Analysis of the water and air samples collected through external laboratory.
- Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- Co-ordination of the environment related activities within the project as well as with outside agencies.
- Collection of health statistics of the workers and population of the surrounding villages.
- Green belt development.
- Monitoring the progress of implementation of the environmental monitoring programme.
- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10. CONCLUSION

Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and fund has been allocated for the same. The EMP is dynamic, flexible and subjected to periodic review. For project where the major environmental impacts are associated, EMP will be under regular review. Senior Management responsible for the project will conduct a review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.