

EXECUTIVE SUMMARY

“B1” CATEGORY (Cluster) – **MINOR MINERAL** – CLUSTER –
GOVERNMENT LAND - FRESH QUARRY

CLUSTER EXTENT = 11.20.5 ha

TVL.SQUARE ENTERPRISES ROUGH STONE QUARRY

PROJECT PROPONENT

Project Proponent	Proposed Project	Extent
Tvl.Square Enterprises, Thiru.R.Chandran (Partner) Varaganapalli Village, Nagamangalam Post, Denkanikottai Taluk, Krishnagiri District – 635 113.	S.F. No 629(Part), Extent: 3.20.5 Ha Nagamangalam Village, Denkanikottai Taluk, Krishnagiri District.	3.20.5 ha

✚ Letter No. SEIAA-TN/F.No.10238/SEAC/ToR-1556/2023 Dated: 27.09.2023

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS



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ENVIRONMENTAL LAB

GLOBAL LAB AND CONSULTANCY SERVICES

Approved by ISO:9001:2015, NABL, FSSAI,

Experts in QHSE

S.F No:92/3A2, Geetha Nagar,
Alagapuram Pudur, Salem-636016.

Baseline Monitoring Period

October 2023 – December 2023

1. INTRODUCTION

The project proponent Tvl. Square Enterprises has applied for Tender cum Auction for Government land and was successfully awarded to the Project Proponent for Rough stone quarry over an extent of 3.20.50 Ha in S.F. No 629(Part), Nagamangalam Village, Denkanikottai Taluk, Krishnagiri District.

Proponent applied for Terms of Reference vide Proposal No. SIA/TN/MIN/433058/2023 Dated 12.06.2023 and the ToR Was Granted vide Letter No No Lr No.SEIAA-TN/F.No.10238/SEAC/ToR-1556/2023 Dated: 27.09.2023

As per Obtained ToR the depth was restricted upto 60m(45m Agl + 15m Bgl) for 10 years and Revised Reserves For First Five Year Production is 4,52,615 m³ of Rough stone & 2,500 m³ of Topsoil and For Second Five Year Production 4,27,040 m³ of Rough stone.

Based on the ToR Baseline Monitoring study has been carried out for one season ie., **October 2023 – December 2023** and this EIA and EMP report is prepared for considering cumulative impacts arising out of these projects, the Cumulative Environmental Impact Assessment study is undertaken, which is followed by preparation of a detailed Environmental Management Plan (EMP) to minimize those adverse impacts.

“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 –

Name of the Project Proponent	Tvl. Square Enterprises Rough Stone Quarry
Address	Thiru.R.Chandran(Partner), Varaganapalli Village, Nagamangalam Post, Denkanikottai Taluk, Krishnagiri District. - 635113
Mobile	9444895079
Email	rajnandhunisha@gmail.com
Status	Individual

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRY					
CODE	Name of the Owner	Mineral	S.F. Nos	Extent in Ha	Status
P1	Tvl.Square Enterprises	Rough Stone	629(P)	3.20.5	Lr No. SEIAA-TN/F.No.10238/SEAC/ToR-1556/2023 Dated: 27.09.2023
TOTAL EXTENT				3.20.5	
EXISTING QUARRIES					
CODE	Name of the Owner	Mineral	S.F. Nos	Extent in Ha	Status
E-1	Thiru.Faldu Chimanlal Monanbhai	Rough Stone	629(Part-1)	4.00.0	29.02.2016 – 28.02.2026
E-2	Thiru.K.Amrish	Rough Stone	629(Part-2)	4.00.0	29.02.2016 – 28.02.2026

E-3	Tvl.Global Trading Company	Granite	629(P)	2.02.5	19.05.1995 – 18.05.2005 *Not taken for calculating Cluster
E-4	Tvl.Indira Granites	Granite	629(P)	0.81.0	06.05.1995 – 05.05.2005 *Not taken for calculating Cluster
E-5	Tvl.M.D.Anandhan	Granite	629(P)	0.81.0	17.03.1996-16.03.2006 *Not taken for calculating Cluster
E-6	Tmt.J.Premalatha	Granite	620(P)	0.81.0	14.12.1995 – 13.12.2005 *Not taken for calculating Cluster
E-7	Thiru.A.Rajamani	Granite	629(P)	2.02.5	06.05.1995 – 05.05.2005 *Not taken for calculating Cluster
E-8	Tvl.Rani Granites	Granite	629(P)	4.05.0	16.06.1993 – 15.06.2003 *Not taken for calculating Cluster
TOTAL EXTENT				18.53.0	
ABANDONED QUARRIES					
A-1	Thiru.Jayendra KumarBavan Bai Patel	Rough Stone	1249(P)	5.00.0	2.7.2008 – 1.7.2018
TOTAL EXTENT				5.00.0	
TOTAL CLUSTER EXTENT				11.20.5	

Cluster area is calculated as per MoEF & CC Notification – S.O. 2269 (E) Dated: 01.07.2016

* Homogeneous Minerals will be taken for calculating the Cluster Area.

1.3 SALIENT FEATURES OF THE PROPOSAL

Name of the Project	Tvl. Square Enterprises Rough Stone Quarry	
S.F. No.	629(Part)	
Extent	3.20.5 ha	
Village Taluk and District	Nagamangalam Village, Denkanikottai Taluk, Krishnagiri District.	
Land Type	Government Land	
Existing quarry operation	Nil, it is a Fresh area	
Toposheet No	57-H/14	
Latitude between	12° 36' 14.45"N to 12° 36' 21.97"N	
Longitude between	77° 53' 57.46"E to 77° 54' 07.76"E	
Elevation of the area	847 - 806m AMSL	
Lease period	10 Years	
Mining Plan period	10 years	
Proposed Depth of Mining as per ToR	60 m (45m Agl + 15m Bgl) (1m Topsoil + 59 m Rough stone)	
Geological Resources	Rough Stone in m ³	Topsoil
	18,35,565	4,850
Mineable Reserves	9,09,210	2,500
For First Five Year Production as per ToR	4,52,615	2,500
For Second Five Year Production as per ToR	4,27,040	-
Peak Production	1,00,240	1,512
Ultimate Pit Dimension	290m (L) x 108m (W) x 70m(D) (45m Agl + 25m Bgl)	

Water Level in the region	70 – 65 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving small drilling and Controlled blasting using Slurry Explosives	
Topography	The lease applied area is Hilly terrain. The area has gentle sloping towards Eastern side and altitude of the area is 847 – 806 m above from Mean sea level. The area is covered Massive Rough Stone (Granitic gneiss) which is clearly inferred from the Surface due to the entire area.	
Machinery proposed	Jack Hammer	9 Nos
	Compressor	2 Nos
	Excavator with Bucket and Rock Breaker	2 Nos
	Tippers	5 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone.	
Proposed Manpower Deployment	37 Nos	
Project Cost	Rs. 2,78,59,000/-	
6 months once compliance Monitoring Cost (EMP)	Rs. 7,60,000/-	
CER Cost	Rs. 5,00,000/-	
Nearby Water Bodies	Seasonal Odai	380m South
	Odai	360m NE
	Tank	840m SE
	Tank Near Nagamangalam	2.5km SE
	Chinnar Stream	4.6km SW
	Tank Near Armadpuram	4.6km NW
	Ponnaiyar River	6.5km NE
Nanjappan Kodigai Eri	6.8km West	
Greenbelt Development Plan	Proposed to plant 1920 Nos of trees considering 500 Nos of trees/ Ha criteria The plantation will be developed around the project site and nearby village roads	
Proposed Water Requirement	1.8 KLD	
Nearest Habitation	1.2 km – South East	
Nearest Reserve Forest	Udedurgam. R.F. – 4.22 km – South West (Source - TNGIS)	
Nearest Wild Life Sanctuary	Cauvery North Wildlife sanctuary -4 km-SouthWest Cauvery South Wildlife sanctuary -27 km-South	

Source: Approved Mining Plan

1.4 STATUTORY DETAILS

- The Project Proponent applied for Tender Cum Auction on 05.04.2022.
- Proponent applied for Rough stone quarry letter on 19.04.2022
- Precise Area Communication Letter was issued by the Deputy Director Department of Geology and Mining, Krishnagiri Rc. No 555/2022/Mines, Dated: 26.04.2022.
- The Mining Plan was prepared by Recognized Qualified Person and approved by Deputy Director, Geology and Mining, Krishnagiri District, vide Rc. No 555/2022/Mines, Dated: 25.07.2022
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No. 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/433058/2023. dated: 12.06.2023.

2. PROJECT DESCRIPTION

The proposed project are site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarry.

Method is mining is common for all the proposed quarries in the cluster. Rough Stone is 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	NH844-Rayakottai– Hosur Road -4.30 km-NE SH85 -Rayakottai– Attibele Road -1.05 km-SE
Nearest Village	Varaganapalli – 1.30 km- SE
Nearest Town	Kelamangalam – 8 km-NW
Nearest Railway Station	Kelamangalam – 8 km-NW Salem – Bangalore Railway line - 860m SW
Nearest Airport	Bengaluru – 72 km – NW
Seaport	Kochi – 341 km – SW

2.2 LAND USE PATTERN OF THE LEASE APPLIED AREA

Description	Present area (Ha)	Area at the end of this quarrying period (Ha)
Area under quarrying	Nil	2.38.5
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.20.0
Unutilized Area	3.20.5	0.59.0
Grand Total	3.20.5	3.20.5

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

PARTICULARS	DETAILS	
	Rough Stone	Topsoil in m ³
Geological Resources	18,35,565	4,850
Mineable Reserves	9,09,210	2,500
Production for first five-year plan period	4,52,615	2,500
Production for Second five-year plan period	4,27,040	-
Peak Production	1,00,240	1,512
Mining Plan Period / Lease Applied Period	10 Years	
Number of Working Days	300 Days	
Production per day	293	4
No of Lorry loads (12m ³ per load)	24	1 trip per week
Proposed Depth of Mining as per ToR	60m (45m Agl + 15m Bgl) (1m Topsoil + 59m Rough Stone)	

Source: Approved mining plan

2.4 RESOURCES AND RESERVES

Description	Rough Stone m ³	Topsoil m ³
Geological Resource in m ³	18,35,565	4,850
Mineable Resource in m ³	9,09,210	2,500
Year wise production for First five-year plan period as per ToR	4,52,615	2,500
Year wise production for Second five-year plan period as per ToR	4,27,040	-

FIGURE – 1: GOOGLE IMAGE SHOWING APPLIED QUARRY LEASE AREA



FIGURE-2 QUARRY LEASE PLAN / SURFACE PLAN



FIGURE – 3: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)

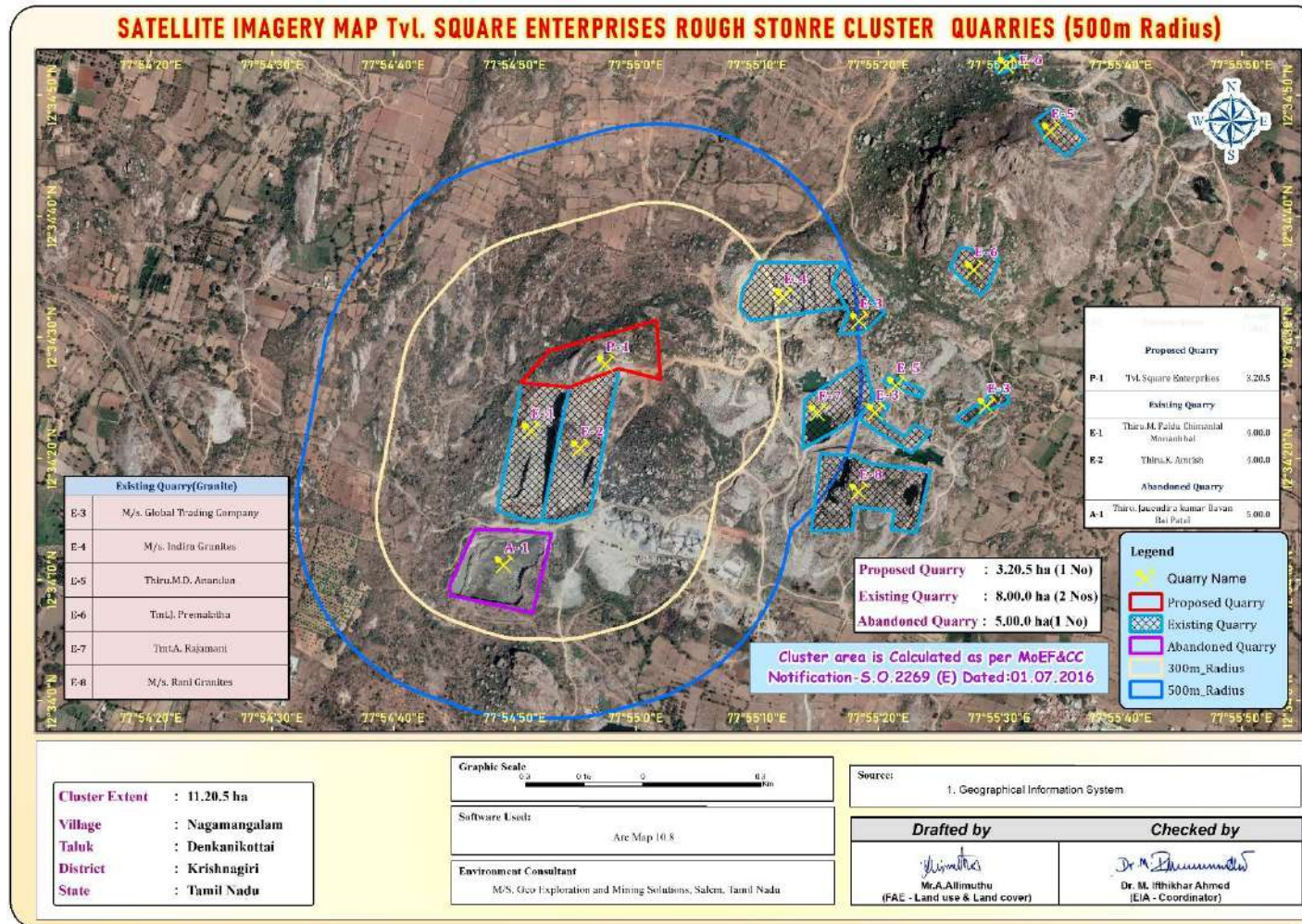


FIGURE – 4: TOPOSHEET MAP COVERING 10 KM RADIUS

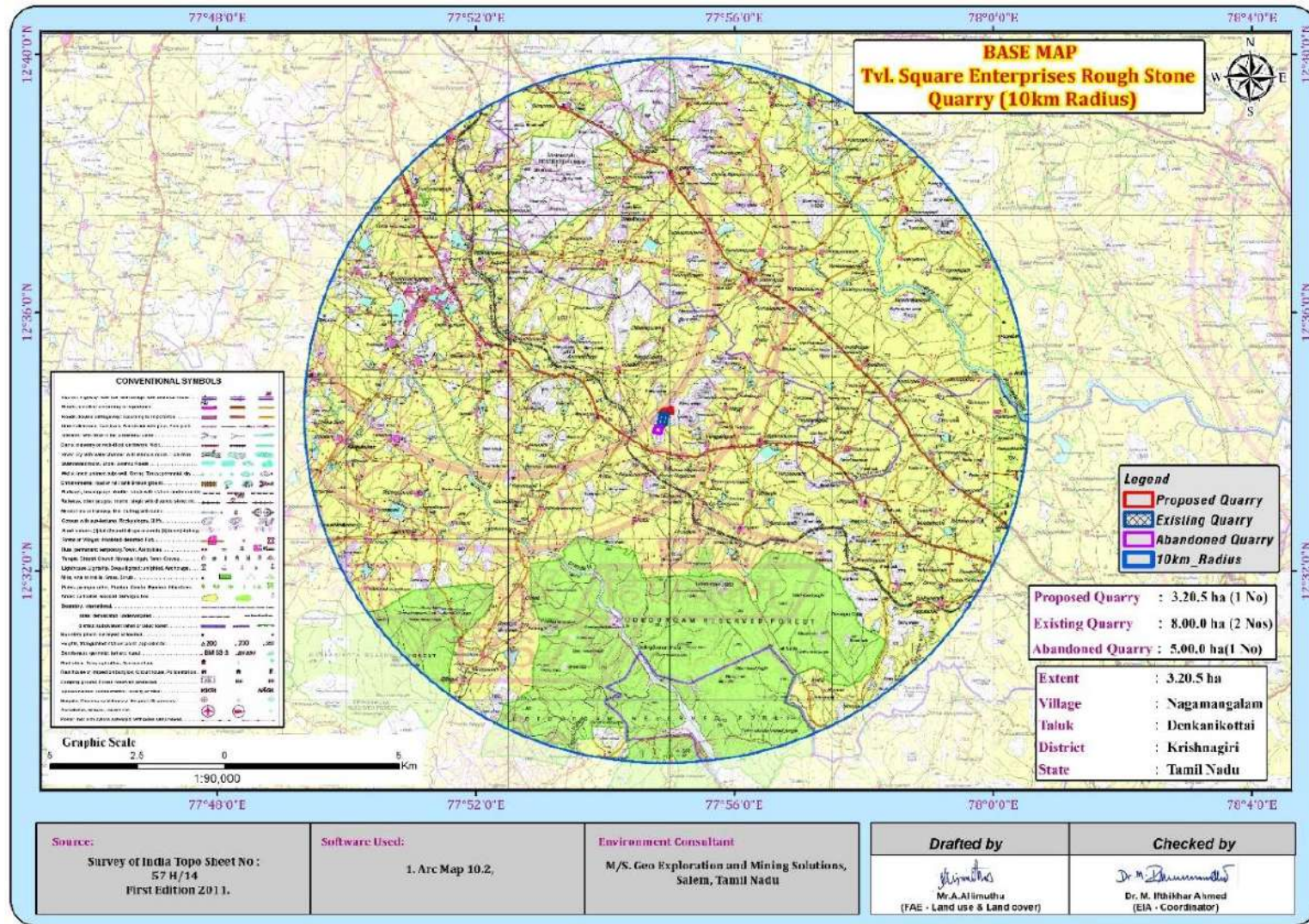


FIGURE – 5: PROJECT SITE PHOTOS



2.5 METHOD OF MINING

Opencast Mechanized Mining Method is proposed by formation of 5.0-meter height bench with a bench width not less than the bench height. Bench slope will be maintained as 60°.

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 Excavator attached with rock breaker/ bucket with tipper combination will be involved for the excavation/breaking of Rough stone after blasting. 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.

2.6 PROPOSED MACHINERY DEPLOYMENT

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	9	1.2m to 2.0m	Compressed air
2	Compressor	2	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker	2	300 HP	Diesel Drive
4	Trucks	5	20 Tonnes	Diesel Drive

2.7 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

- ✚ At the end of life of mine, the excavated mine pit / void will act as artificial reservoir for collecting rain water and helps to meet out the demand or crises during drought season.
- ✚ After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem.
- ✚ Mine Closure is a process of returning a disturbed site to its natural state or which prepares it for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety.
- ✚ The principle closure objectives are for rehabilitated mines to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/ non-contaminating, and capable of sustaining an agreed post-mining land use.

2.8 ULTIMATE PIT DIMENSION

Length (Max) (m)	Width (Max) (m)	Depth (Max)
290	108	70m(45m Agl + 25m Bgl)

3. DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out during October to December 2023 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine GLOBAL LAB AND CONSULTANCY SERVICES Approved by ISO:9001:2015, FSSAI, NABL Certified & MoEF Notified Laboratory.

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 (1 core & 5 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 (2 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Auto matic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourly twice a week (December 2020 – February 2021)	7 (2 core & 5 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7 (2 core & 5 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.

Source: On-site monitoring/sampling by GLOBAL LAB AND CONSULTANCY SERVICES, with GEMS

3.2 LAND ENVIRONMENT

S.No	CLASSIFICATION	AREA in HA	AREA in %
BUILTUP			
1	Rural	52.00	0.16
2	Urban	13.42	0.04
3	Mining	328.63	1.01
AGRICULTURAL LAND			
4	Crop Land	14762.02	45.59
5	Plantation	4212.50	13.01
6	Fallow Land	3865.53	11.94
FOREST			
7	Forest	6203.34	19.16
BARREN/WASTE LANDS			
8	Scrub Land	1391.71	4.30
9	Barren Rocky	930.37	2.87
WETLANDS/ WATER BODIES			
10	Water bodies/lake	618.81	1.91
TOTAL		32378.34	100.00

3.3 SOIL ENVIRONMENT

Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay (21 % 31.17 %) to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 1.08-1.18 g/cc. The Water Holding Capacity of the soil samples is found to be medium i.e., ranging from 42.6 – 55.6 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 1.26 – 1.39
- The available Nitrogen content range between 175.6 – 238.4 mg/kg
- The available Phosphorus content range between 13.7 – 18.4 mg/kg
- The available Potassium range between 0.8 mg/kg to 1.29 mg/kg

3.4 WATER ENVIRONMENT

Surface Water

Ph:

The pH of surface 7.36 – 7.93 while turbidity found within the standards. (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

Total Dissolved Solids:

Total Dissolved Solids 1160-2020 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 187-424 mg/l, sulphates varied from 185 - 264 mg/l.

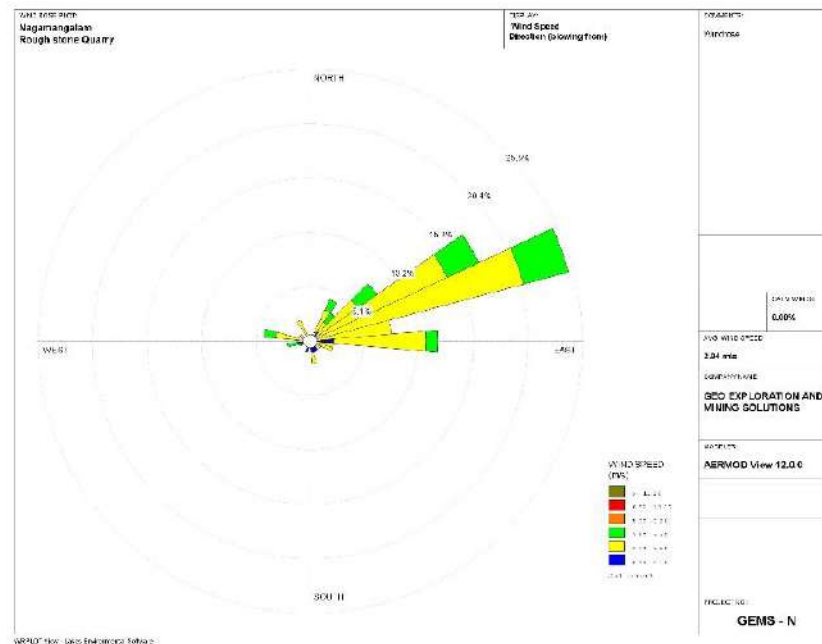
Ground Water

The pH of the water samples collected ranged from 7.49 – 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. The Total Dissolved Solids were found in the range of 1513 - 1702 mg/l in all samples. The Total hardness varied between 790 - 1020 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

As per monitoring data, PM₁₀ ranges from 40.0 µg/m³ to 49.2 µg/m³, PM_{2.5} data ranges from 20.0 µg/m³ to 26.2 µg/m³, SO₂ ranges from 2.2 µg/m³ to 10.0 µg/m³ and NO₂ data ranges from 17.7 µg/m³ to 25.0 µg/m³. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.6 NOISE ENVIRONMENT

Ambient noise levels were measured at 7 (Seven) locations around the project area considering cluster quarries. Noise levels recorded in core zone during day time were from 41.8 - 42.7 dB (A) Leq and during night time were from 36.9 – 38.1 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 35.6 – 41.1 dB (A) Leq and during night time were from 34.7 – 36.9 dB (A) Leq.

3.7 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.

3.8 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 projects will aim to provide preferential employment to the local people there by improving the employment opportunity in the area 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 soil 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 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 drains, settling tank will be constructed along the individual mining leases. The Garland drains of the individual leases will be connected to settling tank and after settling the 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 onwards and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting
- 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 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 and analysing the quality of water in open well, bore wells and surface water

4.3 AIR ENVIRONMENT

ANTICIPATED IMPACT

- During mining, at various stages activities such as excavation, drilling, blasting, and transportation of materials, particular matter (PM), gases such as Sulphur dioxide, oxides of Nitrogen from vehicular exhaust are the main air pollutants.
- Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area.

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 tarpaulin
- 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
- Ambient Air Quality Monitoring will be conducted six months once to assess effectiveness of mitigation measures proposed.

4.4 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 through training and awareness.
- Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

4.5 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

There are no National Park and Archaeological monuments within project area. There are no migratory corridors, migratory avian-fauna, 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

To reduce the adverse effects on natural flora/fauna status of the area due to deposition of dust generated from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out.

4.5.1 GREENBELT DEVELOPMENT PLAN

Year	No. of trees proposed to be planted	Considering survival rate of 80% additionally 20% of plantation is proposed	Area to be covered in m ²	Name of the species
I	1600	1920	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development.	Neem, Pongamia Pinnata etc.,

4.6 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

Employment generation due to the project will provide direct employment for about 37 persons.

MITIGATION MEASURES

- Good maintenance practices will be adopted for plant 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.
- Appropriate 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, DMF, NMET etc, from this project directly and indirectly.

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

The site has been selected based on geological investigation and exploration as below:

- Occurrence of minerals at the specific site.
- Transportation facility for materials & manpower.
- Overall impact on environment and mitigation feasibility
- Socio – economic background.

The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise for this project.

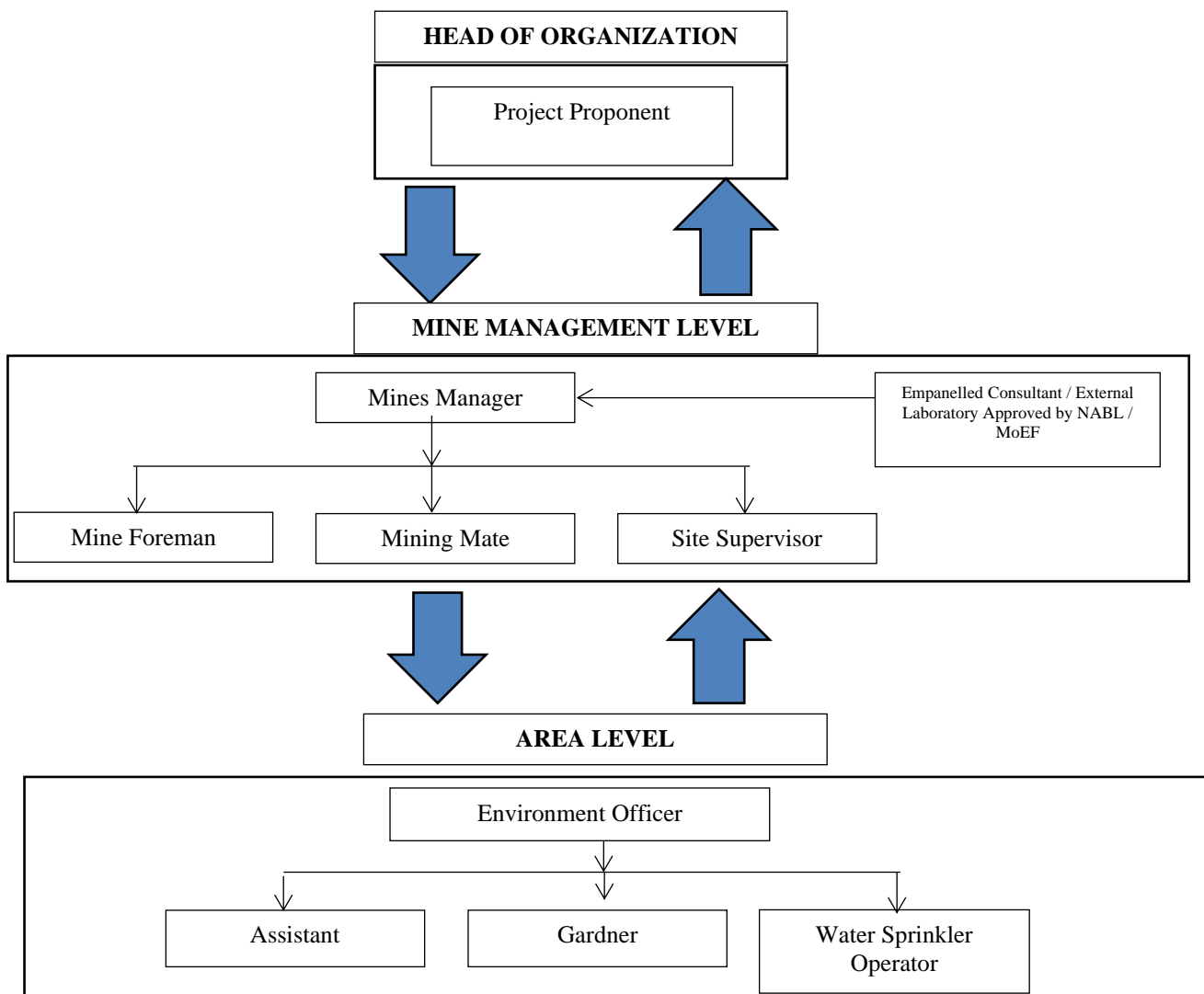
6. ENVIRONMENT MONITORING PROGRAM

Usually, an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to take into account the changes in the Environment.

The Objective of Monitoring -

- ✚ To check or assess the efficiency of the controlling measures;
- ✚ To establish a data base for future impact assessment studies.

6.1 ENVIRONMENTAL MONITORING CELL



6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

IN COMMON FOR PROPOSAL QUARRY					
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 FOR PROPOSAL QUARRY

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. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

7.2 DISASTER MANAGEMENT PLAN FOR PROPOSAL QUARRY

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

Quarry	Production for five/Ten-year plan period	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Day
P1	8,79,655	87,965	293	24
Total	8,79,655	87,965	293	24
E1	8,51,195	85,119	283	23
E2	8,61,045	86,104	287	23
Total	17,12,240	1,71,223	570	46
Grand Total	25,91,895	2,59,188	863	70

CUMULATIVE PRODUCTION LOAD OF TOPSOIL

Quarry	Production for Two-year plan period	Per Year Production in m ³	Per Day Production in m ³	Number of Lorry Load Per Week
P1	2500	1,250	4	1
Total	2500	1,250	4	1
E1	-	-	-	-
E2	-	-	-	-
Total	-	-	-	-
Grand Total	2500	1,250	4	1

SOCIO ECONOMIC BENEFITS FROM CLUSTER

Location ID	Project Cost	CER
P1	Rs. 2,78,59,000/-	Rs.5,00,000/-
E1	Rs.1,48,50,000/-	Rs.2,97,000/-
E2	Rs. 1,48,45,000/-	Rs 2,96,900/-
Total	Rs. 5,75,54,000 /-	Rs. 10,93,900/-

EMPLOYMENT BENEFITS

Description	Employment
P1	37
Total	37
E1	16
E2	16
Total	32
Grand Total	69

GREENBELT DEVELOPMENT BENEFITS

CODE	No of Trees proposed to be planted	Survival %	Area Covered Sq.m	Name of the Species
P1	1920	80%	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development	Neem, Pinnata, Pongamia, Ashoka etc.,
Total	1920			
E1	2400			
E2	2400			
Total	4,800			
G.Total	6,720			

8. PROJECT BENEFITS

The Proposed Project for Quarrying Rough Stone at Nagamanagalam Village aims to produce **8,79,655** m³ Rough Stone over a period of 10 Years and Topsoil 2500 m³ for period of 2 years. 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 FOR PROPOSAL QUARRY

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

It can be concluded from overall assessment of the impacts, in terms of positive and negative effects on various environmental components, that the mining activities will not have any adverse effect on the surrounding environment.

To mitigate any impacts due to the mining activities, a well-planned EMP and a detailed post project monitoring system is provided for regular monitoring and immediate rectification at site. Due to the cluster quarrying activities, socio economic conditions in and around the project site will be improved substantially. Hence, the Prior Environmental Clearance shall be granted at the earliest.