

EXECUTIVE SUMMARY

THIRU. R. MOHANRAJ ROUGH STONE AND GRAVEL QUARRY

In S. F. Nos. 176/1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C, 3D, 3E, 3F,3G & 176/4B, Girijapuram Village, Vembakkam Taluk, Tiruvannamalai District, Over an Extent: 2.94.5 ha

“B1” CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND

CLUSTER EXTENT = 15.73.0 Ha

At

Girijapuram Village, Vembakkam Taluk, Tiruvannamalai District

Complied as per ToR obtained vide

Lr.No.SEIAA-TN/F.No.7238/SEAC/ToR- 844/2019 Dated: 17.02.2021

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS



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

1. INTRODUCTION

This Draft EIA report is prepared by considering Cumulative load of all proposed & existing quarries of Girijapuram Rough Stone and Gravel Cluster Quarries consisting of Four Proposed and Two Existing Quarries with total extent of Cluster of 15.73.0 ha in Girijapuram Village, Vembakkam Taluk, Tiruvannamalai 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 vide Lr.No.SEIAA-TN/F.No.7238/SEAC/ToR- 844/2019 Dated: 17.02.2021. The Baseline Monitoring study has been carried out during Post monsoon season (December 2019 – February 2020).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) individually to minimize those adverse impacts.

“Draft EIA & EMP report prepared on the basis of ToR obtained for the grant of Environmental Clearance from SEIAA, Tamil Nadu”

1.1 DETAILS OF PROJECT PROPONENT –

| Description | Details |
|---------------------|--|
| Name of the Project | Thiru. R. Mohanraj Rough Stone & Gravel Quarry |
| S.F. No. | 176/1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C, 3D, 3E, 3F,3G & 176/4B |
| Extent | 2.94.5 |
| Land Type | Patta Land |
| Village | Girijapuram |
| Taluk and District | Vembakkam Taluk and Tiruvannamalai District |

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

| PROPOSED QUARRIES – 4 Nos | | | | | |
|---------------------------|---|--|--------------|------------------------|--|
| CODE | Name of the proponent and address | Village & S.F.Nos | Extent in Ha | Lease period | Remarks |
| P1 | Thiru. R. Mohanraj, S/o. Rajagopal, No. 33, Pillaiyarkovil, Puliyambedu, Ambattur Taluk Thiruvallur District | Girijapuram Village 176/1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C, 3D, 3E, 3F,3G & 176/4B | 2.94.5 | Applied for 5 years | Obtained ToR Letter No: SEIAA- TN/F.No.7238/SEAC/ToR- 844/2019 Dated: 17.02.2021 |
| P2 | Tvl. N.R.M.Sons Blue Metals, No.97A, Ottakoothar Street, Mamallan Nagar, Kancheepuram – 631 502. | Kizhnaickenpalayam & Girijapuram Village 171/9, 171/12, 103/4, 103/5, 103/6 &103/10 | 2.75.0 | Applied for 5 years | Obtained ToR Letter No SEIAA- TN/F.No.6832/SEAC/ToR- 4052/2019 Dated: 23.10.2019 – |
| P3 | Thiru. N. Raghu, S/o. Natarajan, No.14/2, Center Street, Ganapathypuram, East Thambaram, Chennai | Menallur Village 164/3B, 365/1 & 165/2 | 2.95.0 | Applied for 5 years | Obtained ToR Letter No SEIAA- TN/F.No.6871/SEAC/ToR- 762/2020 Dated: 23.09.2020 |
| P4 | Thiru. D. Jayaprakash. S/o. Dhanapal, Pallikudam Street, Kunrathur Main road, Sikkarayapuram Village, | Girijapuram Village 83/6, 83/7, 83/8, 83/9, 85/6, 85/7, 91/1 & 91/2A | 1.47.0 | Applied for 5 years | Obtained ToR Letter No SEIAA- TN/F.No.7328/SEAC/ToR- 758/2020 Dated: 24.09.2020– |

| | Sriperumpthur Taluk, Kancheepuram District | | | | |
|----------------------------------|--|---|---------------------|--------------------------------|------------------|
| TOTAL | | | 10.11.5 ha | | |
| EXISTING QUARRIES – 2 Nos | | | | | |
| CODE | Name of the proponent and address | S.F.Nos | Extent in Ha | Lease period | Remarks |
| E1 | Thiru. L. Sudhakar, S/o. Loganathan, No. 82, Palla Street, Agaram Village, Kancheepuram Taluk and District | Girijapuram Village 94/4, 95/2, 96/1, 103/11 & 103/12 | 3.51.5 | 14.09.2017 to 13.09.2022 | Operating quarry |
| E2 | Thiru. K. Devaraj, S/o. Kanniyappan, No. 305, Lakshmiapuram Village, Vembakkam Taluk, Tiruvannamalai District | Girijapuram Village 83/11F, 11Q, 11H, 98/13A, 91/4B, 92/3A, 32/3B, 92/3C, 98/14/A, 92/1B | 2.10.0 | - | Operating quarry |
| TOTAL | | | 5.61.5 ha | | |
| TOTAL CLUSTER EXTENT | | | 15.73.0 ha | | |

1.3 SALIENT FEATURES OF THE PROPOSAL

| | | |
|-----------------------------------|--|-----------------------|
| Name of the Mine | Thiru. R. Mohanraj Rough Stone & Gravel Quarry | |
| Extent | 2.94.5 ha | |
| Geological Reserves | Rough Stone | Gravel |
| | 11,78,000 m ³ | 58,900 m ³ |
| Mineable Reserves | Rough Stone | Gravel |
| | 4,41,110 m ³ | 49,998 m ³ |
| Mining Plan Period / Lease Period | 5 Years | |
| Ultimate Pit Dimension | 165m (L) * 120 m (W) * 37 m (D) | |
| Toposheet No | 57 P/10 | |
| Latitude | 12°44'10.31" N 12°44'18.55" N | |
| Longitude | 79°42'02.36" E 79°42'09.51" E | |
| Water Level | 56m – 52m bgl | |
| Machinery | Jack Hammer Drills | 10 |
| | Compressor | 3 |
| | Hydraulic Excavator | 2 |
| | Tippers | 4 |
| Blasting | Usage of Slurry Explosive with MSD detonators | |
| Manpower Deployment | 38 Nos | |
| Project Cost | Rs. 66,53,300/- | |

1.4 STATUTORY DETAILS

- The proponent applied for Rough Stone and Gravel Quarry Lease, Dated: 06.06.2019
- Precise Area Communication Letter was issued by the District Collector, Tiruvannamalai, vide Rc.No. 377/Kanimam/2019, Dated 31.07.2019
- The Mining Plan was prepared and got approved by Assistant Director, Geology and Mining, Tiruvannamalai District, vide Rc.No: 377/Kanimam/2019, Dated 10.09.2019
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/45343/2019 Dated: 23.10.2019

2. PROJECT DESCRIPTION

The applied area is rocky barren patta land with no major vegetation or trees within the project area, the project is site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed project.

Rough Stone and Gravel 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

| Description | Details |
|----------------------------|---|
| Nearest Village | Valavandal village – 1.0 km - NW |
| Nearest Town | Kancheepuram – 11.0 km – North |
| Nearest Roadway | Cart track is West and South side of the area (10m safety distance is provided) Mamandur – Bagavandapuram road – 330m – South Kundiyanthandalam – Sen iyanallur road – 1.2 km – North (NH 4) Chennai – Vellore – 15.0 km North (SH 116) Kancheepuram – Vandavasi 3.0 km West side |
| Nearest Railway | Southern Railway line Chennai – Kancheepuram – Chengalpattu section) – 11.0 km – North |
| Nearest Airport | Chennai Airport – 56 km – North East |
| Seaport | Chennai 70 km North East side |
| Interstate boundary | Andhra Pradesh Interstate boundary – 54 km –North |

2.2 LAND USE PATTERN OF THE LEASE APPLIED AREA

| Description | Present area in (ha) | Area at the end of life of quarry (Ha) |
|--------------------|----------------------|--|
| Area under quarry | Nil | 2.29.0 |
| Infrastructure | Nil | 0.01.0 |
| Roads | Nil | 0.02.0 |
| Green Belt | Nil | 0.30.0 |
| Un – utilized area | 2.94.5 | 0.32.5 |
| Total | 2.94.5 | 2.94.5 |

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

| PARTICULARS | DETAILS | |
|--|---|---------------------------------|
| | Rough Stone (5 Year Plan period) | Gravel (3 Years Plan period) |
| Geological Resources | 11,78,000 m ³ | 58,900m ³ |
| Mineable Reserves | 4,41,110 m ³ | 49,998 m ³ |
| Mining Plan Period | 5 Years | |
| Proposed Production for this Plan Period | 4,41,110 m ³ | 49,998 m ³ |
| Number of Working Days | 300 Days | |
| Production per day | 294 m ³ | 56 m ³ |
| No of Lorry loads (6m ³ per load) | 49 Nos | 10 Nos |
| Total Depth of Mining | 37 meters (35 m Rough Stone + 2 m Gravel) | |

2.4 YEAR-WISE PRODUCTION PLAN

| Year | Rough Stone in m ³ | Gravel in m ³ |
|----------------------|-------------------------------|--------------------------|
| 1 st year | 91580 | 14688 |
| 2 nd year | 91840 | 22420 |
| 3 rd year | 93890 | 12880 |
| 4 th year | 95210 | - |
| 5 th year | 68590 | - |
| Total | 441110 | 49988 |

FIGURE – 1: GOOGLE IMAGE SHOWING APPLIED QUARRY LEASE AREA

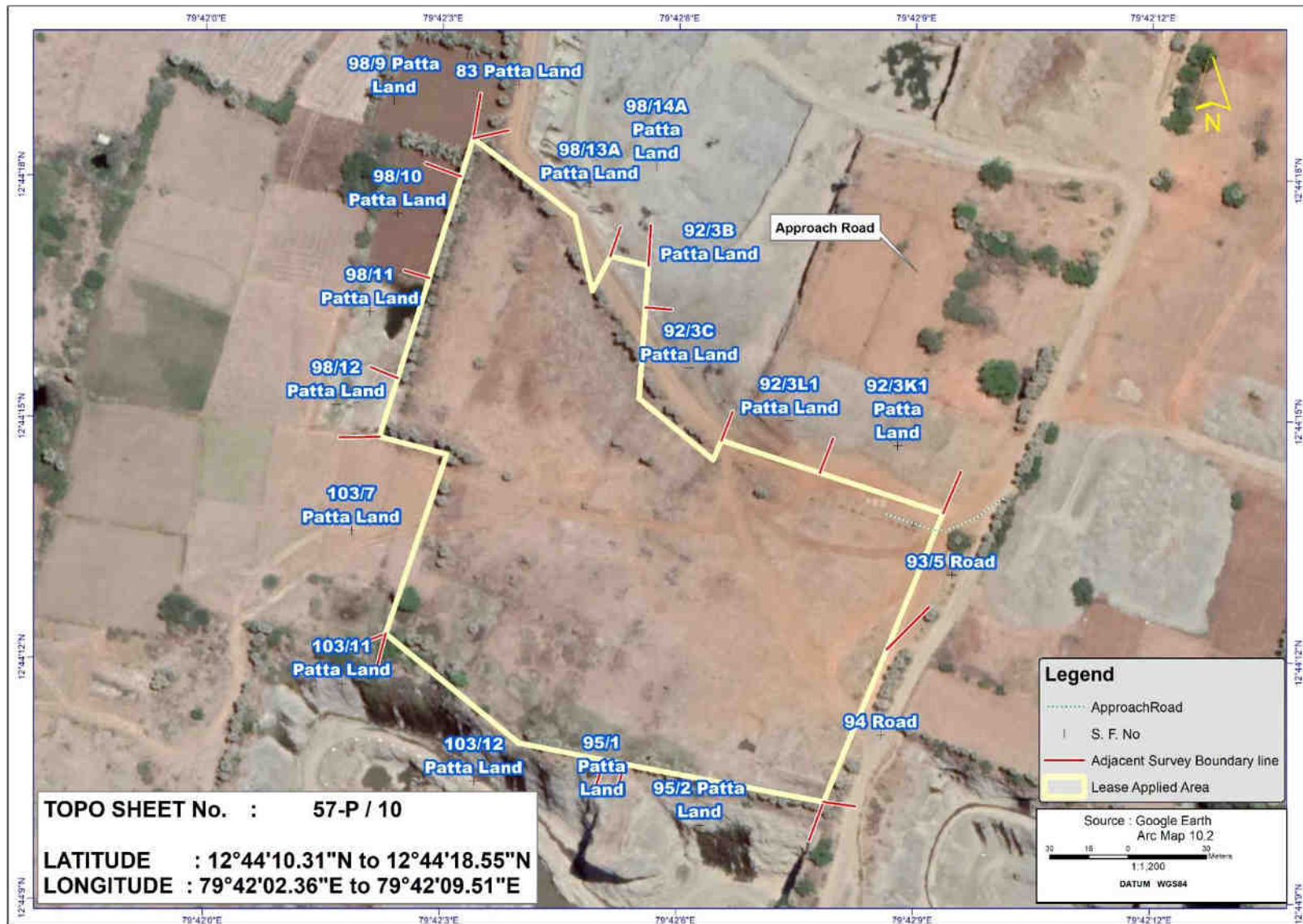


FIGURE – 12: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)

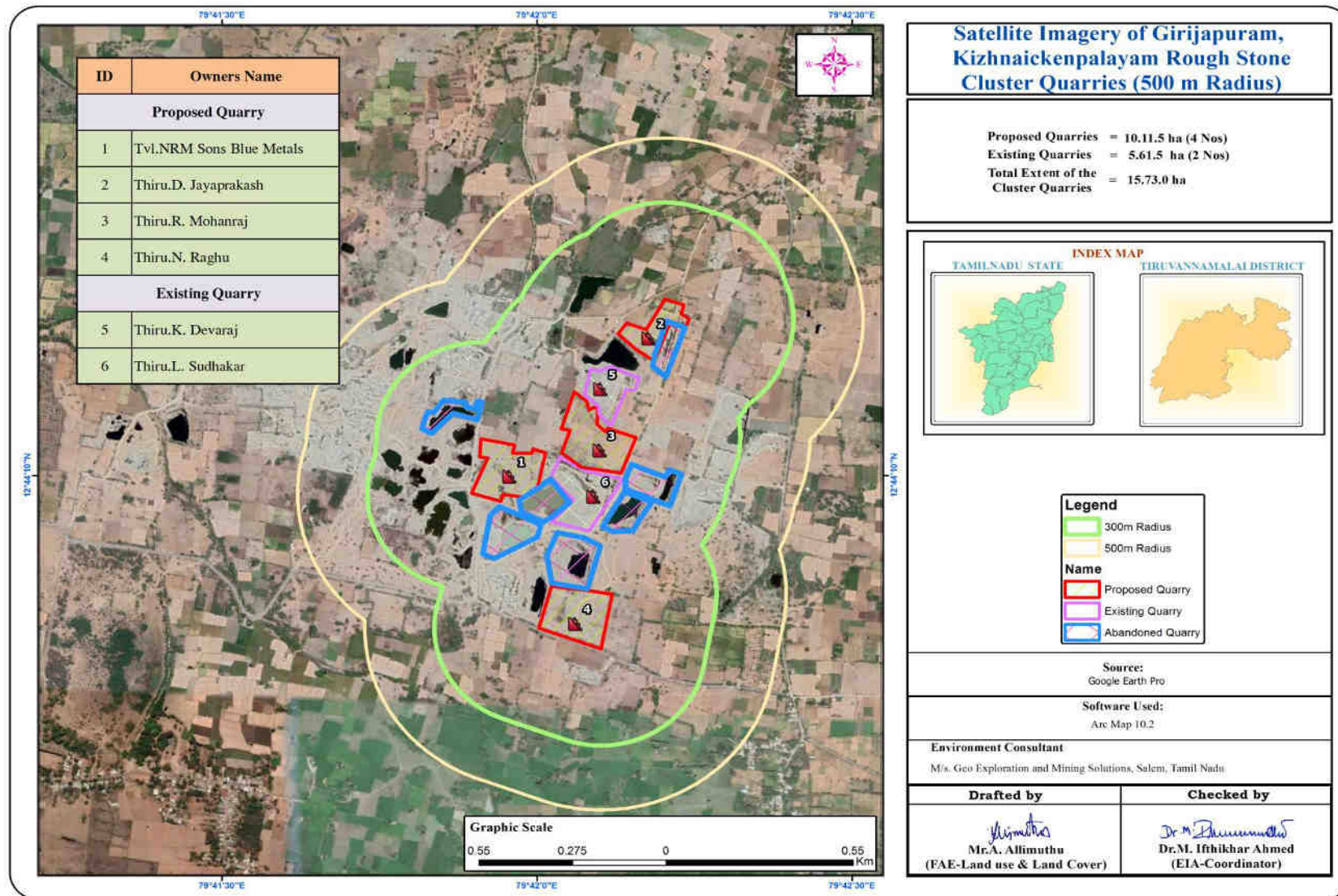
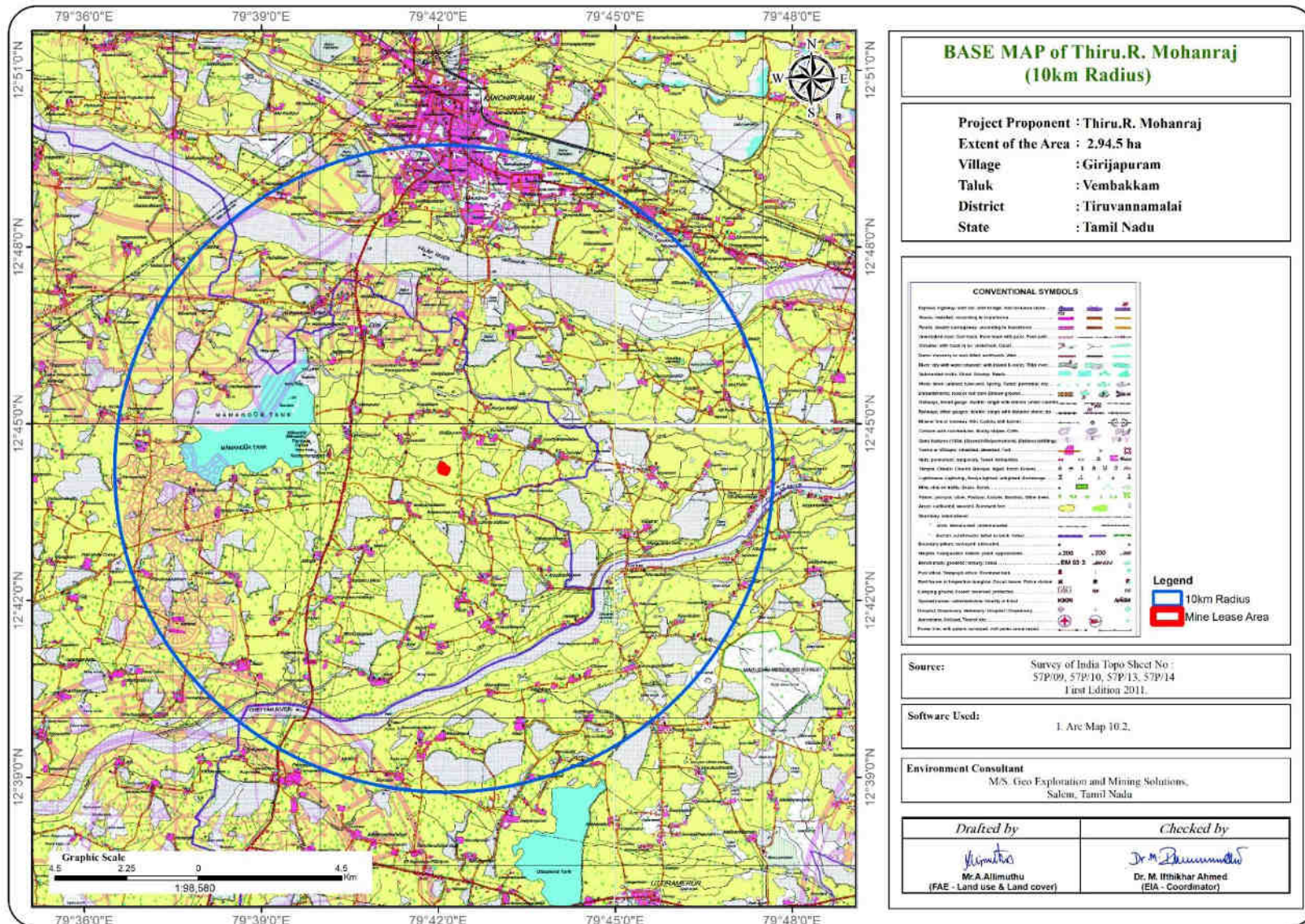


FIGURE – 13: TOPOSHEET MAP COVERING 10 KM RADIUS



2.5 METHOD OF MINING

The method of mining is 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.

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.

2.6 PROPOSED MACHINERY DEPLOYMENT

| S.NO. | TYPE | NOS | SIZE/CAPACITY | MOTIVE POWER |
|-------|-------------------|-----|---------------|----------------|
| 1 | Jack hammers | 10 | 1.2m to 2.0m | Compressed air |
| 2 | Compressor | 3 | 50 HP | Diesel Drive |
| 3 | Excavator | 2 | 150-200 HP | Diesel Drive |
| 4 | Tippers / Dumpers | 4 | 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

| Pit | Length (Max) (m) | Width (Max) (m) | Depth (Max) |
|-----|------------------|-----------------|-------------|
| I | 165 | 120 | 37 m bgl |

3. DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out during the Winter Season (02.12.2019 to 25.02.2020) with CPCB guidelines. Environmental data has been collected with reference to proposed mine by OMEGAA LABORATORIES ISO 9001: 2008, OHSAS 18001: 2007 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 from census handbook 2011 and from the satellite imagery | Study Area | Satellite Imagery Primary Survey |
| Soil | Physico - Chemical Characteristics | Once during the study period | 5 (1 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 | 8 (2 surface water & 6 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 | PM10 PM2.5 SO2 & NOX CO & Fugitive Dust | 24 hourly twice a week (October – December 2019) | 8 (1 core & 7 buffer) | IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB |
| Noise Levels | Ambient Noise | Hourly observation for 24 Hours per location | 12 (5 core & 7 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 Quadrante & Transect Study & Secondary Data |
| 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

| Sl.No | Classification | Area In Ha | Area in % |
|--------------|-------------------------|-----------------|---------------|
| 1 | Urban | 923.07 | 2.86 |
| 2 | Rural | 269.55 | 0.84 |
| 3 | Mining | 560.75 | 1.74 |
| 4 | Agricultural Plantation | 896.49 | 2.78 |
| 5 | Crop Land | 22354.60 | 69.31 |
| 6 | Barren Rocky | 92.39 | 0.29 |
| 7 | Scrub Land | 236.73 | 0.73 |
| 8 | Salt Affected Land | 58.97 | 0.18 |
| 9 | Rivers Stream Canals | 1895.11 | 5.88 |
| 10 | Water Bodies | 4965.24 | 15.39 |
| Total | | 32233.00 | 100.00 |

It is inferred that the majority of the land in the study area is Agriculture land (includes crop land) 72.09 % followed by water bodies (Rivers Stream Canals) 21.27 %.

The total mining area within the study area is 560.75 ha i.e., 1.74%. The cluster area of 15.73.0 ha contributes about 2.80 % of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

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 Loam Soil and Bulk Density of Soils in the study area varied between 1.2 – 1.25 g/cc. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e., ranging from 39.4 – 55 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline in nature with pH range 7.79 to 8.63
- The available Nitrogen content range between 122.4 to 152 kg/ha

- The available Phosphorus content range between 1.18 to 1.51 kg/ha
- The available Potassium range between 56 to 70.0 mg/kg

Whereas, the micronutrient as zinc (Zn), iron (Fe) and copper (Cu) were found in the range of 31.2 to 55mg/kg; 1.79 to 3.45mg/kg and ND

Wilting co efficient in significant level would mean that the soil would support the vegetation. The soil properties in the buffer zone reveal that the soil can sustain vegetation. If amended suitability the core area can also withstand plantation.

3.4 WATER ENVIRONMENT

Surface Water

The pH varied from 7.46 to 7.59 while turbidity found within the standards. Total Dissolved Solids varied from 515 to 766mg/l and Chloride varied between 62.0 mg/l and 99.0 mg/l. Nitrates varied from 13.0 to 20.0 mg/l, while sulphates varied from 39 to 61mg/l.

Ground Water

The pH of the water samples collected ranged from 7.04 to 7.66 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 588-950 mg/l in all samples. The Total hardness varied between 280-419 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 – 14: WIND ROSE DIAGRAM

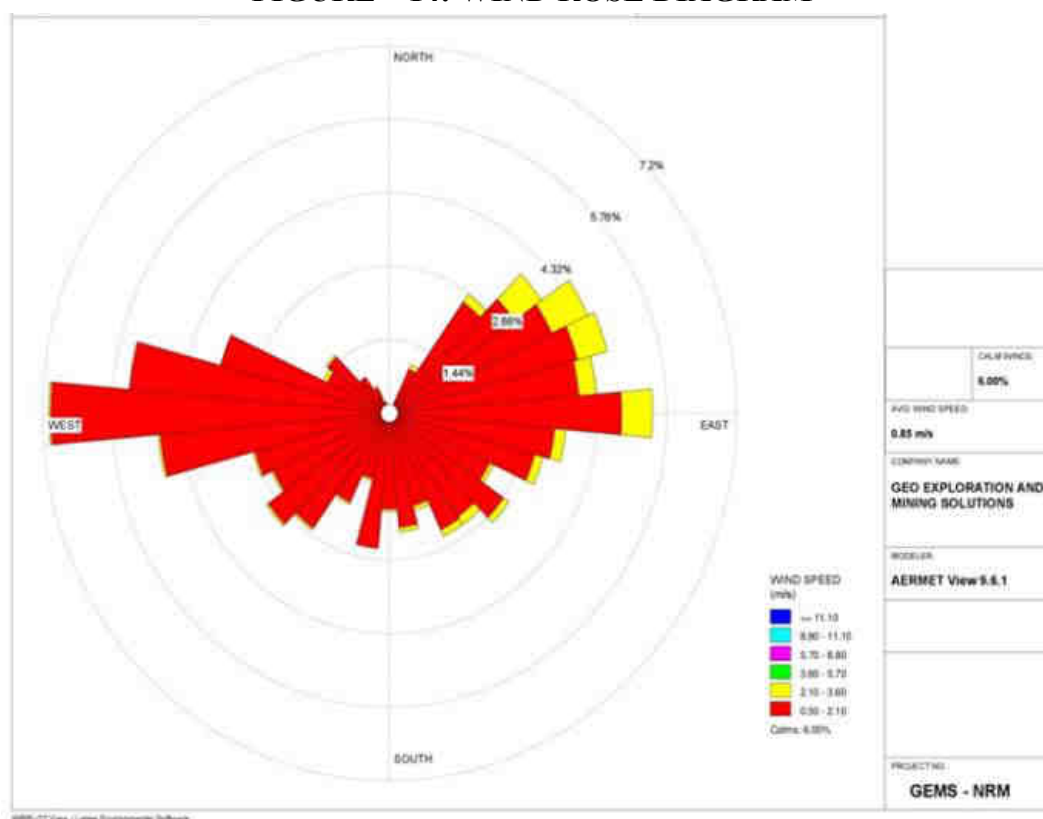
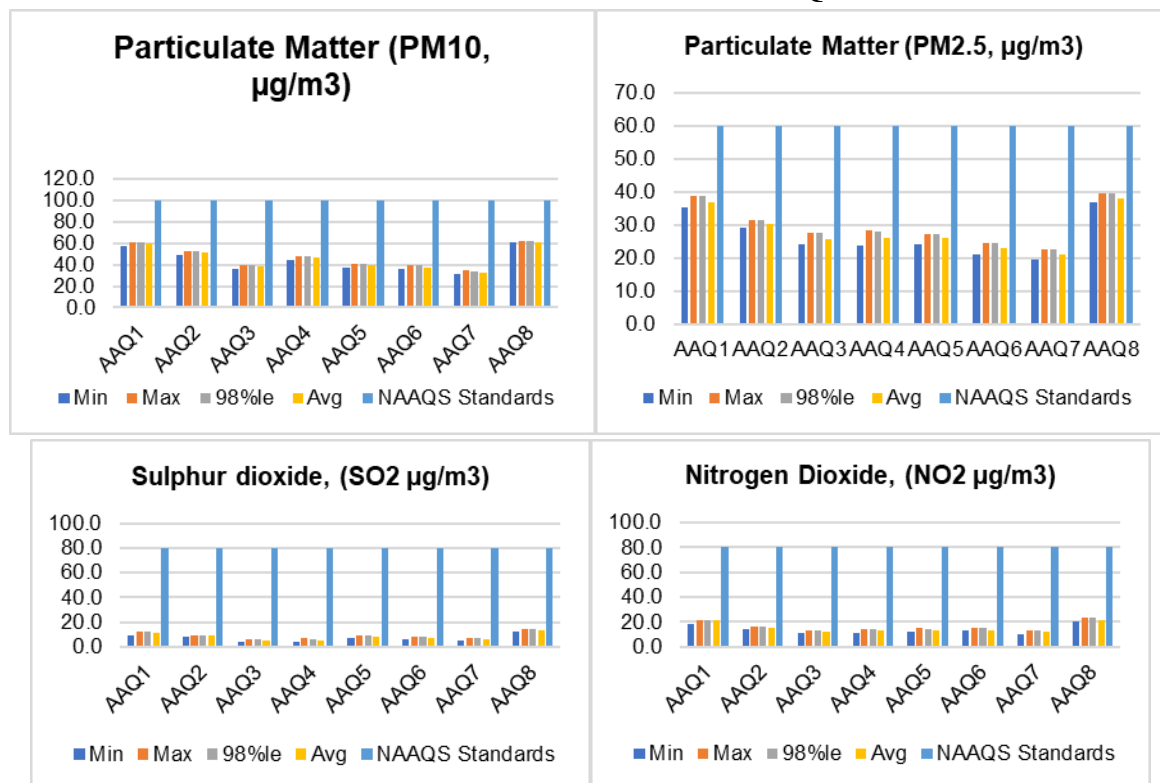


FIGURE – 15: SUMMARY OF AMBIENT AIR QUALITY DATA

As per monitoring data, PM_{10} ranges from $31.0 \mu\text{g}/\text{m}^3$ to $62.3 \mu\text{g}/\text{m}^3$, $\text{PM}_{2.5}$ data ranges from $19.7 \mu\text{g}/\text{m}^3$ to $39.7 \mu\text{g}/\text{m}^3$, SO_2 ranges from $4.3 \mu\text{g}/\text{m}^3$ to $15.0 \mu\text{g}/\text{m}^3$ and NO_2 data ranges from $10.1 \mu\text{g}/\text{m}^3$ to $23.1 \mu\text{g}/\text{m}^3$. 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 $31.0 \mu\text{g}/\text{m}^3$ in Pulivoy village & $62.3 \mu\text{g}/\text{m}^3$ in near crusher respectively. The minimum & maximum concentrations of $\text{PM}_{2.5}$ were found to be $19.7 \mu\text{g}/\text{m}^3$ in Pulivoy village & $39.7 \mu\text{g}/\text{m}^3$ in near Crusher area respectively. The maximum concentration in near the core zone is due to the cluster of quarries situated within 500m radius.

3.6 NOISE ENVIRONMENT

Ambient noise levels were measured at 12 (Twelve) locations around the proposed quarry lease area. Noise levels recorded in core zone during day time were from 47.01 – 52.5 dB (A) Leq and during night time were from 36.3 – 39.4 dB (A) Leq.

Noise levels recorded in buffer zone during day time were from 40.1 – 54.8 dB (A) Leq and during night time were from 33.3 – 38.4 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 maximum & minimum noise levels at day time were recorded in the range of 54.8 dB(A) in Near crusher area and 40.1 dB(A) in night time 39.4 dB(A) in Core zone & 33.3 dB(A) in Akkur village respectively in day and night. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.7 ECOLOGICAL ENVIRONMENT

The core zone of the area is patta dry – barren land, no forest land is involved in the project area. The proposed quarry area is covered by thorny bushes and prosopis juliaflora. There is no Wild Life Sanctuary or National Park within the study area of 10km. 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 mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

3.8 SOCIO ECONOMIC ENVIRONMENT

An attempt has been made to assess the impact of the proposed mining project at Girijapuram Village on Socio-economic aspect of the study area. The various attributes that have been taken into account are population composition, employment generation, occupational shift, household income and consumption pattern. Implementation of the Proposed Mine Project will generate both direct and indirect employment. Besides, Mining operation will be legally valid and it will bring income to the state exchequer. At present seasonal agriculture is the main occupation of the people as more than half of the population depends on it. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in mining-based activities rather in seasonal agriculture.

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 include 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 | Area to be covered in m ² | Name of the species | Survival rate expected in % | No. of trees expected to be grown |
|------|-------------------------------------|--------------------------------------|--|-----------------------------|-----------------------------------|
| I | 60 | 200 | Neem, Casuarina, Pongamia pinnata, etc., | 80 | 48 |
| II | 60 | 200 | | 80 | 48 |
| III | 60 | 200 | | 80 | 48 |

| | | | | | |
|----|----|-----|--|----|----|
| IV | 60 | 200 | | 80 | 48 |
| V | 60 | 200 | | 80 | 48 |

4.6 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

Employment generation due to the project will provide direct employment for about 38 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.

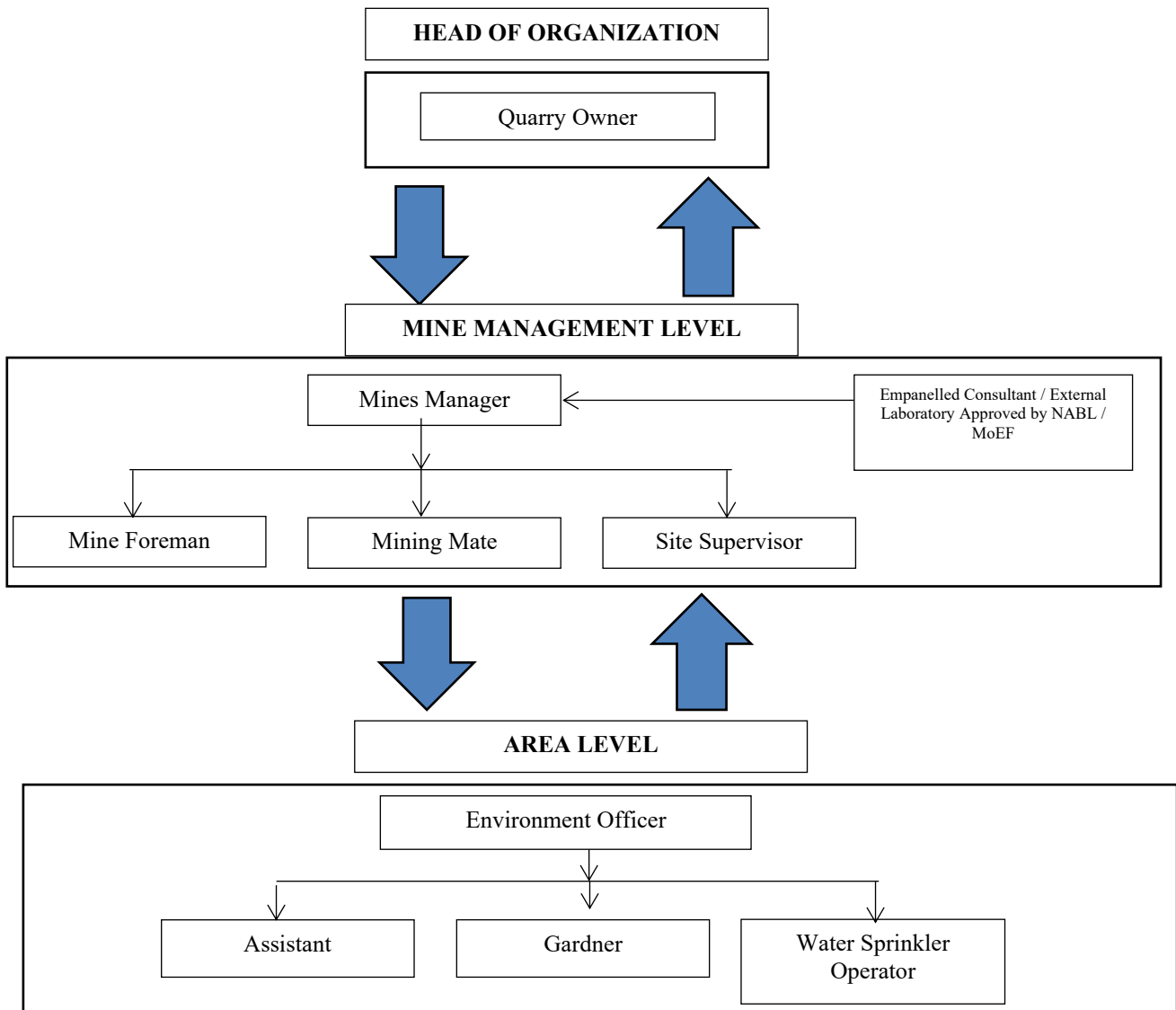
6. ENVIRONMENT MONITORING PROGRAM

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

| S. No. | Environment Attributes | | Monitoring | | Parameters |
|--------|--------------------------|--|----------------|------------------------------------|---|
| | | | Duration | Duration | |
| 1 | Air Quality | 8 locations (One station in the core zone and one in 500 m radius, two stations in the upwind, three stations on the downwind direction) | 24 hours | Twice in a week for every 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 | Mine Pit Water, Nearby project area (Surface water and ground water) | - | Once in 6 months | Parameters specified under IS:10500, 1993 & CPCB Norms |
| 4 | Hydrology | Water level in open wells in buffer zone around 1km at specific wells | - | Once in 6months | Depth in BGL |
| 5 | Noise | Near Mine Equipment / machineries, Mines Office, Operator Cabin, Surrounding Villages in Buffer Area | 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 | Core Zone and Buffer zone (Grab samples) | – | 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. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

7.2 DISASTER MANAGEMENT PLAN

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

SALIENT FEATURES OF CLUSTER QUARRIES

| Description | | P1 Mohanraj | P2 NRM Sons | P3 Raghu | P4 Jayaprakash | E1 Sudhakar | E2 Devaraj | Total |
|--|-------------|----------------|-------------------|-------------|-------------------|----------------|---------------|-------------|
| Geological Resources in m ³ | Rough stone | 11,78,000 | 21,33,360 | 11,78,520 | 367,500 | 2,13,360 | 2,57,400 | 53,28,140 |
| | Gravel | 58,900 | 53,926 | 58,926 | 29,400 | 53,334 | 17,160 | 2,71,646 |
| Mineable Reserves in m ³ | Rough stone | 4,57,880 | 4,94,295 | 3,26,000 | 55,405 | 4,94,295 | 64,550 | 18,92,425 |
| | Gravel | 49,988 | 42,488 | 33,864 | 10,908 | 42,488 | 11,468 | 1,91,204 |
| Production per day in m ³ | Rough stone | 305 | 330 | 217 | 37 | 329 | 43 | 1261 |
| | Gravel | 56 | 71 | 38 | 12 | 47 | 19 | 243 |
| Lorry Loads per day in Nos | Rough stone | 51 | 55 | 36 | 6 | 55 | 7 | 210 |
| | Gravel | 10 | 12 | 6 | 2 | 8 | 3 | 41 |
| Employment in Nos | | 38 | 38 | 33 | 18 | 12 | 12 | 137 |
| Proposed Depth in meters | | 42 | 42 | 42 | 27 | 37 | 43 | 27 - 47 |
| Status of the quarry | | Proposal | Proposal | Proposal | Proposal | Operating | Operating | - |
| Cost of the project in Rs. | | 66,53,300 | 66,53,300 | 56,05,280 | 21,65,300 | 64,92,000 | 66,69,000 | 3,25,64,880 |

PREDICTED NOISE INCREMENTAL VALUES IN 500 M RADIUS QUARRIES

| Location ID | Background Value (Day) dB(A) | Incremental Value dB(A) | Total Predicted dB(A) | Residential Area Standards dB(A) |
|--------------------|------------------------------|-------------------------|-----------------------|----------------------------------|
| Habitation Near P1 | 49.7 | 38.5 | 50.0 | 55 |
| Habitation Near P2 | 44.2 | 42.6 | 46.5 | |
| Habitation Near P3 | 47.5 | 42.6 | 48.7 | |
| Habitation Near P4 | 48.5 | 38.5 | 48.9 | |
| Habitation Near E1 | 40.7 | 42.0 | 44.4 | |
| Habitation Near E2 | 41.5 | 38.2 | 43.2 | |

ANTICIPATED GROUND VIBRATIONS IN CLUSTER

| Location ID | Maximum Charge in kgs | Nearest Habitation in m | PPV in m/ms |
|-------------|-----------------------|-------------------------|-------------|
| P1 | 100 | 1200 | 0.236 |
| P2 | 100 | 1200 | 0.236 |
| P3 | 100 | 750 | 0.500 |
| P4 | 100 | 750 | 0.500 |
| E1 | 100 | 800 | 0.451 |
| E2 | 100 | 1250 | 0.221 |
| E3 | 100 | 1200 | 0.236 |
| E4 | 100 | 750 | 0.500 |

SOCIO ECONOMIC & EMPLOYMENT BENEFITS FROM CLUSTER

| Code | Employment in Nos | Project Cost | CER (@ 2%) |
|--------------|-------------------|-------------------------|----------------------|
| P1 | 38 | Rs 66, 53,300/- | Rs 1,33,100/- |
| P2 | 24 | Rs 49, 80,000/- | Rs 99,600/- |
| P3 | 33 | Rs 56, 05,280/- | Rs 1,12,100/- |
| P4 | 18 | Rs 21, 65,300/- | Rs 43,300/- |
| E1 | 12 | Rs 64,92,000/- | Rs 1,33,100/- |
| E2 | 12 | Rs 66,69,000/- | Rs 1,29,900/- |
| Total | 137 | Rs 3,25,64,880/- | Rs 6,51,100/- |

8. PROJECT BENEFITS

The proposed quarry aims to produce 49988 m³ of Gravel and 441110 m³ of Rough Stone during this Mining Plan Period. 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

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.