

EXECUTIVE SUMMARY

FOR OBTAINING

Environmental Clearance under EIA Notification – 2006 Schedule Sl. No. 1 (a) (i): Mining Project

“B1” CATEGORY (Cluster) – MINOR MINERAL –

GOVERNMENT LAND - EXISTING QUARRY

M/s. TANCEM STONEWARE PIPE FACTORY FIRECLAY QUARRY

CLUSTER EXTENT – 6.59.0 Ha

PROJECT PROPONENT

Proponent Name	Project Location
M/s. TANCEM Stoneware Pipe Factory, 5th Floor, Aavin Illam, 3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.	Extent: 6.59.0 ha S.F. Nos: 133/1A,134/2,134/3 etc., Panikankuppam Village, Panruti Taluk, Cuddalore District

Complied as per ToR obtained

File No: 12749 ToR Identification No: TO25B0108TN5192834N Dated: 24.11.2025

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS



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Accredited for sector 1 Category 'A' 31 & 38 Category 'B'
Certificate No: NABET/EIA/25-28/RA0424



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Laboratory

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Approved by AAI, AGMARK, APEDA, BIS, EIC FSSAI, GAFTA,
IOPEPC, MOEF & TEA BOARD

Jothi Complex, 83, M.K.N Road, Guindy, Chennai – 600 032.

Baseline Monitoring Period: October – December 2025

January 2026

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

• INTRODUCTION

The proponent M/s.TANCEM Stoneware Pipe Factory applied for Fireclay Mining lease over an extent of 6.59.0 ha of Government land in S.F. Nos: 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 at Panikankuppam village of Panruti Taluk, Cuddalore District, Tamil Nadu State.

- Proponent applied for Fire clay Quarry lease on 05.02.2018
- Precise area communication letter was issued by the District Collector vide letter no.3354387/MMC.2/2022-1, Dated: 18.01.2023
- The Mining plan has been prepared by the Qualified person and got approved by the Additional Director vide letter no.Rc.No.3952/MM7/2020 Dated: 23.11.2023
- Proponent applied for Terms of Reference vide Proposal No. SIA/TN/MIN/551953/2025, Dated: 18.09.2025 and the ToR was Granted vide File No: 12749 ToR Identification No: TO25B0108TN5192834N Dated. 24.11.2025
- Based on the ToR Baseline Monitoring study has been carried out for one season (Retreating Monsoon) i.e., **October 2025 to December 2025** and this EIA/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.

Environmental Impact Assessment (EIA) study is a process, used to identify the Environmental, Social and Economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are considered during the project designing.

1.1 DETAILS OF PROJECT PROPONENT –

Name and Location of the project	Project proponent address
M/s. TANCEM Stoneware Pipe Factory S.F.No 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu	M/s. TANCEM Stoneware Pipe Factory, 5th Floor, Aavin Illam, 3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Source: Approved Mining Plan

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRIES				
CODE	Name of the Owner	S.F. Nos	Extent	Status
P1	M/s.TANCEM Stonware Pipe Fcatory , Vridhachalam	133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9,	6.59.0 ha	ToR obtained vide.File No.12749 TOR Identification No. TO25B0108TN5192834N Dated.24.11.2025

		134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11		
TOTAL			6.59.0 ha	
EXISTING QUARRIES				
Nil				
EXPIRED/ABANDONED QUARRIES				
CODE	Name of the Owner	S.F. Nos & Village	Extent	Lease Period
EX-1	M/s. VRW Industries, No.96, Vanagaram Village, Chennai	130/1	1.39.0 ha	26.04.1978 to 25.04.1998
EX-2	Thiru.M.Elangovan, S/o. T.K.P Manickam,F-22, Indira Gandhi road, Fairlands, Salem	90/5	0.78.5 ha	05.02.1998 to 04.02.2018
EX-3	M/s.TANCEM Stoneware Pipe Fcatory , Vridhachalam	133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11	6.59.0 ha	11.04.1994 to 10.04.2014
TOTAL			8.76.5 ha	
TOTAL CLUSTER EXTENT			6.59.0 ha	

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

1.2 SALIENT FEATURES OF THE PROPOSAL

DESCRIPTION OF THE PROJECT

DESCRIPTION	DETAILS
Name of the project	M/s. TANCEM Stoneware Pipe Factory
Name of Mineral	Fire Clay.

S.F. Nos and Village	S.F.No 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 Panikankuppam Village, Panruti Taluk, Cuddalore District.
Extent	6.59.0 ha
Classification of Land	It is a government land, which is not fit for vegetation/Cultivation. The applicant (TANCEM) have surface right over the applied area for grant of mining lease and relevant record of A register and adangal Copy.
Village	Panikankuppam
Taluk	Panruti
District	Cuddalore
State	Tamil Nadu
Latitude Between	11° 44' 49.52"N to 11° 45' 01.01"N
Longitude Between	79° 32' 52.03"E to 79° 33' 03.38"E
Toposheet No	58- M/09
Topography of the area	The area is almost a Undulated terrain.
Geological Resources	3,54,625.25 Ts of ROM, 3,54,625.25 Ts of Fire clay (100 % Recovery), 1,39,293 Ts of Topsoil
Mineable Reserves	2,16,091 Tonnes of ROM 2,16,091 Tonnes of Fire clay @ 100% recovery and 94,977 Ts of Topsoil
Yearwise Production	98,611 Tonnes of ROM 98,611 Tonnes of Fire clay @ 100% recovery and 94,977 Ts of Topsoil
Proposed Peak production	24,224 Tonnes of ROM 24,244 Tonnes of Fire clay @ 100% recovery and 21,798 Ts of Topsoil
Life of Mine	11 years
Mining Plan Period	5 years
Mining Method	Opencast Mechanized Method of Mining without Drilling and Blasting
Ultimate Depth of Mining	5.5m BGL (at the end of mining plan period)
Employees Required	14 Nos
Ground Water Level	50 m BGL
Drainage Pattern	There is no perennial surface water body within the project area. The drainage pattern of the area is dendritic.

Water Requirement & Source	Total water requirement for dust suppression, plantation and drinking is 2 KLD. Water will be sourced from nearby villages/ quarry pit water and drinking water will be sourced from approved water vendors.
Power Requirement	No electricity is proposed for quarrying activities. Diesel operating machineries will be deployed for quarrying operation. For the mine office and rest shelters solar power is proposed.
500 m Cluster Details	As per the MoEF & CC Notification 2269 (E) Dated 1 st July 2016 one Existing quarry and Three proposed quarries falls in the cluster category Total Extent of the cluster is 6.59.0 Ha
Project Cost	Fixed asset Cost = Rs 8,75,000/- Operational Cost = Rs 17,70,000/- EMP Cost = Rs 3,80,000/- Total Project Cost = Rs 30,25,000/-

Source: Approved Mining Plan

1.3 STATUTORY DETAILS

SCREENING:

- The company applied for Fire clay Quarry Lease Dated: 05.02.2018
- Precise Area Communication letter issued by Government of Tamil Nadu, Industries (MMC.2) Department, Secretariat, Chennai vide Letter No. 3354387/MMC.2/2022-1 Dated: 18.01.2023 for preparation of Mining Plan and for Obtaining Prior-Environmental Clearance.
- The Mining Plan was prepared under Rule 41 & 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and the Mining Plan was approved by Joint Director of Geology and Mining, Dept., of Geology & Mining, Guindy, Chennai vide Letter No: 3952/MM7/2020, Dated: 23.11.2023
- 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
- The proponent applied for ToR for Prior Environmental Clearance vide online Proposal No. SIA/TN/MIN/551953/2025 Dated: 18.09.2025

SCOPING:

- The proposal was placed in 634th SEAC meeting held on 27.10.2025 and the committee recommended for issue of ToR
- The proposal was considered in 916th SEIAA meeting held on 17.11.2025 and issued ToR vide File No.12749 TOR Identification No. TO25B0108TN5192834N Dated 24.11.2025

2. PROJECT DESCRIPTION

This project is proposed to excavate 98611 Tonnes (56,349m³) (Mining Plan Period) of Fire clay by Opencast Mechanized Mining Method without drilling and blasting. The excavated Fire clay will be transported to the processing units by tippers/trucks for the blending purpose.

The ore deposit is soft and fragile in nature found about 5 to 20m thickness; the topsoil layer on the Fire clay about 1.5m thickness. The quarrying operation is proposed to carry out upto a depth of 5.5m.

2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Description	Details
Nearest Village/Habitation	Panikankuppam – 2km – SW (4205 Population)
Nearest Railway Station	Panruti– 2.6 km- NE
Nearest Airport	Puducherry Airport – 37.3km – North East
Nearest State Highway	Panruti to Cuddalore (SH-68) – 2.2km – North East
Nearest National Highway	Panayapuram to Thanjavur (NH-36) – 80m – East
Nearest Sea Port	Chennai – 167 km North East
Nearest Interstate boundary	Puducherry (Karaikal) Interstate boundary – 13.0 km – North East
Nearest Water bodies	Kedilam River – 1.0km-North West Thenpennai River –10.0km-North East Thiruvathigai Check Dam – 3.5km – North East
Nearest Reserve Forest	Kangiruppu RF – 6.7km – South West
Nearest Wildlife Sanctuary	Oussudu Lake Bird Sanctuary – 30.0km – North East

Source: Survey of India Toposheet

2.2 LAND USE PATTERN OF THE LEASE APPLIED AREA

Description	Present Land use (Ha)	Area to be reclaimed at the end of present mining plan period (Ha)	Area at the end of life of quarry (Ha)
Area under mining	1.02.5	3.27.3	4.29.8
Dumps	Nil	*Nil	Nil
Site services	Nil	0.01.0	0.01.0
Roads	0.03.0	0.02.0	0.05.0
Greenbelt	Nil	0.20.0	0.40.0
Unutilized area	5.53.5	2.03.2	1.83.2
Total Area	6.59.0	5.53.5	6.59.0

Source: Approved Mining Plans of Proposal

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

DESCRIPTION	Quantity in Tonnes
Geological Resources of Fire clay	3,54,625.25 Ts
Mineable Reserves of Fire clay	2,16,091 Ts
Tentative Excavation for 1 st Five Year Plan Period	
Fire clay for 1 st Five Year Plan Period	98,611Ts
Topsoil for 1 st Five Year Plan Period	94,977 Ts
Peak Production (Fire clay) Proposed	24,224 Ts

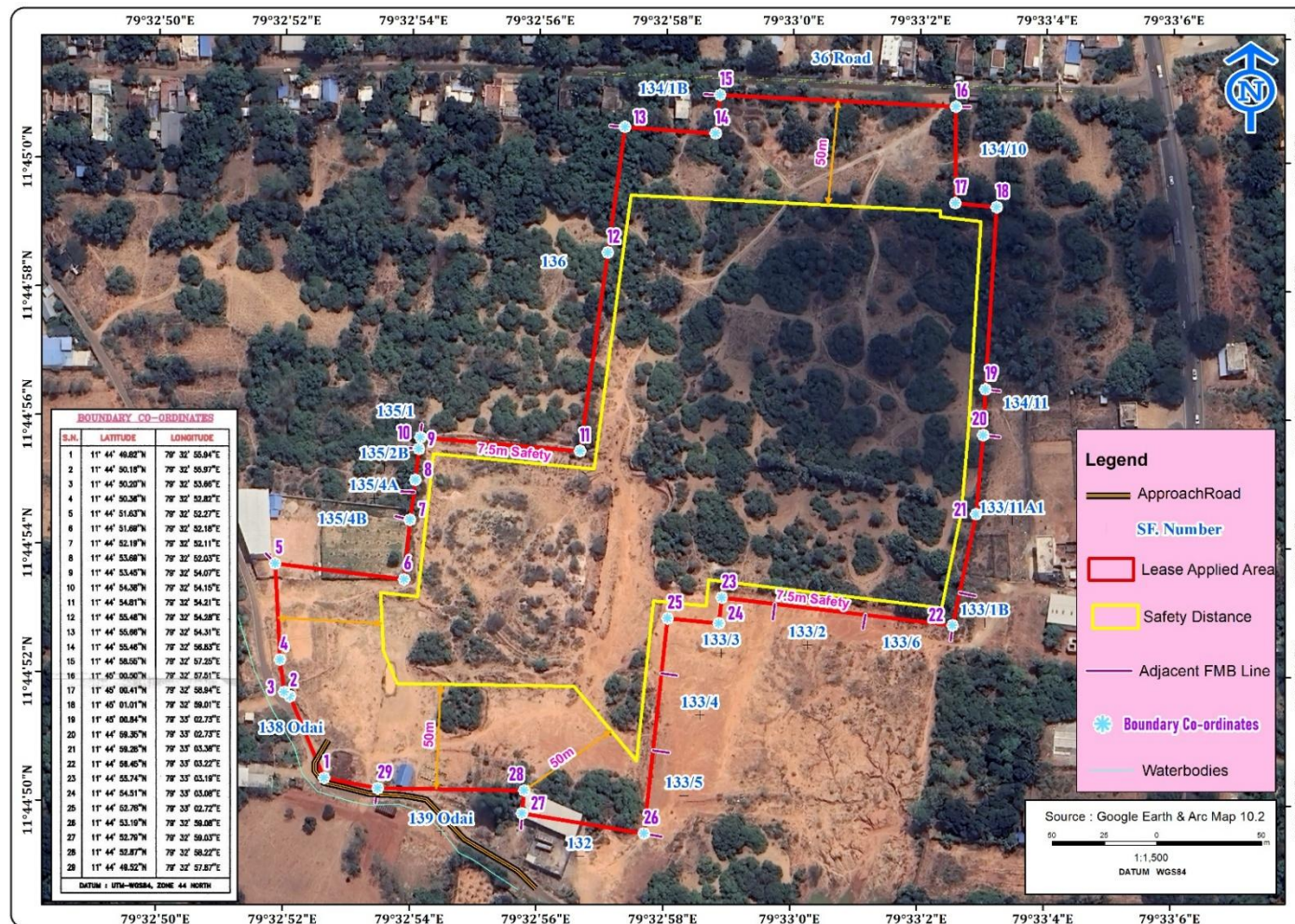
Peak Production per Day (Fire clay)	21,798 Ts
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Source: proposed mining plan

2.4 OPERATIONAL DETAILS OF LEASE APPLIED AREA

Years	Fireclay @ 100%	Topsoil
I	24,224Ts/ 13,842m ³	16,608Ts/ 8,304m ³
II	18,522Ts/ 10,584m ³	21,798Ts/ 10,899m ³
III	18,522Ts/ 10,584m ³	21,798Ts/ 10,899m ³
IV	18,522Ts/ 10,584m ³	21,798Ts/ 10,899m ³
V	18,821Ts/ 10,755m ³	12,975Ts/ 6,487.5m ³
Total	98,611Ts/ 56,349m³	94,977Ts/ 47,488.5m³

Source: proposed mining plan

FIGURE – 1: GOOGLE IMAGE OF THE PROJECT AREA

Source: Google Earth Imagery

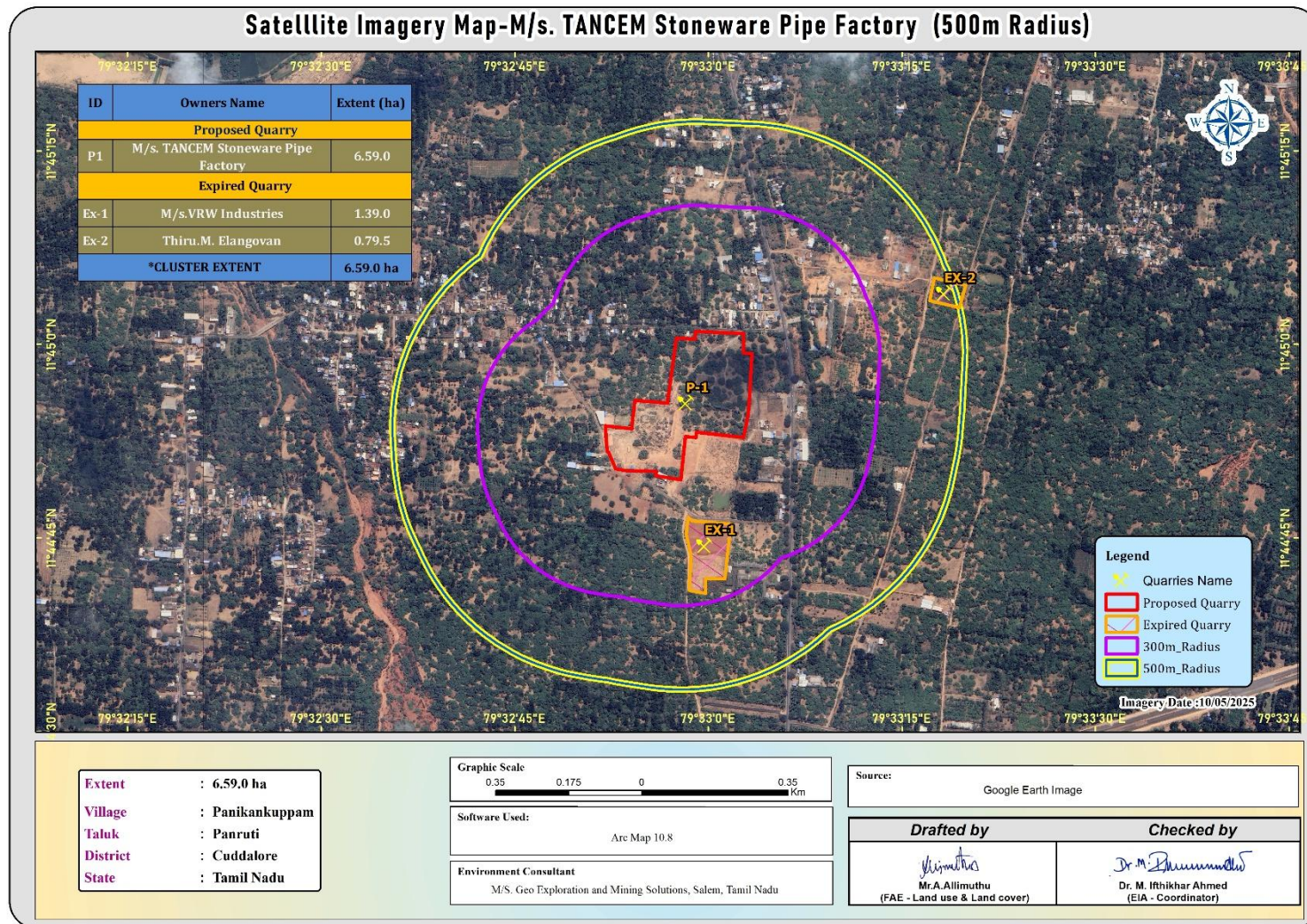
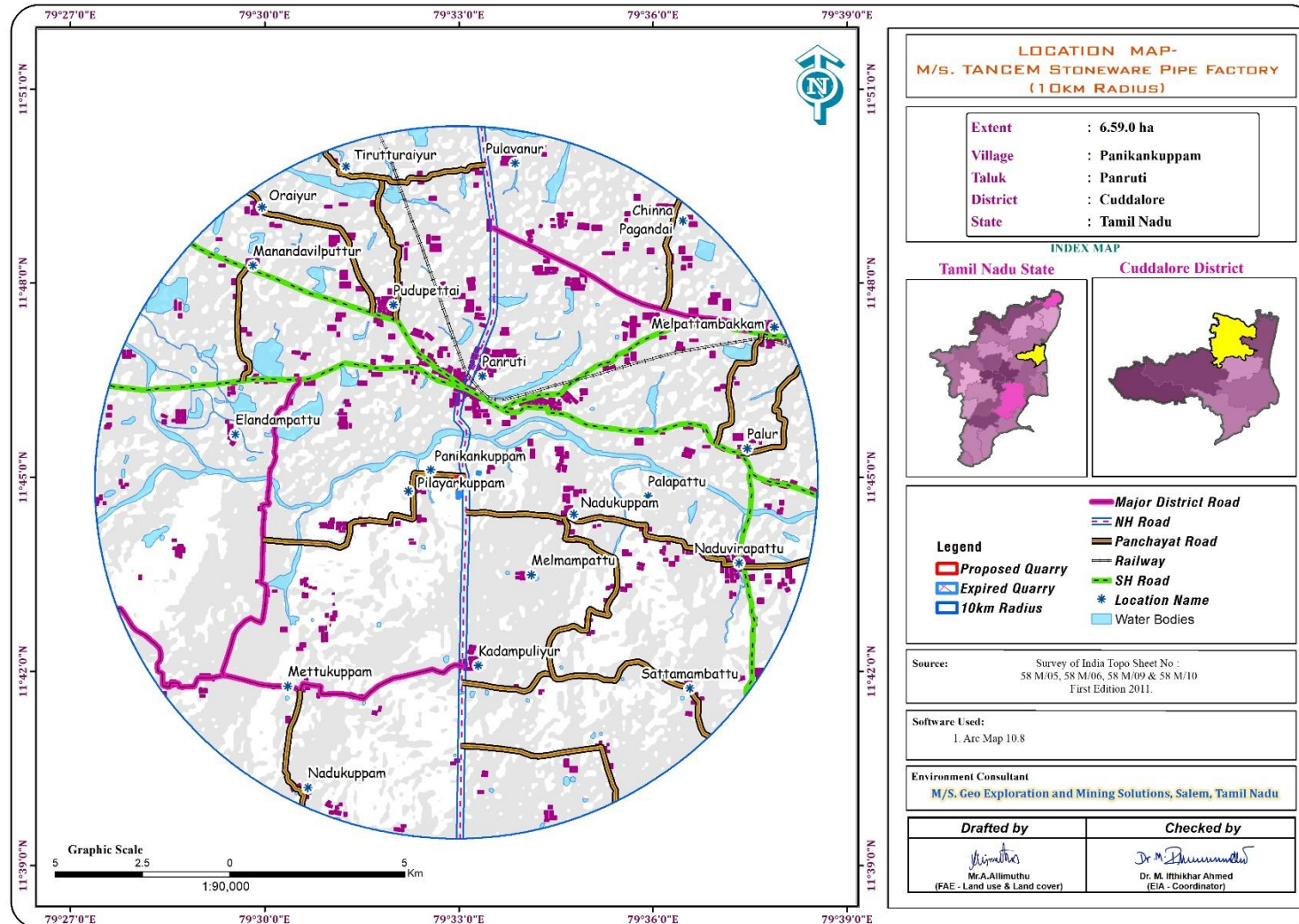
FIGURE – 2: SATELLITE IMAGERY CLUSTER QUARRIES

FIGURE – 4: IMAGE SHOWING SURFACE FEATURES AROUND 10 KM RADIUS

2.5 METHOD OF MINING

Opencast mechanized mining method is proposed for quarrying, the overburden in the form of top soil, the top soil will be side casted. The Fire clay in this area is in friable form and can be excavated by using hydraulic excavator. The mine will be worked in 50m X 50m blocks within the mineable blocks and the side casted topsoil will be backfilled and levelled. There will not be any drilling and blasting involved in the mining operation. It is proposed to leave a distance of 7.5 meters from other adjoining patta lands, 50 meters from village roads situated northern side of the applied area and 50 meters from Odai situated in S.F.Nos. 138& 139 in the western side of the applied area as safety barrier.

The Fire clay will be loaded to trucks for transportation to cement manufacturing unit. The Fire clay will be utilized directly and mobile screen will be utilized whenever required for improving the grade. The mined-out pit will be back filled with side casted topsoil and screened fines. The back filled area will be leveled properly for developing plantation.

2.6 PROPOSED MACHINERY DEPLOYMENT

Sl.No.	Machinery	Numbers of Units
1	Hydraulic Excavator	1
2	Tipper	2

Source: Approved Mining Plan

2.7 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

- ✚ 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 principal 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.

3. DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out during October – December 2025 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by Chennai Mettex Laboratories in association with GEMS

3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of monitoring	No. of locations	Protocol
Land-use	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 Characteristics	Physio-Chemical Characteristics	Once during the study period	6 (2 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 (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 CO	24 hourly twice a week (October – December 2025)	7 (3 core & 4 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7 (3 core & 4 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 Quadrat & 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 Chennai Mettux Laboratories in association with GEMS

* All monitoring and testing have been carried out as per the Guidelines of CPCB and MoEF & CC.

3.2 LAND ENVIRONMENT

S.No	CLASSIFICATION	AREA_HA	AREA_%	AREA_HA	AREA_%
BUILTUP					
1	Builtup Urban	359.70	1.11	72.17	4.85
2	Builtup Rural	1704.91	5.24	70.57	4.74
3	Builtup Mining	176.93	0.54	44.64	3.00
AGRICULTURAL LAND					
4	Crop Land	17096.93	52.55	460.193	30.93
5	Plantation	9858.60	30.30	729.061	49.00
6	Fallow Land	993.08	3.05	41.19	2.77
BARREN/WASTE LANDS					
7	Scrub Land	397.61	1.22	3.93	0.26
FOREST LAND					
8	FOREST	590.97	1.82	0	0.00
WETLANDS/ WATER BODIES					
9	Waterbodies	1358.22	4.17	66.27	4.45
TOTAL		32536.96	100.00	1488.02	100.00

Interpretation

10km

From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture and fallow land (includes crop land) 85.9% followed by Built-up Lands – 6.89%, Scrub & Forest land – 3.04%, and Water bodies 4.17%.

The total mining area within the study area is 176.93 ha i.e., 0.54%. The cluster area of 6.59.0 ha contributes about 3.72% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

2km

From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture and fallow land (includes crop land) 82.7% followed by Built-up Lands – 12.59%, Scrub & Forest land – 0.26%, and Water bodies 4.45%.

The total mining area within the study area is 44.64 ha i.e., 3%. The cluster area of 6.59.0 ha contributes about 14.76% 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, Sandy Clay to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 0.89 – 1.89 g/cm³. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e., ranging from 38.3 – 42.3 % and 36.5 – 41.2 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 6.76 to 7.2
- The available Nitrogen content range between 282 to 416.8 mg/kg
- The available Phosphorus content range between 3.11 to 6.08 mg/kg
- The available Potassium range between 20.6 to 31.3 mg/kg

3.4 WATER ENVIRONMENT

Surface Water

Ph:

At the sampling location, pH (7.91) and turbidity were within recommended standards, indicating suitable conditions for sustainable aquatic life (6.5 to 8.5 pH)

Total Dissolved Solids:

Total Dissolved Solids was recorded as 728 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 251 mg/l. Nitrates (as NO₃) was detected 19.3mg/l, while sulphates was detected 58.2 mg/l.

Ground Water

The pH of the water samples collected ranged from 7.27 to 7.53 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 491 – 640 mg/l in all samples. The Total hardness varied between 128 to 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 – 5: WIND ROSE DIAGRAM

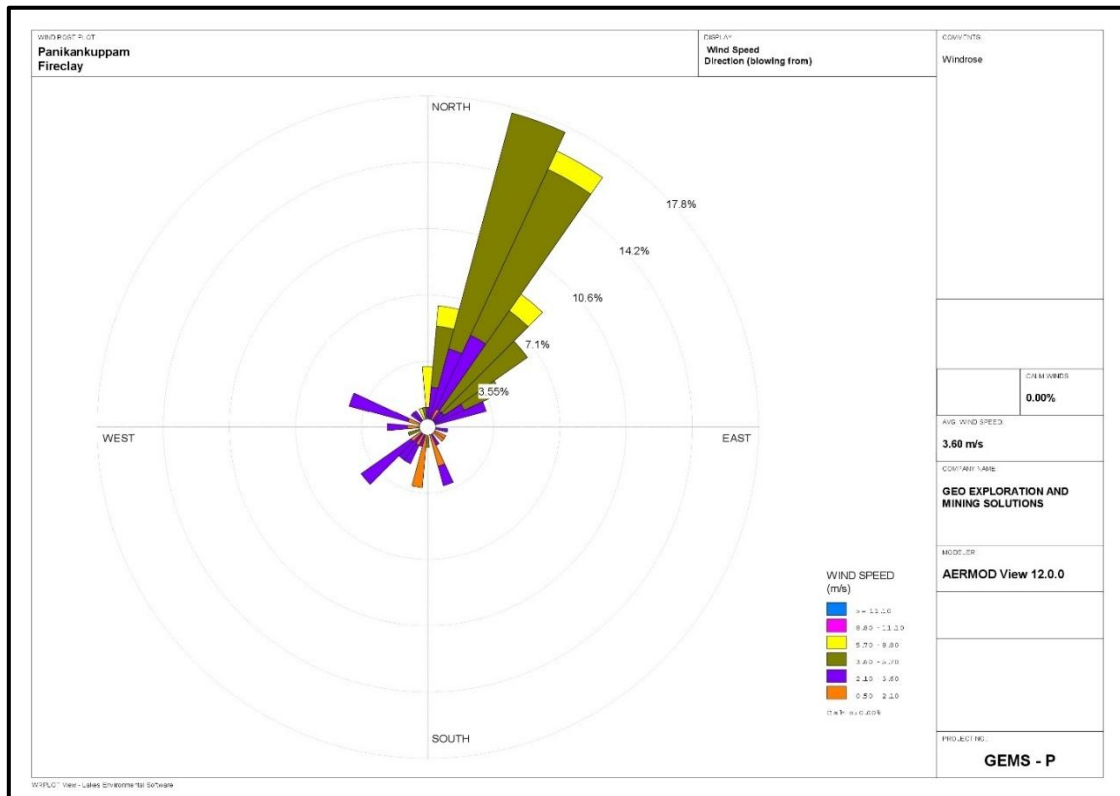
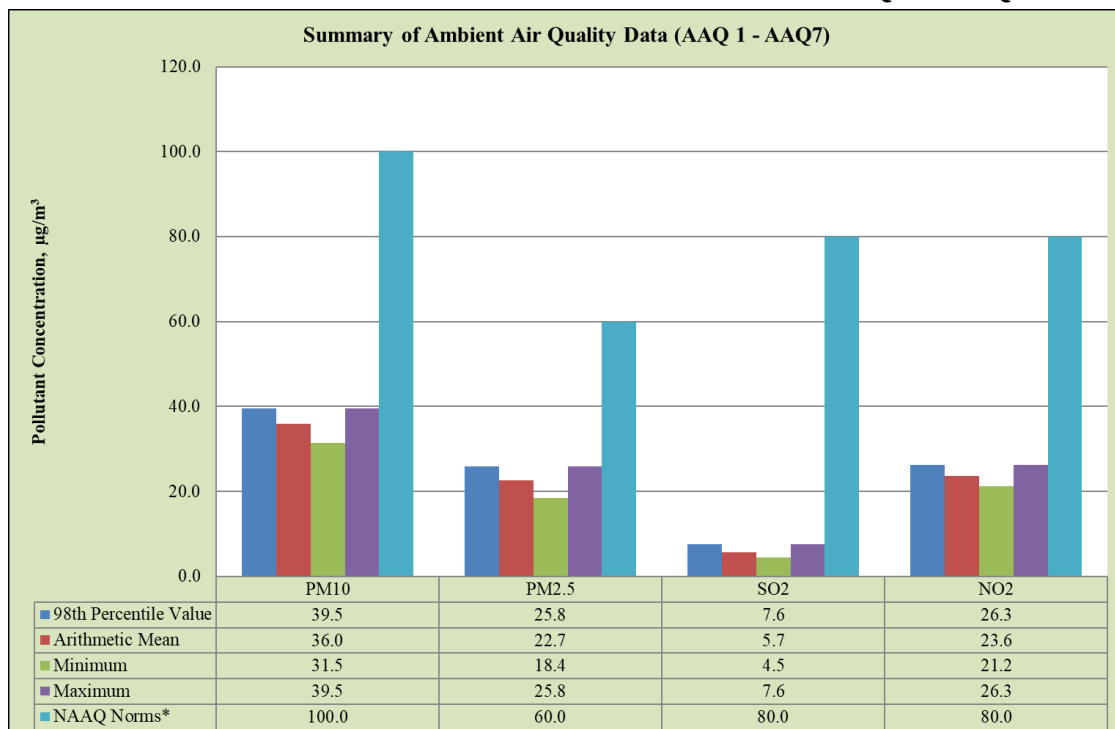


FIGURE – 6. BAR DIAGRAM OF SUMMARY OF AAQ1 – AAQ7



The results of ambient air quality monitoring for the period (October to December 2025) are presented in the report. Data has been compiled for three months.

Interpretations & Conclusion

As per monitoring data, PM10 ranges from 32.0 µg/m³ to 37.4 µg/m³, PM2.5 data ranges from 18.4 µg/m³ to 24.4 µg/m³, SO₂ ranges from 4.8 µg/m³ to 6.6 µg/m³ and NO₂ data ranges from 21.0 µg/m³ to 24.8 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 proposed project area. Noise levels recorded in core zone during day time were from 39.3-43.1 dB (A) Leq and during night time were 35.3-36.6 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 35.8 to 44.1 dB (A) Leq and during night time were from 32.5 to 39.7 dB (A) Leq.

Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

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.

2. 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

- 4.29.8 Ha of the land will be under mining since the Permanent or temporary change on land use and land cover will occur
 - 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 cause the siltation of water course.
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MITIGATION MEASURES

- The 4.29.8 Ha of the land will be converted into temporary reservoir which will full fill the water scarcity in the drought season and the nearby agriculture land will have benefitted by the supply of water
- About 300 Nos of trees will be planted in the lease area and approach road will retain the ecosystem
- 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.,
- Fencing will be constructed before starting the mining operation and it will be maintained in 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.
- 2.0 KLD water will be utilized for the quarrying operation.

MITIGATION MEASURES

- Water for the quarrying operation such as sprinkling on haul roads, Greenbelt development will be sourced from the lower part of the mine pit which is specifically allotted to collect the rain water.
- 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 judiciously utilize the rainwater as part of rainwater harvesting system.
- Periodic (every 6 months 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.

4.3 AIR ENVIRONMENT

ANTICIPATED IMPACT

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- During mining, at various stages activities such as excavation, 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

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 excavation and Loading during movement of vehicles.

MITIGATION MEASURES

- 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.
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- 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
I	300	The safety zone along the boundary barrier and Village roads has been utilized for Greenbelt development.	Mango, Tamarind, Neem etc..

4.6 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

Employment generation due to the project will provide direct employment for about 14 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.

3. 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.

4. ENVIRONMENT MONITORING PROGRAM

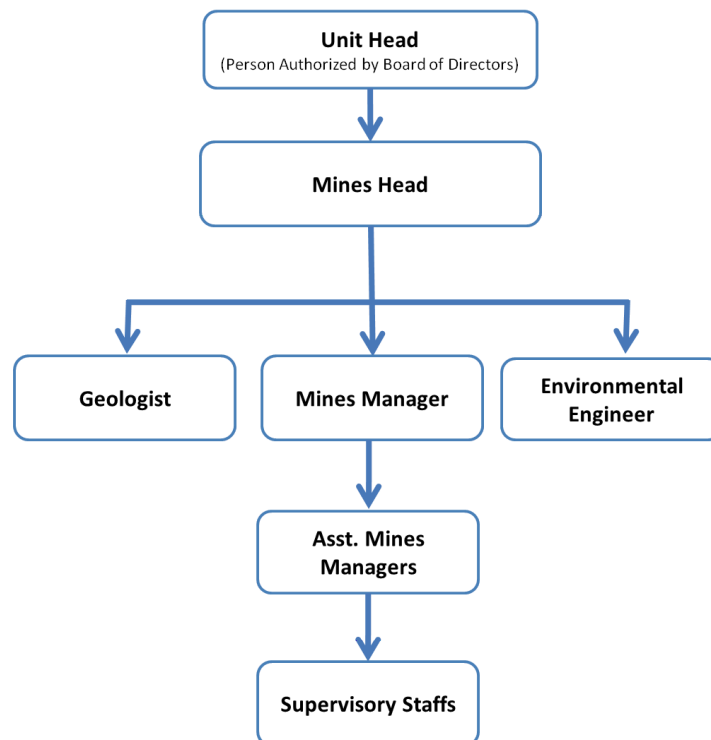
Usually, an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to take into account the changes in the Environment.

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 PROPOSED ENVIRONMENTAL MONITORING CELL

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

5. 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.

8. PROJECT BENEFITS

The company aims to produce 2,16,091 tons of Fire clay for entire life of quarry and 98,611 tons of Fire clay a period of 5 years. This will enhance the socio-economic activities in the adjoining areas. The enhancement of production will result 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 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

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- 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.
