

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT**&****ENVIRONMENT MANAGEMENT PLAN****FOR OBTAINING****Environmental Clearance under EIA Notification – 2006****Schedule Sl. No. 1 (a) (i): Mining Project****“B1” CATEGORY – MINOR MINERAL – CLUSTER – GOVERNMENT LAND –
FRESH QUARRY****VENKATESAPURAM ROUGH STONE QUARRIES****Cluster Extent – 19.31.0 Ha****Lease Period/Mining period – 10 Years**

Project Proponent	
P1	P2
Thiru. M. Shankar Ganesh, S/o. Mallappachetty, Door No. 199, Thippanappalli Village, Nedumaruthi Post, Krishnagiri Taluk and District – 635 115.	Thiru. G. Santhamoorthy, S/o. Govindarajan, Sundarampalli, Krishnapuram Taluk, Tirupattur District – 635 654.
PROJECT LOCATION	
S.F. No. 132 (Part-2) Extent: 1.45.0Ha Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State.	S.F. No. 132 (Part-1) Extent: 1.55.0Ha Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State.
PROPOSED PRODUCTION	
Reserves: Rough stone - 1,81,281m ³ /4,98,523Ts Weathered Rock – 20,160m ³ /40,320Ts Topsoil – 10,788m ³ /21,576Ts Peak Production: Rough stone – 30,250m ³ /83,187Ts Weathered Rock – 7,020m ³ /14,040Ts Topsoil – 6,882m ³ /13,764Ts Depth = 46m (8m AGL + 38m BGL) {1m Topsoil + 2m WR+ 43m RS}	Reserves: Rough stone - 1,88,280m ³ /5,17,700 Ts Weathered Rock - 20,972m ³ /41,944 Ts Topsoil - 11,009m ³ /22,018 Ts Peak Production: Rough stone - 31,130m ³ /85,607.5 Ts Weathered Rock - 10,976m ³ /21,952 Ts Topsoil - 4,040m ³ /8,080 Ts Depth = 51m (11m AGL + 40m BGL) {1m Topsoil + 2m WR+ 48m RS}
ToR	
File No: 12104 ToR Identification No: TO25B0108TN5731666N Dated: 17.06.2025	File No: 12102 ToR Identification No: TO25B0108TN5329544N Dated: 17.06.2025
Environmental Consultant GEO EXPLORATION AND MINING SOLUTIONS Old No. 260-B, New No. 17, Advaitha Ashram Road, Alagapuram, Salem – 636 004, Tamil Nadu, India Accredited for sector 1 Cat ‘A’, sector 31 & 38 Cat ‘B’   Certificate No : NABET/EIA/2225/RA 0276 Phone: 0427-2431989, Email: ifthiahmed@gmail.com, geothangam@gmail.com Web: www.gemssalem.com	Laboratory CHENNAI METTEX LAB PRIVATE LIMITED (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	
MARCH TO MAY 2025	
AUGUST 2025	

UNDERTAKING – P1

I M. Shankar Ganesh given undertaking that this EIA & EMP report prepared for our Rough stone quarry situated in 132 (Part-2), Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State based on the ToR issued by the State Level Environmental Impact Assessment Authority (SEIAA), Tamil Nadu vide File No: 12104 ToR Identification No: TO25B0108TN5731666N Dated: 17.06.2025.

I hereby assured that the Data's submitted and information given by me is true and correct to the best of my knowledge.

Signature of the Applicant



M. Shankar Ganesh

Place: Krishnagiri

Dated:

UNDERTAKING – P2

I G. Santhamoorthy given undertaking that this EIA & EMP report prepared for our Rough stone quarry situated in S.F. No. 132 (Part-1), Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State based on the ToR issued by the State Level Environmental Impact Assessment Authority (SEIAA), Tamil Nadu vide File No: 12102 ToR Identification No: TO25B0108TN5329544N Dated: 17.06.2025.

I hereby assured that the Data's submitted and information given by me is true and correct to the best of my knowledge.

Signature of the Applicant



G. Santhamoorthy

Place: Krishnagiri

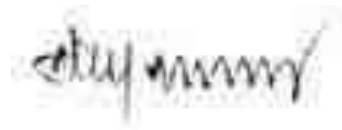
Dated:

DECLARATION

I Dr. P. Thangaraju – EIA Co Ordinator declare that this EIA & EMP report for the Venkatesapuram Rough stone quarries in S.F. No. 132 (Part-2) & S.F. No. 132 (Part-1) of Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State has been prepared by Geo Exploration and Mining Solutions, Salem, Tamil Nadu.

The Data's provided in the EIA report are true and correct to the best of my knowledge.

Signature of the EIA Co Ordinator



Dr. P. Thangaraju

M/s. Geo Exploration and Mining Solutions

Place: Salem

Dated:

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA/EMP

Declaration by experts contributing to the EIA/EMP for Venkatesapuram Rough Stone Quarries over an Extent of **19.31.0 Ha** in Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State It is also certified that information furnished in the above EIA study are true and correct to the best of our knowledge.

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the EIA/EMP Report.

Name: **Dr. M. Ifthikhar Ahmed**

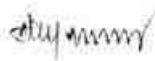
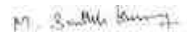
Designation: **EIA Coordinator**

Date & Signature:



Period of Involvement: **March 2025 to till date**

FUNCTIONAL AREA EXPERTS ENGAGED IN THE PROJECT

Sl. No.	Functional Area	Involvement	Name of the Expert/s	Signature
1	AP	- Identification of different sources of air pollution due to the proposed mine activity - Prediction of air pollution and propose mitigation measures / control measures	Mr. N. Sathishkumar	
2	WP	- Suggesting water treatment systems, drainage facilities - Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.	Mr.P.Govindasamy	
3	HG	- Interpretation of ground water table and predict impact and propose mitigation measures. - Analysis and description of aquifer Characteristics	Dr. P. Thangaraju	
4	GEO	- Field Survey for assessing the regional and local geology of the area. - Preparation of mineral and geological maps. - Geology and Geo morphological analysis/description and Stratigraphy/Lithology.	Mr. M. Santhoshkumar	
5	SE	- Revision in secondary data as per Census of India, 2011. - Impact Assessment & Preventive Management Plan - Corporate Environment Responsibility.	Dr. T. Sasikala	
6	EB	- Collection of Baseline data of Flora and Fauna. - Identification of species labelled as Rare, Endangered and threatened as per IUCN list. - Impact of the project on flora and fauna. - Suggesting species for greenbelt development.	Mr. Panneer Selvam	
7	RH	- Identification of hazards and hazardous substances - Risks and consequences analysis - Vulnerability assessment - Preparation of Emergency Preparedness Plan - Management plan for safety.	Mr. J. R. Vikram Krishna	
8	LU	- Construction of Land use Map - Impact of project on surrounding land use - Suggesting post closure sustainable land use and mitigative measures.	Mr.P. Viswanathan	

9	NV	- Identify impacts due to noise and vibrations - Suggesting appropriate mitigation measures for EMP.	Mr. J. R. Vikram Krishna	
10	AQ	- Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. - Recommending mitigations measures for EMP	Mr. N. Senthilkumar	
11	SC	Assessing the impact on soil environment and proposed mitigation measures for soil conservation	Mr.M.Shaik Nawas	
12	SHW	- Identify source of generation of non-hazardous solid waste and hazardous waste. - Suggesting measures for minimization of generation of waste and how it can be reused or recycled.	Mr. J. R. Vikram Krishna	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, Dr. M. Ifthikhar Ahmed, Managing Partner, Geo Exploration and Mining Solutions, hereby, confirm that the above-mentioned Functional Area Experts and Team Members prepared this EIA/EMP for Venkatesapuram Rough Stone Quarries Project over an Extent of 19.31.0ha in Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State. It is also certified that information furnished in the EIA study are true and correct to the best of our knowledge.

Signature& Date:



Name:

Dr. M. Ifthikhar Ahmed

Designation:

Managing Partner

Name of the EIA Consultant Organization:

M/s. Geo Exploration and Mining Solutions

NABET Certificate No & Issue Date:

NABET/EIA/2225/RA 0276 Dated: 20-2-2023

Validity:

Valid till 06.08.2025

NABET Extension Certificate No & Issue Date:

QCI/NABET/ENV/ACO/25/3805 Dated: 05-08-2025

Validity:

Valid till 05.09.2025

For easy representation of Proposed and Existing, Expired and Abandoned Quarries in the Cluster are given unique codes and identifies and studied in this EIA/ EMP Report.

CODE	Name of the Owner	Village/ Taluk	S.F. Nos	Extent in Ha	Status
PROPOSED QUARRY					
P1	Thiru. M. Shankar Ganesh, S/o. Mallappachetty, Door No. 199, Thippanappalli Village, Nedumaruthi Post, Krishnagiri Taluk and District.	Venkatesapuram Village, Shoolagiri Taluk	132 (P-2)	1.45.0	File No: 12104 ToR Identification No: TO25B0108TN573 1666N Dated: 17.06.2025
P2	Thiru. G. Santhamoorthy, S/o. Govindarajan, Sundarampalli, Krishnapuram Taluk, Tirupattur District.		132 (P-1)	1.55.0	File No: 12102 ToR Identification No: TO25B0108TN532 9544N Dated: 17.06.2025
P3	M/s. Ultra Mines		133/1(P), 133/2&4, 134/1&2	4.40.0	Mining Plan Approved
	TOTAL EXTENT			7.40.0	
EXISTING QUARRY					
E-1	M/s. Sumukha Blue Metals & M Sand	Venkatesapuram Village, Shoolagiri Taluk	294 (P-2)	3.75.0	30.04.2021 to 29.04.2031
E-2	Thiru. V. Nataraja S/o. Venkatappa Reddy		287/1	2.16.0	19.02.2021 to 18.02.2031
E-3	M/s. Sumukha Blue Metals & M Sand		288(P)	3.00.0	10.02.2025 to 09.02.2030
E-4	Tvl. Mars Blue Metals		135 (P-2)	3.00.0	19.06.2019 to 18.02.2031
	TOTAL EXTENT			11.91.0 Ha	
EXPIRED QUARRY					
EX-1	Thiru. Muniraj	Venkatesapuram Village, Shoolagiri Taluk	285 (P)	4.92.0	04.07.2018 to 03.07.2023
	TOTAL EXTENT			4.92.0 Ha	
	TOTAL CLUSTER EXTENT			19.31.0 Ha	

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

TERMS OF REFERENCE (ToR) COMPLIANCE

P1 - Thiru. M. Shankar Ganesh

File No: 12104 ToR Identification No: TO25B0108TN5731666N Dated: 17.06.2025

SEIAA SPECIFIC CONDITIONS		
1	The authority noted that the subject was placed in the 564 th SEAC-I meeting held on 13.05.2025. After detailed discussions, the Authority accepts the recommendation of SEAC-I and decided to grant Terms of Reference (ToR) along with Public Hearing for total production quantity of 4,98,523 m ³ of Rough stone for an ultimate depth of mining of 46m (8m AGL + 38m BGL) as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC-I & normal conditions & the conditions mentioned below.	Noted & agreed The Draft EIA was prepared as per the ToR condition for total production quantity of 4,98,523 Ts of Rough stone for an ultimate depth of mining of 46m (8m AGL + 38m BGL) The Environment Management Plan detailed in chapter 10. Page No. 170.
SEAC CONDITIONS – SITE SPECIFIC		
1	A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic & scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal: (i) Copy of the agreement forming CMC. (ii) The Organisation chart of the Committee with defining the role of the members (iii) The ‘Standard Operating Procedures’ (SoP) executing the planned activities.	Noted & agreed A Cluster Management Committee (CMC) was detailed in chapter 7. Page No. 161
2	The Geo referenced Boundary pillars to be erected on the field as per the mine rules and the evidence should be submitted along with the EIA report.	Noted & agreed It will be submitted in Final EIA appraisal.
3	Since waterbodies are situated nearby, the PP shall carry out the hydrological study including the details of waterflow pattern to determine the impacts of the mining operation in the waterbodies.	Noted & agreed The hydrological study was detailed in chapter 3. Page No. 60.
4	The details of enumeration of structures including schools, colleges, primary health centres should be submitted along with the EIA report.	Noted & agreed Detailed in chapter 3 in Socio Economic Environment, Page No. 100.
5	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & upto 1km shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations.	Noted & agreed The enumeration of structure detailed in chapter 3 in Socio Economic Environment, Page No. 100
6	The proponent shall furnish photographs of adequate fencing, garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Noted & agreed The photographs are enclosed in chapter 2. Page No. 14. There are no trees in inside lease area.

7	The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report.	Noted and agreed The Bio diversity study has been conducted by the Functional Area Expert approved by the NABET. The same has been detailed in the Chapter No. 3. Page No. 78
8	The PP shall prepare the EMP for the entire project life of mine, and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	Noted and Agreed Details are discussed in chapter no 10, Table no 10.9, Page No. 179 and the sworn affidavit will be submitted after obtaining Environmental Clearance.
9	The PP shall prepare a conceptual working plan accommodating the inclusion of haul road accessibility keeping the benches intact, by ensuring the slope stability of the working benches to be constructed and existing quarry wall.	Noted and Agreed Detailed in chapter 2. Page No. 30.
10	The PP shall install the CCTV camera for the continuous surveillance of mining activity & furnish the photographic/video graphic evidence along with the EIA report.	Noted & agreed The CCTV camera photographs will be submitted in Final EIA appraisal.
SEAC STANDARD CONDITIONS		
1	In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following: (i) Original pit dimension (ii) Quantity achieved Vs EC Approved Quantity (iii) Balance Quantity as per Mineable Reserve calculated. (iv) Mined out Depth as on date Vs EC Permitted depth (v) Details of illegal/illicit mining (vi) Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zone/benches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.	Noted & agreed It's a fresh quarry
2	Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.	Noted and Agreed Project Proponent obtained VAO certificate and there is no approved habitation within the radius of 300m & enclosed in Annexure.
3	The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.	Noted & agreed The enumeration of structure detailed in chapter 3 in Socio Economic Environment, Page No. 86.
4	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	Noted and agreed. The Hydrogeological study has been carried out in the project site considering the water bodies located within the radius of 1km. The hydrogeological study (Resistivity survey) is detailed in the EIA report, Chapter No.3, Page No. 60.
5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	Noted and agreed The Bio diversity study has been conducted by the Functional Area Expert approved by the

		NABET. The same has been detailed in the Chapter No. 3, Page No. 100.
6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.	Noted and agreed Athimugam R.F - 0.48km – South Letter No – R.C.No. 11162/2023/L Dated: 01.03.2024 and enclosed in annexure.
7	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.	Noted & agreed It's a fresh quarry
8	However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level	Noted & agreed It's a fresh quarry
9	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.	Noted and agreed Proponent given under taking that the blasting will be carried out by the statutory person as per the MMR 1961.
10	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.	Noted and agreed Chapter-2 sub - 2.5.1 Drilling & Blasting Parameters NONEL initiation based controlled blasting operation involving line drilling and muffle blasting in the proposed quarry Chapter-4, Sub 4.4.2 Common Mitigation Measures for Respective Individual Proposed Projects The blasting will be carried out during favorable atmospheric condition and less human activity timings by using nonelectrical initiation system
11	The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	Noted & agreed It's a fresh quarry
12	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,	
13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	
14	Quantity of minerals mined out. - Highest production achieved in any one year - Detail of approved depth of mining. - Actual depth of the mining achieved earlier.	

	- Name of the person already mined in that leases area. - If EC and CTO already obtained, the copy of the same shall be submitted. - Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
15	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	Project area boundary coordinates superimposed on Toposheet Chapter-1, Figure. No. 1.3, Page No. 7 Surface Features around the project area covering 10km radius Chapter-2, Figure. No. 2.5, Page No. 20. Geology map of the project area covering 10km radius Chapter-2, Figure. No. 2.8, Page No. 26. Geomorphology Map of the Study Area covering 10 km radius Chapter-2, Figure. No. 2.9, Page No. 30.
16	16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	Noted & agreed It will be submitted on final EIA appraisal.
17	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Noted & agreed The photographs are enclosed in chapter 2. Page No. 14 There are no trees in inside lease area.
18	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.	Noted and Agreed Details of Geological Resources and Proposed reserves are discussed under Chapter No. 2, Table No.2.6 & 2.6-A, page No. 28
19	The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	Noted and agreed Organization chart for the Competent persons to be appointed as per the provisions of the Mines Act 1952 is given in the Chapter No.6
20	The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.	Noted and agreed The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies around the project area. Details are discussed under Chapter No. 3.
21	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	Noted and agreed Baseline Data were collected for pre-monsoon season March 2025 to May 2025. Details in Chapter No. 3, Page No. 41.
22	The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the	Noted and agreed The Cumulative impact study due to mining operations are detailed in chapter 7, Page no. 149.

	Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Noted and agreed The lower part of the mine pit will act as temporary rainwater harvesting structure, besides Rainwater harvesting structure will be constructed near the mine office and labour shed after commencement of mining operation.
24	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use and land cover of the study area is discussed in Chapter No. 3, Page no.: 43. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.3, Page no.: 23.
25	Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.	Not applicable There is no waste anticipated in this Rough Stone quarrying operation. The entire quarried out materials will be utilized (100%).
26	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
27	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Noted and agreed The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.
28	Impact on local transport infrastructure due to the Project should be indicated.	Noted and agreed Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines 1961 2and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Chapter No.2, Page No. 37.
29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	Noted and agreed It was proposed 720Nos of trees were planted as a part of greenbelt development programme all along the periphery of the lease applied area and approach roads and village roads.
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Noted and agreed After the completion of mining operation, the quarried-out land will be utilized as temporary storage reservoir. The details are given in the Chapter No.4
31	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance	Noted and Agreed

	of preserving local flora and fauna by involving them in the study, wherever possible.	
32	The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	Noted and agreed The varieties of plantations have been proposed as per the Appendix given in the ToR. It is a Proposed Lease. Around 720 trees are proposed to plant in the boundary area and in the village roads.
33	Taller/one year old Saplings raised in appropriate size of bags; preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner	Noted and Agreed
34	A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	Noted and Agreed Disaster management Plan details in Chapter-7, Page No.147
35	A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	Noted and Agreed A Risk Assessment and management Plan Chapter- 7, Page No.146
36	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Noted and Agreed Occupational Health impacts are given in the Chapter- 10. Page No.176
37	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Noted and agreed. No Public Health Implications anticipated due to this project.
38	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Noted and Agreed Details explained Socio economic and impacts studies regarding Chapter No. 3, Page no. 100.
39	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	Noted and Agreed No Litigation is pending against the project.
40	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Noted and agreed The benefits of the project are given in the Chapter No 8. • Through this project around 720Nos of trees will be planted • The government will get revenue from the way of Seigniorage fee, royalty etc., Around 26 people will get direct employment through this project.
41	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is	Noted & agreed It's a fresh quarry

	sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	
42	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine	Noted and Agreed Details are discussed in chapter no 10, Table no 10.9, Page no. 179.
43	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.	Noted and Agreed
SEIAA STANDARD CONDITION		
Cluster Management Committee		
1	Cluster Management Committee, which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Noted and agreed Cluster management committee detailed in chapter 7, page no. 161. Cluster management committee has been formed with mutual agreement with the proponents including Proposed quarry at present are framed.
2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development water sprinkling, tree plantation, blasting etc..	Noted and agreed. As per the committee agreement proponents will coordinates for the Greenbelt development, Water sprinkling and tree plantation activities combined.
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	Noted and agreed. The formation of committee with list of members has been submitted to the AD mines office, Krishnagiri and the same will be update in every year.
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	As per the committee agreement the blasting frequency will be discussed and carryout by the Mines Manager appointed by the proponents and the same will be updated in the committee minutes. Transport details in chapter-2.
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	The risk management plan and disaster management plan will be followed as per this EIA report.
6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the Environmental policy devised shall be given in detail in the EIA Report.	Noted and agreed.
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner	Noted and agreed A proper action plan regarding the restoration will be followed by the committee.
8	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity.	Noted and agreed.
Agriculture & Agro - Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	Noted and agreed As the proposed lease area is dominantly surrounded by mining land, barren land, and

		fallow land, the impact on the surrounding agricultural fields if present will be low. With proper mitigation measures, the project will be carried out to reduce the impact further to the level of negligence.
10	Impact on soil flora & vegetation around the project site.	Noted and agreed The vegetation details have been provided in chapter 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
11	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Noted and agreed The vegetation details have been provided in Chapter No 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
12	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem	Noted and agreed The EIA study has been carried out as per this ToR Condition. The details are given in the EIA report Chapter No.3
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	Noted and agreed The Eco System of the area will be retained during the mining operation by the way of planting trees in the boundary barrier and un utilized areas. After completion of mining operation, the quarried-out pit will be facilitated to collect the rainwater to pit act as temporary reservoir.
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The project area is bounded by Existing quarries on the all side of the lease area.
Forests		
15	The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.	There is no Reserve Forest within 1km radius from the project area. The mining operation will not cause any significant impact to the Reserve Forest and Wild life Sanctuaries
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	Details of flora and fauna studies given in the Chapter No.3
17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	Noted and agreed
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	Noted and agreed
Water Environment		
19	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within I km (radius) so as to assess the impacts on the nearby waterbodies due to mining any ecological fragile areas. activity. Based on actual monitored data, it may clearly be	Hydro-geological study considering the open well and borewell within the radius of 1km along with water level contour map. The details are given in the Chapter No.3.

	shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	
20	Erosion Control measures	Noted and agreed Garland drainage structures will be constructed around the lease area to control the erosion, as discussed in Section 4.3 under Chapter 4.
21	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.	Details in Chapter 3- Detailed EIA study has been carried out considering the impact to the water bodies and eco system of the area. Details are covered in the Chapter No.3 and 4.
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	Noted & agreed Details discussed in Chapter 3 and 4 impact of bio diversity
23	The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.	Noted & agreed
24	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and, possible scars on the landscape damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.	Noted & agreed. Details discussed under Chapter 3.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	Noted & agreed Details of impact on soil health, soil erosion, the soil, physical, chemical components and microbial components described in chapter-3.
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	Noted & agreed
27	The EIA shall include the impact of mining activity on the following: a) Hydrothermal/Geothermal effect due to destruction in the Environment. b) Bio-geochemical processes and its foot prints including Environmental stress.	Noted & agreed
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	The mitigation measures to control the Noise, Air, Water and dust is given in the Chapter No.4.
Climate Change		
29	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and Temperature reduction including control of other emission and climate mitigation activities.	Details of carbon emission and mitigation activities are given in the Chapter No.4
30	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features.	Noted & agreed
31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	Noted & agreed
Mine Closure Plan		
32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs.	Details in Chapter 2 mine closure plan
EMP		

33	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	The detailed Environmental Management plan has been prepared and given in the Chapter No.10
34	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan	Details in Green belt development in chapter 4
Risk Assessment		
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	The risk assessment and its management plan for this project has been provided in Chapter No. 7.
Disaster Management Plan		
36	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	The disaster management plan for this project has been provided in Chapter No. 7.
Others		
37	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.	The Project Proponent have obtained VAO certificate attached in the annexure.
38	As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	Noted and agreed
39	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	Details of carbon emission and mitigation activities are given int the Chapter No.4

TERMS OF REFERENCE (ToR) COMPLIANCE

P2 - Thiru. G. Santhamoorthy,

File No: 12102 ToR Identification No: TO25B0108TN5329544N Dated: 17.06.2025

SEIAA SPECIFIC CONDITIONS		
1	The Authority noted that the subject was placed in the 564 th meeting of SEAC-I held on 13.05.2025. After detailed discussions, the Authority accepts the recommendation of SEAC-I and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 1,88,280 m ³ of Rough Stone up to the depth of 51 m (11 m AGL + 40 m BGL) as per the approved mining plan, under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC-I & normal conditions & the conditions mentioned below.	Noted & agreed The Draft EIA was prepared as per the ToR condition for total production quantity of 1,88,280 m³ of Rough Stone up to the depth of 51 m (11 m AGL + 40 m BGL) The Environment Management Plan detailed in chapter 10. Page No. 182.
SEAC CONDITIONS – SITE SPECIFIC		
1	A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic & scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal: (i) Copy of the agreement forming CMC. (ii) The Organisation chart of the Committee with defining the role of the members (iii) The 'Standard Operating Procedures' (SoP) executing the planned activities.	Noted & agreed A Cluster Management Committee (CMC) was detailed in chapter 7. Page No. 161.
2	The Geo referenced Boundary pillars to be erected on the field as per the mine rules and the evidence should be submitted along with the EIA report.	Noted & agreed It will be submitted in Final EIA appraisal.
3	The proponent shall furnish photographs of adequate fencing, garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Noted & agreed Fencing, garland drainage & green belt photographs are enclosed in chapter 2. Page No. 14 There are no trees in inside lease area.
4	The PP shall install the CCTV camera for the continuous surveillance of mining activity & furnish the photographic/video graphic evidence along with the EIA report.	Noted & agreed The CCTV camera photographs will be submitted in Final EIA appraisal.
SEAC STANDARD CONDITIONS		
1	In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following: (i) Original pit dimension (ii) Quantity achieved Vs EC Approved Quantity (iii) Balance Quantity as per Mineable Reserve calculated. (iv) Mined out Depth as on date Vs EC Permitted depth (v) Details of illegal/illicit mining (vi) Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zone/benches	Noted & agreed It's a fresh quarry

	(ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.	
2	Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.	Noted and Agreed Project Proponent obtained VAO certificate and there is no approved habitation within the radius of 300m & enclosed in Annexure.
3	The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.	Noted & agreed The enumeration of structure detailed in chapter 3 in Socio Economic Environment, Page No. 100.
4	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	Noted and agreed. The Hydrogeological study has been carried out in the project site considering the water bodies located within the radius of 1km. The hydrogeological study (Resistivity survey) is detailed in the EIA report, Chapter No.3, Page No. 60.
5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	Noted and agreed The Bio diversity study has been conducted by the Functional Area Expert approved by the NABET. The same has been detailed in the Chapter No. 3, Page No.78.
6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.	Noted and agreed Athimugam R.F- 0.63km – South Letter No – Rc.No. 11162/2023/L Dated: 01.03.2024 and enclosed in annexure.
7	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.	Noted & agreed It's a fresh quarry
8	However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level	Noted & agreed It's a fresh quarry
9	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.	Noted and agreed Proponent given under taking that the blasting will be carried out by the statutory person as per the MMR 1961.
10	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.	Noted and agreed Chapter-2 sub - 2.5.1Drilling & Blasting Parameters NONEL initiation based controlled blasting operation involving line drilling and muffle blasting in the proposed quarry

		Chapter-4, Sub 4.4.2 Common Mitigation Measures for Respective Individual Proposed Projects The blasting will be carried out during favorable atmospheric condition and less human activity timings by using nonelectrical initiation system
11	The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	Noted & agreed It's a fresh quarry
12	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,	
13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	
14	Quantity of minerals mined out. • Highest production achieved in any one year • Detail of approved depth of mining. • Actual depth of the mining achieved earlier. • Name of the person already mined in that leases area. • If EC and CTO already obtained, the copy of the same shall be submitted. • Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
15	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	Project area boundary coordinates superimposed on Toposheet Chapter-1, Figure. No. 1.3, Page No. 7 Surface Features around the project area covering 10km radius Chapter-2, Figure. No. 2.5, Page No. 20. Geology map of the project area covering 10km radius Chapter-2, Figure. No. 2.8, Page No. 26. Geomorphology Map of the Study Area covering 10 km radius Chapter-2, Figure. No. 2.9, Page No. 30.
16	16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	Noted & agreed It will be submitted on final EIA appraisal.
17	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Noted & agreed The photographs are enclosed in chapter 2. Page No. 14 There are no trees in inside lease area.
18	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.	Noted and Agreed Details of Geological Resources and Proposed reserves are discussed under Chapter No. 2, Table No.2.8 & 2.8-A, page No. 31.
19	The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act' 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	Noted and agreed Organization chart for the Competent persons to be appointed as per the provisions of the Mines Act 1952 is given in the Chapter No.6
20	The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius)	Noted and agreed The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies

	along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.	around the project area. Details are discussed under Chapter No. 3.
21	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	Noted and agreed Baseline Data were collected for pre-monsoon season March 2025 to May 2025. Details in Chapter No. 3, Page No. 41.
22	The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	Noted and agreed The Cumulative impact study due to mining operations are detailed in chapter 7, Page no. 145.
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Noted and agreed The lower part of the mine pit will act as temporary rainwater harvesting structure, besides Rainwater harvesting structure will be constructed near the mine office and labour shed after commencement of mining operation.
24	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use and land cover of the study area is discussed in Chapter No. 3, Page no.: 33 Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.3-A Page no.: 23.
25	Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.	Not applicable There is no waste anticipated in this Rough Stone quarrying operation. The entire quarried out materials will be utilized (100%).
26	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
27	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Noted and agreed The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.
28	Impact on local transport infrastructure due to the Project should be indicated.	Noted and agreed Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines 1961 2and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Chapter No.2, Page No. 37.
29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining	Noted and agreed

	lease applied area & 300m buffer zone and its management during mining activity.	It was proposed 770Nos of trees were planted as a part of greenbelt development programme all along the periphery of the lease applied area and approach roads and village roads.
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Noted and agreed After the completion of mining operation, the quarried-out land will be utilized as temporary storage reservoir. The details are given in the Chapter No.4
31	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	Noted and Agreed
32	The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	Noted and agreed The varieties of plantations have been proposed as per the Appendix given in the ToR. It is a Proposed Lease. Around 770 trees are proposed to plant in the boundary area and in the village roads.
33	Taller/one year old Saplings raised in appropriate size of bags; preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner	Noted and Agreed
34	A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	Noted and Agreed Disaster management Plan details in Chapter-7, Page No.147.
35	A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	Noted and Agreed A Risk Assessment and management Plan Chapter- 7, Page No.145.
36	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Noted and Agreed Occupational Health impacts are given in the Chapter-10. Page No.188.
37	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Noted and agreed. No Public Health Implications anticipated due to this project.
38	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Noted and Agreed Details explained Socio economic and impacts studies regarding Chapter No. 3, Page no. 100.
39	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	Noted and Agreed No Litigation is pending against the project.

40	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Noted and agreed The benefits of the project are given in the Chapter No 8. • Through this project around 790Nos of trees will be planted • The government will get revenue from the way of Seigniorage fee, royalty etc., Around 28 people will get direct employment through this project.
41	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	Noted & agreed It's a fresh quarry
42	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine	Noted and Agreed Details are discussed in chapter no 10, Table no 10.9, Page no. 191
43	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.	Noted and Agreed

SEIAA STANDARD CONDITION**Cluster Management Committee**

1	Cluster Management Committee, which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Noted and agreed Cluster management committee detailed in chapter 7, page no. 161. Cluster management committee has been formed with mutual agreement with the proponents including Proposed quarry at present are framed.
2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development water sprinkling, tree plantation, blasting etc..	Noted and agreed. As per the committee agreement proponents will coordinates for the Greenbelt development, Water sprinkling and tree plantation activities combined.
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	Noted and agreed. The formation of committee with list of members has been submitted to the AD mines office, Krishnagiri and the same will be update in every year.
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	As per the committee agreement the blasting frequency will be discussed and carryout by the Mines Manager appointed by the proponents and the same will be updated in the committee minutes. Transport details in chapter-2.
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	The risk management plan and disaster management plan will be followed as per this EIA report.
6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the Environmental policy devised shall be given in detail in the EIA Report.	Noted and agreed.
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner	Noted and agreed A proper action plan regarding the restoration will be followed by the committee.

8	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity.	Noted and agreed.
Agriculture & Agro - Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	Noted and agreed As the proposed lease area is dominantly surrounded by mining land, barren land, and fallow land, the impact on the surrounding agricultural fields if present will be low. With proper mitigation measures, the project will be carried out to reduce the impact further to the level of negligence.
10	Impact on soil flora & vegetation around the project site.	Noted and agreed The vegetation details have been provided in chapter 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
11	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Noted and agreed The vegetation details have been provided in Chapter No 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
12	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem	Noted and agreed The EIA study has been carried out as per this ToR Condition. The details are given in the EIA report Chapter No.3
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	Noted and agreed The Eco System of the area will be retained during the mining operation by the way of planting trees in the boundary barrier and un utilized areas. After completion of mining operation, the quarried-out pit will be facilitated to collect the rainwater to pit act as temporary reservoir.
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The project area is bounded by Existing quarries on the all side of the lease area.
Forests		
15	The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.	There is no Reserve Forest within 1km radius from the project area. The mining operation will not cause any significant impact to the Reserve Forest and Wild life Sanctuaries
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	Details of flora and fauna studies given in the Chapter No.3
17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	Noted and agreed
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	Noted and agreed
Water Environment		
19	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within I km (radius) so	Hydro-geological study considering the open well and borewell within the radius of 1km along with water level contour map. The details are given in the Chapter No.3.

	as to assess the impacts on the nearby waterbodies due to mining any ecological fragile areas. activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	
20	Erosion Control measures	Noted and agreed Garland drainage structures will be constructed around the lease area to control the erosion, as discussed in Section 4.3 under Chapter 4.
21	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.	Details in Chapter 3- Detailed EIA study has been carried out considering the impact to the water bodies and eco system of the area. Details are covered in the Chapter No.3 and 4.
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	Noted & agreed Details discussed in Chapter 3 and 4 impact of bio diversity
23	The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.	Noted & agreed
24	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and, possible scars on the landscape damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.	Noted & agreed. Details discussed under Chapter 3.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	Noted & agreed Details of impact on soil health, soil erosion, the soil, physical, chemical components and microbial components described in chapter-3.
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	Noted & agreed
27	The EIA shall include the impact of mining activity on the following: a) Hydrothermal/Geothermal effect due to destruction in the Environment. b) Bio-geochemical processes and its foot prints including Environmental stress.	Noted & agreed
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	The mitigation measures to control the Noise, Air, Water and dust is given in the Chapter No.4.
Climate Change		
29	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and Temperature reduction including control of other emission and climate mitigation activities.	Details of carbon emission and mitigation activities are given in the Chapter No.4
30	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features.	Noted & agreed
31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	Noted & agreed
Mine Closure Plan		
32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs.	Details in Chapter 2 mine closure plan

EMP		
33	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	The detailed Environmental Management plan has been prepared and given in the Chapter No.10
34	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan	Details in Green belt development in chapter 4
Risk Assessment		
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	The risk assessment and its management plan for this project has been provided in Chapter No. 7.
Disaster Management Plan		
36	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	The disaster management plan for this project has been provided in Chapter No. 7.
Others		
37	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.	The Project Proponent have obtained VAO certificate and attached in the annexure.
38	As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	Noted and agreed
39	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	Details of carbon emission and mitigation activities are given int the Chapter No.4

STANDARD TERMS OF REFERENCE		
1	Year-wise production details since 1994 should be given. clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	Not applicable. This is Not a violation category project. This proposal falls under B1 Category (Cluster Condition).
2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given	The applied land for quarrying is a Government Land. Document is enclosed along with Approved Mining Plan as Annexure Volume 1.
3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee	Noted & agreed.
4	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)	Map showing – Project area is superimposed on Satellite imagery is enclosed in Figure No. 2.4, page no. 19 Project area boundary coordinates superimposed on Toposheet – Figure No. 1.3, page no. 7 Surface Features around the project area covering 10km radius – Figure No. 2.5, page no. 20 Geology map of the project area covering 10km radius - Figure No. 2.8, page no. 16 Geomorphology Map of the Study Area covering 10 km radius – Figure No. 2.9, page no. 27
5	Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics	Map showing – Geology map of the project area covering 10km radius - Figure No. 2.8, page no. 16 Geomorphology Map of the Study Area covering 10 km radius – Figure No. 2.9, page no. 27
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority	The applied area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.
7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report	The proponent has framed their Environmental Policy and the same is discussed in the Chapter No 10, page no. 170 – P1 and 182 – P2

8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided	It is an opencast quarrying operation proposed to operate in Mechanized method. The rough stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 90° bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.
9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.	Noted & agreed. The study area considered for this study is 10 km radius and all data contained in the EIA report such as waste generation etc., is for the Life of the Mine / lease period.
10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2.
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	Not Applicable. There is no waste anticipated during this quarry operation. The entire quarried out rough stone will be transported to the needy customers. No Dumps is proposed outside the lease area.
12	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary, claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees	Not Applicable. There is no Forest Land involved in the proposed project area. The proposed project area is a government land. Approved Mining Plan is enclosed as Annexure Volume 1.
13	Status of forestry clearance for the broken-up area and virgin forest land involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	Not Applicable. The proposed project area does not involve any Forest Land.
14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest rights) Act, 2006 should be indicated.	Not Applicable. The project doesn't attract Recognition of Forest Rights Act, 2006.
15	The vegetation in the RF / PF areas in the study area, with necessary, details, should be given	No Reserve Forest within the Study Area.
16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and	Not Applicable. There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.

	accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted	
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	Not Applicable. There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	Detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] was carried out and discussed under Chapter No. 3 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.
19	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
20	Similarly. for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable. The project doesn't attract The C. R. Z. Notification, 2018.
21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line	Not Applicable. There are no approved habitations within a radius of 300 meters. Therefore, R&R Plan / Compensation details for the Project Affected People (PAP) is not anticipated and Not Applicable for this project.

	departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socioeconomic aspects should be discussed in the Report.	
22	One season (non-monsoon) i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the predominant downwind direction. The mineralogical composition of PM ₁₀ , particularly for free silica, should be given.	Baseline Data were collected for One Season (Pre-Monsoon) March 2025 to May 2025 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. 3.
23	Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly, indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing predominant wind direction may also be indicated on the map.	Air Quality Modelling for prediction of incremental GLC's of pollutant was carried out using AERMOD view 9.6.1 Model. Details in Chapter No. 4, Page no. 117.
24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	Total Water Requirement: 2.0KLD for P1 & P2 Discussed under Chapter 2, Table No 2.15, page no. 38
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project, should be provided.	Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rain water harvesting proposed in the project, if any, should be provided.	Part of the working pit will be allowed to collect rain water during the spell of rain will be used for greenbelt development and dust suppression. The Mine Closure Plan is prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.

27	Impact of the Project on the water quality, both surface and groundwater. should be assessed and necessary safeguard measures, if any required, should be provided.	Impact Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Chapter 4.
28	Based on actual monitored data, it may clearly be shown whether working will intersect. Ground water. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	Not Applicable. The ground water table inferred 72-75m below ground level. P1 - The ultimate & proposed depth of quarry is 46m (8m AGL + 38m BGL) will not intersect the ground water table, which is inferred from the hydro-geological studies carried out at the project site. P2 - The ultimate & proposed depth of quarry is 51m (11m AGL + 40m BGL) will not intersect the ground water table, which is inferred from the hydro-geological studies carried out at the project site. Discussed under Chapter 3.
29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Not Applicable. There is no stream, seasonal or other water bodies passing within the project area. Therefore, no modification/ diversion of water bodies is anticipated.
30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	P1-Highest elevation of the project area is 874m-882m (max) AMSL. The ultimate depth of quarry is 46m (8m AGL + 38m BGL) P2-Highest elevation of the project area is 870m-880m (max) AMSL. The ultimate of quarry is 51m (11m AGL + 40m BGL) The ground water table inferred 72-75m below ground level.
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Greenbelt Development Plan is discussed under Chapter 4 & 7.
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including	Traffic density survey was carried out to analyse the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details in Chapter 2.

	action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in the Chapter No. 2.
34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report	Discussed under Chapter 2, Mine Closure Plan is a part of Approved Mining Plan enclosed as Annexure Volume – 1.
35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational Health Impacts of the project and preventive measures are detailed under Chapter 4.
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No Public Health Implications anticipated due to this project. Details of CER and CSR are discussed under Chapter 8.
37	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No Negative Impact on Socio Economic Environment on the Study Area is anticipated and this project shall benefit the Socio-Economic Environment by ways of employment for 54(P1-26+P2-28) people directly and 50 people indirectly. Details in Chapter 4.
38	Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Detailed Environment Management Plan for the project to mitigate the anticipated impacts described under Chapter 4 is discussed under Chapter 10.
39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the project.	The outcome of public hearing will be updated in the final EIA/AMP report
40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	P1-Project Cost is Rs. 4,67,93,000/- P2-Project Cost is Rs. 4,53,80,000/- For each proposed (P1&P2) mine CER Cost is Rs.3,00,000/- The EMP budget detailed in chapter 10, table no. 10.9
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Details in Chapter 7.
43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall	Details in Chapter 8.

	clearly indicate environmental, social, economic, employment potential, etc.	
44	Besides the above, the below mentioned general points are also to be followed: -	
a	Executive Summary of the EIA/EMP Report	Enclosed as separate booklet.
b	All documents to be properly referenced with index and continuous page numbering.	All the documents are properly referenced with index and continuous page numbering.
c	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	List of Tables and source of the data collected are indicated.
d	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project	Baseline monitoring reports are enclosed with This report in Chapter 3. Original Baseline monitoring reports will be submitted in the final EIA report during appraisal.
e	Where the documents provided are in a language other than English, an English translation should be provided.	Not Applicable.
f	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Will be enclosed along with Final EIA EMP Report.
g	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IAII(I) Dated: 4th August, 2009, which are available on the website of this Ministry, should be followed.	Noted & agreed. Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IAII (I) Dated: 4th August, 2009 are followed.
h	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation	Noted & agreed.
i	As per the circular no. J-11011/618/2010-IAII(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	Not Applicable.
j	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	P1- Surface Plan – Figure No. 2.3 – Page No. 17 Topography, Geological, Year-Wise Development Production Plan and Sections Plan - Figure No.2.10 – Page No. 29 Mine Closure Plan – Figure No.2.11 – Page No. 30 P2- Surface Plan – Figure No. 2.3-A – Page No. 18 Topography, Geological, Year-Wise Development Production Plan and Sections Plan - Figure No.2.12 – Page No. 32 Mine Closure Plan – Figure No.2.13 – Page No. 33

TABLE OF CONTENTS

1. INTRODUCTION.....	1
1.0 PREAMBLE.....	1
1.1 PURPOSE OF THE REPORT.....	2
1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT	3
1.3 BRIEF DESCRIPTION OF THE PROJECT	5
1.4 ENVIRONMENTAL CLEARANCE.....	9
1.5 TERMS OF REFERENCE (ToR).....	10
1.6 POST ENVIRONMENT CLEARANCE MONITORING.....	10
1.7 GENERIC STRUCTURE OF EIA DOCUMENT	10
1.8 THE SCOPE OF THE STUDY	10
2. PROJECT DESCRIPTION.....	12
2.0 GENERAL	12
2.1 DESCRIPTION OF THE PROJECT	12
2.2 LOCATION OF THE PROJECT	12
2.3 GEOLOGY.....	24
2.4 RESOURCES AND RESERVES	28
2.5 METHOD OF MINING	35
2.6 GENERAL FEATURES.....	36
2.7 PROJECT REQUIREMENT	38
2.8 EMPLOYMENT REQUIREMENT:.....	39
2.9 PROJECT IMPLEMENTATION SCHEDULE	40
3. DESCRIPTION OF ENVIRONMENT	41
3.0 GENERAL	41
3.1 LAND ENVIRONMENT.....	43
3.2 WATER ENVIRONMENT.....	53
3.3 AIR ENVIRONMENT	65
3.4 NOISE ENVIRONMENT.....	75
3.5 BIOLOGICAL ENVIRONMENT	78
3.6 SOCIO ECONOMIC ENVIRONMENT	100
4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES.....	114
4.0 GENERAL	114
4.1 LAND ENVIRONMENT:.....	114

4.2	WATER ENVIRONMENT.....	116
4.3	AIR ENVIRONMENT	117
4.4	NOISE ENVIRONMENT.....	123
4.5	ECOLOGY AND BIODIVERSITY.....	127
4.6	SOCIO ECONOMIC	134
4.7	OCCUPATIONAL HEALTH AND SAFETY.....	134
4.8	MINE WASTE MANAGEMENT	135
4.9	MINE CLOSURE.....	135
5.	ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)	138
5.0	INTRODUCTION	138
5.1	FACTORS BEHIND THE SELECTION OF PROJECT SITE.....	138
5.2	ANALYSIS OF ALTERNATIVE SITE	138
5.3	FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY.....	138
5.4	ANALYSIS OF ALTERNATIVE TECHNOLOGY.....	139
6.	ENVIRONMENTAL MONITORING PROGRAMME.....	140
6.0	GENERAL	140
6.1	METHODOLOGY OF MONITORING MECHANISM.....	140
6.2	IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES.....	142
6.3	MONITORING SCHEDULE AND FREQUENCY	142
6.4	BUDGETARY PROVISION FOR EMP.....	143
6.5	REPORTING SCHEDULES OF MONITORED DATA.....	143
7.	ADDITIONAL STUDIES.....	145
7.0	GENERAL	145
7.1.	PUBLIC CONSULTATION	145
7.2	RISK ASSESSMENT	145
7.3	DISASTER MANAGEMENT PLAN.....	147
7.4	CUMULATIVE IMPACT STUDY	149
7.5	PLASTIC WASTE MANAGEMENT PLAN.....	160
7.6	CLUSTER MANAGEMENT COMMITTEE	161
8.	PROJECT BENEFITS	167
8.0	GENERAL	167
8.1	EMPLOYMENT POTENTIAL.....	167
8.2	SOCIO-ECONOMIC WELFARE MEASURES PROPOSED	167
8.3	IMPROVEMENT IN PHYSICAL INFRASTRUCTURE	167
8.4	IMPROVEMENT IN SOCIAL INFRASTRUCTURE	167

8.5	OTHER TANGIBLE BENEFITS	168
9.	ENVIRONMENTAL COST BENEFIT ANALYSIS	169
10.	ENVIRONMENTAL MANAGEMENT PLAN – THIRU. M. SHANKAR GANESH.....	170
10.0.	GENERAL	170
10.1.	ENVIRONMENTAL POLICY	170
10.2.	LAND ENVIRONMENT MANAGEMENT –.....	171
6.3.	SOIL MANAGEMENT.....	172
10.4.	WATER MANAGEMENT.....	172
10.5.	AIR QUALITY MANAGEMENT	173
10.6.	NOISE POLLUTION CONTROL	173
10.7.	GROUND VIBRATION AND FLY ROCK CONTROL.....	174
10.8.	BIOLOGICAL ENVIRONMENT MANAGEMENT	174
10.9.	OCCUPATIONAL SAFETY & HEALTH MANAGEMENT.....	176
10.10	CONCLUSION –.....	181
10.	ENVIRONMENTAL MANAGEMENT PLAN – THIRU. G. SANTHAMOORTHY	182
10.0.	GENERAL	182
10.1.	ENVIRONMENTAL POLICY	182
10.2.	LAND ENVIRONMENT MANAGEMENT –.....	183
10.3	SOIL MANAGEMENT.....	184
10.4.	WATER MANAGEMENT.....	184
10.5.	AIR QUALITY MANAGEMENT	185
10.6.	NOISE POLLUTION CONTROL	185
10.7.	GROUND VIBRATION AND FLY ROCK CONTROL.....	186
10.8.	BIOLOGICAL ENVIRONMENT MANAGEMENT	186
10.9.	OCCUPATIONAL SAFETY & HEALTH MANAGEMENT.....	188
10.10	CONCLUSION –.....	193
11.	SUMMARY AND CONCLUSION	194
12.	DISCLOSURE OF CONSULTANT	196

LIST OF TABLES

TABLE 1.1: DETAILS OF PROJECT PROPONENT– P1	3
TABLE 1.1-A: DETAILS OF PROJECT PROPONENT – P2	3
TABLE 1.2: SALIENT FEATURES OF THE PROPOSED PROJECT– P1.....	3
TABLE 1.2-A: SALIENT FEATURES OF THE PROPOSED PROJECT – P2	4
TABLE 1.3: ENVIRONMENT ATTRIBUTES	10
TABLE 2.1: SITE CONNECTIVITY	12
TABLE 2.2: CO-ORDINATES– PROJECT BOUNDARY – P1	13
TABLE 2.2-A: CO-ORDINATES– PROJECT BOUNDARY – P2	13
TABLE 2.3: LAND USE PATTERN – P1.....	23
TABLE 2.3-A: LAND USE PATTERN – P2	23
TABLE 2.4: PRODUCTION DETAILS – P1.....	23
TABLE 2.4-A: PRODUCTION DETAILS – P2.....	24
TABLE 2.5: GROUND WATER LEVEL VARIATIONS OF KRISHNAGIRI DISTRICT.....	25
TABLE 2.6: RESOURCES AND RESERVES – P1.....	28
TABLE 2.6-A: YEAR-WISE PRODUCTION PLAN	28
TABLE 2.7: ULTIMATE PIT DIMENSION – P1	28
TABLE 2.8: RESOURCES AND RESERVES – P2.....	31
TABLE 2.8-A: YEAR-WISE PRODUCTION PLAN	31
TABLE 2.9: ULTIMATE PIT DIMENSION – P2	31
TABLE 2.10: PROPOSED MACHINERY DEPLOYMENT	36
TABLE 2.11: TRAFFIC SURVEY LOCATIONS	37
TABLE 2.12: EXISTING TRAFFIC VOLUME.....	37
TABLE 2.13: ROUGH STONE HOURLY TRANSPORTATION REQUIREMENT	37
TABLE 2.14: SUMMARY OF TRAFFIC VOLUME	38
TABLE 2.15: WATER REQUIREMENT FOR THE PROJECT	38
TABLE 2.16: PROPOSED MANPOWER DEPLOYMENT.....	40
TABLE 2.17: EXPECTED TIME SCHEDULE	40
TABLE 3.1: MONITORING ATTRIBUTES AND FREQUENCY OF MONITORING	42
TABLE 3.2: LAND USE / LAND COVER TABLE 10 Km RADIUS.....	43
TABLE 3.3: DETAILS OF ENVIRONMENT SENSITIVITY AROUND THE CLUSTER.....	47

TABLE 3.4: NEARBY WATER BODIES FROM THE PROPOSED PROJECT SITE	48
TABLE 3.5: SOIL SAMPLING LOCATIONS.....	48
TABLE 3.6: METHODOLOGY OF SAMPLING COLLECTION	49
TABLE 3.7: SOIL QUALITY OF THE STUDY AREA	51
TABLE 3.8: WATER SAMPLING LOCATIONS	53
TABLE 3.9: SURFACE WATER SAMPLING RESULTS.....	55
TABLE 3.10: GROUND WATER SAMPLING RESULTS.....	57
TABLE 3.11: PRE-MONSOON SEASON WATER LEVEL OF OPEN WELLS 1 KM RADIUS.....	60
TABLE 3.12: PRE-MONSOON SEASON WATER LEVEL OF BOREWELLS 1 KM RADIUS	61
TABLE 3.13: RAINFALL DATA.....	66
TABLE 3.14: METEOROLOGICAL DATA RECORDED AT SITE	66
TABLE 3.15: METHODOLOGY AND INSTRUMENT USED FOR AAQ ANALYSIS.....	68
TABLE 3.16: NATIONAL AMBIENT AIR QUALITY STANDARDS	68
TABLE 3.17: AMBIENT AIR QUALITY (AAQ) MONITORING LOCATIONS	69
TABLE 3.18: SUMMARY OF AAQ 1 to AAQ 7	71
TABLE 3.19: ABSTRACT OF AMBIENT AIR QUALITY DAT.....	71
TABLE 3.20: AVERAGE FUGITIVE DUST SAMPLE VALUES	73
TABLE 3.21: FUGITIVE DUST SAMPLE VALUES IN $\mu\text{g}/\text{m}^3$	74
TABLE 3.22: DETAILS OF SURFACE NOISE MONITORING LOCATIONS	75
TABLE 3.23: AMBIENT NOISE QUALITY RESULT	76
TABLE 3.24: FLORA IN THE CORE ZONE	80
TABLE 3.25: FLORA IN BUFFER ZONE	84
TABLE 3.26: NUMBER OF FLORAL LIFE FORMS IN THE STUDY AREA	89
TABLE 3.27: FAUNA IN CORE ZONE	94
TABLE 3.28: LIST OF FAUNA & THEIR CONSERVATION STATUS, MAMMALS: (*DIRECTLY SIGHTED ANIMALS & SECONDARY DATA).....	95
TABLE 3.29: LISTED BIRDS (PRIMARY & SECONDARY DATA).....	95
TABLE 3.30: LIST OF REPTILES EITHER SPOTTED OR REPORTED FROM THE STUDY AREA	96
TABLE 3.31: LIST OF BUTTERFLIES REPORTED FROM THE STUDY AREA AND SECONDARY DATA ...	97
TABLE 3.32: LIST OF INSECTS EITHER SPOTTED OR REPORTED FROM THE STUDY AREA	97
TABLE 3.33: DESCRIPTION OF MACROPHYTES.....	98
TABLE 3.34: AMPHIBIANS OBSERVED/RECORDED FROM THE STUDY AREA	99

TABLE 3.35: ENUMERATION OF STRUCTURES 0-300m radius – P1	100
TABLE 3.35: ENUMERATION OF STRUCTURES 0- 300m radius – P2	101
TABLE 3.47: POPULATIN DATA AROUND 5KM RADIUS	105
TABLE 3.48: COMMUNICATION & TRANSPORT FACILITIES IN THE STUDY AREA	108
TABLE 3.49: WATER & DRAINAGE FACILITIES IN THE STUDY AREA	109
TABLE 3.50: OTHER FACILITIES IN THE STUDY AREA	110
TABLE 3.51: EDUCATIONAL FACILITIES IN THE STUDY AREA.....	111
TABLE 3.52: MEDICAL FACILITIES IN THE STUDY AREA	112
TABLE 4.1: ESTIMATED EMISSION RATE.....	118
TABLE 4.2: INCREMENTAL & RESULTANT GLC OF PM ₁₀	120
TABLE 4.3: INCREMENTAL & RESULTANT GLC OF PM _{2.5}	121
TABLE 4.4: INCREMENTAL & RESULTANT GLC OF NOX	121
TABLE 4.5: INCREMENTAL & RESULTANT GLC OF SO ₂	121
TABLE 4.6: INCREMENTAL & RESULTANT GLC OF FUGITIVE	121
TABLE 4.7: ACTIVITY AND NOISE LEVEL PRODUCED BY MACHINERY	124
TABLE 4.8: PREDICTED NOISE INCREMENTAL VALUES.....	124
TABLE 4.9: PREDICTED PPV VALUES DUE TO BLASTING – P1	125
TABLE 4.10: PREDICTED PPV VALUES DUE TO BLASTING – P2	126
TABLE 4.11: GREENBELT DEVELOPMENT PLAN	130
TABLE 4.12: LIST OF PLANT SPECIES PROPOSED FOR GREENBELT DEVELOPMENT	130
TABLE 4.13: SPECIES SUITABLE FOR ABATEMENT OF NOISE AND DUST POLLUTION	131
TABLE 4.14: OVERALL ECOLOGICAL IMPACT ASSESSMENTS OF VENKATESAPURAM VILLAGE, ROUGH STONE QUARRY, SHOOLAGIRI TALUK, KRISHNAGIRI DISTRICT	132
TABLE 6.1 IMPLEMENTATION SCHEDULE	142
TABLE 6.2: PROPOSED MONITORING SCHEDULE POST EC	142
TABLE 6.3 ENVIRONMENT MONITORING PROGRAM BUDGET	143
TABLE 7.1 RISK ASSESSMENT & CONTROL MEASURES	145
TABLE 7.2: PROPOSED TEAMS TO DEAL WITH EMERGENCY SITUATION	148
TABLE 7.3: PROPOSED FIRE EXTINGUISHERS AT DIFFERENT LOCATIONS	149
TABLE 7.4: LIST OF QUARRIES WITHIN 500 METER RADIUS	150
TABLE 7.5-A: SALIENT FEATURES OF PROPOSAL “P1”	151
TABLE 7.5-B: SALIENT FEATURES OF PROPOSAL “P2”	151

TABLE 7.5-C: SALIENT FEATURES OF PROPOSAL “P3”	152
TABLE 7.6-A: SALIENT FEATURES OF PROPOSAL “E1”	153
TABLE 7.6-B: SALIENT FEATURES OF PROPOSAL “E2”	153
TABLE 7.6-C: SALIENT FEATURES OF PROPOSAL “E3”	154
TABLE 7.6-D: SALIENT FEATURES OF PROPOSAL “E4”	154
TABLE 7.7: CUMULATIVE PRODUCTION LOAD OF ROUGH STONE	155
TABLE 7.8: CUMULATIVE PRODUCTION LOAD OF WEATHERED ROCK.....	155
TABLE 7.9: CUMULATIVE PRODUCTION LOAD OF GRAVEL/ TOPSOIL	155
TABLE 7.10: EMISSION ESTIMATION FROM QUARRIES WITHIN 500 METER RADIUS	156
TABLE 7.11: INCREMENTAL & RESULTANT GLC WITHIN CLUSTER	157
TABLE 7.12: PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER.....	158
TABLE 7.13: NEAREST HABITATION FROM EACH MINES	159
TABLE 7.14: GROUND VIBRATIONS AT EACH MINES	159
TABLE 7.15: SOCIO ECONOMIC BENEFITS FROM EACH MINES	159
TABLE 7.16: EMPLOYMENT BENEFITS FROM EACH MINES.....	160
TABLE 7.17: GREENBELT DEVELOPMENT BENEFITS FROM EACH MINES	160
TABLE 7.18: ACTION PLAN TO MANAGE PLASTIC WASTE	161
TABLE 8.1 CER – ACTION PLAN	168
TABLE 10.1. PROPOSED CONTROLS FOR LAND ENVIRONMENT	171
TABLE 10.2. PROPOSED CONTROLS FOR SOIL MANAGEMENT	172
TABLE 10.3. PROPOSED CONTROLS FOR WATER ENVIRONMENT	172
TABLE 10.4. PROPOSED CONTROLS FOR AIR ENVIRONMENT	173
TABLE 10.5. PROPOSED CONTROLS FOR NOISE ENVIRONMENT.....	173
TABLE 10.6. PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK.....	174
TABLE 10.7. RECOMMENDED SPECIES FOR THE PLANTATION	176
TABLE 10.8. MEDICAL EXAMINATION SCHEDULE	177
TABLE 10.9: EMP BUDGET FOR PROPOSED PROJECT	179
TABLE 10.1. PROPOSED CONTROLS FOR LAND ENVIRONMENT	183
TABLE 10.2. PROPOSED CONTROLS FOR SOIL MANAGEMENT	184
TABLE 10.3. PROPOSED CONTROLS FOR WATER ENVIRONMENT	184
TABLE 10.4. PROPOSED CONTROLS FOR AIR ENVIRONMENT	185

TABLE 10.5. PROPOSED CONTROLS FOR NOISE ENVIRONMENT	185
TABLE 10.6. PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK	186
TABLE 10.7. RECOMMENDED SPECIES FOR THE PLANTATION	188
TABLE 10.8. MEDICAL EXAMINATION SCHEDULE	189
TABLE 10.9: EMP BUDGET FOR PROPOSED PROJECT	191

LIST OF FIGURES

FIGURE 1.1: SATELLITE IMAGERY CLUSTER QUARRIES	3
FIGURE 1.2: LOCATION MAP OF THE PROJECT SITE	6
FIGURE 1.3: TOPOSHEET MAP OF THE STUDY AREA 10 KM RADIUS	7
FIGURE 1.4: TOPOSHEET MAP OF THE STUDY AREA 2KM RADIUS	8
FIGURE 2.1: TOPOGRAPHICAL VIEW OF PROJECT AREA.....	13
FIGURE 2.1-A: FENCING, GARLAND DRAIN AND GREEN BELT PHOTOGRAPHS.....	14
FIGURE 2.2: GOOGLE IMAGE OF THE PROJECT AREA – P1.....	15
FIGURE 2.2-A: GOOGLE IMAGE OF THE PROJECT AREA – P2.....	16
FIGURE 2.3: QUARRY LEASE PLAN / SURFACE PLAN - P1	17
FIGURE 2.3-A: QUARRY LEASE PLAN / SURFACE PLAN – P2	18
FIGURE 2.4: VILLAGE MAP SUPERIMPOSED ON GOOGLE EARTH IMAGE.....	19
FIGURE 2.5: IMAGE SHOWING SURFACE FEATURES AROUND 10 KM RADIUS.....	20
FIGURE 2.6: IMAGE SHOWING SURFACE FEATURES AROUND 5 KM RADIUS.....	21
FIGURE 2.7: IMAGE SHOWING SURFACE FEATURES AROUND 1 KM RADIUS.....	22
FIGURE 2.8: REGIONAL GEOLOGY MAP.....	26
FIGURE 2.9: GEOMORPHOLOGY MAP.....	27
FIGURE 2.10: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS- AFTER LEAVING SAFETY DISTANCES AND BENCHES – P1	29
FIGURE 2.11: CLOSURE PLAN AND SECTIONS – P1	30
FIGURE 2.12: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS- AFTER LEAVING SAFETY DISTANCES AND BENCHES – P1	32
FIGURE 2.13: CLOSURE PLAN AND SECTIONS – P2	33
FIGURE 2.14: MINERAL TRANSPORTATION ROUTE MAP	37
FIGURE 3.1: LAND USE LAND COVER MAP 2KM AND 10KM RADIUS.....	44
FIGURE 3.2: PHYSIOGRAPHIC MAP 10KM RADIUS	45
FIGURE 3.3: PIE DIAGRAM OF LAND USE AND LAND COVER - 10KM RADIUS IN AREA_%	46
FIGURE 3.3-A: PIE DIAGRAM OF LAND USE AND LAND COVER - 2KM RADIUS IN AREA_%	46
FIGURE 3.4: SOIL SAMPLING LOCATIONS AROUND 10 KM RADIUS.....	49
FIGURE 3.5: SOIL MAP	50
FIGURE 3.6: WATER SAMPLING LOCATIONS AROUND 10 KM RADIUS.....	54
FIGURE 3.7: OPEN WELL CONTOUR MAP MARCH TO MAY 2025	60

FIGURE 3.8: BOREWELL CONTOUR MARCH TO MAY 2025.....	61
FIGURE 3.9: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE.....	62
FIGURE 3.10: GROUND WATER PROSPECT MAP	63
FIGURE 3.11: WINDROSE DIAGRAM.....	67
FIGURE 3.12: AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS	70
FIGURE 3.13: BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ7.....	72
FIGURE 3.14: BAR DIAGRAM OF PARTICULATE MATTER PM _{2.5}	72
FIGURE 3.15: BAR DIAGRAM OF PARTICULATE MATTER PM ₁₀	72
FIGURE 3.16: BAR DIAGRAM OF GASEOUS POLLUTANT SO ₂	73
FIGURE 3.17: BAR DIAGRAM OF GASEOUS POLLUTANT NO _x	73
FIGURE 3.18: LINE DIAGRAM OF AVERAGE SPM VALUES	74
FIGURE 3.19: BAR DIAGRAM OF SPM VALUES.....	74
FIGURE 3.20: NOISE MONITORING STATIONS AROUND 10 KM RADIUS	76
FIGURE 3.21: DAY TIME NOISE LEVELS IN CORE AND BUFFER ZONE	77
FIGURE 3.22: NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE	77
FIGURE 3.23: GRAPH SHOWING % DISTRIBUTION OF FLORAL LIFE FORMS (CORE ZONE)	81
FIGURE 3.24: FLORAL SPECIES OBSERVATION IN THE CORE ZONE AREA	81
FIGURE 3.25: GRAPH SHOWING % DISTRIBUTION OF FLORAL LIFE FORMS	89
FIGURE 3.26: GRAPH SHOWING NUMBERS DISTRIBUTION OF FLORAL LIFE FORMS	89
FIGURE 3.27: FLORA SPECIES OBSERVATION IN THE BUFFER ZONE AREA	90
FIGURE 3.28: DISTRIBUTION OF FAUNAL COMMUNITIES (CORE ZONE).....	94
FIGURE 3.29: THE % DISTRIBUTION OF FAUNAL COMMUNITIES (BUFFER ZONE)	97
FIGURE 3.30: THE NUMBERS OF DISTRIBUTION OF FAUNAL COMMUNITIES (BUFFER ZONE).....	98
FIGURE 3.31: STRUCTURE MAP - P1	100
FIGURE 3.31: STRUCTURE MAP - P2	101
FIGURE 3.31: COMBINED STRUCTURE MAP – P1 & P2	102
FIGURE 4.1: AERMOD TERRAIN MAP.....	118
FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM ₁₀	119
FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF PM ₂₅	119
FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF NO _x	119
FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF SO ₂	120

FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE	120
FIGURE 4.6: GROUND VIBRATION PREDICTION	126
FIGURE 4.7: GROUND VIBRATION PREDICTION	126
FIGURE 6.1: PROPOSED ENVIRONMENTAL MONITORING CELL – P1	141
FIGURE 6.1-A: PROPOSED ENVIRONMENTAL MONITORING CELL – P2	141
FIGURE 7.1: DISASTER MANAGEMENT TEAM LAYOUT	147
FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS	178
FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS	190

1.INTRODUCTION

1.0 PREAMBLE

The project proponent's **Thiru. M. Shankar Ganesh (P1) and Thiru. G. Santhamoorthy (P2)** applied for Rough stone quarry over an extent of 1.45.0 Ha & 1.55.0 Ha in S.F. No. 132 (Part-2) and 132 (Part-1) of Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State.

As per the EIA Notification, 2006 and subsequent amendments and OM The proposal falls in the B1 Category (Cluster quarries - 3 proposal and 4 Existing quarry forming Cluster Category {Total Extent of the Cluster is 19.31.0Ha}- Cluster area calculated as per MoEF& CC Notification S.O. 2269(E) Dated 1st July 2016).

P1

- Proponent applied for Rough stone quarry lease on 03.01.2025 (e-Tender cum auction)
- Precise area communication letter was issued by the Deputy Director vide Rc. No. 22/2025/Mines, Dated: 27.02.2025
- The Mining plan has been prepared by the Qualified person and got approved by the Deputy Director vide Roc. No. 22/2025/Mines, Dated: 02.04.2025
- The mining plan has been approved for the quantity of 4,98,523Ts of Rough stone, 40,320Ts of Weathered Rock & 21,576Ts of Topsoil up to a depth of 46m (8m AGL + 38m BGL) for the period of Ten years.
- Proponent applied for Terms of Reference vide Online proposal No. SIA/TN/MIN/535204/2025 Dated 26.04.2025 and the ToR was Granted vide File No: 12104 ToR Identification No: TO25B0108TN5731666N Dated: 17.06.2025

P2

- Proponent applied for Rough stone quarry lease on 03.01.2025 (e-Tender cum auction)
- Precise area communication letter was issued by the Deputy Director vide Rc. No. 21/2025/Mines, Dated: 27.02.2025
- The Mining plan has been prepared by the Qualified person and got approved by the Deputy Director vide Roc. No. 21/2025/Mines, Dated: 02.04.2025
- The mining plan has been approved for the quantity of 1,88,280m³ of Rough stone, 20,972m³ of 51m (11m AGL + 40m BGL) Weathered Rock & 11,009m³ of Topsoil up to a depth of for the period of Ten years.
- Proponent applied for Terms of Reference vide Online proposal No. SIA/TN/MIN/535120/2025 Dated 24.04.2025 and the ToR was Granted vide File No: 12102 ToR Identification No: TO25B0108TN5329544N Dated: 17.06.2025

Based on the ToR Baseline Monitoring study has been carried out for one season i.e., **March to May 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) is the management tool to ensure the sustainable development and it is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It

is a decision-making tool, which guides the decision makers in taking appropriate decisions for any project. EIA systematically examines both beneficial and adverse consequences of the project and ensures that these impacts are taken into account during the project designing. It also reduces conflicts by promoting community participation, information, decision makers, and helps in developing the base for environmentally sound project.

1.1 PURPOSE OF THE REPORT

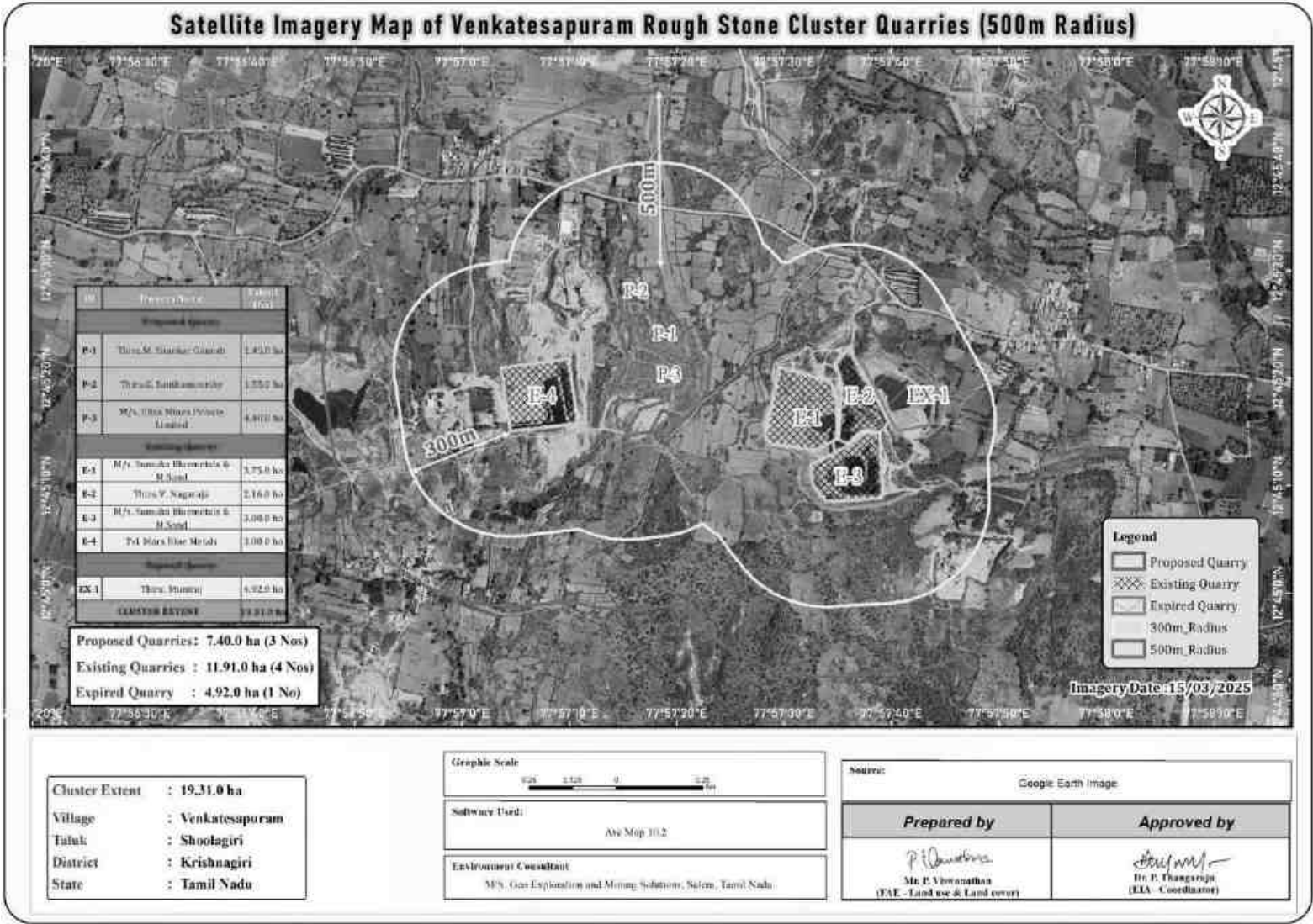
The Ministry of Environment and Forests, Govt. of India, through its EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 1886 of 20th April 2022, Mining Projects are classified under two categories i.e. A (>250 Ha) and B ($\leq$ 250 Ha), and Schematic Presentation of Requirements on Environmental Clearance of Minor Minerals including cluster situation in Appendix–XI.

Now, 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 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B1 and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed project is categorized under category “B1” Activity 1(a) (mining lease area in cluster situation) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance.

“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”

FIGURE 1.1: SATELLITE IMAGERY CLUSTER QUARRIES



1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

1.2.1 Identification of Project Proponent

TABLE 1.1: DETAILS OF PROJECT PROPONENT– P1

Name of the Project Proponent	Thiru. M. Shankar Ganesh
Address	S/o. Mallappachetty, Door No. 199, Thippanappalli Village, Nedumaruthi Post, Krishnagiri Taluk and District – 635 115.
Mobile	+91 63796 67995
Email	shangarganeshm45@gmail.com
Status	Individual

TABLE 1.1-A: DETAILS OF PROJECT PROPONENT – P2

Name of the Project Proponent	Thiru. G. Santhamoorthy
Address	S/o. Govindarajan, Sundarampalli, Krishnapuram Taluk, Tirupattur District – 635 654.
Mobile	+91 97874 42425
Email	gsconstruction.mathur@gmail.com
Status	Individual

1.2.2 Identification of Project

TABLE 1.2: SALIENT FEATURES OF THE PROPOSED PROJECT– P1

Name of the Project	Thiru. M. Shankar Ganesh Rough Stone quarry		
S.F. No.	132 (Part-2)		
Extent	1.45.0Ha		
Village Taluk and District	Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State.		
Land Type	Government Land – Tender Quarry		
Toposheet No	57 H/13		
Latitude between	12°45'21.78"N to 12°45'26.73"N		
Longitude between	77°57'16.85"E to 77°57'22.14"E		
Elevation of the area	874m-882m AMSL		
Water Level in the region	72m – 75m BGL		
Lease period	10 Years		
Mining Plan period	10 Years		
Proposed Depth of Mining	46m (8m AGL + 38m BGL)		
	Rough Stone in Ts	Weathered Rock in Ts	Topsoil in Ts
Geological Resources	16,43,375	57,888	28,944
Mineable Reserves	4,98,523	40,320	21,576
Year wise Production	4,98,523	40,320	21,576
Peak Production	83,187	14,040	13,764
Ultimate Pit Dimension	116m (L) X 93m (W) X 46m (8m AGL + 38m BGL) (D)		
Method of Mining	Opencast Mechanized Mining Method is being carried out with 5.0-meter vertical bench with a bench width is not less than the bench height		
Topography	The lease applied area is situated in hilly terrain. The gradient of the area towards Western side. The area is covered by quaternary formation of reddish gravelly soil having an average thickness of 1m, 2m Weathered rock and followed by Massive Gneissic rock which is clearly inferred from the out crop and adjacent existing quarry pit.		
Machinery proposed	Jack Hammer	5 Nos	
	Compressor	1 No	
	Excavator with Bucket and Rock Breaker	1 No	
	Tipper	2 Nos	

	Water sprinkler	1 No
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. No deep hole drilling is proposed.	
Proposed Manpower Deployment	26 Nos	
Project Cost	Rs. 4,67,93,000/-	
CER Cost	Rs. 3,00,000/-	
Nearby Water Bodies	Kuttai	800m NW
	Tank	1.4km NE
	Odai	1.5km East
	Bukkasagaram Lake	3.7km SW
	Muthali Lake	5.1km West
	Canal	5.3km SW
	Ponnaiyar River	6km SW
Greenbelt Development Plan	Proposed to plant 720 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	2.0 KLD	
Nearest Habitation	480m– North West	
Nearest Reserve Forest	Athimugam R.F - 0.48km – South	
Nearest Wild Life Sanctuary	Cauvery North Wildlife Sanctuary – 24.1km - South Cauvery South Wildlife Sanctuary – 47.94km – South	

Source: Approved Mining & Land Documents.

TABLE 1.2-A: SALIENT FEATURES OF THE PROPOSED PROJECT – P2

Name of the Project	Thiru. G. Santhamoorthy Rough Stone quarry		
S.F. No.	132 (Part-1)		
Extent	1.55.0Ha		
Village Taluk and District	Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State.		
Land Type	Government Land – Tender Quarry		
Toposheet No	57 H/13		
Latitude between	12°45'25.93"N to 12°45'30.58"N		
Longitude between	77°57'14.85"E to 77°57'19.67"E		
Elevation of the area	880m-870m AMSL		
Water Level in the region	72m – 75m BGL		
Lease period	10 Years		
Mining Plan period	10 Years		
Proposed Depth of Mining	51m (11m AGL + 40m BGL)		
	Rough Stone in m³	Weathered Rock in m³	Topsoil in m³
Geological Resources	7,08,840	31,232	15,616
Mineable Reserves	1,88,280	20,972	11,009
Year wise Production	1,88,280	20,972	11,009
Peak Production	31,130	10,976	4,040
Ultimate Pit Dimension	109m (L) X 101m (W) X 51m (11m AGL + 40m BGL) (D)		
Method of Mining	Opencast Mechanized Mining Method is being carried out with 5.0-meter vertical bench with a bench width is not less than the bench height		
Topography	The lease applied area is situated in Hilly terrain. The gradient of the area is gentle towards southwestern side. The area is covered by quaternary formation of reddish gravelly soil having an average thickness of 1m, 2m Weathered rock and followed by Massive Gneissic rock which is clearly inferred from the out crop and adjacent existing quarry pit.		
Machinery proposed	Jack Hammer	6 Nos	
	Compressor	2 Nos	

	Excavator with Bucket and Rock Breaker	1 No
	Tipper	2 Nos
	Water sprinkler	1 No
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. No deep hole drilling is proposed.	
Proposed Manpower Deployment	28 Nos	
Project Cost	Rs. 4,53,80,000 /-	
CER Cost	Rs. 3,00,000/-	
Nearby Water Bodies	Kuttai	680m NW
	Tank	1.4km NE
	Odai	1.5km East
	Bukkasagaram Lake	3.8km SW
	Muthali Lake	5.0km West
	Canal	5.2km SW
	Ponnaiyar River	5.9km SW
Greenbelt Development Plan	Proposed to plant 770 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	2.0 KLD	
Nearest Habitation	370m– North West	
Nearest Reserve Forest	Athimugam R.F - 0.63km – South	
Nearest Wild Life Sanctuary	Cauvery North Wildlife Sanctuary – 24.20km - South Cauvery South Wildlife Sanctuary – 47.91km – South	

Source: Approved Mining & Land Documents.

1.3 BRIEF DESCRIPTION OF THE PROJECT

1.3.1 Nature and Size of the Project

The quarrying operation is proposed to be carried out by Opencast Mechanized Mining method with 5.0m bench height and 5.0m bench width by deploying Jack Hammer Drilling & Slurry Explosive during blasting. Hydraulic Excavator and tippers are used for Loading and transportation. Rock Breakers are deployed to avoid secondary blasting.

P1 - The peak production of Rough stone is 83,187Ts of Rough stone, 14,040Ts of Weathered Rock & 13,764Ts of Topsoil maximum in a year. The depth of the mining is 46m (8m AGL + 38m BGL) {1m Topsoil + 2m WR+ 43m RS}.

P2 - The peak production of 31,130m³ of Rough stone, 10,976m³ of Weathered Rock & 4,040m³ of Topsoil maximum in a year. The depth of the mining is 51m (11m AGL + 40m BGL) {1m Topsoil + 2m WR+ 48m RS}.

1.3.2 Location of the Project

The project sites located in Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State.

The lease applied area is located about 37km North-western side of Krishnagiri District, 12.0km North-western side of Shoolagiri Taluk and 5.0km South West side of Venkatesapuram village.

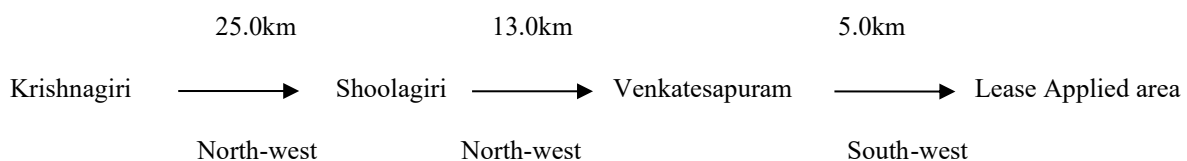


FIGURE 1.2: LOCATION MAP OF THE PROJECT SITE

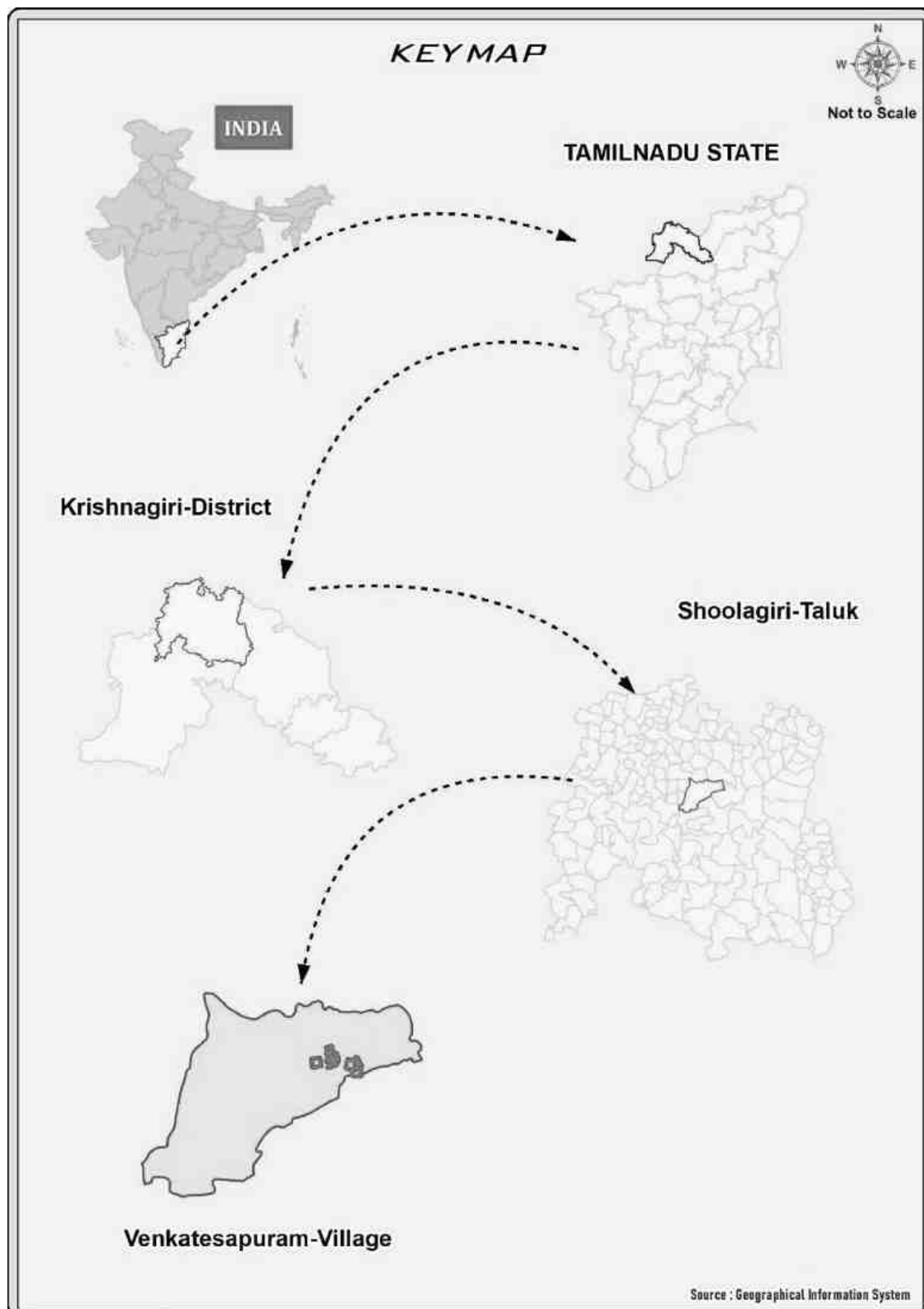


FIGURE 1.3: TOPOSHEET MAP OF THE STUDY AREA 10 KM RADIUS

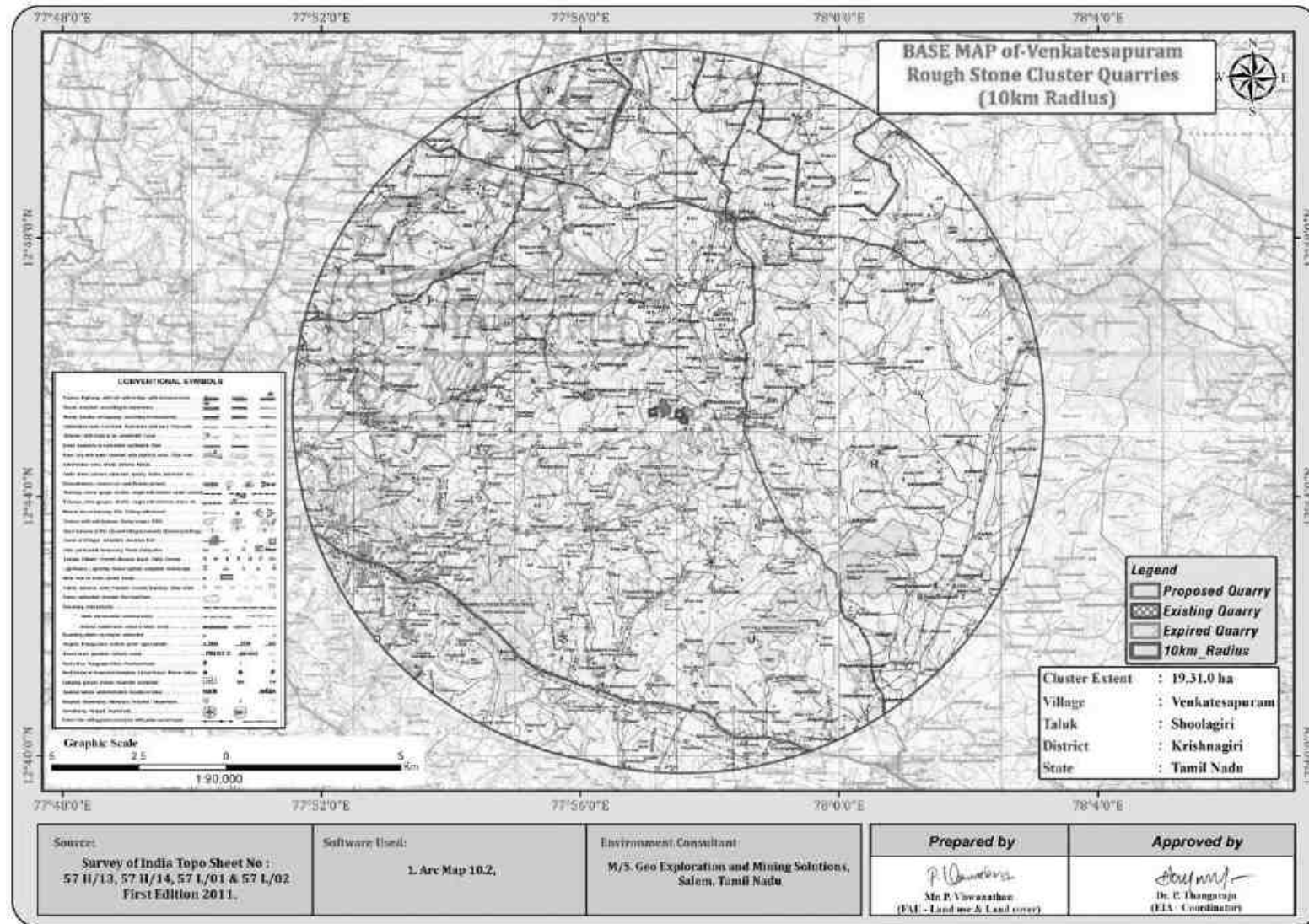
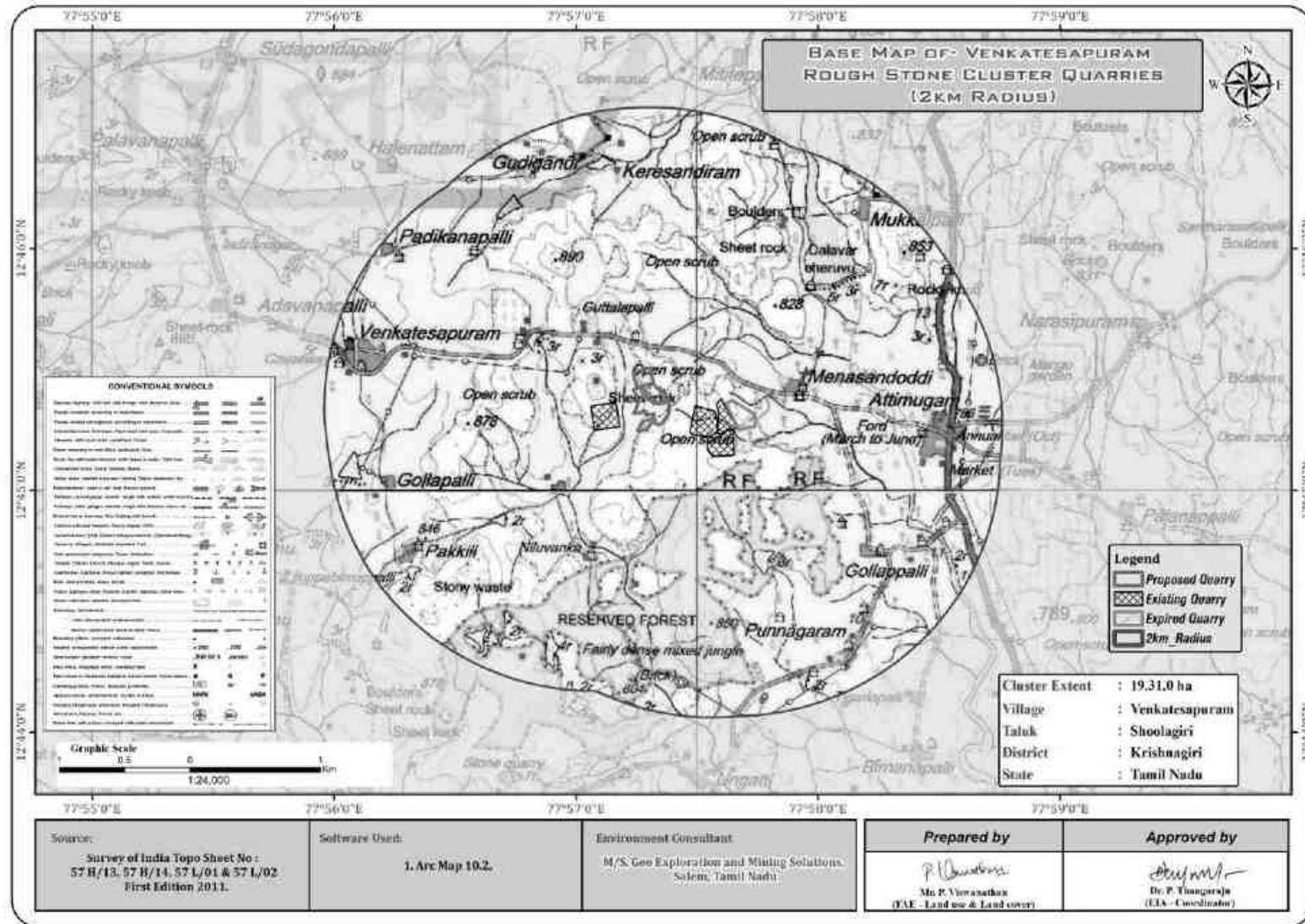


FIGURE 1.4: TOPOSHEET MAP OF THE STUDY AREA 2KM RADIUS



1.4 ENVIRONMENTAL CLEARANCE

The Environmental Clearance process for the project will comprise of four stages. These stages in sequential order are given below: -

- Screening,
- Scoping
- Public consultation &
- Appraisal

P1	P2
SCREENING:	
- Proponent applied for Rough stone quarry lease on 03.01.2025 (e-Tender cum auction) - Precise area communication letter was issued by the Deputy Director vide Rc. No. 22/2025/Mines, Dated: 27.02.2025 - The Mining plan has been prepared by the Qualified person and got approved by the Deputy Director vide Roc. No. 22/2025/Mines, Dated: 02.04.2025 - The mining plan has been approved for the quantity of 4,98,523Ts of Rough stone, 40,320Ts of Weathered Rock & 21,576Ts of Topsoil up to a depth of 46m (8m AGL + 38m BGL) for the period of Ten years.	- Proponent applied for Rough stone quarry lease on 03.01.2025 (e-Tender cum auction) - Precise area communication letter was issued by the Deputy Director vide Rc. No. 21/2025/Mines, Dated: 27.02.2025 - The Mining plan has been prepared by the Qualified person and got approved by the Deputy Director vide Roc. No. 21/2025/Mines, Dated: 02.04.2025 - The mining plan has been approved for the quantity of 1,88,280m³ of Rough stone, 20,972m³ of 51m (11m AGL + 40m BGL) Weathered Rock & 11,009m³ of Topsoil up to a depth of for the period of Ten years.
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	
SCOPING:	
Proponent applied for Terms of Reference vide Online proposal No. SIA/TN/MIN/535204/2025 Dated 26.04.2025	Proponent applied for Terms of Reference vide Online proposal No. SIA/TN/MIN/535120/2025 Dated 24.04.2025
- The proposal was placed in 564th SEAC meeting held on 13.05.2025 and the committee recommended for issue of ToR. - The proposal was considered in 836th SEIAA meeting held on 06.06.2025 and issued ToR	- The proposal was placed in 564th SEAC meeting held on 13.05.2025 and the committee recommended for issue of ToR. - The proposal was considered in 836th SEIAA meeting held on 06.06.2025 & 11.06.2025 and issued ToR

PUBLIC CONSULTATION

Application to The Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district is submitted along with this Draft EIA/ EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP Report.

APPRAISAL –

Appraisal is the detailed scrutiny by the State Expert Appraisal Committee (SEAC) of the application and other documents like the final EIA & EMP Report, outcome of the Public Consultations including Public Hearing Proceedings, submitted by the proponent to the regulatory authority concerned for grant of environmental clearance.

1.5 TERMS OF REFERENCE (ToR)

The ToR was issued by the SEIAA,

P1					P2						
File	No:	12104	ToR	Identification	No:	File	No:	12102	ToR	Identification	No:
TO25B0108TN5731666N Dated: 17.06.2025					TO25B0108TN5329544N Dated: 17.06.2025						

The Details of the ToR Compliance is given in the Page No. A

1.6 POST ENVIRONMENT CLEARANCE MONITORING

The proponent shall submit a half-yearly compliance report in respect of stipulated Environmental Clearance terms and conditions to MoEF& CC Regional Office & SEIAA after grant of EC on 1st June and 1st December of each calendar year as per MoEF& CC Notification S.O. 5845 (E) Dated: 26.11.2018.

1.7 GENERIC STRUCTURE OF EIA DOCUMENT

The overall contents of the EIA report follow the list of contents prescribed in the EIA Notification 2006 and the “Environmental Impact Assessment Guidance Manual for Mining of Minerals” published by MoEF& CC.

1.8 THE SCOPE OF THE STUDY

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures. A detailed account of the emission sources, emissions control equipment, background Air quality levels, Meteorological measurements, Dispersion model and all other aspects of pollution like effluent discharge, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the Pre monsoon season (March 2025 to May 2025) for various environmental components so as to assess the anticipated impacts of the cluster quarry projects on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project.

TABLE 1.3: ENVIRONMENT ATTRIBUTES

Sl.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂	Continuous 24-hourly samples twice a week for three months at 7 locations

			(1 Core & 6 Buffer)
2	Meteorology	Wind speed and direction, temperature, relative humidity and rainfall	Near project site continuous for three months with hourly recording and from secondary sources of IMD station
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 6 locations – 2 Surface water and 4 Ground water samples; once during study period.
4	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle.	Limited primary survey and secondary data was collected from the Forest department.
5	Noise levels	Noise levels in dB(A)	7 Locations – data monitored once for 24 hours during EIA study
6	Soil Characteristics	Physical and Chemical Parameters	Once at 6 locations during study period
7	Land use	Existing land use for different categories	Based on Survey of India topographical sheet and satellite imagery and primary survey.
8	Socio-Economic Aspects	Socio-economic and demographic characteristics, worker characteristics	Based on primary survey and secondary sources data like census of India 2011.
9	Hydrology	Drainage pattern of the area, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected from secondary sources as well as hydro-geology study report prepared.
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances	Based on the findings of Risk analysis done for the risk associated with mining.

Source: Field Monitoring Data

1.8.1 Regulatory Compliance & Applicable Laws/Regulations for all Proposed Quarries

- Application for Quarrying Lease as per Tamil Nadu Minor Mineral Concession Rules, 1959.
- Obtained Precise Area Communication Letter as per Tamil Nadu Minor Mineral Concession Rules, 1959 for Preparation of Mining Plan and obtaining Environmental Clearance.
- The Mining Plan has been approved under Rule 41 & 42 as amended of Tamil Nadu Minor Mineral Concession Rules, 1959.
- Obtained Terms of Reference (ToR) from SEIAA

2. PROJECT DESCRIPTION

2.0 GENERAL

The Proposed Venkatesapuram Rough Stone Quarries requires Environmental Clearance. There are 3 proposed, and 4 existing quarry forming a cluster; calculated as per MoEF& CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 19.31.0ha.

As the extent of cluster are more than 5 ha, the proposal falls under B1 Category as per the 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, and requirement for EIA, EMP and Public Consultation for obtaining Environmental Clearance.

2.1 DESCRIPTION OF THE PROJECT

The proposed project is site specific and there is no additional area required for this project. There is no effluent generation/discharge from this project. Method of mining is 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.

2.2 LOCATION OF THE PROJECT

The lease applied area is located about 37km North-western side of Krishnagiri District, 12.0km North-western side of Shoolagiri Taluk and 5.0km South West side of Venkatesapuram village.

TABLE 2.1: SITE CONNECTIVITY

Nearest Roadway	National Highway – Salem – Bengaluru (NH – 44) – 8.0km – South West State Highway – Hosur – Malur (SH – 17) – 11.5km – North West
Nearest Village	Athimugam – 2.0km - East
Nearest Town	Shoolagiri – 12.0km – South East
Nearest Railway Station	Hosur Railway station – 15.0km – South West
Nearest Airport	Bengaluru Airport – 56.5km – North West
Seaport	Chennai Seaport – 256.0km – North East

Source: Survey of India Toposheet

TABLE 2.2: CO-ORDINATES– PROJECT BOUNDARY – P1

Corner Nos.	Latitude	Longitude
1	12°45'26.34"N	77°57'16.85"E
2	12°45'28.74"N	77°57'19.67"E
3	12°45'25.37"N	77°57'20.61"E
4	12°45'25.58"N	77°57'21.11"E
5	12°45'24.57"N	77°57'21.34"E
6	12°45'21.82"N	77°57'22.14"E
7	12°45'21.99"N	77°57'21.12"E
8	12°45'21.78"N	77°57'20.80"E
9	12°45'22.26"N	77°57'19.71"E
10	12°45'23.12"N	77°57'18.14"E

Source: Approved Mining Plate

TABLE 2.2-A: CO-ORDINATES– PROJECT BOUNDARY – P2

Corner Nos.	Latitude	Longitude
1	12°45'26.34"N	77°57'16.85"E
2	12°45'25.93"N	77°57'15.57"E
3	12°45'29.76"N	77°57'14.85"E
4	12°45'30.56"N	77°57'17.69"E
5	12°45'30.58"N	77°57'19.04"E
6	12°45'26.73"N	77°57'19.67"E

Source: Approved Mining Plate

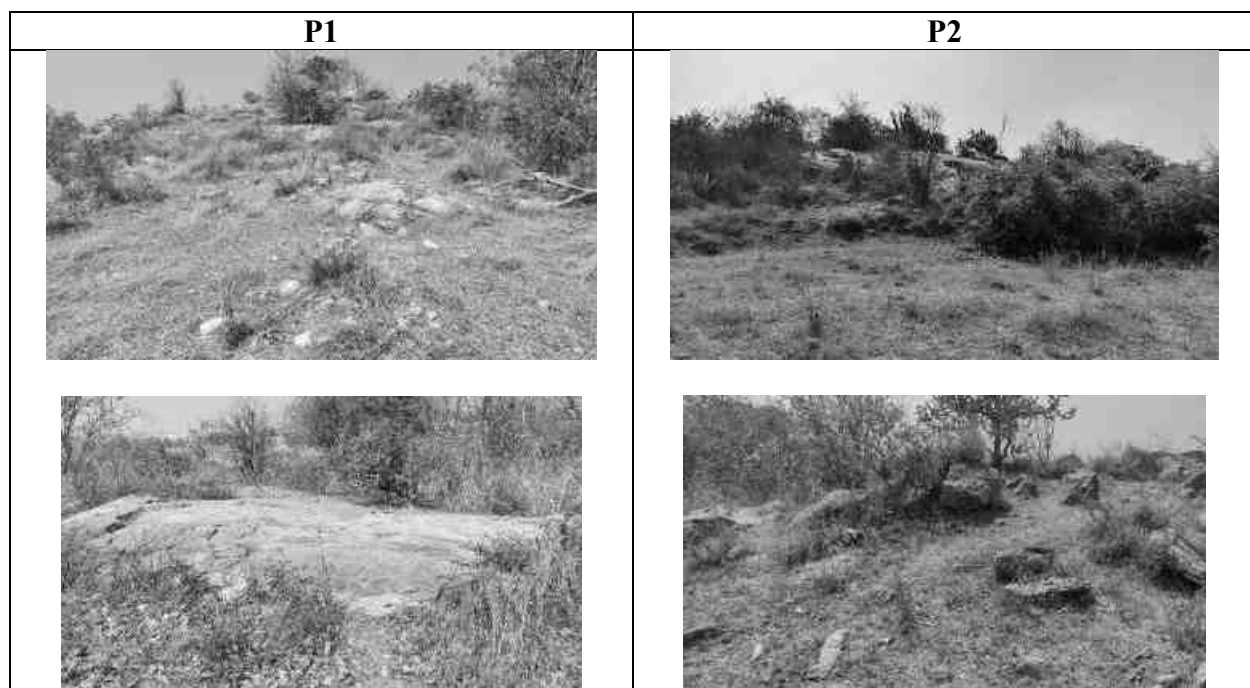
FIGURE 2.1: TOPOGRAPHICAL VIEW OF PROJECT AREA

FIGURE 2.1-A: FENCING, GARLAND DRAIN AND GREEN BELT PHOTOGRAPHS

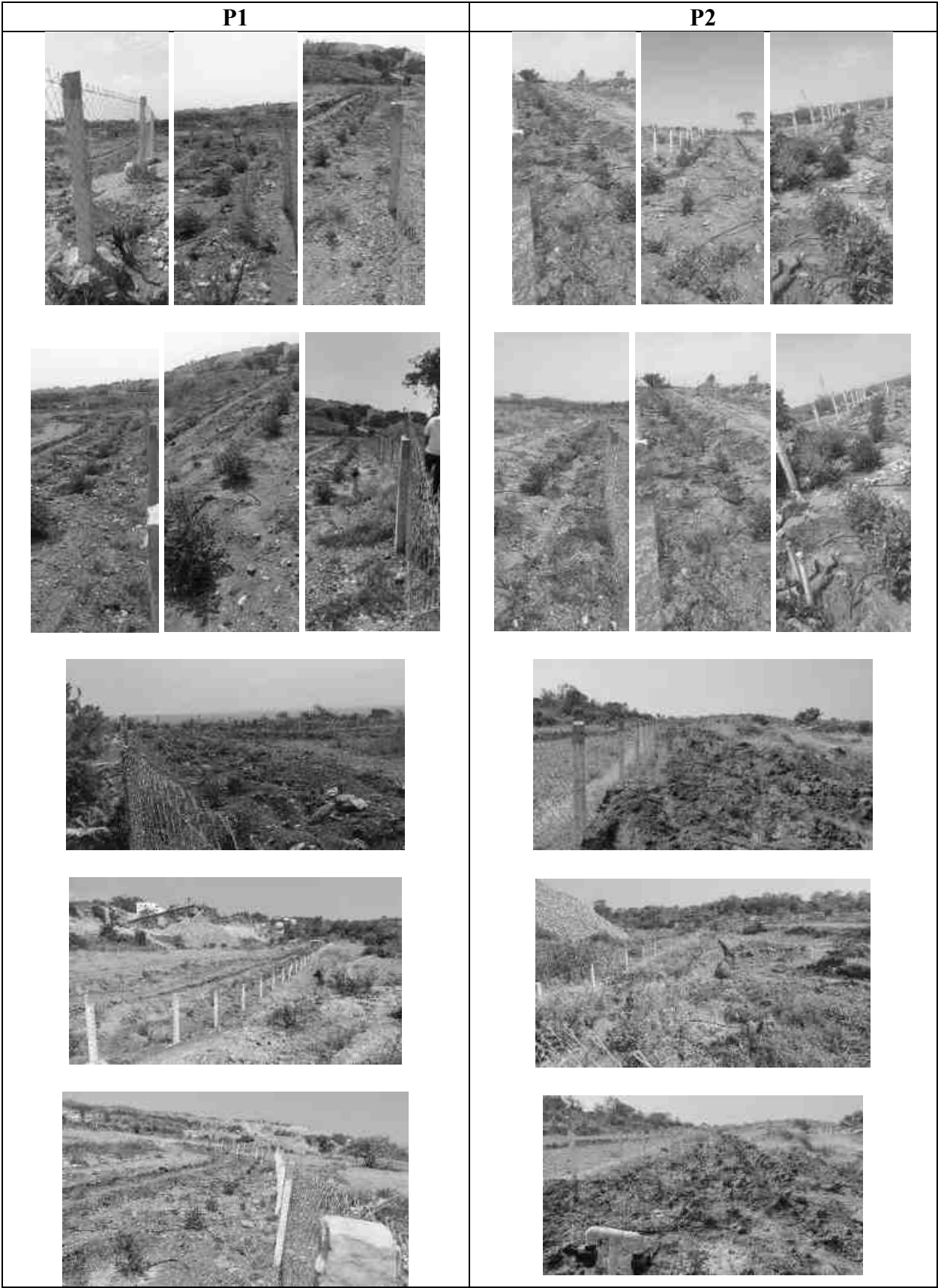
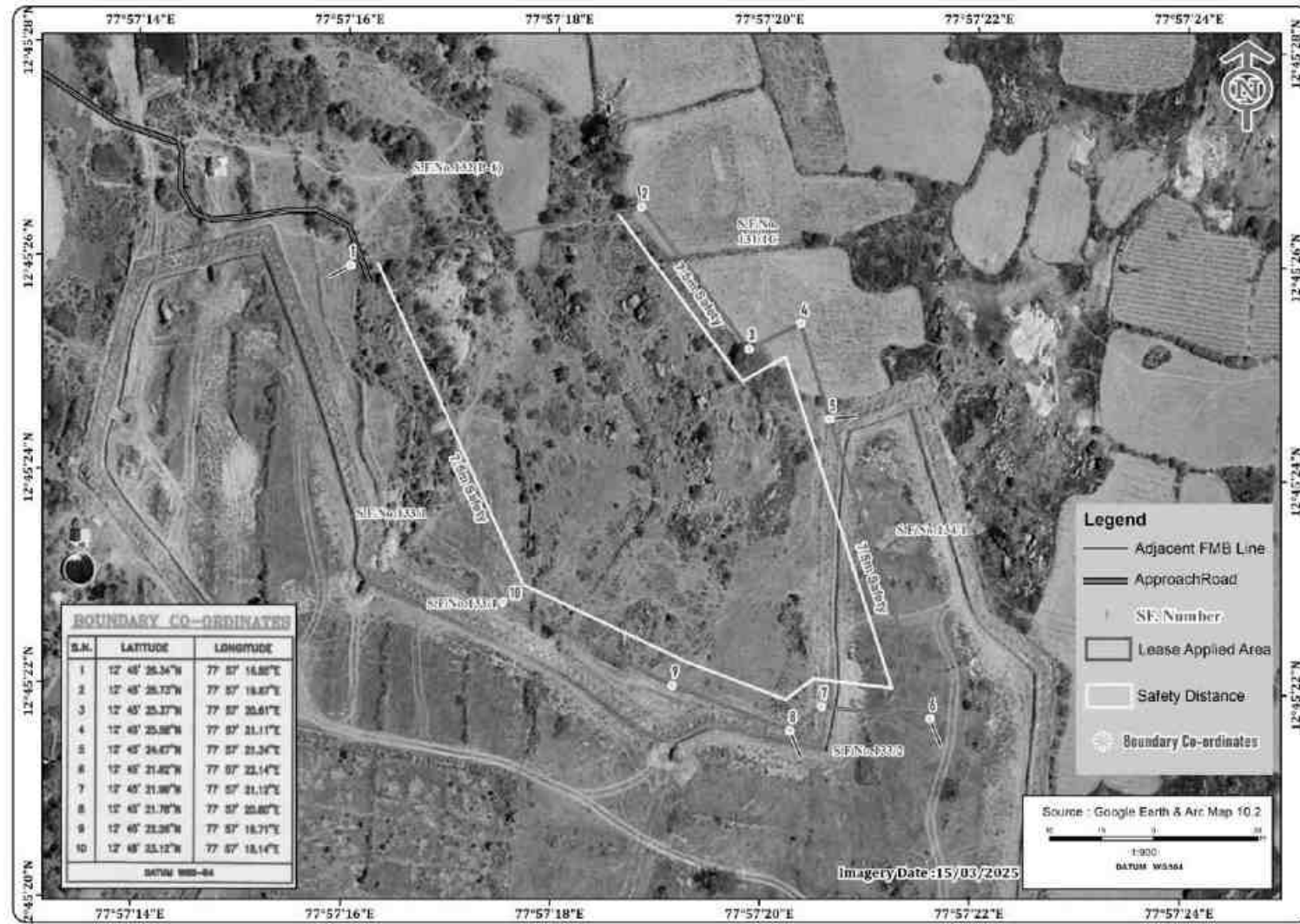
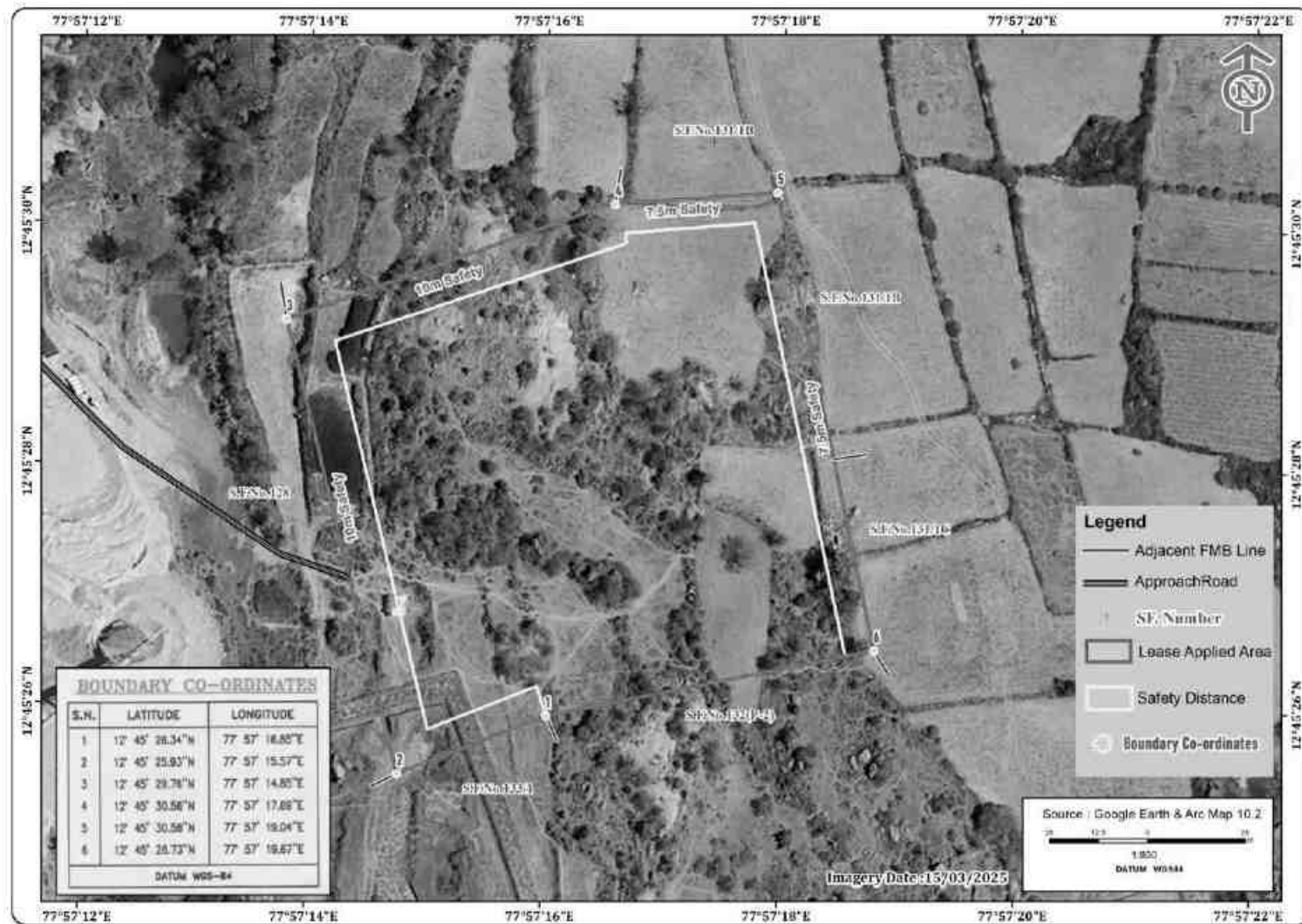


FIGURE 2.2: GOOGLE IMAGE OF THE PROJECT AREA – P1



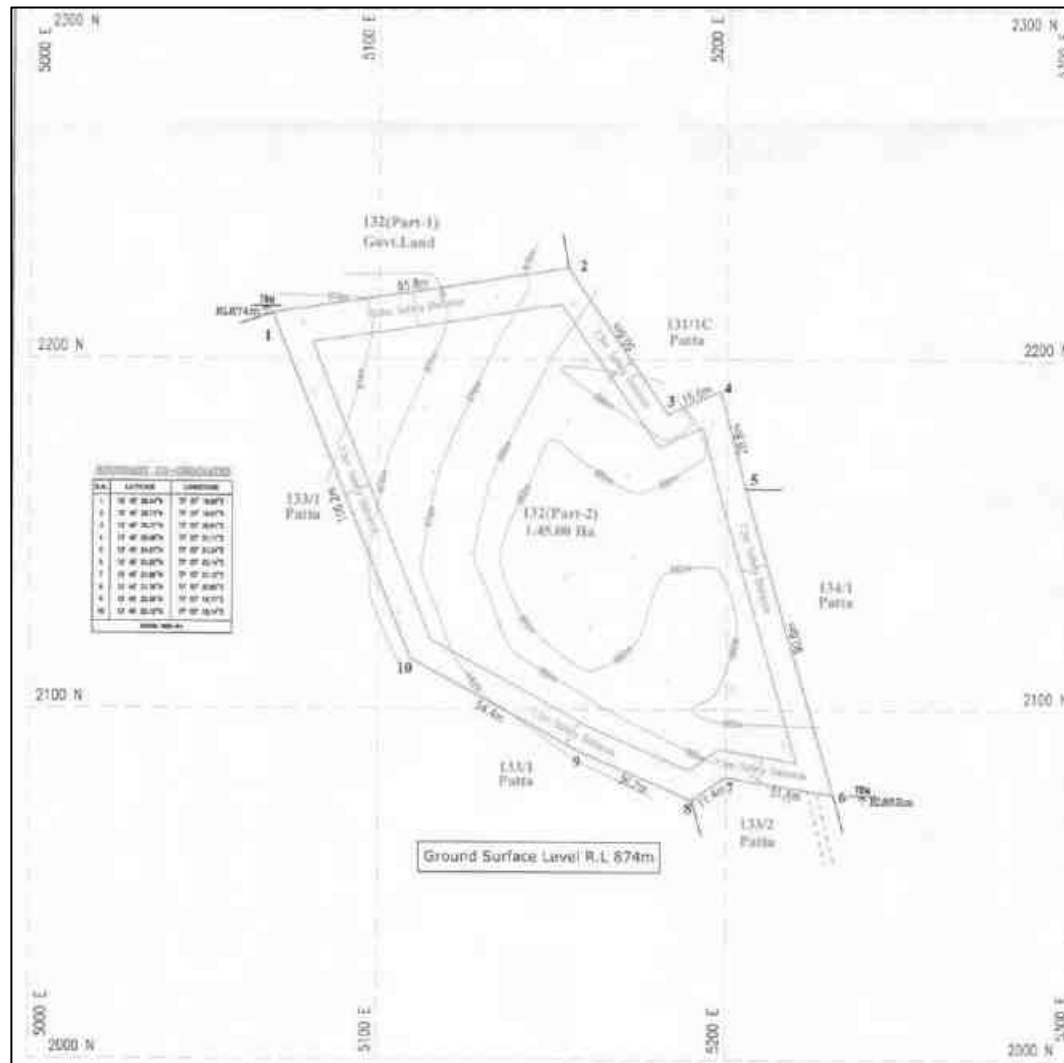
Source: Google Earth Imagery

FIGURE 2.2-A: GOOGLE IMAGE OF THE PROJECT AREA – P2



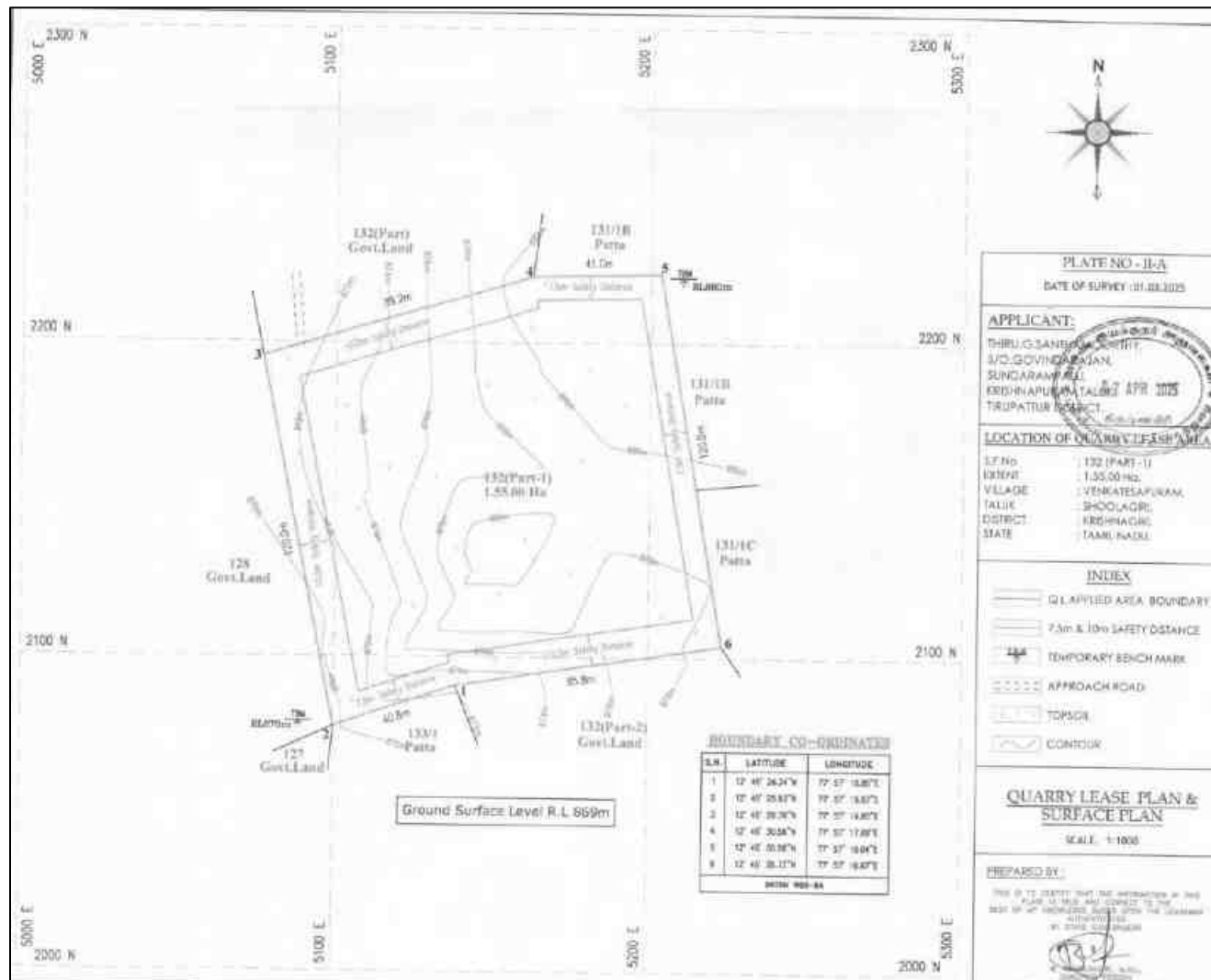
Source: Google Earth Imagery

FIGURE 2.3: QUARRY LEASE PLAN / SURFACE PLAN - P1



Source: Approved Mining Plan

FIGURE 2.3-A: QUARRY LEASE PLAN / SURFACE PLAN – P2



Source: Approved Mining Plan

FIGURE 2.4: VILLAGE MAP SUPERIMPOSED ON GOOGLE EARTH IMAGE

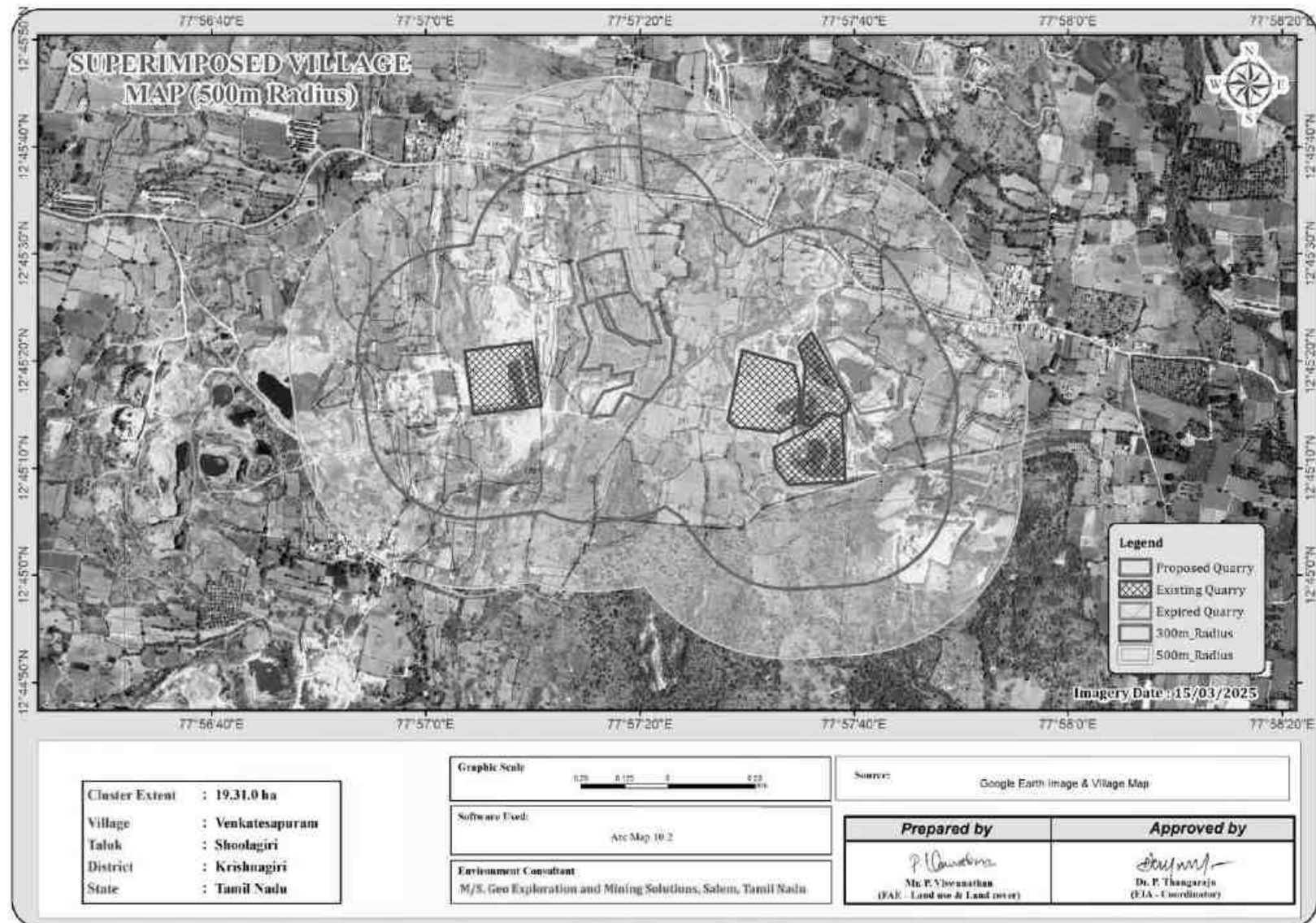


FIGURE 2.5: IMAGE SHOWING SURFACE FEATURES AROUND 10 KM RADIUS

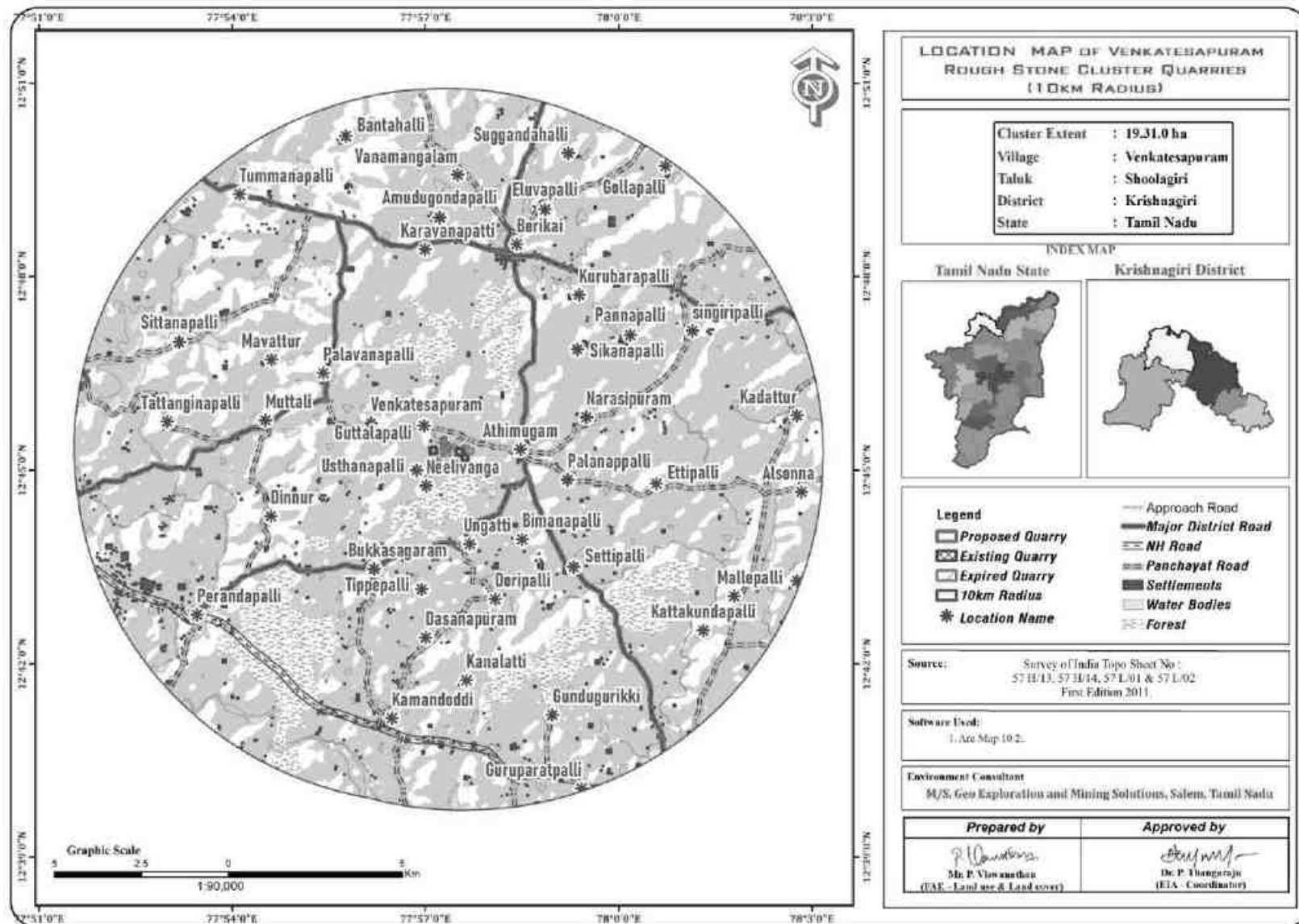


FIGURE 2.6: IMAGE SHOWING SURFACE FEATURES AROUND 5 KM RADIUS

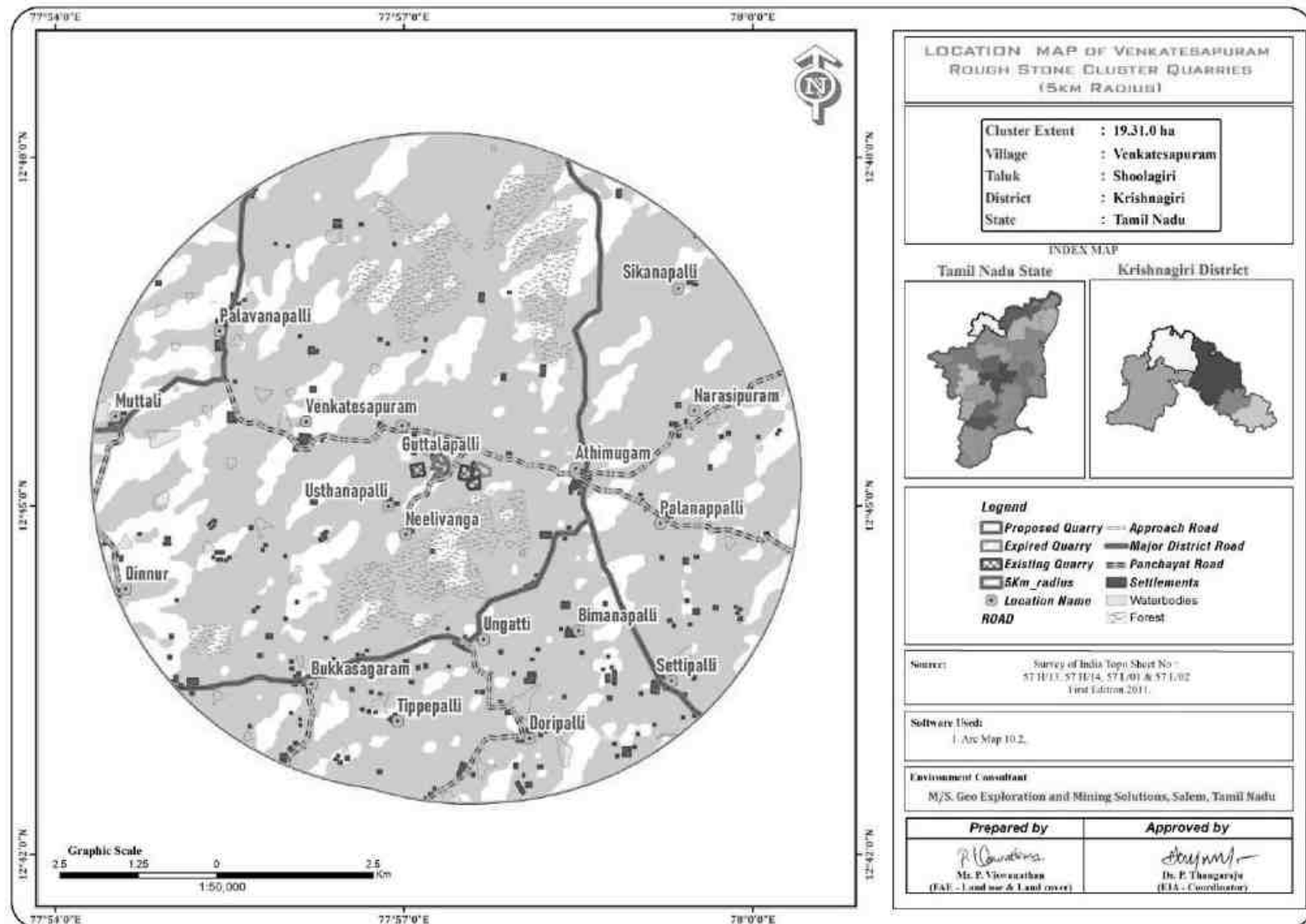
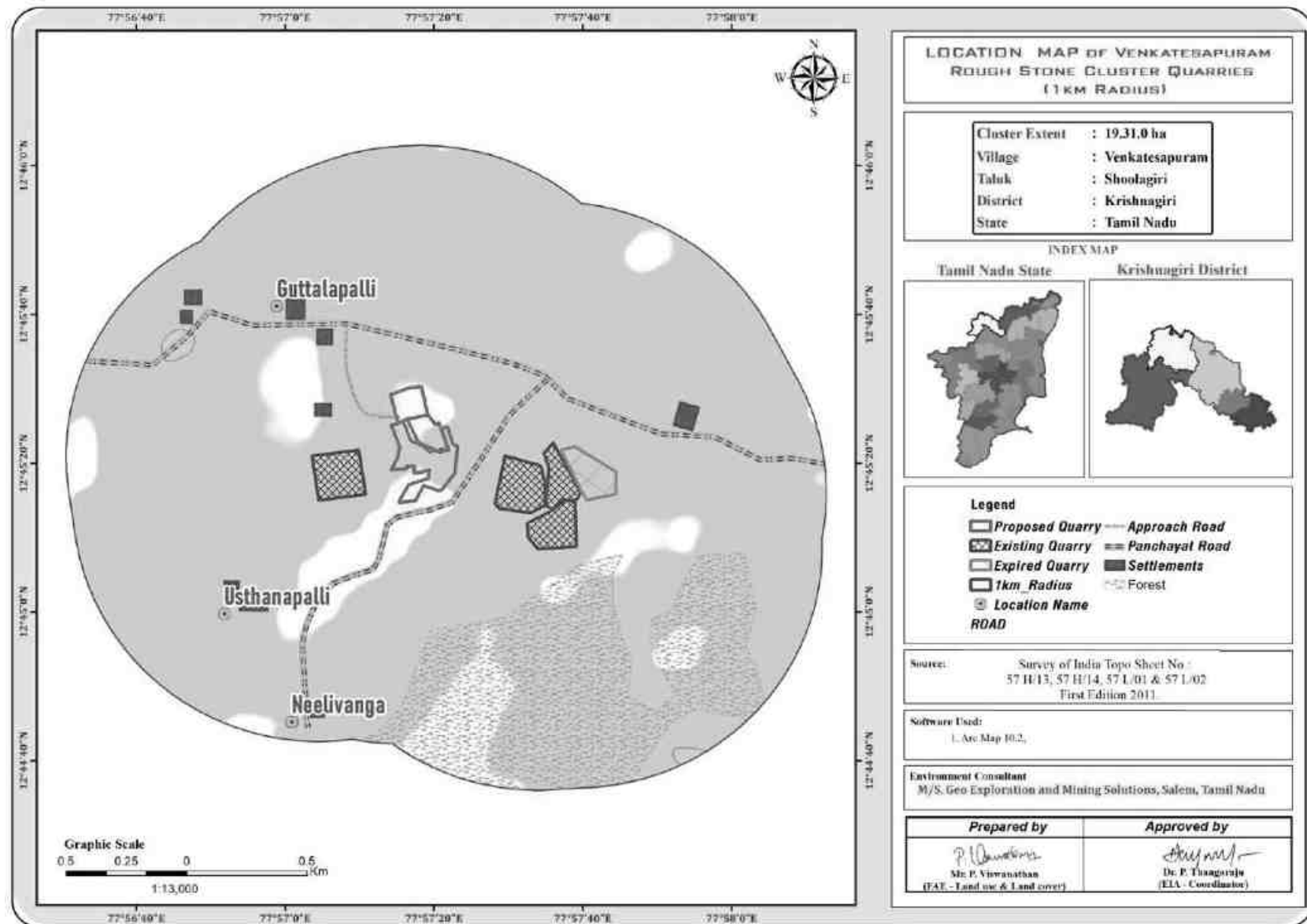


FIGURE 2.7: IMAGE SHOWING SURFACE FEATURES AROUND 1 KM RADIUS



2.2.1 Project Area

- The project is site specific & no beneficiation or processing in the project site.
- There is no forest land involved in the proposed projects and is devoid of major vegetation and trees.

TABLE 2.3: LAND USE PATTERN – P1

Description	Present Area (Ha)	Proposed Common Boundary		Leaving safety and Benches	
		Area required during the first five years (Ha)	Area at the end of lease period (Ha)	Area required during the first five years (Ha)	Area at the end of lease period (Ha)
Area Under Quarry	Nil	1.13.20	1.13.20	1.06.20	1.06.20
Site Services	Nil	0.01.00	0.01.00	0.01.00	0.01.00
Roads	Nil	0.02.00	0.02.00	0.02.00	0.02.00
Green Belt	Nil	0.28.80	0.28.80	0.35.80	0.35.80
Unutilized Area	1.45.00	Nil	Nil	Nil	Nil
Grand Total	1.45.00	1.45.00	1.45.00	1.45.00	1.45.00

Source: Approved Mining Plan

TABLE 2.3-A: LAND USE PATTERN – P2

Description	Present Area (Ha)	Proposed Common Boundary		Leaving safety and Benches	
		Area required during the first five years (Ha)	Area at the end of lease period (Ha)	Area required during the first five years (Ha)	Area at the end of lease period (Ha)
Area Under Quarry	Nil	1.20.70	1.20.70	1.12.80	1.12.80
Site Services	Nil	0.01.00	0.01.00	0.01.00	0.01.00
Roads	Nil	0.02.00	0.02.00	0.02.00	0.02.00
Green Belt	Nil	0.31.30	0.31.30	0.39.20	0.39.20
Unutilized Area	1.55.00	Nil	Nil	Nil	Nil
Grand Total	1.55.00	1.55.00	1.55.00	1.55.00	1.55.00

Source: Approved Mining Plan

TABLE 2.4: PRODUCTION DETAILS – P1

PARTICULARS	DETAILS		
	Rough Stone in Ts	Weathered Rock in Ts	Topsoil in Ts
Geological Resources	16,43,375	57,888	28,944
Mineable Reserves	4,98,523	40,320	21,576
Year wise Production	4,98,523	40,320	21,576

Peak Production	83,187	14,040	13,764
Lease Period	10 Years		
Revised Scheme of Mining Period	10 Years		
Number of Working Days	300 Days		
Production per day (As per peak production)	277 Ts (101 m ³)	47 Ts (17 m ³)	46 Ts (17 m ³)
No of Lorry loads	8	4	4
Total Depth of Mining	46m (8m AGL + 38m BGL)		

Source: Approved mining plan.

TABLE 2.4-A: PRODUCTION DETAILS – P2

PARTICULARS	DETAILS		
	Rough Stone in m ³	Weathered Rock in m ³	Topsoil in m ³
Geological Resources	7,08,840	31,232	15,616
Mineable Reserves	1,88,280	20,972	11,009
Year wise Production	1,88,280	20,972	11,009
Peak Production	31,130	10,976	4,040
Lease Period	10 Years		
Revised Scheme of Mining Period	10 Years		
Number of Working Days	300 Days		
Production per day	104 m ³	37 m ³	13 m ³
No of Lorry loads	9	3	1
Total Depth of Mining	51m (11m AGL + 40m BGL)		

Source: Approved mining plan.

2.3 GEOLOGY

The geological formations of the district belong mainly to Archaean age along with rock of Proterozoic age. The former is represented by Khondalite Group of rocks, Charnockite Group of rocks, Migmatites Complex, Sathyamangalam Group of rocks, while the latter is represented by Alkaline rocks. The Khondalite Group includes garnet sillimanite gneiss and quartzite which occur as small patches. The migmatite complex includes garnetiferous quartzofeldspathic gneiss and hornblende biotite gneiss, the former exposed on the western part of the district. The Sathyamangalam Group includes fuchsite quartzite, sillimanite mica schist and amphibolites. The Bhavani Group in this area includes fissile hornblende-biotite gneiss, granitoid gneiss and pink migmatite. Amphibolites with barbed ferruginous quartzite and associated quartzofeldspathic rocks (Champion Gneiss) represent the Kolar group and are found west and southwest of Veppanapalli. Following this there are basic intrusions occurring as dykes. The Charnockite Group occupies a major part of the south-west portion of this district with small bands of garnetiferous quartzofeldspathic gneiss, Granite gneiss and dolerite dykes. The North-East and Northern part of the district mainly consist of granite gneiss with small patches of Pink Migmatite, hornblende-biotite gneiss and dolerite dykes. The Eastern part of the district consists of Epidote-Hornblende Gneiss, Ultra Mafics, Syenite and Carbonatite. The Alkaline Complex is represented by epidote-hornblende gneiss, ultramafics, syenite and carbonatite and these are distributed in the eastern part of the district. Innumerable basic dykes and felsites, quartz, barites and pegmatite veins form part of the Alkali Complex.

Hydrogeology

Krishnagiri district is underlined by Archaean crystalline formations with Recent alluvial deposits of limited areal extent and thickness along the courses of major rivers. The occurrence and movement of ground water are controlled by various factors such as physiography, climate, geology and structural features. Weathered, and fractured crystalline rocks constitute the important aquifer systems in the district. Ground water generally occurs under phreatic conditions in the weathered mantle and under semi-confined conditions in the fractured zones at deeper levels. The thickness of weathered zones in the district ranges from less than a meter to more than 15m. The yield of large diameter dug wells in the district, tapping the weathered mantle of crystalline rocks ranges from 100 to 500 lpm. These wells normally sustain pumping for 2 to 6 hours per day, depending up on the local topography and characteristics of the weathered mantle. The depth to water level (DTW) during pre-monsoon (May 2006) ranged between 0.5 and 9.9m bgl in the district. In major part of the district the DTW is more than 55m bgl. Whereas it ranged between 2 and 9.9m bgl during post monsoon, in the district and the DTW is in the range of 5 – 10m bgl in the entire district except a few isolated pockets. The yield of successful exploratory wells drilled in the district ranged from 0.78 lps to 26 lps. As per the studies the wells drilled in granitic gneiss have higher yields than the wells drilled in charnockites. The specific capacity of the wells ranged from 1.2 to 118.0 lpm/m/dd. The piezometric head of fracture zones varied between 0.50 and 18.45 m bgl. Long Term fluctuation (1998-2007).

The long-term water level fluctuation for the period of 1998-2007 indicates a rise in water level in the range of 0.098-0.414 m/year whereas the fall in water level ranges between 0.0666 and 1.618 m/year.

<https://krishnagiri.nic.in/document/krishnagiri-district-survey-report-minor-minerals-rough-stone/>

TABLE 2.5: GROUND WATER LEVEL VARIATIONS OF KRISHNAGIRI DISTRICT

Jan 2020	May 2020	Jan 2021	May 2021	Jan 2022	May 2022	Jan 2023	May 2023	Jan 2024	May 2024	5 Years Pre- Monsoon Average	5 Years Post Monsoon Average
8.95	10.99	8.42	10.56	5.79	7.02	2.51	4.33	5.36	7.81	6.20	7.94

Source: <https://www.twadboard.tn.gov.in/content/Krishnagiri>

FIGURE 2.8: REGIONAL GEOLOGY MAP

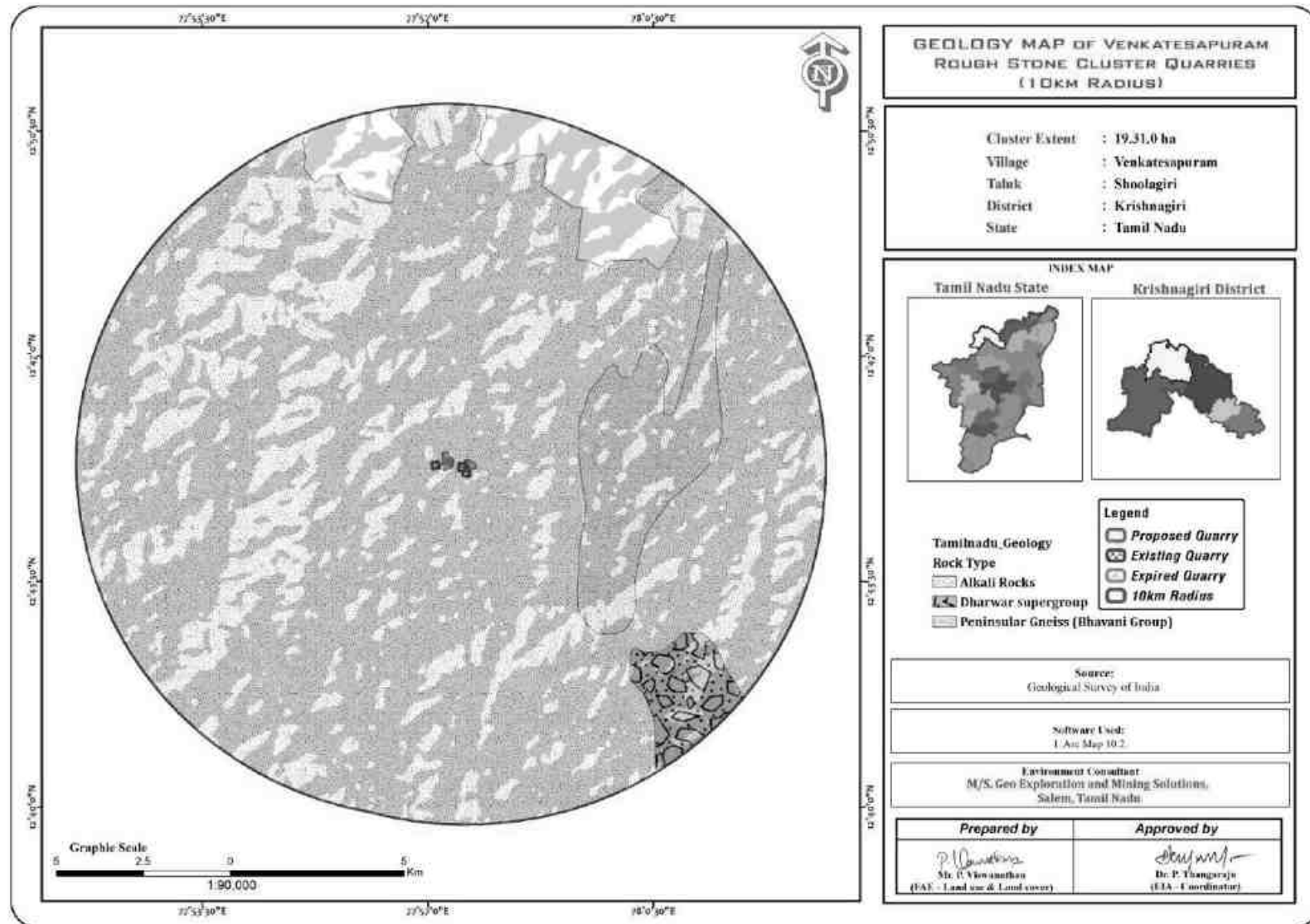
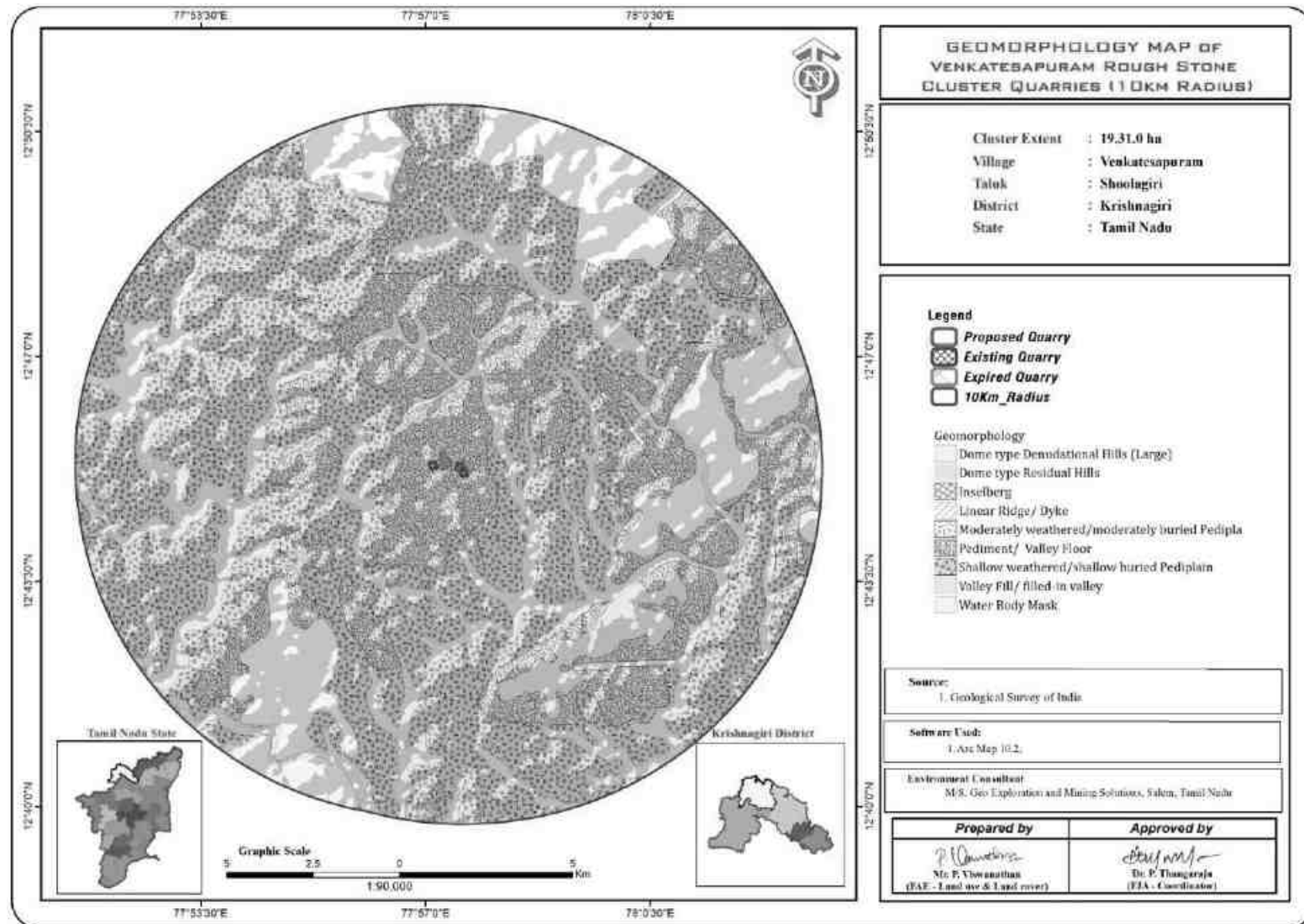


FIGURE 2.9: GEOMORPHOLOGY MAP



2.4 RESOURCES AND RESERVES

The Resources and Reserves of Rough Stone were calculated based on Cross-Section Method by plotting sections to cover the maximum lease area. Based on the availability of Geological Resources the Mineable Reserves are calculated by considering excavation system of bench formation and leaving essential safety distance of 7.5 m (Safety Barrier all around the applied area) and safety distance as per precise area communication letter and deducting the locked up reserves during bench formation (Also called as Bench Loss) and the Mineable Reserves is calculated considering there is no waste / overburden / side burden (100% Recovery Anticipated).

TABLE 2.6: RESOURCES AND RESERVES – P1
AFTER LEAVING SAFETY DISTANCES AND BENCHES

Description	Rough stone in Ts	Weathered Rock in Ts	Topsoil in Ts
Geological Resources	16,43,375	57,888	28,944
Mineable Reserves	4,98,523	40,320	21,576

TABLE 2.6-A: YEAR-WISE PRODUCTION PLAN

YEAR	Rough stone in m ³	Weathered Rock in m ³	Topsoil in m ³	Rough stone in Ts	Weathered Rock in Ts	Topsoil in Ts
I	22867	7020	3906	62,885	14,040	7,812
II	23023	4140	6882	63,313	8,280	13,764
III	23023	3420	-	63,313	6,840	-
IV	30250	-	-	83,187	-	-
V	14125	-	-	38,844	-	-
1st Five Years Total	113288	14580	10788	3,11,542	29,160	21,576
VI	17218	5580	-	47,350	11,160	-
VII	15250	-	-	41,938	-	-
VIII	15950	-	-	43,862	-	-
IX	12800	-	-	35,200	-	-
X	6775	-	-	18,631	-	-
2nd Five Years Total	67993	5580	-	1,86,981	11,160	-
G. TOTAL	1,81,281	20,160	10,788	4,98,523	40,320	21,576

Source: Approved Mining Plan

Conceptual Mining Plan/ Final Mine Closure Plan

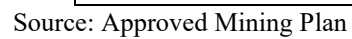
The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.

TABLE 2.7: ULTIMATE PIT DIMENSION – P1

Length (Max) (m)	Width (Max) (m)	Depth (Max)
116	93	46m (8m AGL + 38m BGL)

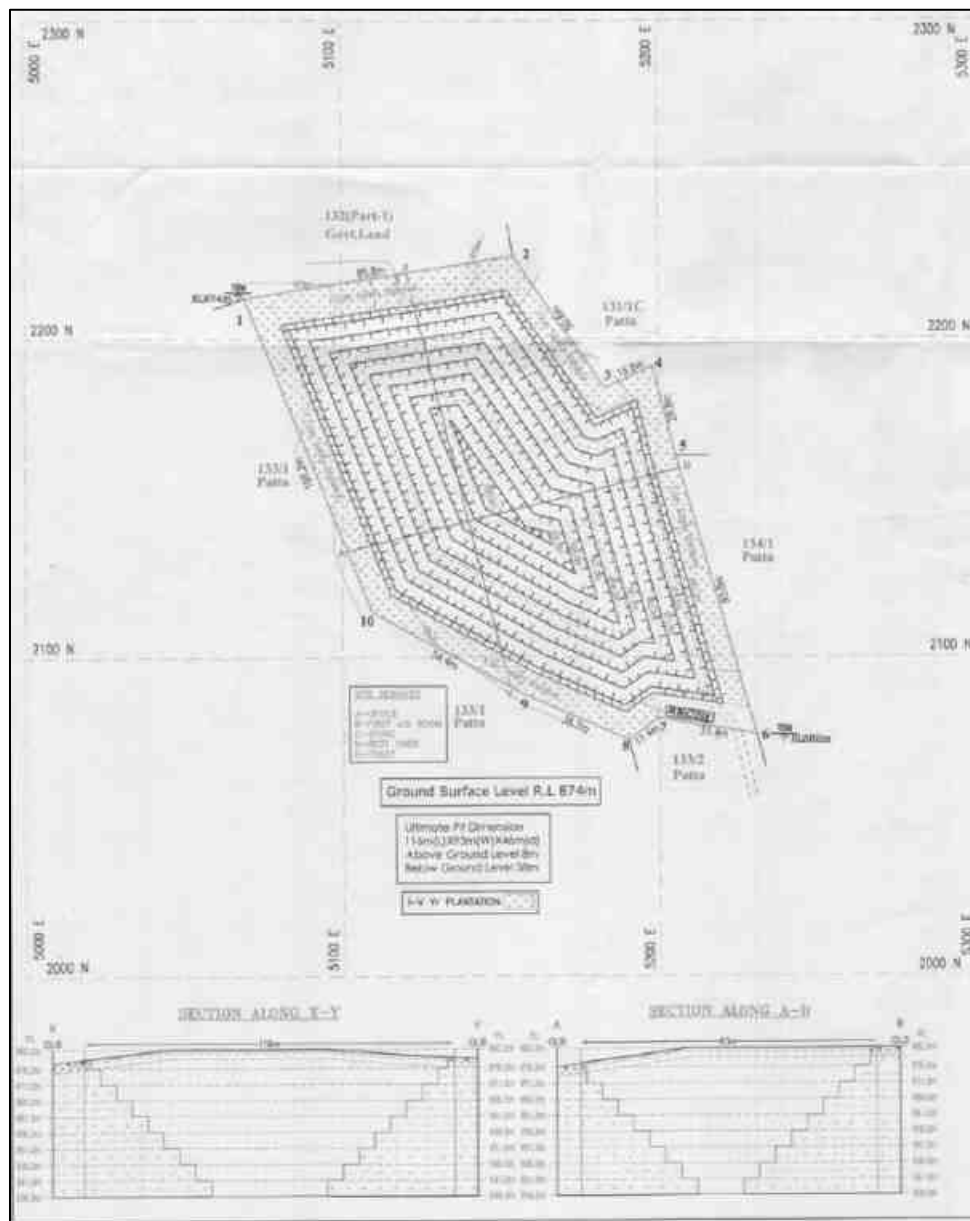
Source: Approved Mining Plan

LEAVING SAFETY DISTANCES AND BENCHES – P1



For Common Boundary:

- ☞ One proposed quarry belongs to the Thiru. G. Santhamoorthy (P2) over an extent 1.55.0ha in S.F. No. 132 (Part-1) having a lease period of ten years.
- ☞ Proponent willing to work in the common boundary on North to ensure safety of the mining operation of this proposal after obtaining permission from the Director general of Mines safety (DGMS).
- ☞ The rough stone will be exploited after obtaining necessary permission from the Director General of Mine Safety, Chennai Zone.

FIGURE 2.11: CLOSURE PLAN AND SECTIONS – P1

Source: Approved Mining Plan

TABLE 2.8: RESOURCES AND RESERVES – P2**AFTER LEAVING SAFETY DISTANCES AND BENCHES**

Description	Rough stone	Weathered Rock	Topsoil
Geological Resources	7,08,840 m ³ / 19,49,310 Ts	31,232 m ³ / 62,464 Ts	15,616 m ³ / 31,232 Ts
Mineable Reserves	1,88,280m ³ / 5,17,700 Ts	20,972m ³ / 41,944 Ts	11,009m ³ / 22,018 Ts

Source: Approved Mining Plan

TABLE 2.8-A: YEAR-WISE PRODUCTION PLAN

YEAR	Rough stone in m ³	Weathered Rock in m ³	Topsoil in m ³	Rough stone in Ts	Weathered Rock in Ts	Topsoil in Ts
I	24,470	6,860	3,838	67292.5	13720	7676
II	31,130	3,136	3,131	85607.5	6272	6262
III	24,300	10,976	4,040	66825.0	21952	8080
IV	24,300	-	-	66825.0	-	-
V	17,560	-	-	48290.0	-	-
1st Five Years Total	1,21,760	20,972	11,009	3,34,840.0	41,944	22,018
VI	18,180	-	-	49995.0	-	-
VII	11,400	-	-	31350.0	-	-
VIII	18,300	-	-	50325.0	-	-
IX	12,300	-	-	33825.0	-	-
X	6,340	-	-	17435.0	-	-
2nd Five Years Total	66,520	-	-	1,82,930.0	-	-
G. TOTAL	1,88,280	20,972	11,009	5,17,700	41,944	22,018

Source: Approved Mining Plan

Conceptual Mining Plan/ Final Mine Closure Plan

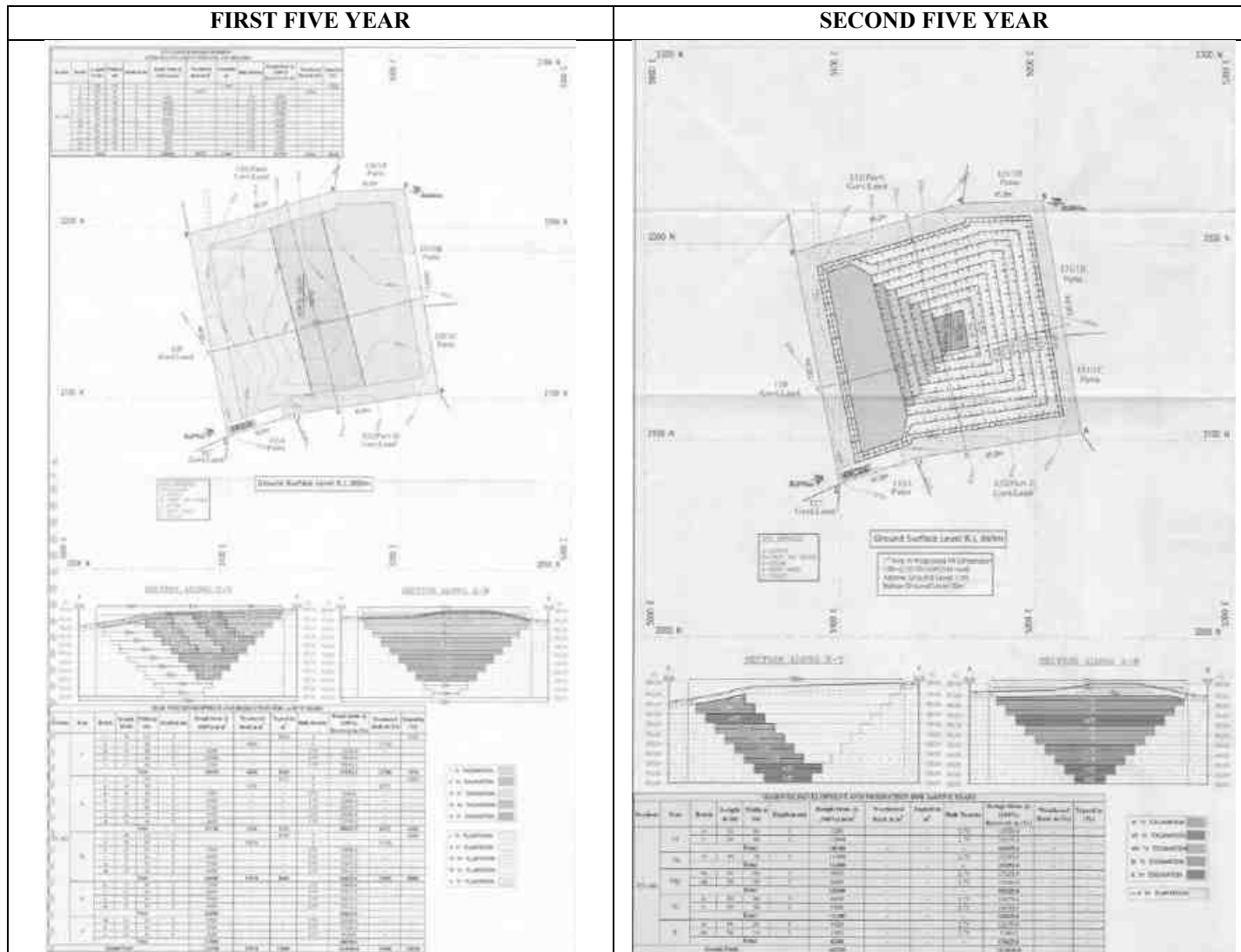
The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.

TABLE 2.9: ULTIMATE PIT DIMENSION – P2

Length (Max) (m)	Width (Max) (m)	Depth (Max)
109	101	51m (11m AGL + 40m BGL)

Source: Approved Mining Plan

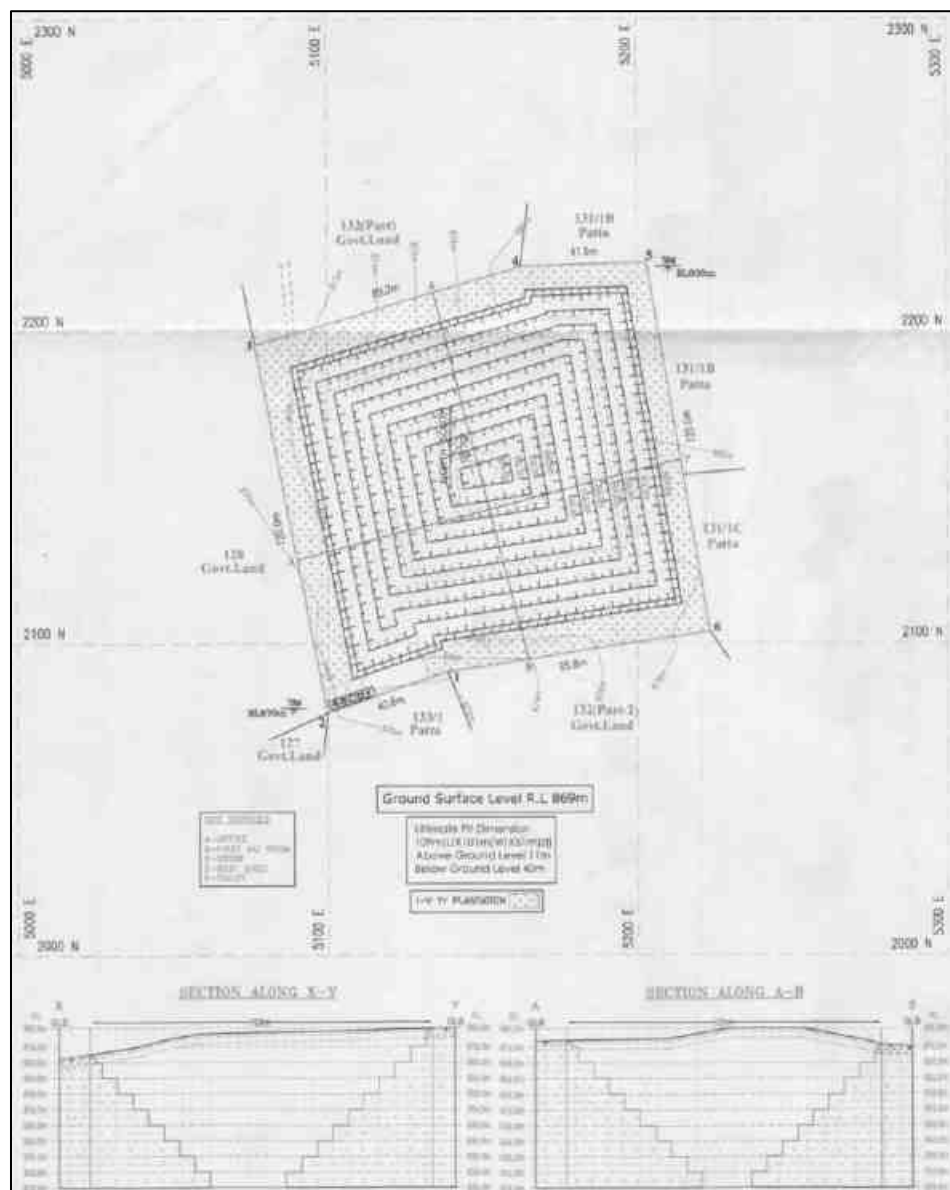
FIGURE 2.12: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS- AFTER LEAVING SAFETY DISTANCES AND BENCHES – P1



Source: Approved Mining Plan

For Common Boundary:

- ☞ One proposed quarry belongs to the Thiru. M. Shankar Ganesh (P1) over an extent 1.45.0ha in S.F. No. 132 (Part-2) having a lease period of ten years.
- ☞ Proponent willing to work in the common boundary on South to ensure safety of the mining operation of this proposal after obtaining permission from the Director general of Mines safety (DGMS).
- ☞ The rough stone will be exploited after obtaining necessary permission from the Director General of Mine Safety, Chennai Zone.

FIGURE 2.13: CLOSURE PLAN AND SECTIONS – P2

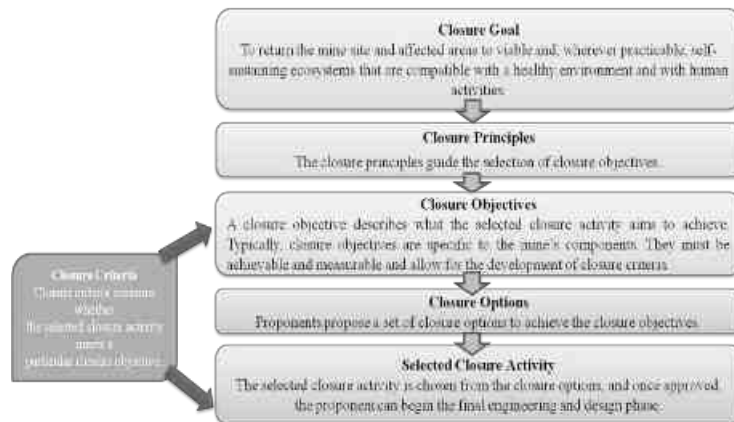
Source: Approved Mining Plan

Disposal of Waste

The overburden in the form of Top soil and weathered rock, it will be safely removed and preserve all along the boundary barrier to facilitate the afforestation. The excavated Rough stone will be directly loaded into tipper to the needy customers.

Closure Objectives –

- 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 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.



- Access to be limited, for the safety of humans and wildlife.
- The open pit mine workings and pit boundary are physically and geo-technically stable.
- Water quality in flooded pits is safe for humans, aquatic life, and wildlife.
- Discharge of contaminated drainage has been minimized and controlled.
- Original or desired new surface drainage patterns have been established.
- For flooded pits, in-pit aquatic habitat has been established where practical and feasible.
- Emergency access and escape routes from flooded pits for humans and wildlife are in place.
- Dust levels are safe for people, vegetation, aquatic life, and wildlife.

Closure Planning & Options Considerations in Mine Design –

- The closure of mine is well planned at the initial stage of planning & design consideration by the internal and external stake holders

- Construction of 2m height bund all along the mine pit boundary and ensure its stability all time & construction of garland drain along the natural slope to avoid sliding and collection of soil to the pit & surface runoff during rainfall
- After complete exploitation of mineral, the lowest bench foot wall side will be maintained as plain surface without any sump pits to avoid any accidents
- All the sharp edges will be dressed to smoother face before the closure of mine and ensure no loose debris on hanging wall side
- The project proponent as a part of social responsibilities assures to supply the stored mine pit water to the nearby villages after effective treatment process as per the standards of TNPCB & TWAD
- Native species will be planted in 3 row patterns on the boundary barriers and 1st bench, a full-time sentry will be appointed at the gate to prevent inherent entry of public & cattle.
- The access road to the quarry will be cut-off immediately after the closure
- The layout design shall be prepared and get approved from Department of Geology and Mining.
- The proponent is instructed to construct as per the layout approved
- Physical and chemical stability of structures left in place at the site, the natural rehabilitation of a biologically diverse, stable environment, the ultimate land use is optimized and is compatible with the surrounding area and the requirements of the local community, and taking the needs of the local community into account and minimizing the socio-economic impact of closure
- There will be a positive change in the environmental and ecology due to the mine closure

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.

It is recommended to obtain necessary statutory permission from the Department of Geology and Mining for Using Heavy Earth Moving Machineries, Blasting and appointment of Mines Manager etc.,

2.5.1 Drilling & Blasting Parameters

Drilling will be carried out using Jack hammer and compressor, the depth of the hole will be maximum 1.5m. Drilling & Blasting will be carried out as per parameters given below: -

Spacing	–	1.2m
Burden	–	1.0 m
Depth of hole	–	1.5 m
Charge per hole	–	0.50 – 0.75kg

Powder factor	–	6.0 tonnes/kg
Diameter of hole	–	32 mm
Spacing X Burden X Depth	=	1.2m X 1.0m X 1.5m = 1.8m ³
	=	1.8m ³ X 2.75 (Bulk Density) = 4.95Ts per hole

Proponent	Production per day	Nos of holes to be drilled per day
P1	Rough Stone - 101m ³ (277Ts)	46
	Weathered Rock - 17m ³ (47Ts)	8
P2	Rough Stone - 104m ³ (286Ts)	48
	Weathered Rock - 37m ³ (102Ts)	17

Explosives per hole = ½ kg hence kg of Explosives will be utilized maximum considering the peak production

Type of Explosives to be used –

Slurry explosives (An explosive material containing substantial portions of a liquid, oxidizers, and fuel, plus a thickener), NONEL / Electric Detonator & Detonating Fuse.

Storage of Explosives

No proposal for storage of explosives within the project area, the project proponent will made agreement with authorized explosives agencies for carrying out blasting activities and competent person as per DGMS guidelines will be employed for safety and supervision of overall quarrying activities.

The explosives will be sourced from the blasting agency on daily basis and the blasting will be carried out under the supervision of competent qualified Blaster and it will be ensured that there shall be no balance of explosive stock; any balance stock will be taken back by the supplier.

2.5.2 Extent of Mechanization

TABLE 2.10: PROPOSED MACHINERY DEPLOYMENT

S.NO.	TYPE	P1	P2	SIZE/CAPACITY	MOTIVE POWER
1	Hand Jack hammer	5	6	1.2m to 2.0m	Air Compression
2	Compressor	1	2	400psi	Diesel Drive
3	Excavator with Bucket and Rock Breaker	1	1	300 HP	Diesel Drive
4	Tipper	2	2	30 Tonnes	Diesel Drive
5	Water Sprinkler	1	1	6000 ltrs	Diesel Drive

Source: Approved Mining Plan

2.6 GENERAL FEATURES

2.6.1 Existing Infrastructures

Infrastructures like Mine office, Temporary Rest shelters for workers, Latrine and Urinal Facilities are will be constructed as per the Mine Rule after the grant of quarry lease in all the proposed quarries.

2.6.2 Drainage Pattern

There are no streams, canals or water bodies crossing within the project area. The drainage pattern of the area is dendritic – sub dendritic.

2.6.3 Traffic Density

The traffic survey conducted based on the transportation route of material, the Rough Stone is proposed to be transported mainly through

Traffic density measurements were performed at two locations and given below in table no. 2.11.

Traffic density measurement was made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., Heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station during each shift- one person on either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

TABLE.2.11: TRAFFIC SURVEY LOCATIONS

Station Code	Distance and Direction	Road Name	Type of Road
TS-1	720m NW	Venkatesapuram	Panchayat Road
TS-2	2.2km South	Berigai-Shoolagiri	District Road

Source: On-site monitoring by GEMS FAE & TM

TABLE 2.12: EXISTING TRAFFIC VOLUME

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	70	210	40	40	300	150	400
TS2	60	180	80	80	450	225	485

Source: On-site monitoring by GEMS FAE & TM

* PCU conversion factor: HMV (Trucks and Bus) = 3, LMV (Car, Jeep and Auto) = 1 and 2/3 Wheelers = 0.5

TABLE 2.13: ROUGH STONE HOURLY TRANSPORTATION REQUIREMENT

Transportation of Rough Stone & Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
20 tonnes	145	435

FIGURE.2.14: MINERAL TRANSPORTATION ROUTE MAP

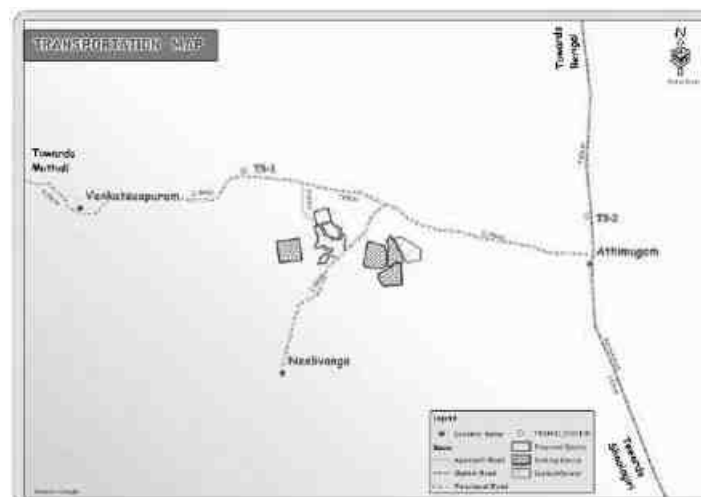


TABLE 2.14: SUMMARY OF TRAFFIC VOLUME

Route	Existing Traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
TS1	400	435	835	1200
TS2	485	435	920	1500

Source: On-site monitoring analysis summary by GEMS FAE & TM

- Due to these projects the existing traffic volume will not exceed
- As per the IRC 1960 this existing village road can handle 1200 PCU in hour and Major district road can handle 1500 PCU in hour hence there will not be any conjunction due to this proposed transportation.

2.6.4 Mineral Beneficiation and Processing

There is no proposal for the mineral processing or ore beneficiation in any of the proposed project.

2.7 PROJECT REQUIREMENT

2.7.1 Water Source & Requirement

Detail of water requirements in KLD as given below:

TABLE 2.15: WATER REQUIREMENT FOR THE PROJECT

	P1	P2	
Purpose	Quantity		Source
Dust Suppression	0.6KLD	0.6KLD	From the existing pit or from the water vendors
Green Belt	1.0KLD	1.0KLD	From the existing pit or from the water vendors
Sanitation & Drinking	0.4KLD	0.4KLD	From the existing pit or from the water vendors.
Total	2.0KLD	2.0KLD	

Source: Prefeasibility report

2.7.2 Power and Other Infrastructure Requirement

Power is not required for the mining operation; the mining operation will be carried out using Diesel Generator and Earth moving machineries using diesel. The quarrying activity is proposed during day time only (General Shift 8 AM – 5 PM, Lunch Break 1 PM – 2 PM). Electricity for use in office and other internal infrastructure will be obtained from TNEB by project proponent.

No workshops are proposed inside the project area hence there will not be any process effluent generation from the project area. Domestic effluent from the mine office will be discharged to septic tank and soak pit. There is no toxic effluent expected to generate in the form of solid, liquid or gaseous form hence there is no requirement of waste treatment plant.

2.7.3 Fuel Requirement

The proposed quarrying activity requires HSD (High Speed Diesel) for machineries as per below quantum-

	P1 (Quantity in Ts)	P2 (Quantity in m³)
Rough Stone	Per hour Excavator will consume = 16 liters / hour Per hour Excavator will excavate = 55Ts of Rough stone Rough stone quantity = $4,98,523/55 = 9,064$ hours Diesel consume = $9,064 \text{ hours} \times 16 \text{ liters}$ Total diesel consumption = 1,45,024 Liters of HSD	Per hour Excavator will consume = 16 liters / hour Per hour Excavator will excavate = 20 m^3 of Rough stone Rough stone quantity = $1,88,280/20 = 9,414$ hours Diesel consume = $9,414 \text{ hours} \times 16 \text{ liters}$ Total diesel consumption = 1,50,624 Liters of HSD
Weathered Rock	Per hour Excavator will consume = 10 liters / hour Per hour Excavator will excavate = 165 m^3 of Weathered Rock Weathered Rock quantity = $40,320/165 = 244$ hours Diesel consume = $244 \text{ hours} \times 10 \text{ liters}$ Total diesel consumption = 2,440 Liters of HSD	Per hour Excavator will consume = 10 liters / hour Per hour Excavator will excavate = 60 m^3 of Weathered Rock Weathered Rock quantity = $20,972/60 = 350$ hours Diesel consume = $350 \text{ hours} \times 10 \text{ liters}$ Total diesel consumption = 3,500 Liters of HSD
Topsoil	Per hour Excavator will consume = 10 liters / hour Per hour Excavator will excavate = 165 m^3 of Topsoil Topsoil = $21,576/165 = 131$ hours Diesel consume = $131 \text{ hours} \times 10 \text{ liters}$ Total diesel consumption = 1,310 Liters of HSD	Per hour Excavator will consume = 10 liters / hour Per hour Excavator will excavate = 60 m^3 of Topsoil Topsoil = $11009/60 = 184$ hours Diesel consume = $184 \text{ hours} \times 10 \text{ liters}$ Total diesel consumption = 1840 Liters of HSD
Total diesel consumption	1,48,774 Liters of HSD will be utilized for entire project life.	1,55,964 Liters of HSD will be utilized for entire project life.

2.7.4 Project Cost

The project has been prepared considering the mode of working, Safety of the employees and Monitoring periods.

P1	P2
Rs. 4,67,93,000/-	Rs. 4,53,80,000/-

2.8 EMPLOYMENT REQUIREMENT:

The following manpower's are proposed in the mining plan to carry out the day-to-day quarrying activities, the same employment is maintaining aimed at the proposed production target and also to comply with the statutory provisions of the Metalliferous mine's regulations, 1961.

TABLE 2.16: PROPOSED MANPOWER DEPLOYMENT

	P1	P2
Designation	No of persons	
Supervisory Category		
Mines Manager	1	1
Geologist	1	1
Skilled Labour		
Mines Foreman	1	1
Blaster/ Mate	1	1
Excavator Operator	1	1
Tipper Driver	2	2
Water sprinkler Driver	1	1
Jack hammer Drillers	10	12
Unskilled labour		
Security	1	1
Labour & Helper	3	3
Co-operator & Cleaner	4	4
Total	26	28

Source: Approved Mining Plan & Pre-Feasibility report.

2.9 PROJECT IMPLEMENTATION SCHEDULE

The mining operation will commence after the grant of Environmental Clearance, Consent to operate (CTO), Execution of Lease Deed and Obtaining permission from the DGMS (Notice of Opening).

TABLE 2.17: EXPECTED TIME SCHEDULE

Sl.No.	Particulars	Time Schedule (In Month)					Remarks if any
		1 st	2 nd	3 rd	4 th	5 th	
1	Environmental Clearance						
2	Consent to Operate						
3	Execution of Lease deed						
4	Permission from DGMS						
Time line may vary; subjected to rules and regulations /& other unforeseen circumstances							

Source: Anticipated based on Timelines framed in EIA Notification & CPCB Guidelines.

3. DESCRIPTION OF ENVIRONMENT

3.0 GENERAL

The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering **March to May 2025** by CHENNAI METTEX LAB PRIVATE LIMITED with CPCB guidelines for the following attributes-

- Land
- Water
- Air
- Noise
- Biological
- Socio-economic status

Environmental data has been collected with reference to cluster quarries by CHENNAI METTEX LAB PRIVATE LIMITED

Study Area

An area of 10 km radius (aerial distance) from the periphery of the cluster is considered for EIA study. The study area has been divided into two zones viz **core zone** and **buffer zone**.

- Core zone is considered as cluster area
- Buffer zone taken as 10km radius from the periphery of the Cluster. Both Core zone and Buffer zone is taken as the study area.

Study Period

The baseline study was conducted during the Post monsoon season i.e., **March to May 2025**

Study Methodology

- The project area was surveyed in detail with the help of Total Station Survey instruments and pillars were marked. The boundary coordinates were superimposed on the satellite imagery to understand the relief of the area, besides Land use pattern of the area was studied through the Bhuvan (ISRO)
- Soil samples were collected and analysed for relevant physio-chemical characteristics in order to assess the impact due to mining activities and to recommend saplings for Greenbelt development.
- Ground water samples were collected from the existing bore wells, Surface water was collected from water bodies in the buffer zone and analysed as per CPCB Guidelines.
- An onsite meteorological station was setup in cluster area, to collect data about wind speed, wind direction, temperature, relative humidity, rainfall and general weather conditions were recorded throughout the study period.
- Air quality Data were collected by installation of Respiratory Dust Samplers (RDS) for Fugitive dust, PM₁₀ and SO₂, NO_x with gaseous attachments & Fine Dust Samplers (FDS) for PM_{2.5} and other parameters as per NAAQ norms and analysed for primary air pollutants to work out the existing status of air quality.

- The Noise level measurements were also made at various locations in different intervals of time with the help of sound level meter to establish the baseline noise levels in the impact zone.
- Baseline biological studies were carried out to assess the ecology of the study area to study the existing flora and fauna pattern of the area.
- Socio-Economic survey was conducted at village and household level in the study area to understand the present socio-economic conditions and assess the extent of impact due to the proposed mining project. The sampling methodologies for the various environmental parameters required for the study, frequency of sampling, method of samples analysis, etc., are given below Table 3.1.

TABLE 3.1: MONITORING ATTRIBUTES AND FREQUENCY OF MONITORING

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	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/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourlies twice a week (March – May 2025)	7 (1 core & 6 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7(1 core & 6 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS. * All monitoring and testing have been carried out as per the Guidelines of CPCB and MoEF& CC.

3.1 LAND ENVIRONMENT

The main objective of this section is to provide a baseline status of the study area covering 10km radius around the proposed mine site so that temporal changes due to the mining activities on the surroundings can be assessed in future.

3.1.1 Land Use/ Land Cover

A visual interpretation technique has been adopted for land use classification based on the keys suggested in the chapter – V of the guidelines issued by NNRMS Bangalore & Level III classification with 1:50,000 scale for the preparation of land use mapping. Land use pattern of the area was studied through LISS III imagery of Bhuvan (ISRO). The 10 km radius map of study area was taken for analysis of Land use cover.

TABLE 3.2: LAND USE / LAND COVER TABLE 10 Km RADIUS

S.No	CLASSIFICATION	10km Radius		2.0km Radius	
		AREA_HA	AREA_%	AREA_HA	AREA_%
BUILTUP					
1	URBAN	405.65	1.18	0.00	0.00
2	RURAL	382.10	1.11	27.76	1.48
3	MINING	770.81	2.24	185.68	9.92
AGRICULTURAL LAND					
4	CROP LAND	24420.43	71.09	1447.17	77.35
5	PLANTATION	988.51	2.88	25.07	1.34
6	FALLOW LAND	1820.606	5.30	28.91	1.55
FOREST					
7	FOREST LAND	629.93	1.83	0.00	0.00
BARREN/WASTE LANDS					
8	SCRUB LAND	4086.62	11.90	151.50	8.10
WETLANDS/ WATER BODIES					
9	WATER BODIES/LAKE/RIVER	845.94	2.46	4.89	0.26
TOTAL		34350.60	100.00	1870.99	100.00

Source: Survey of India Toposheet and Landsat Satellite Imagery

FIGURE 3.1: LAND USE LAND COVER MAP 2KM AND 10KM RADIUS

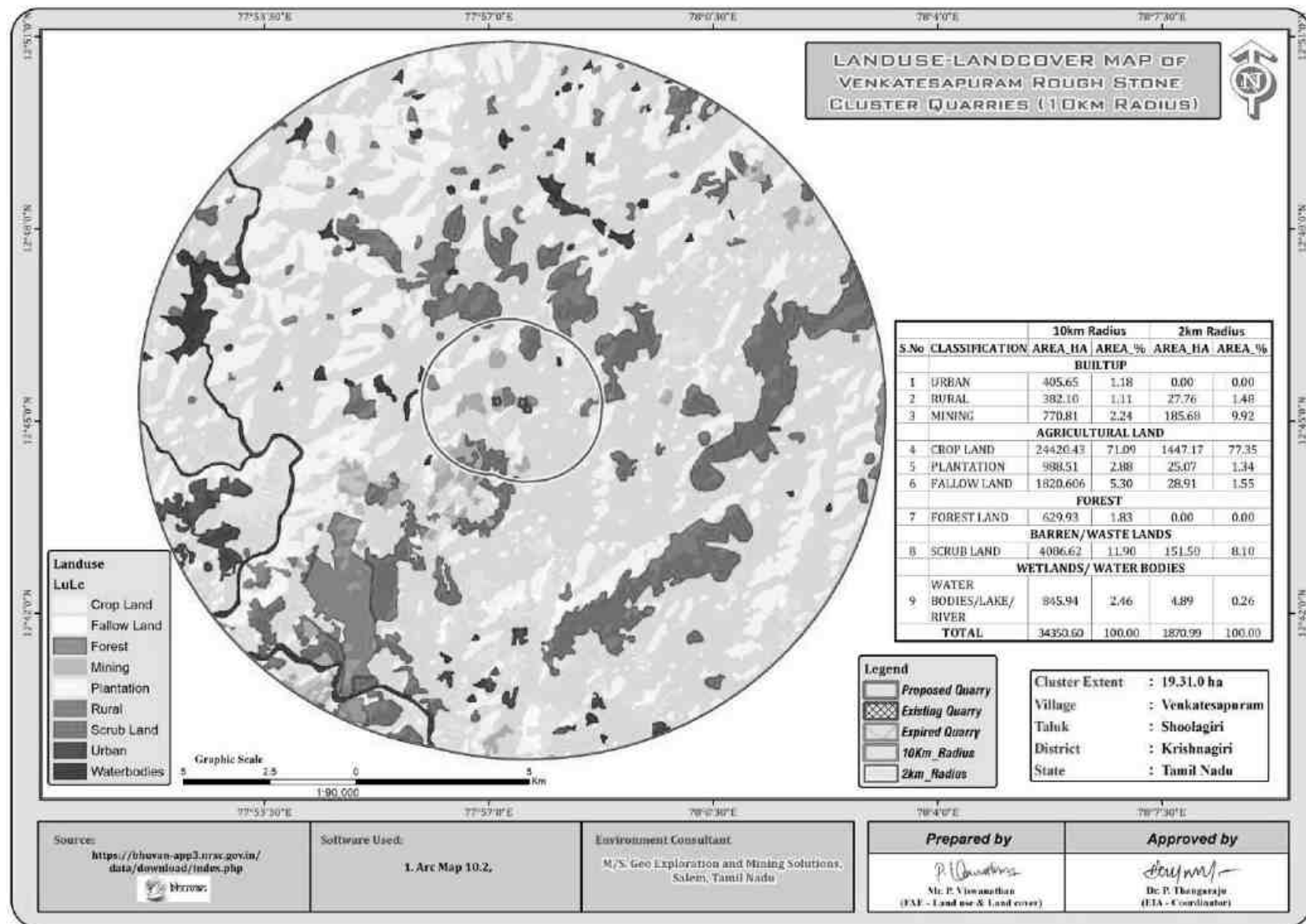


FIGURE 3.2: PHYSIOGRAPHIC MAP 10KM RADIUS

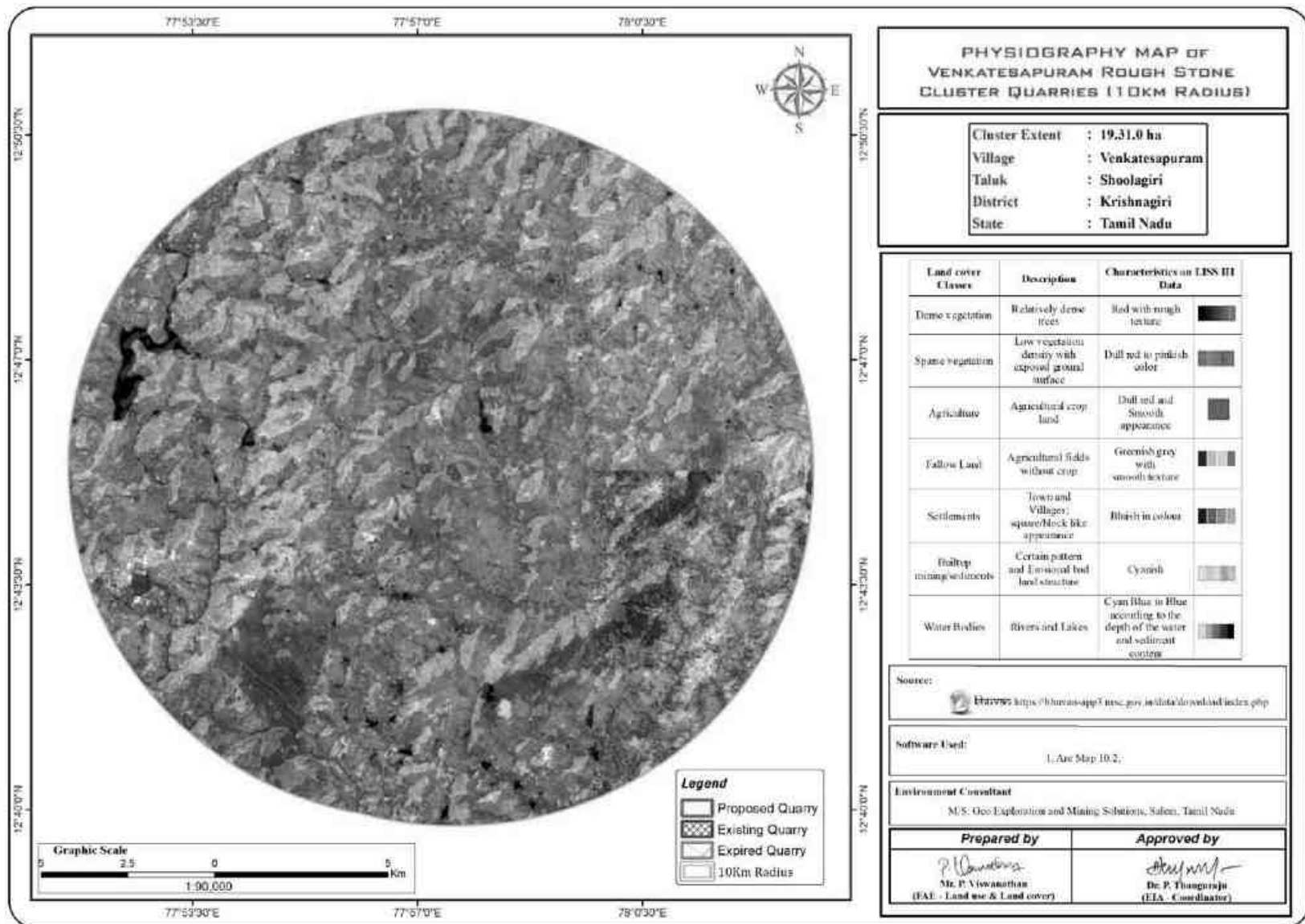
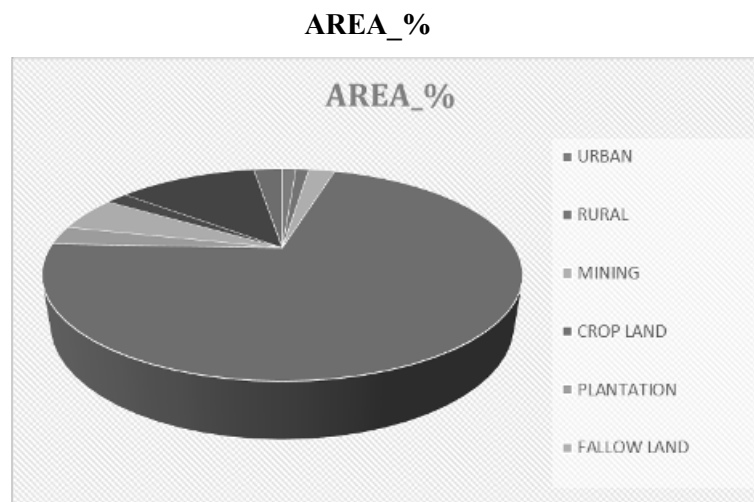
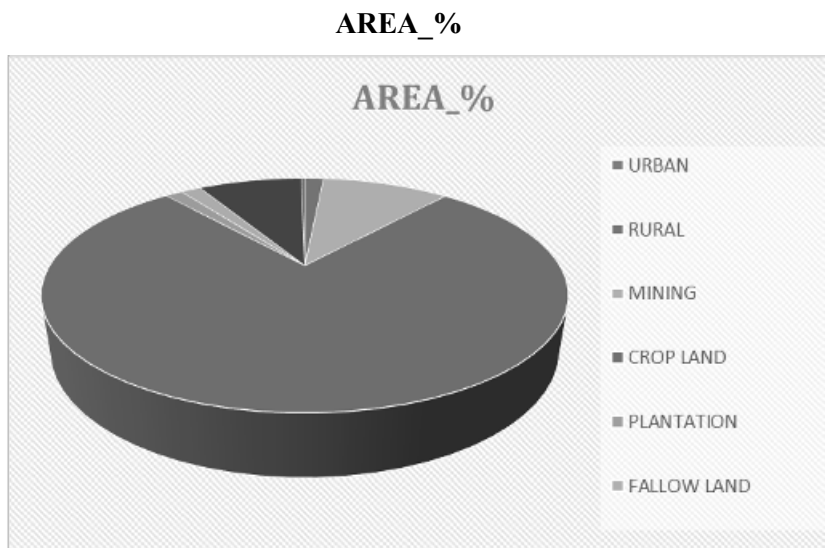


FIGURE 3.3: PIE DIAGRAM OF LAND USE AND LAND COVER - 10KM RADIUS IN

From the Table No.3.2, Pie Diagram 3.3 and Land Use Map (Fig No.3.1) is inferred that the majority of the land in the study area is Agriculture land (includes crop land – 71.09%, plantation – 2.88% and Fallow land – 5.30%) and followed scrub land 11.90%.

The total mining area within the study area is 770.81ha i.e., 2.24%. The overall area is 34,350.60ha and the cluster area of 19.31.0ha contributes about 0.056% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

FIGURE 3.3-A: PIE DIAGRAM OF LAND USE AND LAND COVER - 2KM RADIUS IN

From the Table No.3.2, Pie Diagram 3.3-A and Land Use Map (Fig No.3.1) is inferred that the majority of the land in the study area is Agriculture land (includes crop land – 77.35%, plantation – 1.34 and Fallow land – 1.55%).

The total mining area within the study area is 185.68ha i.e., 9.92%. The overall area is 1,870.99ha and the cluster area of 19.31.0ha contributes about 1.03% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

3.1.2 Topography

The project area is almost hilly terrain having gentle slope towards Western and South Western side and the quarry was surrounded by an expire & an existing quarry on all side.

3.1.3 Drainage Pattern of the Area

The drainage pattern of the area is dendritic – sub dendritic. Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin. They are governed by the topography of the land, whether a particular region is dominated by hard or soft rocks, and the gradient of the land. There are no streams, canals or water bodies crossing within the project area.

3.1.4 Seismic Sensitivity

The proposed project site falls in the seismic Zone II, least active zone as per BMTPC, Vulnerability Atlas of Seismic zone of India IS: 1893 – 2002. The project area falls in the hard rock terrain on the peninsular shield of south India which is highly stable.

3.1.5 Environmental Features in the Study Area

There is no National Park and Archaeological monuments within project area. No Protected and Reserved Forest area is involved in the project area. Therefore, there will be no need to acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e., 10 km radius, are given in the below Table 3.3.

TABLE 3.3: DETAILS OF ENVIRONMENT SENSITIVITY AROUND THE CLUSTER

Sl.No	Sensitive Ecological Features	Name		Arial Distance in km from Cluster
1	National Park / Wild life Sanctuaries	P1	Cauvery North Wildlife Sanctuary	24.1km – South
			Cauvery South Wildlife Sanctuary	47.94km – South
		P2	Cauvery North Wildlife Sanctuary	24.20km – South
			Cauvery South Wildlife Sanctuary	47.91km – South
3	Tiger Reserve/ Elephant Reserve/ Biosphere Reserve	P1	Athimugam R.F	0.48km – South
		P2	Athimugam R.F	0.63km – South
4	Critically Polluted Areas	None		Nil within 10km Radius
5	Mangroves	None		Nil within 10km Radius
6	Mountains/Hills	None		Nil within 10km Radius
7	Notified Archaeological Sites	None		Nil within 10km Radius
8	Industries/ Thermal Power Plants	None		Nil within 10km Radius
9	Defence Installation	None		Nil within 10km Radius

Source: Survey of India Toposheet

TABLE 3.4: NEARBY WATER BODIES FROM THE PROPOSED PROJECT SITE

		P1	P2
Sl.No	NAME	DISTANCE & DIRECTION	
1	Kuttai	800m NW	680m NW
2	Tank	1.4km NE	1.4km NE
3	Odai	1.5km East	1.5km East
4	Bukkasagaram Lake	3.7km SW	3.8km SW
5	Muthali Lake	5.1km West	5.0km West
6	Canal	5.3km SW	5.2km SW
7	Ponnaiyar River	6km SW	5.9km SW

Source: Village Cadastral Map and Field Survey

3.1.6 Soil Environment

Soil quality of the study area is one of the important components of the land environment. The composite soil samples were collected from the study area and analysed for different parameters. The locations of the monitoring sites are detailed in Table 3.5 and Figure 3.4.

The objective of the soil sampling is -

To determine the baseline soil characteristics of the study area; study the impact of proposed activity on soil characteristics and study the impact on soil more importantly agriculture production point of view.

TABLE 3.5: SOIL SAMPLING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	S-1	Core Zone	Project Area	12°45'25.46"N 77°57'17.96"E
2	S-2	Near Existing Quarry	440m SW	12°45'14.35"N 77°57'4.24"E
3	S-3	Athimugam Near School	2.4km SE	12°44'51.74"N 77°58'37.38"E
4	S-4	Berigai	5.4km NE	12°48'9.01"N 77°58'6.30"E
5	S-5	Muthalli	4.8km West	12°45'46.68"N 77°54'39.43"E
6	S-6	Thippapalli	3.8km SW	12°43'11.29"N 77°56'57.38"E

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS.

Methodology –

For studying soil quality, sampling locations were selected to assess the existing soil conditions in and around the project site representing various land use conditions. The samples were collected by auger boring into the soil up to 90-cm depth. Six (6) locations were selected for soil sampling on the basis of soil types, vegetative cover, industrial & residential activities including infrastructure facilities, which would accord an overall idea of the soil characteristics. The samples were analysed for physical and chemical characteristics. The samples were sent

to laboratory for analysis. The samples were filled in Polythene bags, coded and sent to laboratory for analysis and the details of methodology in respect are given in below Table 3.6.

TABLE 3.6: METHODOLOGY OF SAMPLING COLLECTION

Particulars	Details
Frequency	One grab sample from each station-once during the study period
Methodology	Composite grab samples of the topsoil were collected from 3 depths, and mixed to provide a representative sample for analysis. They were stored in airtight Polythene bags and analysed at the laboratory.

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS.

Soil Testing Result –

The samples were analysed as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The important properties analysed for soil are bulk density, porosity, infiltration rate, pH and Organic matter, kjeldahi Nitrogen, Phosphorous and Potassium. The standard classifications of soil are presented below in Figure 3.4 and the physico-chemical characteristics of the soil & Test Results in Table 3.7.

FIGURE 3.4: SOIL SAMPLING LOCATIONS AROUND 10 KM RADIUS

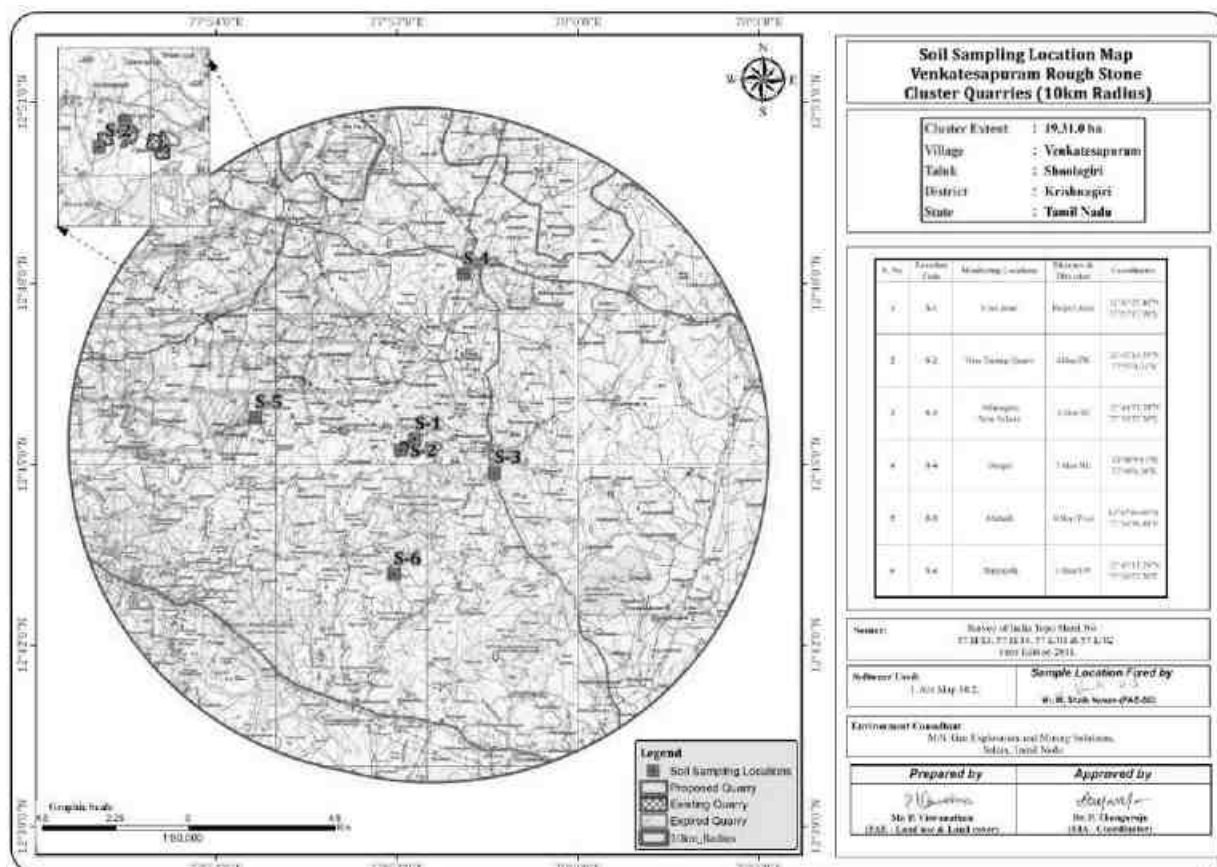


FIGURE 3.5: SOIL MAP

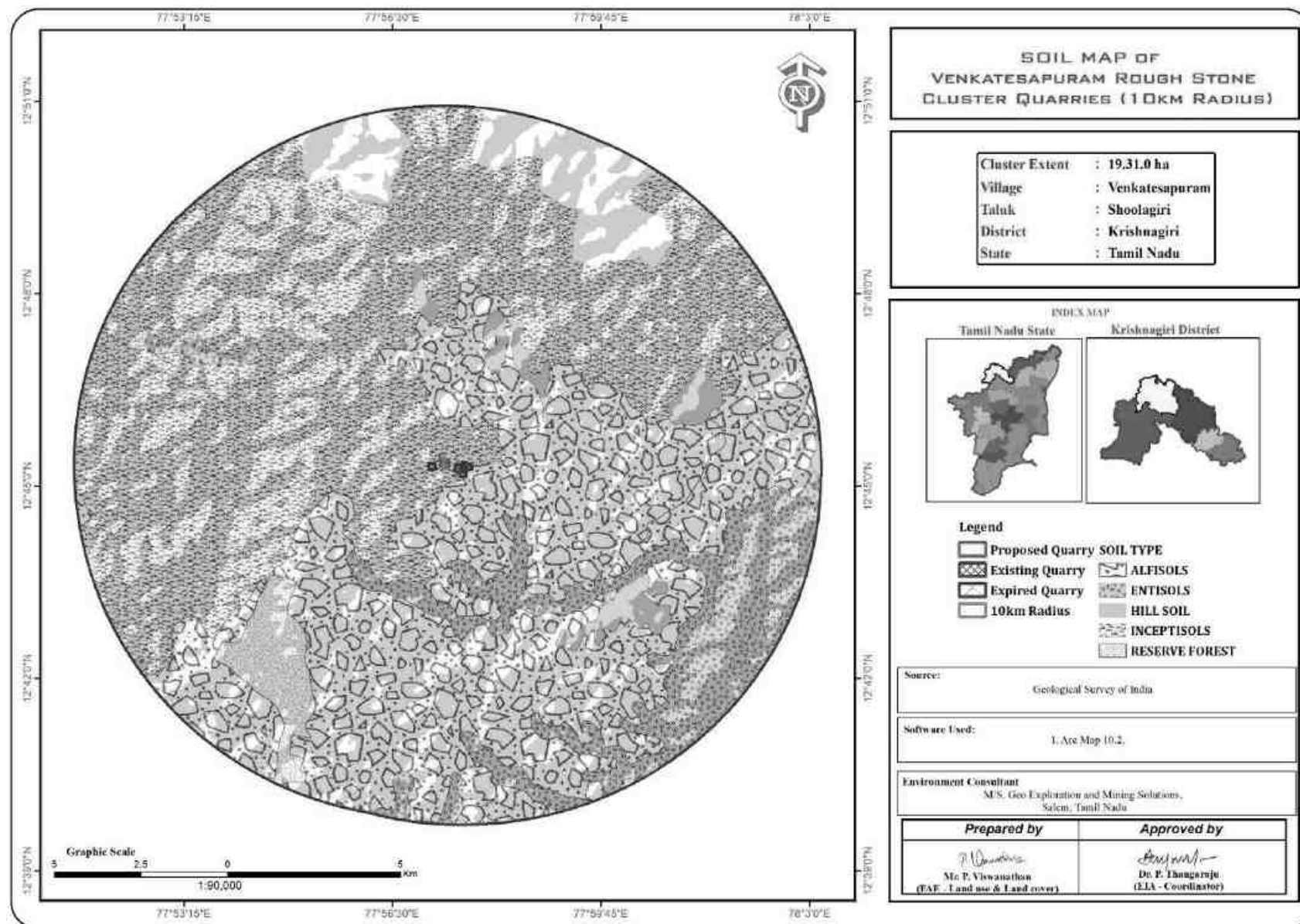


TABLE 3.7: SOIL QUALITY OF THE STUDY AREA

S. NO	TEST PARAMETERS	TEST METHOD	UNIT	S-1 Core Zone	S-2 Near Existing Quarry	S-3 Athimugam Near School	S-4 Berigai	S-5 Muthalli	S-6 Thippapalli
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	-	7.03	7.46	7.19	7.21	7.51	7.23
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff: 2016)	µmhos/cm	306	325	289	237	247	347
03	Texture:								
	Clay	Gravimetric Method	%	31.2	27.0	29.2	30.3	35.7	30.7
	Sand		%	36.5	37.9	36.1	35.8	34.6	35.9
	Silt		%	32.3	35.1	34.7	33.9	29.7	33.4
04	Water Holding Capacity	By Gravimetric Method	%	44.3	41.1	40.8	45.8	40.6	41.9
05	Bulk Density	By Cylindrical Method	g/cm ³	1.09	1.10	1.03	1.01	1.14	1.18
06	Porosity	By Gravimetric Method	%	39.1	38.7	38.7	36.3	37.2	39.8
07	Calcium as Ca	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	mg/kg	102	84	65.9	72	75.5	81.0
08	Magnesium as Mg		mg/kg	51.3	40.6	31.7	32.6	28.5	26.8
09	Manganese as Mn		mg/kg	31.2	21.3	21.6	20.7	20.3	20.9
10	Zinc as Zn		mg/kg	2.17	2.03	3.45	2.98	1.19	3.34
11	Boron as B		mg/kg	1.10	1.21	1.37	1.62	2.04	1.04
12	Chloride as Cl	APHA 23 rd Edn 1919 4500 Cl B	mg/kg	168	134	106.8	106	100.8	121
13	Total Soluble Sulphate as SO ₄	IS 2720 Part 27: 1977 (Reaff:2015)	%	0.024	0.024	0.018	0.017	0.018	0.018
14	Potassium as K	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	mg/kg	37.1	39.8	30.7	28.3	36.7	32.7

15	Total Phosphorus as P	IS 10158: 1982 (Reaff: 2019)	mg/kg	3.21	2.12	3.63	3.24	3.41	4.09
16	Total Nitrogen as N	IS 14684: 1999 (Reaff:2019)	mg/kg	212	353	352	312	372	374
17	Cadmium as Cd	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	mg/kg	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)
18	Total Chromium as Cr		mg/kg	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)
19	Copper as Cu		mg/kg	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)	BDL (DL : 1.0)
20	Lead as Pb		mg/kg	0.5	1.09	0.93	1.67	1.91	0.99
21	Iron as Fe		mg/kg	6.63	4.18	1.78	4.21	6.03	7.98
22	Organic Matter	IS: 2720 Part 22: 1972 (Reaff: 2015)	%	2.53	3.98	3.25	2.89	3.25	2.12
23	Organic Carbon	IS: 2720 Part 22: 1972 (Reaff: 2015)	%	1.47	2.31	1.89	1.68	1.89	1.23
24	Cation Exchange Capacity	USEPA 9080 – 1986	meq/100g of soil	29.9	29.8	28.9	27.9	27.1	38.7

Source: Sampling Results by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS

Interpretation & Conclusion

Physical Characteristics –

The physical properties of the soil samples were examined. In this result, the soil texture found in the study area is Clay varied between 27.0-35.7%, Sand varied between 34.6-37.9% and Silt varied between 29.7-35.1% and Bulk Density of Soils in the study area varied between 1.01-1.18g/cm³. The Water Holding Capacity of the soil samples is found to be medium i.e., ranging from 40.6-45.8%.

Chemical Characteristics

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.03-7.51
- The available Nitrogen content range between 212-374mg/kg
- The available Phosphorus content range between 2.12–4.09mg/kg
- The available Potassium range between 28.3–39.8mg/kg

3.2 WATER ENVIRONMENT

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the water quality characteristics for critical parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

3.2.1 Surface Water Resources:

Ponnaiyar River is the major surface water body in the study area and the rainfall over the area is moderate, the rainwater storage in open wells and trenches are in practice over the area and the stored water acts as source of drinking water for few months after rainy season.

3.2.2 Ground Water Resources:

Groundwater occurs in all the crystalline formations of oldest Achaeans and Recent Alluvium. The occurrence and behaviour of groundwater are controlled by rainfall, topography, geomorphology, geology, structures etc., The weathering is controlled by the intensity of weathering and fracturing. Dug wells as wells as bore wells are more common ground water abstraction structures in the area. The diameter of the dug well is in the range of 7 to 10 m and depth of dug wells range from 7.2 to 13 m bgl. The dug wells yield up to 1 lps in summer months and few wells remains dry. The yield is adequate for irrigation for one or two crops in monsoon period.

3.2.3 Methodology

Reconnaissance survey was undertaken and monitoring locations were finalized based on;

- Drainage pattern;
- Location of Residential areas representing different activities/likely impact areas; and
- Likely areas, which can represent baseline conditions

Two (2) surface water and Four (4) ground water samples were collected from the study area and were analysed for physio-chemical, heavy metals and bacteriological parameters in order to assess the effect of mining and other activities on surface and ground water. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and 'Standard methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA). The water sampling locations are given in Table 3.8 and shown as Figure 3.6.

TABLE 3.8: WATER SAMPLING LOCATIONS

S.NO	CODE	LOCATIONS	DISTANCE & DIRECTION	CO-ORDINATES
SURFACE WATER				
1	SW-1	Tank Near Mukkalpalli	1.5km NE	12°45'51.24"N 77°58'3.66"E
2	SW-2	Ponnaiyar River	6.2km SW	12°44'33.31"N 77°54'3.18"E
GROUND WATER				
3	WW-1	Near Project Area	280m NW	12°45'36.61"N 77°57'8.76"E
4	WW-2	Berigai	5.0km NE	12°48'7.18"N 77°58'0.64"E
5	BW-1	Near Habitation	480m NW	12°45'38.90"N 77°57'1.51"E
6	BW-2	Thippapalli	3.8km SW	12°43'11.79"N 77°56'55.59"E

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS

FIGURE 3.6: WATER SAMPLING LOCATIONS AROUND 10 KM RADIUS

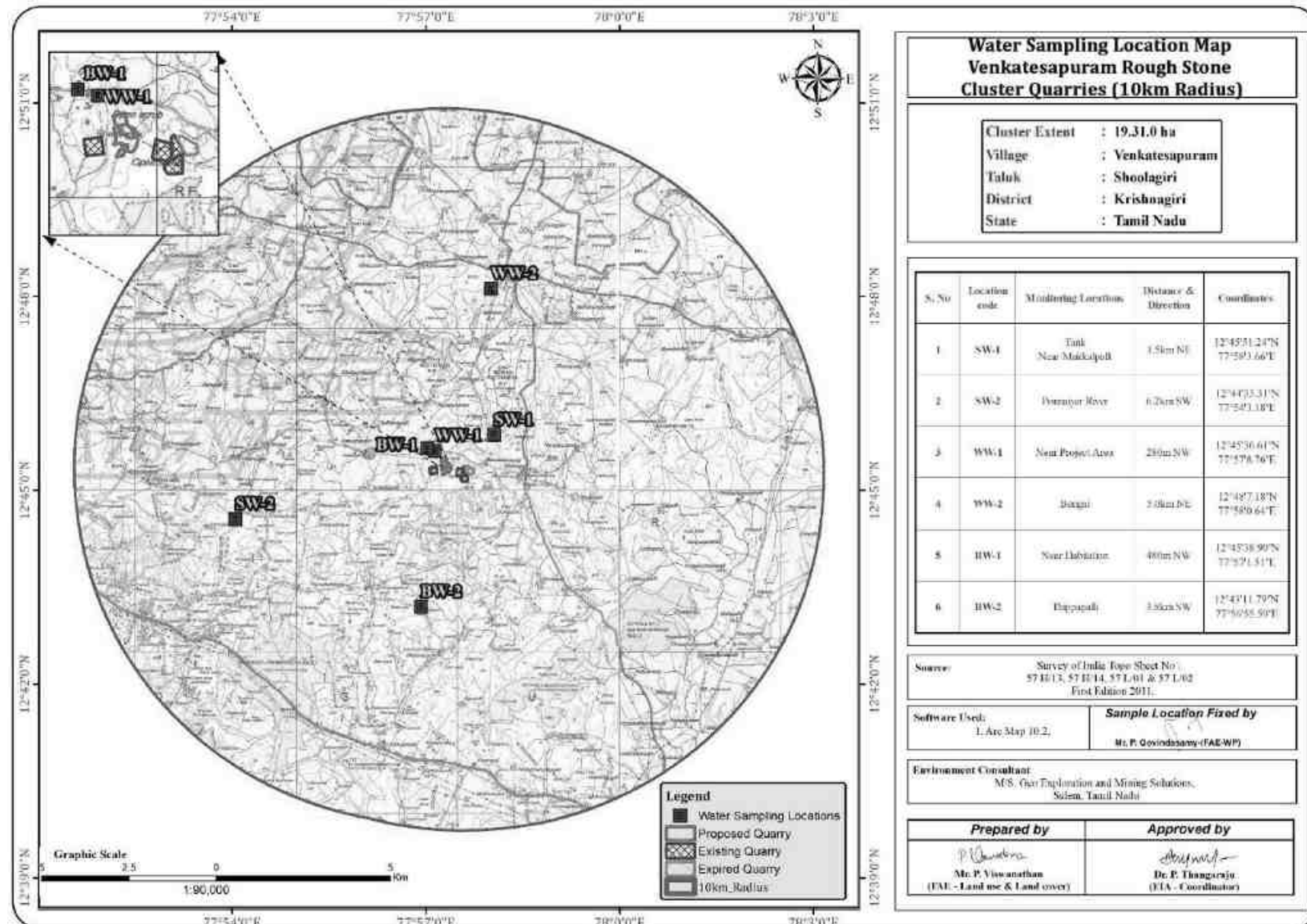


TABLE 3.9: SURFACE WATER SAMPLING RESULTS

TEST	TEST METHOD	UNIT	SW1- Tank Near Mukkalpalli	SW2- Ponnaiyar River
Discipline: Chemical				
Colour	IS 3025 Part 4:1983 (Reaff:2017)	Hazen	8	6
Odour	IS 3025 Part 5:2018	-	Agreeable	Agreeable
pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	-	7.91	7.98
Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	µmhos/cm	1777.0	1851.0
Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	NTU	5	6
Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	mg/l	1048.0	1092.0
Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	mg/l	324.0	340.0
Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	mg/l	84.9	86.5
Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	mg/l	27.2	30.1
Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	mg/l	302.8	329.7
Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	mg/l	349.8	368.9
Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	mg/l	79.6	72.5
Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	mg/l	0.51	0.42
Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
Fluoride as F	APHA 23 rd Edn. 2017:4500 F, D	mg/l	0.42	0.39
Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	mg/l	20.1	16.3
Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)
Mercury as Hg	USEPA 200.8	mg/l	BDL (DL:0.0005)	BDL (DL:0.0005)
Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.001)	BDL (DL:0.001)
Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)
Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)
Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)
Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL(DL : 0.05)	BDL(DL : 0.05)
Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL(DL : 0.02)	BDL(DL : 0.02)

Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL(DL : 0.05)	BDL(DL : 0.05)
Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	mg/l	BDL(DL : 0.01)	BDL(DL : 0.01)
Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	mg/l	BDL (DL:0.0005)	BDL (DL:0.0005)
Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
BOD @ 27°C for 3 days	IS 3025 Part 44:1993 (Reaff:2019)	mg/l	13.5	16.2
Chemical Oxygen Demand	IS 3025 Part 58:2006 (Reaff:2017)	mg/l	40.2	50.0
Dissolved Oxygen	IS 3025 Part 38:1989 (Reaff:2019)	mg/l	7.9	7.7
Barium as Ba	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL(DL:0.05)	BDL(DL:0.05)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Reaff. 2019)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
Sulphide as H ₂ S	IS 3025 Part 29-1986 (Reaff: 2019)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)
Total Arsenic as As	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)
Total Suspended Solids	IS 3025 Part 17 -1984 (Reaff:2017)	mg/l	28.3	33.4
Discipline: Biological				
Total Coliform	APHA 23 rd Edn. 2017:9221F	MPN/100ml	1029	1287
<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	MPN/100ml	204	192

Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number.

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS

TABLE 3.10: GROUND WATER SAMPLING RESULTS

TEST	PROTOCOL	Unit	WW1 - Near Project Area	WW2 - Berigai	BW1 - Near Habitation	BW2 – Thippapalli
Discipline: Chemical						
Colour	IS 3025 Part 4:1983 (Reaff:2017)	-	5	5	5	5
Odour	IS 3025 Part 5:2018	-	Agreeable	Agreeable	Agreeable	Agreeable
pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	-	7.67	7.63	7.37	7.12
Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	µmhos/cm	1646.0	1581.0	1475.0	1389.0
Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	NTU	1	1	1	1
Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	mg/l	971.0	933.0	870.0	819.0
Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	mg/l	296.0	280.0	264.6	244.0
Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	mg/l	76.9	65.7	53.7	59.3
Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	mg/l	25.2	28.2	22.4	23.3
Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	mg/l	278.6	268.7	245.8	219.8
Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	mg/l	320.1	306.8	289.7	262.3
Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	mg/l	65.8	60.3	55.7	50.5
Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	mg/l	0.37	0.30	0.31	0.34
Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	mg/l	0.31	0.27	0.27	0.37
Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	mg/l	10.7	8.2	7.9	6.9
Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.011)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)

Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
Mercury as Hg	USEPA 200.8	mg/l	BDL (DL:0.0005)	BDL (DL:0.0005)	BDL (DL:0.0005)	BDL (DL:0.0005)
Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL(DL : 0.05)	BDL(DL : 0.05)	BDL(DL : 0.05)	BDL(DL : 0.05)
Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL(DL : 0.02)	BDL(DL : 0.02)	BDL(DL : 0.02)	BDL(DL : 0.02)
Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL(DL : 0.05)	BDL(DL : 0.05)	BDL(DL : 0.05)	BDL(DL : 0.05)
Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	mg/l	BDL(DL : 0.01)	BDL(DL : 0.01)	BDL(DL : 0.01)	BDL(DL : 0.01)
Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	mg/l	BDL (DL:0.0005)	BDL (DL:0.0005)	BDL (DL:0.0005)	BDL (DL:0.0005)
Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	BDL(DL:0.05)	BDL(DL:0.05)
Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	mg/l	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)

Discipline: Biological							
Total Coliform	APHA 23 rd Edn. 2017:9221B	MPN/100ml	213	123	137	144	
<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	MPN/100ml	< 1.8	< 1.8	< 1.8	< 1.8	

Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number, < 1.8 MPN/100ml can be taken as “No Microbial Growth”.

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS

3.2.4 Interpretation& Conclusion

Surface Water

The pH varied from 7.91 to 7.98 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 varied from 1048 to 1092 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 349.8 to 368.9mg/l, Nitrates content is 16.3 to 20.1mg/l and Sulphates varied from 72.5 to 79.6mg/l.

Ground Water

The pH of the water samples collected ranged from 7.12 to 7.67 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. Total Dissolved Solids were found in the range of 819 to 971mg/l in all samples. Total hardness varied between 244 to 296mg/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.

3.2.5 Hydrology and Hydrogeological studies

The district is underlain by hard rock formation fissured and fractured crystalline rocks constitute the important aquifer systems in the district. Geophysical prospecting was carried out in that area by SSRMP-80 Instrument by qualified Geo physicist with the help of IGIS software and it was inferred that the low resistance encountered at the depth between 72-75m.

Ground water levels and Flow Direction based on the Bore well and open well Data's

In general, the ground water movement is based on the gradient i.e., water moves from the highest static ground water elevation to lowest static ground water elevation point. The ground water movement is important aspect to locating the recharge and discharge areas. Therefore, the data has been collected in the study area. Water level measured in the 5 open wells and 8 borewells.

The average water level in the open well is varies from = 12.8m to 15.3m bgl

The water level in the bore well is varies from = 72.8m to 75.2m bgl

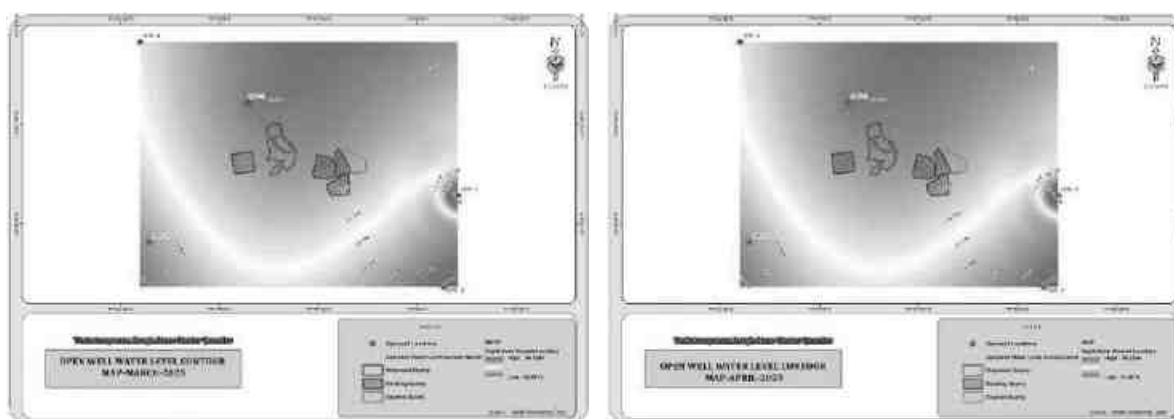
The water level in the area is above 58m-63m hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area.

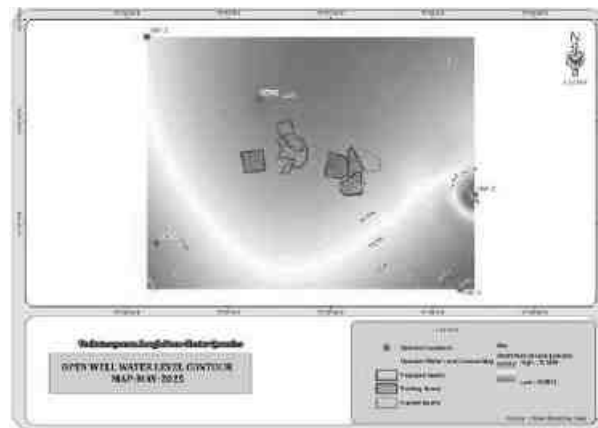
TABLE 3.11: PRE-MONSOON SEASON WATER LEVEL OF OPEN WELLS 1 KM RADIUS

S.NO	LABEL	LONGITUDE	LATITUDE	MARCH-25	APRIL-25	MAY-25
1	OW-1	77° 57' 08.8771" E	12° 45' 36.5882" N	13.3	13.9	14.5
2	OW-2	77° 56' 35.9628" E	12° 45' 54.9041" N	13.6	14.2	14.8
3	OW-3	77° 58' 12.3154" E	12° 45' 08.4018" N	12.8	13.4	14
4	OW-4	77° 58' 08.0527" E	12° 44' 40.8773" N	14.1	14.7	15.3
5	OW-5	77° 56' 38.6748" E	12° 44' 54.3953" N	13.9	14.5	15.1

Source: Onsite monitoring data

FIGURE 3.7: OPEN WELL CONTOUR MAP MARCH TO MAY 2025



**TABLE 3.12: PRE-MONSOON SEASON WATER LEVEL OF BOREWELLS 1 KM RADIUS**

S.No	Name	LONGITUDE	LATITUDE	Mar-25	APPR-25	May-25
1	BW1	77° 57' 01.6491" E	12° 45' 38.8800" N	73.2	73.8	74.4
2	BW2	77° 57' 57.9713" E	12° 45' 28.2019" N	73.6	74.2	74.8
3	BW3	77° 57' 55.2287" E	12° 46' 05.7222" N	74.1	74.7	75.3
4	BW4	77° 57' 48.5235" E	12° 45' 04.8322" N	72.8	73.4	74
5	BW5	77° 58' 11.3403" E	12° 44' 47.2782" N	73.5	74.1	74.7
6	BW6	77° 56' 52.8726" E	12° 45' 01.8781" N	72.9	73.5	74.1
7	BW7	77° 56' 31.3811" E	12° 45' 13.9208" N	74	74.6	75.2
8	BW8	77° 57' 06.3724" E	12° 44' 43.4214" N	73	73.6	74.2

Source: Onsite monitoring data

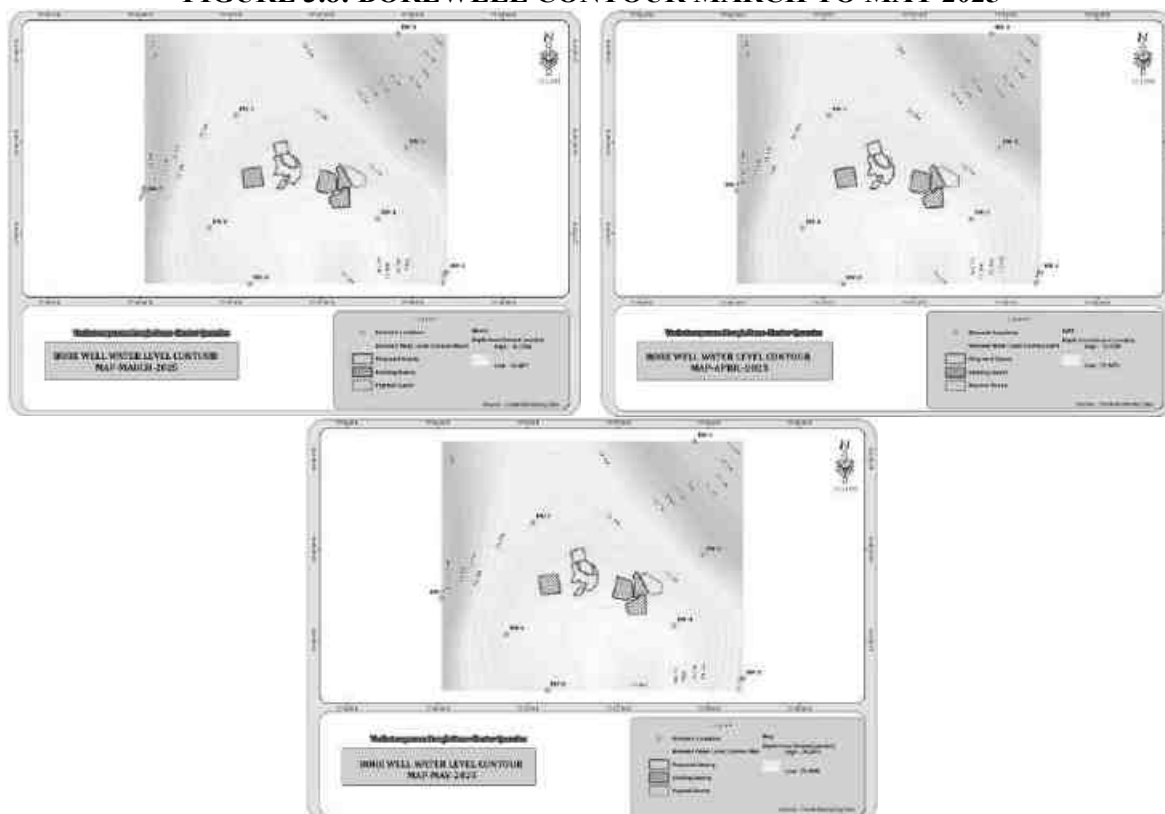
FIGURE 3.8: BOREWELL CONTOUR MARCH TO MAY 2025

FIGURE 3.9: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE

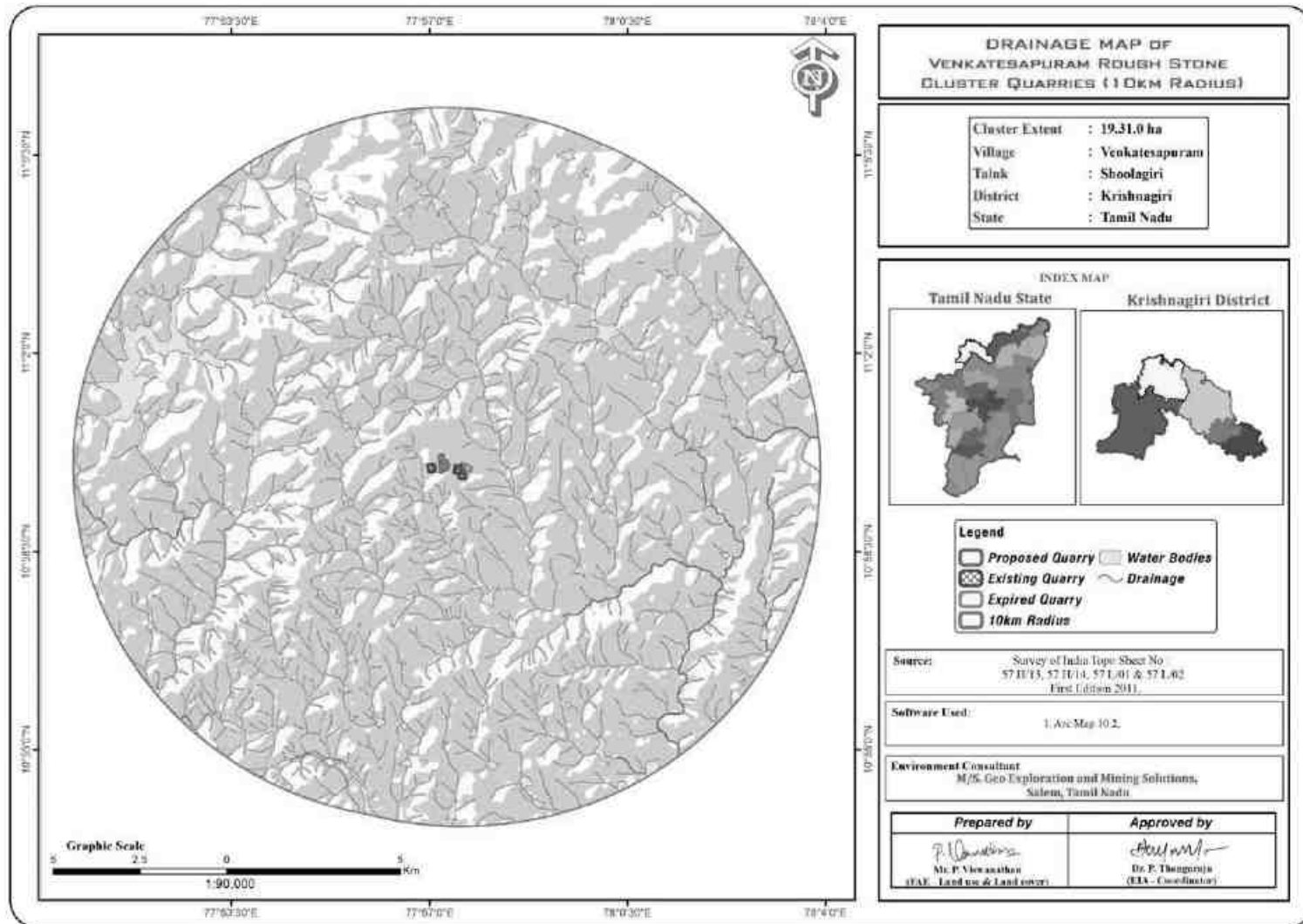
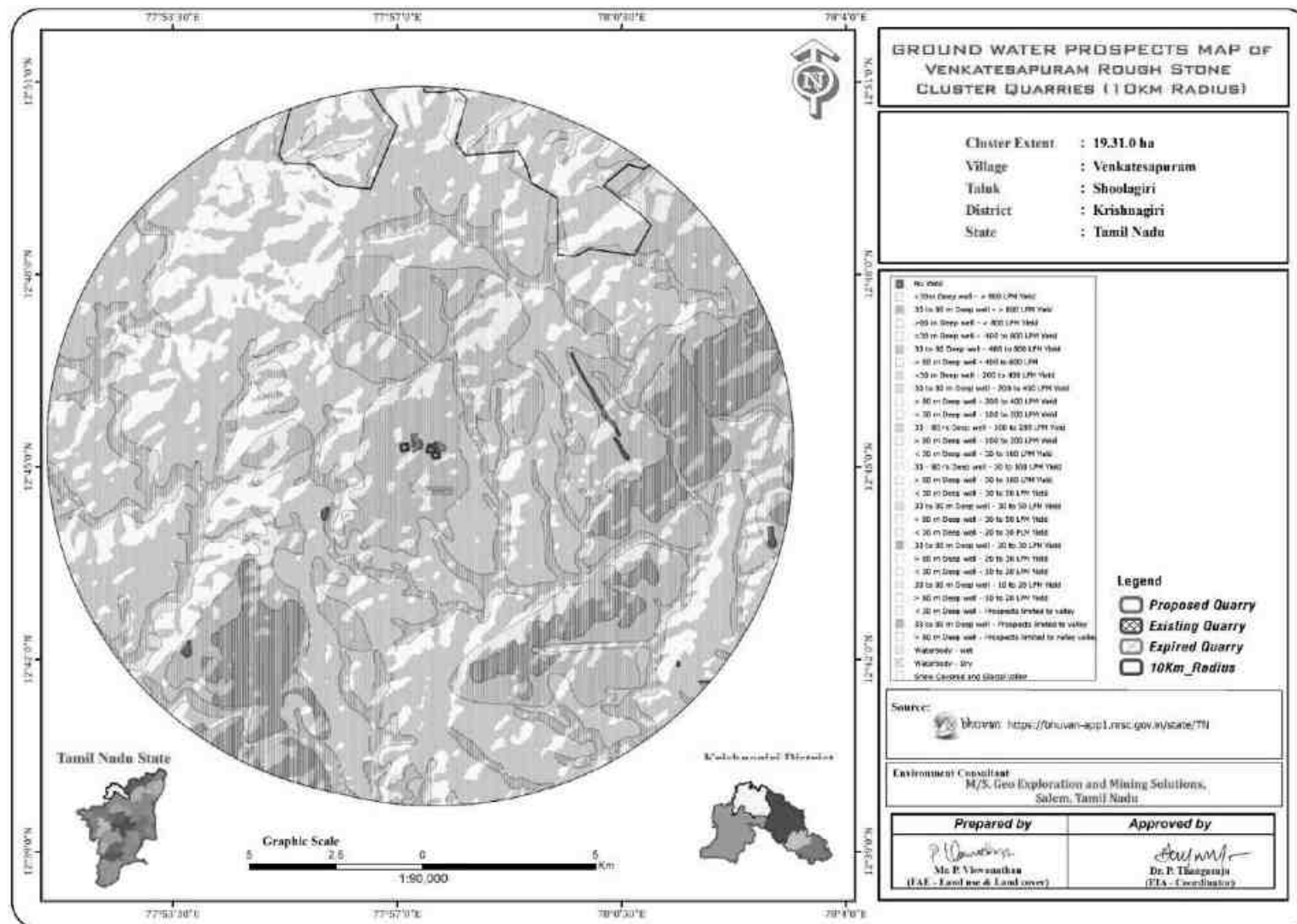


FIGURE 3.10: GROUND WATER PROSPECT MAP



Geophysical Resistivity Survey

3.2.5.1 Methodology and Data Acquisition

The Geophysical Electrical Resistivity survey conducted in the area Schlumberger configuration, Vertical Electrical Sounding (VES) method. Schlumberger electrode set up was employed for making sounding measurements. Since it is least influenced by lateral in homogeneities and is capable of providing higher depth of investigation. This is four electrodes collinear set up where in the outer electrodes send current into the ground and the inner electrodes measure the potential difference.

The present study utilizes maximum current electrode separation $AB/2$. The data from this survey are commonly arranged and contoured in the form of Pseudo-section that gives an approximate of the subsurface resistivity. This technique is used for the inversion of Schlumberger VES data to predict the layer parameter namely layer resistivity and Geo electric layer thickness. The main goal of the present study is to search the vertical in homogeneities that is consistent with the measured data.

For a Schlumberger among the Apparent resistivity can be calculated as follows.

$$\rho_a = \frac{GAV}{I}$$

ΔV = potential difference between receiving electrodes

G = Geometric Factor.

Rocks show wide variation in resistivity ranging from 10-8 more than 10+14 ohmmeter. On a broad classification, one can group the rocks falling in the range of 10-8 to 1 ohmmeter as good conductors. 1 to 106 ohmmeter as intermediate conductors and 106 to 1012 ohmmeter as more as poor conductor. The resistivity of rocks and subsurface lithology, which is mostly dependent on its porosity and the pore fluid resistivity is defined by Archie's Law,

$$\rho_r = F\rho_w = a \emptyset^m \rho_w$$

ρ_r = Resistivity of Rocks

ρ_w = Resistivity of water in pores of rock

F = Formation Factor

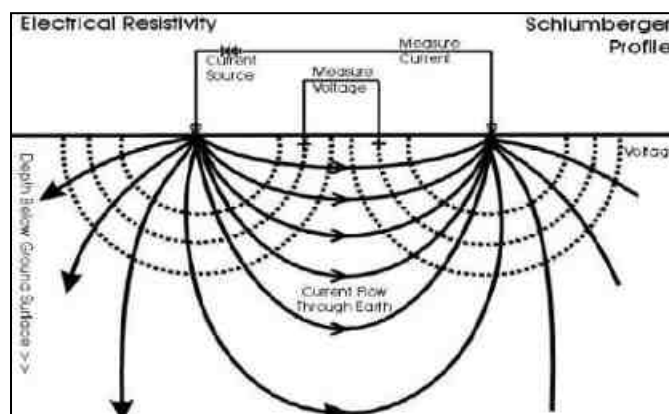
$\emptyset$ = Fractional pore volume

A = Constants with values ranging from 0.5 to 2.5

3.2.5.2 Survey Layout

The field equipment deployed for the study is in a deep resistivity meter with a model of SSR – MP – AT. This Signal stacking Resistivity meter is a high-quality data acquisition system incorporating several innovation features for Earth resistivity. In the presence of random earth Noises the signal to noise ration can be enhanced by $\sqrt{N}$ where N is the number of stacked readings. This SSR meter in which running averages of measurements $[1, (1+2)/2, (1+2+3)/3 \dots (1+2\dots+16/16)]$ up to the chosen stacks are displayed and the final average is stored automatically, in memory utilizing the principles of stacking to achieve the benefit of high signals to noise ratio. Based on these above significations the signal stacking resistivity meter was used for (VES) Vertical Electric Resistivity Sounding.

RESISTIVITY SURVEY PROFILE



Measurements of ground Resistivity is essentially done by sending a current through two electrodes called current electrodes (C_1 & C_2) and measuring the resulting potential by two other electrodes called potential electrode (P_1 & P_2). The amount of current required to be sent into the ground depends on the contact resistance at the current electrode, the ground resistivity and the depth of interest.

3.2.5.3 Data Presentation

It was inferred that the low resistance encountered at the depth between 60-65m. The maximum depth proposed out of proposed projects 42m BGL. Hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area.

3.2.5.4 Geophysical Data Interpretation

The geophysical data was obtained to study the lateral variations, vertical in homogeneities in the sub – surface with respect to the availability of groundwater. From the interpreted data, it has inferred that the area has moderate groundwater potential in the investigated area. This small quarrying operation will not have any significant impact on the natural water bodies.

It is inferred that the existing quarries in the surrounding area not intersected the water table is, only the seepage water during rainy season encountered from the upper layer and it will be used for the Greenbelt development, Dust suppression and quarrying operation.

3.3 AIR ENVIRONMENT

The existing ambient air quality of the area is important for evaluating the impact of mining activities on the ambient air quality.

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 cluster forms the baseline information. The prime objective of the baseline air quality study was to establish the existing

ambient air quality of the study area. These will also be useful for assessing the conformity to standards of the ambient air quality during the operation of proposed projects in cluster.

3.3.1 Meteorology & Climate

Meteorology is the key to understand the Air quality. The essential relationship between meteorological condition and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time, accomplish dispersion and strongly influence other processes associated with them.

A temporary meteorological station was installed at project site by covering cluster quarries. The station was installed at a height of 3 m above the ground level in such a way that there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature are recorded on hourly basis.

Climate -

- The climate is tropical in Krishnagiri. In Krishnagiri, the quantity of rainfall during summers surpasses that of winters. This climate is considered to be Aw according to the Köppen-Geiger climate classification. The temperature here averages 25.5 °C | 77.9 °F. The annual precipitation in this location is approximately 773 mm | 30.4 inch.
- Krishnagiri are in the middle of our planet and the summers are not easy to define. The most favored period for a visit is during the months of January, February, March, April, May, June, July, August, September, October, November.
- The driest month is February. There is 6 mm | 0.2 inch of precipitation in February. On average, the highest amount of rainfall occurs during October with a mean value of 144 mm | 5.7 inch.
- With an average of 29.0 °C | 84.2 °F, April is the warmest month. On average, the month of December is considered to be the coldest time of year with temperatures averaging at around 21.9 °C | 71.4 °F.

<https://en.climate-data.org/asia/india/tamil-nadu/krishnagiri-34157/>

Rainfall

TABLE 3.13: RAINFALL DATA

Actual Rainfall in mm						Normal Rainfall in mm
2019	2020	2021	2022	2023	2024 (As On 30.09.2024)	
730.0	1099.5	985.4	1204.6	729.2	515.6	850.7

Source: <https://www.twadboard.tn.gov.in/content/krishnagiri>

TABLE 3.14: METEOROLOGICAL DATA RECORDED AT SITE

S.No	Parameters		Mar-2025	Apr-2025	May-2025
1	Temperature (°C)	Max	28.17	29.57	29.06
		Min	24.01	25.96	23.20

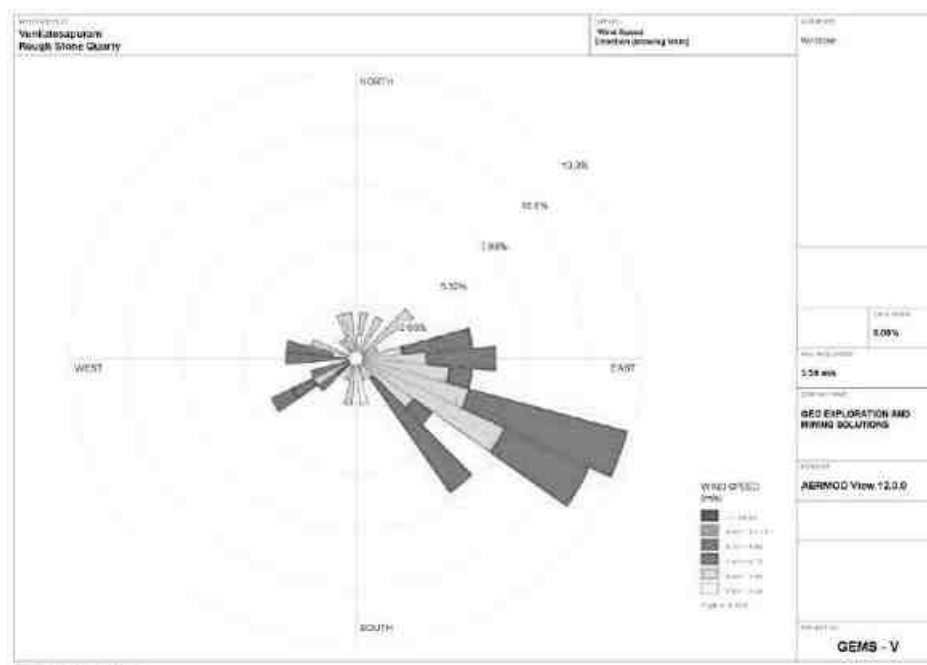
		Avg	26.09	27.76	26.13
2	Relative Humidity (%)	Avg	47.71	53.08	70.28
3	Wind Speed (m/s)	Max	5.53	4.34	8.63
		Min	2.45	1.94	1.20
		Avg	3.99	3.14	4.91
4	Cloud Cover (OKTAS)		0-8	0-8	0-8
5	Wind Direction		ESE,E	ESE,SE	W,WSW

Correlation between Secondary and Primary Data

The average rainfall over the period of five years 850.7m. The meteorological data collected at the site is almost similar to that of secondary data collected from TWAD Board – Krishnagiri.

Wind rose diagram of the study site is depicted in Figure. 3.11. Predominant downwind direction of the area during study season is West to East & SE

FIGURE 3.11: WINDROSE DIAGRAM



In the abstract of collected data wind rose were drawn on presented in figure No.3.11 during the monitoring period in the study area

1. Predominant winds were from ESE, E, SE, W, WSW
2. Wind speed readings were recorded between 1.20 to 8.63m/s
3. Temperature readings ranging from 23.20 to 29.57°C
4. Relative humidity ranging from 47.71 to 70.28%
5. The monitoring was carried out continuously for three months.

3.3.2 Methodology and Objective

The prime objective of the ambient air quality study is to assess the existing air quality of study area and its conformity to NAAQS. The observed sources of air pollution in the study area are industrial, traffic and domestic activities. The baseline status of the ambient air quality has been established through a scientifically designed ambient air quality monitoring network considering the followings:

- Meteorological condition on synoptic scale;
- Topography of the study area;
- Representatives of regional background air quality for obtaining baseline status;
- Location of residential areas representing different activities;
- Accessibility and power availability; etc.,

3.3.3 Sampling and Analytical Techniques

TABLE 3.15: METHODOLOGY AND INSTRUMENT USED FOR AAQ ANALYSIS

Parameter	Method	Instrument
PM _{2.5}	Gravimetric Method Beta attenuation Method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM ₁₀	Gravimetric Method Beta attenuation Method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO ₂	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO _x	IS-5182 Part II (Jacob & Hochheiser modified method)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology followed by CHENNAI METTEX LAB PRIVATE LIMITED & CPCB Notification

TABLE 3.16: NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl.No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	Sulphur Dioxide (µg/m ³)	Annual Avg.*	50.0	20.0
		24 hours**	80.0	80.0
2	Nitrogen Dioxide (µg/m ³)	Annual Avg.	40.0	30.0
		24 hours	80.0	80.0

3	Particulate matter (size less than 10µm) PM10 (µg/m3)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	Particulate matter (size less than 2.5 µm PM2.5 (µg/m3)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

Source: NAAQS CPCB Notification No. B-29016/20/90/PCI-I Dated: 18th Nov 2009

*Annual Arithmetic mean of minimum 104 measurements in a year taken twice a Week 24 hourly at uniform interval,

** 24 hourly / 8 hourly or 1 hourly monitored value as applicable shall be complied with 98 % of the time in a year. However, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

3.3.4 Frequency & Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two samples per week at seven (7) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period March – May 2025. The baseline data of ambient air has been generated for PM₁₀, PM_{2.5}, Sulphur Dioxide (SO₂) & Nitrogen Dioxide (NO₂) Monitoring has been carried out as per the CPCB, MoEF guidelines and notifications.

The equipment was placed preferably at a height of at least 3 ± 0.5m above the ground level at each monitoring station, for negating the effects of wind-blown ground dust. The equipment was placed at open space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results.

3.3.5 Ambient Air Quality Monitoring Stations

Seven (7) monitoring stations were set up in the study area as depicted in Figure 3.12 for assessment of the existing ambient air quality. Details of the sampling locations are as per given below.

TABLE 3.17: AMBIENT AIR QUALITY (AAQ) MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ-1	Core Zone	Project Area	12°45'26.33"N 77°57'18.03"E
2	AAQ-2	Near Existing Quarry	440m SW	12°45'19.90"N 77°57'1.45"E
3	AAQ-3	Athimugam Near School	2.4km SE	12°44'53.32"N 77°58'36.55"E
4	AAQ-4	Berigai	5.4km NE	12°48'9.89"N 77°58'6.31"E
5	AAQ-5	Muthalli	4.8km West	12°45'46.82"N 77°54'38.93"E
6	AAQ-6	Ettipalligutta	6km East	12°44'48.40"N 78° 0'36.25"E
7	AAQ-7	Thippapalli	4km SW	12°43'9.53"N 77°56'56.82"E

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS.

FIGURE 3.12: AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS

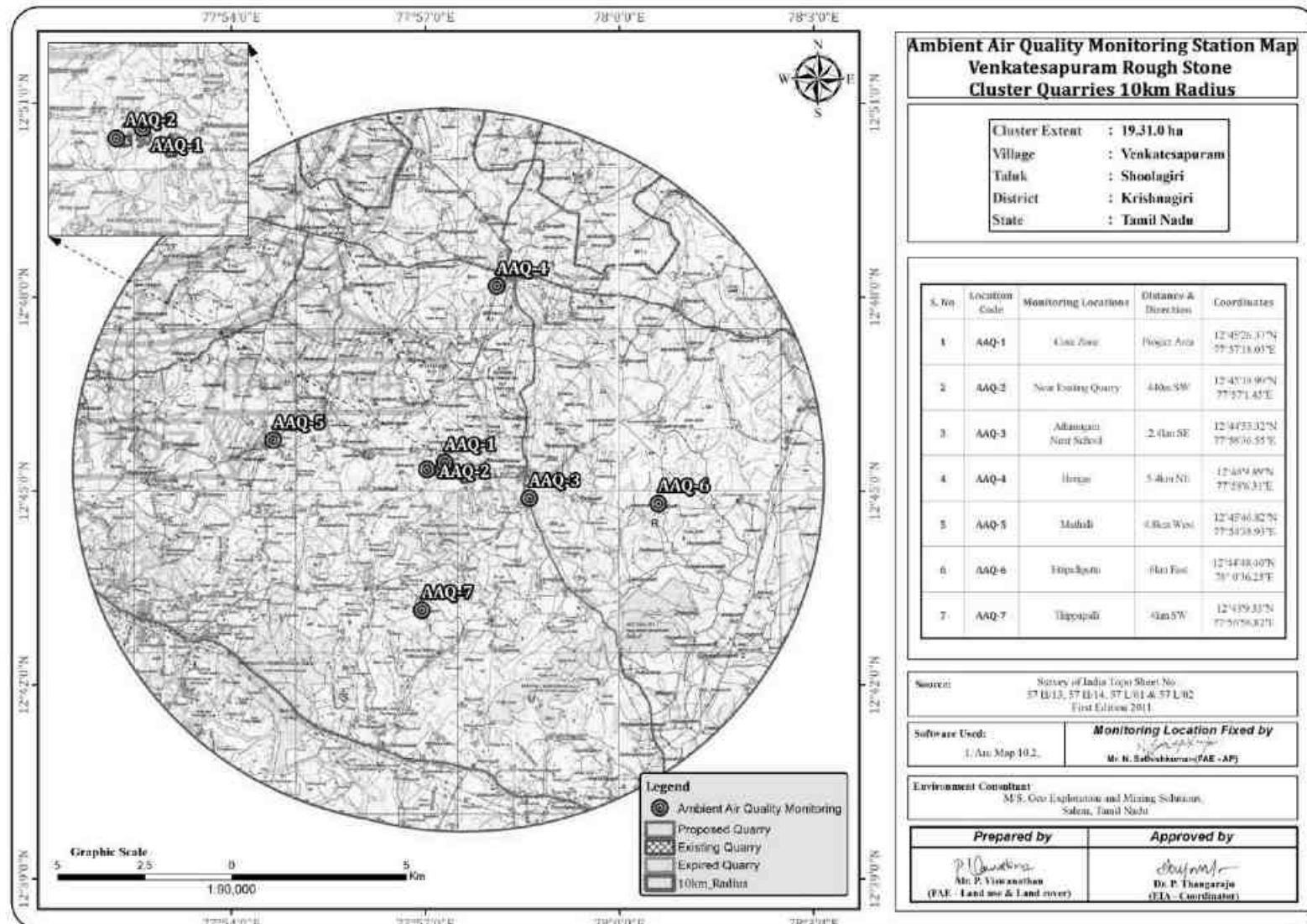


TABLE 3.18: SUMMARY OF AAQ 1 to AAQ 7

PM10	AAQ1 Core Zone	AAQ2 Near Existing Quarry	AAQ3 Athimugam Near School	AAQ4 Berigai	AAQ5 Muthalli	AAQ6 Ettipalligutta	AAQ7 Thippapalli
Arithmetic Mean	35.9	36.0	36.0	36.1	35.9	35.4	35.2
Minimum	32.1	32.1	32.0	32.0	32.0	32.0	32.0
Maximum	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAAQ Norms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PM2.5	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	21.2	21.3	21.2	21.1	21.4	21.4	21.3
Minimum	19.0	19.0	19.0	19.0	19.1	19.0	19.0
Maximum	23.6	23.2	23.0	23.0	24.1	23.8	23.8
NAAQ Norms	60.0	60.0	60.0	60.0	60.0	60.0	60.0
SO2	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	6.5	6.3	6.2	6.3	6.4	6.2	6.3
Minimum	5.4	5.0	5.0	5.1	5.1	5.1	5.0
Maximum	7.5	7.5	7.5	7.5	7.4	7.5	7.1
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0
NO2	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	23.1	23.3	23.3	23.1	23.1	23.2	23.1
Minimum	20.8	21.1	21.1	21.0	21.0	21.1	21.1
Maximum	25.0	25.0	25.0	25.0	25.0	25.0	25.0
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

TABLE 3.19: ABSTRACT OF AMBIENT AIR QUALITY DAT

	Parameter	PM10	PM2.5	SO ₂	NO ₂
	No. of Observations	260	260	260	260
1	10 th Percentile Value	32.5	19.4	5.4	21.6
2	20 th Percentile Value	33.0	19.7	5.8	21.9
3	30 th Percentile Value	33.6	20.1	5.9	22.3
4	40 th Percentile Value	34.5	20.8	6.1	22.8
5	50 th Percentile Value	35.5	21.4	6.3	23.0
6	60 th Percentile Value	36.6	21.9	6.6	23.6
7	70 th Percentile Value	37.9	22.2	6.8	24.0
8	80 th Percentile Value	38.9	22.6	7.0	24.5
9	90 th Percentile Value	39.5	23.0	7.1	24.9
10	95 th Percentile Value	40.0	23.0	7.4	25.0
11	98 th Percentile Value	40.0	23.7	7.5	25.0
12	Arithmetic Mean	36.5	21.6	6.5	23.5
13	Geometric Mean	36.4	21.6	6.5	23.5
14	Standard Deviation	2.9	1.5	0.7	1.3
15	Minimum	32.5	19.4	5.4	21.6
16	Maximum	40.0	23.7	7.5	25.0
	NAAQ Norms*	100.0	60.0	80.0	80.0
	% Values exceeding Norms*	0.0	0.0	0.0	0.0

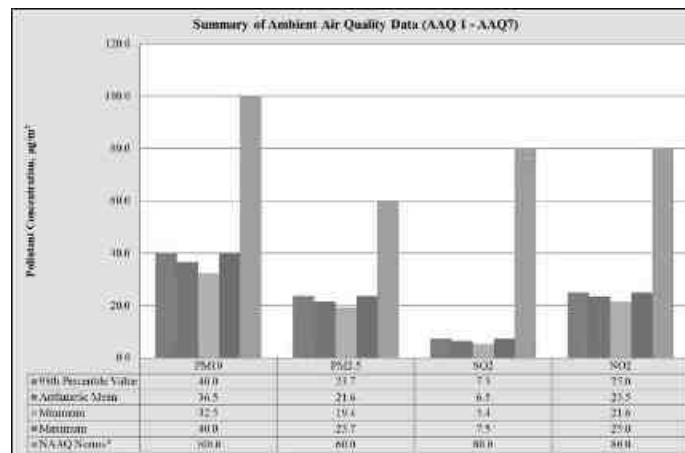
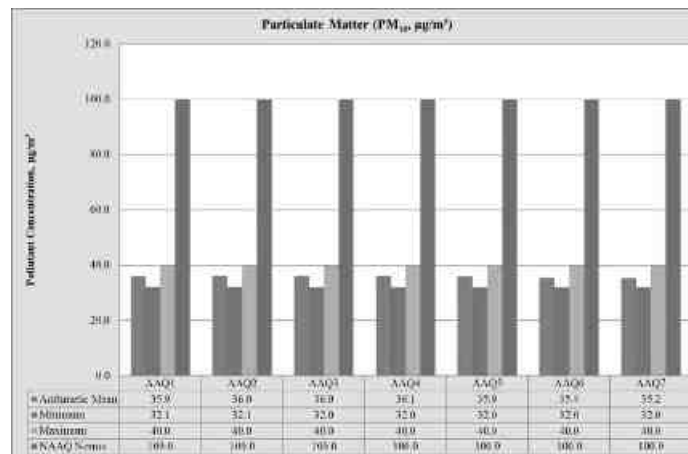
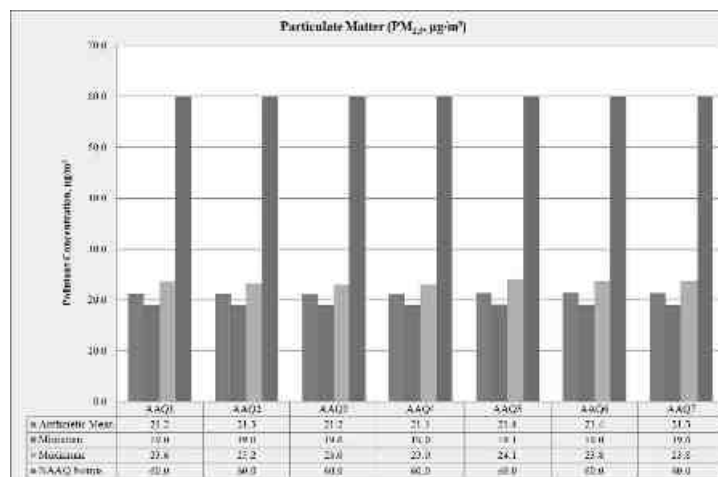
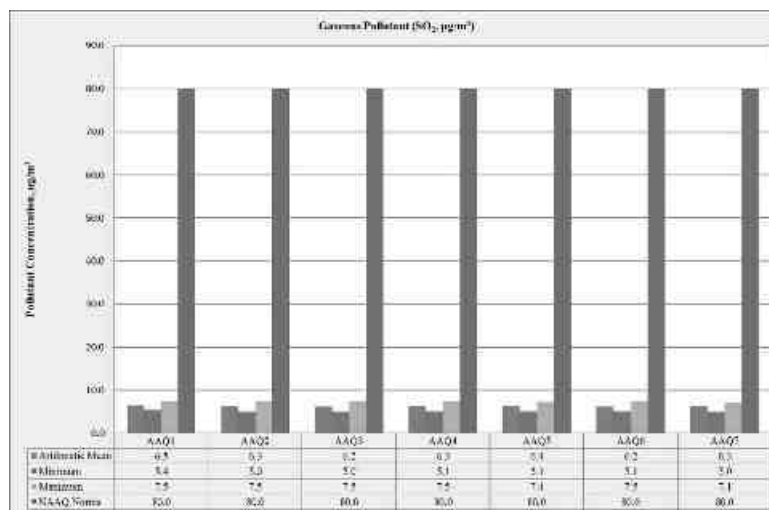
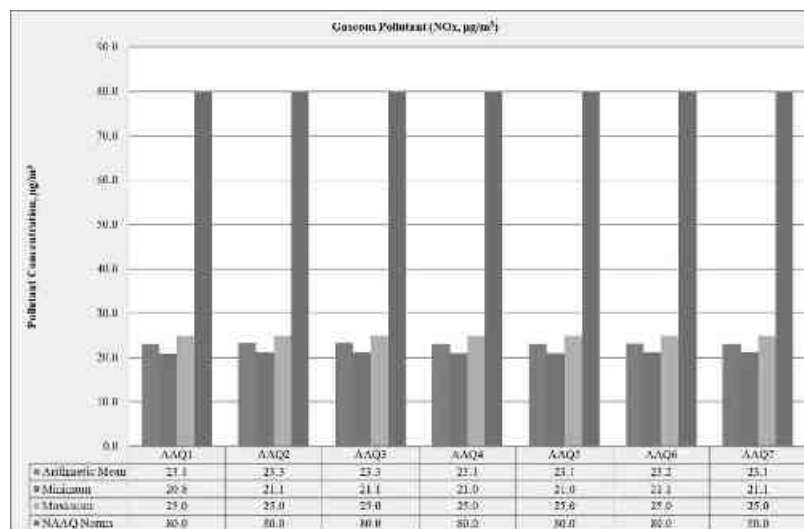
FIGURE 3.13: BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ7**FIGURE 3.14: BAR DIAGRAM OF PARTICULATE MATTER PM_{2.5}****FIGURE 3.15: BAR DIAGRAM OF PARTICULATE MATTER PM₁₀**

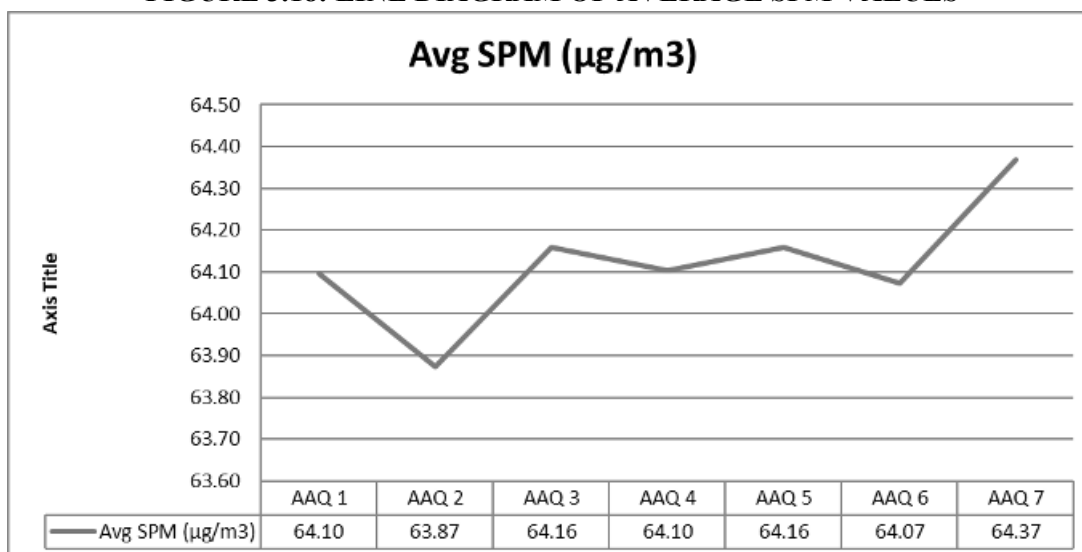
FIGURE 3.16: BAR DIAGRAM OF GASEOUS POLLUTANT SO₂**FIGURE 3.17: BAR DIAGRAM OF GASEOUS POLLUTANT NO_x**

3.3.7 Fugitive Dust Emission –

Fugitive dust was recorded at 7AAQ monitoring stations for 30 days average during the study period.

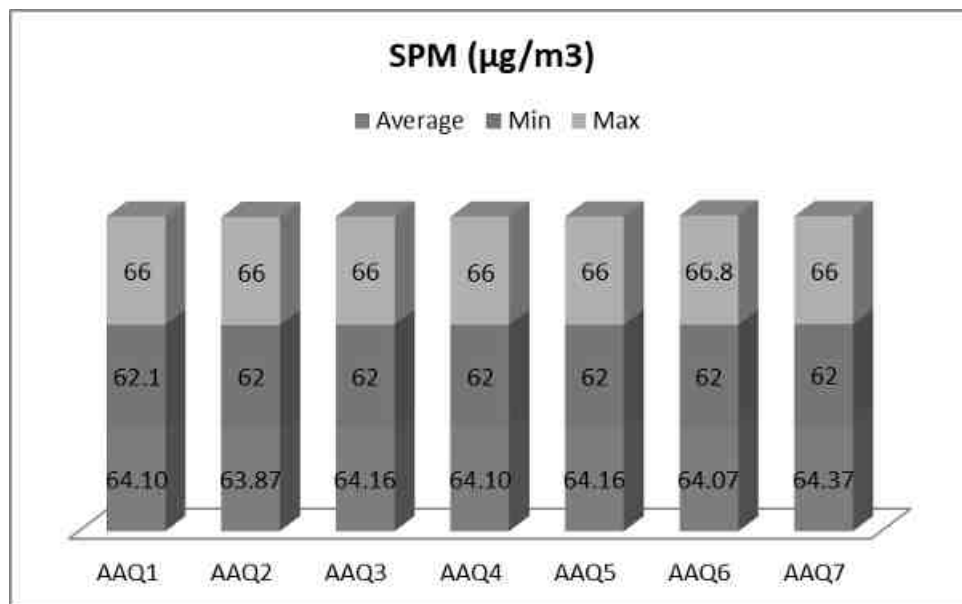
TABLE 3.20: AVERAGE FUGITIVE DUST SAMPLE VALUES

AAQ Locations	Avg SPM (µg/m ³)
AAQ 1	64.10
AAQ 2	63.87
AAQ 3	64.16
AAQ 4	64.10
AAQ 5	64.16
AAQ 6	64.07
AAQ7	64.37

FIGURE 3.18: LINE DIAGRAM OF AVERAGE SPM VALUES**TABLE 3.21: FUGITIVE DUST SAMPLE VALUES IN µg/m³**

SPM (µg/m³)	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Average	64.10	63.87	64.16	64.10	64.16	64.07	64.37
Min	62.1	62	62	62	62	62	62
Max	66	66	66	66	66	66.8	66

Source: Calculations from Lab Analysis Reports

FIGURE 3.19: BAR DIAGRAM OF SPM VALUES

3.3.6 Interpretations & Conclusion

As per monitoring data, PM₁₀ ranges from 32.0 to 40.0 µg/m³, PM_{2.5} data ranges from 19.0 to 24.1 µg/m³, SO₂ ranges from 5.0 to 7.5 µg/m³ and NO₂ data ranges from 20.8 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.

3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in study area, the environmental assessment of noise from the mining activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses, and annoyance and general community responses. The main objective of noise monitoring in the study area is to establish the baseline noise level and assess the impact of the total noise expected to be generated during the project operations around the project site.

3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Seven (7) locations. The noise level measurement was carried out at each ambient air quality station. The main aim of the noise level monitoring is

- To assess the ambient Noise level in the study area
- Type of noise pollution generated in the core zone
- To predict the temporal changes in the ambient noise level in the area

The noise level monitoring locations were carried out by covering commercial, residential, rural areas within the radius of 10km. A noise monitoring methodology was chosen such that it best suited the purpose and objectives of the study.

TABLE 3.22: DETAILS OF SURFACE NOISE MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	N-1	Core Zone	Project Area	12°45'26.01"N 77°57'16.57"E
2	N-2	Near Existing Quarry	440m SW	12°45'19.23"N 77°57'0.86"E
3	N-3	Athimugam Near School	2.4km SE	12°44'52.71"N 77°58'37.51"E
4	N-4	Berigai	5.4km NE	12°48'9.49"N 77°58'5.90"E
5	N-5	Muthalli	4.8km West	12°45'45.91"N 77°54'38.51"E
6	N-6	Ettipalligutta	6km East	12°44'50.55"N 78° 0'36.71"E
7	N-7	Thippapalli	4km SW	12°43'10.20"N 77°56'55.60"E

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS.

3.4.2 Method of Monitoring

Digital Sound Level Meter was used for the study. All reading was taken on the 'A-Weighting' frequency network, at a height of 1.5 meters from ground level. The sound level meter does not give a steady and consistent reading and it is quite difficult to assess the actual sound level over the entire monitoring period. To mitigate this shortcoming, the Continuous Equivalent Sound level, indicated by L_{eq} , is used. Equivalent sound level, ' L_{eq} ', can

be obtained from variable sound pressure level, 'L', over a time period by using following equation. The equivalent noise level is defined mathematically as,

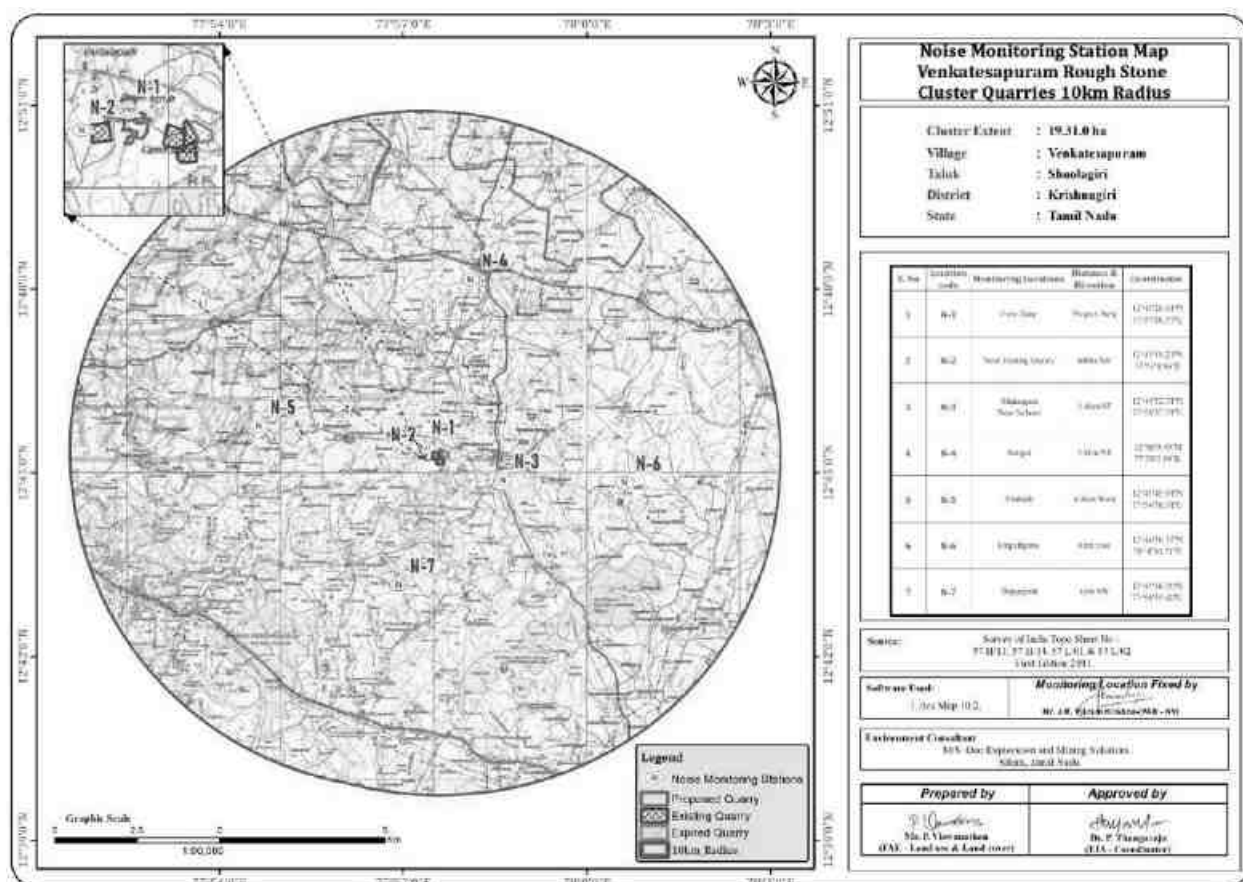
$$Leq = 10 \log L / T \sum (10L_n/10)$$

Where L = Sound pressure level at function of time dB (A)

T = Time interval of observation

Measured noise levels, displayed as a function of time, is useful for describing the acoustical climate of the community. Noise levels recorded at each station with a time interval of about 60minutes are computed for equivalent noise levels. Equivalent noise level is a single number descriptor for describing time varying noise levels.

FIGURE 3.20: NOISE MONITORING STATIONS AROUND 10 KM RADIUS



3.4.3 Analysis of Ambient Noise Level in the Study Area

The Digital Sound pressure level has been measured by a sound level meter (Model: HTC SL-1352)

An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time. The results are presented in below Table 3.23.

Day time: 6:00 hours to 22.00 hours.

Night time: 22:00 hours to 6.00 hours.

TABLE 3.23: AMBIENT NOISE QUALITY RESULT

S. No	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
1	Core Zone	49.6	41.8	Industrial

				Day Time- 75 dB (A) Night Time- 70 dB (A)
2	Near Existing Quarry	48.6	44.4	Residential Day Time- 55 dB (A) Night Time- 45 dB (A)
3	Athimugam Near School	50.1	43.9	
4	Berigai	51.2	44.2	
5	Muthalli	53.6	47.1	
6	Ettipalligutta	54.1	45.7	
7	Thippapalli	50.7	44.0	

Source: On-site monitoring/sampling by CHENNAI METTEX LAB PRIVATE LIMITED in association with GEMS.

FIGURE 3.21: DAY TIME NOISE LEVELS IN CORE AND BUFFER ZONE

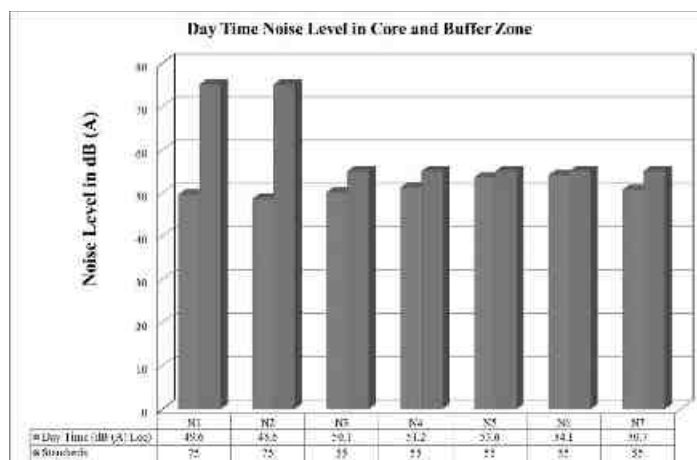
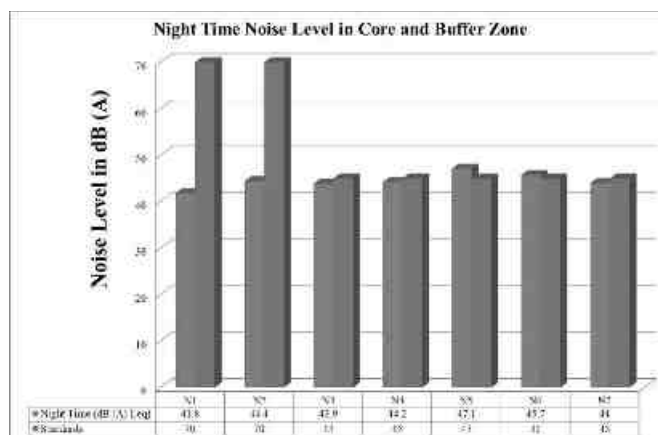


FIGURE 3.22: NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE



3.4.4 Interpretation & Conclusion:

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 49.6 dB (A) Leq and during night time were from 41.8 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 48.6 – 54.1 dB (A) Leq and during night time were from 43.9 – 47.1 dB (A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.5 BIOLOGICAL ENVIRONMENT

3.1. Study area Ecology

The core area extent of 3.00.0Ha of two proposed Rough stone quarry has an impact on the diversity of flora and fauna of the surrounding area. But present work was carried out on the detailed study of the impacts of the Rough stone quarry on the ecology and biodiversity of the core lease area with the proper mitigation and sustainable management plan. The proposed area applied area is situated in hilly terrain. The following methods were applied during the baseline study of flora, fauna, and diversity assessment.

3.2. Objectives of Biological Studies

- a) To study the likely impact of the proposed mining project on the local biodiversity and to suggest mitigation measures, if required, for vulnerable biota.
- b) Undertake intensive field survey to assess the status of floral & faunal component in different habitats in the core and buffer areas of the project site.
- c) Identification and listing of flora and fauna which are important as per the Wildlife (Protection) Act 1972
- d) Suggest Wildlife conservation (species specific/habitat specific) and management plan for the threatened (critically endangered & endangered species - schedule I) faunal species if any reported within the study area as per the Wildlife (Protection) Amendment Act 2022.
- e) To identify the impacts of mining on agricultural lands and how it affects.
- f) Proper collection of information about wildlife Sanctuaries/ national parks/ biosphere reserves of the project area.
- g) Devise management & conservation measures for biodiversity.

3.3. Methodology of Sampling

Identification of vegetation in relation to the natural flora and crops was conducted through reconnaissance field surveys and onsite observations in core and buffer zone. The plant species identification was done based on the reference materials and also by examining the morphological characteristics and reproductive materials i.e., flowers, fruits and seeds. Land use pattern in relation to agriculture crop varieties were identified through physical verification of land and interaction with local villagers.

The faunal elements (animal species) of core and buffer zone were identified by direct sightings or indirect evidences viz. pug marks, skeletal remains, scats and droppings etc. (Jayson and Easa 2004). Standard binocular was used for the observations. The authenticity of faunal elements occurrence was confirmed by interaction with the local people. Avifauna identification was done with pictorial descriptions of published literature. Information pertaining to existence of any migratory corridors and paths were obtained from local inhabitants. The status of each faunal element was determined and the Wildlife schedule category was ascertained as per the IUCN-Red Data Book and Indian wildlife (Protection) Amendment Act, 2022.

Plot method is used in the floral documentation in the core and buffer zone. For trees (10x10-m), shrubs (5x5-m) and herbs (1x1-m) plots were taken. Birds and butterflies were mainly focused during faunal assessment, transect method was employed for birds and butterflies. Transect is a path along which one counts and records the occurrence of an individual for study. A straight-line walk covering desired distance, within a time span of one

hour to 30 minutes was carried out in the proposed region. Bird species were recorded during the hours of peak activity. 0700 to 1100 Hrs and 1430 to 1730 Hrs (Bibby et al. 2000).

Direct observations and bird calls were used for bird documentation. Same transects were used for counting butterflies. Opportunistic observations were made for Amphibians, reptiles and ordinales. Presence of mammals was recorded by direct and indirect signs. All possible transects were taken for birds and butterflies. Birds and butterflies were classified into species level. Recorded bird species were identified to species level using standard books (Ali & Ripley 1987, Grimmett et al., 2016).

3.3.1. Sampling

A stratified simple random sampling procedure was employed to obtain a sample from study area. The study area was further stratified in different land use/ecosystems.

3.3.2. Sampling Size

Keeping in mind both random sampling technique and covering all land use patterns for the study following sampling locations were chosen depending up on the area of the proposed site.

3.3.3. Timing of Study

The study was carried out during morning and evening hours, to cover the different activity phases for important species such as time resting, feeding, hunting, and daily movements.

3.3.4. Observations from Sampling

The various observations relating to flora and fauna species are discussed in detail below, in separate sections.

3.3.5. Equipment/ References

- Canon Mark III Camera with 50-500mm lens– Snap shots taken
- Leica Binoculars (8x 20) to spot/identify species
- IUCN Red Data Book – <https://www.iucnredlist.org/species>

Ornithological/Entomological/Herpetological/Mammalian catalogues and pictorial descriptions from various authors and websites are followed for species identification.

3.4. Part I Field Sampling Techniques

3.4.1. Transect walk – Birds

Six no transect lines with varying length (100m-300m) and fixed width (2m) were laid which cuts through the core and buffer areas of proposed site. The transect surveys were conducted from 0700 to 1100Hrs and 1430 to 1730Hrs (Bibby et al. 2000). All avifauna found along these transects were recorded for analysing the data. Counts were conducted while there is no heavy rain, mist or strong wind.

3.4.2. Modified Pollard Walk – for Butterflies

The Modified Pollard Walk (Pollard 1977, 1993, Walpole 1999) using fixed width transect walk method were employed to investigate butterfly spatial distribution, diversity and abundance at the different survey sites.

3.4.3. Visual Encounter Survey (VES) - reptiles and amphibians

VES is a time-constrained sampling technique (Campbell and Christman, 1982; Corn and Bury, 1990). It needs a systematic search through an area or habitat for a prescribed time period (Campbell and Christman, 1982). The result of VES is measured against the time spent for search. VES technique is one of the simplest methods, and an appropriate technique for both inventory and monitoring Herpetofauna (Heyer et al. 1994).

3.4.4. Observational methods- Mammals

For the purpose of recording mammals, we used two different observational techniques: (1) direct observations, and (2) recording of occurrences like holes, markings, scats, hairs, and spines (Menon 2003). For identification confirmations, photographs with a scale reference were used, and locations were recorded using a portable GPS device. Indigenous knowledge particularly that of the locals, was occasionally employed to compile a preliminary list of species and/or aid in the recognition of indicators.

3.4.5. Multiple Stage Quadrat – Vegetation

A variety of habitat or vegetation structure variables were measured using the Multiple Stage Quadrat sampling protocol (Sykes and Horrill 1977). All of those areas were sampled, and the major corners were temporarily delineated with colored ribbons. Each site was identified in the field using a compass and clinometer, and the plot's latitude, longitude, and elevation were recorded using a handheld Global Positioning System (Garmin 12XL).

3.5. Flora

The quadrat sampling technique was used for sampling vegetation. Sampling quadrats of the regular shape of dimensions 10×10 m, 5×5 m, and 1×1 m, were nested within each other and were defined as the units for sampling the area and measuring the diversity of trees, Shrubs, and herbs respectively.

TABLE 3.24: FLORA IN THE CORE ZONE

Sl.No	English Name	Vernacular Name	Scientific Name	Family Name	IUCN Red List
Trees					
1.	Indian mulberry	Nuna maram	<i>Morinda tinctoria</i>	Rubiaceae	NE
2.	Neem	Vembu maram	<i>Azadirachta indica</i>	Meliaceae	LC
3.	Pala indigo	Paalai Maram	<i>Wrightia tinctoria</i>	Apocynaceae	LC
4.	Indian elm	Ayya maram	<i>Holoptelea integrifolia</i>	Ulmaceae	LC
5.	Velvet mesquite	Mullu maram	<i>Neltuma juliflora</i>	Fabaceae	LC
6.	Indian jujube	Elanthai	<i>Ziziphus mauritiana</i>	Rhamnaceae	LC
7.	Triangular spurge	Sadhurakalli	<i>Euphorbia antiquorum</i>	Euphorbiaceae	LC
8.	Bitter Albizia	Arappu	<i>Albizia amara</i>	Fabaceae	LC
9.	Pongamia pinnata	Pungam	<i>Millettia pinnata</i>	Fabaceae	LC
10.	Silver Bush	Kattuppurachu	<i>Mundulea sericea</i>	Fabaceae	LC
Shrubs					
1.	Avaram	Avarai	<i>Senna auriculata</i>	Fabaceae	LC
2.	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	NE
3.	Broadleaf hopbush	Virali	<i>Dodonaea viscosa</i>	Sapindaceae	LC
4.	Coromandel Canthium	Mullu karai	<i>Canthium coromandelicum</i>	Rubiaceae	NE
5.	West Indian Lantana	Unni chedi	<i>Lantana camara</i>	Verbenaceae	NE
6.	Wild Egg Plant	Kantkari	<i>Solanum xanthocarpum</i>	Solanaceae	NE

7.	Siam weed	Communist pacha	<i>Chromolaena odorata</i>	Asteraceae	NE
8.	Columnar Cactus	Sippaikaathaalai	<i>Cereus pterogonus</i>	Cactaceae	NE
9.	Mexican prickly poppy	Bramathndu	<i>Argemone mexicana</i>	Papaveraceae	NE
Herbs					
1.	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae	NE
2.	Fish poison	Kolinch	<i>Tephrosia purpurea</i>	Fabaceae	NE
3.	Coat buttons	Thatha poo	<i>Tridax procumbens</i>	Asteraceae	NE
4.	chaff-flower	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	NE
5.	Ban tulsi	Reilpoond	<i>Croton bonplandianus</i>	Euphorbiaceae	NE
6.	Century plant	Agave	<i>Agave americana</i>	Agavaceae	LC
Creepers & Climbers					
1.	Stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	NE
Grasses					
1.	Great brome	Thodappam	<i>Bromus diandrus</i>	Poaceae	NE
2.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae	NE
3.		Nimbe hullu	<i>Cymbopogon coloratus</i>	Poaceae	NE
4.	Rose natal grass	Rose natal grass	<i>Melinis repens</i>	Poaceae	NE

3.5.1. Flora Composition in the Core Zone

Taxonomically a total of 30 species belonging to 18 families have been recorded from the core mining lease area. The proposed area applied area exhibits hilly terrain. This land is fit for vegetation and cultivation. Based on the habitat classification of the enumerated plants the majority of species were Trees 10, Shrubs 9, Herbs 6 followed by Grasses 4, and Creepers/Climbers 1. No species found as threatened category.

FIGURE 3.23: GRAPH SHOWING % DISTRIBUTION OF FLORAL LIFE FORMS (CORE ZONE)

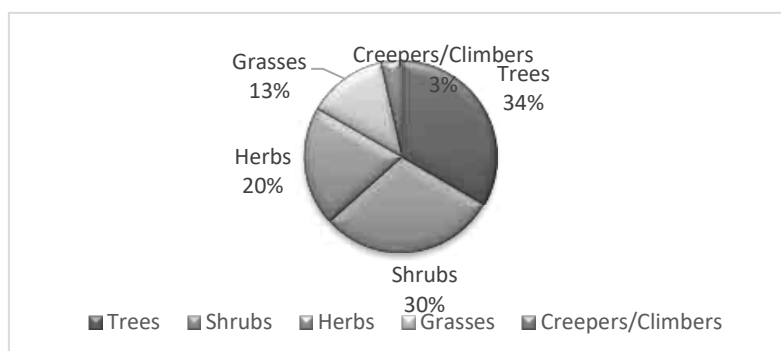
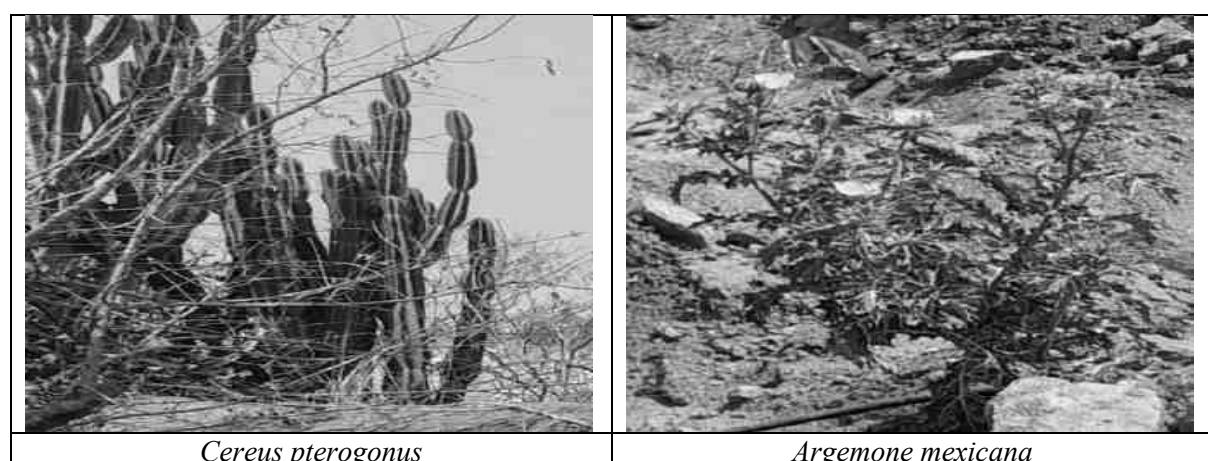


FIGURE 3.24: FLORAL SPECIES OBSERVATION IN THE CORE ZONE AREA



	
<i>Euphorbia antiquorum</i>	<i>Morinda tinctoria</i>
	
<i>Albizia amara</i>	<i>Canthium coromandelicum</i>
	
<i>Wrightia tinctoria</i>	<i>Neltuma juliflora</i>
	
<i>Senna auriculata</i>	<i>Chromolaena odorata</i>

	
<i>Pongamia pinnata</i>	<i>Lantana camara</i>
	
<i>Mundulea suberosa</i>	<i>Holoptelea integrifolia</i>
	
<i>Parthenium hysterophorus</i>	<i>Dodonia viscosa</i>
	
<i>Tall Grass</i>	<i>Stachytarpheta cayennensis</i>

TABLE 3.25: FLORA IN BUFFER ZONE

Sl.No	English Name	Vernacular Name	Scientific Name	Family Name	IUCN Red List
Trees					
1.	Velvet mesquite	Mullu maram	<i>Neltuma juliflora</i>	Fabaceae	LC
2.	Coconut	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	NE
3.	Mango	Manga	<i>Mangifera indica</i>	Anacardiaceae	DD
4.	Yellow oleander	Ponarali	<i>Cascabela thevetia</i>	Apocynaceae	LC
5.	Gum arabic tree	Karuvelam	<i>Vachellia nilotica</i>	Fabaceae	LC
6.	River tamarind	Soundal maram	<i>Leucaena leucocephala</i>	Fabaceae	NE
7.	Lemon	Ezhumuchaipalam	<i>Citrus lemon</i>	Rutaceae	NE
8.	Monkey pod tree	Thungumoonchi	<i>Samanea saman</i>	Fabaceae	LC
9.	Indian-almond	Padam	<i>Terminalia catappa</i>	Combretaceae	LC
10.	Portia tree	Poovarasam	<i>Thespesia Populnea</i>	Malvaceae	LC
11.	Bitter Albizia	Arrapu	<i>Albizia amara</i>	Mimosaceae	LC
12.	Yellow Flame	Manjal kondrai	<i>Peltophorum pterocarpum</i>	Caesalpiniaceae	LC
13.	Indian mulberry	Nuna maram	<i>Morinda tinctoria</i>	Rubiaceae	NE
14.	Neem or Indian lilac	Vembu	<i>Azadirachta indica</i>	Meliaceae	LC
15.	Asian Palmyra palm	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	LC
16.	Golden shower tree	Sarakonnai	<i>Cassia fistula</i>	Caesalpiniaceae	LC
17.	Guava	Koyya	<i>Psidium guajava</i>	Myrtaceae	LC
18.	Curry tree Plant	Karuveppilai	<i>Murraya koenigii</i>	Rutaceae	LC
19.	Jamun Fruit Plant	Naval maram	<i>Syzygium cumini</i>	Myrtaceae	LC
20.	Eucalyptus	Thailam maram	<i>Eucalyptus tereticornis</i>	Myrtaceae	LC
21.	Drumstick tree	Murunga maram	<i>Moringa oleifera</i>	Moringaceae	LC
22.	Madras thorn	Kudukapuli	<i>Pithecellobium dulce</i>	Fabaceae	LC
23.	Tamarind	Puliyamaram	<i>Tamarindus indica</i>	Legumes	LC
24.	Peepal	Asoka maram	<i>Ficus religiosa</i>	Legumes	LC
25.	Butter Tree	Kattu illupai	<i>Madhuca indica</i>	Sapotaceae	NE
26.	Henna	Marudaani	<i>Lawsonia inermis</i>	Lythraceae	LC
27.	Indian gooseberry	Nelli	<i>Phyllanthus emblica</i>	Phyllanthaceae	LC
28.	Horsetail She-oak	Savukku maram	<i>Casuarina equisetifolia</i>	Casuarinaceae	LC
29.	Sacred fig	Arasa maram	<i>Ficus religiosa</i>	Moraceae	LC
30.	Malayan Cherry	Ten Pazham	<i>Muntingia calabura</i>	Muntingiaceae	LC
31.	Banana tree	Vazhaimaram	<i>Musa paradisiaca</i>	Musaceae	LC
32.	Jujube Trees	Elantha Pazham	<i>Ziziphus Mauritiana</i>	Rhamnaceae	LC

33.	Papaya	Pappali maram	<i>Carica papaya</i>	Caricaceae	DD
34.	Manilkara zapota	Sapotas	<i>Manilkara zapota</i>	Sapotaceae	LC
35.	Custard apple	Seethapazham	<i>Annona reticulata</i>	Annonaceae	LC
36.	Indian elm	Ayya maram	<i>Holoptelea integrifolia</i>	Ulmaceae	LC
37.	Pongamia pinnata	Pungam	<i>Millettia pinnata</i>	Fabaceae	LC
38.	Banyan tree	Alamaram	<i>Ficus benghalensis</i>	Moraceae	NE
39.	Pala indigo	Paalai Maram	<i>Wrightia tinctoria</i>	Apocynaceae	LC
40.	Flame Tree	Vathanarana maram	<i>Delonix Elata</i>	Fabaceae	LC
41.	Indian Tree of Heaven	Perumaram	<i>Ailanthus excelsa</i>	Simaroubaceae	DD
42.	Siris Tree	Vagai	<i>Albizia lebbek</i>	Mimosaceae	LC
43.	Indian Kanchan	Aathi	<i>Bauhinia racemosa</i>	Fabaceae	LC
44.	Mountain Pomegranate	Mathukkaarai	<i>Catunaregam spinosa</i>	Rubiaceae	LC
45.	Red Gulmohar	Mayilkonrai	<i>Delonix regia</i>	Caesalpiniaceae	LC
46.	Vidathalan	Bell mimosa	<i>Dichrostachys cinerea</i>	Mimosaceae	LC
47.	Mountain Persimmon	Vakkanai maram	<i>Diospyros cordifolia</i>	Ebenaceae	NE
48.	Hpbush	Virali	<i>Dodonaea viscosa</i>	Sapindaceae	NE
49.	Triangular spurge	Sadhurakalli	<i>Euphorbia antiquorum</i>	Euphorbiaceae	LC
50.	Asian Bushbeech	Mulkumil	<i>Gmelina asiatica</i>	Lamiaceae	LC
51.	Curcas nut	Kattukottai	<i>Jatropha curcas</i>	Euphorbiaceae	NE
52.	Bastard Satin wood	Vellaipurasu	<i>Mundulea suberosa</i>	Caesalpiniaceae	NE
53.	Nerium	Sevvarali	<i>Nerium oleander</i>	Apocynaceae	LC
54.	Wild Date Palm	Eechamaram	<i>Phoenix sylvestris</i>	Arecaceae	NE
55.	Paradise tree	Sorga maram	<i>Simarouba glauca</i>	Simaroubaceae	LC
56.	White bark acacia	Velvelam	<i>Vachellia leucophloea</i>	Mimosaceae	LC
Shrubs					
1.	Thornapple	Umathai	<i>Datura stramonium</i>	Solanaceae	NE
2.	Senna Coffee	Payaveri	<i>Cassia occidentalis</i>	Caesalpiniaceae	LC
3.	Green amaranth	Kuppaikerai	<i>Amaranthus vividis</i>	Amaranthaceae	NE
4.	Avaram	Avarai	<i>Senna auriculata</i>	Fabaceae	LC
5.	Castor bean	Amanakku	<i>Ricinus communis</i>	Euphorbiaceae	LC
6.	Devil's claw	Thael kodukkukai	<i>Martynia annua</i>	Pedaliaceae	NE
7.	Horn of Plenty	Karu Umathai	<i>Datura metel</i>	Solanaceae	NE
8.	Indian Oleander	Arali	<i>Nerium indicum</i>	Apocynaceae	NE
9.	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	NE
10.	Indian mallow	Thuthi	<i>Abutilon indicum</i>	Meliaceae	NE
11.	Mexican prickly poppy	Bramathndu	<i>Argemone mexicana</i>	Papaveraceae	NE

12.	Clustered Morning Glory	Onan kodi	<i>Ipomoea staphylina</i>	Convolvulaceae	NE
13.	Cypress vine	Mayil maanikam	<i>Ipomoea quamoclit</i>	Convolvulaceae	NE
14.	Malabar catmint	Pei veratti	<i>Anisomeles malabarica</i>	Lamiaceae	NE
15.	Dwarf Heliotrope	Theelkoduku	<i>Heliotropium supinum</i>	Boraginaceae	NE
16.	Night shade plan	Sundaika	<i>Solanum torvum</i>	Solanaceae	NE
17.	Touch-me-not	Thottalchinungi	<i>Mimosa pudica</i>	Mimosaceae	LC
18.	Puriging nut	Kattamanakku	<i>Jatropha curcas</i>	Euphorbiaceae	LC
19.	West Indian Lantana	Unni chedi	<i>Lantana camara</i>	Verbenaceae	NE
20.	Rosary pea	Kundumani	<i>Abrus precatorius</i>	Fabaceae	NE
21.	Rough cocklebur	Marlumuttu	<i>Xanthium indicum</i>	Asteraceae	NE
22.	Century Plant	Aanai Kathalai	<i>Agave americana</i>	Asparagaceae	LC
23.	Hopehead	Rosemullippoondur	<i>Barleria buxifolia</i>	Acanthaceae	NE
24.	Peacock flower	Mayil konnay	<i>Caesalpinia pulcherrima</i>	Fabaceae	LC
25.	Coromandel Canthium	Mullukkarai	<i>Canthium coromandelicum</i>	Rubiaceae	NE
26.	Columnar Cactus	Sippaai kathaalai	<i>Cereus pterogonus</i>	Cactaceae	NE
27.	Siam weed	Communist pacha	<i>Chromolaena odorata</i>	Asteraceae	NE
28.	Ink Berry	Sirungattukodi	<i>Cocculus hirsutus</i>	Menispermaceae	NE
29.	Ding Ding	KilukilikkI	<i>Crotalaria pallida</i>	Fabaceae	NE
30.	Spinous Fluggea	Vellaipula	<i>Flueggea leucopyrus</i>	Phyllanthaceae	LC
31.	Cotton leaf	Aatalai	<i>Jatropha gossypifolia</i>	Euphorbiaceae	LC
32.	American Mint	Nattapoochedi	<i>Mesosphaerum suaveolens</i>	Lamiaceae	NE
33.	Three lobed False Mallow	Peramutti	<i>Pavonia odorata</i>	Malvaceae	NE
34.	Camp Siege	Karindu	<i>Pterolobium hexapetalum</i>	Caesalpiniaceae	NE
35.	Sweethearts	Adai-otti	<i>Pupalia lappacea</i>	Amaranthaceae	LC
36.	Country Mallow	Nilatutti	<i>Sida cordifolia</i>	Malvaceae	NE
37.	Horn bean leaved sida	Ariva-mooku keera	<i>Sida acuta</i>	Malvaceae	NE
38.	Blue snakeweed	Seemai Nayuruvi	<i>Stachytarpheta cayennensis</i>	Verbenaceae	NE
39.	Boater Bush	Sengalipundu	<i>Waltheria indica</i>	Malvaceae	LC
40.	Burweed	Ottarachedi	<i>Xanthium strumarium</i>	Asteraceae	NE
Herbs					
1.	Indian Mercury	Kuppamani	<i>Acalypha indica</i>	Euphorbiaceae	NE
2.	Sessile Joyweed	Ponnankanni	<i>Alternanthera sessilis</i>	Amaranthaceae	LC
3.	Billygoat weed	Pumpillu	<i>Ageratum conyzoides</i>	Asteraceae	LC
4.	Aloe barbadensis	Katrashai	<i>Aloe vera</i>	Asphodelaceae	NE
5.	Madagascar Periwinkle	Nithyakalyani	<i>Catharanthus roseus</i>	Apocynaceae	NE
6.	Spiny amaranth	Mullu keera	<i>Amaranthus spinosus</i>	Amaranthaceae	NE
7.	Indian nettle	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae	NE

8.	Mexican prickly poppy	Mullu umathai	<i>Argemone mexicana</i>	Papaveraceae	NE
9.	Spreading hogweed	Mookkaratti	<i>Boerhavia diffusa</i>	Nyctaginaceae	NE
10.	Mountain knot grass	Ciru-pulai	<i>Aerva lanata</i>	Amaranthaceae	NE
11.	Carrot grass	Partiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	NE
12.	Carry me seed	Kizhar nelli	<i>Phyllanthus amarus</i>	Phyllanthaceae	NE
13.	Malabar spinach	Pasalaikkeerai, Paasaangalli	<i>Basella alba</i>	Basellaceae	NE
14.	Yellow elder	Manjarali	<i>Tecoma stans</i>	Apocynaceae	LC
15.	Dwarf morning-glory	Vishnu kiranthi	<i>Evolvulus alsinoides</i>	Convolvulaceae	NE
16.	Datura metel	Oomathai	<i>Datura metel</i>	Solanaceae	NE
17.	Asthma-plant	Amman pacharisi	<i>Euphorbia hirta</i>	Euphorbiaceae	NE
18.	Black-jack	Mukkuthi	<i>Bidens pilosa</i>	Aizoaceae	NE
19.	Red Hogweed	Mukurattai	<i>Boerhavia diffusa</i>	Nyctaginaceae	NE
20.	Green amaranth	Kuppai keera	<i>Amaranthus viridis</i>	Amaranthaceae	NE
21.	Obscure Morning Glory	Siruthaali	<i>Ipomoea obscura</i>	Convolvulaceae	NE
22.	Cleome viscosa	Nai kadugu	<i>Celome viscosa</i>	Capparidaceae	NE
23.	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae	NE
24.	Century plant	Agave	<i>Agave americana</i>	Agavaceae	LC
25.	Fish poison	Kolunchi	<i>Tephrosia purpurea</i>	Papilionaceae	NE
26.	Elephant Climber	Kanvali poo	<i>Argyrea cuneata</i>	Convolvulaceae	NE
27.	Porcupine flower	Shemmuli	<i>Barleria prionitis</i>	Acanthaceae	NE
28.	Holy basil	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	NE
29.	Eggplant	Kathirikai	<i>Solanum melongena</i>	Solanaceae	NE
30.	European black nightshade	Manathakkali	<i>Solanum nigrum</i>	Solanaceae	NE
31.	Tridax daisy	Thatha poo	<i>Tridax procumbens</i>	Asteraceae	NE
32.	Gale of the wind	Keelaneeli	<i>Phyllanthus niruri</i>	Phyllanthaceae	NE
33.	Malabar catmint	Peymarutti	<i>Anisomeles malabarica</i>	Lamiaceae	NE
34.	Horn Spine	Kombumul	<i>Acanthospermum hispidum</i>	Asteraceae	NE
35.	Alyce clove	Alyce clove	<i>Alysicarpus longifolius</i>	Fabaceae	NE
36.	Spider Flower	Nallavellai	<i>Cleome gynandra</i>	Cleomaceae	NE
37.	Thick leaved lavender	Kalvalli	<i>Coleus strobilifer</i>	Lamiaceae	NE
38.	Dayflower	Kanavaazhai	<i>Commelina benghalensis</i>	Commelinaceae	LC
39.	Wild Jute	Talakkaippoond	<i>Corchorus trilobularis</i>	Malvaceae	NE
40.	Railway Weed	Reil poond	<i>Croton bonplandianum</i>	Euphorbiaceae	NE
41.	Purple fleabane	Sirusengalaner	<i>Cyanthillium cinereum</i>	Asteraceae	NE
42.	Three-flower beggarweed	Siru puladi	<i>Desmodium triflorum</i>	Fabaceae	LC
43.	Lobed leaf Mallow	Magathutthi	<i>Hibiscus lobatus</i>	Malvaceae	NE
44.	Lemon Basil	Naithulasi	<i>Ocimum americanum</i>	Lamiaceae	NE

45.	Naked Stem Carpetweed	Parpaadagam	<i>Paramollugo nudicaulis</i>	Molluginaceae	NE
46.	Teeth dropping Plant	Yanai nerunji	<i>Pedaliium murex</i>	Pedaliaceae	NE
47.	Febrifuge plant	Kandankathiri	<i>Solanum virginianum</i>	Solanaceae	NE
48.	Natthai choori	Thatharaa	<i>Spermacoce hispida</i>	Rubiaceae	NE
49.	Puncture Vine	Nerunji	<i>Tribulus terrestris</i>	Zygophyllaceae	LC
50.	Indian Borage	Kaasitthumbai	<i>Trichodesma indicum</i>	Boraginaceae	NE
Climber/ Creeper/Liana					
1.	Ivy gourd	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae	NE
2.	Stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	NE
3.	Wild water lemon	Sirupoonakaali	<i>Passiflora foetida</i>	Passifloraceae	NE
4.	Butterfly pea	Sangu poo	<i>Clitoria ternatea</i>	Fabaceae	NE
5.	Ink Berry	Sirungattukodi	<i>Cocculus hirsutus</i>	Menispermaceae	NE
6.	Smooth rattelpod	Kilu-Kiluppai	<i>Crotalaria pallida</i>	Fabaceae	NE
7.	Spreading caper	Toaratti	<i>Capparis divaricata</i>	Capparaceae	NE
8.	Balloon vine	Modakkathan	<i>Cardiospermum halicacabum</i>	Sapindaceae	LC
9.	Velvet Leaf Pareira	Ponmusutai	<i>Cissampelos pareira</i>	Menispermaceae	NE
10.	Arrow-leaf Morning Glory	Mutiyar-kuntal	<i>Merrimea tridentata</i>	Convolvulaceae	NE
11.	Trellis Vine	Veli Paruthi	<i>Pergularia daemia</i>	Apocynaceae	LC
Grass					
1.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae	NE
2.	Buffel grass	Erumaipul	<i>Cenchrus ciliaris</i>	Poaceae	LC
3.	Nut grass	Korai	<i>Cyperus rotandus</i>	Poaceae	NE
4.	Windmill grass	Chevvarakupul	<i>Chloris truncata</i>	Poaceae	NE
5.	Swollen windmill grass	Sevvaraguppul	<i>Chloris barbata</i>	Poaceae	NE
6.	Eragrostis	Pullu	<i>Eragrostis ferruginea</i>	Poaceae	NE
7.		Nimbe hullu	<i>Cymbopogon coloratus</i>	Poaceae	NE
8.	Henry's crabgrass	Southern Crabgrass	<i>Digitaria ciliaris</i>	Poaceae	NE
9.	Rose natal grass	Rose natal grass	<i>Melinis repens</i>	Poaceae	NE
10.	Stalked bur grass	Grass	<i>Tragus racemosus</i>	Poaceae	NE
Cactus					
1.	Prickly pear	Sappathikalli	<i>Opuntia dillenii</i>	Cactaceae	NE
2.	Triangular spruge	Chaturakalli	<i>Euphorbia antiquorum</i>	Euphorbiaceae	LC

3.5.2. Flora Composition in the Buffer Zone

Similar habitats may be found in the buffer area as well, although there is a wider variety of plants there than in the core zone area. The buffer zone study area contains a total of 169 species that have been recorded from the buffer zone. The floral (169) varieties of them Trees 56, herbs 50, shrubs 40, Climbers 11, Grasses 10, and Cactus 2 were identified. The result of the buffer zone of flora studies shows that Fabaceae and Poaceae is the main dominating species in the study area. There are no impacts due to this mining activity. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. Apart from the proposed project area, there is agricultural land. Horticulture and agricultural land are untouched. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. A list of floral species has been prepared based on a primary survey (site observations) and discussion with local people (Secondary data).

TABLE 3.26: NUMBER OF FLORAL LIFE FORMS IN THE STUDY AREA

S. No	Plant Life Form	Number of Species
1	Trees	56
2	Shrubs	40
3	Herbs	50
4	Climber/creepers/Liana	11
6	Grass	10
7	Cactus	2
Total No. of Species		169

FIGURE 3.25: GRAPH SHOWING % DISTRIBUTION OF FLORAL LIFE FORMS

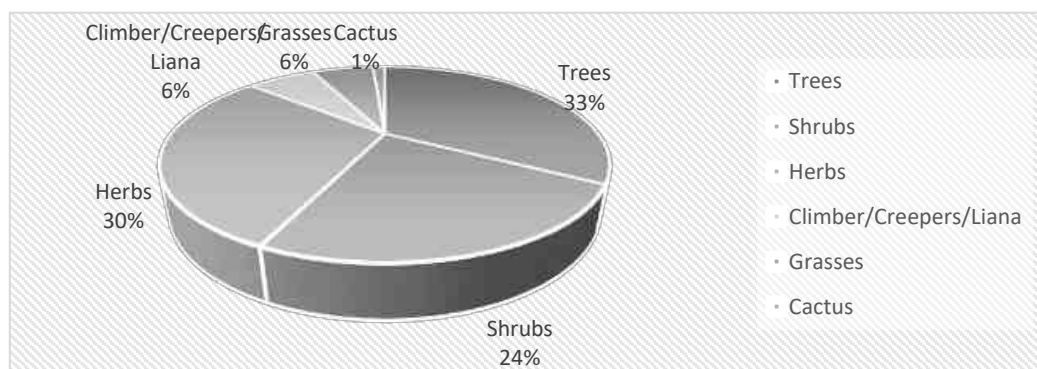


FIGURE 3.26: GRAPH SHOWING NUMBERS DISTRIBUTION OF FLORAL LIFE FORMS

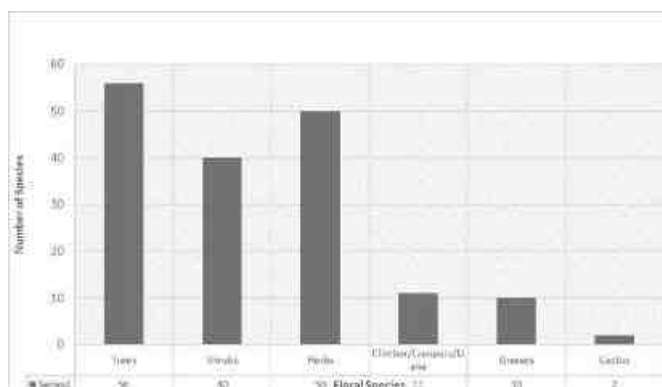
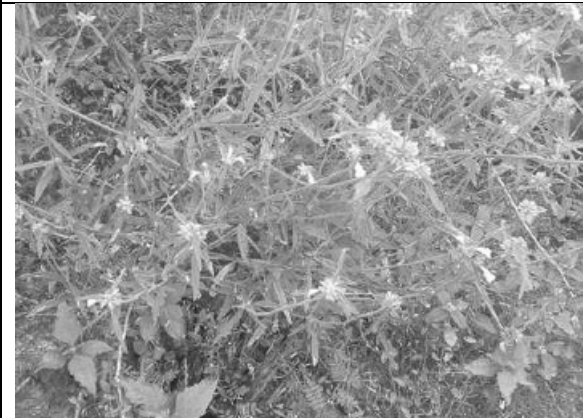
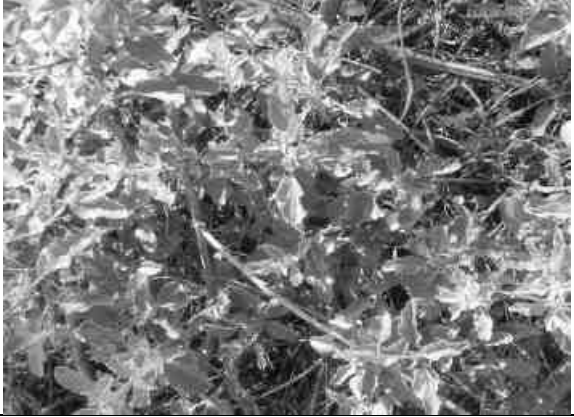
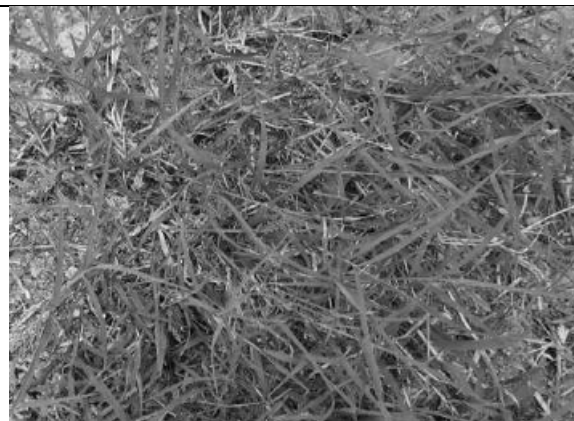
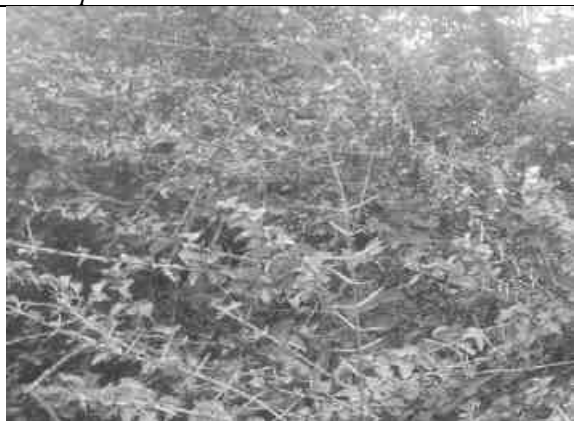
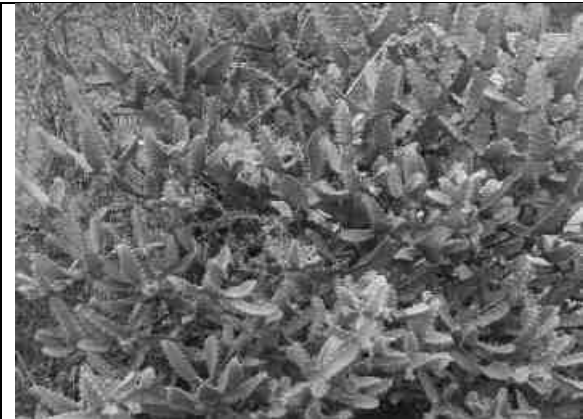


FIGURE 3.27: FLORA SPECIES OBSERVATION IN THE BUFFER ZONE AREA

	
<i>Abutilon indicum</i>	<i>Morinda tinctoria</i>
	
<i>Leucas aspera</i>	<i>Psidium guajava</i>
	
<i>Calotropis gigantea</i>	<i>Prosopis juliflora</i>
	

<i>Musa paradisiaca</i>	<i>Ziziphus Mauritiana</i>
	
<i>Chromolaena odorata</i>	<i>Ocimum tenuiflorum</i>
	
<i>Tamarindus indica</i>	<i>Albizia amara</i>
	
<i>Azadirachta indica</i>	<i>Wrightia tinctoria</i>
	
<i>Xanthium strumarium</i>	<i>Datura metel</i>

*Borassus flabellifer**Coccus Nucifera**Argemone mexicana**Mangifera indica**Lantana camara**Mesosphaerum suaveolens**Cynodon dactylon**Canthium coromandelicum*

	
<i>Euphorbia antiquorum</i>	<i>Agave americana</i>
	
<i>Thespesia Populnea</i>	<i>Holoptelea integrifolia</i>

3.5.3. The vegetation in the RF / PF areas, ecologically sensitive areas

Berigai Extn R.F., is located 310m on North side of the area followed by Athimugam R.F., is located 800m on South east side, Midethepalli R.F., is located 1.8km on North east side, Berigai R.F., is located 2.9km on North side, Nariganapuram R.F., is located 3.2km on South west side, Sanamavu R.F., is located 5.4km on South west side, Kodattur R.F., is located 8.35km on North east side and Gollapally R.F., is located 8.7km on North east side of the area. There are no protected (PF) forests either in the mine lease area or in the buffer zone. Thus, no forest land is involved in any manner. Hence, no certificate from the Forest department is required. There are no protected or ecologically sensitive areas such as National parks or Important Bird Areas (IBAs), or Wetlands or migratory routes of fauna or water bodies or human settlements within the proposed mine lease area. There are no Biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), or migratory routes of fauna. Thus, the area under study (Mine lease area and the 10 Km buffer zone) is not ecologically sensitive. It is away from the proposed project site.

Thus, no forest land is involved in any manner. Hence, no certificate from the Forest department is required. There are no impacts due to this mining activity. There are neither forests nor forest dwellers nor forest-dependent communities in the mine lease area. There shall be no forest-impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project.

3.6. Fauna

The faunal survey has been carried out as per the methodology cited and listed out Mammals, birds, Reptiles, Amphibians, and Butterflies. All the listed species were compared with Red Data Book and Indian

Wildlife Protection Act, 1972 / Indian Wildlife Protection Amendment Act, 2022. There are no rare, endangered, threatened (RET), and endemic species present in the core area.

3.6.1. Fauna Composition in the Core Zone

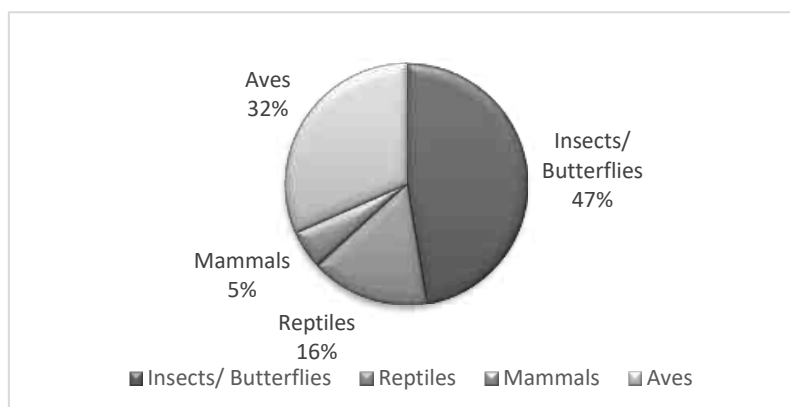
Core Zone: During the study, it was found that the faunal diversity in the core site was limited to Butterflies, insects, and some species of mammals & reptiles among them numbers Insects / Butterflies 9, Reptiles 3, Mammals 1, and Avian 6. The core site has avifauna species like crow, Black drongo, Common myna, etc. None of these species are threatened or endemic in the study area and surroundings. There is no Schedule I species observed in the Indian Wildlife Protection Amendment Act 2022. There are no critically endangered, endangered, vulnerable, and endemic species were observed.

TABLE 3.27: FAUNA IN CORE ZONE

Sl. No	Common Name	Scientific Name	Schedule list WLPC, Amendment Act, 2022	IUCN Red List
Insects/Butterflies				
1.	Common Tiger	<i>Danaus genutia</i>	---	NA
2.	Common rose	<i>Pachliopta aristolochiae</i>	---	LC
3.	Danaid Eggfly	<i>Hypolimnas misippus</i>	Schedule II	LC
4.	Grasshopper	<i>Hieroglyphus sp</i>	----	NA
5.	Dragonfly	<i>Ceratogomphus pictus</i>	---	LC
6.	Common Crow	<i>Euploea core</i>	---	LC
7.	Ant	<i>Camponotus Vicinus</i>	---	NA
8.	Slender Skimmer	<i>Orthetrum sabina</i>	---	LC
9.	Robber fly	<i>Triorla interrupta</i>	---	NA
Reptiles				
1.	Oriental garden lizard	<i>Calotes versicolor</i>	---	LC
2.	Indian forest skink	<i>Sphenomorphus indicus</i>	---	LC
3.	South Indian rock agama	<i>Psammophilus dorsalis</i>	---	LC
Mammals				
1.	Common rat	<i>Rattus rattus</i>	---	LC
Aves				
1.	Common myna	<i>Acridotheres tristis</i>	Schedule II	LC
2.	House sparrow	<i>Passer domesticus</i>	Schedule II	LC
3.	Indian robin	<i>Copsychus fulicatus</i>	Schedule II	LC
4.	Yellow-billed babbler	<i>Argya affinis</i>	Schedule II	LC
5.	Black drongo	<i>Dicrurus macrocercus</i>	Schedule II	LC
6.	House crow	<i>Corvus splendens</i>	---	LC

*NA- Not Applicable, *LC-Least Concern (**Sources:** Species observation in the field study)

FIGURE 3.28: DISTRIBUTION OF FAUNAL COMMUNITIES (CORE ZONE)



3.6.2. Fauna Composition in the Buffer Zone

As animals, especially vertebrates move from place to place in search of food, shelter, mate or other biological needs, separate lists for core and buffer areas are not feasible however, a separate list of fauna pertaining to core and buffer zone are listed separately. Though there are no reserved forests in the buffer zone. As such there are no chances of occurrence of any rare or endangered or endemic or threatened (REET) species within the core or buffer area.

There are no Sanctuaries, National Parks, Tiger Reserve or Biosphere reserves or Elephant Corridor or other protected areas within 10 km radius of from the core area. It is evident from the available records, reports, and circumstantial evidence that the entire study area including the core and buffer areas were free from any endangered animals. There were no resident birds other than common bird species such as Cattle egret, Asian Koel, House crow, Black drongos, Crows, Rose-ringed Parakeet etc.

Taxonomically a total of 90 species recorded were from the buffer zone area. Based on habitat classification the majority of species were Insects 9, followed by birds 41, Reptiles 7, Mammals 9, Amphibians 4, and Butterflies 20. A total of 41 species of bird were sighted in the study area. There are no critically endangered, endangered, vulnerable, and endemic species were observed. There are no impacts on nearby fauna species.

Dominant species are mostly birds, butterflies, and insects. There is no Schedule I Species in the study area. There are no critically endangered, endangered, vulnerable, and endemic species were observed.

TABLE 3.28: LIST OF FAUNA & THEIR CONSERVATION STATUS, MAMMALS: (*DIRECTLY SIGHTED ANIMALS & SECONDARY DATA)

Sl. No	Common Name	Scientific Name	Schedule list of Wildlife (Protection) Amendment Act, 2022	IUCN Red List
1.	Brown rat	<i>Rattus norvegicus</i>	---	NA
2.	Indian palm squirrel	<i>Funambulus palmarum</i>	---	LC
3.	Indian hare	<i>Lepus nigricollis</i>	Schedule II	LC
4.	Indian Field Mouse	<i>Mus booduga</i>	---	LC
5.	Domestic dog	<i>Canis familiaris</i>	---	NA
6.	Domestic cat	<i>Felis catus</i>	---	NA
7.	Domestic cattle	<i>Bos taurus</i>	---	NA
8.	Asian house shrew	<i>Suncus murinus</i>	---	LC

*NA- Not Applicable, *LC-Least Concern

TABLE 3.29: LISTED BIRDS (PRIMARY & SECONDARY DATA)

Sl. No	Common Name	Scientific Name	Schedule list The Wildlife (Protection) Amendment Act, 2022	IUCN Red List
1.	Yellow browed Bulbul	<i>Acrithillas indica</i>	Schedule II	LC
2.	Common myna	<i>Acridothores tristis</i>	Schedule II	LC
3.	Tawny pipit	<i>Anthus campestris</i>	Schedule II	LC

4.	Cattle egret	<i>Bubulcus ibis</i>	Schedule II	LC
5.	Indian roller	<i>Coracias benghalensis</i>	Schedule II	LC
6.	Greater Coucal	<i>Centropus sinensis</i>	Schedule II	LC
7.	Purple sunbird	<i>Cinnyris asiaticus</i>	Schedule II	LC
8.	Brown Shrike	<i>Lanius cristatus</i>	Schedule II	LC
9.	Black-rumped Flameback	<i>Dinopium benghalense</i>	Schedule II	LC
10.	Yellow wagtail	<i>Motacilla flava</i>	Schedule II	LC
11.	Spotted owl	<i>Athene brama</i>	Schedule II	LC
12.	Rose-ringed Parakeet	<i>Psittaculakrameria</i>	Schedule II	NA
13.	House Sparrow	<i>Passer domesticus</i>	Schedule II	LC
14.	Common Hawk Cuckoo	<i>Hieroccyx varius</i>	Schedule II	NA
15.	Ashy Drongo	<i>Dicrurus leucophaeus</i>	Schedule II	LC
16.	Spotted dove	<i>Streptopelia chinensis</i>	Schedule II	NA
17.	Asian koel	<i>Eudynamys scolopacea</i>	Schedule II	LC
18.	Common kingfisher	<i>Alcedo atthis</i>	Schedule II	LC
19.	White-thorated kingfisher	<i>Halcyon smyrnensis</i>	Schedule II	LC
20.	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Schedule II	LC
21.	Blue-rock pigeon	<i>Colomba livia</i>	---	NA
22.	House crow	<i>Corvus splendens</i>	---	LC
23.	Large-billed Crow	<i>Corvus macrorhynchos</i>	Schedule II	LC
24.	Black Drongo	<i>Dicrurus macrocercus</i>	Schedule II	LC
25.	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Schedule II	LC
26.	Yellow-billed Babbler	<i>Argya affinis</i>	Schedule II	LC
27.	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Schedule II	LC
28.	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	Schedule II	LC
29.	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Schedule II	LC
30.	Red-wattled Lapwing	<i>Vanellus indicus</i>	Schedule II	LC
31.	Indian Pond-Heron	<i>Ardeola grayii</i>	Schedule II	LC
32.	Black Kite	<i>Milvus migrans</i>	Schedule II	LC
33.	Common Tailorbird	<i>Orthotomus sutorius</i>	Schedule II	LC
34.	Ashy Prinia	<i>Prinia socialis</i>	Schedule II	LC
35.	Little Swift	<i>Apus affinis</i>	Schedule II	LC
36.	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Schedule II	LC
37.	Common Iora	<i>Aegithina tiphia</i>	Schedule II	LC
38.	Asian Tit (Cinereous)	<i>Parus cinereus</i>	Schedule II	NA
39.	Jerdon's Bushlark	<i>Plocealauda affinis</i>	Schedule II	LC
40.	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Schedule II	LC
41.	Indian White-eye	<i>Zosterops palpebrosus</i>	Schedule II	LC

*NA- Not Applicable, *LC-Least Concern

Direct observation & Secondary data, Source: ebird.org, Inaturalist.com, IUCN Red Data website

TABLE 3.30: LIST OF REPTILES EITHER SPOTTED OR REPORTED FROM THE STUDY AREA

Sl. No	Common Name	Scientific Name	Schedule list of Wildlife (Protection) Amendment Act, 2022	IUCN Red List
1.	Oriental garden lizard	<i>Calotes versicolor</i>	---	LC
2.	Rock Dragon	<i>Psammophilus dorsalis</i>		LC
3.	Common krait	<i>Bungarus caeruleus</i>	---	LC
4.	House lizards	<i>Hemidactylus flaviviridis</i>	---	LC
5.	Leschenault's leaf-toed gecko	<i>Hemidactylus leschenaultii</i>		LC
6.	Dussumier's Litter Skink	<i>Sphenomorphus dussumieri</i>		LC
7.	Common skink	<i>Mabuya carinatus</i>	---	NA

*NA- Not Applicable, *LC-Least Concern

TABLE 3.31: LIST OF BUTTERFLIES REPORTED FROM THE STUDY AREA AND SECONDARY DATA

Sl. No	Common Name	Scientific Name	Schedule	IUCN Red List
1.	Peacock Pansy	<i>Junonia almana</i>	---	LC
2.	Lemon Pansy	<i>Junonia lemonias</i>	---	NA
3.	Common Indian crow	<i>Euploea core</i>	---	LC
4.	Common rose	<i>Pachliopta aristolochiae</i>	---	LC
5.	Indian palm bob	<i>Suastus gremius</i>	---	NA
6.	Blue Mormon	<i>Papilio polymnestor</i>	---	NA
7.	Spotless grass yellow	<i>Eurema laeta</i>	---	NA
8.	Peacock Royal	<i>Tajuria cippus</i>	Schedule II	NA
9.	Yellow Pansy	<i>Junonia hierta</i>	---	LC
10.	Lime Butterfly	<i>Papilio demoleus</i>	---	NA
11.	Blue Tiger	<i>Tirumala limniace</i>	---	NA
12.	Danaid Eggfly	<i>Hypolimnas misippus</i>	Schedule II	LC
13.	Great Eggfly	<i>Hypolimnas bolina</i>	---	NA
14.	Common emigrant	<i>Catopsilia pomona</i>	---	NA
15.	Crimson tip	<i>Colotisdanae</i>	---	NA
16.	Common Mormon	<i>Papilio polytes</i>	---	NA
17.	Common Crow	<i>Euploea core</i>	---	LC
18.	Common Tiger	<i>Danaus genutia</i>	---	NA
19.	Plain Tiger	<i>Danaus chrysippus</i>	---	LC
20.	Common Mime	<i>Papilio clytia</i>	Schedule II	NA

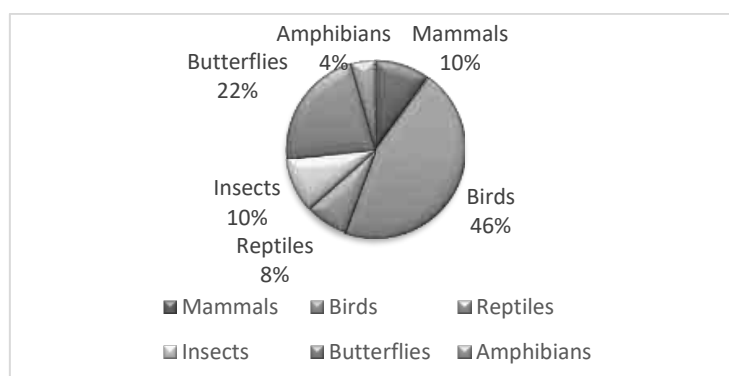
*NA- Not Applicable, *LC-Least Concern, Source: inaturalist.com

TABLE 3.32: LIST OF INSECTS EITHER SPOTTED OR REPORTED FROM THE STUDY AREA

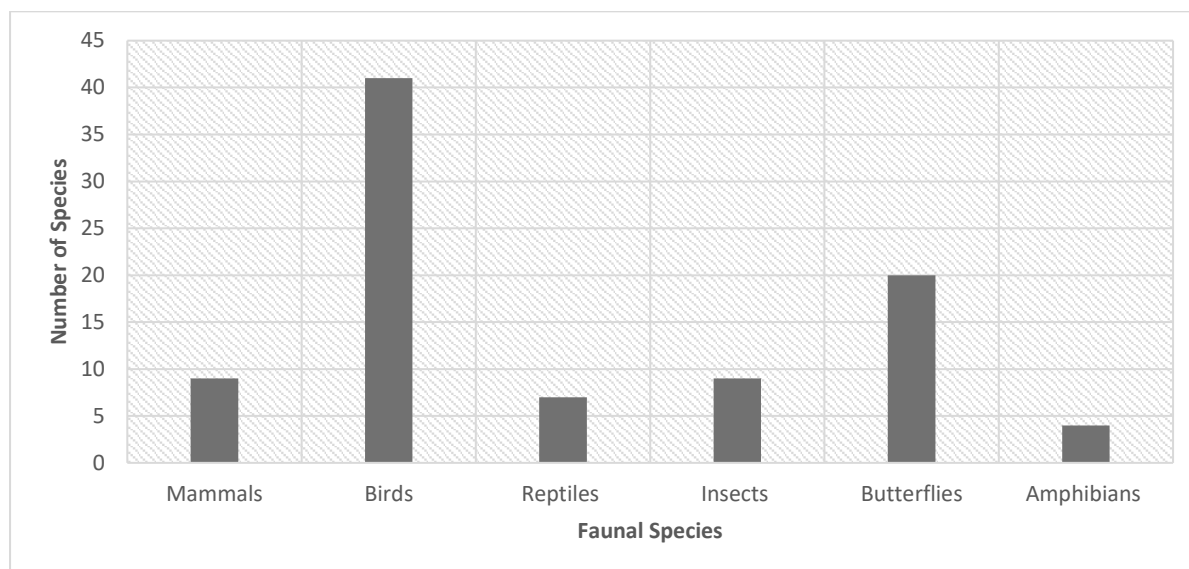
Sl. No	Common Name	Scientific Name	IUCN Red List
1.	Indian honey bee	<i>Apis cerana</i>	NA
2.	Termite	<i>Hamitermes silvestri</i>	NA
3.	Grasshopper	<i>Hieroglyphus daganensis</i>	NA
4.	Sandalwood Defoliator	<i>Amata passalis</i>	NA
5.	Ant	<i>Camponotus Vicinus</i>	NA
6.	Ditch jewel	<i>Brachythemis contaminata</i>	LC
7.	Dragonfly	<i>Ceratogomphus pictus</i>	LC
8.	Darth Maul Bug	<i>Spilostethus hospes</i>	NA
9.	Brown-spotted Locust	<i>Cyrtacanthacris tatarica</i>	NA

*NA- Not Applicable, *LC-Least Concern

FIGURE 3.29: THE % DISTRIBUTION OF FAUNAL COMMUNITIES (BUFFER ZONE)



**FIGURE 3.30: THE NUMBERS OF DISTRIBUTION OF FAUNAL COMMUNITIES
(BUFFER ZONE)**



3.7. Aquatic Ecology

The study area has odai is passing on the on the Western side of the proposed project site. No Aquatic diversity is noticed in the core zone area. Aquatic weeds are found to be growing everywhere in 10 km radius area, in every water bog, pond, lake and River etc. *Typha angustata* can be found growing all along the drains of villages, small water-logged depressions, and agricultural fields lacking water but containing enough moisture to support its growth. And where water is present, *Eichhornia crassipes* has taken its roots and covers the entire water surface by its sprawl and invasion.

3.7.1. Objectives of Aquatic Studies

- ✓ Generating data through actual field collection in these locations over the study period
- ✓ Consulted with locals to obtain knowledge about aquatic flora and animals.

3.7.2. Macrophytes

The macrophytes observed within the study area.

TABLE 3.33: DESCRIPTION OF MACROPHYTES

S.No	Scientific Name	Common Name	Type
1.	<i>Eichhornia crassipes</i>	Common water hyacinth	Free floating hydrophytes
2.	<i>Typha angustifolia</i>	Lesser Bulrush	Emergent hydrophytes
3.	<i>Hydrilla verticillata</i>	Hydrilla	Submerged hydrophytes
4.	<i>Pistia stratiotes</i>	Water lettuce	Free floating hydrophytes
5.	<i>Cyperus articulatus</i>	Jointed flatsedge	Emergent Hydrophytes
6.	<i>Ipomea aquatica</i>	Water Morning Glory	Marshy amphibious hydrophytes

3.7.3. Aquatic Faunal Diversity

Amphibian species like the common Pond frog, Skipper frog, Indian Pond Frog etc., were sighted near the water bodies located in the study area.

TABLE 3.34: AMPHIBIANS OBSERVED/RECORDED FROM THE STUDY AREA

Sl. No	Common Name	Scientific Name	Schedule list of Wildlife (Protection) Amendment Act, 2022	IUCN Red List
1.	Indian Burrowing frog	<i>Sphaerotheca breviceps</i>	---	LC
2.	Indian pond frog	<i>Phrynoderma hexadactylum</i>	Schedule II	NA
3.	Asian common Toad	<i>Duttaphrynus melanostictus</i>	---	LC
4.	Indian bull Frog	<i>Hoplobatrachus tigerinu</i>	Schedule II	LC

*NA- Not Applicable, *LC-Least Concern

3.7.4. Findings/Results

The assessment was carried out during the pre-monsoon. The inspection day was quite alright with respectable weather. The details of the flora and fauna observed are given below.

Records of threatened species in the area

No threatened species were observed

Endangered Species as per Wildlife (Protection) Act

No Endangered fauna was recorded in the project area.

Endemic Species of the Project areas

No endemic species were observed in the project area.

Migratory species of the Project areas

No migratory fauna observed in project area.

Migratory corridors and Flight paths

No migratory corridors and Flight paths were observed in project area.

Breeding and spawning grounds

No breeding and spawning grounds were earmarked for the wildlife fauna in project area.

There are no critically endangered, endangered, vulnerable and endemic species were observed. As the rainfall in the area is scanty and as no toxic wastes are produced or discharged on account of mining, the proposed mining activity is not going to have any additional and adverse impacts on these RET species. There are no ecologically sensitive areas or protected areas within the 10 Km radius. Hence no specific conservation for conservation of any RET species or Wildlife is envisaged.

There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar sites, Tiger/Elephant Reserves (existing as well as proposed) within 10 km of the mine lease area. There are no protected forests within the project area. Hence submission of clearance from the National Board of Wildlife does not arise.

There is no endangered, endemic and RET Species. There is no Schedule I species in study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] The proposed project is not going to have any direct or indirect adverse impact on the species mentioned above.

3.8. Conclusion

The observations and assessment of the overall ecological scenario involve details such as classification of Biogeographic zone, eco-region, habitat types and land cover, distances from natural habitats, vegetation/forest types, and sensitive ecological habitats such as Wetlands sites, Important Bird areas, migration corridors of important wildlife etc. Such baseline information provides better understanding of the situation and overall ecological importance of the area. This baseline information viewed against proposed project activities help in predicting their impacts on the wildlife and their habitats in the region. Data collected and information gathered from secondary literature on flora, fauna, protected area, natural habitats, and wildlife species etc., and consulted and discussed with local people, from the villages, herders and farmers who inhabit close to the proposed project area.

3.6 SOCIO ECONOMIC ENVIRONMENT

Socio-economic study is an essential part of environmental study. 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. It is expected that the Socio-Economic Status of the area will substantially improve because of this proposed project. As the proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area and, thus, improve their standard of living.

3.6.1 STRUCTURE STUDY

There are few structures within the radius of 500m from the project site, the details of the structures are given below:

FIGURE 3.31: STRUCTURE MAP - P1

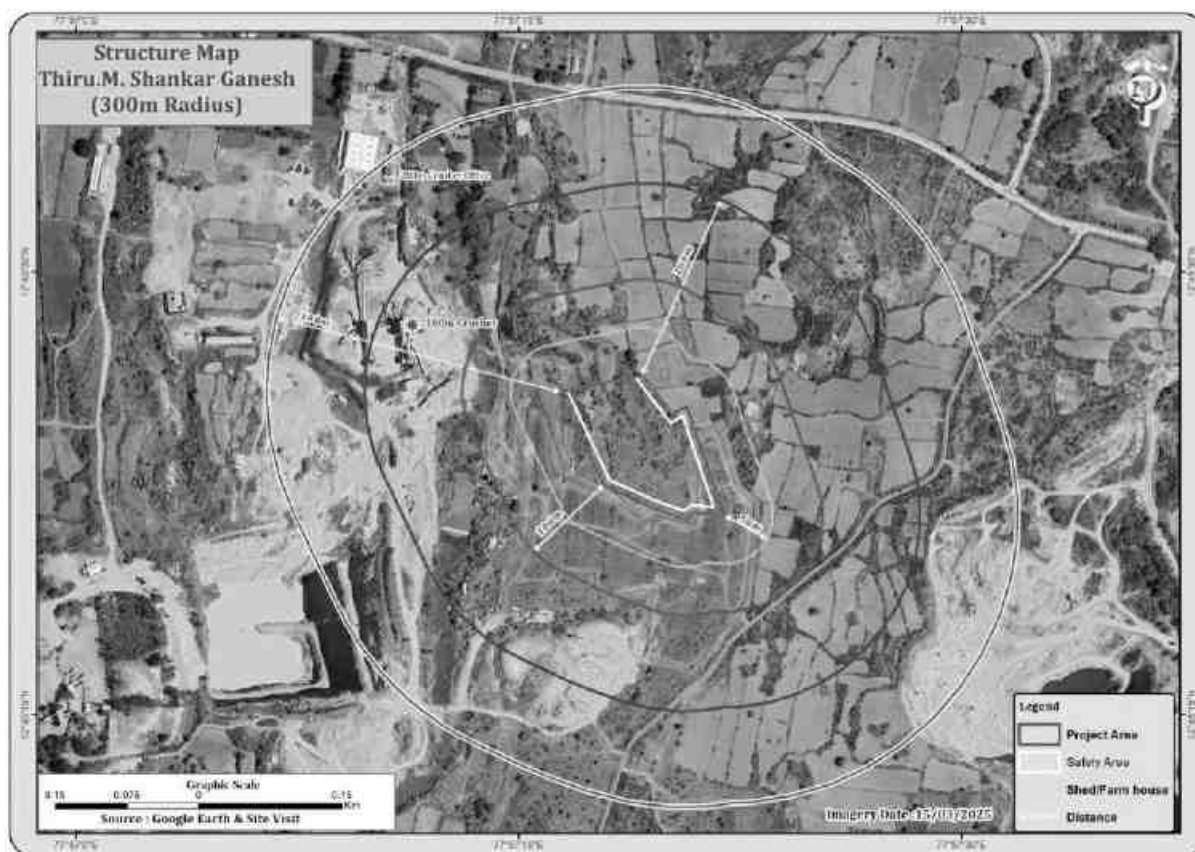


TABLE 3.35: ENUMERATION OF STRUCTURES 0-300m radius – P1

Structure Numbers	Distance & Direction from the project site	Structure Details and Usage Purpose	Type of Structure Structures (Kutch/ Brick/ Cement/ RCC/ Framed Structures)	No. of Occupants	Structure belongs to owner (Yes/No)	Remarks
1	160m – NW	Crusher	Framed Structure	7Nos	No	Manufacturing M-Sand, P-Sand & Jally – No Stay
2	280m – NW	Crusher Office	RCC Structure	Nil	No	Used to store documents – No Stay

FIGURE 3.31: STRUCTURE MAP - P2

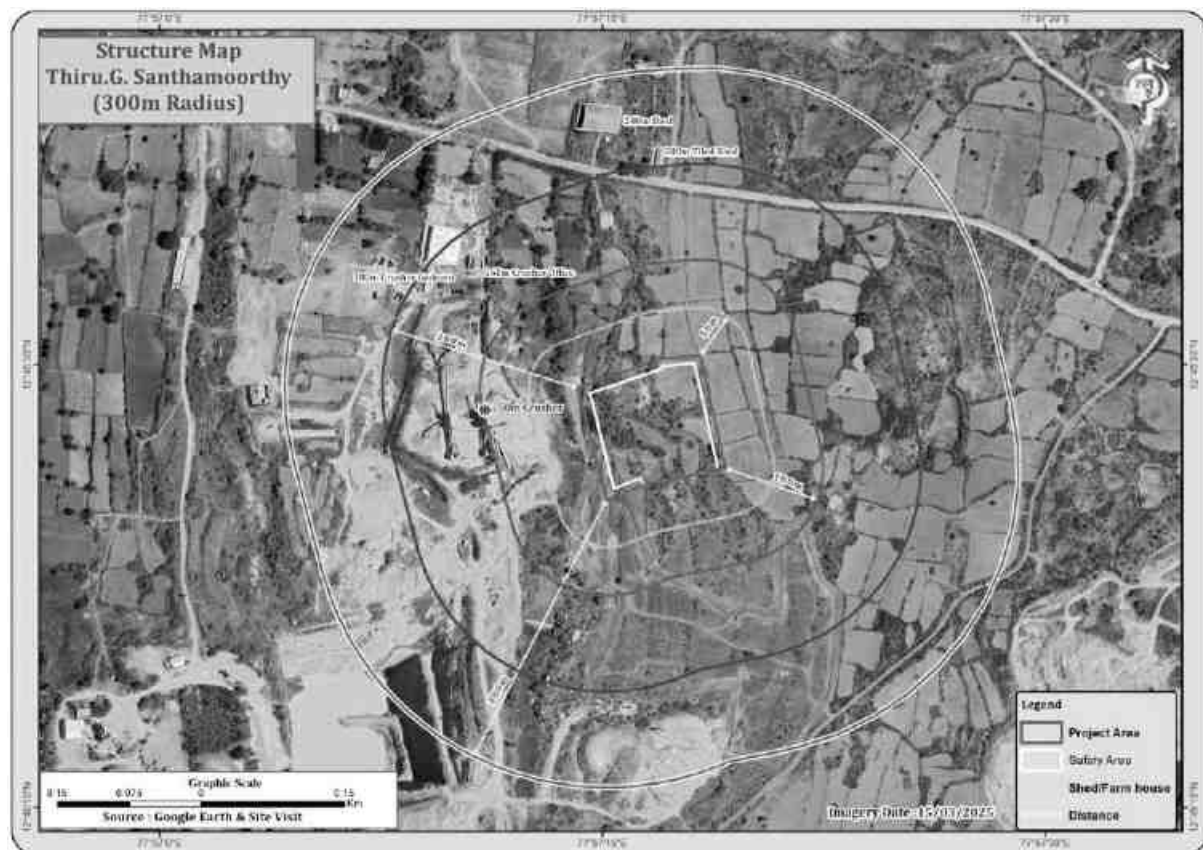
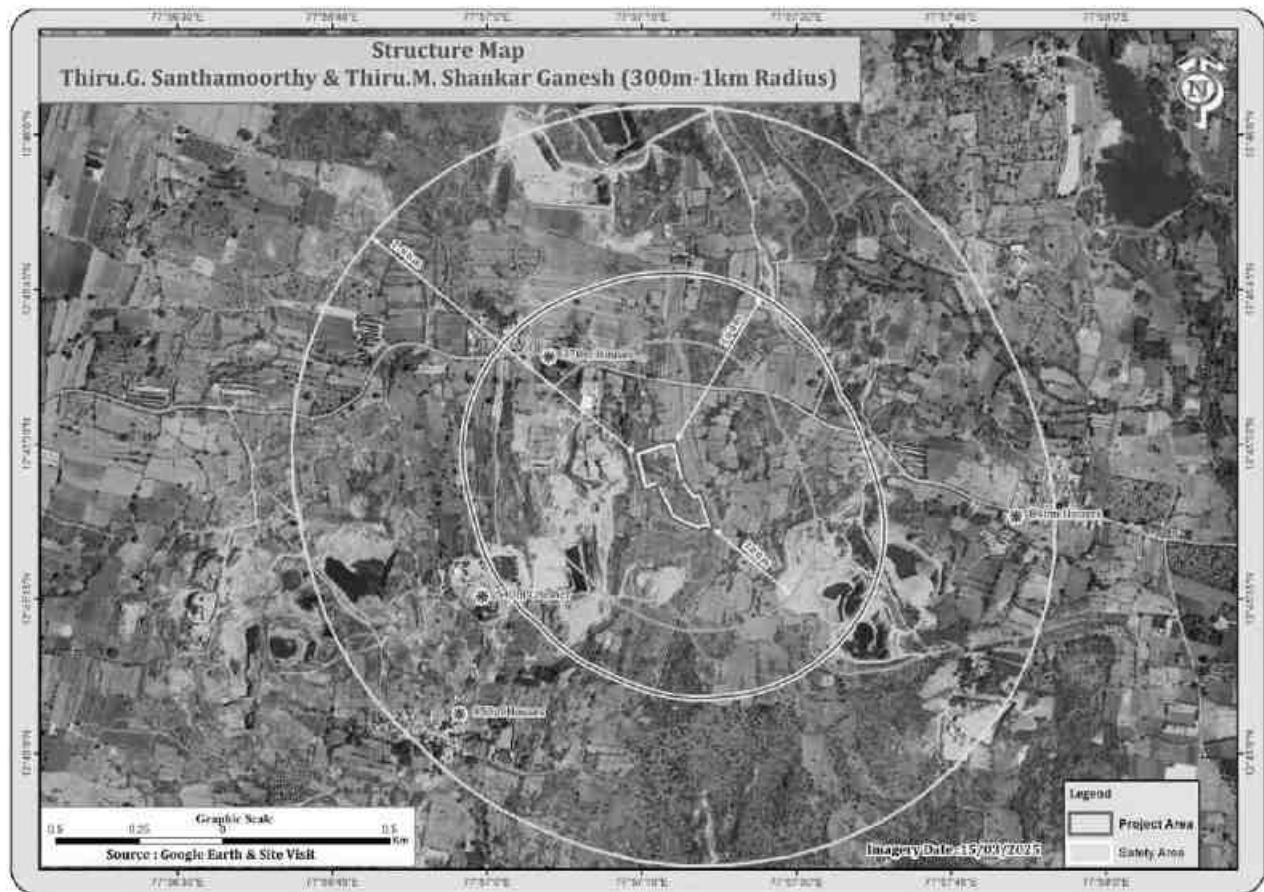


TABLE 3.35: ENUMERATION OF STRUCTURES 0- 300m radius – P2

Structure Numbers	Distance & Direction from the project site	Structure Details and Usage Purpose	Type of Structure Structures (Kutcha/ Brick/ Cement/ RCC/ Framed Structures)	No. of Occupants	Structure belongs to owner (Yes/No)	Remarks
1	50m – NW	Crusher	Framed Structure	7Nos	No	Manufacturing M-Sand, P-Sand & Jally – No Stay
2	160m – NW	Crusher Office	RCC Structure	Nil	No	Used to store documents – No Stay
3	180m - NW	Crusher Godown	Sheet & RCC Structure	Nil	No	Used to store Crusher equipment's and Materials – No Stay
4	200m – North	Shed	Sheet Structure	Nil	No	Rest Shelter – No Stay
5	240m - North	Tiled Shed	Tiled & Brick Structure	Nil	No	Storage Purpose – No Stay

FIGURE 3.31: COMBINED STRUCTURE MAP – P1 & P2

3.6.2 Objectives of the Study

The objectives of the socio-economic study are as follows:

- To study the socio-economic status of the people living in the study area.
- To assess the impact of the project on Quality of life of the people in the study area.
- To recommend Community Development measures needs to be taken up in the study Area.

3.6.3 Scope of Work

- To study the Socio-economic Environment of the area from the secondary sources;
- Data Collection & Analysis
- Prediction of project impact
- Mitigation Measures

3.6.4 District Profile

‘Krishna’ refers to ‘black’ and ‘giri’ refers to ‘hill’. This district is gifted with black granite hillocks and named as “krishnagiri”. The region came under the rule of Krishna Deva Raya and hence it might have been named after this king.

Krishnagiri district is bounded by Vellore and Thiruvannamalai districts in the East, Karnataka state in the west, State of Andhra Pradesh in the North Dharmapuri District in the south. Its area is 5143 Sq. Kms. This district is elevated from 300m to 1400m above the mean sea level. It is located between 11° 12'N to 12° 49'N Latitude, 77° 27'E to 78° 38'E Longitude.

Eastern part of the district experiences hot climate and Western part has a contrasting cold climate. The average rainfall is 830 mm per annum. March – June is summer season. July – November is Rainy Season and between December – February winter prevails. Three languages namely Tamil, Telugu and Kannada are predominantly spoken in this district. Major religions are Hindu, Islam and Christianity. This district stands as an ideal exhibit of National integration and religious harmony. The society exhibit the confluence of different languages and religions.

Administrative Setup of Krishnagiri District

Krishnagiri district includes 2 Revenue Divisions, 8 Taluks, 7 Town Panchayats. There are 874 Revenue Villages, 352 Village panchayats in this district. In 2011, Krishnagiri district had population of 1,879,809 with a sex-ratio of 963 females for every 1,000 males.

Krishnagiri Population 2001– 2030

The last census of Krishnagiri was done in 2011 and next census of 2021 has been postponed or cancelled. But we can do projection of future Krishnagiri 2025, 2030 Population on the basis likely Population Growth Rate.

Year	Projected Population (Estimation)
2001	1561118
2011	1879809
2021	2198500
2025	2325976
2030	2485322

Source: <https://www.census2011.co.in>

A population projection is an estimation of the number of people expected to be alive at a future date that is made based on assumptions of population structure, fertility, mortality and migration. It is an essential to assess the need for new jobs, schools, doctors and nurses, planning urban housing, foods, clothing and requirements of energy and resources. It is also needed for policy discourse i.e., helps to the policy-makers to understand the existing problems and finally supports to develop the suitable solutions. A population projection gives a picture of what the future size and structure of the population by sex and age might look like. It is based on knowledge of the past trends, and, for the future, on assumptions made for three components: fertility, mortality and migration

3.6.5 Study area - Venkatesapuram Village

Venkatesapuram is a large village located in Shoolagiri Taluk of Krishnagiri district, Tamil Nadu with total 650 families residing. The Venkatesapuram village has population of 2873 of which 1484 are males while 1389 are females as per Population Census 2011.

In Venkatesapuram village population of children with age 0-6 is 325 which makes up 11.31 % of total population of village. Average Sex Ratio of Venkatesapuram village is 936 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Venkatesapuram as per census is 890, lower than Tamil Nadu average of 943.

Venkatesapuram village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Venkatesapuram village was 64.95 % compared to 80.09 % of Tamil Nadu. In Venkatesapuram Male literacy stands at 73.17 % while female literacy rate was 56.23 %.

As per constitution of India and Panchyati Raaj Act, Venkatesapuram village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Venkatesapuram village.

VENKATESAPURAM DATA

Particulars	Total	Male	Female
Total No. of Houses	650	-	-
Population	2,873	1,484	1,389
Child (0-6)	325	172	153
Schedule Caste	583	290	293
Schedule Tribe	0	0	0
Literacy	64.95 %	73.17 %	56.23 %
Total Workers	1,211	857	354
Main Worker	965	-	-
Marginal Worker	246	126	120

<https://www.census2011.co.in/data/village/643747-venkatesapuram-tamil-nadu.html>

TABLE 3.47: POPULATIN DATA AROUND 5KM RADIUS

Sl.No.	Village Name	NO HH	Total Population	Male	Female	Total SC Population	Male SC	Female SC	Total ST Population	Male ST	Female ST	Total Literate Population	Male Literate	Female Literate	Total Illiterate Population	Male Illiterate	Female Illiterate	Total Workers Population	Male Workers	Female Workers
1	Advanapalli	58	239	123	116	1	0	1	0	0	0	125	75	50	114	48	66	68	65	3
2	Alnatham	71	327	170	157	77	41	36	0	0	0	176	118	58	151	52	99	91	85	6
3	Alur	678	3018	1569	1449	178	80	98	5	1	4	1794	1058	736	1224	511	713	1140	828	312
4	Amgondapalli	543	2634	1371	1263	141	71	70	0	0	0	1296	771	525	1338	600	738	1249	793	456
5	Athimugam	937	4540	2339	2201	334	163	171	17	9	8	2297	1317	980	2243	1022	1221	1936	1395	541
6	Attur	160	667	334	333	172	92	80	0	0	0	427	238	189	240	96	144	308	248	60
7	Berigai	1807	7884	3970	3914	597	284	313	6	4	2	5529	3007	2522	2355	963	1392	3335	2404	931
8	Dhasapalli	152	894	443	451	1	0	1	0	0	0	363	202	161	531	241	290	521	257	264
9	Doripalli	852	3681	1898	1783	596	304	292	0	0	0	2013	1165	848	1668	733	935	1140	775	365
10	Karupalli	73	332	181	151	41	25	16	0	0	0	181	113	68	151	68	83	135	99	36
11	Koladasapuram	221	857	429	428	390	196	194	0	0	0	492	276	216	365	153	212	431	269	162
12	Kurubarapalli	1171	5354	2760	2594	502	250	252	0	0	0	3100	1766	1334	2254	994	1260	2235	1470	765
13	Midithepalli	287	1287	667	620	278	141	137	31	14	17	630	369	261	657	298	359	729	399	330
14	Muthalli	108	444	223	221	130	64	66	0	0	0	222	132	90	222	91	131	156	138	18
15	Nariganapuram	218	928	494	434	212	107	105	0	0	0	513	293	220	415	201	214	499	287	212
16	Palavanapalli	258	1096	540	556	370	183	187	0	0	0	637	349	288	459	191	268	480	331	149
17	Pannapalli	997	4431	2275	2156	583	295	288	0	0	0	2207	1292	915	2224	983	1241	2068	1414	654
18	Settipalli	401	1696	879	817	533	277	256	3	2	1	983	602	381	713	277	436	859	593	266
19	Sikkanapalli	135	555	279	276	167	82	85	0	0	0	346	200	146	209	79	130	206	175	31
20	Sudugondapalli	87	447	229	218	95	49	46	0	0	0	217	128	89	230	101	129	329	168	161
21	Venkatesapuram	650	2873	1484	1389	583	290	293	0	0	0	1655	960	695	1218	524	694	1211	857	354

Sl. No.	Village Name	Total Main Workers	Main Workers Male	Main Workers Female	Main Cultivation Workers	Main Cultivation Workers Male	Main Cultivation Workers Female	Main Agriculture Workers	Main Agriculture Workers Male	Main Agriculture Workers Female	Main Other Workers	Main Other Workers Male	Main Other Workers Female	Total Margin Workers	Margin Workers Male	Margin Workers Female	Margin Cultivation Workers	Margin Cultivation Workers Male	Margin Cultivation Workers Female
1	Advanapalli	48	48	0	37	37	0	1	1	0	10	10	0	20	17	3	2	2	0
2	Alnatham	69	66	3	62	62	0	0	0	0	7	4	3	22	19	3	0	0	0
3	Alur	673	547	126	431	386	45	88	51	37	149	105	44	467	281	186	213	127	86
4	Amgondapalli	1225	782	443	735	469	266	384	229	155	104	83	21	24	11	13	10	5	5
5	Athimugam	1525	1123	402	485	387	98	547	309	238	458	400	58	411	272	139	44	30	14
6	Attur	307	247	60	139	129	10	160	112	48	8	6	2	1	1	0	0	0	0
7	Berigai	3089	2264	825	514	337	177	775	445	330	1693	1429	264	246	140	106	18	10	8
8	Dhasapalli	519	256	263	0	0	0	516	254	262	3	2	1	2	1	1	0	0	0
9	Doripalli	1056	732	324	353	246	107	243	120	123	444	356	88	84	43	41	9	5	4
10	Karupalli	132	98	34	98	83	15	15	1	14	16	13	3	3	1	2	1	0	1
11	Koladasapuram	401	256	145	79	76	3	161	74	87	158	105	53	30	13	17	5	5	0
12	Kurubarapalli	1524	1117	407	253	171	82	236	174	62	1008	756	252	711	353	358	64	31	33
13	Midithepalli	727	398	329	259	141	118	406	206	200	60	50	10	2	1	1	2	1	1
14	Muthalli	155	137	18	100	89	11	5	4	1	48	42	6	1	1	0	0	0	0
15	Nariganapuram	409	237	172	54	42	12	308	161	147	42	32	10	90	50	40	6	4	2
16	Palavanapalli	478	331	147	220	202	18	239	112	127	19	17	2	2	0	2	1	0	1
17	Pannapalli	1810	1295	515	986	793	193	536	291	245	253	196	57	258	119	139	57	33	24
18	Settipalli	824	572	252	389	332	57	295	148	147	133	91	42	35	21	14	5	4	1
19	Sikkanapalli	198	171	27	75	75	0	77	55	22	46	41	5	8	4	4	1	1	0
20	Sudugondapalli	211	110	101	202	108	94	3	0	3	3	1	2	118	58	60	12	7	5
21	Venkatesapuram	965	731	234	815	620	195	91	56	35	55	51	4	246	126	120	5	5	0

SLNo.	Village Name	Margin House Hold Workers	Margin House Hold Workers Male	Margin House Hold Workers Female	Main Other Workers	Main Other Workers Male	Main Other Workers Female	Total Margin Workers	Margin Workers Male	Margin Workers Female	Margin Cultivation Workers	Margin Cultivation Workers Male	Margin Cultivation Workers Female	Margin House Hold Workers	Margin House Hold Workers Male	Margin House Hold Workers Female	Margin Other Workers	Margin Other Workers Male	Margin Other Workers Female	Non Worker Population	Non Worker Male	Non Worker Female
1	Advanapalli	0	0	0	10	10	0	20	17	3	2	2	0	0	0	0	1	1	0	171	58	113
2	Alnatham	0	0	0	7	4	3	22	19	3	0	0	0	0	0	0	7	7	0	236	85	151
3	Alur	22	10	12	149	105	44	467	281	186	213	127	86	22	10	12	136	99	37	1878	741	1137
4	Amgondapalli	0	0	0	104	83	21	24	11	13	10	5	5	0	0	0	5	3	2	1385	578	807
5	Athimugam	69	28	41	458	400	58	411	272	139	44	30	14	69	28	41	90	66	24	2604	944	1660
6	Attur	0	0	0	8	6	2	1	1	0	0	0	0	0	0	0	1	1	0	359	86	273
7	Berigai	20	9	11	1693	1429	264	246	140	106	18	10	8	20	9	11	149	106	43	4549	1566	2983
8	Dhasapalli	0	0	0	3	2	1	2	1	1	0	0	0	0	0	0	0	0	0	373	186	187
9	Doripalli	0	0	0	444	356	88	84	43	41	9	5	4	0	0	0	54	29	25	2541	1123	1418
10	Karupalli	1	1	0	16	13	3	3	1	2	1	0	1	1	1	0	1	0	1	197	82	115
11	Koladasapuram	0	0	0	158	105	53	30	13	17	5	5	0	0	0	0	16	5	11	426	160	266
12	Kurubarapalli	113	20	93	1008	756	252	711	353	358	64	31	33	113	20	93	479	277	202	3119	1290	1829
13	Midithepalli	0	0	0	60	50	10	2	1	1	2	1	1	0	0	0	0	0	0	558	268	290
14	Muthalli	0	0	0	48	42	6	1	1	0	0	0	0	0	0	0	1	1	0	288	85	203
15	Nariganapuram	0	0	0	42	32	10	90	50	40	6	4	2	0	0	0	10	6	4	429	207	222
16	Palavanapalli	0	0	0	19	17	2	2	0	2	1	0	1	0	0	0	0	0	0	616	209	407
17	Pannapalli	1	1	0	253	196	57	258	119	139	57	33	24	1	1	0	44	30	14	2363	861	1502
18	Settipalli	0	0	0	133	91	42	35	21	14	5	4	1	0	0	0	16	11	5	837	286	551
19	Sikkanapalli	0	0	0	46	41	5	8	4	4	1	1	0	0	0	0	2	2	0	349	104	245
20	Sudugondapalli	1	0	1	3	1	2	118	58	60	12	7	5	1	0	1	9	4	5	118	61	57
21	Venkatesapuram	0	0	0	55	51	4	246	126	120	5	5	0	0	0	0	11	9	2	1662	627	1035

TABLE 3.48: COMMUNICATION & TRANSPORT FACILITIES IN THE STUDY AREA

Sl	Village Name	PO	SPO	PTO	T	PCO	MP	IC / CSC	PCF	BS	PBS	RS	NH	SH	MDR	BTR	GR	NWR	FP
1	Advanapalli	2	2	2	1	1	1	2	2	1	2	2	2	2	2	1	1	2	1
2	Alnatham	2	2	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
3	Alur	2	2	2	1	1	1	2	2	2	2	2	2	2	2	1	1	2	1
4	Amgondapalli	2	2	2	2	1	1	1	2	2	2	2	2	2	2	1	1	2	1
5	Athimugam	2	1	2	1	1	1	1	2	1	1	2	2	1	1	1	1	2	1
6	Attur	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	1	2	1
7	Berigai	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	2	1
8	Dhasapalli	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1
9	Doripalli	2	1	2	1	1	1	2	2	1	2	2	2	2	1	1	1	2	1
10	Karupalli	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	1	2	1
11	Koladasapuram	2	1	2	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1
12	Kurubarapalli	2	1	2	1	1	1	2	2	2	2	2	2	2	2	2	1	2	1
13	Midithepalli	2	2	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
14	Muthalli	2	1	2	1	2	1	2	2	1	1	2	2	2	2	1	1	2	1
15	Nariganapuram	2	2	2	2	2	1	2	2	1	1	2	2	2	2	1	1	2	1
16	Palavanapalli	2	2	2	1	1	1	2	2	1	2	2	2	2	2	1	1	2	1
17	Pannapalli	2	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
18	Settipalli	2	2	2	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1
19	Sikkanapalli	2	2	2	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1
20	Sudugondapalli	2	2	2	1	1	1	2	2	1	2	2	2	2	2	1	1	2	1
21	Venkatesapuram	2	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1

Source: www.censusindia.gov.in - Tamilnadu Census of India - 2011

PO - Post Office	MP - Mobile Phone Coverage	RS - Railway Station	GR - Gravel Roads
SPO - Sub Post Office	IC / CSC - Internet Cafe/Common Service Centre	NH - National Highways	NWR - Navigate waterways River
PTO - Post & Telegraph office	PCF - Private Courier Facility	SH - State Highways	FP - Foot path
T- Telephone (Landline)	BS - Public Bus Service	MDR - Major District Road	
PCO - Public call office / Mobile	PBS - Private Bus Service	BTR - Black Topped (Pucca Roads)	

TABLE 3.49: WATER & DRAINAGE FACILITIES IN THE STUDY AREA

Sl	Village Name	TP	CW	UCW	HP	TW/BH	S	R/C	T/P/L	CD	OD	CT
1	Advanapalli	1	2	2	2	2	2	2	2	2	2	2
2	Alnatham	1	2	2	2	2	2	2	2	2	2	2
3	Alur	1	2	2	2	1	2	2	1	1	1	1
4	Amgondapalli	1	2	1	2	1	2	2	2	2	2	1
5	Athimugam	1	2	1	2	2	2	2	2	2	1	2
6	Attur	1	2	2	2	2	2	2	2	2	1	2
7	Berigai	1	1	1	2	1	2	2	2	2	1	1
8	Dhasapalli	1	2	2	2	2	2	2	2	2	2	2
9	Doripalli	1	1	2	2	1	2	2	2	2	1	1
10	Karupalli	2	2	2	2	2	2	2	2	2	2	2
11	Koladasapuram	1	2	2	2	2	2	2	2	2	1	2
12	Kurubarapalli	1	2	2	2	1	2	2	2	2	2	2
13	Midithepalli	1	1	2	1	2	2	2	2	2	1	2
14	Muthalli	1	2	2	2	2	2	2	2	2	2	2
15	Nariganapuram	1	2	2	2	1	2	2	2	2	1	2
16	Palavanapalli	2	2	2	2	2	2	2	2	2	2	2
17	Pannapalli	1	1	1	1	1	2	2	2	2	2	2
18	Settipalli	1	2	2	2	1	2	2	2	2	1	1
19	Sikkanapalli	1	2	2	2	2	2	2	2	2	2	2
20	Sudugondapalli	1	2	2	2	2	2	2	2	2	2	2
21	Venkatesapuram	1	1	2	1	2	2	2	2	2	2	2

Source: www.censusindia.gov.in - Tamilnadu Census of India - 2011

T - Tap Water	TW/BH - Tube / Bore Well	OD - Open Drainage
CW - Covered Well	R / C - River / Canal	CT - Community Toilet Complex for General public
UCW - Uncovered Well	T/P/L - Tank / Pond / Lake	S - Spring
HP - Hand Pump	CD - Covered Drainage	

TABLE 3.50: OTHER FACILITIES IN THE STUDY AREA

Sl	Village Name	ATM	CB	COB	ACS	SHG	PDS	RM	AMS	NC	NC-AC	CC	SF	PL	NPS	APS	BDRO	PS
1	Advanapalli	2	2	2	2	1	1	2	2	1	1	2	2	2	2	1	1	1
2	Alnatham	2	2	2	2	1	1	2	2	1	1	2	2	2	2	1	2	1
3	Alur	2	2	2	2	1	1	2	2	1	1	1	2	2	2	2	1	1
4	Amgondapalli	2	2	2	2	1	1	2	2	1	1	1	2	2	2	1	1	1
5	Athimugam	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
6	Attur	2	2	2	2	1	2	2	2	1	1	1	2	2	2	2	2	1
7	Berigai	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
8	Dhasapalli	2	2	2	2	1	1	2	2	1	1	2	2	2	2	2	2	1
9	Doripalli	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
10	Karupalli	2	2	2	2	1	2	2	2	1	1	2	2	2	2	2	2	1
11	Koladasapuram	2	2	2	2	1	1	2	2	1	1	1	2	2	2	1	1	1
12	Kurubarapalli	2	2	2	2	1	1	2	2	1	1	1	2	2	1	1	1	1
13	Midithepalli	2	2	2	2	1	1	2	2	1	1	1	2	2	2	1	2	1
14	Muthalli	2	2	2	2	1	1	2	2	1	1	2	2	2	2	1	1	1
15	Nariganapuram	2	2	2	2	1	2	2	2	1	1	2	2	2	2	1	2	1
16	Palavanapalli	2	2	2	2	1	1	2	2	1	1	1	2	2	2	1	1	1
17	Pannapalli	2	2	2	2	1	1	2	2	1	1	1	2	2	1	1	1	1
18	Settipalli	2	2	2	2	1	1	2	2	1	1	1	1	2	2	1	1	1
19	Sikkanapalli	2	2	2	2	1	2	2	2	1	1	2	2	2	2	2	2	1
20	Sudugondapalli	2	2	2	2	1	1	2	2	1	1	2	2	2	2	1	1	1
21	Venkatesapuram	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	2	1

Source: www.censusindia.gov.in - Tamilnadu Census of India - 2011

ATM - Automatic Teller Machine	SHG - Self Help Group	NC - Nutritional Centres
CB - Commercial Bank	PDS - Public Distribution System (Shop)	NC-AC - Nutritional Centres - Anganwadi Centre
COB - Co-operative Bank	RM - Regular Market	DBRO - Birth & Death Registration Office
ACS - Agricultural Credit Societies	AMS - Agricultural Market Society	PS - Power Supply

TABLE 3.51: EDUCATIONAL FACILITIES IN THE STUDY AREA

Sl	Village Name	PPS		PS		MS		SS		SSS		DC		EC		MC		MI		PT		VTS		SSD	
		G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P
1	Advanapalli	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	Alnatham	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2
3	Alur	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	Amgondapalli	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	Athimugam	1	2	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	Attur	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
7	Berigai	1	2	1	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8	Dhasapalli	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
9	Doripalli	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10	Karupalli	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
11	Koladasapuram	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	Kurubarapalli	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
13	Midithepalli	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
14	Muthalli	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15	Nariganapuram	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
16	Palavanapalli	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
17	Pannapalli	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18	Settipalli	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
19	Sikkanapalli	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
20	Sudugondapalli	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
21	Venkatesapuram	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Source: www.censusindia.gov.in - Tamilnadu Census of India - 2011

PPS-Pre-Primary School	SSS-Senior Secondary School	DC-Degree School	PT-Polytechnic
PS-Primary School	G-Government	EC-Engineering College	VTS-Vocational School /ITI
MS-Middle School	P-Private	MC-Medical College	SSD-Special School for Disabled
SS-Secondary School	MI-Management College/Institute		

TABLE 3.52: MEDICAL FACILITIES IN THE STUDY AREA

Sl. No.	Village Name	CHC	PHC	PHSC	MCW	TBC	HA	HAM	D	VH	MHC	FWC	NGM-I/O
1	Advanapalli	0	0	0	0	0	0	0	0	0	0	0	b
2	Alnatham	0	0	0	0	0	0	0	0	0	0	0	b
3	Alur	0	0	1	0	0	0	0	0	0	0	0	b
4	Amgondapalli	0	0	0	0	0	0	0	0	0	0	0	c
5	Athimugam	0	0	1	0	0	0	0	0	1	0	0	b
6	Attur	0	0	0	0	0	0	0	0	0	0	0	b
7	Berigai	0	1	1	1	1	0	0	1	1	0	1	c
8	Dhasapalli	0	0	0	0	0	0	0	0	0	0	0	c
9	Doripalli	0	0	1	0	0	0	0	0	0	0	0	b
10	Karupalli	0	0	0	0	0	0	0	0	0	0	0	c
11	Koladasapuram	0	0	0	0	0	0	0	0	0	0	0	b
12	Kurubarapalli	0	0	0	0	0	0	0	0	0	0	0	a
13	Midithepalli	0	0	0	0	0	0	0	0	0	0	0	a
14	Muthalli	0	0	1	0	0	0	0	0	0	0	0	c
15	Nariganapuram	0	0	0	0	0	0	0	0	0	0	0	a
16	Palavanapalli	0	0	0	0	0	0	0	0	0	0	0	b
17	Pannapalli	0	0	1	0	0	0	0	0	0	0	0	b
18	Settipalli	0	0	0	0	0	0	0	0	0	0	0	a
19	Sikkanapalli	0	0	0	0	0	0	0	0	0	0	0	b
20	Sudugondapalli	0	0	0	0	0	0	0	0	0	0	0	b
21	Venkatesapuram	0	0	0	0	0	0	0	0	0	0	0	b

Source: www.censusindia.gov.in - Tamilnadu Census of India - 2011

CHC-Community Health Centre	TBC-TB Clinic	VH-Veterinary Hospital
PHC-Primary Health Centre	HA-Aallopathic Hospital	FWC-Family Welfare Centre
PHSC-Primary Health Sub Centre	HAM-Alternative Medicine Hospital	MH-Mobile Health Clinic
MCW-Maternity and Child Welfare Centre	D-Dispensary	NGM-I/O-Non Goernment Medical Facilities In & Out Patient

3.6.5 Basic Amenities

A better network of physical infrastructure facilities (well-built roads, rail links, irrigation, power and telecommunication, information technology, market-network and social infrastructure support, viz. health and education, water and sanitation, veterinary services and co-operative) is essential for development of the rural economy.

A review of infrastructure facilities available in the area has been given on the basis of field survey. In this study the villages which fall within 10 km radius around the site has been covered. Infrastructure facilities available in the area are presented below.

All basic amenities Education (higher education, colleges, universities, medical college, Transport facilities, Railway station, Bus station area available in the district headquarters Krishnagiri.

3.6.6 Recommendation and Suggestion

- The main activities in the area are agriculture, quarry operation and Crushing units.
- Due to the project about 26 Nos of peoples will be benefitted directly due to employment and more than 50 Nos of peoples and Crushers will be benefitted through this project
- As part of CER activities proponent intends to spend Rs. 3.0 Lakhs.
- At the end of the life of the mine the mined-out pit will act as temporary reservoir, the collected rain water in the mine pit may utilized for the nearby agriculture lands.

Apart from the following general activities will be conducted

- Awareness program to be conducted to make the population aware to get education and a better livelihood.
- Vocational training programme can be organized to make the people self - employed, particularly for women and unemployed youth.
- On the basis of qualification and skills local community may be preferred. Long term and short-term employments can be generated.
- While developing an Action Plan, it is very important to identify the population who falls under the marginalized and vulnerable groups. So that special attention can be given to these groups with special provisions while making action plans.

3.6.7 Summary & Conclusion

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

4.0 GENERAL

Environmental impacts both direct and indirect on various environmental attributes due to proposed mining activity will be created in the surrounding environment, during the operational and post-operational phases. The occurrence of mineral deposits, being site specific, their exploitation, often, does not allow for any choice except adoption of eco-friendly operation. The methods are required to be selected in such a manner, so as to maintain environmental equilibrium ensuring sustainable development.

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.

Several scientific techniques and methodologies are available to predict impacts of physical environment. Mathematical models are the best tools to quantitatively describe the cause-and-effect relationships between sources of pollution and different components of environment. In cases where it is not possible to identify and validate a model for a particular situation, predictions have been arrived at based on logical reasoning /consultation / extrapolation.

The following parameters are of significance in the Environmental Impact Assessment and are being discussed in detail

- Land environment
- Soil environment
- Water Environment
- Air Environment
- Noise Environment
- Socio economic environment
- Biological Environment

Based on the baseline environmental status at the project site, the environmental factors that are likely to be affected (Impacts) are identified, quantified and assessed.

4.1 LAND ENVIRONMENT:

4.1.1 Anticipated Impact

- The land will be under mining site 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 causes the siltation of water course

4.1.2 Mitigation Measures

- Area under quarry land will be converted into temporary reservoir which will full fill the water scarcity in the drought season and the nearby agriculture land will be benefitted by the supply of water
- About 1490 Nos (P1-720+ P2-770) of trees will be planted in the lease area and approach road will retain the eco system
- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development in the production
- Construction of garland drains all around the quarry pits and construction of silt trap at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt.
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- 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.

4.1.1.1 Soil Environment

Impact on Soil Environment

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

Mitigation Measures

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

Waste Dump Management

There is no waste anticipated in this Rough Stone and gravel quarrying operation. The entire quarried out materials will be utilized (100%).

4.2 WATER ENVIRONMENT

4.2.1 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
- 2.0KLD water will be utilized for each quarrying operation

4.2.2 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 month once) analysis of quarry pit water and ground water quality in nearby villages.
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- Wastewater 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

4.3.1 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.

4.3.2 Modelling of Incremental Concentration from all Proposed Projects

Wind erosion of the exposed areas and the air borne particulate matter generated by quarrying operation, and transportation are mainly PM₁₀ & PM_{2.5} and emissions of Sulphur dioxide (SO₂) & Oxides of Nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are the cause of air pollution in the project area.

Similarly, loading -unloading and transportation of Rough Stone, wind erosion of the exposed area and movement of light vehicles causes of pollution. This leads to an impact on the ambient air environment around the project area.

Anticipated incremental concentration due to this quarrying activity and net increase in emissions due to quarrying activities within 500 meters around the project area is predicted by Open Pit Source modelling using **AERMOD Software**.

Prediction of impacts on air environment has been carried out taking into consideration cumulative production all the quarries fall in the Cluster. Air environment and net increase in emissions by Open pit source modelling in AERMOD Software AERMOD 12.

4.3.2.1 Emission Estimation

An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

The general equation for emissions estimation is:

$$E = A \times EF \times (1-ER/100)$$

Where:

E = emissions;

A = activity rate;

EF = emission factor, and

ER = overall emission reduction efficiency, %

The proposed mining activity includes various activities like ground preparation, excavation, handling and transport of Rough Stone. These activities have been analysed systematically basing on USEPA-Emission Estimation

Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 4-2.

4.3.2.2 Frame work of Computation & Model details

Suspended Particulate Matter (SPM) is the major pollutant occurred during quarrying activities. The prediction included the impact of Excavation, Drilling, Blasting (Occasionally), loading and movement of vehicles during transportation and meteorological parameters such as wind speed, wind direction, temperature, rainfall, humidity and Cloud cover.

Impact was predicted over the distance of 10 km around the source to assess the impact at each receptor separately at the various locations and maximum incremental GLC value at the project site. Maximum impact of PM₁₀ was observed close to the source due to low to moderate wind speeds. Incremental value of PM₁₀ was superimposed on the base line data monitored at the proposed site to predict total GLC of PM₁₀ due to combined impacts

TABLE 4.1: ESTIMATED EMISSION RATE

EMISSION ESTIMATION FOR QUARRY “P1”				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.102459034	g/s
	Blasting	Point Source	0.002731277	g/s
	Mineral Loading	Point Source	0.044850280	g/s
	Haul Road	Line Source	0.002499385	g/s/m
	Overall Mine	Area Source	0.047118005	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.001113556	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000038634	g/s
EMISSION ESTIMATION FOR QUARRY “P2”				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.079710840	g/s
	Blasting	Point Source	0.000778397	g/s
	Mineral Loading	Point Source	0.041081831	g/s
	Haul Road	Line Source	0.002489321	g/s/m
	Overall Mine	Area Source	0.046609996	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000481278	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000017299	g/s

FIGURE 4.1: AERMOD TERRAIN MAP

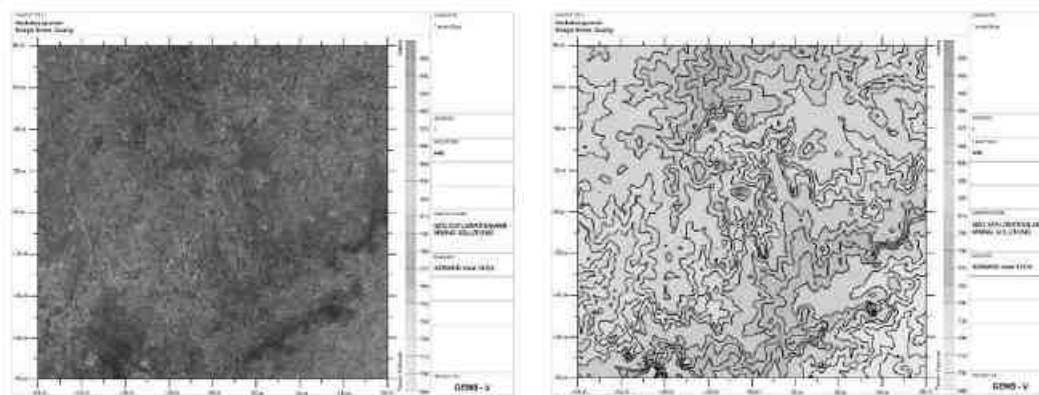


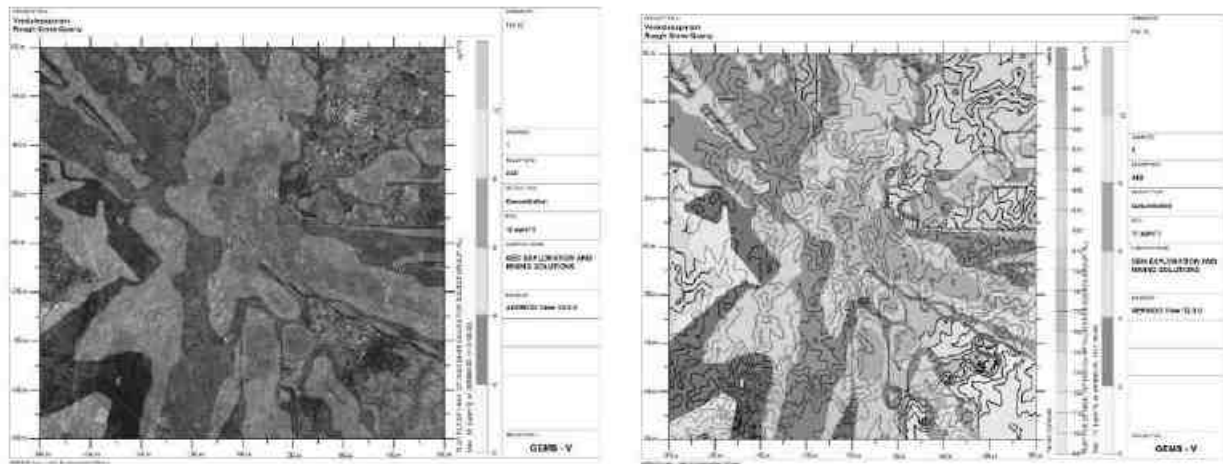
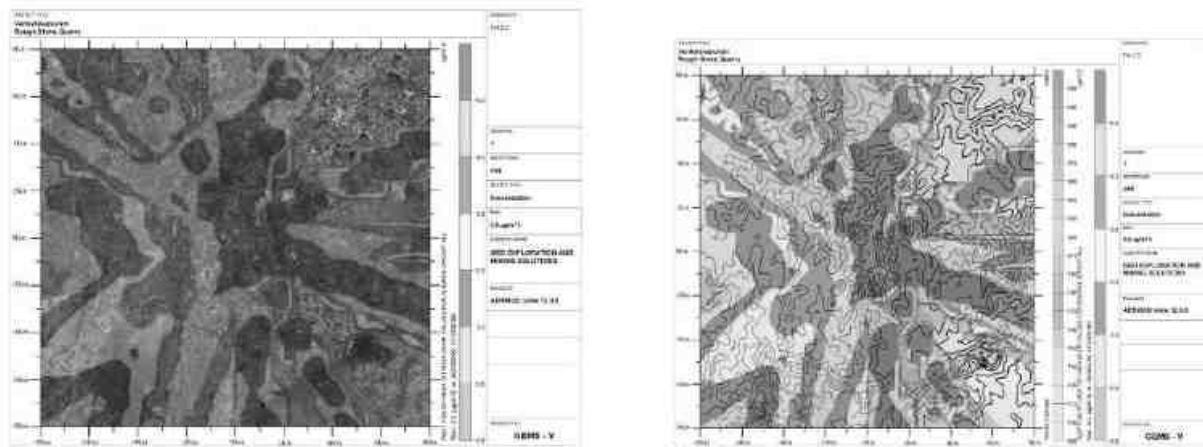
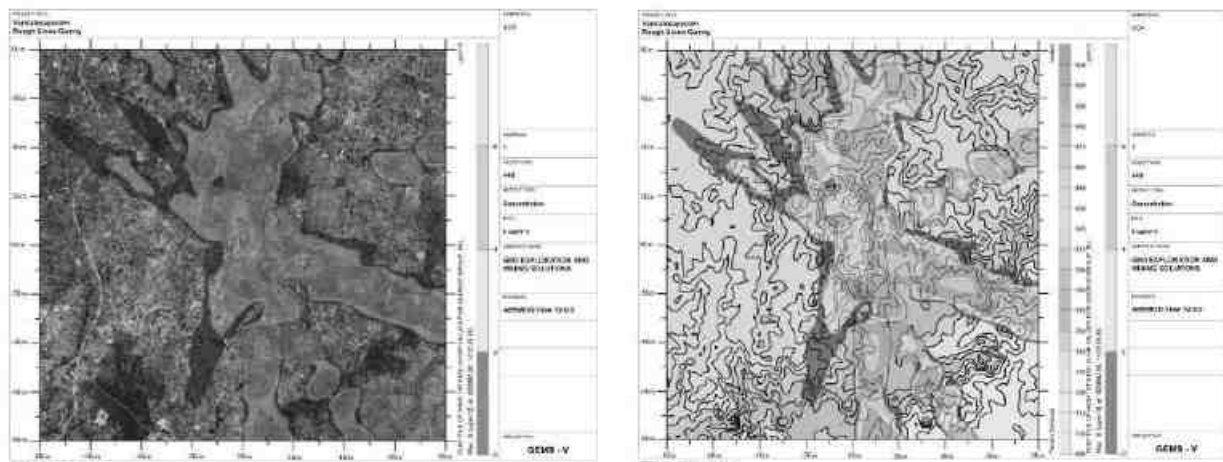
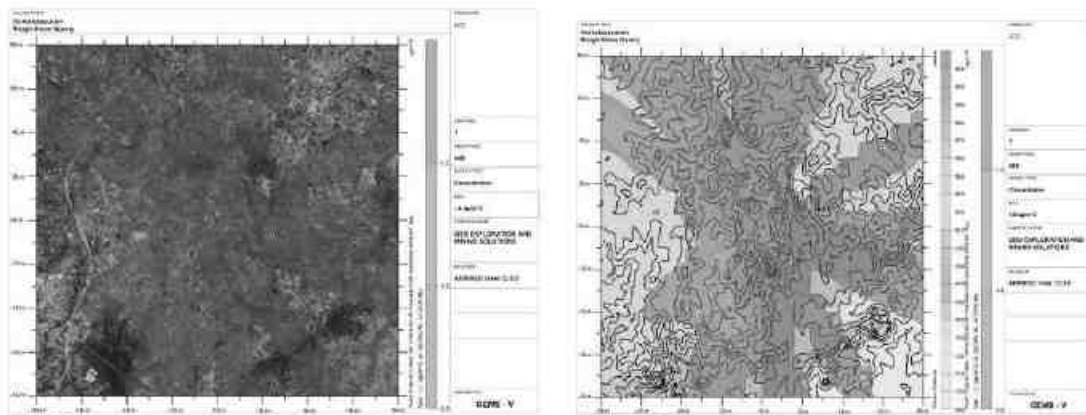
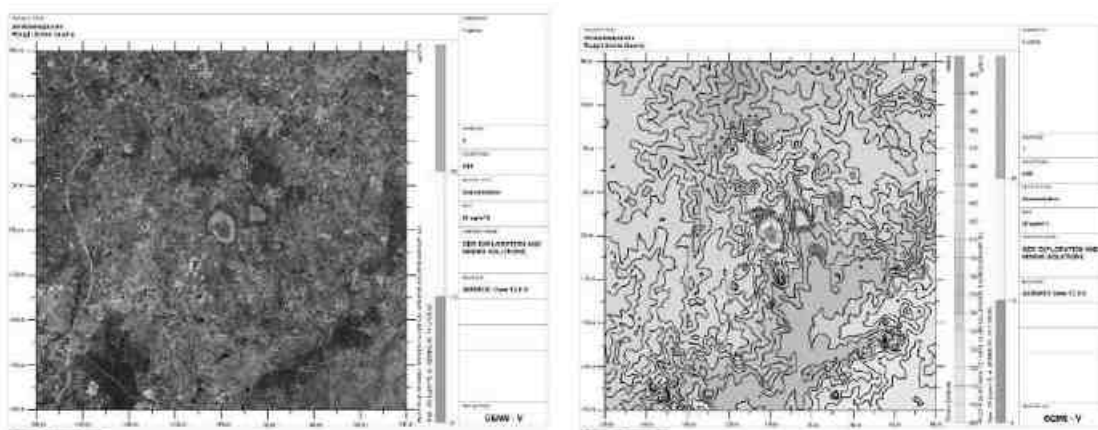
FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM₁₀**FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF PM₂₅****FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF NO_x**

FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF SO₂**FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE**

4.3.2.3 Model Results

The post project Resultant Concentrations of PM₁₀, PM_{2.5}, SO₂&NO_x (GLC) is given in Table below:

TABLE 4.2: INCREMENTAL & RESULTANT GLC OF PM₁₀

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM ₁₀ (µg/m ³)	Incremental value of PM ₁₀ due to mining (µg/m ³)	Total PM ₁₀ (µg/m ³)
AAQ1	12°45'26.33"N 77°57'18.03"E	50	-36	35.9	12.63	48.53
AAQ2	12°45'19.90"N 77°57'1.45"E	-459	-240	36	11.8	47.8
AAQ3	12°44'53.32"N 77°58'36.55"E	2445	-1059	36	12.16	48.16
AAQ4	12°48'9.89"N 77°58'6.31"E	1521	5041	36.1	8.75	44.85
AAQ5	12°45'46.82"N 77°54'38.93"E	-4810	604	35.9	3	38.9
AAQ6	12°44'48.40"N 78° 0'36.25"E	6096	-1208	35.4	10	45.4
AAQ7	12°43'9.53"N 77°56'56.82"E	-600	-4277	35.2	7	42.2

TABLE 4.3: INCREMENTAL & RESULTANT GLC OF PM_{2.5}

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM _{2.5} (µg/m ³)	Incremental value of PM _{2.5} due to mining (µg/m ³)	Total PM _{2.5} (µg/m ³)
AAQ1	12°45'26.33"N 77°57'18.03"E	50	-36	21.2	5.87	27.07
AAQ2	12°45'19.90"N 77°57'1.45"E	-459	-240	21.3	5.2	26.5
AAQ3	12°44'53.32"N 77°58'36.55"E	2445	-1059	21.2	5.46	26.66
AAQ4	12°48'9.89"N 77°58'6.31"E	1521	5041	21.1	4.39	25.49
AAQ5	12°45'46.82"N 77°54'38.93"E	-4810	604	21.4	1.9	23.3
AAQ6	12°44'48.40"N 78° 0'36.25"E	6096	-1208	21.4	4.79	26.19
AAQ7	12°43'9.53"N 77°56'56.82"E	-600	-4277	21.3	3.87	25.17

TABLE 4.4: INCREMENTAL & RESULTANT GLC OF NO_x

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline SO ₂ (µg/m ³)	Incremental value due to mining (µg/m ³)	Total SO ₂ (µg/m ³)
AAQ1	12°45'26.33"N 77°57'18.03"E	50	-36	23.1	6.72	29.82
AAQ2	12°45'19.90"N 77°57'1.45"E	-459	-240	23.3	5.5	28.8
AAQ3	12°44'53.32"N 77°58'36.55"E	2445	-1059	23.3	6.12	29.42
AAQ4	12°48'9.89"N 77°58'6.31"E	1521	5041	23.1	1.19	24.29
AAQ5	12°45'46.82"N 77°54'38.93"E	-4810	604	23.1	0	23.1
AAQ6	12°44'48.40"N 78° 0'36.25"E	6096	-1208	23.2	1.9	25.1
AAQ7	12°43'9.53"N 77°56'56.82"E	-600	-4277	23.1	0	23.1

TABLE 4.5: INCREMENTAL & RESULTANT GLC OF SO₂

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline NO _x (µg/m ³)	Incremental value due to mining(µg/m ³)	Total NO _x (µg/m ³)
AAQ1	12°45'26.33"N 77°57'18.03"E	50	-36	6.5	1.1	7.6
AAQ2	12°45'19.90"N 77°57'1.45"E	-459	-240	6.3	1.02	7.32
AAQ3	12°44'53.32"N 77°58'36.55"E	2445	-1059	6.2	1.06	7.26
AAQ4	12°48'9.89"N 77°58'6.31"E	1521	5041	6.3	0.78	7.08
AAQ5	12°45'46.82"N 77°54'38.93"E	-4810	604	6.4	0	6.4
AAQ6	12°44'48.40"N 78° 0'36.25"E	6096	-1208	6.2	0.94	7.14
AAQ7	12°43'9.53"N 77°56'56.82"E	-600	-4277	6.3	0.61	6.91

TABLE 4.6: INCREMENTAL & RESULTANT GLC OF FUGITIVE

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline NO _x (µg/m ³)	Incremental value due to mining(µg/m ³)	Total NO _x (µg/m ³)
AAQ1	12°45'26.33"N 77°57'18.03"E	50	-36	64.1	20	84.1
AAQ2	12°45'19.90"N 77°57'1.45"E	-459	-240	63.87	0	63.87
AAQ3	12°44'53.32"N 77°58'36.55"E	2445	-1059	64.16	0	64.16

AAQ4	12°48'9.89"N 77°58'6.31"E	1521	5041	64.1	0	64.1
AAQ5	12°45'46.82"N 77°54'38.93"E	-4810	604	64.16	0	64.16
AAQ6	12°44'48.40"N 78° 0'36.25"E	6096	-1208	64.07	0	64.07
AAQ7	12°43'9.53"N 77°56'56.82"E	-600	-4277	64.37	0	64.37

From the resultant of cumulative concentration i.e., Background + Incremental Concentration of pollutant in all the receptor locations without effective mitigation measures are still within the prescribed NAAQ limits of 100, 80 & 80 µg/m³ for PM₁₀, SO₂ & NO_x respectively. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be further being controlled.

4.3.3 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 –

- 1490 Nos (P1-720+ P2-770) trees will be planted along the safety barrier located in the leased area to prevent dust generation due to movement of tippers/trucks.
- Some trees will be planted along village road and nearby schools.

Occupational Health –

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical checkups, 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

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. These activities will not cause any problem to the inhabitants of this area because there is no human settlement within 300m radius from the project site. Noise modelling has been carried out considering blasting and compressor operation (drilling) and transportation activities.

Predictions have been carried out to compute the noise level at various distances around the working pit due to these major noise-generating sources. Noise modelling has been carried out to assess the impact on surrounding ambient noise levels.

Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves, which are propagated outwards from the source through the air at speed of 1,100 ft/sec, with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB(A).

For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using model based on first principle.

$$L_{p2} = L_{p1} - 20 \log (r_2/r_1) - A_{e1,2}$$

Where:

L_{p1} & L_{p2} are sound levels at points located at distances r_1 & r_2 from the source.

$A_{e1,2}$ is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

$$L_{p\text{total}} = 10 \log \{10^{(L_{p1}/10)} + 10^{(L_{p2}/10)} + 10^{(L_{p3}/10)} + \dots\}$$

4.4.1 Anticipated Impact

Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are:

- Source data
- Receptor data
- Attenuation factor

Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4-8.

TABLE 4.7: ACTIVITY AND NOISE LEVEL PRODUCED BY MACHINERY

Sl.No.	Machinery / Activity	Impact on Environment?	Noise Produced in dB(A) at 50 ft from source*
1	Blasting	Yes	94
2	Jack Hammer	Yes	88
3	Compressor	No	81
4	Excavator	No	85
5	Tipper	No	84
Total Noise Produced			95.8

Source: U.S. Department of Transportation (Federal Highway Administration) – Construction Noise Handbook

The total noise to be produced by mining machineries 95.8 dB(A). Generally, most mining operations produce noise between 100-109 dB(A). We have considered equipment and operation noise levels (max) to be approx. 109 dB(A) for noise prediction modelling.

TABLE 4.8: PREDICTED NOISE INCREMENTAL VALUES

Location ID	N1	N2	N3	N4	N5	N6	N7
Maximum Monitored Value (Day) dB(A)	58.6	57.1	58.3	58.4	59.6	59.1	57.6
Incremental Value dB(A)	60.1	47.2	32.5	25.5	26.5	24.5	28.1
Total Predicted Noise level dB(A)	62.4	57.5	58.3	58.4	59.6	59.1	57.6

The incremental noise level is found within the range of 58.6dB (A) in Core Zone and 57.1-59.6 dB(A) in Buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations are within permissible limits of Industrial area (core zone) & Residential area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.).

4.4.2 Mitigation Measures

The following noise mitigation measures are proposed for control of Noise

- 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;

- 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

4.4.3 Ground Vibrations

Ground vibrations due to the proposed mining activities are anticipated due to operation of Mining Machines like Excavators, drilling and blasting, transportation vehicles, etc., However, the major source of ground vibration from the quarry is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining lease area and may cause injury to persons or damage to the structures. Nearest habitation from the proposed project areas is listed in below table. The ground vibrations due to the blasting in the quarry are calculated using the empirical equation.

The empirical equation for assessment of peak particle velocity (PPV) is:

$$V = K [R/Q^{0.5}]^{-B}$$

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

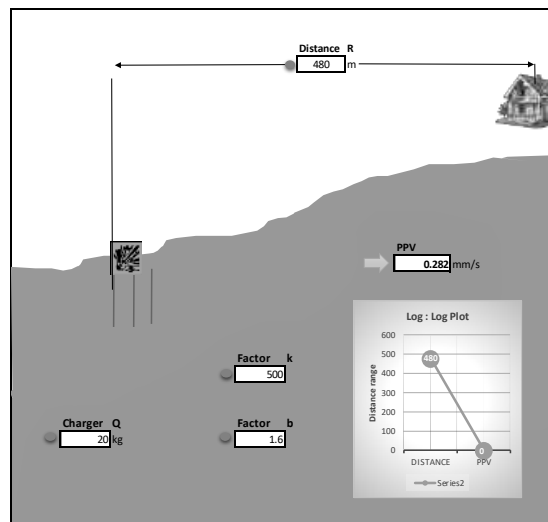
Q = maximum instantaneous charge (kg)

B = constant related to the rock and site (usually 1.6)

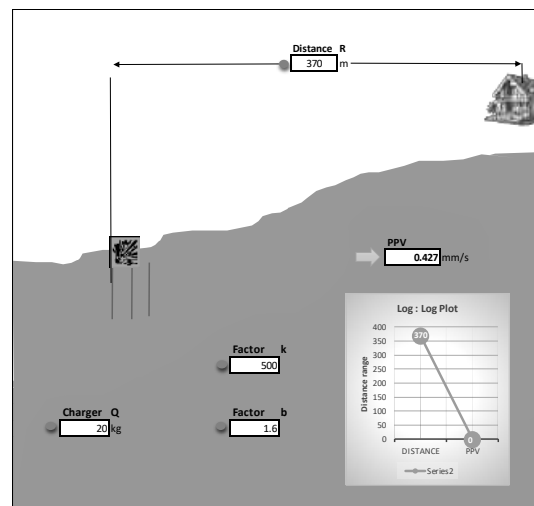
R = distance from charge (m)

TABLE 4.9: PREDICTED PPV VALUES DUE TO BLASTING – P1

Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
20	480	0.282

FIGURE 4.6: GROUND VIBRATION PREDICTION**TABLE 4.10: PREDICTED PPV VALUES DUE TO BLASTING – P2**

Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
20	370	0.427

FIGURE 4.7: GROUND VIBRATION PREDICTION

From the above graphs, for each mines the charge per blast of 20kg is well below the Peak Particle Velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. But the all the project proponent ensures that the charge per blast shall be carry out blasting twice or thrice a day based on the onsite conditions under the supervision of competent person employed. However, as per statutory requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

Mitigation Measures

- It is proposed to carry out blasting operation 20kg per round so that the vibration will be minimal
- The mining operation will be carried out without deep hole drilling, 25mm small Di cartridge will be utilized for the blasting
- The blasting operations in the project site without deep hole drilling and blasting using delay detonators, which reduces the ground vibrations;
- Proper quantity of explosive, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting;
- Adequate safe distance from blasting will be maintained as per DGMS guidelines;
- Blasting shelter will be provided as per DGMS guidelines;
- Blasting operations will be carried out only during day time;
- The charge per delay will be minimized and preferably a greater number of delays will be used per blasts;
- During blasting, other activities in the immediate vicinity will be temporarily stopped;
- Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast;
- A fully trained explosives blast man (Mining Mate, Mines Foreman, 2ndClass Mines Manager/ 1stClass Mines Manager) will be appointed.
- A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public.
- The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used.
- The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects.
- Appropriate blasting techniques shall be adopted such that the predicted peak particle velocity shall not exceed 8 mm/s.
- Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices

4.5 ECOLOGY AND BIODIVERSITY

4.5.1. Impact Identification and Evaluation

In general, impact prediction methods argue that the foremost step in impact appraisal must consider and identify project actions that are likely to bring significant changes in the project environment. The present study determined to predict the likely impacts of the Proposed Rough stone quarry, mining Project in the surrounding environment with a specific focus on biological attributes covering habitats/ecosystems and associated biodiversity. Likely impacts identified were categorized into different levels like direct or primary and indirect or secondary impacts based on the influence of sources of impacts.

4.5.2. Impact on Flora

The proposed mine lease area exhibits in hilly terrain and it is not fit for cultivation. It is mostly devoid of any considerable vegetation. The proposed mine lease area (core zone) does not encompass any designated forest land within it. The vegetation is very sparse and scanty. So, there will be no impact on flora from the mining operation. There will not be much contamination of soil or any other materials from the mining operation. No threatened plant species were reported in the core and buffer study area during the field survey.

Anticipated Impact of mining activity on local flora, fauna and agricultural land

1. Mining of rough stone involves clearing the flora and fauna in core zone. This can lead to habitat destruction for plant species and removal of trees from the site. However, the core zone contains widely occurring herbs, shrubs and trees. This must be compensated with suitable green belt development practices.
2. The excavation process can remove topsoil, which is crucial for plant growth. In some cases, this can lead to erosion, loss of soil fertility, and changes in soil structure, making it difficult for native plant species to thrive.
3. Mining activity can they destroy the natural habitats of various animal species. However, the proposed area is very small and the animals can migrate to buffer zone.
4. During the loading of the truck, dust generation will be likely to occur. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.

4.5.3 Mitigation Measures

General Guidelines for Green Belt Development

Drone survey was covered the green belt and fencing as per the terms of references. The green belt and plantation purposes in and around the proposed mine lease area native species, fruit-bearing trees, medicinal plants, and dense canopy trees should be selected. These species should be tolerant to pollution levels as per Bio- Geography zones of India.

After the operation of mining production capacity, Green belt and Plantation species should be in accordance with the Terms and Conditions of the Environmental Clearance Green belt is created not only for the purpose of protecting sensitive areas or maintaining the ecological balance but because they also act as efficient biological filters or sinks for particulate and gaseous emissions, generated by vehicular movements and various industrial and mining activities. Optimally designed green belts can be effective in reducing the impact of fugitive emissions and pollutants accidentally or otherwise released at ground levels.

Proposed Green Belt

Extensive green belt development will be started during the construction phase, which will continue till the operation of the plant. About 500 trees will be planted per hectare all around the quarry safety barrier, approach roads, and township premises. Locally available types of trees that are resistant to pollutants will be planted. In addition to the above, all open spaces available within the premises will be developed as nurseries, parks, gardens, and other forms of greenery. 5 m wide greenbelt will be developed along the plant premises, as per land available.

Guidelines & Techniques for Green Belt Development

An extensive survey of the project area was undertaken to observe the structure and composition of vegetation. Hence a combination of plants is selected depending upon the topographical suitability and species selected as per the SPCB Guideline and ToR. The soil characteristics were kept in mind. Based on this survey and environmental conditions suitable native plant species have been proposed for the green belt development plan.

Development of Green Belt

The plantation matrix adopted for the green belt development includes pit of 0.3 m x 0.3 m in size with a spacing of 2 m x 2 m. In addition, earth filling and manure may also be required for the proper nutritional balance and nourishment of the sapling. It is also recommended that the plantation has to be taken up randomly and the landscaping aspects could be taken into consideration. Multi-layered plantations comprising of medium height trees (7 m to 10 m) and shrubs (5 m height) are proposed for the green belt.

A greenbelt is a set of rows of trees planted in such a fashion, to create an effective barrier between the project and its surroundings. The greenbelt helps to capture fugitive emissions, attenuate the noise levels in the existing project, and simultaneously improve aesthetics of the surroundings.

Design of Green Belt

The present plan comprises the details of field investigations. Plant species for greenbelt development are selected as per CPCB guidelines. The green belt will be developed along the periphery of the Proposed Rough stone quarry. The greenbelt development plan has been formulated considering the parameters such as climate, soil types, topography, etc.

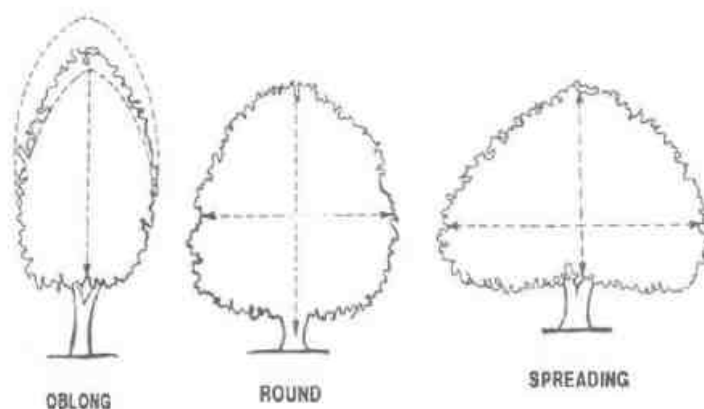
Characteristic features of plants to be used for Absorption of pollutant gases

- Plant species should be perennial and evergreen with thick canopy cover.
- The crown of the tree (mass of foliage/leaves and branches growing outward from the trunk of the tree) should be either Oblong, Round, or Spreading for effective absorption of pollutant gases.
- Plant should have foliage of longer duration.
- The foliage should be freely exposed through: Adequate height of crown, Openness of foliage/leaves in canopy, Big leaves (long and broad laminar surfaces).

The purpose of Green belt around the project is to capture the fugitive emissions. Carbon sequestration and to attenuate the noise generated. In addition to improving the aesthetics. A wide range of indigenous plant species was planted as given in the table No 4.1 & 4.2 in consulted with the DFO. The plant species with dense/moderate canopy of native origin was chosen are given below. Species of small/ medium/tall trees alternating with shrubs was planted.

- Plants that grow fast will be preferred.
- Preference for high canopy covers plants with local varieties.
- Perennial and evergreen plants will be preferred.
- The development of the Green Belt is an important aspect for any plant because:

- It improves the ambient air quality by controlling Suspended Particulate Matter (SPM) in the air.
- It helps in noise abatement for the surrounding area.
- It helps in the settlement of new birds and insects within itself.
- It maintains the ecological balance.
- It increases the aesthetic value of the site.



(*Source: Guidance for Developing Green belts Manual, CPCB 2000)

TABLE 4.11: GREENBELT DEVELOPMENT PLAN

	No. of trees proposed to be planted	Area to be planted
P1	720	Safety barrier, Un utilized areas and nearby village roads
P2	770	

TABLE 4.12: LIST OF PLANT SPECIES PROPOSED FOR GREENBELT DEVELOPMENT

S. No	Scientific name	Tamil Name
1	<i>Aegle marmelos</i>	Vilva maram
2	<i>Albizia lebbek</i>	Vaagai maram
3	<i>Cassia fistula</i>	Konrai tree
4	<i>Lannea coromandelica</i>	Othiyam
5	<i>Limonia acidissima</i>	Vila maram
6	<i>Syzygium cumini</i>	Naval maram
8	<i>Ficus hispida</i>	Aththi maram
9	<i>Borassus flabellifer</i>	Panai-maram
10	<i>Madhuca longifolia</i>	Illupai maram
11	<i>Pongamia pinnata</i>	Pongamaram
12	<i>Cassia roxburghii</i>	Sengondrai

(*Source: Term of Reference-ToR)

TABLE 4.13: SPECIES SUITABLE FOR ABATEMENT OF NOISE AND DUST POLLUTION

S. No	Botanical name	Common name
1	<i>Azadirachta indica</i>	Vembhu maram
2	<i>Ficus religiosa</i>	Arasan maram
3	<i>Ficus hispida</i>	Aththi maram
4	<i>Bombax ceiba</i>	Mul Elavu
5	<i>Syzygium cumini</i>	Naval maram
6	<i>Tamarindus indica</i>	Puliyamaram
7	<i>Mangifera indica</i>	Manga maram
8	<i>Harwickia binata</i>	Anjan maram
9	<i>Delonix regia</i>	Neruppu Kondrai
10	<i>Cassia fistula</i>	Sara Kondrai

(*Source: Guidance for Developing Green belts Manual, CPCB 2000)

The above-suggested list covers species with thick canopy cover, perennial green nature, native origin, and a large leaf area index. The proposed species will help in forming an effective barrier between the mine site area and the surroundings.

These species need to be planted along the periphery of the lease area for absorb fugitive emissions and noise levels which is generated during mining activities. All the open spaces, where tree plantation may not be possible, should be covered with shrubs and grass to prevent erosion of topsoil.

Some of the important aspects to be considered are:

- ✓ Planting of trees in each row will be in staggered orientation.
- ✓ In the front row, shrubs will be grown.
- ✓ Since the trunks of the tall trees are generally devoid of foliage, it will be useful to have shrubs in front of the trees so as to give coverage to this portion.
- ✓ The spacing between the trees will be maintained slightly less than the normal spaces, so that the trees may grow vertically and slightly increase the effective height of the green belt.

4.5.4. Anticipated Impact on Fauna

- Since the terrestrial fauna in the study area are distributed away from the mine site, the impacts of project are likely to be much low on terrestrial fauna of the region. The proposed mining lease area is devoid of any significant vegetation; it is not suitable for permanent habitat for any specific wildlife.
- Habitat degradation and disturbance to faunal group due to ground vibration and increase in noise level will be minimize or resolved by modern technologies. So, from above facts it is revealed that there will be no impact on fauna. No threatened fauna species reported in the core and buffer study area.

Measures for protection and conservation of wildlife species

- Topsoil has a large number of seeds of native plant species in the mining area.
- Topsoil will be used for restoration and suitable surfaces for planted seedlings.
- Checks and controls the movement of vehicles in and out of the mine.
- Undertaking mitigative measures for a conducive environment to the flora and fauna in consultation with Forest Department.
- A dust suppression system will be installed within the mine and periphery of the mine.
- Plantation around the mine area will help in creating habitats for small faunal species and create a better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

4.5.5 Impact on Aquatic Biodiversity

Mining activities will not disturb the aquatic ecology as there is no effluent discharge proposed Rough stone quarry. There is no natural perennial surface water body within the mine lease area, like wetlands, rivers streams, lakes, and farmer sites. There are few seasonal water bodies located in the study area. There are a few Canals and River located in the study area. There is no impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. Kindly refer the clause no 3.6.3. Aquatic biodiversity is observed in the study area.

4.5.6 Impacts on Bird Fauna:

The project does not involve any tree felling or removal of vegetation. Therefore, there may not be loss of nesting and roosting habitat of avian fauna.

4.5.7 Impacts on wildlife

There is no National Park, Biosphere Reserve, Wildlife corridors, and Tiger/Elephant Reserve found within 10 km radius of the project site.

TABLE 4.14: OVERALL ECOLOGICAL IMPACT ASSESSMENTS OF VENKATESAPURAM VILLAGE, ROUGH STONE QUARRY, SHOOLAGIRI TALUK, KRISHNAGIRI DISTRICT

S.No	Attributes	Assessment
1	Impact of mining activity on agricultural land nearby the proposed project site.	Seasonal Agri is done by near the proposed project site. There are no impacts on the agricultural land & Horticulture. Kindly refer to the conclusion.
	Activities of the project affect the breeding/nesting sites of birds and animals	No breeding and nesting site was identified in the mining lease site. The fauna sighted mostly migrated from the buffer area.
2	Located near an area populated by rare or endangered species	No Endangered, Critically Endangered, or vulnerable species were sighted in the core mining lease area.

3	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/coastline/estuary/sea	Athimugam R.F is located 480m for P1 and 630m for P2 on South side of the area followed by Berigai Extn R.F., is located 310m on North side, Midethepalli R.F., is located 1.8km on North east side, Berigai R.F., is located 2.9km on North side, Nariganapuram R.F., is located 3.2km on South west side, Sanamavu R.F., is located 5.4km on South west side, Kodattur R.F., is located 8.35km on North east side and Gollapally R.F., is located 8.7km on North east side of the area.
4	The proposed project restricts access to waterholes for wildlife	‘No ‘
5	Proposed mining project impact surface water quality that also provides water to wildlife	‘No ‘scheduled or threatened wildlife animals are sighted regularly core in the core area.
6	Proposed mining project increase siltation that would affect nearby biodiversity areas.	Surface runoff management such as drains is constructed properly so there will be no siltation effect in the nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities.	‘No‘
8	The project release effluents into a water body that also supplies water to a wildlife.	No water body near to core zone so the chances of water becoming polluted is low.
9	Mining projects affect the forest-based livelihood/ any specific forest product on which local livelihood depended.	‘No‘
10	The project likely to affect migration routes.	‘No ‘migration route was observed during the monitoring period.
11	The project is likely to affect the flora of an area, which have medicinal value	‘No‘
12	Forestland is to be diverted, has carbon high sequestration.	‘No ‘There was no forest land diverted.
13	The project is likely to affect wetlands, Fish breeding grounds, and marine ecology.	‘No‘. Wetland was not present in the near core Mining lease area. No breeding and nesting ground is present in the core mining area.

(*Source: EIA Guidance Manual-Mining and Minerals, 2010)

4.6 SOCIO ECONOMIC

4.6.1 Anticipated Impact

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

4.6.2 Mitigation Measures

- Good maintenance practices will be adopted for all machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Air pollution control measure will be taken to minimize the environmental impact within the core zone.
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules.
- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc., from this project directly and indirectly.
- From above details, the quarry operations will have highly beneficial positive impact in the area

4.7 OCCUPATIONAL HEALTH AND SAFETY

Occupational health and safety hazards occur during the operational phase of mining and primarily include the following:

- Respiratory hazards
- Noise
- Physical hazards
- Explosive storage and handling

4.7.1 Respiratory Hazards

Noise

Workers are likely to get exposed to excessive noise levels during mining activities. The following measures are proposed for implementation

- No employee will be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection
- The use of hearing protection will be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110 dB(A)
- Ear muffs provided will be capable of reducing sound levels at the ear to at least 85 dB(A)
- Periodic medical hearing checks will be performed on workers exposed to high noise levels

Physical Hazards

The following measures are proposed for control of physical hazards

- Specific personnel training on work-site safety management will be taken up;
- Work site assessment will be done by rock scaling of each surface exposed to workers to prevent accidental rock falling and / or landslide, especially after blasting activities;
- Natural barriers, temporary railing, or specific danger signals will be provided along rock benches or other pit areas where work is performed at heights more than 2m from ground level;
- Maintenance of yards, roads and footpaths, providing sufficient water drainage and preventing slippery surfaces with an all-weather surface, such as coarse gravel will be taken up

4.7.2 Occupational Health Survey

All the persons will undergo pre-employment and periodic medical examination. Employees will be monitored for occupational diseases by conducting the following tests

- General physical tests
- Audiometric tests
- Full chest, X-ray, Lung function tests, Spirometric tests
- Periodic medical examination – yearly
- Lung function test – yearly, those who are exposed to dust
- Eye test

Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine for immediate treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

4.8 MINE WASTE MANAGEMENT

No waste is anticipated, the entire mined out material will be sold to needy crushers and customers.

4.9 MINE CLOSURE

The ultimate depth of the mine is 46m (8m AGL + 38m BGL) – P1 & 51m (11m AGL + 40m BGL) – P2 and the life of the mine is 10 years for each mine, after completion of mining operation the following action will be taken in the project site as a part of Mine closure plan

- The total mined out land will be converted into temporary water reservoir which will facilitate to collect the rain water
- The stagnant water will be supplied to the nearby agriculture land during drought seasons
- Fencing will be re constructed around the pit after closure, the warning/ danger display board will be placed on all the sides of the project site
- The un utilized area and haul roads will be converted as plantation area, fruit bearing trees will be planted to retain the eco system of the area

- Final Mine closure plan will be prepared and submitted to the concerned authority

Mine closure plan is the most important environmental requirement in mining project. The mine closure plan should cover technical, environmental, social, legal and financial aspects dealing with progressive and post closure activities. The closure operation is a continuous series of activities starting from the decommissioning of the project.

As progressive mine closure is a continuous series of activities, it is obvious that the proposals of scientific mining have included most of the activities to be included in the closure plan. While formulating the closure objectives for the site, it is important to consider the existing or the pre-mining land use of the site; and how the operation will affect this activity.

The primary aim is to ensure that the following broad objectives along with the abandonment of the mine can be successfully achieved:

- To create a productive and sustainable after-use for the site, acceptable to mine owners, regulatory agencies, and the public
- To protect public health and safety of the surrounding habitation
- To minimize environmental damage
- To conserve valuable attributes and aesthetics
- To overcome adverse socio-economic impacts.

4.9.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

4.9.1.1 Physical Stability

All anthropogenic structures, which include mine workings, buildings, rest shelters etc., remaining after mine decommissioning should be physically stable. They should present no hazard to public health and safety as a result of failure or physical deterioration and they should continue to perform the functions for which they were designed. The design periods and factors of safety proposed should take full account of extreme events such as floods, hurricane, winds or earthquakes, etc. and other natural perpetual forces like erosion, etc.,

4.9.1.2 Chemical Stability

The solid wastes on the mine site should be chemically stable. This means that the consequences of chemical changes or conditions leading to leaching of metals, salts or organic compounds should not endanger public health and safety nor result in the deterioration of environmental attributes. If the pollutant discharges likely to cause adverse impacts is predicted in advance, appropriate mitigation measures like settling of suspended solids or passive treatment to improve water quality as well as quantity, etc., could be planned. Monitoring should demonstrate that there is no adverse effect of pollutant concentrations exceeding the statutory limits for the water, soil and air qualities in the area around the closed mine.

4.9.1.3 Biological Stability

The stability of the surrounding environment is primarily dependent upon the physical and chemical characteristics of the site, whereas the biological stability of the mine site itself is closely related to rehabilitation and final

land use. Nevertheless, biological stability can significantly influence physical or chemical stability by stabilizing soil cover, prevention of erosion/wash off, leaching, etc.,

A vegetation cover over the disturbed site is usually one of the main objectives of the rehabilitation programme, as vegetation cover is the best long-term method of stabilizing the site. When the major earthwork components of the rehabilitation programme have been completed, the process of establishing a stable vegetation community begins. For re-vegetation, management of soil nutrient levels is an important consideration. Additions of nutrients are useful under three situations.

- Where the nutrient level of spread topsoil is lower than material in-situ e.g., for development of social forestry
- Where it is intended to grow plants with a higher nutrient requirement than those occurring naturally e.g., planning for agriculture
- Where it is desirable to get a quick growth response from the native flora during those times when moisture is not a limiting factor e.g., development of green barriers

The Mine closure plan should be as per the approved mine plan. The mine closure is a part of approved mine plan and activities of closure shall be carried out as per the process described in mine closure plan.

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION

Consideration of alternatives to a project proposal is a requirement of EIA process. During the scoping process, alternatives to a proposal can be considered or refined, either directly or by reference to the key issues identified. A comparison of alternatives helps to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost-effective options.

5.1 FACTORS BEHIND THE SELECTION OF PROJECT SITE

There is already quarrying going on in the surrounding areas and some crushers are located near the proposed quarries. Most of the quarries in these areas are abandoned and existing quarries. Therefore, this quarry will provide rough stone materials to the crushing units.

The Rough Stone Quarry Project for excavation of Rough Stone, which is site specific. The proposed mining lease areas have following advantages: -

- The mineral deposit occurs in a non-forest area.
- There is no habitation within the project area; hence no R & R issues exist.
- There is no river, stream, nallah and water bodies in the applied mine lease areas.
- Availability of skilled, semi-skilled and unskilled workers in this region.
- All the basic amenities such as medical, firefighting, education, transportation, communication and infrastructural facilities are well connected and accessible.
- The mining operations will not intersect the ground water level. Hence, no impact on ground water environment.
- Study area falls in seismic zone – II, there is no major history of landslides, earthquake, subsidence etc., recorded in the past history.

5.2 ANALYSIS OF ALTERNATIVE SITE

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

5.3 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY

The existing quarries in the area operated by Opencast Mechanised Mining operation with drilling and blasting method will be used to extract Rough Stone in the area. All the applied mining lease area have following advantages –

- As the mineral deposition is homogeneous and batholith formation, therefore opencast method of working is preferred over underground method
- The material will be loaded with the help of excavators into dumpers / trippers and transported to the needy customers.
- Blasting and availability of drills along with controlled blasting technology gives desired fragmentation so that the mineral is handled safely and used without secondary blasting.

- Semi-skilled labours fit for quarrying operations are easily available around the nearby villages.

5.4 ANALYSIS OF ALTERNATIVE TECHNOLOGY

Open cast mechanized method has been selected for these projects. This technology is having least gestation period, economically viable, safest and less labour intensive. The method has inbuilt flexibility for increasing or decreasing the production as per market condition.

6. ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

The main objective of environmental monitoring is to ensure that the obtained results in respect of environmental attributes and prevailing conditions during operation stage are in conformity with the prediction during the planning stage. In case of substantial deviation from the earlier prediction of results, this forms as base data to identify the cause and suggest remedial measures. Environmental monitoring is mandatory to meet compliance of statutory provisions under the Environment (Protection) Act, 1986, relevant conditions regarding monitoring covered under EC orders issued by the SEIAA as well as the conditions set forth under the order issued by Tamil Nadu Pollution Control Board while granting CTO.

6.1 METHODOLOGY OF MONITORING MECHANISM

Implementation of EMP and periodic monitoring will be carried out by the project proponent. A comprehensive monitoring mechanism has been devised for monitoring of impacts due to this project; Environmental protection measures like dust suppression, control of noise and blast vibrations, maintenance of machinery and vehicles, housekeeping in the mine premises, plantation, implementation of Environmental Management Plan and environmental clearance conditions will be monitored by Mine Management. On the other hand, implementation of area level protection measures like green belt development, environmental quality monitoring etc., are taken up by a senior executive who reports to their Mine Management.

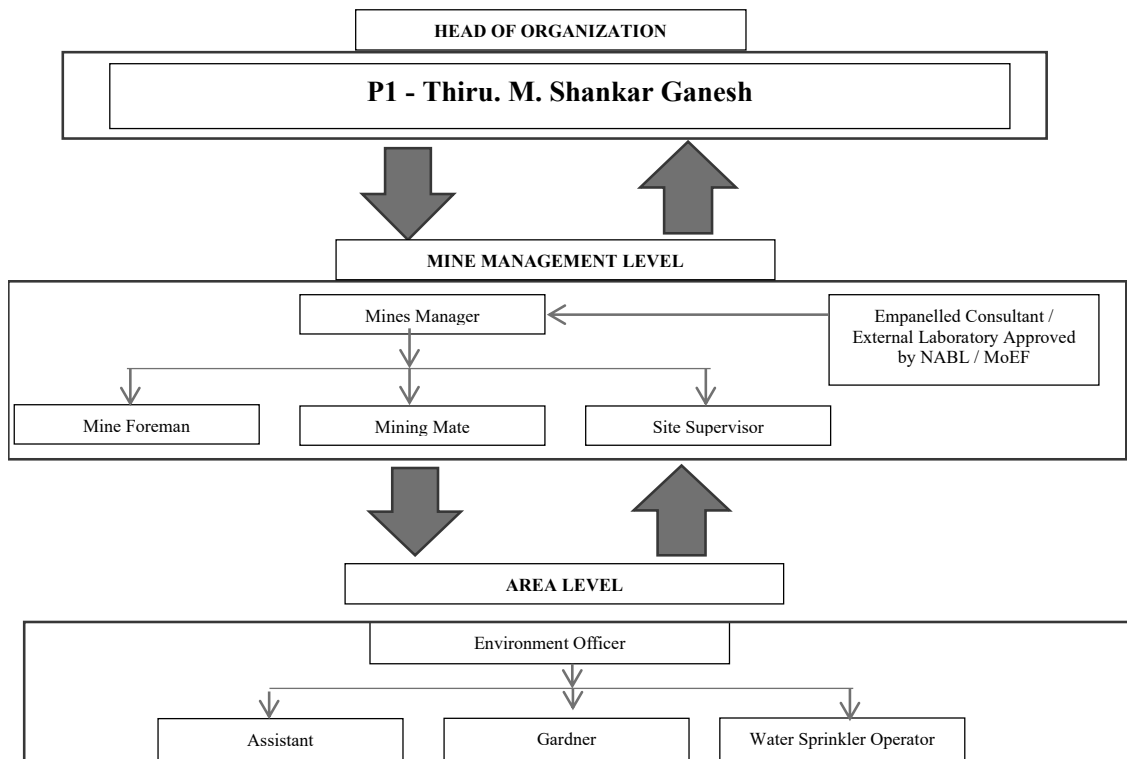
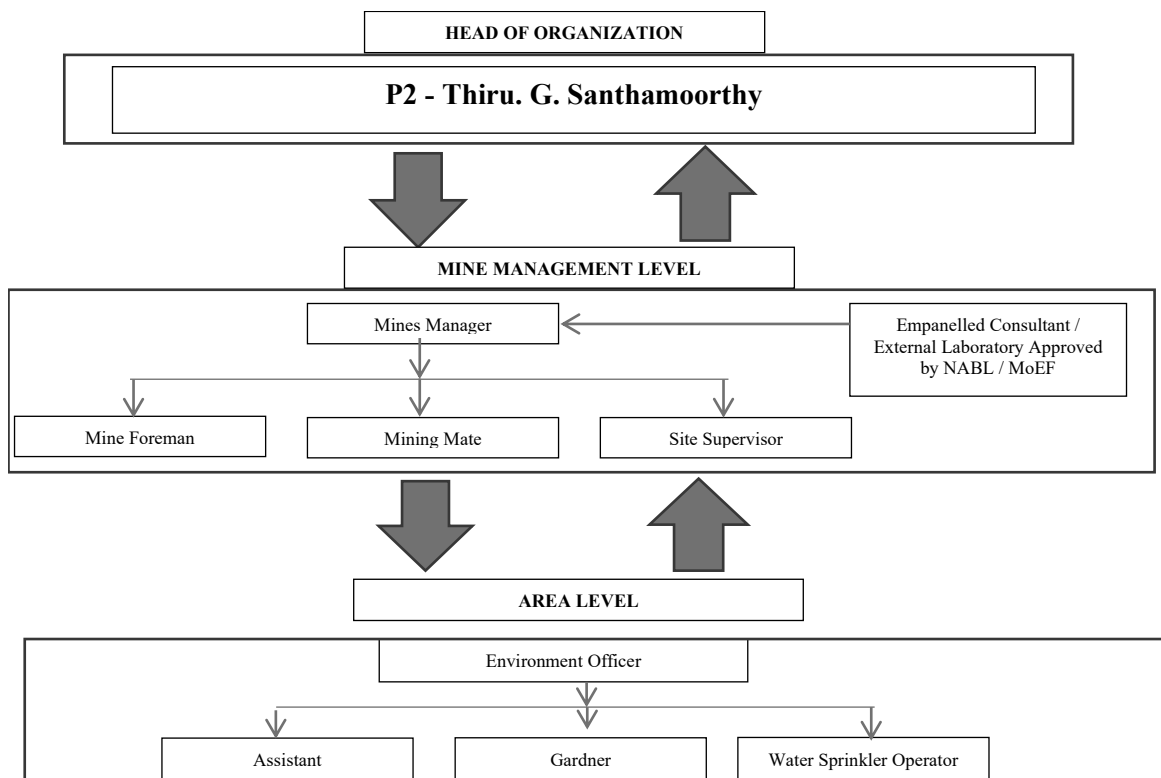
An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in all the proposed quarries.

The responsibilities of this cell will be:

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

The environmental monitoring cell will co-ordinate all monitoring programs at site and data thus generated will be regularly furnished to the State regulatory agencies as compliance status reports. The sampling and analysis report of the monitored environmental attributes will be submitted to the Tamil Nadu Pollution Control Board (TNPCB) at a frequency of half-yearly and yearly by each proposed project proponent. The half-yearly reports are submitted to Ministry of Environment and Forest, Regional Office and SEIAA as well.

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB)/Ministry of Environment, Forest and Climate Change (MoEF& CC).

FIGURE 6.1: PROPOSED ENVIRONMENTAL MONITORING CELL – P1**FIGURE 6.1-A: PROPOSED ENVIRONMENTAL MONITORING CELL – P2**

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

The mitigation measures proposed in Chapter-4 will be implemented so as to reduce the impact on the environment due to the operations of the proposed project. Implementation schedule of mitigation measures is given in Table 6.1.

TABLE 6.1 IMPLEMENTATION SCHEDULE

SI No.	Recommendations	Time Period	Schedule
1	Land Environment Control Measures	Before commissioning of the project	Immediately after the commencement of project
2	Soil Quality Control Measures	Before commissioning of the project	Immediately after the commencement of project
3	Water Pollution Control Measures	Before commissioning of the project and along with mining operation	Immediately and as project progress
4	Air Pollution Control Measures	Before commissioning of the project and along with mining operation	Immediately and as project progress
5	Noise Pollution Control Measures	Before commissioning of the project and along with mining operation	Immediately and as project progress
6	Ecological Environment	Phase wise implementation every year along with mine operations	Immediately and as project progress

6.3 MONITORING SCHEDULE AND FREQUENCY

The environmental monitoring will be conducted in the mine operations as follows:

- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil Quality; and
- Greenbelt Development

The details of monitoring are detailed in Table 6.2

TABLE 6.2: PROPOSED MONITORING SCHEDULE POST EC

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

Source: Guidance of manual for mining of minerals, February 2010

6.4 BUDGETARY PROVISION FOR EMP

The cost in respect of monitoring of environmental attributes, parameter to be monitored, sampling/monitoring locations with frequency and cost provision against each proposal is shown in Table 6.3. Monitoring work will be outsourced to external laboratory approved by NABL / MoEF.

The proposed capital cost for Environmental Monitoring Programme is Rs 76,000/- per annum for Proposed Project.

TABLE 6.3 ENVIRONMENT MONITORING PROGRAM BUDGET

PROPOSAL			
Sl.No.	Parameter	Capital Cost	Recurring Cost per annum
1	Air Quality	Rs. 76,000/-	Rs. 76,000/-
2	Meteorology		
3	Water Quality		
4	Hydrology		
5	Soil Quality		
6	Noise Quality		
7	Vibration Study		
Total		Rs 76,000/-	Rs 76,000/-

Source: Approved Mining Plan

6.5 REPORTING SCHEDULES OF MONITORED DATA

The monitored data on air quality, water quality, noise levels and other environmental attributes will be periodically examined by the Cluster Mine Management Coordinator and Respective Head of Organization for taking necessary corrective measures. The monitoring data will be submitted to Tamil Nadu State Pollution Control Board in the Compliance to CTO Conditions & environmental audit statements every year to MoEF& CC and Half-Yearly Compliance Monitoring Reports to MoEF& CC Regional Office and SEIAA.

Periodical reports to be submitted to: -

- MoEF& CC – Half yearly status report
- TNPCB - Half yearly status report
- Department of Geology and Mining: quarterly, half yearly annual reports

Besides the Mines Manager/Agent of respective project will submit the periodical reports to –

- Director of mines safety,
- Labour enforcement officer,
- Controller of explosives as per the norms stipulated by the department.

7. ADDITIONAL STUDIES

7.0 GENERAL

The following Additional Studies were done as per items identified by project proponent and items identified by regulatory authority. And items identified by public and other stakeholders will be incorporated after Public Hearing.

- Public Consultation
- Risk Assessment
- Disaster Management Plan
- Cumulative Impact Study
- Plastic Waste Management
- Post-COVID Health Management Plan

7.1. PUBLIC CONSULTATION

Application to The Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district is submitted along with this Draft EIA / EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP Report.

7.2 RISK ASSESSMENT

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

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

Factors of risks involved due to human induced activities in connection with these proposed mining & allied activities with detailed analysis of causes and control measures for the mine is given in below Table 7.1.

TABLE 7.1 RISK ASSESSMENT & CONTROL MEASURES

S. No	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries	Improper handling and unsafe working practice	All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations; Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited;

			Fire-fighting and first-aid provisions in the mine office complex and mining area; Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use Working of quarry, as per approved plans and regularly updating the mine plans; Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut; Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager; Maintenance and testing of all mining equipment as per manufacturer 's guidelines.
2	Drilling	Improper and unsafe practices Due to high pressure of compressed air, hoses may burst Drill Rod may break	Safe operating procedure established for drilling (SOP) will be strictly followed. Only trained operators will be deployed. No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places, Drilling shall not be carried on simultaneously on the benches at places directly one above the other. Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. Operator shall regularly use all the personal protective equipment.
4	Blasting	Fly rock, ground vibration, Noise and dust. Improper charging, stemming & Blasting/fining of blast holes Vibration due to movement of vehicles	Restrict maximum charge per delay as per regulations and by optimum blast hole pattern, vibrations will be controlled within the permissible limit and blasting can be conducted safely. SOP for Charging, Stemming & Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation Shots are fired during daytime only. All holes charged on any one day shall be fired on the same day. The danger zone will be distinctly demarcated (by means of red flags)
5	Transportation	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	Before commencing work, drivers personally check the dumper/truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition. Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle. Concave mirrors should be kept at all corners All vehicles should be fitted with reverse horn with one spotter at every tipping point Loading according to the vehicle capacity Periodical maintenance of vehicles as per operator manual

6	Natural calamities	Unexpected happenings	Escape Routes will be provided to prevent inundation of storm water Fire Extinguishers & Sand Buckets
7	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m height.

Source: Analysed and proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN

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

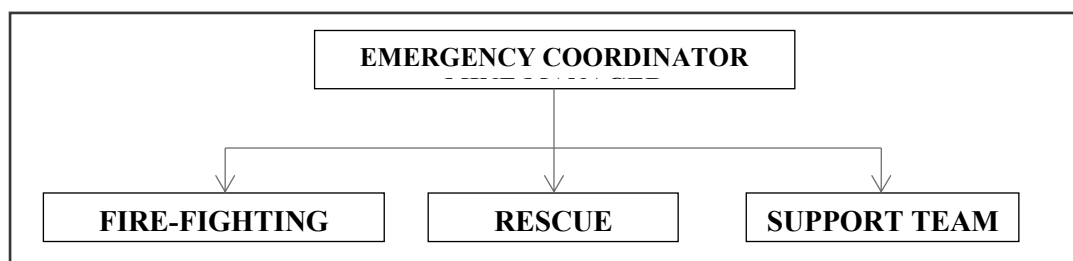
The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

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

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

In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations and the coordination among key personnel and their team has been shown in Fig 7.1.

FIGURE 7.1: DISASTER MANAGEMENT TEAM LAYOUT



The emergency organization shall be headed by emergency coordinator who will be qualified competent mine manager. In his absence senior most people available at the mine shall be emergency coordinator till arrival of mine manager. There would be three teams for taking care of emergency situations – Fire-Fighting Team, Rescue Team and Support Team. The proposed composition of the teams is given in Table 7.2.

TABLE 7.2: PROPOSED TEAMS TO DEAL WITH EMERGENCY SITUATION

DESIGNATION	QUALIFICATION
FIRE-FIGHTING TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member	Mines Foreman
Team Member	Mining Mate
RESCUE TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member/ Incident Controller (IC)	Environment Officer
Team Member	Mining Foreman
SUPPORT TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Assistant Team Leader	Environment Officer
Team Member	Mining Mate
Security Team Leader/ Emergency Security Controller	Mines Foreman

Once the mine becomes operational, the above table along with names of personnel will be prepared and made easily available to workers. A mobile communication network and wireless shall connect Mine Emergency Control Room (MECR) to control various departments of the mine, fire station and neighbouring industrial units/mines.

Roles and responsibilities of emergency team –

(a) Emergency coordinator (EC)

The emergency coordinator shall assume absolute control of site and shall be located at MECR.

(b) Incident controller (IC)

Incident controller shall be a person who shall go to the scene of emergency and supervise the action plan to overcome or contain the emergency. Shift supervisor or Environmental Officer shall assume the charge of IC.

(c) Communication and advisory team

The advisory and communication team shall consist of heads of Mining Departments i.e., Mines Manager

(d) Roll call coordinator

The Mine Foreman shall be Roll Call Coordinator. The roll call coordinator will conduct the roll call and will evacuate the mine personnel to assembly point. His prime function shall be to account for all personnel on duty.

(e) Search and rescue team

There shall be a group of people trained and equipped to carryout rescue operation of trapped personnel. The people trained in first aid and fire-fighting shall be included in search and rescue team.

(f) Emergency security controller

Emergency Security Controller shall be senior most security person located at main gate office and directing the outside agencies e.g., fire brigade, police, doctor and media men etc.,

Emergency control procedure –

The onset of emergency, will in all probability, commence with a major fire or explosion or collapse of wall along excavation and shall be detected by various safety devices and also by members of operational staff on duty. If located by a staff member on duty, he (as per site emergency procedure of which he is adequately briefed) will go to nearest alarm call point, break glass and trigger off the alarms. He will also try his best to inform about location and nature of accident to the emergency control room. In accordance with work emergency procedure the following key activities will immediately take place to interpret and take control of emergency.

- On site fire crew led by a fireman will arrive at the site of incident with fire foam tenders and necessary equipment.
- Emergency security controller will commence his role from main gate office
- Incident controller shall rush to the site of emergency and with the help of rescue team and will start handling the emergency.
- Site main controller will arrive at MECR with members of his advisory and communication team and will assume absolute control of the site.
- He will receive information continuously from incident controller and give decisions and directions to:
 - Incident controller
 - Mine control rooms
 - Emergency security controller

Proposed fire extinguishers at different locations –

The following type of fire extinguishers has been proposed at strategic locations within the mine.

TABLE 7.3: PROPOSED FIRE EXTINGUISHERS AT DIFFERENT LOCATIONS

LOCATION	TYPE OF FIRE EXTINGUISHERS
Electrical Equipment's	CO ₂ type, foam type, dry chemical powder type
Fuel Storage Area	CO ₂ type, foam type, dry chemical powder type, Sand bucket
Office Area	Dry chemical type, foam type

Alarm system to be followed during disaster –

On receiving the message of disaster from Site Controller, fire-fighting team, the mine control room attendant will sound siren wailing for 5 minutes. Incident controller will arrange to broadcast disaster message through public address system. On receiving the message of "Emergency Over" from Incident Controller the emergency control room attendant will give "All Clear Signal", by sounding alarm straight for 2 minutes.

7.4 CUMULATIVE IMPACT STUDY

For easy representation of Proposed and Existing Quarries in the Cluster are given unique codes and identifies and studied in this EIA EMP Report.

TABLE 7.4: LIST OF QUARRIES WITHIN 500 METER RADIUS

CODE	Name of the Owner	Village/ Taluk	S.F. Nos	Extent in Ha	Status
PROPOSED QUARRY					
P1	Thiru. M. Shankar Ganesh, S/o. Mallappachetty, Door No. 199, Thippanappalli Village, Nedumaruthi Post, Krishnagiri Taluk and District.	Venkatesapuram Village, Shoolagiri Taluk	132 (P-2)	1.45.0	File No: 12104 ToR Identification No: TO25B0108TN573 1666N Dated: 17.06.2025
P2	Thiru. G. Santhamoorthy, S/o. Govindarajan, Sundarampalli, Krishnapuram Taluk, Tirupattur District.		132 (P-1)	1.55.0	File No: 12102 ToR Identification No: TO25B0108TN532 9544N Dated: 17.06.2025
P3	M/s. Ultra Mines		133/1(P), 133/2&4, 134/1&2	4.40.0	Mining Plan Approved
	TOTAL EXTENT			7.40.0	
EXISTING QUARRY					
E-1	M/s. Sumukha Blue Metals & M Sand	Venkatesapuram Village, Shoolagiri Taluk	294 (P-2)	3.75.0	30.04.2021 to 29.04.2031
E-2	Thiru. V. Nataraja S/o. Venkatappa Reddy		287/1	2.16.0	19.02.2021 to 18.02.2031
E-3	M/s. Sumukha Blue Metals & M Sand		288(P)	3.00.0	10.02.2025 to 09.02.2030
E-4	Tvl. Mars Blue Metals		135 (P-2)	3.00.0	19.06.2019 to 18.02.2031
	TOTAL EXTENT			11.91.0 Ha	
EXPIRED QUARRY					
EX-1	Thiru. Muniraj	Venkatesapuram Village, Shoolagiri Taluk	285 (P)	4.92.0	04.07.2018 to 03.07.2023
	TOTAL EXTENT			4.92.0 Ha	
	TOTAL CLUSTER EXTENT			19.31.0 Ha	

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

TABLE 7.5-A: SALIENT FEATURES OF PROPOSAL “P1”

Name of the Project	Thiru. M. Shankar Ganesh Rough Stone quarry		
S.F. No.	132 (Part-2)		
Extent	1.45.0Ha		
Village Taluk and District	Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State.		
Land Type	Government Land – Tender Quarry		
Toposheet No	57 H/13		
Latitude between	12°45’21.78”N to 12°45’26.73”N		
Longitude between	77°57’16.85”E to 77°57’22.14”E		
Elevation of the area	874m-882m AMSL		
Water Level in the region	72m – 75m BGL		
Lease period	10 Years		
Mining Plan period	10 Years		
Proposed Depth of Mining	46m (8m AGL + 38m BGL)		
	Rough Stone in Ts	Weathered Rock in Ts	Topsoil in Ts
Geological Resources	16,43,375	57,888	28,944
Mineable Reserves	4,98,523	40,320	21,576
Year wise Production	4,98,523	40,320	21,576
Peak Production	83,187	14,040	13,764
Ultimate Pit Dimension	116m (L) X 93m (W) X 46m (8m AGL + 38m BGL) (D)		
Method of Mining	Opencast Mechanized Mining Method is being carried out with 5.0-meter vertical bench with a bench width is not less than the bench height		
Machinery proposed	Jack Hammer	5 Nos	
	Compressor	1 No	
	Excavator with Bucket and Rock Breaker	1 No	
	Tipper	2 Nos	
	Water sprinkler	1 No	
Proposed Manpower Deployment	26 Nos		
Project Cost	Rs. 4,67,93,000/-		
CER Cost	Rs. 3,00,000/-		
Greenbelt Development Plan	Proposed to plant 720 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	2.0 KLD		
Nearest Habitation	480m– North West		

Source: Approved Mining Plan

TABLE 7.5-B: SALIENT FEATURES OF PROPOSAL “P2”

Name of the Project	Thiru. G. Santhamoorthy Rough Stone quarry		
S.F. No.	132 (Part-1)		
Extent	1.55.0Ha		
Village Taluk and District	Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State.		
Land Type	Government Land – Tender Quarry		
Toposheet No	57 H/13		
Latitude between	12°45'25.93"N to 12°45'30.58"N		
Longitude between	77°57'14.85"E to 77°57'19.67"E		
Elevation of the area	880m-870m AMSL		

Water Level in the region	72m – 75m BGL		
Lease period	10 Years		
Mining Plan period	10 Years		
Proposed Depth of Mining	51m (11m AGL + 40m BGL)		
	Rough Stone in m³	Weathered Rock in m³	Topsoil in m³
Geological Resources	7,08,840	31,232	15,616
Mineable Reserves	1,88,280	20,972	11,009
Year wise Production	1,88,280	20,972	11,009
Peak Production	31,130	10,976	4,040
Ultimate Pit Dimension	109m (L) X 101m (W) X 51m (11m AGL + 40m BGL) (D)		
Method of Mining	Opencast Mechanized Mining Method is being carried out with 5.0-meter vertical bench with a bench width is not less than the bench height		
Machinery proposed	Jack Hammer	6 Nos	
	Compressor	2 Nos	
	Excavator with Bucket and Rock Breaker	1 No	
	Tipper	2 Nos	
	Water sprinkler	1 No	
Proposed Manpower Deployment	28 Nos		
Project Cost	Rs. 4,53,80,000 /-		
CER Cost	Rs. 3,00,000/-		
Greenbelt Development Plan	Proposed to plant 770 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	2.0 KLD		
Nearest Habitation	370m– North West		

Source: Approved Mining Plan

TABLE 7.5-C: SALIENT FEATURES OF PROPOSAL “P3”

Name of the Quarry	M/s. Ultra-Mines Private Limited Rough Stone and Gravel Quarry	
S.F.No	133/1(Part), 133/2, 133/4, 134/1 & 134/2	
Extent	4.40.0 Ha	
Toposheet No	57 - H/13	
Latitude between	12°45'14.72"N to 12°45'26.27"N	
Longitude between	77°57'14.30"E to 77°57'23.15"E	
Proposed Depth of Mining	45 m (10m AGL + 35mBGL)	
Mining Plan period	5 Years	
	Rough Stone in m³	Gravel in m³
Geological Resources	19,49,296	89,832
Mineable Reserves	6,01,641	63,116
Year wise production details	5,88,141	63,116
Peak Production	1,30,895	32,352
Water Level in the surrounds area	60 – 65 m BGL	
Method of Mining	Open cast Semi - Mechanized Mining Method	
Machinery proposed	Jack Hammer	3 Nos
	Compressor	2 No
	Excavator	1 No
	Tippers	9 Nos
Proposed Manpower Deployment	24 Nos	
Project Cost	Rs. 2,20,37,820/-	
CER Cost	Rs.5,00,000/-	

Greenbelt Development Plan	Proposed to plant 2,200 Nos of trees considering 500 Nos of trees/ Ha criteria.
Proposed Water Requirement	4.0 KLD
Nearest Habitation	450m – South West

Source: Approved Mining Plan & EC Copy

TABLE 7.6-A: SALIENT FEATURES OF PROPOSAL “E1”

Name of the Quarry	M/s.Sumuka Blue Metals & M. Sand Rough Stone Quarry	
S.F.No	294 (Part-II)	
Extent	3.75.0 Ha	
Toposheet No	57 - H/14	
Latitude between	12° 45' 13.34"N to 12° 45' 21.01"N	
Longitude between	77° 57' 28.25"E to 77° 57' 35.28"E	
Proposed Depth of Mining	36m BGL	
Mining Plan period	3 Years	
Geological Resources	Rough Stone in m³	Topsoil in m³
	13,32,975	77,148
Mineable Reserves	6,45,075	32,519
Year wise production details	4,11,755	32,519
Peak Production	1,76,820	32,519
Water Level in the surrounds area	85m bgl	
Method of Mining	Mechanized mining method	
Machinery proposed	Jack Hammer	1 Nos
	Compressor	1 No
	Excavator	1 No
	Tippers	4 Nos
Proposed Manpower Deployment	18 Nos	
Project Cost	Rs. 6,26,40,000/-	
CER Cost	Rs.5,00,000/-	
Greenbelt Development Plan	Proposed to plant 1,880 Nos of trees considering 500 Nos of trees/ Ha criteria.	
Proposed Water Requirement	2.0 KLD	
Nearest Habitation	500m – North East	

Source: Approved Mining Plan & EC Copy

TABLE 7.6-B: SALIENT FEATURES OF PROPOSAL “E2”

Name of the Quarry	Thiru V Nagaraja Rough Stone Quarry	
S.F.No	S.F. Nos. 287/1	
Extent	2.16.0 Ha	
Toposheet No	57 - H/14	
Latitude between	12° 45'13.88" N To 12° 45'22.70" N	
Longitude between	77° 57' 34.81" E To 77° 57' 39.68" E	
Proposed Depth of Mining	47m (28m AGL & 19m BGL)	
Mining Plan period	3 Years	
Geological Resources	Rough Stone in m³	Topsoil in m³
	6,96,340	1,44,937
Mineable Reserves	2,53,495	1,07,722
Year wise production details	2,53,495	1,07,722
Peak Production	99,775	1,07,722
Water Level in the surrounds area	90m bgl	
Method of Mining	Mechanized mining method	
Machinery proposed	Jack Hammer	4 Nos

	Compressor	1 No
	Excavator	1 No
	Tippers	2 Nos
Proposed Manpower Deployment	18 Nos	
Project Cost	Rs. 54,68,000/-	
CER Cost	Rs.5,00,000/-	
Greenbelt Development Plan	Proposed to plant 1,080 Nos of trees considering 500 Nos of trees/ Ha criteria.	
Proposed Water Requirement	1.9 KLD	
Nearest Habitation	380m – North East	

Source: Approved Mining Plan & EC Copy

TABLE 7.6-C: SALIENT FEATURES OF PROPOSAL “E3”

Name of the Quarry	M/s.Sumuka Blue Metals & M. Sand Rough Stone Quarry
S.F.No	288 (Part)
Extent	3.00.0 Ha
Toposheet No	57 - H/14
Latitude between	12°45'10.63"N to 12°45'15.31"N
Longitude between	77°57'32.71"E to 77°57'39.47"E
Proposed Depth of Mining	59m (20m AGL + 39m BGL)
Mining Plan period	5 Years
Year wise production details	Rough Stone in m³
	2,53,413
Peak Production	75,364
Water Level in the surrounds area	68m bgl
Method of Mining	Mechanized mining method
Proposed Manpower Deployment	18 Nos
Project Cost	Rs. 2,34,00,000/- Lakh
CER Cost	Rs.5,00,000/-
Greenbelt Development Plan	Proposed to plant 1,500 Nos of trees considering 500 Nos of trees/ Ha criteria.
Proposed Water Requirement	2.0 KLD
Nearest Habitation	420m – North East

Source: Approved Mining Plan & EC Copy

TABLE 7.6-D: SALIENT FEATURES OF PROPOSAL “E4”

Name of the Quarry	M/s. MARS BLUE METALS Rough Stone Quarry
S.F.No	135 (Part-II)
Extent	3.00.0 Ha
Toposheet No	57 - H/14
Latitude between	12°45'21.41"N to 12°45'15.20"N
Longitude between	77°57'10.43"E to 77°57'3.96"E
Proposed Depth of Mining	77m
Mining Plan period	5 Years
Year wise production details	Rough Stone in m³
	4,67,322
Water Level in the surrounds area	72m – 75m BGL
Method of Mining	Opencast Semi Mechanised Mining
Proposed Manpower Deployment	18 Nos
Project Cost	Rs.222.10 Lakhs
CER Cost	Rs.5,00,000/-
Greenbelt Development Plan	Proposed to plant 1,500 Nos of trees considering 500 Nos of trees/ Ha criteria.

Proposed Water Requirement	2.5 KLD
Nearest Habitation	400m – South West

Source: Approved Mining Plan & EC Copy

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the quarries (proposed and existing) within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting.

Air Environment –

Calculating the Cumulative Load of Mining within the cluster is as shown in table 7.7 to 7.9.

TABLE 7.7: CUMULATIVE PRODUCTION LOAD OF ROUGH STONE

Quarry	Year wise production	Per Year Production	Per Day Production	Number of Lorry Load Per Day
P1 (10 Years)	4,98,523 Ts	49,852 Ts	166 Ts (60 m ³)	5
P2 (10 Years)	1,88,280 m ³	18,828 m ³	63 m ³	5
P3 (5 Years)	5,88,141 m ³	1,17,628 m ³	392 m ³	33
Total	-	-	515	43
E1 (3 Years)	4,11,755 m ³	1,37,252 m ³	458 m ³	38
E2 (3 Years)	2,53,495 m ³	84,498 m ³	282 m ³	24
E3 (5 Years)	2,53,413 m ³	50,683 m ³	169 m ³	14
E4 (5 Years)	4,67,322 m ³	93,464 m ³	312 m ³	26
Total	-	-	1,221	102
Grand Total	-	-	1,736	145

TABLE 7.8: CUMULATIVE PRODUCTION LOAD OF WEATHERED ROCK

Quarry	Year wise production	Per Year Production	Per Day Production	Number of Lorry Load Per Day
P1 (4 Years)	40,320 Ts	10,080 Ts	34 Ts (12 m ³)	1
P2 (3 Years)	20,972 m ³	6,991 m ³	23 m ³	2
P3	-	-	-	-
Total	-	-	35	3
E1	-	-	-	-
E2	-	-	-	-
E3	-	-	-	-
E4	-	-	-	-
Total	-	-	-	-
Grand Total	-	-	35	3

TABLE 7.9: CUMULATIVE PRODUCTION LOAD OF GRAVEL/ TOPSOIL

Quarry	Year wise production	Per Year Production	Per Day Production	Number of Lorry Load Per Day
P1 (2 Years)	21,576 Ts	10,788 Ts	36 Ts (13 m ³)	1
P2 (3 Year)	11,009 m ³	3,670 m ³	12 m ³	1
P3 (3 Year)	63,116 m ³	21,039 m ³	70 m ³	6
Total	-	-	95	8
E1 (1 Year)	32,519 m ³	32,519 m ³	108 m ³	9
E2 (1 Year)	1,07,722 m ³	1,07,722 m ³	359 m ³	30
E3	-	-	-	-
E4	-	-	-	-

Grand Total	-	-	467	39
--------------------	---	---	------------	-----------

On a cumulative basis considering the proposed quarries, it can be seen that the overall production of Rough Stone is 1,736m³ per day with a capacity of 145trips of Rough Stone per day, Weathered Rock is 35m³ per day with a capacity of 3trips of Weathered Rock per day and Gravel/Topsoil is 467m³ per day with a capacity of 39trips of from the cluster.

Based on the above production quantities the emissions due to various activities in all the mines includes various activities like ground preparation, excavation, handling and transport of ore. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 7.10.

TABLE 7.10: EMISSION ESTIMATION FROM QUARRIES WITHIN 500 METER RADIUS

EMISSION ESTIMATION FOR QUARRY “P1”				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.102459034	g/s
	Blasting	Point Source	0.002731277	g/s
	Mineral Loading	Point Source	0.044850280	g/s
	Haul Road	Line Source	0.002499385	g/s/m
	Overall Mine	Area Source	0.047118005	g/s
	Estimated Emission Rate for SO ₂	Overall Mine	0.001113556	g/s
EMISSION ESTIMATION FOR QUARRY “P2”				
	Activity	Source type		Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.079710840	g/s
	Blasting	Point Source	0.000778397	g/s
	Mineral Loading	Point Source	0.041081831	g/s
	Haul Road	Line Source	0.002489321	g/s/m
	Overall Mine	Area Source	0.046609996	g/s
	Estimated Emission Rate for SO ₂	Overall Mine	0.000481278	g/s
EMISSION ESTIMATION FOR QUARRY “P3”				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.112018849	g/s
	Blasting	Point Source	0.004266483	g/s
	Mineral Loading	Point Source	0.046614487	g/s
	Haul Road	Line Source	0.002507495	g/s/m
	Overall Mine	Area Source	0.075542068	g/s
	Estimated Emission Rate for SO ₂	Overall Mine	0.001769036	g/s
EMISSION ESTIMATION FOR QUARRY “E1”				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.122595239	g/s
	Blasting	Point Source	0.006698576	g/s
	Mineral Loading	Point Source	0.047788280	g/s
	Haul Road	Line Source	0.002514648	g/s/m
	Overall Mine	Area Source	0.072720992	g/s
	Estimated Emission Rate for SO ₂	Overall Mine	0.002213716	g/s
EMISSION ESTIMATION FOR QUARRY “E2”				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.103257287	g/s
	Blasting	Point Source	0.002839344	g/s

	Mineral Loading	Point Source	0.047746063	g/s
	Haul Road	Line Source	0.002514362	g/s/m
	Overall Mine	Area Source	0.057775364	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.001932724	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000098872	g/s
EMISSION ESTIMATION FOR QUARRY “E3”				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.094921233	g/s
	Blasting	Point Source	0.001863937	g/s
	Mineral Loading	Point Source	0.043147216	g/s
	Haul Road	Line Source	0.002493855	g/s/m
	Overall Mine	Area Source	0.061808605	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.000844565	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000055655	g/s
EMISSION ESTIMATION FOR QUARRY “E4”				
Estimated Emission Rate for PM ₁₀	Activity	Source type	Value	Unit
	Drilling	Point Source	0.101252906	g/s
	Blasting	Point Source	0.002574257	g/s
	Mineral Loading	Point Source	0.044086013	g/s
	Haul Road	Line Source	0.002496665	g/s/m
	Overall Mine	Area Source	0.062476362	g/s
Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.001040021	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000069021	g/s

Source: Emission Calculation

TABLE 7.11: INCREMENTAL & RESULTANT GLC WITHIN CLUSTER

PM₁₀ in µg/m³	
Background	35.9
Incremental	12.63
Resultant	48.53
NAAQ Norms	100 µg/m³
PM_{2.5} in µg/m³	
Background	21.2
Incremental	5.87
Resultant	27.07
NAAQ Norms	60 µg/ m³
So₂ in µg/m³	
Background	6.5
Incremental	1.1
Resultant	7.6
NAAQ Norms	80 µg/ m³
No₂ in µg/m³	
Background	23.1
Incremental	6.72
Resultant	29.82
NAAQ Norms	80 µg/ m³

Noise Environment –

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks& HEMM. Cumulative Noise modelling has been carried out considering blasting and compressor operation (drilling) and transportation

activities. Predictions have been carried out to compute the noise level at various distances around the different quarries within the 500 m radius.

For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using model based on first principle.

$$L_{p2} = L_{p1} - 20 \log (r_2/r_1) - Ae_{1,2}$$

Where:

L_{p1} & L_{p2} are sound levels at points located at distances r_1 & r_2 from the source.

$Ae_{1,2}$ is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

$$L_{p\text{total}} = 10 \log \{10^{(L_{p1}/10)} + 10^{(L_{p2}/10)} + 10^{(L_{p3}/10)} + \dots\}$$

Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are:

Source data has been computed taking into account of all the machinery and activities used in the mining process.

TABLE 7.12: PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Industrial Standards dB(A)
P1	58.6	60.1	62.4	Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)
P2	58.6	60.1	62.4	
P3	59.0	54.1	60.2	
E1	57.0	52.1	58.2	
E2	56.5	52.1	57.9	
E3	56.5	52.1	57.9	
E4	59.0	60.1	62.6	

Source: Lab Monitoring Data

The incremental noise level is found within the range of 58.6dB (A) in Core zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000(The Principal Rules were published in the Gazette of India, vide S.O.123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E),dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986).

Ground Vibrations

Ground vibrations due to mining activities in each Mines within cluster are anticipated due to operation of Mining Machines like Excavators, drilling and blasting, transportation vehicles, etc. However, the major source of ground vibration from each mine is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements nearby the mining areas and may cause injury to persons or damage to the structures. Nearest Habitations from each mine respectively are as in below.

TABLE 7.13: NEAREST HABITATION FROM EACH MINES

Location ID	Distance & Direction
P1	480m– North West
P2	370m– North West
P3	450m – South West
E1	500m – North East
E2	380m – North East
E3	420m – North East
E4	400m – South West

The ground vibrations due to the blasting in all the mines are calculated using the empirical equation for assessment of peak particle velocity (PPV) is:

$$V = K [R/Q^{0.5}]^{-B}$$

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

Q = maximum instantaneous charge (kg)

B = constant related to the rock and site (usually 1.6)

R = distance from charge (m)

TABLE 7.14: GROUND VIBRATIONS AT EACH MINES

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	20	480m– North West	0.282
P2	20	370m– North West	0.427
P3	20	450m – South West	0.312
E1	20	500m – North East	0.264
E2	20	380m – North East	0.409
E3	20	420m – North East	0.349
E4	20	400m – South West	0.377

Source: Blasting Calculations

From the above table, the charge per blast is considered as maximum in each mine and the resultant PPV is well below the Peak Particle Velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

Socio Economic Environment –

Each mine shall contribute towards CER and the community shall develop.

TABLE 7.15: SOCIO ECONOMIC BENEFITS FROM EACH MINES

Location ID	Project Cost	CER
P1	Rs. 4,67,93,000/-	Rs. 3,00,000/-
P2	Rs. 4,53,80,000 /-	Rs. 3,00,000/-
P3	Rs. 2,20,37,820/-	Rs. 5,00,000/-
Total	Rs. 11,42,10,820/-	Rs. 11,00,000/-
E1	Rs. 6,26,40,000/-	Rs. 5,00,000/-

E2	Rs. 54,68,000/-	Rs. 5,00,000/-
E3	Rs. 2,34,00,000/-	Rs. 5,00,000/-
E4	Rs. 2,22,10,000/-	Rs. 5,00,000/-
Total	Rs. 11,37,18,000/-	Rs. 20,00,000/-
Grand. Total	Rs. 22,79,28,820/-	Rs. 31,00,000/-

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III, Dated: 01.05.2018 by all the mines.

TABLE 7.16: EMPLOYMENT BENEFITS FROM EACH MINES

Description	Employment
P1	26
P2	28
P3	24
Total	78
E1	18
E2	18
E3	18
E4	18
Total	72
Grand Total	150

A total of 78 people will get employment due to proposed mines in cluster and remaining people are already employed at existing mines.

TABLE 7.17: GREENBELT DEVELOPMENT BENEFITS FROM EACH MINES

Code	No of Trees proposed to be planted	Area Covered Sq.m	Name of the Species
P1	720	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development	Neem, Pongamia pinnata, Casuarina, etc.,
P2	770		
P3	2200		
Total	3,690		
E1	1880		
E2	1080		
E3	1500		
E4	1500		
Total	5,960		
G. Total	9,650		

7.5 PLASTIC WASTE MANAGEMENT PLAN

The project Proponent shall comply with Tamil Nadu Government Order (Ms) No. 84 Environment and Forest (EC.2) Department Dated: 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986.

Objective –

- To investigate the actual supply chain network of plastic waste.
- To identify and propose a sustainable plastic waste management by installing bins for collection of recyclables with all the plastic waste
- Preparation of a system design layout, and necessary modalities for implementation and monitoring.

TABLE 7.18: ACTION PLAN TO MANAGE PLASTIC WASTE

Sl.No.	Activity	Responsibility
1	Framing of Layout Design by incorporating provision of the Rules, user fee to be charged from waste generators for plastic waste management, penalties/fines for littering, burning plastic waste or committing any other acts of public nuisance	Mines Manager
2	Enforcing waste generators to practice segregation of bio-degradable, recyclable and domestic hazardous waste	Mines Manager
3	Collection of plastic waste	Mines Foreman
4	Setting up of Material Recovery Facilities	Mines Manager
5	Segregation of Recyclable and Non-Recyclable plastic waste at Material Recovery Facilities	Mines Foreman
6	Channelization of Recyclable Plastic Waste to registered recyclers	Mines Foreman
7	Channelization of Non-Recyclable Plastic Waste for use either in Cement kilns, in Road Construction	Mines Foreman
8	Creating awareness among all the stakeholders about their responsibility	Mines Manager
9	Surprise checking's of littering, open burning of plastic waste or committing any other acts of public nuisance	Mine Owner

Source: Proposed by FAE's and EC

7.6 CLUSTER MANAGEMENT COMMITTEE

The cluster management committee is proposed to form including of 3 Proposed quarry and 4 Existing quarries total extent of the cluster is 19.31.0 Ha

In the cluster management committee, the following Environmental Management plan will be followed the activities such as

- Transportation of Minerals and blasting activities with the coordination between the individual quarry owners.
- Sprinkling of water regularly thrice a day in the mutual understanding with the quarry owners
- Carrying out blasting operation as specified times by the Mines Managers and as per the EIA report
- Usage of Haul roads in a time specified by the Cluster Management Committee
- Following Safe operating procedure prescribed by the Mines Manager during natural calamities
- Planting Trees in the Government Land, School and within the project site
- Celebrating Safety month, Environmental Month along with the Mines Managers in every six months once
- Regularly follow the health of the workers and take medical examination as per the DGMS norms under the guidance of Mines Manager
- Meet at Association Hall monthly once to review the Environmental Management and Safety activities prescribed by the Cluster Management Committee

- We have read and understood all the above steps and we ensure to follow these specific steps Quarry owners in the Cluster management committee

Quarries in the Cluster Management Committee

CODE	Name of the Owner	Village/ Taluk	S.F. Nos	Extent in Ha	Status
PROPOSED QUARRY					
P1	Thiru. M. Shankar Ganesh, S/o. Mallappachetty, Door No. 199, Thippanappalli Village, Nedumaruthi Post, Krishnagiri Taluk and District.	Venkatesapuram Village, Shoolagiri Taluk	132 (P-2)	1.45.0	File No: 12104 ToR Identification No: TO25B0108TN573 1666N Dated: 17.06.2025
P2	Thiru. G. Santhamoorthy, S/o. Govindarajan, Sundarampalli, Krishnapuram Taluk, Tirupattur District.		132 (P-1)	1.55.0	File No: 12102 ToR Identification No: TO25B0108TN532 9544N Dated: 17.06.2025
P3	M/s. Ultra Mines		133/1(P), 133/2&4, 134/1&2	4.40.0	Mining Plan Approved
	TOTAL EXTENT			7.40.0	
EXISTING QUARRY					
E-1	M/s. Sumukha Blue Metals & M Sand	Venkatesapuram Village, Shoolagiri Taluk	294 (P-2)	3.75.0	30.04.2021 to 29.04.2031
E-2	Thiru. V. Nataraja S/o. Venkatappa Reddy		287/1	2.16.0	19.02.2021 to 18.02.2031
E-3	M/s. Sumukha Blue Metals & M Sand		288(P)	3.00.0	10.02.2025 to 09.02.2030
E-4	Tvl. Mars Blue Metals		135 (P-2)	3.00.0	19.06.2019 to 18.02.2031
	TOTAL EXTENT			11.91.0 Ha	
EXPIRED QUARRY					
EX-1	Thiru. Muniraj	Venkatesapuram Village, Shoolagiri Taluk	285 (P)	4.92.0	04.07.2018 to 03.07.2023
	TOTAL EXTENT			4.92.0 Ha	
	TOTAL CLUSTER EXTENT			19.31.0 Ha	

STANDARD OPERATING PROCEDURE FOR VENKATESAPURAM VILLAGE CLUSTER MANAGEMENT COMMITTEE

1. Maintenance of Haul Roads and Village Roads:

- 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

2. Maintenance of Drilling Activities

- 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.
- 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

3. Maintenance of Blasting Activities

- 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 (1.00 PM to 2.00 PM), 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
- The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators, which reduces the ground vibrations;
- Proper quantity of explosive, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting;
- Adequate safe distance from blasting will be maintained as per DGMS guidelines;
- Blasting shelter will be provided as per DGMS guidelines;
- Blasting operations will be carried out only during day time;
- The charge per delay will be minimized and preferably a greater number of delays will be used per blasts;
- During blasting, other activities in the immediate vicinity will be temporarily stopped;
- Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast;
- A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed.
- A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public.
- Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire.
- The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used.
- The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects.
- Appropriate blasting techniques shall be adopted such that the predicted peak particle velocity shall not exceed 8 Hz.
- Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices

4. Maintenance of Greenbelt Activities

- 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
- Suitable plan for conservation of Schedule-I Species have prepared and necessary fund for implement for the same will be made.
- All the preventive measures will be taken for growth & development of fauna.
- Creating and development awareness for nature and wildlife in the adjoin villages.
- The workers shall be trained to not harm any wildlife, should it come near the project site. No work shall be carried out after 6.00 pm

5. Maintenance of Occupational Health

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical checkups, 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
- Specific personnel training on work-site safety management will be taken up;
- Work site assessment will be done by rock scaling of each surface exposed to workers to prevent accidental rock falling and / or landslide, especially after blasting activities;
- Natural barriers, temporary railing, or specific danger signals will be provided along rock benches or other pit areas where work is performed at heights more than 2m from ground level;
- Maintenance of yards, roads and footpaths, providing sufficient water drainage and preventing slippery surfaces with an all-weather surface, such as coarse gravel will be taken up

Occupational health and safety hazards occur during the operational phase of mining and primarily include the following:

- Respiratory hazards
- Noise
- Physical hazards
- Explosive storage and handling

All the persons will undergo pre-employment and periodic medical examination. Employees will be monitored for occupational diseases by conducting the following tests

- General physical tests
- Audiometric tests
- Full chest, X-ray, Lung function tests, Spirometric tests
- Periodic medical examination – yearly
- Lung function test – yearly, those who are exposed to dust
- Eye test

Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine for immediate treatment.

First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

6. Cluster Management Committee Policy

- Meet the requirements of all laws, acts, regulations, and standards relevant to its operations and activities
- Implement a program to train employees in general environmental issues and individual workplace environmental responsibilities
- Allocate necessary resources to ensure the implementation of the environmental policy
- Ensure that an effective closure strategy is in place at all stages of project development and that progressive reclamation is undertaken as early as possible to reduce potential long-term environmental and community impacts
- Implement monitoring programme to provide early warning of any deficiency or unanticipated performance in environmental safeguards
- Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement
- 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.

8.PROJECT BENEFITS

8.0 GENERAL

The Proposed Project Venkatesapuram Rough Stone Quarries at Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State aims to produce 4,98,523Ts of Rough Stone, 40,320Ts of Weathered Rock and 21,576Ts of Topsoil over a period of 10 years for P1 and 1,88,280m³ of Rough Stone, 20,972m³ of Weathered Rock and 11,009m³ of Topsoil over a period of 10 years for P2. 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

8.1 EMPLOYMENT POTENTIAL

It is proposed to provide employment to about 54 persons (P1-26+P2-28) for carrying out mining operations and give preference to the local people in providing employment in the three proposed quarries in the cluster. In addition, there will be opportunity for indirect employment to many people in the form of contractual jobs, business opportunities, service facilities etc. the economic status of the local people will be enhanced due to mining project.

8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED

The impact of mining activity in the area will be more positive on the socio-economic environment in the immediate project impact area. The employment opportunities both direct and indirect will contribute to enhanced money incomes to job seekers with minimal skill sets especially among the local communities.

8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

The proposed quarry was located in Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu Stat and the area have communications, roads and other facilities already well established. The following physical infrastructure facilities will further improve due to proposed mine.

- Road Transport facilities
- Communications
- Medical, Educational and social benefits will be made available to the nearby civilian population in addition to the workmen employed in the mine.

8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily temporary or contractual and involvement of unskilled labour will be more. A major part of the labour force will be mainly from local villagers who are expected

to engage themselves both in agriculture and mining activities. This will enhance their income and lead to overall economic growth of the area.

8.5 OTHER TANGIBLE BENEFITS

The proposed mine is likely to have other tangible benefits as given below.

- Indirect employment opportunities to local people in contractual works like construction of infrastructural facilities, transportation, sanitation, for supply of goods and services to the mine and other community services.
- Additional housing demand for rental accommodation will increase
- Cultural, recreation and aesthetic facilities will also improve
- Improvement in communication, transport, education, community development and medical facilities and overall change in employment and income opportunity
- The State Government will also benefit directly from the proposed mine, through increased revenue from royalties, cess, DMF, GST etc.,

8.5.1 CORPORATE SOCIAL RESPONSIBILITY

The Project Proponent will take responsibility to develop awareness among all levels of their staff about CSR activities and the integration of social processes with business processes. Those involved with the undertaking of CSR activities will be provided with adequate training and re-orientation.

CSR activities will be taken up in the Venkatesapuram Village mainly contributing to education, health, training of women self-help groups and contribution to infrastructure etc., CSR budget is allocated as 2.5% of the profit.

8.5.2 CORPORATE ENVIRONMENT RESPONSIBILITY

For the proposed quarry allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF& CC Office Memorandum F.No.22-65/2017-IA.III, Dated: 01.05.2018.

Each Proponent's (P1 & P2) intends to spent Rs 3,00,000/- towards CER for the Government School near the project site the details are given below:

TABLE 8.1 CER – ACTION PLAN

Activity	CER
• Renovation/ Construction of Existing Toilet • Providing Environmental Related books to the school Library • Carrying out plantation and maintenance in the school Ground • Any other requirements in consultation with the school Head master	Rs 3,00,000/-

9. ENVIRONMENTAL COST BENEFIT ANALYSIS

Not Applicable, Since Environmental Cost Benefit Analysis not recommended at the Scoping stage.

10.ENVIRONMENTAL MANAGEMENT PLAN – THIRU. M. SHANKAR GANESH

10.0. GENERAL

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of Environmental Management plan will ensure to keep all the environmental parameters of the project in respect of Ambient Air quality, Water quality, Socio – economic improvement standards.

Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA.

10.1. ENVIRONMENTAL POLICY

The Project Proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance.

The Proponent Thiru. M. Shankar Ganesh will –

- Meet the requirements of all laws, acts, regulations, and standards relevant to its operations and activities
- Implement a program to train employees in general environmental issues and individual workplace environmental responsibilities.
- Allocate necessary resources to ensure the implementation of the environmental policy.
- Ensure that an effective closure strategy is in place at all stages of project development and that progressive reclamation is undertaken as early as possible to reduce potential long-term environmental and community impacts.
- Implement monitoring programmes to provide early warning of any deficiency or unanticipated performance in environmental safeguards.
- Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement.

Description of the Administration and Technical Setup –

The Environment Monitoring Cell discussed under Chapter 6 will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level of each Proposed Quarry.

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.

10.2. LAND ENVIRONMENT MANAGEMENT –

Landscape of the area will be changed due to the quarrying operation, restoration of the land by converting the quarry pit into temporary reservoir and the remaining part of the area (un utilized areas, infrastructure, haul Roads) will be utilized for greenbelt development. There is no major vegetation in the project area during the course of quarrying operation and after completion of the quarrying operation thick plantation will be developed under greenbelt development programme.

TABLE 10.1. PROPOSED CONTROLS FOR LAND ENVIRONMENT

CONTROL	RESPONSIBILITY
Design vehicle wash-down areas so that all runoff water is captured and passed through oil water separators and sediment catchment devices.	Mines Manager
Refuelling to be undertaken in a safe location, away from vehicle movement pathways & 100 m away of any watercourse Refuelling activity to be under visual observation at all times. Drainage of refuelling areas to sumps with oil/water separation	Mine Foreman & Mining Mate
Soil and groundwater testing as required following up a particular incident of contamination.	Mines Manager
At conceptual stage, the mining pits will be converted into Rain Water Harvesting. Remaining area will be converted into greenbelt area	Mines Manager
No external dumping i.e., outside the project area	Mine Foreman
Garland drains with catch pits / settlement traps to be provided all around the project area to prevent run off affecting the surrounding lands.	Mines Manager
The periphery of Project area will be planted with thick plantation to arrest the fugitive dust, which will also act as acoustic barrier.	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

6.3. SOIL MANAGEMENT

The overburden in the form of Top soil and weathered rock, it will be safely removed and preserve all along the boundary barrier to facilitate the afforestation. The excavated Rough stone will be directly loaded into tipper to the needy customers.

TABLE 10.2. PROPOSED CONTROLS FOR SOIL MANAGEMENT

CONTROL	RESPONSIBILITY
Surface run-off from the project boundary via garland drains will be diverted to the mine pits	Mine Foreman & Mining Mate
Design haul roads and other access roads with drainage systems to minimize concentration of flow and erosion risk	Mines Manager
Empty sediment from sediment traps Maintain, repair or upgrade garland drain system	Mines Manager
Test soils for pH, EC, chloride, size & water holding capacity	Manager Mines

Source: Proposed by FAE's & EIA Coordinator

10.4. WATER MANAGEMENT

In the proposed quarrying project, no process is involved for the effluent generation, only oil & grease from the machinery wash is anticipated and domestic sewage from mine office. The quarrying operation is proposed up to a depth of 46m (8m AGL + 38m BGL), the water table in the area is 72m–75m below ground level, hence the proposed projects will not intersect the Ground water table during entire quarry period.

TABLE 10.3. PROPOSED CONTROLS FOR WATER ENVIRONMENT

CONTROL	RESPONSIBILITY
To maximize the reuse of pit water for water supply	Mines Foreman
Temporary and permanent garland drain will be constructed to contain the catchments of the mining area and to divert runoff from undisturbed areas through the mining areas	Mines Manager
Natural drains/nallahs/brooklets outside the project area should not be disturbed at any point of mining operations	Mines Manager
Ensure there is no process effluent generation or discharge from the project area into water bodies	Mines Foreman
Domestic sewage generated from the project area will be disposed in septic tank and soak pit system	Mines Foreman
Monthly or after rainfall, inspection for performance of water management structures and systems	Mines Manager
Conduct ground water and surface water monitoring for parameters specified by CPCB	Manager Mines

Source: Proposed by FAE's & EIA Coordinator

10.5. AIR QUALITY MANAGEMENT

The proposed quarrying activity would result in the increase of particulate matter concentrations due to fugitive dust. Daily water sprinkling on the haul roads, approach roads in the vicinity would be undertaken and will be continued as there is possibility for dust generation due to truck mobility. It will be ensured that vehicles are properly maintained to comply with exhaust emission requirements

TABLE 10.4. PROPOSED CONTROLS FOR AIR ENVIRONMENT

CONTROL	RESPONSIBILITY
Generation of dust during excavation is minimized by daily (twice) water sprinkling on working face and daily (twice) water sprinkling on haul road	Mines Manager
Wet drilling procedure /drills with dust extractor system to control dust generation during drilling at source itself is implemented	Mines Manager
Maintenance as per operator manual of the equipment and machinery in the mines to minimizing air pollution	Mines Manager
Ambient Air Quality Monitoring carried out in the project area and in surrounding villages to access the impact due to the mining activities and the efficacy of the adopted air pollution control measures	Mines Manager
Provision of Dust Mask to all workers	Mines Manager
Greenbelt development all along the periphery of the project area	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.6. NOISE POLLUTION CONTROL

There will be intermittent noise levels due to vehicular movement, trucks loading, drilling and blasting and cutting activities. No mining activities are planned during night time.

TABLE 10.5. PROPOSED CONTROLS FOR NOISE ENVIRONMENT

CONTROL	RESPONSIBILITY
Development of thick greenbelt all along the Buffer Zone (7.5 Meters) of the project area to attenuate the noise and the same will be maintained	Mines Manager
Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation	Mines Foreman
Deployment of mining equipment with an inbuilt mechanism to reduce noise	Mines Manager
Provision of earmuff / ear plugs to workers working in noise prone zones in the mines	Mining Mate
Provision of effective silencers for mining machinery and transport vehicles	Mines Manager
Provision of sound proof AC operator cabins to HEMM	Mines Manager
Sharp drill bits are used to minimize noise from drilling	Mines Foreman

Controlled blasting technologies are adopted by using delay detonators to minimize noise from blasting	Mines Manager
Annual ambient noise level monitoring is carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	Mines Manager
Reduce maximum instantaneous charge using delays while blasting	Mining Mate
Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination	Mines Manager
Undertake noise or vibration monitoring	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.7. GROUND VIBRATION AND FLY ROCK CONTROL

The Rough stone quarry operation creates vibration due to the blasting and movement of Heavy Earth moving machineries, fly rocks due to the blasting.

TABLE 10.6. PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK

CONTROL	RESPONSIBILITY
Controlled blasting using delay detonators will be carried out to maintain the PPV value (below 8Hz) well within the prescribed standards of DGMS	Mines Manager
Drilling and blasting will be carried under the supervision of qualified persons	Mines Manager
Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting	Mines Manager
Suitable spacing and burden will be maintained to avoid misfire / fly rocks	Manager Mines
Number of blast holes will be restricted to control ground vibrations	Manager Mines
Blasting will be carried out only during noon time	Mining Mate
Undertake noise or vibration monitoring	Mines Manager
ensure blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material	Mines Foreman

Source: Proposed by FAE's & EIA Coordinator

10.8. BIOLOGICAL ENVIRONMENT MANAGEMENT

The proponent will take all necessary steps to avoid the impact on the ecology of the area by adopting suitable management measures in the planning and implementation stage. During mining, thick plantation will be carried out around the project periphery, on safety barrier zone, on top benches of quarried out area etc.,

Following control measures are proposed for its management and will be the responsibility of the Mines Manager.

- Greenbelt development all along the safety barrier of the project area

- It is also proposed to implement the greenbelt development programme and post plantation status will be regularly checked for every season.
- The main attributes that retard the survival of sapling is fugitive dust, this fugitive dust can be controlled by water sprinkling on the haul roads and installing a sprinkler unit near the newly planted area.
- Year wise greenbelt development will be recorded and monitored
 - Based on the area of plantation.
 - Period of plantation
 - Type of plantation
 - Spacing between the plants
 - Type of manuring and fertilizers and its periods
 - Lopping period, interval of watering
 - Survival rate
 - Density of plantation
- The ultimate reclamation planned leaves a congenial environment for development of flora & immigration of small fauna through green belt and water reservoir. The green belt and water reservoir developed within the Project at the end of mine life will attract the birds and animals towards the project area in the post mining period.

10.8.1. Green Belt Development Plan

About 720 Nos of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

The objectives of the greenbelt development plan are –

- Provide a green belt around the periphery of the quarry area to combat the dispersal of dust in the adjoining areas,
- Protect the erosion of the soil, Conserve moisture for increasing ground water recharging,
- Restore the ecology of the area, restore aesthetic beauty of the locality and meet the requirement of fodder, fuel and timber of the local community.

A well-planned Green Belt with multi rows (three tiers) preferably with long canopy leaves shall be developed with dense plantations around the boundary and haul roads to prevent air, dust noise propagation to undesired places and efforts will be taken for the enhancement of survival rate.

1.8.2. Species Recommended for Plantation

Following points have been considered while recommending the species for plantation:

- Creating of bio-diversity.
- Fast growing, thick canopy cover, perennial and evergreen large leaf area,
- Efficient in absorbing pollutants without major effects on natural growth

TABLE 10.7. RECOMMENDED SPECIES FOR THE PLANTATION

S.No	Botanical Name	Local Name
1	<i>Aegle marmelos</i>	Vilvamaram
2	<i>Albizia lebbeck</i>	Vaagai maram
3	<i>Cassia fistula</i>	Konrai tree
4	<i>Lannea coromandelica</i>	Othiyam
5	<i>Limoniaacidissima</i>	Vila maram
6	<i>Syzygiumcumini</i>	Naval maram
7	<i>Toona ciliata</i>	Santhana Vembu
8	<i>Ficus hispida</i>	Aththimaram
9	<i>Borassus flabellifer</i>	Panai-maram

Source: Proposed by FAE's & EIA Coordinator

10.9. OCCUPATIONAL SAFETY & HEALTH MANAGEMENT

Occupational safety and health are very closely related to productivity and good employer-employee relationship. The main factors of occupational health impact in quarries are fugitive dust and noise. Safety of employees during quarrying operation and maintenance of mining equipment will be taken care as per Mines Act 1952 and Rule 29 of Mines Rules 1955. To avoid any adverse effect on the health of workers due to dust, noise and vibration sufficient measures have been provided.

10.9.1. Medical Surveillance and Examinations –

The health status of workers in the mine will be regularly monitored under an occupational surveillance program. Under this program, all the employees are subjected to a detailed medical examination at the time of employment. The medical examination covers the following tests under mines act 1952.

- General Physical Examination and Blood Pressure
- X-ray Chest and ECG
- Sputum test
- Detailed Routine Blood and Urine examination

The medical histories of all employees will be maintained in a standard format annually. Thereafter, the employees will be subject to medical examination annually. The below tests keep upgrading the database of medical history of the employees.

TABLE 10.8. MEDICAL EXAMINATION SCHEDULE

Sl.No	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1	Initial Medical Examination (Mine Workers)					
A	Physical Check-up					
B	Psychological Test					
C	Audiometric Test					
D	Respiratory Test					
2	Periodical Medical Examination (Mine Workers)					
A	Physical Check – up					
B	Audiometric Test					
C	Eye Check – up					
D	Respiratory Test					
3	Medical Camp (Mine Workers & Nearby Villagers)					
4	Training (Mine Workers)					

10.9.2 Proposed Occupational Health and Safety Measures –

- The mine site will have adequate drinking water supply so that workers do not get dehydrated.
- Lightweight and loose-fitting clothes having light colours will be preferred to wear.
- Noise exposure measurements will be taken to determine the need for noise control strategies.
- The personal protective equipment will be provided for mine workers.
- At noisy working activity, exposure time will be minimized.
- Dust generating sources will be identified and proper control measure will be adopted.
- Periodic medical examinations will be provided for all workers.
- In respect of contract work, safety code for contractors and workers will be implemented. They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centres. All personal protective equipment's will be provided to them.
- A safety committee meeting every month will be organized to discuss the safety of the mines and the persons employed.
- Celebration of annual mines safety week and environmental week in order to develop safety awareness and harmony amongst employees and co quarry owners.

FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS**10.9.3: Health and Safety Training Programme**

The Proponent will provide special induction program along with machinery manufacturers for the operators and co-operators to run and maintain the machinery effectively and efficiently. The training program for the supervisors and office staffs will be arranged in the Group Vocational Training Centres in the State and engage Environmental Consultants to provide periodical training to all the employees to carry out the mining operation in and eco-friendly manner as per Metalliferous Mines Regulation, 1961.

10.9.4.: Budgetary Provision for Environmental Management –

Adequate budgetary provision has been made by the Company for execution of Environmental Management Plan. The Table 10.9 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

TABLE 10.9: EMP BUDGET FOR PROPOSED PROJECT

Activities	Mitigation Measure	Provision for Implementation	Capital	Recurring per annum
Air Environment	Haul road maintenance & Water sprinkling	Lump sum fund allocation for daily maintenance of haul roads and thrice a day water sprinkling by fixed sprinklers or water tankers	0	50000
	Muffle blasting – To control fly rocks during blasting	Lump sum fund allocation Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure	Lump sum fund allocation for ensuring wet drilling by covering drill holes with wet gunny bags and spraying water while drilling	0	10000
	No overloading of trucks/tippers/tractors	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Enforcing speed limits of 20 km/hr within ML area	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Regular monitoring of exhaust fumes as per RTO norms	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	5000
Noise Environment	Source of noise will be during operation of transportation vehicles, HEMM for this proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done	Provision made in Operating Cost	0	0
	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implements that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0
	Provision for Portable blaster shed	Installation of Portable blasting shelter	50000	2000

	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 Tonnes of Blasted Material	0	0
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency	5000	20000
		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Mine Closure	1. Progressive Closure Activity - Surface Runoff management	Provision made in Operating Cost	0	0
	2. Progressive Closure Activity Barbed Wire Fencing to quarry area will be provisioned.	Provision made in Operating Cost	0	0
	3. Greenbelt development under safety zone during the mining period	Provision made in Operating Cost	0	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure mentioning Environmental Conditions	10000	1000
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms	0	100000
	Workers will be provided with Personal Protective Equipment's	Lumpsum fund allocation	50000	15000
	Health checkup for workers will be provisioned	IME & PME Health checkup for all the employees will be covered batch wise.	0	50000
	First aid facility will be provided	Lumpsum fund allocation	0	5000
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	No parking will be provided on the transport routes. Separate provision will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	Lumpsum fund allocation	50000	10000
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Appointment of Competent person for ensuring the safety operation	Provision made in operational cost	0	0

CER	As per MoEF & CC OM 22-65/2017-IA.III Dated 25.02.2021	Lumpsum fund allocation	300000	0
TOTAL			5,60,000	3,02,000

Year Wise Break Up	
I Year	₹ 8,62,000/-
II Year	₹ 3,17,100/-
III Year	₹ 3,32,955/-
IV Year	₹ 3,49,603/-
V Year	₹ 3,67,083/-
Total	₹ 22.29 Lakhs

Cost inflation 5% per annum

Note: This Environmental Management plan cost will vary according to the public consultation comments

10.10 CONCLUSION –

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

10.ENVIRONMENTAL MANAGEMENT PLAN – THIRU. G. SANTHAMOORTHY

10.0. GENERAL

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of Environmental Management plan will ensure to keep all the environmental parameters of the project in respect of Ambient Air quality, Water quality, Socio – economic improvement standards.

Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA.

10.1. ENVIRONMENTAL POLICY

The Project Proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance.

The Proponent Thiru. G. Santhamoorthy will –

- Meet the requirements of all laws, acts, regulations, and standards relevant to its operations and activities
- Implement a program to train employees in general environmental issues and individual workplace environmental responsibilities.
- Allocate necessary resources to ensure the implementation of the environmental policy.
- Ensure that an effective closure strategy is in place at all stages of project development and that progressive reclamation is undertaken as early as possible to reduce potential long-term environmental and community impacts.
- Implement monitoring programmes to provide early warning of any deficiency or unanticipated performance in environmental safeguards.
- Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement.

Description of the Administration and Technical Setup –

The Environment Monitoring Cell discussed under Chapter 6 will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level of each Proposed Quarry.

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.

10.2. LAND ENVIRONMENT MANAGEMENT –

Landscape of the area will be changed due to the quarrying operation, restoration of the land by converting the quarry pit into temporary reservoir and the remaining part of the area (un utilized areas, infrastructure, haul Roads) will be utilized for greenbelt development. There is no major vegetation in the project area during the course of quarrying operation and after completion of the quarrying operation thick plantation will be developed under greenbelt development programme.

TABLE 10.1. PROPOSED CONTROLS FOR LAND ENVIRONMENT

CONTROL	RESPONSIBILITY
Design vehicle wash-down areas so that all runoff water is captured and passed through oil water separators and sediment catchment devices.	Mines Manager
Refuelling to be undertaken in a safe location, away from vehicle movement pathways & 100 m away of any watercourse Refuelling activity to be under visual observation at all times. Drainage of refuelling areas to sumps with oil/water separation	Mine Foreman & Mining Mate
Soil and groundwater testing as required following up a particular incident of contamination.	Mines Manager
At conceptual stage, the mining pits will be converted into Rain Water Harvesting. Remaining area will be converted into greenbelt area	Mines Manager
No external dumping i.e., outside the project area	Mine Foreman
Garland drains with catch pits / settlement traps to be provided all around the project area to prevent run off affecting the surrounding lands.	Mines Manager
The periphery of Project area will be planted with thick plantation to arrest the fugitive dust, which will also act as acoustic barrier.	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.3 SOIL MANAGEMENT

The overburden in the form of Top soil and weathered rock, it will be safely removed and preserve all along the boundary barrier to facilitate the afforestation. The excavated Rough stone will be directly loaded into tipper to the needy customers.

TABLE 10.2. PROPOSED CONTROLS FOR SOIL MANAGEMENT

CONTROL	RESPONSIBILITY
Surface run-off from the project boundary via garland drains will be diverted to the mine pits	Mine Foreman & Mining Mate
Design haul roads and other access roads with drainage systems to minimize concentration of flow and erosion risk	Mines Manager
Empty sediment from sediment traps Maintain, repair or upgrade garland drain system	Mines Manager
Test soils for pH, EC, chloride, size & water holding capacity	Manager Mines

Source: Proposed by FAE's & EIA Coordinator

10.4. WATER MANAGEMENT

In the proposed quarrying project, no process is involved for the effluent generation, only oil & grease from the machinery wash is anticipated and domestic sewage from mine office. The quarrying operation is proposed up to a depth of 51m (11m AGL + 40m BGL), the water table in the area is 72m–75m below ground level, hence the proposed projects will not intersect the Ground water table during entire quarry period.

TABLE 10.3. PROPOSED CONTROLS FOR WATER ENVIRONMENT

CONTROL	RESPONSIBILITY
To maximize the reuse of pit water for water supply	Mines Foreman
Temporary and permanent garland drain will be constructed to contain the catchments of the mining area and to divert runoff from undisturbed areas through the mining areas	Mines Manager
Natural drains/nallahs/brooklets outside the project area should not be disturbed at any point of mining operations	Mines Manager
Ensure there is no process effluent generation or discharge from the project area into water bodies	Mines Foreman
Domestic sewage generated from the project area will be disposed in septic tank and soak pit system	Mines Foreman
Monthly or after rainfall, inspection for performance of water management structures and systems	Mines Manager
Conduct ground water and surface water monitoring for parameters specified by CPCB	Manager Mines

Source: Proposed by FAE's & EIA Coordinator

10.5. AIR QUALITY MANAGEMENT

The proposed quarrying activity would result in the increase of particulate matter concentrations due to fugitive dust. Daily water sprinkling on the haul roads, approach roads in the vicinity would be undertaken and will be continued as there is possibility for dust generation due to truck mobility. It will be ensured that vehicles are properly maintained to comply with exhaust emission requirements

TABLE 10.4. PROPOSED CONTROLS FOR AIR ENVIRONMENT

CONTROL	RESPONSIBILITY
Generation of dust during excavation is minimized by daily (twice) water sprinkling on working face and daily (twice) water sprinkling on haul road	Mines Manager
Wet drilling procedure /drills with dust extractor system to control dust generation during drilling at source itself is implemented	Mines Manager
Maintenance as per operator manual of the equipment and machinery in the mines to minimizing air pollution	Mines Manager
Ambient Air Quality Monitoring carried out in the project area and in surrounding villages to access the impact due to the mining activities and the efficacy of the adopted air pollution control measures	Mines Manager
Provision of Dust Mask to all workers	Mines Manager
Greenbelt development all along the periphery of the project area	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.6. NOISE POLLUTION CONTROL

There will be intermittent noise levels due to vehicular movement, trucks loading, drilling and blasting and cutting activities. No mining activities are planned during night time.

TABLE 10.5. PROPOSED CONTROLS FOR NOISE ENVIRONMENT

CONTROL	RESPONSIBILITY
Development of thick greenbelt all along the Buffer Zone (7.5 Meters) of the project area to attenuate the noise and the same will be maintained	Mines Manager
Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation	Mines Foreman
Deployment of mining equipment with an inbuilt mechanism to reduce noise	Mines Manager
Provision of earmuff / ear plugs to workers working in noise prone zones in the mines	Mining Mate
Provision of effective silencers for mining machinery and transport vehicles	Mines Manager
Provision of sound proof AC operator cabins to HEMM	Mines Manager
Sharp drill bits are used to minimize noise from drilling	Mines Foreman

Controlled blasting technologies are adopted by using delay detonators to minimize noise from blasting	Mines Manager
Annual ambient noise level monitoring is carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	Mines Manager
Reduce maximum instantaneous charge using delays while blasting	Mining Mate
Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination	Mines Manager
Undertake noise or vibration monitoring	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.7. GROUND VIBRATION AND FLY ROCK CONTROL

The Rough stone quarry operation creates vibration due to the blasting and movement of Heavy Earth moving machineries, fly rocks due to the blasting.

TABLE 10.6. PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK

CONTROL	RESPONSIBILITY
Controlled blasting using delay detonators will be carried out to maintain the PPV value (below 8Hz) well within the prescribed standards of DGMS	Mines Manager
Drilling and blasting will be carried under the supervision of qualified persons	Mines Manager
Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting	Mines Manager
Suitable spacing and burden will be maintained to avoid misfire / fly rocks	Manager Mines
Number of blast holes will be restricted to control ground vibrations	Manager Mines
Blasting will be carried out only during noon time	Mining Mate
Undertake noise or vibration monitoring	Mines Manager
ensure blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material	Mines Foreman

Source: Proposed by FAE's & EIA Coordinator

10.8. BIOLOGICAL ENVIRONMENT MANAGEMENT

The proponent will take all necessary steps to avoid the impact on the ecology of the area by adopting suitable management measures in the planning and implementation stage. During mining, thick plantation will be carried out around the project periphery, on safety barrier zone, on top benches of quarried out area etc., Following control measures are proposed for its management and will be the responsibility of the Mines Manager.

- Greenbelt development all along the safety barrier of the project area

- It is also proposed to implement the greenbelt development programme and post plantation status will be regularly checked for every season.
- The main attributes that retard the survival of sapling is fugitive dust, this fugitive dust can be controlled by water sprinkling on the haul roads and installing a sprinkler unit near the newly planted area.
- Year wise greenbelt development will be recorded and monitored
 - Based on the area of plantation.
 - Period of plantation
 - Type of plantation
 - Spacing between the plants
 - Type of manuring and fertilizers and its periods
 - Lopping period, interval of watering
 - Survival rate
 - Density of plantation
- The ultimate reclamation planned leaves a congenial environment for development of flora & immigration of small fauna through green belt and water reservoir. The green belt and water reservoir developed within the Project at the end of mine life will attract the birds and animals towards the project area in the post mining period.

10.8.1. Green Belt Development Plan

About 770nos. of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

The objectives of the greenbelt development plan are –

- Provide a green belt around the periphery of the quarry area to combat the dispersal of dust in the adjoining areas,
- Protect the erosion of the soil, Conserve moisture for increasing ground water recharging,
- Restore the ecology of the area, restore aesthetic beauty of the locality and meet the requirement of fodder, fuel and timber of the local community.

A well-planned Green Belt with multi rows (three tiers) preferably with long canopy leaves shall be developed with dense plantations around the boundary and haul roads to prevent air, dust noise propagation to undesired places and efforts will be taken for the enhancement of survival rate.

1.8.3. Species Recommended for Plantation

Following points have been considered while recommending the species for plantation:

- Creating of bio-diversity.
- Fast growing, thick canopy cover, perennial and evergreen large leaf area,
- Efficient in absorbing pollutants without major effects on natural growth

TABLE 10.7. RECOMMENDED SPECIES FOR THE PLANTATION

S.No	Botanical Name	Local Name
1	<i>Aegle marmelos</i>	Vilvamaram
2	<i>Albizia lebbeck</i>	Vaagai maram
3	<i>Cassia fistula</i>	Konrai tree
4	<i>Lannea coromandelica</i>	Othiyam
5	<i>Limoniaacidissima</i>	Vila maram
6	<i>Syzygiumcumini</i>	Naval maram
7	<i>Toona ciliata</i>	Santhana Vembu
8	<i>Ficus hispida</i>	Aththimaram
9	<i>Borassus flabellifer</i>	Panai-maram

Source: Proposed by FAE's & EIA Coordinator

10.9. OCCUPATIONAL SAFETY & HEALTH MANAGEMENT

Occupational safety and health are very closely related to productivity and good employer-employee relationship. The main factors of occupational health impact in quarries are fugitive dust and noise. Safety of employees during quarrying operation and maintenance of mining equipment will be taken care as per Mines Act 1952 and Rule 29 of Mines Rules 1955. To avoid any adverse effect on the health of workers due to dust, noise and vibration sufficient measures have been provided.

10.9.1. Medical Surveillance and Examinations –

The health status of workers in the mine will be regularly monitored under an occupational surveillance program. Under this program, all the employees are subjected to a detailed medical examination at the time of employment. The medical examination covers the following tests under mines act 1952.

- General Physical Examination and Blood Pressure
- X-ray Chest and ECG
- Sputum test
- Detailed Routine Blood and Urine examination

The medical histories of all employees will be maintained in a standard format annually. Thereafter, the employees will be subject to medical examination annually. The below tests keep upgrading the database of medical history of the employees.

TABLE 10.8. MEDICAL EXAMINATION SCHEDULE

Sl.No	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1	Initial Medical Examination (Mine Workers)					
A	Physical Check-up					
B	Psychological Test					
C	Audiometric Test					
D	Respiratory Test					
2	Periodical Medical Examination (Mine Workers)					
A	Physical Check – up					
B	Audiometric Test					
C	Eye Check – up					
D	Respiratory Test					
3	Medical Camp (Mine Workers & Nearby Villagers)					
4	Training (Mine Workers)					

10.9.2 Proposed Occupational Health and Safety Measures –

- The mine site will have adequate drinking water supply so that workers do not get dehydrated.
- Lightweight and loose-fitting clothes having light colours will be preferred to wear.
- Noise exposure measurements will be taken to determine the need for noise control strategies.
- The personal protective equipment will be provided for mine workers.
- At noisy working activity, exposure time will be minimized.
- Dust generating sources will be identified and proper control measure will be adopted.
- Periodic medical examinations will be provided for all workers.
- In respect of contract work, safety code for contractors and workers will be implemented. They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centres. All personal protective equipment's will be provided to them.
- A safety committee meeting every month will be organized to discuss the safety of the mines and the persons employed.
- Celebration of annual mines safety week and environmental week in order to develop safety awareness and harmony amongst employees and co quarry owners.

FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS**10.9.3: Health and Safety Training Programme**

The Proponent will provide special induction program along with machinery manufacturers for the operators and co-operators to run and maintain the machinery effectively and efficiently. The training program for the supervisors and office staffs will be arranged in the Group Vocational Training Centres in the State and engage Environmental Consultants to provide periodical training to all the employees to carry out the mining operation in and eco-friendly manner as per Metalliferous Mines Regulation, 1961.

10.9.4.: Budgetary Provision for Environmental Management –

Adequate budgetary provision has been made by the Company for execution of Environmental Management Plan. The Table 10.9 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

TABLE 10.9: EMP BUDGET FOR PROPOSED PROJECT

Activities	Mitigation Measure	Provision for Implementation	Capital	Recurring per annum
Air Environment	Haul road maintenance & Water sprinkling	Lump sum fund allocation for daily maintenance of haul roads and thrice a day water sprinkling by fixed sprinklers or water tankers	0	50000
	Muffle blasting – To control fly rocks during blasting	Lump sum fund allocation Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure	Lump sum fund allocation for ensuring wet drilling by covering drill holes with wet gunny bags and spraying water while drilling	0	10000
	No overloading of trucks/tippers/tractors	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Enforcing speed limits of 20 km/hr within ML area	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Regular monitoring of exhaust fumes as per RTO norms	Lump sum fund allocation Manual Monitoring through Security guard	0	5000
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	5000
Noise Environment	Source of noise will be during operation of transportation vehicles, HEMM for this proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done	Provision made in Operating Cost	0	0
	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implements that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0

	Provision for Portable blaster shed	Installation of Portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 Tonnes of Blasted Material	0	0
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency	5000	20000
		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Mine Closure	1. Progressive Closure Activity - Surface Runoff management	Provision made in Operating Cost	0	0
	2. Progressive Closure Activity Barbed Wire Fencing to quarry area will be provisioned.	Provision made in Operating Cost	0	0
	3. Greenbelt development under safety zone during the mining period	Provision made in Operating Cost	0	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure mentioning Environmental Conditions	10000	1000
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms	0	100000
	Workers will be provided with Personal Protective Equipment's	Lumpsum fund allocation	50000	15000
	Health checkup for workers will be provisioned	IME & PME Health checkup for all the employees will be covered batch wise.	0	50000
	First aid facility will be provided	Lumpsum fund allocation	0	5000
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	No parking will be provided on the transport routes. Separate provision will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	Lumpsum fund allocation	50000	10000
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000

	Appointment of Competent person for ensuring the safety operation	Provision made in operational cost	0	0
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Lumpsum fund allocation	300000	0
TOTAL			5,60,000	3,02,000

Year Wise Break Up	
I Year	₹ 8,62,000/-
II Year	₹ 3,17,100/-
III Year	₹ 3,32,955/-
IV Year	₹ 3,49,603/-
V Year	₹ 3,67,083/-
Total	₹ 22.29 Lakhs

Cost inflation 5% per annum

Note: This Environmental Management plan cost will vary according to the public consultation comments

10.10 CONCLUSION –

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

11. SUMMARY AND CONCLUSION

The Draft EIA & EMP report prepared for the proposed Venkatesapuram Rough Stone Quarries project located in S.F.No. 132 (Part-2) & 132 (Part-1) of Venkatesapuram Village, Shoolagiri Taluk, Krishnagiri District, Tamil Nadu State belongs to Thiru. M. Shankar Ganesh-P1 & Thiru. G. Santhamoorthy – P2, the Project falls in the Cluster category consist of 1 Proposed & 3 Existing Quarries falls under “B” category as per MoEF & CC Notification S.O. 3977 (E).

Now, 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 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B-1 and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed project is categorized under category “B1” Activity 1(a) (mining lease area in cluster situation) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance. “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”.

Environmental monitoring and audit mechanism have been recommended before and after commencement of the project, where necessary, to verify the accuracy of the EIA predictions and the effectiveness of recommended mitigation measures.

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures for each individual leases. A detailed account of the emission sources, emissions control equipment, background Air quality levels, Meteorological measurements, Dispersion model and all other aspects of pollution like effluent discharge, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the months March – May 2025 for various environmental components so as to assess the anticipated impacts of the cluster quarry projects on the environment and suitable mitigation measures for likely adverse impacts due to the proposed project is suggested individually for the respective proposed project under Chapter 10.

The project proponent ensures to obtain necessary clearances and quarrying will be carried out as per rules and regulations. The Mining Activity will be carried out in a phased manner as per the approved mining plan after obtaining EC, CTO from TNPCB, execution of lease deed and obtaining DGMS Permission and working will be carried out under the supervision of Competent Persons employed. Overall, the EIA report has predicted that the project will comply with all environment standards and legislation after commencement of the project and operational stage mitigation measures are implemented.

Mining operations has positive impact on environment and socio economy such as landscape improvement, water as by-product, economy development and better public services, providing and supply of Rough Stone as per market demand. Sustainable and modern mining leads us to see positive impact of mining operation and providing consistent employment for nearly 54 people (P1-26+P2-28) directly in the proposed projects and indirectly around 50 people.

As discussed, it is safe to say that the proposed quarries are not likely to cause any significant impact to the ecology of the area, as adequate preventive measures will be adopted to keep the various pollutants within the permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigate technique, as well as to serve as biological indicators for the pollutants released from the Venkatesapuram Rough Stone Cluster Quarry (Extent 19.31.0 Ha).

12. DISCLOSURE OF CONSULTANT

The Project Proponent's Thiru. M. Shankar Ganesh have engaged M/s Geo Exploration and Mining Solutions, an Accredited Organization under Quality Council of India – National Accreditation Board for Education & Training, New Delhi, for carrying out the EIA Study as per the ToR Issued.

Name and address of the consultancy:

GEO EXPLORATION AND MINING SOLUTIONS

No 17, Advaita Ashram Road,

Alagapuram, Salem – 636 004

Tamil Nadu, India

Email: infogeoexploration@gmail.com

Web: **www.gemssalem.com**

Phone: 0427 2431989.

The Accredited Experts and associated members who were engaged for this EIA study as given below –

Sl.No.	Name of the expert	In house/ Empanelled	EIA Coordinator		FAE	
			Sector	Category	Sector	Category
1	Dr. P. Thangaraju	In-house	1	A	HG GEO	A A
2	Mr. J. R. Vikram Krishna	Empanelled	1 38	A B	SHW RH NV	A A A
3	Mr. N. Senthilkumar	Empanelled	31 38	A B	AQ WP RH	A B A
4	Mr. M. Santhoshkumar	In-house	-	-	GEO	B
5	Mr. Govindasamy	In-house	-	-	WP	B
6	Mr. Panneer Selvam	In-house	-	-	EB	B
7	Dr. T. Sasikala	Empanelled	-	-	SE	B
8	Mr. N. Sathishkumar	In-house	-	-	AP	B
9	Mr.P. Viswanathan	In-house	-	-	LU	B
10	Mr.M. Shaik Nawas	In-house	-	-	SC	B
Abbreviations						
EC	EIA Coordinator					
AEC	Associate EIA Coordinator					
FAE	Functional Area Expert					
FAA	Functional Area Associates					
TM	Team Member					
GEO	Geology					
WP	Water pollution monitoring, prevention and control					
AP	Air pollution monitoring, prevention and control					
LU	Land Use					
AQ	Meteorology, air quality modelling, and prediction					
EB	Ecology and bio-diversity					
NV	Noise and vibration					
SE	Socio economics					
HG	Hydrology, ground water and water conservation					
SC	Soil conservation					
RH	Risk assessment and hazard management					
SHW	Solid and hazardous wastes					
MSW	Municipal Solid Wastes					
ISW	Industrial Solid Wastes					
HW	Hazardous Wastes					