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 (Cluster) – MINOR MINERAL - PATTA LAND

IDAYARPALAYAM ROUGH STONE AND GRAVEL QUARRIES

Cluster Extent-16.08.34 Ha

(6 Proposed+1 Existing Quarries)

P1	P2
Thiru.S. Nandagopal S/o. Subramaniam, No. 6/215-A, Kadukuttai Road, Pattanam, Coimbatore District, Tamil Nadu State – 641 016	**Tmt. N. Chitradevi,** W/o. Nandhagopal, No. 6/215-A, Kadukuttai Road, Pattanam, Coimbatore District, Tamil Nadu State – 641 016
PROJECT LOCATION	**PROPOSED PRODUCTION**
P1 **Extent: 2.15.83 ha** S.F. Nos: 180/1 and 181/3 Idayarpalayam Village, Sulur Taluk, Coimbatore District **P2** **Extent: 1.60.0 ha** S.F.Nos. 179/2(Part), Idayarpalayam Village, Sulur Taluk, Coimbatore District.	**P1** Rough Stone = **2,31,510m^3** Peak Production =**35,850m^3** Gravel = **30,964m^3** Proposed Depth = **42m bgl** **P2** Rough Stone = **1,87,565m^3** Peak Production = **44,980m^3** Gravel = **7,502m^3** Proposed Depth = **57m bgl** Existing Depth = **20m bgl**
ToR obtained vide **File No. 11968 TOR Identification No. TO25B0108TN5897910N Dated:15.06.2025-P1** **File No. 11970 TOR Identification No. TO25B0108TN5935752N Dated:16.06.2025-P2**	
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: infogeoexploration@gmail.com **Web: www.gemssalem.com**	**Laboratory** **GLOBAL LAB AND CONSULTANCY SERVICES** **Approved by ISO:9001:2015, NABL, FSSAI, Experts in QHSE** S.F No:92/3A2, Geetha Nagar, Alagapuram Pudur, Salem-636016.
Baseline Monitoring Period **March to May 2025**	
AUGUST 2025	

UNDERTAKING

I, S. Nandhagopal given undertaking that this EIA & EMP report prepared for our Rough Stone and Gravel Quarry situated in S.F. No 180/1 and 181/3 over an extent of 2.15.83 Ha in Idayarpalayam Village, Sulur Taluk and Coimbatore District based on the ToR issued by the State Level Environmental Impact Assessment Authority (SEIAA), Tamil Nadu vide File No.11968 TOR Identification No. TO25B0108TN5897910N Dated: 15.06.2025

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 Project Proponent

Thiru. S. Nandhagopal

Place: Coimbatore
Dated:

DECLARATION

I Dr. M. Ifthikhar Ahmed – EIA Co Ordinator declare that the EIA & EMP report for the Rough Stone and Gravel Quarry in S.F. No 180/1 and 181/3 over an extent of 2.15.83 Ha in Idayarpalayam Village, Sulur Taluk and Coimbatore District 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. M. Ifthikhar Ahmed

Managing Partner

M/s. Geo Exploration and Mining Solutions

Place : Salem

Dated :

UNDERTAKING

I, N. Chitradevi given undertaking that this EIA & EMP report prepared for our Rough Stone and Gravel Quarry situated in S.F. No 179/2 (Part), over an extent of 1.60.0 Ha in Idayarpalayam Village, Sulur Taluk and Coimbatore District based on the ToR issued by the State Level Environmental Impact Assessment Authority (SEIAA), Tamil Nadu vide Letter No File No. 11970 TOR Identification No. TO25B0108TN5935752N Dated:16.06.2025

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 Project Proponent

N. Chitradevi

Tmt. N. Chitradevi

Place: Coimbatore

Dated:

DECLARATION

I Dr. M. Ifthikhar Ahmed – EIA Co Ordinator declare that the EIA & EMP report for the Rough stone and Gravel quarry in S.F. No 179/2 (Part), over an extent of 1.60.0 Ha in Idayarpalayam Village, Sulur Taluk and Coimbatore District 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. M. Ifthikhar Ahmed

Managing Partner

M/s. Geo Exploration and Mining Solutions

Place : Salem

Dated :

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

PROPOSED QUARRIES					
CODE	**Name of the Owner**	**Village**	**S.F. Nos**	**Extent in Ha**	**Status**
P1	**S. Nandhagopal**	Idayarpalayam	180/1 & 181/3	2.15.83	File No. 11968 TOR Identification No. TO25B0108TN5897910N Dated:15.06.2025
P2	**N. Chitradevi**		179/2 (Part)	1.60.00	File No. 10996 TOR Identification No. TO24B0108TN5260870T Dated:23.12.2024
P3	V. Saravanan		171/2 (Part) & 176/2	1.84.0	File No. 10794 TOR Identification No. TO24B0108TN5892891N Dated: 05.08.2024
P4	N. Vivek Prithviraj		180/3 (Part)	1.62.0	Precise area communicated
P5	M/s. Ultra Readymix concrete pvt Ltd		168/2A (P), 168/2B (P), 169/1C(P), 169/2A(P)	2.94.01	Precise area communicated
P6	K. Ranganathan		174/4, 176/1	2.28.00	Precise area communicated
			TOTAL EXTENT	**12.43.84**	
EXISTING QUARRIES					
CODE	**Name of the Owner**	**Village**	**S.F. Nos**	**Extent in Ha**	**Status**
E1	N. Chitradevi	Idayarpalayam	179/2(P)	3.64.5	14.07.2021 to 13.07.2026
			TOTAL EXTENT	**3.64.5**	
ABANDONED QUARRIES					
A-1	Thiru.M.Arumugam	Idayarpalayam	172/2	0.49.5	18.05.2008 to 17.05.2013
A-2	Tmt. Ponnammal		178/2	2.34.5	22.10.2004 to 21.10.2009
			TOTAL EXTENT	**2.84.00**	
			TOTAL CLUSTER EXTENT	**16.08.34**	

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

As per above notification S.O.2269(E) dated : 01.07.2016 in para (b) in Appendix XI,- (ii)(5): The lease not operative for three years or more and leases which have got environmental clearance as on 15th January, 2016 shall not be counted for calculating the area of cluster, but shall be included in the Environment Management Plan and the Regional Environmental Management Plan.

TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru.S. Nandhagopal

File No.11968 TOR Identification No. TO25B0108TN5897910N Dated:15.06.2025

	SPECIFIC CONDITIONS	
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.** Copy of affidavit agreement regrading forming CMC will be submitted during the appraisal meeting.
	2.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 and agreed** Not Applicable. It is 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 & agreed.** The PP obtained VAO Certificate regarding the location of habitations within 300m radius from the periphery of the site and enclosed with as 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 and agreed** The structure study has been carried out within the radius of 500m. There is no habitation within the radius of 300m from the project site the details of the structures is given in the EIA report, Chapter No.III.
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 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 • Odai - 100m-NW • Odai – 1km -SE

5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	**Noted and agreed** Biodiversity study has been carried out by Functional Area Expert by the NABET accredited consultant. The detailed study is given in the Chapter No.3
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** Bolampatti I – 17.5 km –West
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 and agreed** It is a Fresh Proposal.
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 and agreed** Proponent requested as will be carrying the slope stability Plan after commencement of quarrying operation and ensure that the reports will be submitted along with HYCR.
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 affidavit stating that the blasting will be carried out under the supervision of Competent person.
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**
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 and agreed.** There is no other quarry exept this proposal operated by Proponent Thiru.S.Nandhagopal.
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,	Noted and agreed Not Applicable. It is a fresh proposal.
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,	**Noted and agreed**

	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).	Satellite imagery of the project area along with boundary coordinates is given in the Chapter No 2, Figure No.2.2, Page No.11. Geomorphology of the area is given in Chapter No 2, Figure No.2.10, Page No.23 Land use pattern of the project area is tabulated in the Chapter No.2. Table no 2.4, Pg.No.18
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	**Noted and agreed.** PP carried out the drone video survey and will be submitted during the appraisal while obtaining the EC.
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 and agreed** The area has been fenced and plantation activities carried out within the project site.
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** The details of mineral reserves have been provided in Chapter No 1, Mineable reserves– 2,31,510 m^3 Peak Production – 35,850m^3 Proposed Depth – 42m bgl
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.** The PP provided 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
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 One Season (Summer Season) Mar to May 2025 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. 3
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 is explained in chapter - 7
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Noted and agreed
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	**Noted and agreed** Land use and land cover of the study area is discussed in Chapter No. 3.

	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 plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2
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.
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** 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.
28	Impact on local transport infrastructure due to the Project should be indicated.	**Noted and agreed** Transportation details mentioned in Chapter -2
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** Details of the trees in the buffer zone given in Chapter No.3&4
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 part of 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** Details are given in the Chapter No.3
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** Noted & agreed. It is proposed to plant a 1080nos of trees in the 7.5m safety barrier and village roads.
33	Taller/one-year-old Saplings raised in appropriate size of bags, preferably ecofriendly bagsshould 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** No trees within the project site. it is proposed to plant 1080 Nos of Trees in the safety barrier and Village roads.
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

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
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 chapter- 10
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. Details of CER are discussed under Chapter 8
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** It is explained in Chapter -3
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 against this 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** Chapter-8 discussed about benefits of projects.
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.** Not Applicable
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** The EMP prepared for the life of the mine and discussed in chapter 10.
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 & agreed.

SEIAA SPECIFIC CONDITIONS		
1	The Authority noted that the subject was placed in the 565th Meeting of SEAC-II held on 15.05.2025. After detailed discussions, the Authority accepts the recommendation of SEAC-II and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 2,31,510 m^3 of rough stone and 30,964 m^3 of gravel upto the depth of 42m 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-II & normal conditions & the conditions mentioned below	**Noted and agreed**

SEIAA STANDARD CONDITIONS		
Cluster Management Committee		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	**Noted and agreed** The Cluster management committee has been formed covering the existing and proposed quarries in the cluster
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** The information will be shared to the cluster management committee during the monthly meeting.
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 list of members of the committee formed will be submitted to AD/Mines before resuming the mining operation.
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.	**Noted and agreed** The blasting frequency of the individual mines will be monitored by the competent person appointed specifically. Existing village road is situated on the north side, the same will be utilized for the transportation.
5	The committee shall deliberate on risk & emergency management plan, fire safety & evacuation plan and sustainable development goals 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.	**Noted and agreed** The risk management plan and disaster management plan has been prepared and enclosed in this EIA report, Chapter No. 7.
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** Environmental policy of the cluster management committee is detailed in the EIA Report Chapter No. 6
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** The Restoration strategy is discussed in the progressive mine closure plan and enclosed in the Scheme of Mining plan.
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** The information on the health of the workers and the local people will be updated periodically along with medical examination.
Agriculture & Agro-Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	The vegetation details have been provided in chapter III. 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.
10	Impact on soil flora & vegetation around the project site.	The vegetation details have been provided in chapter III. 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 vegetation including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area shall committed mentioned in EMP.	**Noted and agreed** It is a Fresh lease area and no trees inside the lease area.
12	The Environmental Impact Assessment should study the agro-biodiversity, agro-forestry, horticultural plantations, the natural ecosystem, the soil micro flora,	Details in Chapter 3

	fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	Noted & agreed
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock	**Noted and agreed** The project area is dry barren land no agriculture activities carried out. This is a proposed lease area.
Forests		
15	The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife	**Noted and agreed.** Nearest Reserve Forest is Bolampatti I-R.F- 17.5km-West
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	**Noted and agreed** The area is surrounded by Barren land. 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	No major trees within the project area.
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site	**Noted & agreed.** Indira Gandhi (Anamalai) Wildlife Sanctuary – 44 Km – South
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 1 km (radius) so as to assess the impacts on the nearby waterbodies 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, covering the entire mine lease period	**Noted and agreed** There are 10 open wells and 08 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method
20	Erosion Control measures	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.	The impact of mining on the nearby villages and water bodies are discussed in the Chapter No.4
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir	Food webs describe who eats whom in an ecological community. Made of interconnected food chains, food webs help us understand how changes to ecosystems — say, removing a top predator or adding nutrients — affect many different species, both directly and indirectly. Whereas in this proposed project is for quarrying of Rough Stone and Gravel and is on a hard batholith formation where no diversion of any water bodies is proposed of there is no intersection of ground water table anticipated.
23	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The EIA study has been carried out as per the ToR Condition the impact analysis and mitigation measures are given in the Chapter No.4.
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.	The EIA study has been carried out as per the ToR Condition the impact analysis and mitigation measures are given in the Chapter No.4.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components	Details in Chapter 3 Soil environment.

26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites	Details in Chapter 3 Water environment.
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. c) Sediment geochemistry in the surface streams.	Noted and agreed a) There is no volcanic activity prone areas in the region hence there is no possibilities fo the Hydrothermal and geo thermal effect in the region b) The area is covered with Gravel formation and the entire area is massive hard rock formation hene the possibilities of bio geo chemical process is not arised c) The water analysis has been carried out in the surrounding areas there is no water bodies adjacent to the project site and no proposal for the discharge of water into the stream hence this process will not create sediment geochemistry in the surface streams.
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	**Noted and agreed** Details in Chapter 3 environmental monitoring details.
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	A greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3), Carbon dioxide (CO_2): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Methane (CH_4): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide (N_2O): Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater
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 and agreed** Details in Chapter-3 for meteorological and climate/weather data representation of graphs.
31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	A greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3) Carbon dioxide (CO_2): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.

		Methane (CH_4): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide (N_2O): Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater
Mine Closure Plan		
32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Progressive Mine closure plan has been prepared considering the entire lease period in the mining plan and the same has been approved.
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 and the scope for achieving SDGs	Detailed under Chapter 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.	The EMP has been prepared with budget for greenbelt development and mine closure plan including disaster management plan. Details are given in the Chapter No.10.
Risk Assessment		
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	A Risk Assessment and management Plan Chapter- 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.	Disaster management Plan details in Chapter-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.	VAO certificate has been obtained mentioning the details of approved habitations within the radius of 300m
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.	The issues raised during public hearing is addressed in chapter No.7
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	Plastic waste management in the project area detailed in Chapter No.7.

TERMS OF REFERENCE (ToR) COMPLIANCE

Tmt.N.Chitradevi

File No.11970 TOR Identification No. TO25B0108TN5935752N Dated:16.06.2025

<table>
<tr><th colspan="3">SPECIFIC CONDITIONS</th></tr>
<tr><td>1</td><td>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.</td><td>Noted & agreed.
Copy of affidavit agreement regrading forming CMC will be submitted during the appraisal meeting.</td></tr>
<tr><th colspan="3">2.SEAC STANDARD CONDITIONS</th></tr>
<tr><td>1</td><td>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.</td><td>Noted and Agreed
The quarry was previously operated by M/s. Robo Silicon Pvt Ltd over an extent of 1.60.0 ha for period 14.04.2010 to 13.04.2015.
The existing pit
<table>
<tr><th>Pit ID</th><th>Length (m)</th><th>Width(m)</th><th>Depth(m)</th></tr>
<tr><td>I</td><td>115</td><td>90</td><td>20</td></tr>
</table></td></tr>
<tr><td>2</td><td>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.</td><td>Noted & agreed.
The PP obtained VAO Certificate regarding the location of habitations within 300m radius from the periphery of the site and enclosed with as annexure.</td></tr>
<tr><td>3</td><td>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.</td><td>Noted and agreed
The structure study has been carried out within the radius of 500m.
There is no habitation within the radius of 300m from the project site the details of the structures is given in the EIA report, Chapter No.III.</td></tr>
<tr><td>4</td><td>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.</td><td>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
• Odai - 370m-NW
• Odai – 800m -SE</td></tr>
</table>

5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	**Noted and agreed** Biodiversity study has been carried out by Functional Area Expert by the NABET accredited consultant. The detailed study is given in the Chapter No.3
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** Bolampatti I – 17.5 km –West.
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 and agreed** Proponent requested as will be carrying the slope stability Plan after commencement of quarrying operation and ensure that the reports will be submitted along with HYCR.
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 and agreed** Proponent requested as will be carrying the slope stability Plan after commencement of quarrying operation and ensure that the reports will be submitted along with HYCR.
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 affidavit stating that the blasting will be carried out under the supervision of Competent person.
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**
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 and agreed.** There is another one quarry operated by the Tmt. N. Chitradevi
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,	Noted and agreed.
13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	Noted and agreed. The AD letter will be submitted during the apparaisal meeting.
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.	Exisiting depth of mining is 20m bgl • Previous Lessee: M/s. Robo Silicon Pvt Ltd • Previous Lease Period: 14.04.2010 to 13.04.2015, S.F. No 179/2(P) (Extent: 1.60.0)
15	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet,	**Noted and agreed**

	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).	Satellite imagery of the project area along with boundary coordinates is given in the Chapter No 2, Figure No.2.2, Page No.11. Geomorphology of the area is given in Chapter No 2, Figure No.2.10, Page No.23 Land use pattern of the project area is tabulated in the Chapter No.2. Table no 2.4, Pg.No.18
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	**Noted and agreed.** PP carried out the drone video survey and will be submitted during the appraisal while obtaining the EC.
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 and agreed** The area has been fenced and plantation activities carried out within the project site.
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** The details of mineral reserves have been provided in Chapter No 1, Mineable reserves– 1,87,565 m^3 Peak Production – 44,980m^3 Proposed Depth – 57m bgl
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.** The PP provided 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
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 One Season (Summer Season) Mar to May 2025 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. 3
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 is explained in chapter - 7
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	**Noted and agreed**
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	**Noted and agreed** Land use and land cover of the study area is discussed in Chapter No. 3.

	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 plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2
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.
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** 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.
28	Impact on local transport infrastructure due to the Project should be indicated.	**Noted and agreed** Transportation details mentioned in Chapter -2
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** Details of the trees in the buffer zone given in Chapter No.3&4
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 part of 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** Details are given in the Chapter No.3
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** Noted & agreed. It is proposed to plant a 800 nos of trees in the 7.5m safety barrier and village roads.
33	Taller/one-year-old Saplings raised in appropriate size of bags, preferably ecofriendly bagsshould 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** No trees within the project site. it is proposed to plant 800 Nos of Trees in the safety barrier and Village roads.
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

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
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 chapter- 10
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. Details of CER are discussed under Chapter 8
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** It is explained in Chapter -3
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 against this 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** Chapter-8 discussed about benefits of projects.
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.** Not Applicable.
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** The EMP prepared for the life of the mine and discussed in chapter 10.
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 & agreed.

SEIAA SPECIFIC CONDITIONS		
1	The Authority noted that the subject was placed in the 566th Meeting of SEAC-II held on 16.05.2025. After detailed discussions, the Authority accepts the recommendation of SEAC-II and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 1,87,565m³ of rough stone and 7502 m³ of gravel upto the depth of 57m 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-II & normal conditions & the conditions mentioned below.	**Noted and agreed**
SEIAA STANDARD CONDITIONS		

Cluster Management Committee		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	**Noted and agreed** The Cluster management committee has been formed covering the existing and proposed quarries in the cluster
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** The information will be shared to the cluster management committee during the monthly meeting.
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 list of members of the committee formed will be submitted to AD/Mines before resuming the mining operation.
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.	**Noted and agreed** The blasting frequency of the individual mines will be monitored by the competent person appointed specifically. Existing village road is situated on the north side, the same will be utilized for the transportation.
5	The committee shall deliberate on risk & emergency management plan, fire safety & evacuation plan and sustainable development goals 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.	**Noted and agreed** The risk management plan and disaster management plan has been prepared and enclosed in this EIA report, Chapter No. 7.
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** Environmental policy of the cluster management committee is detailed in the EIA Report Chapter No. 6
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** The Restoration strategy is discussed in the progressive mine closure plan and enclosed in the Scheme of Mining plan.
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** The information on the health of the workers and the local people will be updated periodically along with medical examination.
Agriculture & Agro-Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	The vegetation details have been provided in chapter III. 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.
10	Impact on soil flora & vegetation around the project site.	The vegetation details have been provided in chapter III. 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 vegetation including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area shall committed mentioned in EMP.	**Noted and agreed** It is a Fresh lease area and no trees inside the lease area.
12	The Environmental Impact Assessment should study the agro-biodiversity, agro-forestry, horticultural plantations, the natural ecosystem, the soil micro flora,	Details in Chapter 3

	fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	Noted & agreed
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock	**Noted and agreed** The project area is dry barren land no agriculture activities carried out. This is a proposed lease area.
Forests		
15	The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife	**Noted and agreed.** Nearest Reserve Forest is Bolampatti I-R.F- 17.5km-West
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	**Noted and agreed** The area is surrounded by Barren land. 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	No major trees within the project area.
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site	**Noted & agreed.** Indira Gandhi (Anamalai) Wildlife Sanctuary – 44 Km – South
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 1 km (radius) so as to assess the impacts on the nearby waterbodies 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, covering the entire mine lease period	**Noted and agreed** There are 10 open wells and 08 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method
20	Erosion Control measures	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.	The impact of mining on the nearby villages and water bodies are discussed in the Chapter No.4
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir	Food webs describe who eats whom in an ecological community. Made of interconnected food chains, food webs help us understand how changes to ecosystems — say, removing a top predator or adding nutrients — affect many different species, both directly and indirectly. Whereas in this proposed project is for quarrying of Rough Stone and Gravel and is on a hard batholith formation where no diversion of any water bodies is proposed of there is no intersection of ground water table anticipated.
23	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The EIA study has been carried out as per the ToR Condition the impact analysis and mitigation measures are given in the Chapter No.4.
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.	The EIA study has been carried out as per the ToR Condition the impact analysis and mitigation measures are given in the Chapter No.4.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components	Details in Chapter 3 Soil environment.

26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites	Details in Chapter 3 Water environment.
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. c) Sediment geochemistry in the surface streams.	Noted and agreed d) There is no volcanic activity prone areas in the region hence there is no possibilities fo the Hydrothermal and geo thermal effect in the region e) The area is covered with Gravel formation and the entire area is massive hard rock formation hene the possibilities of bio geo chemical process is not arised f) The water analysis has been carried out in the surrounding areas there is no water bodies adjacent to the project site and no proposal for the discharge of water into the stream hence this process will not create sediment geochemistry in the surface streams.
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	**Noted and agreed** Details in Chapter 3 environmental monitoring details.
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	A greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3), Carbon dioxide (CO_2): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Methane (CH_4): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide (N_2O): Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater
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 and agreed** Details in Chapter-3 for meteorological and climate/weather data representation of graphs.
31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	A greenhouse gas (GHG) is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3) Carbon dioxide (CO_2): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.

		Methane (CH_4): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide (N_2O): Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater
Mine Closure Plan		
32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Progressive Mine closure plan has been prepared considering the entire lease period in the mining plan and the same has been approved.
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 and the scope for achieving SDGs	Detailed under Chapter 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.	The EMP has been prepared with budget for greenbelt development and mine closure plan including disaster management plan. Details are given in the Chapter No.10.
Risk Assessment		
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	A Risk Assessment and management Plan Chapter- 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.	Disaster management Plan details in Chapter-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.	VAO certificate has been obtained mentioning the details of approved habitations within the radius of 300m
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.	The issues raised during public hearing is addressed in chapter No.7
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	Plastic waste management in the project area detailed in Chapter No.7.

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 Patta 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/ toposheet, 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).	Satellite imagery of the project area along with boundary coordinates is given in the Chapter No 1 Figure No .1.1 . Geomorphology of the area is given in Chapter No 2 Figure No 2.8. Land use pattern of the project area is tabulated in the Chapter No.2. Table No.2.3. Land use pattern of the Study area is tabulated in the Chapter No.3 Table No 3.3.
5	Information should be provided in Survey of India Toposheet 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. 2.7 Geomorphology Map of the Study Area covering 10 km radius – Figure No. 2.8.
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	The proponent has framed their Environmental Policy and the same is discussed in the Chapter No 10.1.

	shareholders or stakeholders at large, may also be detailed in the EIA Report.	
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 90^0 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, Table No 2.3.
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 patta land. Approved Mining Plan is enclosed as Annexure Volume 1.
13	Status of forestry clearance for the broken-up area and virgin forestland 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 accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	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.
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 'Aravalli 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 w.r.t 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 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 socio-economic aspects should be discussed in the Report.	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.
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 pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	Baseline Data were collected for One Season (Summer Season) Mar – 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 pre-dominant 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.
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: **P1** -2.0 KLD, **P2** -2.0 KLD Discussed under Chapter 2, Table No 2.13.
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 rainwater 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 groundwater. 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 65-70m below ground level. The ultimate depth of quarry is P1 42m & P2-57m This proposal of 65-70m below ground level will not intersect the ground water table, which is inferred from the hydro-geological 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.	Highest elevation of the project area is **P1**- - 432m AMSL. **P2** – 421m AMSL Ultimate depth of the mine P1 - 42m BGL P2 - 57m BGL Water level of the area is 65-70m BGL
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	Greenbelt Development Plan is discussed under Chapter 4.

	local population with emphasis on local and native species and the species which are tolerant to pollution.	
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 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.	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.
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 52 people directly and 100 people indirectly. Details in Chapter 2.
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.	Public hearing points and commitment of the project proponent is detailed in the chapter No.7, c

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.1,42,24,000/- CER Cost is Rs 3,00,000/- **P2:** Project Cost is Rs.1,63,24,000/- CER Cost is Rs 3,00,000/-
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 clearly indicate environmental, social, economic, employment potential, etc.	Details in Chapter 8.
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.	Questionnaire of the project will be submitted during Final EIA
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-IA. II(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-IA. II (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	There is no changes in Form-I, Mining plan and Pre-feasibility report for all the projects.

i	As per the circular no. J-11011/618/2010-IA. II(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.	Surface Plan – Figure No. 2.2. Geological Plan – Figure No 2.9. Working Plan – Figure No 2.9. Closure Plan – Figure No.2.10.

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1.INTRODUCTION

1.0 PREAMBLE

Project History- P1

The project proponent Thiru. S. Nandhagopal has applied for Rough Stone and Gravel Quarry over an extent of 2.15.83 Ha in S.F.Nos. 180/1 & 181/3, Idayarpalayam Village, Sulur Taluk & Coimbatore District.

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 13.06.2024
- Precise Area Communication Letter was issued by the District Collector, Coimbatore Rc. No 542/Mines/2024, Dated: 12.12.2024
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Coimbatore District, vide Rc. No. 542/Mines/2024, Dated: 04.02.2025.
- The proposed project falls under "B1" Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No.SIA/TN/MIN/529996/2025 Dated: 18.03.2025 and the ToR Was Granted vide Letter No File No.11968 TOR Identification No. TO25B0108TN5897910N Dated: 15.06.2025
- The proposal was placed in 565th SEAC meeting held on 15.05.2025 and the committee recommended for issue of ToR. The proposal was considered in 833rd SEIAA meeting held on 03.06.2025 and issued ToR vide Letter No File No.11968 TOR Identification No. TO25B0108TN5897910N Dated: 15.06.2025.

Project History- P2

The project proponent Tmt. N. Chitradevi has applied for Rough Stone and Gravel Quarry over an extent of 1.60.0 Ha in S.F.Nos. 179/2 (Part), Idayarpalayam Village, Sulur Taluk & Coimbatore District.

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 13.06.2024
- Precise Area Communication Letter was issued by the District Collector, Coimbatore Rc. No 541/Mines/2024, Dated: 12.12.2024
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Coimbatore District, vide Rc. No 541/Mines/2024, Dated: 04.02.2025
- The proposed project falls under "B1" Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No.SIA/TN/MIN/530101/2025 Dated: 20.03.2025 and the ToR Was Granted vide Letter No File No.11970 TOR Identification No. TO25B0108TN5935752N Dated: 16.06.2025
- The proposal was placed in 566th SEAC-II meeting held on 16.05.2025 and the committee recommended for issue of ToR. The proposal was considered in 834th SEIAA meeting held on 06.06.2025 and issued ToR vide Letter No File No.11970 TOR Identification No. TO25B0108TN5935752N Dated: 16.06.2025.
- It is a fresh application but the applied area has been considered quarrying operation earlier. The quarry lease was previously granted for quarrying Rough Stone and Gravel with lease granted details are given below.

S. No	Name of Ex Lessee	Ditrict collector's Proceeding Number and date	S.F. Nos	Validity	Lease Period
1	Tvl. ROBO Silicon Private Limited	Rc.No.1571/2009/MM2 Dated: 13.04.2010	179/2(P)	5 Years	13.04.2010 to 12.04.2015

- As per the EIA Notification, 2006 and subsequent amendments and OM The proposal falls in the B1 Category (Cluster quarries – 6 proposals, 1 Existing quarry and 2 Abandoned quarries forming Cluster Category {Total Extent of the Cluster is 17.63.12 Ha}- Cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016).

Based on the ToR Baseline Monitoring study has been carried out for one season (Summer 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

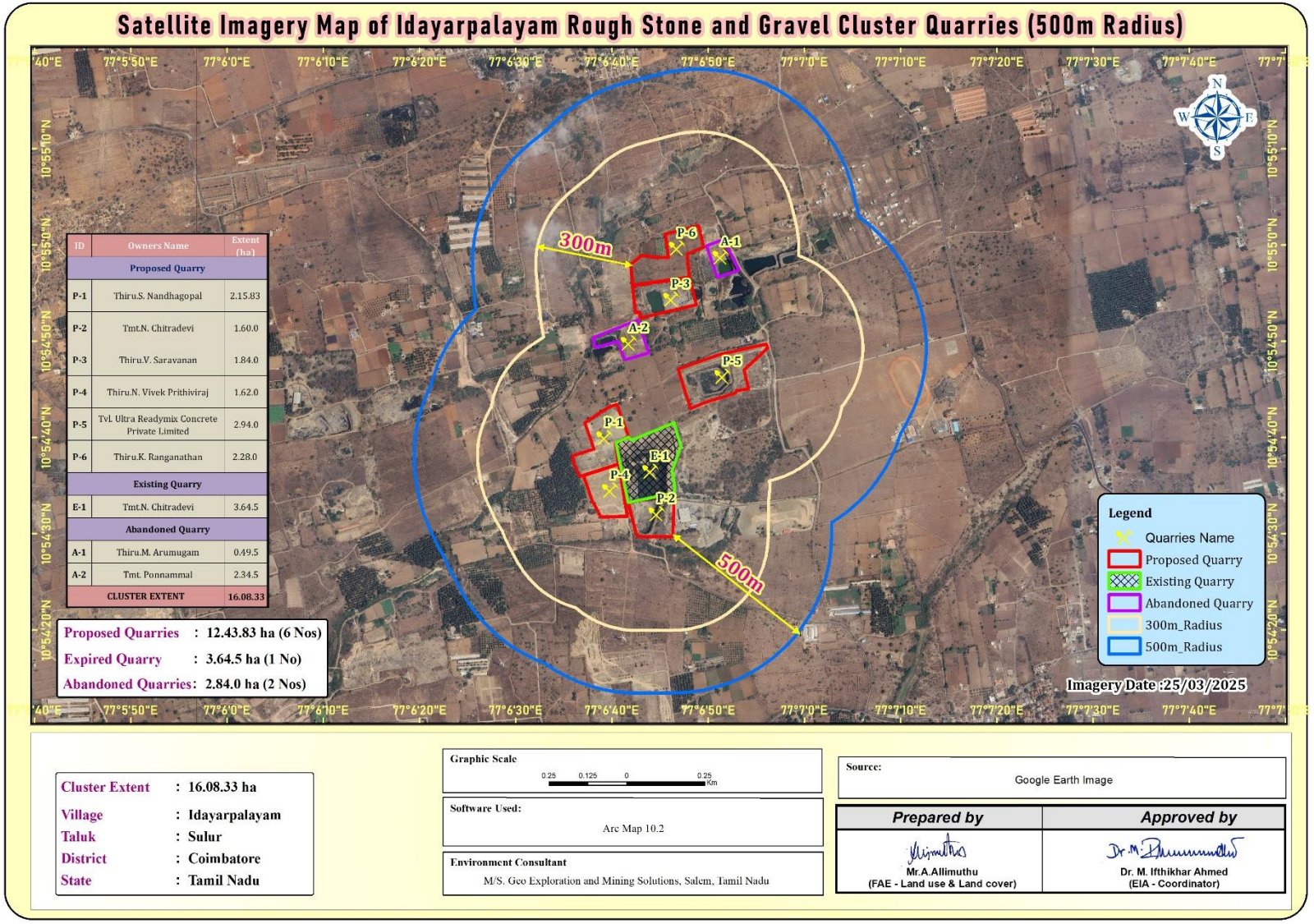
The Ministry of Environment and Forests, Govt. of India, through its EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 1889 of 20thApril 2022, Mining Projects are classified under two categories i.e. A (> 250 Ha) and B (≤ 250 Ha), and 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 projects are 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



ID	Owners Name	Extent (ha)
Proposed Quarry		
P-1	Thiru.S. Nandhagopal	2.15.83
P-2	Tmt.N. Chitradevi	1.60.0
P-3	Thiru.V. Saravanan	1.84.0
P-4	Thiru.N. Vivek Prithiviraj	1.62.0
P-5	Tvl. Ultra Readymix Concrete Private Limited	2.94.0
P-6	Thiru.K. Ranganathan	2.28.0
Existing Quarry		
E-1	Tmt.N. Chitradevi	3.64.5
Abandoned Quarry		
A-1	Thiru.M. Arumugam	0.49.5
A-2	Tmt. Ponnammal	2.34.5
CLUSTER EXTENT		16.08.33

1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENTS

1.2.1 Identification of Project

TABLE 1.1: SALIENT FEATURES OF THE PROPOSED PROJECTS

	P1	P2
Name of the Project	Thiru. S. Nandhagopal Rough Stone and Gravel Quarry	Tmt. N. Chitradevi Rough Stone and Gravel Quarry
S.F. No.	180/1 and 181/3	179/2 (Partt)
Extent	2.15.83 ha	1.60.0
Land Type	Patta Land	Patta Land
Village Taluk and District	Idayarpalayam Village, Sulur Taluk, Coimbatore District.	

Source: Approved Mining Plan

1.2.2 Identification of Project Proponent

TABLE 1.2: DETAILS OF PROJECT PROPONENTS

Name of the Project Proponent	**Thiru. S. Nandhagopal**	**Tmt. N. Chitradevi**
Address	S/o. Subramaniam, No. 6/215-A, Kadukuttai Road, Pattanam, Coimbatore District – 641 016	W/o. Subramaniam, No. 6/215-A, Kadukuttai Road, Pattanam, Coimbatore District – 641 016
Mobile	+91 99441 65179	+91 99441 65179
Status	Individual	Individual

Source: Approved Mining Plan.

1.3 BRIEF DESCRIPTION OF THE PROJECTS

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.

TABLE 1.3: BRIEF DESCRIPTION OF THE PROJECT- P1

Name of the Project	Thiru. S. Nandhagopal Rough Stone & Gravel Quarry	
S.F. No.	180/1 and 181/3	
Extent	2.15.83 Ha	
Village, Taluk and District	Idayarpalayam Village, Sulur Taluk & Coimbatore District	
Land type	It is a Patta land (Barren land) which is not fit for vegetation/ Cultivation	
Land owner details	It is a Patta land, Registered in the name of the applicant Thiru. S. Nandhagopal vide Patta no.963. The S.F.No.181/3 is jointly registered in the name of the applicant and other 6 members vide patta no.958. The Applicant has purchased the S.F.No.181/3 and the same has been registered vide sale deed document no.7791/2020 dated:27.08.2020 in the sulur sub-registor office. But the name transfer in patta is pending till now.	
Toposheet No	58 - F/01	
Latitude between	**10°54'35.95.20"N to 10°54'43.4523"N**	
Longitude between	**77°06'35.9065"E to 77°06'41.7207"E**	
Highest Elevation	432m AMSL	
Mining Plan period	10 years	
Proposed Depth of Mining	42m below ground level.	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	8,90,600	44,530
Mineable Reserves	Rough Stone in m^3	Gravel in m^3
	2,31,510	30,964
Yearwise Production	Rough Stone in m^3	Gravel in m^3
	2,31,510	30,964
Ultimate Pit Dimension	S.No / Length(m) (Max) / Width(m) (Max) / Depth(m) (Max)	

	Pit- I	122	53	22m
	Pit – II	98	92	42m
Water Level in the surrounding areas	63 - 68m bgl			
Method of Mining	Opencast Mechanized Mining Method involving small drilling and Controlled blasting using Slurry Explosives			
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards Southwestern side. The altitude of the area is 432m (Max) above Mean sea level. The area is covered by the Gravel which is about 2m thickness. Massive Charnockite is found after 2m (Gravel) which is clearly inferred from the existing quarry pits.			
Machinery proposed	Jack Hammer	4 Nos		
	Compressor	1 Nos		
	Excavator with Bucket and Rock Breaker	1 No		
	Tippers	2 Nos		
	Water Sprinkling Tanker	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	23 Nos			
Project Cost	Rs. 1,42,24,000/-			
EMP Cost	Rs. 3,80,000/-			
Total Project cost	Rs. 1,60,59,000/-			
CER Cost	Rs. 3,00,000,/-			
Nearby Water Bodies	Odai	100m NW		
	Odai	1km SE		
	Canal	9km SE		
	Pallapalayam Lake	9.3km NW		
Greenbelt Development Plan	As per Mining plan it is Proposed to plant 1080 trees in the 7.5 m Safety Zone, approach road and panchayat roads.			
Proposed Water Requirement	2.0 KLD			
Nearest Habitation	930m – NE			
Nearest Reserve Forest	Boluvampatti I R.F. – 17.5 km –West			
Nearest Wild Life Sanctuary	Indira Gandhi (Anamalai) Wildlife Sanctuary- 44.0km - South			

Source: Approved Mining Plan, PFR.

TABLE 1.4: BRIEF DESCRIPTION OF THE PROJECT- P2

Name of the Project	Tmt. N. Chitradevi	
S.F. No.	179/2 (Part)	
Extent	1.60.0 ha	
Village, Taluk and District	Idayarpalayam Village, Sulur Taluk & Coimbatore District	
Land Type	Patta land	
Existing Quarry Operation	It is an existing quarry. The quarry lease was previously operated by Tvl. ROBO Silicon Private Limited, in S.F.No. 179/2(P) vide Rc.No.1571/2009/MM2, Dated:13.04.2010 for the period of five years from 13.04.2010 to 12.004.201.	
Toposheet No	58 - F/01	
Latitude between	**10° 54' 28.7892"N to 10° 54' 33.4185"N**	
Longitude between	**77° 06' 41.7857"E to 77° 06' 46.7711"E**	
Elevation of the area	421m AMSL	
Lease period	5 Years	
Mining Plan period	5 years	
Existing Depth	20m	
Proposed Depth of Mining as per ToR	57m BGL (2m Gravel + 55m Rough Stone)	
	Rough Stone in m^3	Gravel m^3
Geological Resources	7,22,748	10,824
Mineable Reserves	1,87,565	7,502
Year wise Production as per ToR	1,87,565	7,502

Peak Production	44,980	7,502
Existing Pit Dimension	115m(L) x 90m(B) x 20m(D)(BGL)	
Ultimate Pit Dimension	259m(L) x 202m(B) x 50m(D)(BGL)	
Water Level in the region	65m -70m bgl	
Method of Mining	Opencast Mechanized Mining Method involving small drilling and Controlled blasting using Slurry Explosives	
Topography	The lease applied area is exhibiting plain terrain. The area has gentle sloping towards Southernwestern side and altitude of the area is 421m above from Mean Sea Level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the nearby open well.	
Machinery proposed	Jack Hammer	6Nos
	Compressor	2Nos
	Excavator with Bucket and Rock Breaker	1 Nos
	Trucks	3 Nos
	Water Sprinkling Tanker	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.	
Proposed Manpower Deployment	29 Nos	
Operational Cost	Rs.1,63,24,000/-	
EMP Cost	Rs.3,80,000/-	
Total Project cost	Rs.1,78,75,000/-	
CER Cost	Rs. 3,00,000/-	
Nearby Water Bodies	Odai	370m NW
	Odai	800m SE
	Canal	8.8km SE
	Pallapalayam Lake	9.5km NW
Greenbelt Development Plan	Proposed to plant 800 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	600m – North West	
Nearest Reserve Forest	Boluvampatti I R.F. – 17.5 km –West	
Nearest Wild Life Sanctuary	Indira Gandhi (Anamalai) Wildlife Sanctuary- 44.0km - South	

1.3.2 Location of the Project

P1

- The proposed quarry project falls in Idayarpalayam Village, Sulur Taluk and Coimbatore District.
  The lease applied area is located about 20km Southeastern side of Coimbatore, 12km Southwestern side of Sulur and 1.15km Southwestern side of Idayarpalayam Village.

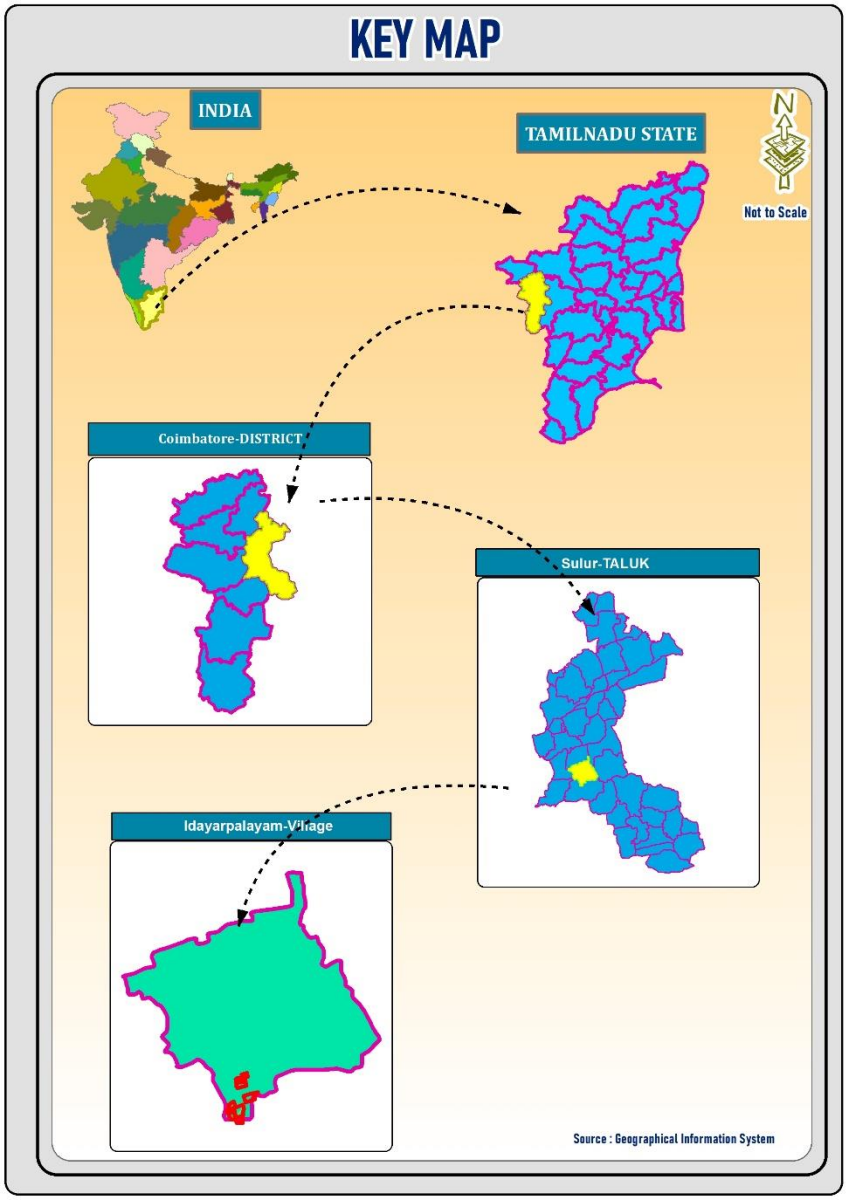
Coimbatrore —20km (Southeast)→ Sulur —12km (Southwest)→ Idayarpalayam —1.15km (Southwest)→ Lease applied area

P2

- The proposed quarry project falls in Idayarpalayam Village, Sulur Taluk and Coimbatore District.
  The lease applied area is located about 19.5km Southeastern side of Coimbatore, 12.5km Southwestern side of Sulur and 1.4km Southern side of Idayarpalayam Village.

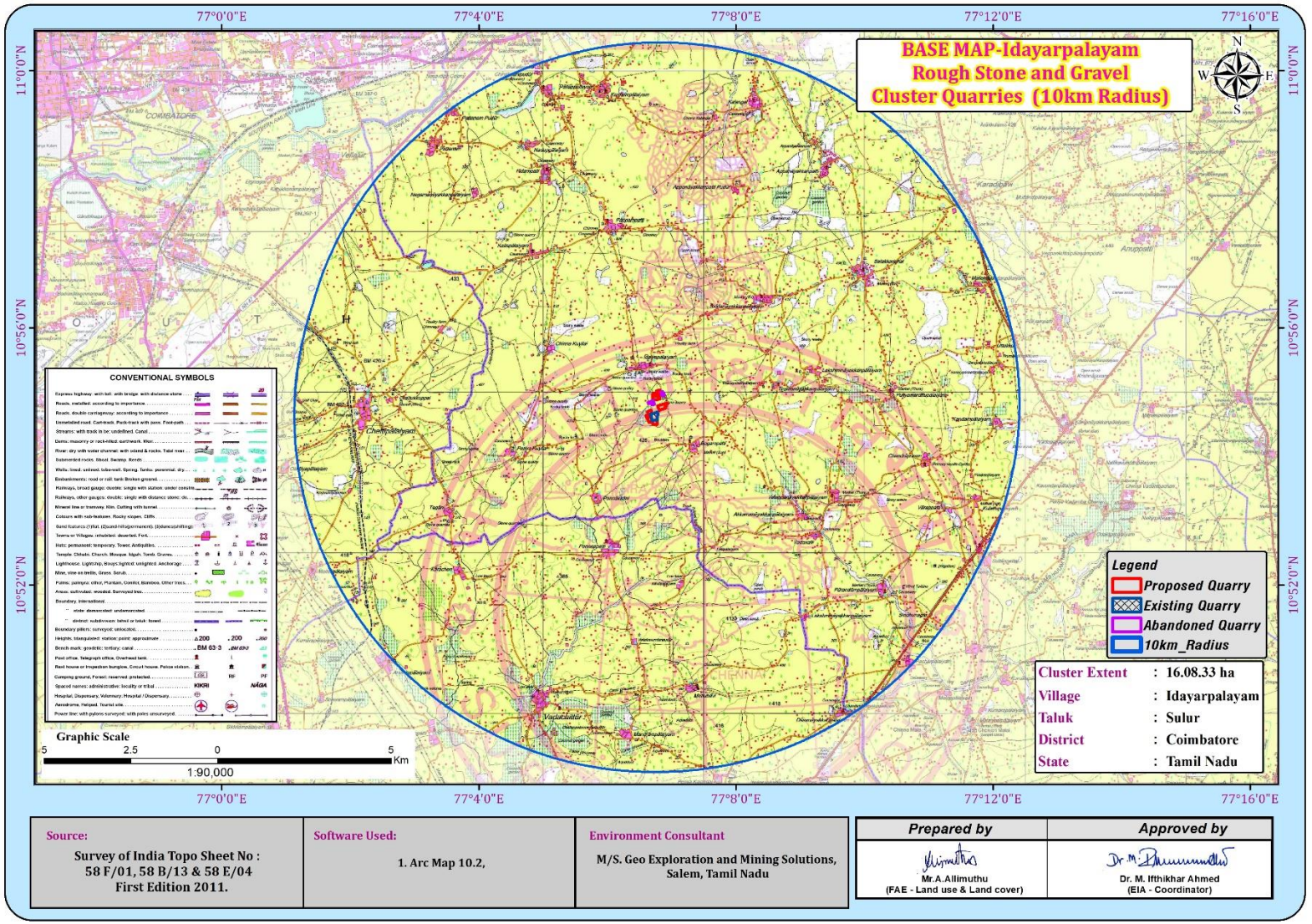
Coimbatrore —19.5km (Southeast)→ Sulur —12.5km (Southwest)→ Idayarpalayam —1.4km (South)→ Lease applied area

FIGURE 1.2 KEY MAP SHOWING THE LOCATION OF THE CLUSTER SITE



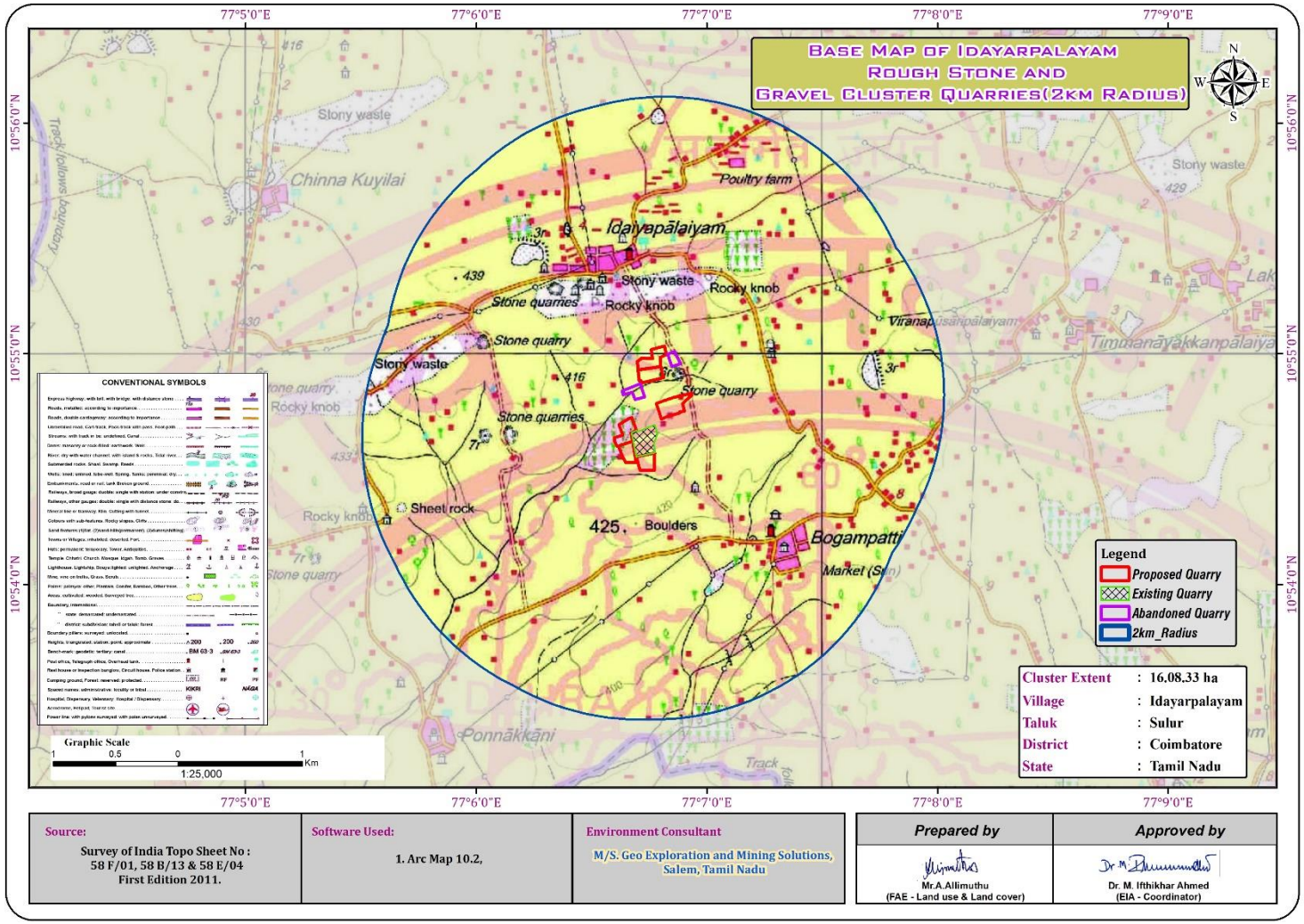
Source: Survey of India Toposheet 58-A/15 & 16

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



Source: Survey of India Toposheet 58-A/15 & 16

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

SCREENING:

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 13.06.2024
- Precise Area Communication Letter was issued by the District Collector, Coimbatore Rc. No 542/Mines/2024 Dated: 12.12.2024
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Coimbatore District, vide Rc. No. 542/Mines/2024, Dated: 04.02.2025.
- The proposed project falls under "B1" Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No.SIA/TN/MIN/529996/2025 Dated: 18.03.2025

SCOPING:

- The proposal was placed in 565th SEAC meeting held on 15.05.2025 and the committee recommended for issue of ToR.
- The proposal was considered in 833rd SEIAA meeting held on 03.06.2025 and issued ToR vide File No.11968 TOR Identification No. TO25B0108TN5897910N Dated: 15.06.2025

P2

SCREENING:

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 13.06.2024
- Precise Area Communication Letter was issued by the District Collector, Coimbatore Rc. No 541/Mines/2024, Dated: 12.12.2024
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Coimbatore District, vide Rc. No 541/Mines/2024, Dated: 04.02.2025
- The proposed project falls under "B1" Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No.SIA/TN/MIN/530101/2025 Dated: 20.03.2025

SCOPING:

- The proposal was placed in 566th SEAC-II meeting held on 16.05.2025 and the committee recommended for issue of ToR.
- The proposal was considered in 834th SEIAA meeting held on 06.06.2025 and issued ToR vide File No. 11970 TOR Identification No. TO25B0108TN5935752N Dated: 16.06.2025

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.
- The report has been prepared using the following references:
- Guidance Manual of Environmental Impact Assessment for Mining of Minerals, Ministry of Environment and Forests, 2010
- EIA Notification, 14th September, 2006
- ToR vide File No. 11968 TOR Identification No. TO25B0108TN5897910N Dated:15.06.2025-P1
- ToR vide File No. 11970 TOR Identification No. TO25B0108TN5935752N Dated:16.06.2025- P2
- Approved Mining Plan

1.5 TERMS OF REFERENCE (ToR)

Compliance to ToR issued vide –

- ToR vide File No. 11968 TOR Identification No. TO25B0108TN5897910N Dated:15.06.2025-P1
- ToR vide File No. 11970 TOR Identification No. TO25B0108TN5935752N Dated:16.06.2025- P2

1.6 POST ENVIRONMENT CLEARANCE MONITORING

The respective proposed project proponents 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 for 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 summer season Mar - 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 1.5: 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 8 locations (2 Core & 5 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 – 1 Surface water and 5

			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)	8 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 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.
- ToR vide File No. 11968 TOR Identification No. TO25B0108TN5897910N Dated:15.06.2025 - P1
- ToR vide File No. 11970 TOR Identification No. TO25B0108TN5935752N Dated:16.06.2025 - P2
- Environment Protection Act, 1986

2. PROJECT DESCRIPTION

2.0 GENERAL

The Proposed Rough Stone & Gravel Quarry requires Environmental Clearance. There are 6 proposed and 1 existing quarries forming a cluster; calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 16.08.34 ha.

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

Method of mining is common for all the quarries. Rough Stone is proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

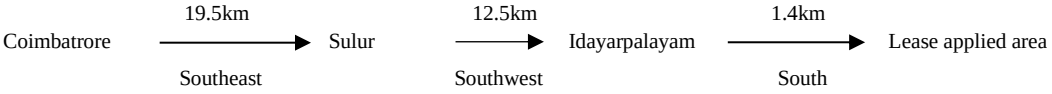
2.2 LOCATION OF THE PROJECT

P1

- The proposed quarry project falls in Idayarpalayam Village, Sulur Taluk and Coimbatore District.
- The lease applied area is located about 20km Southeastern side of Coimbatore, 12km Southwestern side of Sulur and 1.15km Southwestern side of Idayarpalayam Village.

P2

- The proposed quarry project falls in Idayarpalayam Village, Sulur Taluk and Coimbatore District.
- The lease applied area is located about 19.5km Southeastern side of Coimbatore, 12.5km Southwestern side of Sulur and 1.4km Southern side of Idayarpalayam Village.



The project does not fall within 10 km radius of any Eco – sensitive zone, National Park, Tiger Reserve, Elephant Corridor and Biosphere Reserves.

TABLE 2.1: SITE CONNECTIVITY

Nearest Roadway	NH544- Salem – Kochi -10.4.0km-NW SH163- Palladam– Othakalmandabam - 4.4km-NE
Nearest Village	Idayarpalayam – 1.15km- NE
Nearest Town	Sulur – 12.5km-North
Nearest Railway Station	Irugur – 12.5km-NW
Nearest Airport	Coimbatore – 15.2km – NW

Source: Survey of India Toposheet

TABLE 2.2: BOUNDARY CO-ORDINATES OF PROPOSED PROJECT-P1

Corner Nos.	Latitude	Longitude
1	$10^0$54’35.9520” N	$77^0$06’36.6709” E
2	$10^0$54’37.2857” N	$77^0$06’36.0438” E
3	$10^0$54’38.1275” N	$77^0$06’35.9065” E
4	$10^0$54’38.7912” N	$77^0$06’38.1541” E

5	$10^0$54’41.5311” N	$77^0$06’37.1795” E
6	$10^0$54’43.1896” N	$77^0$06’39.7010” E
7	$10^0$54’43.4523” N	$77^0$06’40.4938” E
8	$10^0$40’40.1056” N	$77^0$06’41.7207” E
9	$10^0$54’39.4340” N	$77^0$06’40.3306” E
10	$10^0$54’37.2559” N	$77^0$06’40.6848” E
11	$10^0$54’36.0272” N	$77^0$06’36.9024” E
Datum: UTM-WGS84, Zone 43 North		

Source: Approved Mining Plan

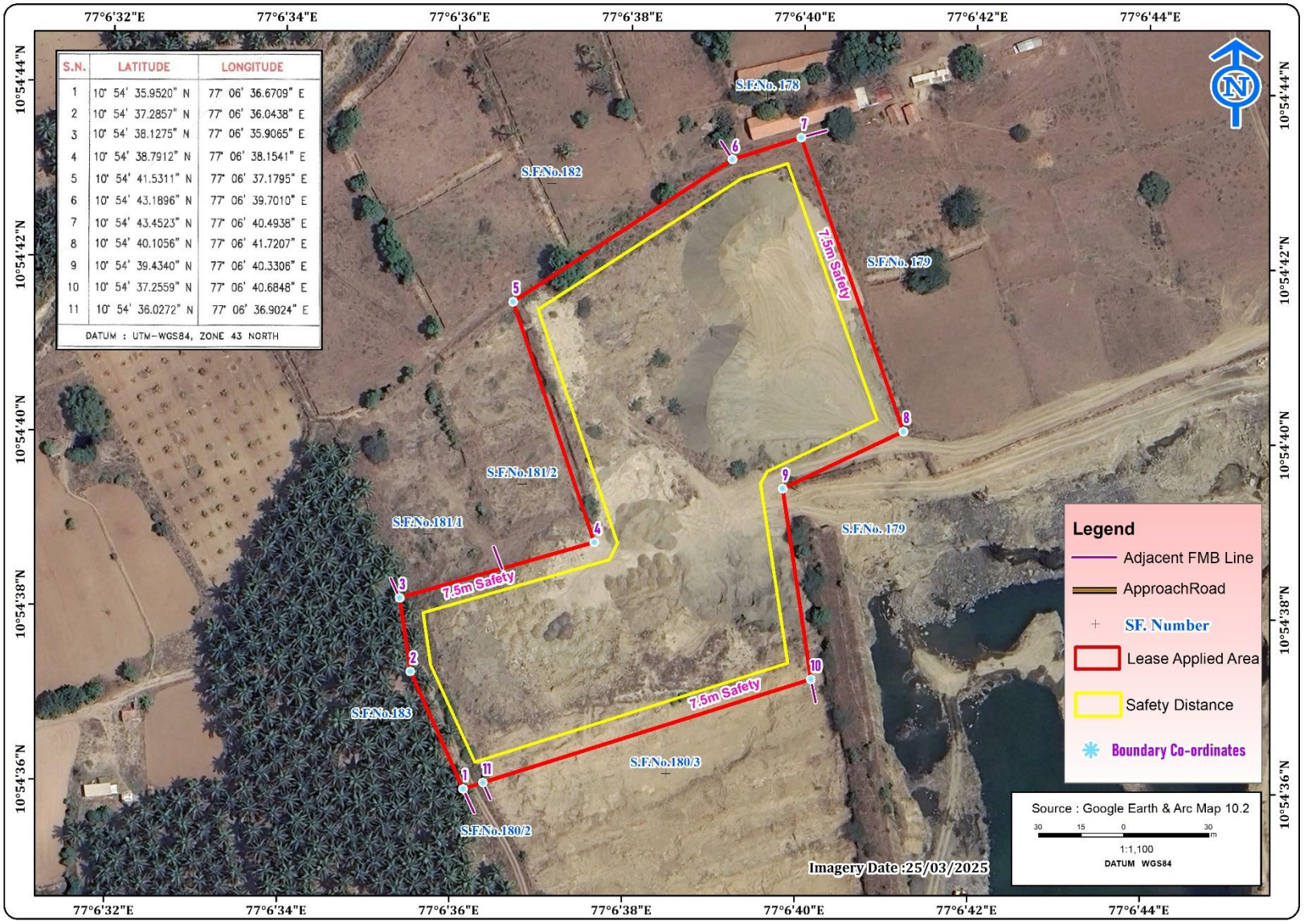
TABLE 2.3: BOUNDARY CO-ORDINATES OF PROPOSED PROJECT-P2

Corner Nos.	Latitude	Longitude
1	$10^0$54’29.7004” N	$77^0$06’42.7046” E
2	$10^0$54’30.1128” N	$77^0$06’42.4796” E
3	$10^0$54’33.2101” N	$77^0$06’41.7129” E
4	$10^0$54’34.2238” N	$77^0$06’46.4497” E
5	$10^0$54’29.7348” N	$77^0$06’46.3456” E
Datum: UTM-WGS84, Zone 43 North		

FIGURE 2.1: TOPOGRAPHICAL VIEW OF PROJECT AREA- P1

FIGURE 2.2: TOPOGRAPHICAL VIEW OF PROJECT AREA- P2

FIGURE 2.3: GOOGLE IMAGE OF THE PROJECT AREA- P1



S.N.	LATITUDE	LONGITUDE
1	10° 54' 35.9520" N	77° 06' 36.6709" E
2	10° 54' 37.2857" N	77° 06' 36.0438" E
3	10° 54' 38.1275" N	77° 06' 35.9065" E
4	10° 54' 38.7912" N	77° 06' 38.1541" E
5	10° 54' 41.5311" N	77° 06' 37.1795" E
6	10° 54' 43.1896" N	77° 06' 39.7010" E
7	10° 54' 43.4523" N	77° 06' 40.4938" E
8	10° 54' 40.1056" N	77° 06' 41.7207" E
9	10° 54' 39.4340" N	77° 06' 40.3306" E
10	10° 54' 37.2559" N	77° 06' 40.6848" E
11	10° 54' 36.0272" N	77° 06' 36.9024" E

DATUM : UTM-WGS84, ZONE 43 NORTH

FIGURE 2.6: GOOGLE IMAGE OF THE PROJECT AREA- P2

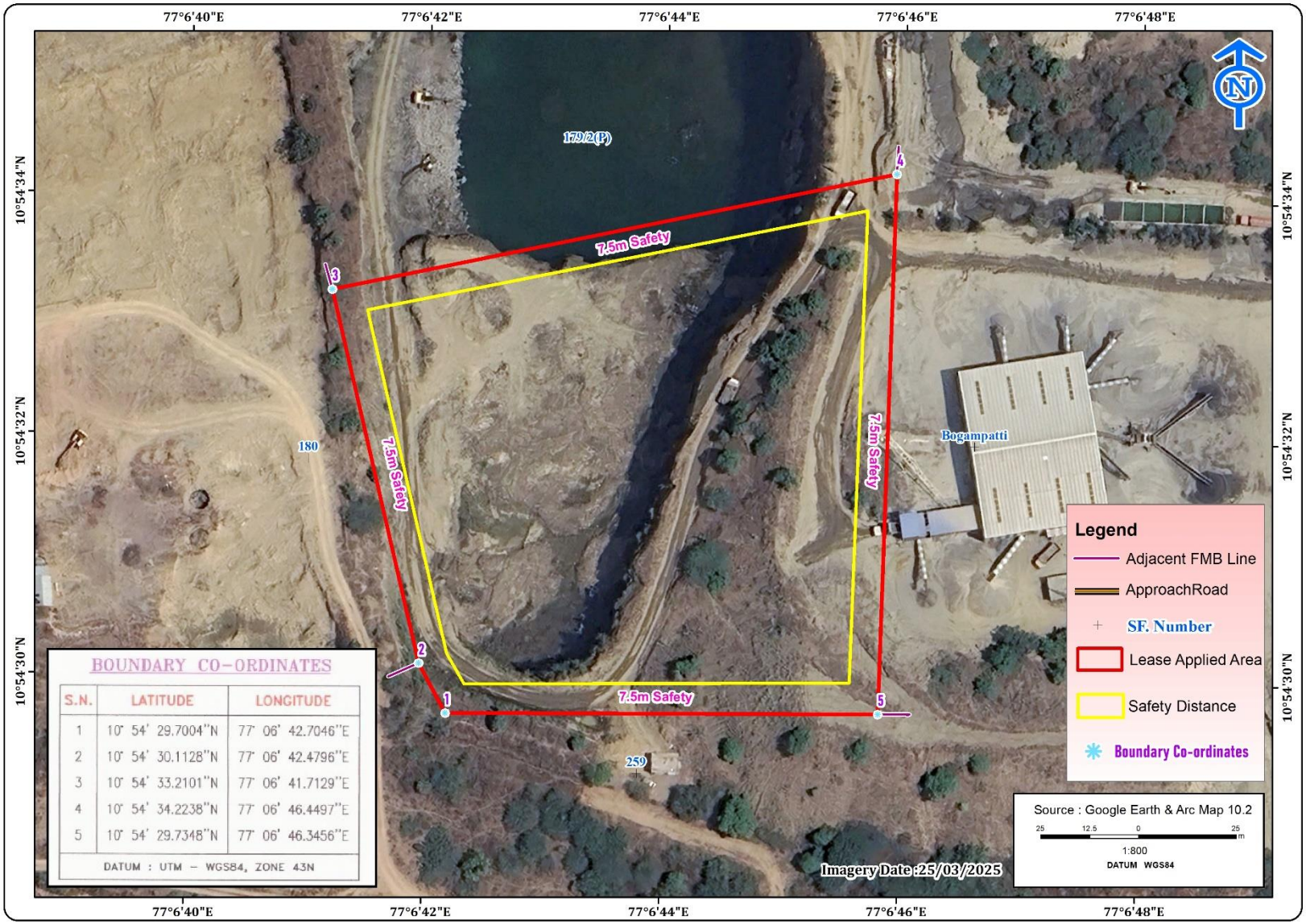
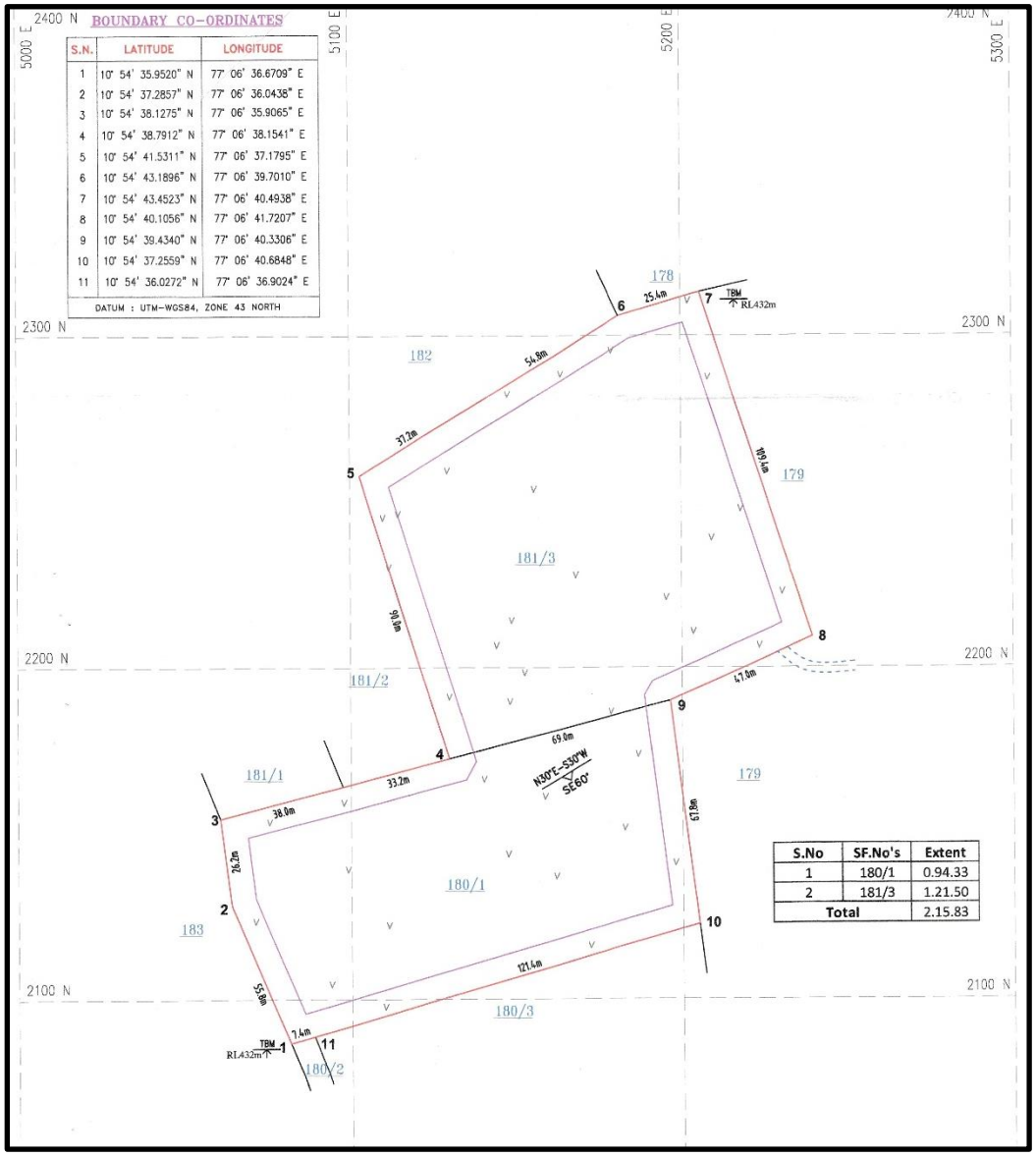
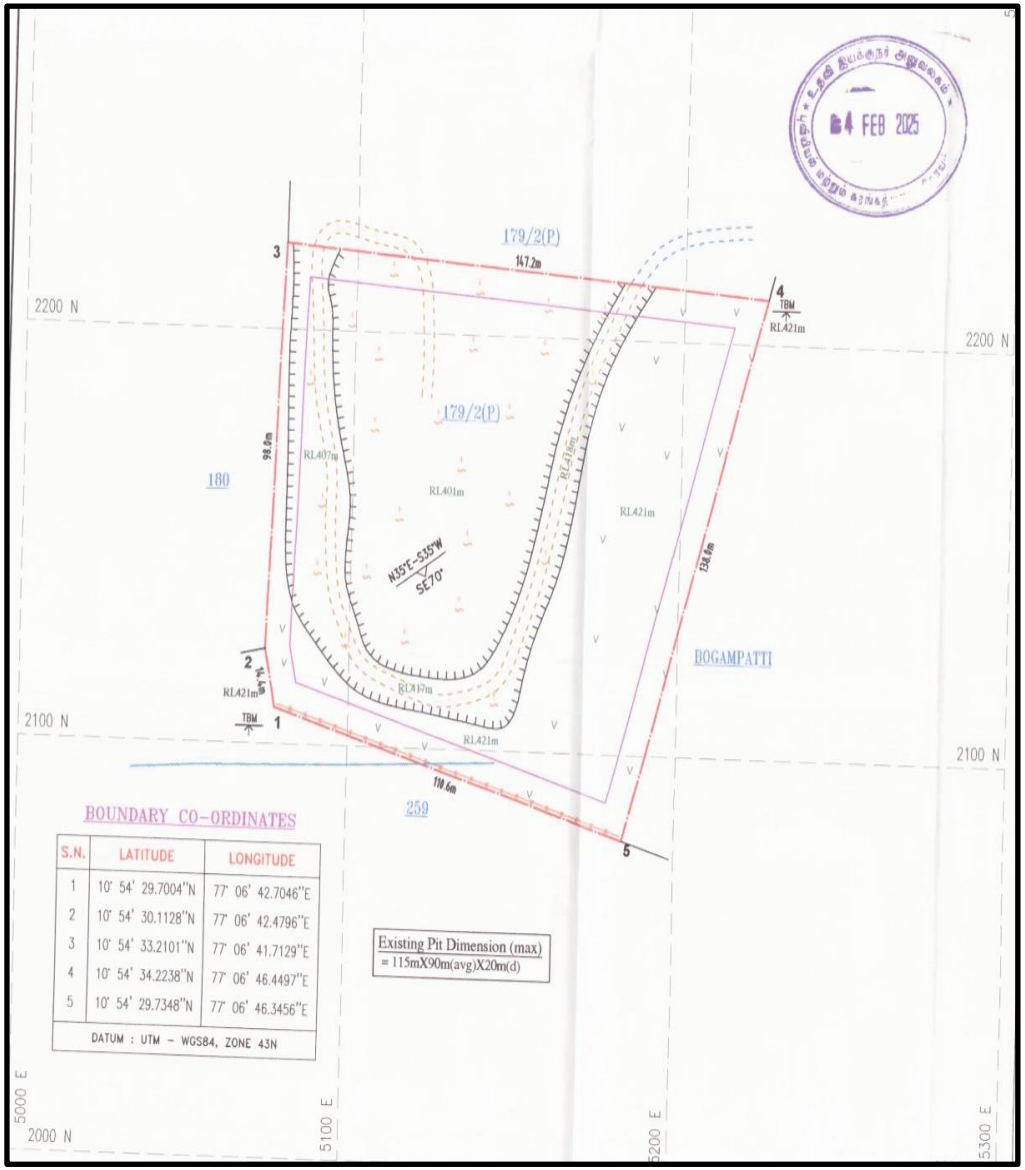


FIGURE 2.7: QUARRY LEASE PLAN / SURFACE PLAN- P1



Source: Approved Mining Plan

FIGURE 2.8: QUARRY LEASE PLAN / SURFACE PLAN- P2



Source: Approved Mining Plan

FIGURE 2.9: VILLAGE MAP SUPERIMPOSED ON GOOGLE EARTH IMAGE

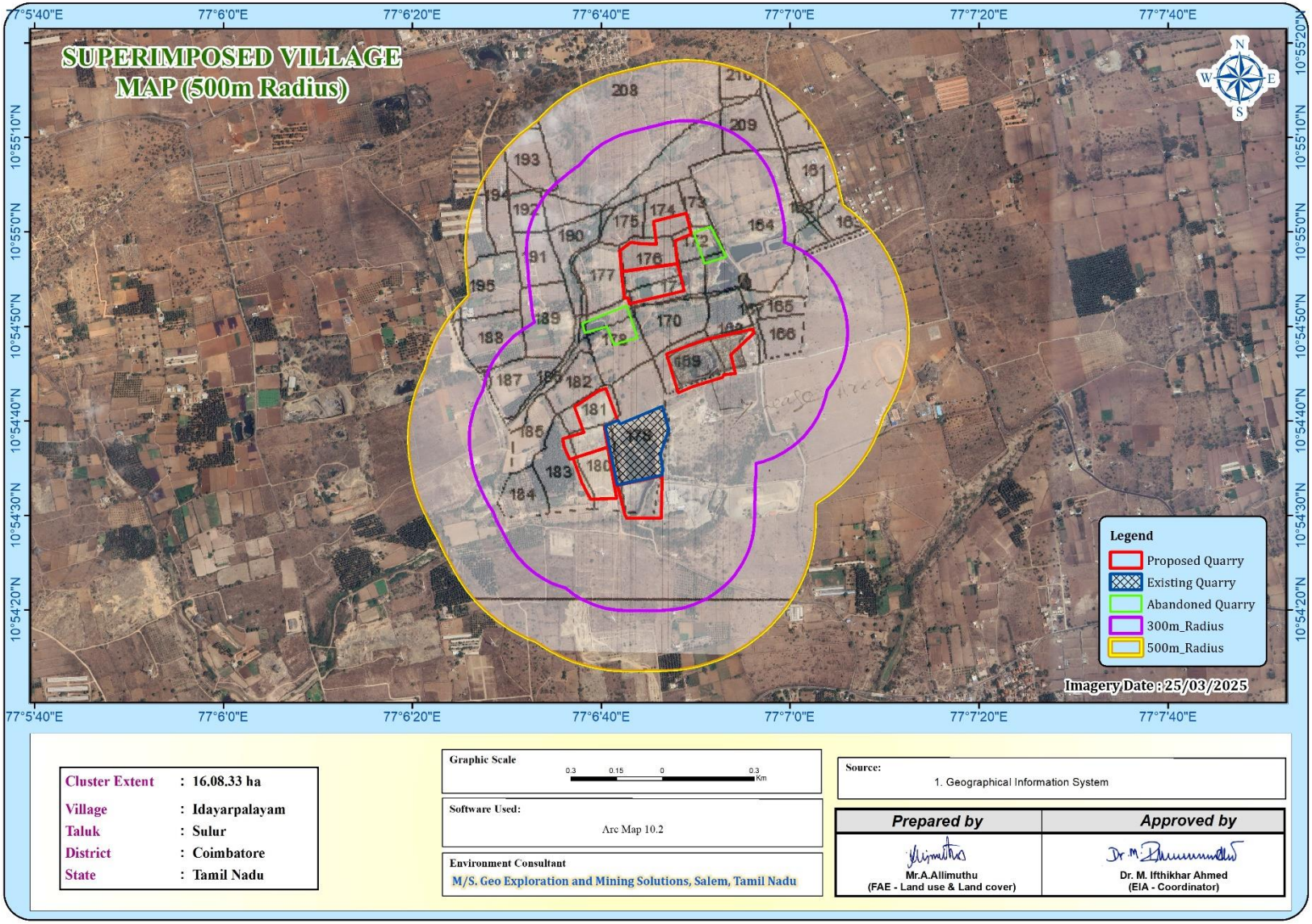


FIGURE 2.10: IMAGE SHOWING SURFACE FEATURES AROUND 10 KM RADIUS

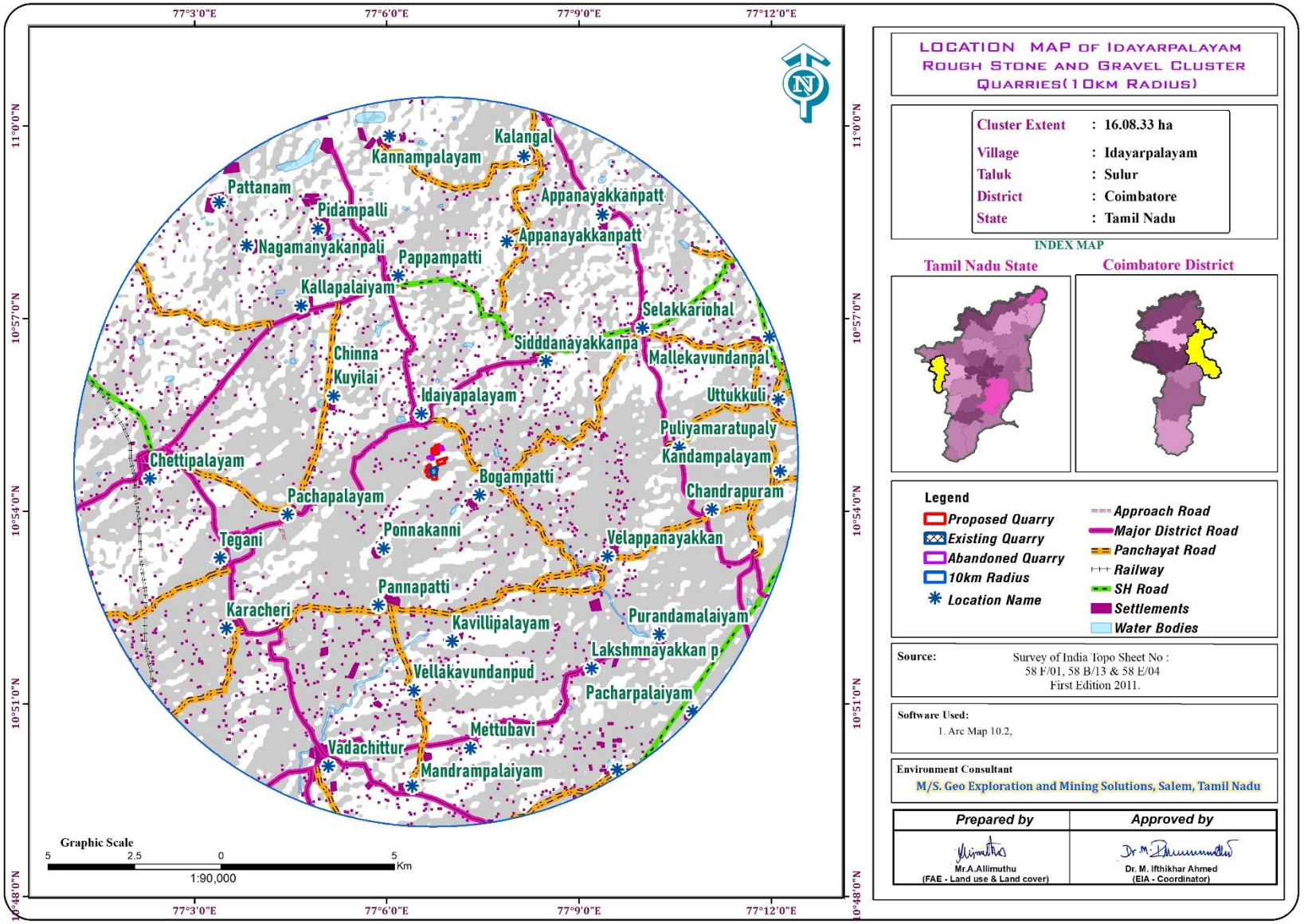


FIGURE 2.11: IMAGE SHOWING SURFACE FEATURES AROUND 5KM RADIUS

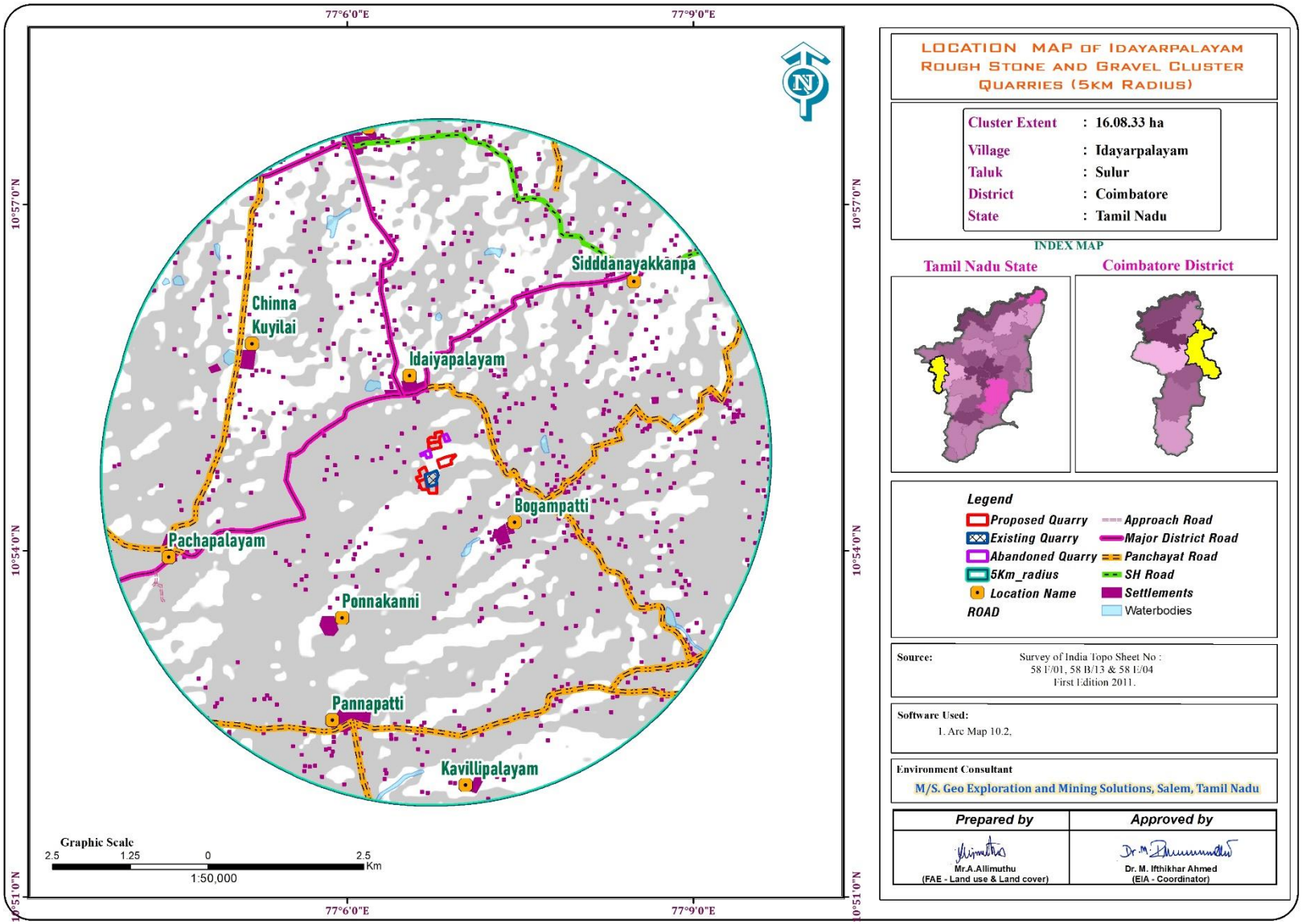
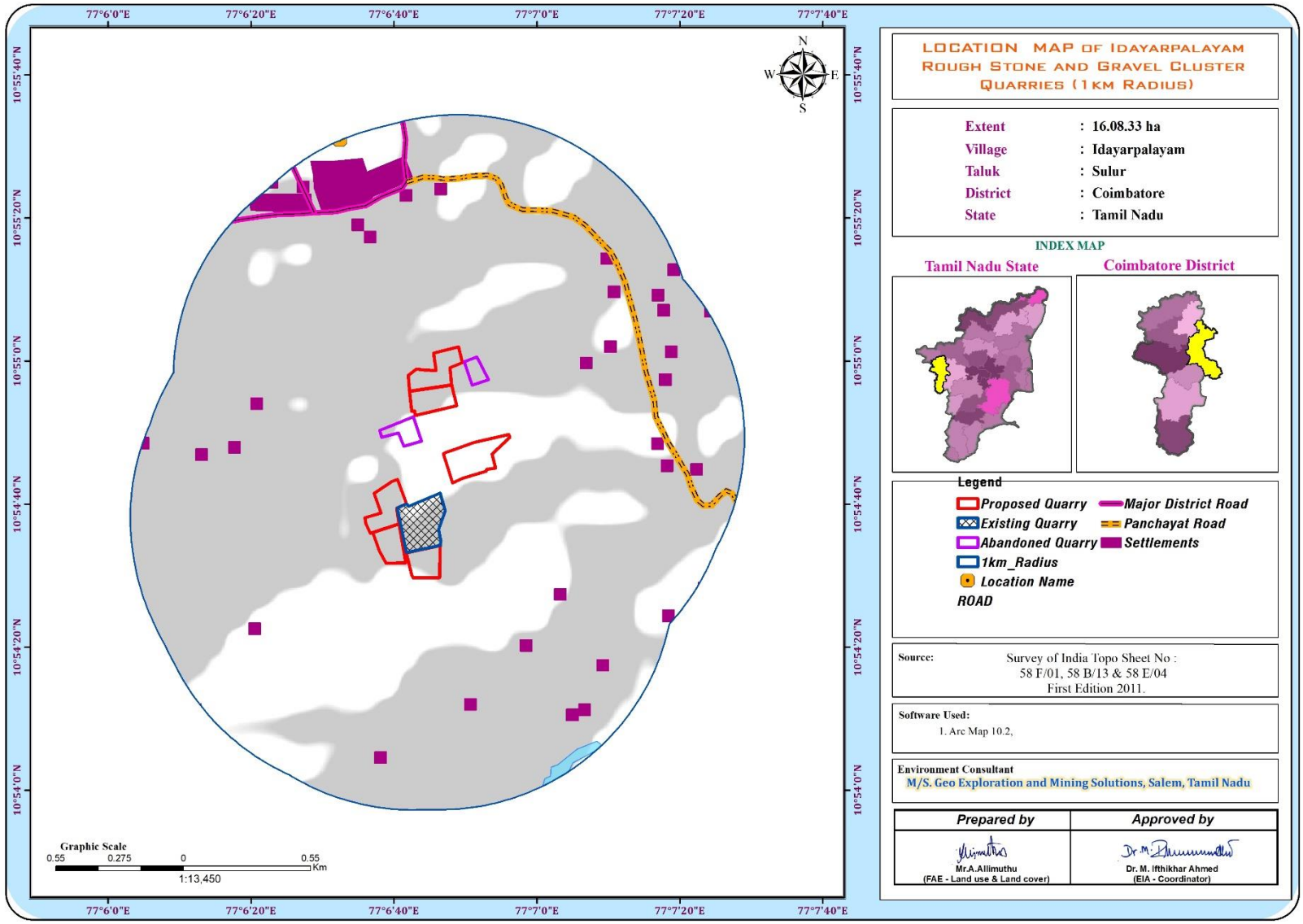


FIGURE 2.12: IMAGE SHOWING SURFACE FEATURES AROUND 1 KM RADIUS



2.2.1 Project Area

- All the Proposed Projects are site specific.
- There is no beneficiation or processing proposed inside all the project area.
- There is no forest land involved in the proposed projects and is devoid of major vegetation and trees.

TABLE 2.4: LAND USE PATTERN OF THE PROPOSED PROJECT- P1

Description	Present area (Ha)	Area required during the first five years (Ha)	Area at the end of this quarrying period (Ha)
Area under quarry	Nil	1.63.85	1.63.85
Infrastructure	Nil	0.01.00	0.01.00
Roads	Nil	0.01.00	0.02.00
Green Belt	Nil	0.27.87	0.46.66
Unutilized Area	2.15.83	0.22.11	0.02.32
Grand Total	**2.15.83**	**2.15.83**	**2.15.83**

Source: Approved Mining Plan

TABLE 2.5: LAND USE PATTERN OF THE PROPOSED PROJECT- P2

Description	Present area (Ha)	Area at the end of this quarrying period (Ha)
Area under quarry	0.92.70	1.35.65
Infrastructure	Nil	0.01.00
Roads	0.01.00	0.02.00
Green Belt	Nil	0.19.56
Unutilized Area	0.66.30	0.01.79
Grand Total	**1.60.00**	**1.60.00**

Source: Approved Mining Plan

2.2.2 Size or Magnitude of Operation

TABLE 2.6: OPERATIONAL DETAILS FOR PROPOSED PROJECT- P1

PARTICULARS	DETAILS	
	Rough Stone (10 Year Plan period)	Gravel (3 Year Plan period)
Geological Resources	8,90,600	44,530
Mineable Reserves	2,31,510	30,964
Production year wise plan period	2,31,510	30,964
Mining Plan Period / Lease Applied Period	10 Years	
Number of Working Days	300 Days	
Production per day in m^3	77	35
No of Lorry loads ($12m^3$ per load)	7	6
Total Depth of Mining	42m below the ground level	

Source: Approved mining plan

TABLE 2.7: OPERATIONAL DETAILS FOR PROPOSED PROJECT- P2

PARTICULARS	DETAILS	
	Rough Stone (5Year Plan period)	**Gravel (1 Year Plan period)**
Geological Resources	7,22,748	10,824
Mineable Reserves	1,87,565	7,502
Production year wise plan period	1,87,565	7,502
Mining Plan Period / Lease Applied Period	5 Years	
Number of Working Days	300 Days	
Production per day in m^3	125	25
No of Lorry loads ($12m^3$ per load)	11	2
Total Depth of Mining	57m below the ground level	

Source: Approved mining plan

2.3 GEOLOGY

2.3.1 Regional Geology

Coimbatore district of Tamil Nadu forms a part of southern Granulitic terrain and is predominantly occupied by crystalline rocks of Archaean to late Proterozoic age. Regionally, the rocks can be grouped under five categories namely –

i.	Charnockite Group represented by Charnockite, Pyroxene Granulite and Magnetite Quartzite
ii	Peninsular Gneissic Complex (II) comprising hornblende-biotite gneiss
iii	Peninsular Gneissic Complex (II) comprising hornblende-biotite gneiss
iv	Younger intrusive comprising, Nepheline-Syenite,Pink Granite, Pegmatite and Quartz veins and
v	Younger intrusive comprising, Nepheline-Syenite,Pink Granite, Pegmatite and Quartz veins and
vi	Quaternary sediments of Kankar and soil

Stratigraphy of the area –

Age	Group	Lithology
Holocene		Block cotton soil/clay±gypsum
Cenozoic		Kankar/calc-tufa
Neoproterozoic	Acid intrusives	Quartz veins Pegmatite Pink Granite
	Sivamalai syenite Complex	Nepheline-syenite
	Chalk Hills (Basic Intrusives)	Pyroxenite/Dunite
Archaean – Palaeoproterozoic	Peninsular Gneissic Complex (II) PGC (II)	Pink Granite Gneiss Hornblende Biotite gneiss
Archaean	Charnockite Group	Charnockite (Unclassified) Pyroxene Granulite Banded Magnetite Quartzite

Geologically, the district is covered by rocks belonging to Archean age comprising the khondalite group, Charnockite Group, migmatite group, Sathayamangalam group, Bhavani Group and Alkali complex of Proterozoic age and Recent to Late Plestocene rocks of Cainozoic age.

The Charnockite Group of rocks consisting of Charnockite, pyroxene granulites and associated magnetite quartzite, the Knodalite Group comprising gametiferous – sillimanite gneiss, calc-granulite, crystalline limestone, sillimanite quartzites and associated migmatitic gneisses. The rocks are restricted to the central and southern portions of the district, especially around Sulur, Sulur and Pollachi taluks.

The fissile homblende gneisses (Peninsular gneiss – younger phase) of Bhavani Group with enclaves of schistose, micaceous and amphibolitic rocks, fuchsitge – kyanite quartzites, ferruginous quartzite (Satyamangalam Group) intruded by a number of ultramafic and basic rocks and granites are seen in the Northern portions of the district especially around Mettupalayam and Northern areas of Coimbatore. The granites are Proterozoic age and occupy the Western end and Eastern Part of the District as separate bodies and are recognized as Maruthamalai Granite and Punjapuliyampatti Granites respectively. The quaternary alluvium is seen in the Western areas of Coimbatore town. The alluvium is more than 30m thick in the Chinnathadagam valley northwest of Coimbatore and in the Siruvani valley west of Coimbatore.

Source: District Survey Report for Minor Minerals Coimbatore District – May 2019 (https://www.tnmines.tn.gov.in/pdf/dsr/9.pdf)

2.3.2 Local Geology: -

The study area follows the regional trend and mainly comprises of Hard Rock Formation as a homogeneous formation / Batholith formation of Charnockite. All the project areas are plain terrain, all the project areas are covered with gravel and weathered gravel formation of 1m-4m thickness (2m gravel); Massive Charnockite formation is found after 1m-4m gravel and weathered gravel formation which is clearly inferred from the existing quarry pit.

2.3.3 Hydrogeology

Coimbatore District is underlain by crystalline metamorphic complex in the western parts of district and sedimentary tract in eastern side. An area of 4551 Sq.km is covered by crystalline rocks (63%) and 2671 Sq.km is covered by sediments (37%). The general geological sequence of formation is given below:

Quaternary - Laterites, Sands and Clays

Tertiary - Sandstone, Gravels and Clays

Cretaceous - Limestone, Calcareous Sandstone and Clay unconformity.

Archaean - Charnockites, Gneisses, Granites, Dolerites and Pegmatite

- The major part of the area is covered by metamorphic crystalline rocks of charnockite, granitic gneiss of Archaean age intruded by dolerite dykes and pegmatite veins. These rocks are highly metamorphosed and have been subjected to very severe folding, crushing and faulting.
- Ground Water occurs under the phreatic condition and wherever there are deep seated fractures, it occurs under semi-confined to confined conditions.
- Occurrence of Ground Water in hard rock depends upon the intensity and depth of weathering, fractures and fissures present in the rocks.
- Granites and gneisses yield moderately compared to the yield in Charnockites.
- Depth of well in hard rock generally ranges between 8 and 15m below ground level.
- Generally, yield in open wells ranges from 30 to 250m^3 /day and in bore well between 260 and 430m^3 /day.

The weathered thickness varies from 2.5 m to 42m in general there are 3 to 5 fracture zones within 100 m and 1 to 4 fracture zones between 100 and 200 m.

The Cretaceous formation is represented by Arenaceous Lime stone, Calcareous sand - stone and marl.

The Tertiary formation is argillaceous comprising of Silty clay stones, argillaceous Lime stone.

The Quaternary deposits represented by the river deposits of Ponnaiyar and Varahanadhi spread over as patches in Tirupur District. The alluvium consists of unconsolidated sands, gravelly sands, clays and clayey sands. The thickness of the sands ranges between 15 and 25 m in the alluvial formation which also form potential aquifers. In some areas, sand stone of tertiary formation are the potential groundwater reservoirs.

Aquifer Systems:

Occurrence and storage of groundwater depend upon three factors viz., Geology, Topography and rainfall in the form of precipitation. Apart from Geology, wide variation in topographic profile and intensity of rainfall constitutes the prime factors of groundwater recharge. Aquifers are part of the more complex hydro geological system and the behaviour of the entire system cannot be interpreted easily. In hard rock terrain the occurrence of Ground Water is limited to top weathered, fissured and fractured zone which extends to maximum 30 m on an average it is about 10-15 m in Coimbatore District.

In Sedimentary formations, the presence of primary inter granular porosity enhances the transmitting capacity of groundwater where the yield will be appreciable. The sedimentary area which occupies the eastern part of the district along the coastal tract is more favourable for groundwater recharge. Ground Water occurs both in semi

confined and confined conditions. A brief description of occurrence of groundwater in each formation is furnished below.

Alluvial Formations

In the river alluvium groundwater occurs under water table condition. The maximum thickness is 37 m and the average thickness of the aquifer is approximately 12 m. These formations are porous and permeable which have good water bearing zones.

Tertiary Cuddalore sandstone

Tertiary formations are represented by Cuddalore Sandstone and characterised as fluvial to brakish marine deposits. Predominantly this formation is divided into Lower and Upper Cuddalore formations. In the Upper Cuddalore formations the groundwater occurs in semi confined conditions, whereas in the Lower Cuddalore the groundwater occurs in confined condition with good groundwater potential.

Cretaceous Formations

Groundwater occurring in the lens shape in the sandy clay lenses and fine sand is underlain by white and black clay beds which constitute phreatic aquifer depth which ranges 10m to 15m below ground level. Phreatic aquifer in Limestone is potential due to the presence of Oolitic Limestone.

Hard Rock Formations

Groundwater occurs under water table conditions but the intensity of weathering, joint, fracture and its development is much less in other type of rocks when compared to gneissic formation. The groundwater potential is low, when compared with the gneissic formations

Granitic Gneiss

Groundwater occurs under water table conditions in weathered, jointed and fractural formations. The pore space developed in the weathered mantle acts as shallow granular aquifers and forms the potential water bearing and yielding zones water table is shallow in canal and tank irrigation regions and it is somewhat deeper in other regions.

Charnockite

Groundwater occurs under water table conditions but the intensity of weathering, joint, fracture and its development is much less when compared to gneissic formations. The groundwater potential is low, when compared with the gneissic formations.

Aquifer Parameters

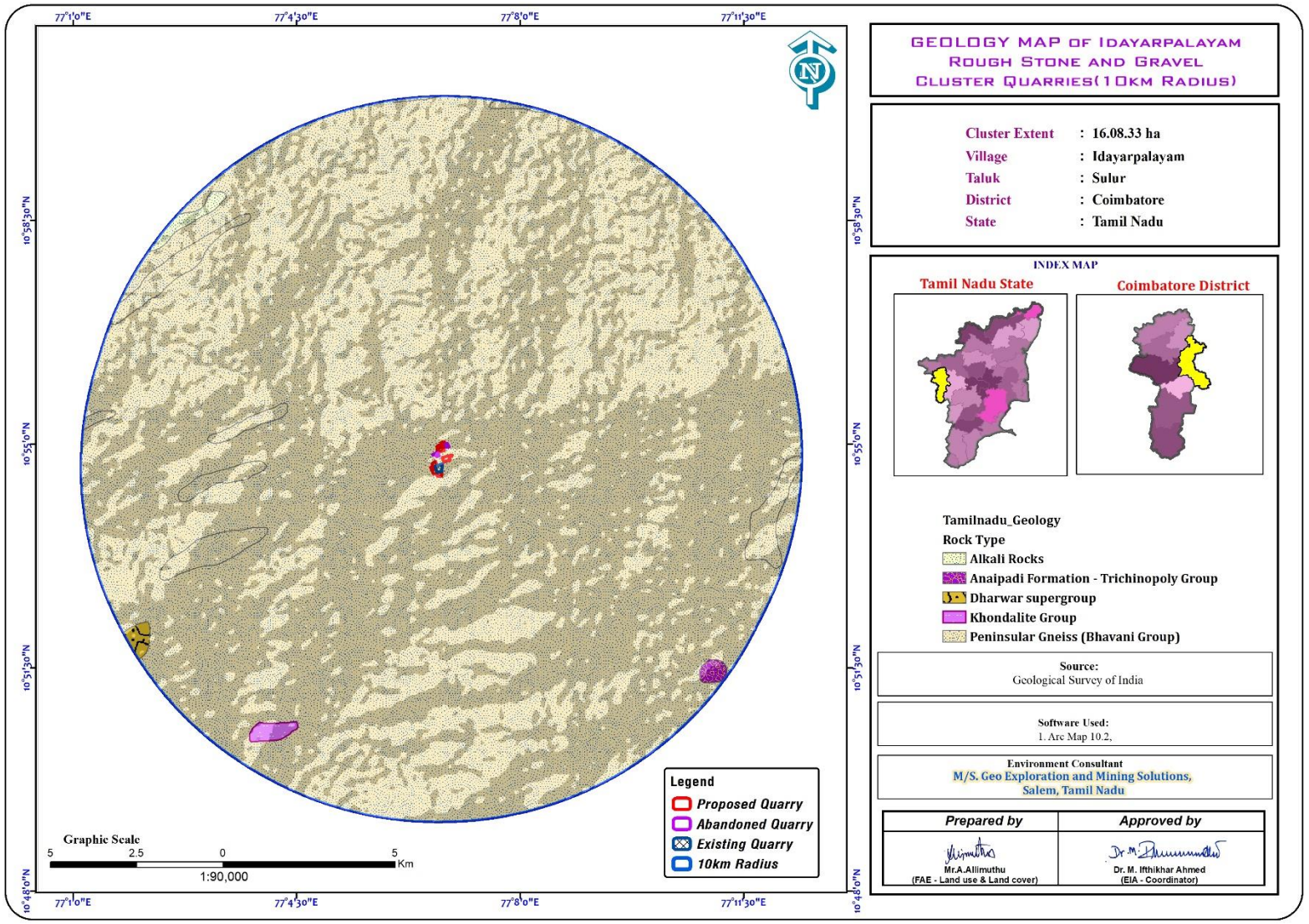
The thickness of aquifer in this district is highly erratic and varies between 15m to 40m below ground level. The intergranular Porosity is essentially dependent on the intensity and degree of weathering and fracture development in the bed rock. As discussed earlier deep weathering has developed in Gneissic formations and moderate weathering in charnockite formations. The range of aquifer parameters in hard rock and sedimentary formations are given below:

TABLE 2.8: RANGE OF AQUIFER PARAMETERS

Type of Aquifer	Water Table conditions in hard rock areas
Aquifer paramters yield	50 to 300 Lpm
Transmissivity (T)	1.49 to 164.18 m^2/day
Permeability (K)	0.25 to 26.75 m/day
Depth of water level	7m to 25m

Source: http://nwm.gov.in/sites/default/files/Notes%20on%20Coimbatore%20District.pdf and https://www.twadboard.tn.gov.in/content/coimbatore

FIGURE 2.13: REGIONAL GEOLOGY MAP



From the above map it is inferred that the cluster quarries fall in the hard rock terrain (Peninsular Gneiss)

FIGURE 2.14: GEOMORPHOLOGY MAP

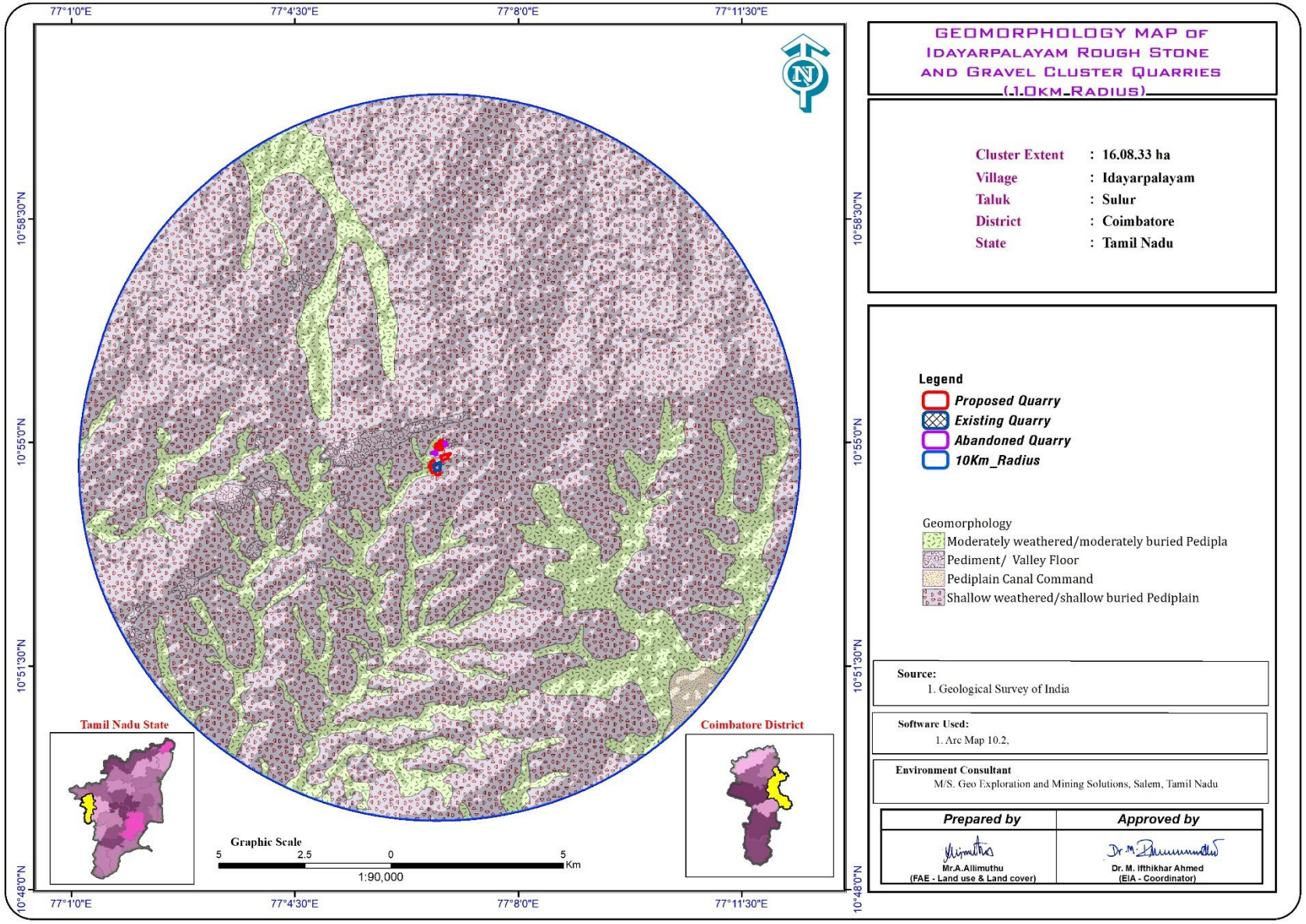
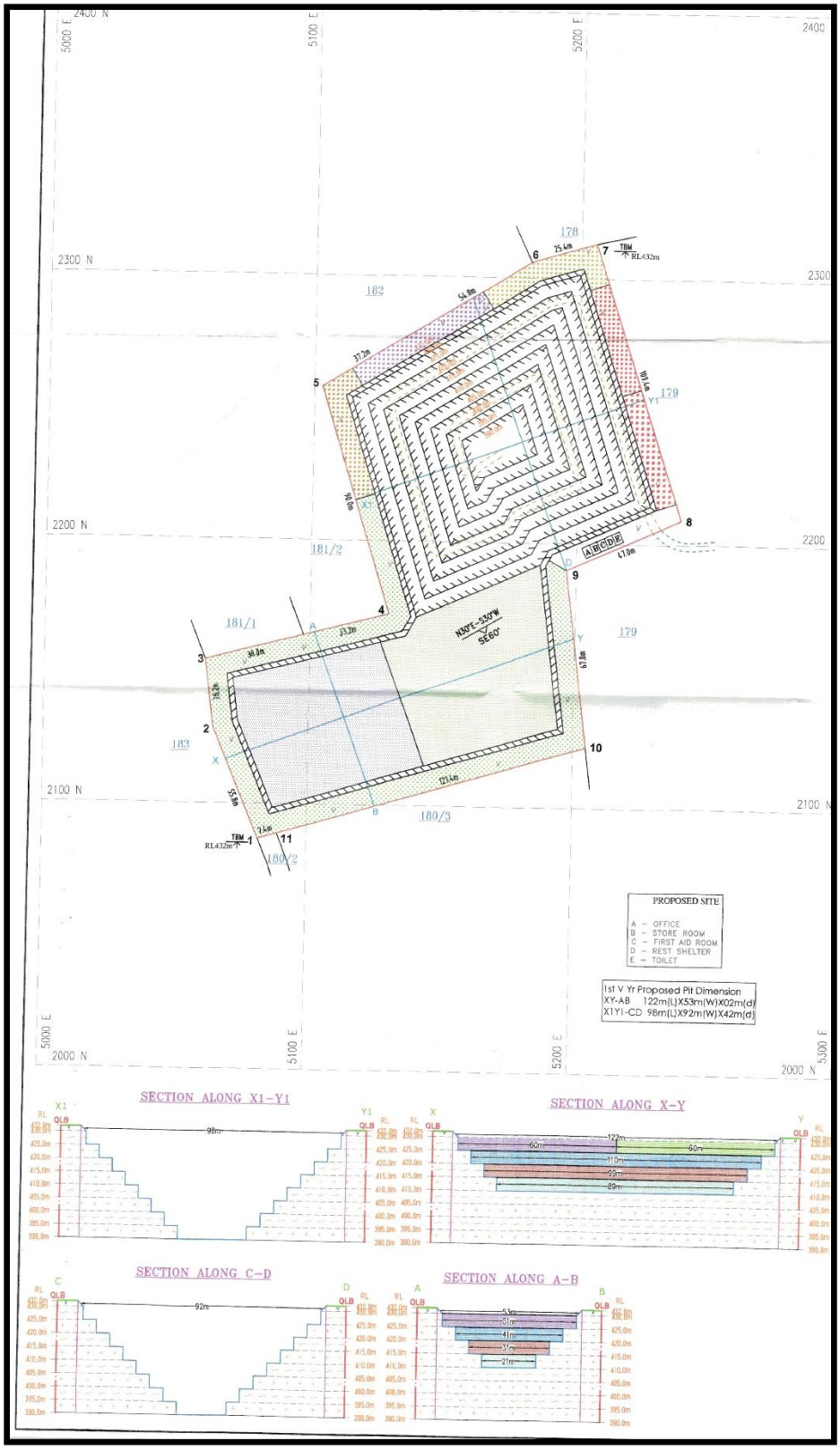


FIGURE 2.15: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS – P1

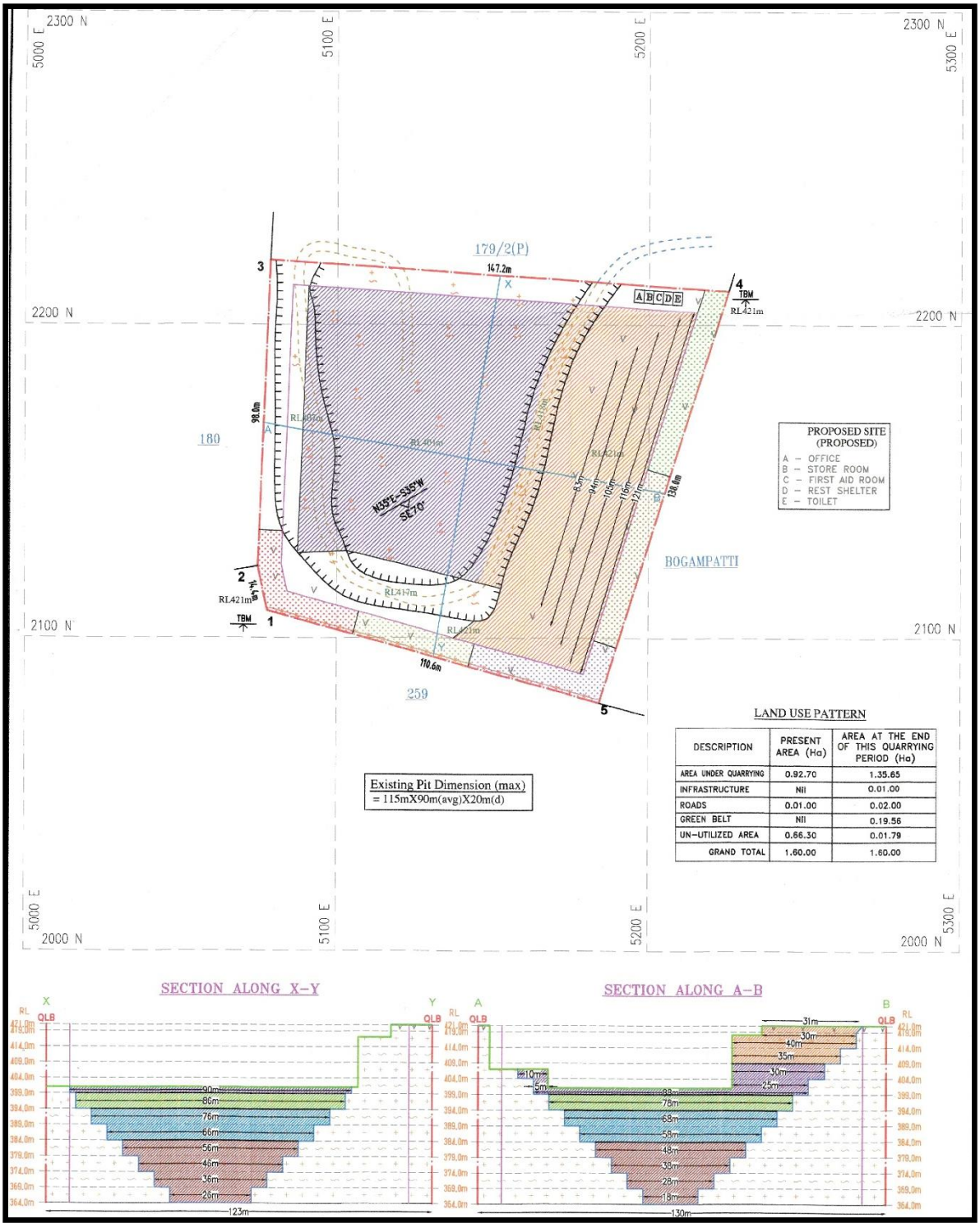
Source: Approved Mining Plan

FIGURE 2.15A: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS – P1



Source: Approved Mining Plan

FIGURE 2.16: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS – P2



DESCRIPTION	PRESENT AREA (Ha)	AREA AT THE END OF THIS QUARRYING PERIOD (Ha)
AREA UNDER QUARRYING	0.92.70	1.35.65
INFRASTRUCTURE	Nil	0.01.00
ROADS	0.01.00	0.02.00
GREEN BELT	Nil	0.19.56
UN–UTILIZED AREA	0.66.30	0.01.79
GRAND TOTAL	1.60.00	1.60.00

Source: Approved Mining Plan

FIGURE 2.17: CLOSURE PLAN AND SECTIONS- P1

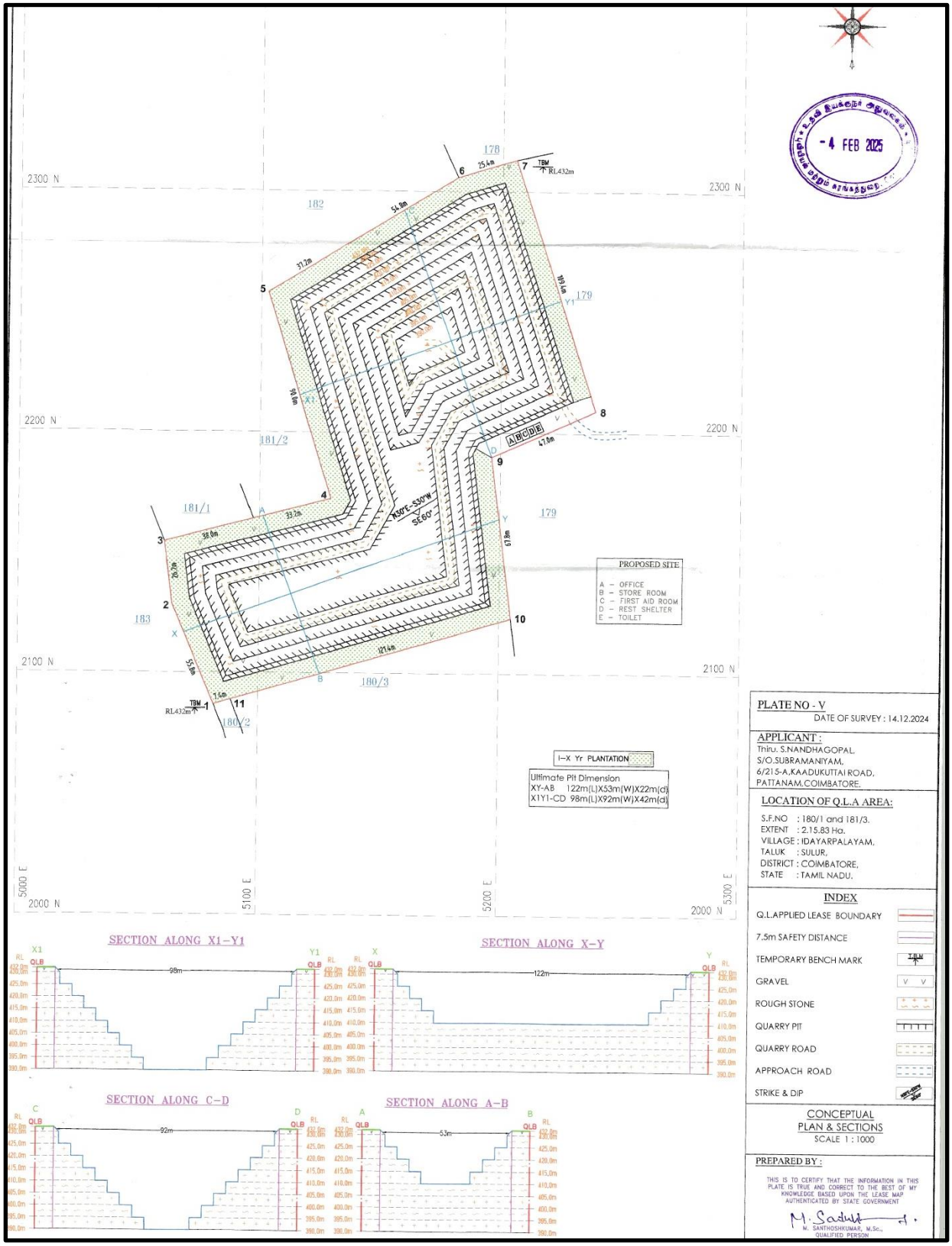
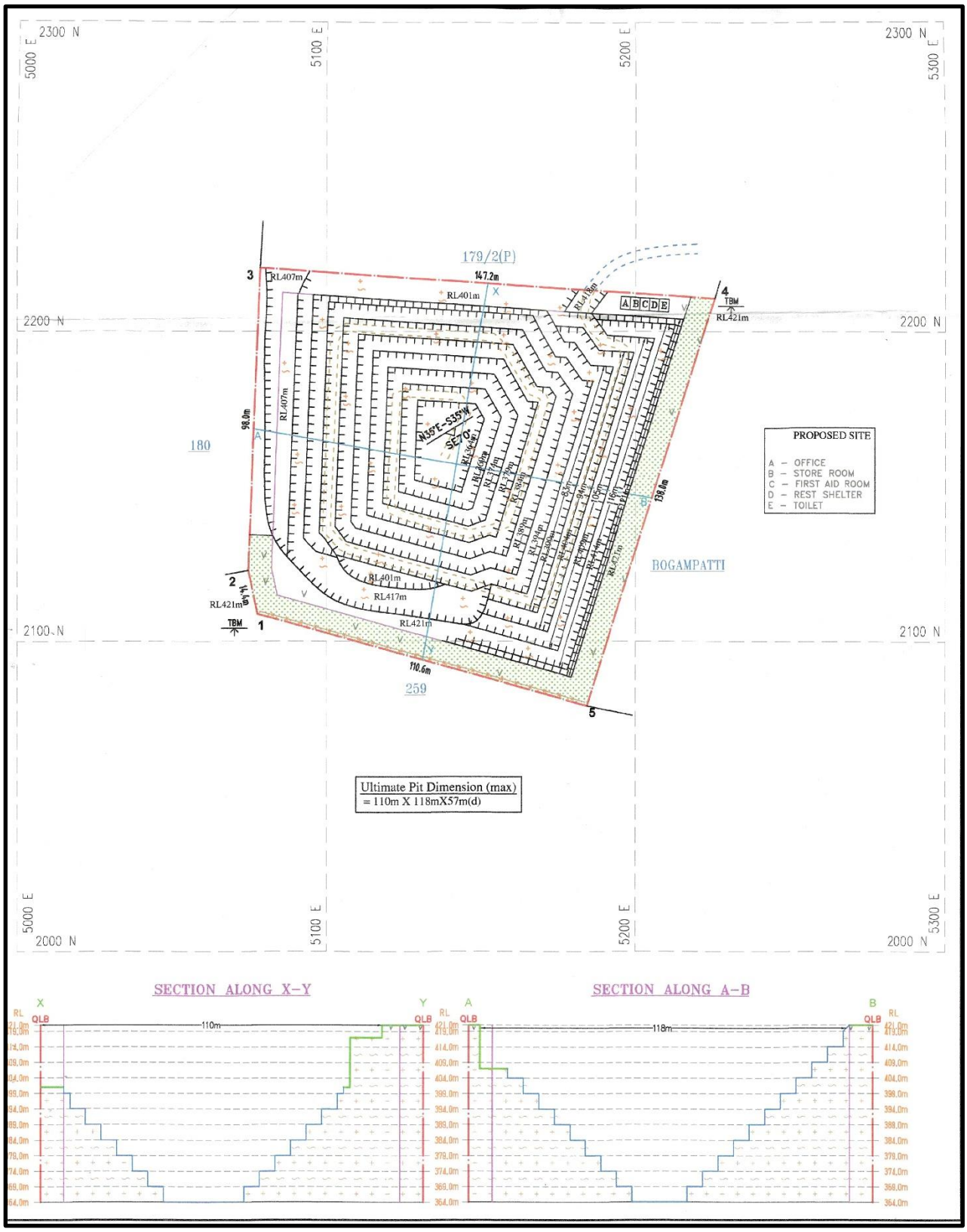


FIGURE 2.18: CLOSURE PLAN AND SECTIONS- P2



2.4 RESOURCES AND RESERVES

The Resources and Reserves of Rough Stone and Gravel were calculated based on Cross-Section Method by plotting sections to cover the maximum lease area for all the proposed projects.

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) for all the proposed projects.

TABLE 2.9: AVAILABLE GEOLOGICAL RESOURCES OF PROPOSED PROJECT- P1

Particulars	Rough Stone (10 Year Plan period)	Gravel (2 Year Plan period)
Geological Resource in m3	8,90,600	44,530
Mineable Resource in m3	2,31,510	30,964
Year wise production for ten-year plan period	2,31,510	30,964

Source: Approved Mining Plan

TABLE 2.10: AVAILABLE GEOLOGICAL RESOURCES OF PROPOSED PROJECT-P2

Particulars	Rough Stone (5Year Plan period)	Gravel (3 Year Plan period)
Geological Resource in m^3	7,22,748	10,824
Mineable Resource in m^3	1,87,565	7,502
Year wise production for five-year plan period	1,87,565	7,502

Source: Approved Mining Plan

TABLE 2.11: YEAR-WISE PRODUCTION PLAN-P1

YEAR	ROUGH STONE (m^3)	Gravel (2 Year Plan period)	YEAR	ROUGH STONE (m^3)	Gravel (2 Year Plan period)
I	32,120	9,016	VI	15,300	-
II	35,850	9,016	VII	15,300	-
III	35,850	12,932	VIII	22,550	-
IV	33,190	-	IX	15,345	-
V	16,660	-	X	9,34	-
TOTAL	**73907**	**4260**	**Total**	**77,840**	**-**

Source: Approved Mining Plan

TABLE 2.12: YEAR-WISE PRODUCTION PLAN- P2

YEAR	ROUGH STONE (m^3)	Gravel (3 Year Plan period)
I	39,255	7,502
II	40,230	-
III	33,540	-
IV	44,980	-
V	29,560	-
TOTAL	**1,87,565**	**7,502**

Source: Approved Mining Plan

Disposal of Overburden/Waste:

The overburden in the form of Gravel formation, the Gravel will be directly loaded into tippers for the filling and levelling of low-lying areas. There is no disposal of Gravel. The excavated rough stone will be directly loaded into tippers to the needy customers.

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 2.13: ULTIMATE PIT DIMENSION-P1

S.no	Length (Max) (m)	Width (Max) (m)	Depth (Max)
Pit – I	122	53	22m bgl
Pit II	98	92	42m bgl

Source: Approved Mining Plan

TABLE 2.14: ULTIMATE PIT DIMENSION-P2

S.no	Length (Max) (m)	Width (Max) (m)	Depth (Max)
Pit - I	110	118	57m bgl

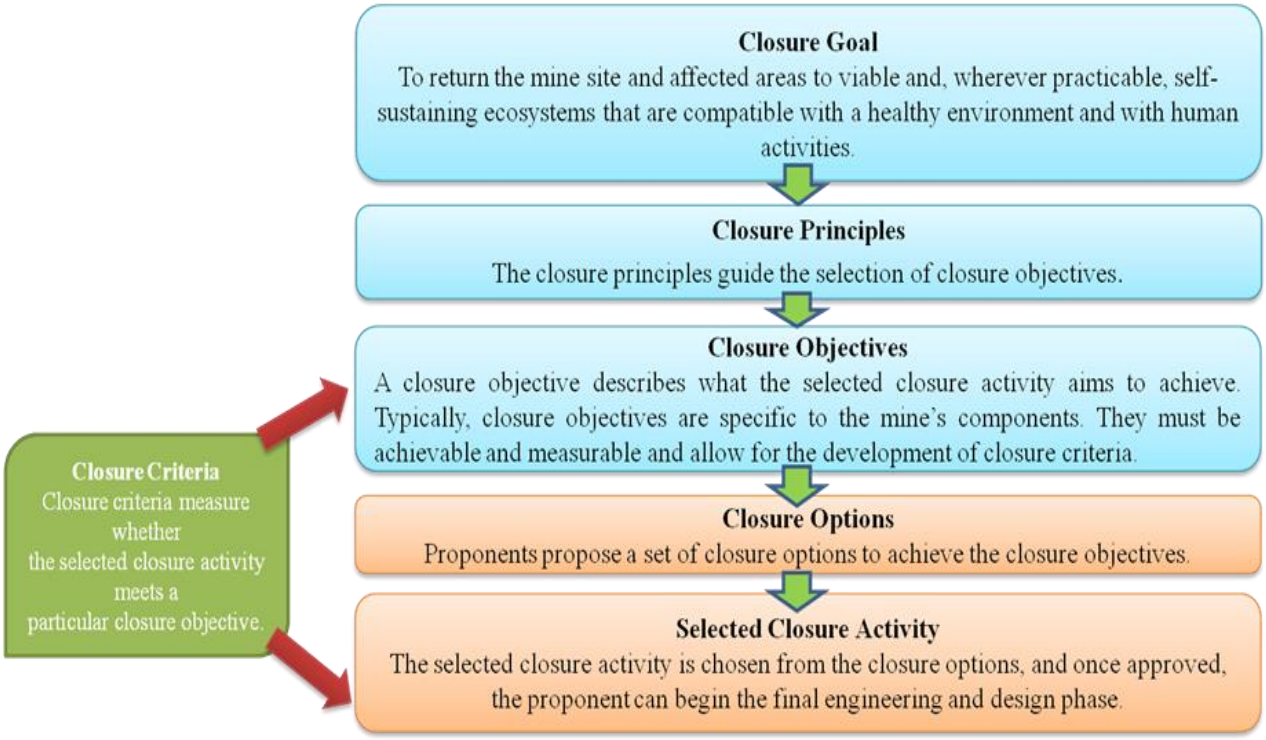
Source: Approved Mining Plan

- At the end of life of mine, the excavated mine pit / void will act as artificial reservoir for collecting rain water and helps to meet out the demand or crises during drought season.
- After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem
- Mine Closure is a process of returning a disturbed site to its natural state or which prepares it for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety.
- The 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.

Closure Objectives –

- 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.

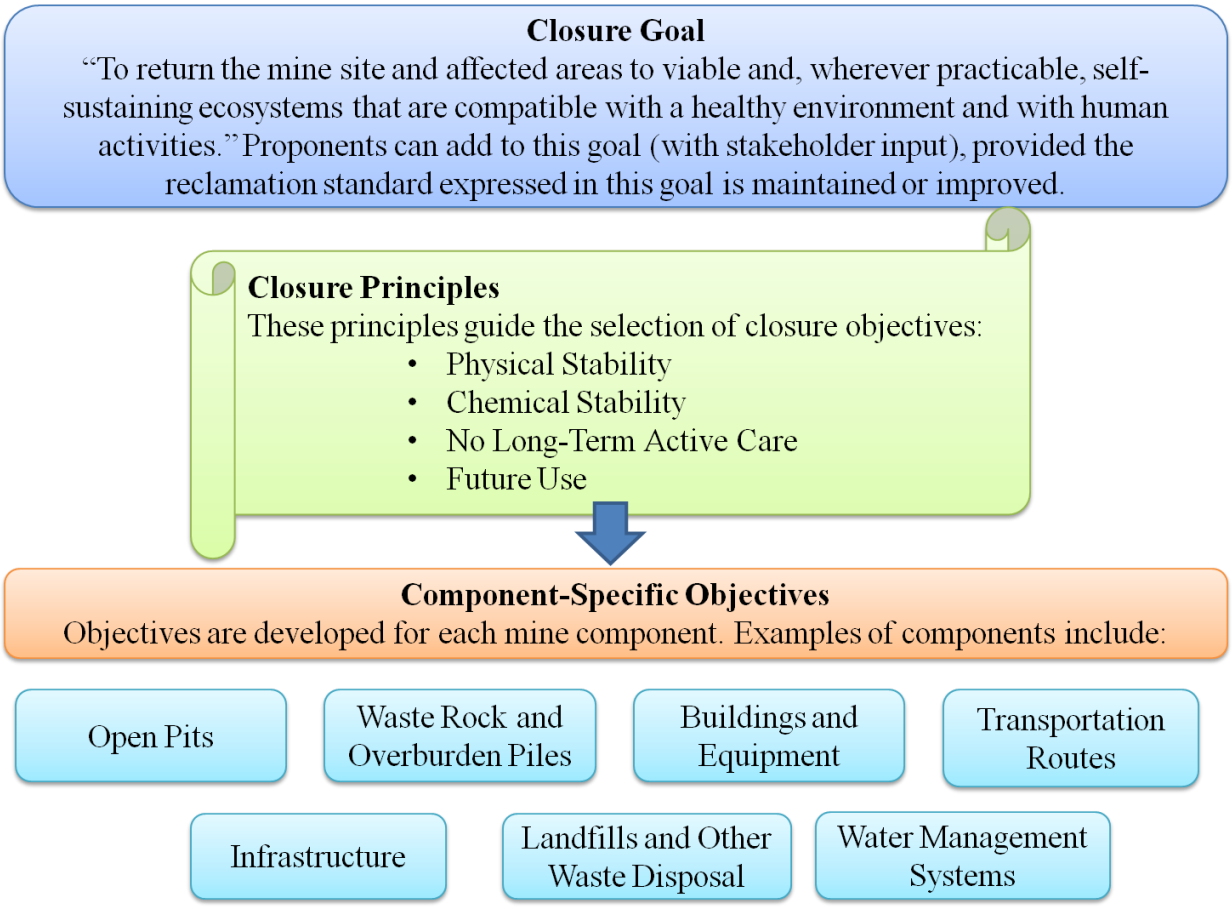


Closure Planning & Options Considerations in Mine Design –

- 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
- There is a canal on Western side of the cluster project area. The river canal will not be hindered by any of mine closure activities
- 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.



Post-Closure Monitoring –

The purpose of post-closure monitoring with respect to open pit mine workings is to ensure the attainment of closure objectives.

- Monitor physical and geotechnical stability of remnant pit walls.
- Monitor the ground regime in pit walls to confirm achievement of design objectives.
- Monitor water level in pit to confirm closure objectives regarding fish, fish habitat, and wildlife safety are being achieved.
- Sample water quality and quantity at controlled pit discharge points.
- Identify and test unanticipated areas where water management is an issue.
- Inspect integrity of barriers such as berms & fences.
- Monitor wildlife interactions with barriers to determine effectiveness.
- Inspect aquatic habitat in flooded pits where applicable.
- Monitor dust levels.

2.5 METHOD OF MINING

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

The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

2.5.1 Drilling & Blasting Parameters

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	–	0.5kg
Powder factor	–	6.0 tonnes/kg
Diameter of hole	–	30-32 mm

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 respective project proponents have 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 2.17. PROPOSED MACHINERY DEPLOYMENT- P1

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	4	1.2m to 2.0m	Compressed air
2	Compressor	1	400psi	Diesel Drive
3	Excavator with Bucket and Rock Breaker	1	300 HP	Diesel Drive
4	Tippers	2	20 Tonnes	Diesel Drive
5	Water Sprinkling Tanker	1	6000 litres	Diesel Drive

Source: Approved Mining Plan

TABLE 2.18. PROPOSED MACHINERY DEPLOYMENT- P2

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	6	1.2m to 2.0m	Compressed air
2	Compressor	2	400psi	Diesel Drive
3	Excavator with Bucket and Rock Breaker	1	300 HP	Diesel Drive
4	Tippers	3	20 Tonnes	Diesel Drive
5	Water Sprinkling Tanker	1	6000 litres	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 will be constructed as per the Mine Rule after the grant of quarry lease in all the proposed quarries.

2.6.2 Drainage Pattern

Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin over time that reveals characteristics of the kind of rocks and geological structures in a landscape. 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.

Dendritic drainage pattern is one of the most common type that develop in areas where the rock (or unconsolidated material) beneath the stream has no particular fabric or structure and can be easily eroded equally in all directions.

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

1. Bogampatti - Panapatti Panchayat Road located 700m South
2. Periyakuili - Idayarpalayam District Road located 1.5 km Northeast side

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.2.19: TRAFFIC SURVEY LOCATIONS

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Bogampatti - Panapatti (Panchayat Road)	700m South	Panchayat Road
TS2	Okkilipalayam-Valanthavalam (District Road)	1.5km NE	District Road

Source: On-site monitoring by GEMS FAE & TM

TABLE 2.20: EXISTING TRAFFIC VOLUME

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	84	252	58	58	196	98	408
TS2	146	438	108	108	328	164	710

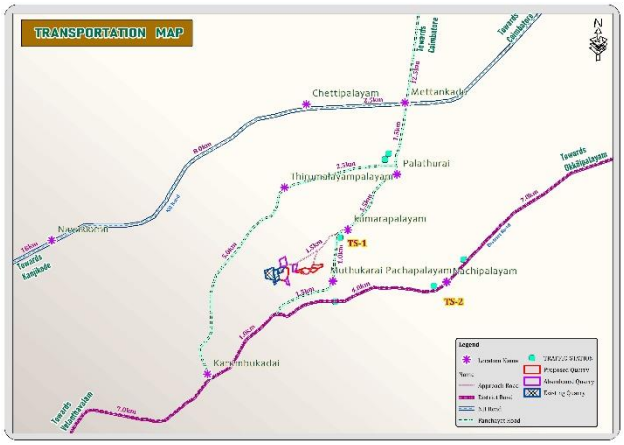
Source: On-site monitoring by GEMS FAE & TM

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

TABLE 2.21: ROUGH STONE & GRAVEL HOURLY TRANSPORTATION REQUIREMENT

Transportation of Rough Stone & Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
20 tonnes	24	72

FIGURE.2.19: MINERAL TRANSPORTATION ROUTE MAP



Proposed Transportation Route:

No Major Habitation, Schools in the proposed transportation route.

TABLE 2.22: 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 – 1960guidelines
Bogampatti - Panapatti (Panchayat Road)	408	72	480	1200
Okkilipalayam-Valanthavalam (District Road)	710	72	782	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 1,200 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 2.23: WATER REQUIREMENT FOR THE PROJECT-P1

Purpose	**Quantity**	**Source**
Dust Suppression	0.6 KLD	From Existing bore wells from nearby area
Green Belt	1.0 KLD	From Existing bore wells from nearby area
Domestic & Drinking purpose	0.4 KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors
Total	**2.0 KLD**	

Source: Prefeasibility report

TABLE 2.24: WATER REQUIREMENT FOR THE PROJECT- P2

Purpose	Quantity	Source
Dust Suppression	0.6 KLD	From Existing bore wells from nearby area
Green Belt	1.0 KLD	From Existing bore wells from nearby area
Domestic & Drinking purpose	0.4 KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors
Total	**2.0 KLD**	

Source: Prefeasibility report

2.7.2 Power and Other Infrastructure Requirement

No proposed projects require power supply for the mining operations. 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 SEB by respective 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

High speed Diesel (HSD) will be used for mining machineries. Diesel will be brought from nearby Fuel Stations. The quarry works restricted to one general shift during day time only. **No electricity is needed for quarry operation etc** as mainly diesel operated mining machinery is used for quarrying. However, the electricity will be required for crusher plant, pumping of water and for administrative building & rest shelters. Besides, standby generator will be available to meet the emergency power requirement of the quarry.

P1

For Rough Stone:

Per hour Excavator will consume	=	16 liters / hour
Per hour Excavator will excavate	=	20$m^3$of Rough stone
Rough stone	=	2,31,510/20 = 11,575 hours
Diesel consume	=	11,575 hours' x 16 liters
Total diesel consumption	=	**1,85,208** Liters of HSD will be utilized for rough stone

Gravel:

Per hour Excavator will consume	=	10 litters / hour
Per hour Excavator will excavate	=	60m^3 of Gravel
Gravel quantity	=	30,964/60 = 516 hours
Diesel consume	=	516 hours x 10 litters
Total diesel consumption	=	5,160 Litres of HSD will be utilized for Gravel for the entire life

Total Diesel consumption per day average is computed as 30 – 35 Litres / day

Total diesel consumption is around **1,90,368 Liters** of HSD for the entire period of life.

P2

For Rough Stone:

Per hour Excavator will consume	=	16 liters / hour
Per hour Excavator will excavate	=	20$m^3$of Rough stone
Rough stone	=	1,87,565/20 = 9,378 hours
Diesel consume	=	9,378 hours' x 16 liters

Total diesel consumption = **1,50,052** Liters of HSD will be utilized for rough stone

Gravel:

Per hour Excavator will consume = 10 litters / hour

Per hour Excavator will excavate = 60m^3 of Gravel

Gravel quantity = 7,502/60 = 125 hours

Diesel consume = 1,25hours x 10 litters

Total diesel consumption = **1,250** Litres of HSD will be utilized for Gravel for the entire life

Total Diesel consumption per day average is computed as 30 – 35 Litres / day

Total diesel consumption is around **1,51,302 Liters** of HSD for the entire period of life.

2.7.4 Project Cost

TABLE 2.25: PROJECT COST OF PROPOSED PROJECT

Details	Total Project Cost
P1	Rs. 1,60,59,000/-
P2	Rs. 1,78,75,000/-

Source: Approved Mining Plan &Prefeasibility Report

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 for all the proposed projects.

TABLE 2.26: PROPOSED MANPOWER DEPLOYMENT

Employment Potential	Nos
P1	23
P2	29

Source: Approved Mining Plan

2.9 PROJECT IMPLEMENTATION SCHEDULE

The commercial operation will commence after the grant of Environmental Clearance. CTO will be obtained from the Tamil Nadu State Pollution Control Board. The conditions imposed during the Environmental Clearance will be compiled before the start of mining operation.

TABLE 2.27: EXPECTED TIME SCHEDULE

Sl.No.	Particulars	Time Schedule (In Month)					Remarks if any
		1st	2nd	3rd	4th	5th	
1	Environmental Clearance						
2	Consent to Operate						Production Start Period
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

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering Mar – May 2025 with CPCB guidelines. Environmental data has been collected with reference to cluster quarries Global Lab and Consultancy Services (NABL) Laboratory for the below attributes –

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

Study Area

An area of 10 km radius (aerial distance) from the periphery of the cluster is considered for EIA study. The data collection has been used to understand the existing environment scenario around the cluster against which the potential impacts of the project can be assessed. The study area has been divided into two zones viz **core zone** and **buffer zone** where core zone is considered as cluster and 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 **summer season** i.e., March 2025 to May 2025.

Study Methodology

- The project area was surveyed in detail with the help of Total Station and the boundary pillars were picked up with the help of GPS. 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, exchangeable Cations, nutrients & micro nutrients etc., in order to assess the impact due to mining activities and to recommend saplings for Greenbelt development.
- Ground water samples were collected during the study period from the existing bore wells, while surface water was collected from ponds in the buffer zone. The samples were analysed for parameters necessary to determine water quality (based on IS: 10500:2012 criteria) and those which are relevant from the point of view of environmental impact of the proposed mines.
- 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.
- In order to assess the Ambient Air Quality (AAQ), samples of ambient air were collected by installation of Respiratory Dust Samplers (RDS) for Fugitive dust, PM_{10} and SO_2, 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's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (1 core & 5 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (1 surface water & 5 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourly twice a week (oct to Dec 2024)	7 (2 core & 5 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7 (2 core & 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 Global Lab and Consultancy Services 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

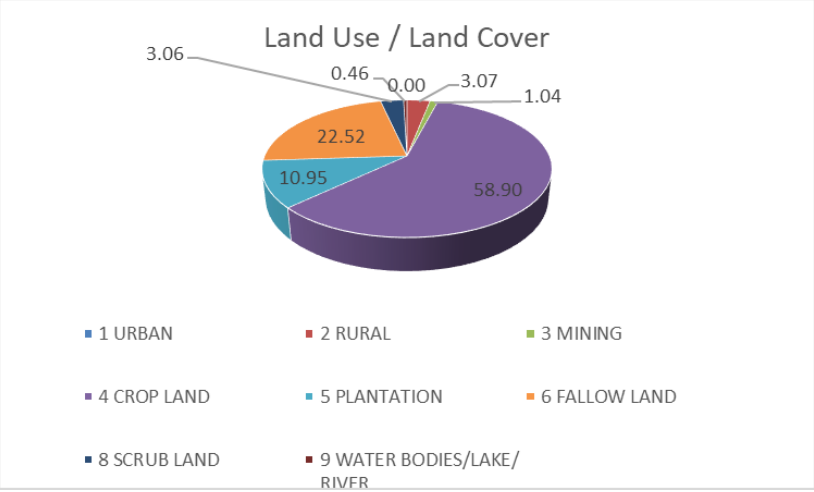
preparation of land use mapping. Land use pattern of the area was studied through LISS III imagery of Bhuvan (ISRO). The 10 km radius map of study area was taken for analysis of Land use cover.

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

S.No	CLASSIFICATION	AREA_HA	AREA_%
	BUILTUP		
1	RURAL	1019.49	3.07
2	URBAN	0	0
3	MINING	346.79	1.04
	AGRICULTURAL LAND		
4	CROP LAND	19571.44	58.90
5	FALLOW LAND	7483.80	22.52
6	PLANTATION	3637.33	10.95
	BARREN/WASTE LANDS		
7	SCRUB LAND	1015.90	3.06
	WETLANDS/ WATER BODIES		
8	WATER BODIES/LAKE	151.94	0.46
TOTAL		33226.69	100.00

Source: Survey of India Toposheet and Landsat Satellite Imagery

FIGURE 3.1: PIE DIAGRAM OF LAND USE AND LAND IN STUDY AREA



Source: Table 3.2

Interpretation

From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture and fallow land (includes crop land) 92.37% followed by Built-up Lands – 4.11%, Scrub land – 3.06%, and Water bodies 0.46%.

The total mining area within the study area is 346.79 ha i.e., 1.04%. The cluster area of 16.08.34 ha contributes about 0.04% 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

All the proposed project area is plain terrain, covered with gravel and weathered formation of 2 to 4m thickness; Massive Charnockite formation is found after 2 to 4m gravel and weathered formation which is clearly inferred from the existing quarry pits.

3.1.3 Drainage Pattern of the Area

Drainage pattern are created by stream erosion over time that reveals characteristics of the kind of rocks and geological structures in a landscape region drained by streams.

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.

Dendritic patterns, which are by far the most common, develop in areas where the rock (or unconsolidated material) beneath the stream has no particular fabric or structure and can be eroded equally easily in all directions.

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

3.1.4 Seismic Sensitivity

The proposed project site falls in the seismic Zone III, low damage risk 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.
(Source: https://moes.gov.in/writereaddata/files/LS_EN_20032020_385.pdf)

3.1.5 Environmental Features in the Study Area

There is no Wildlife Sanctuaries, 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.

FIGURE 3.2: PHYSIOGRAPHIC MAP 10KM RADIUS

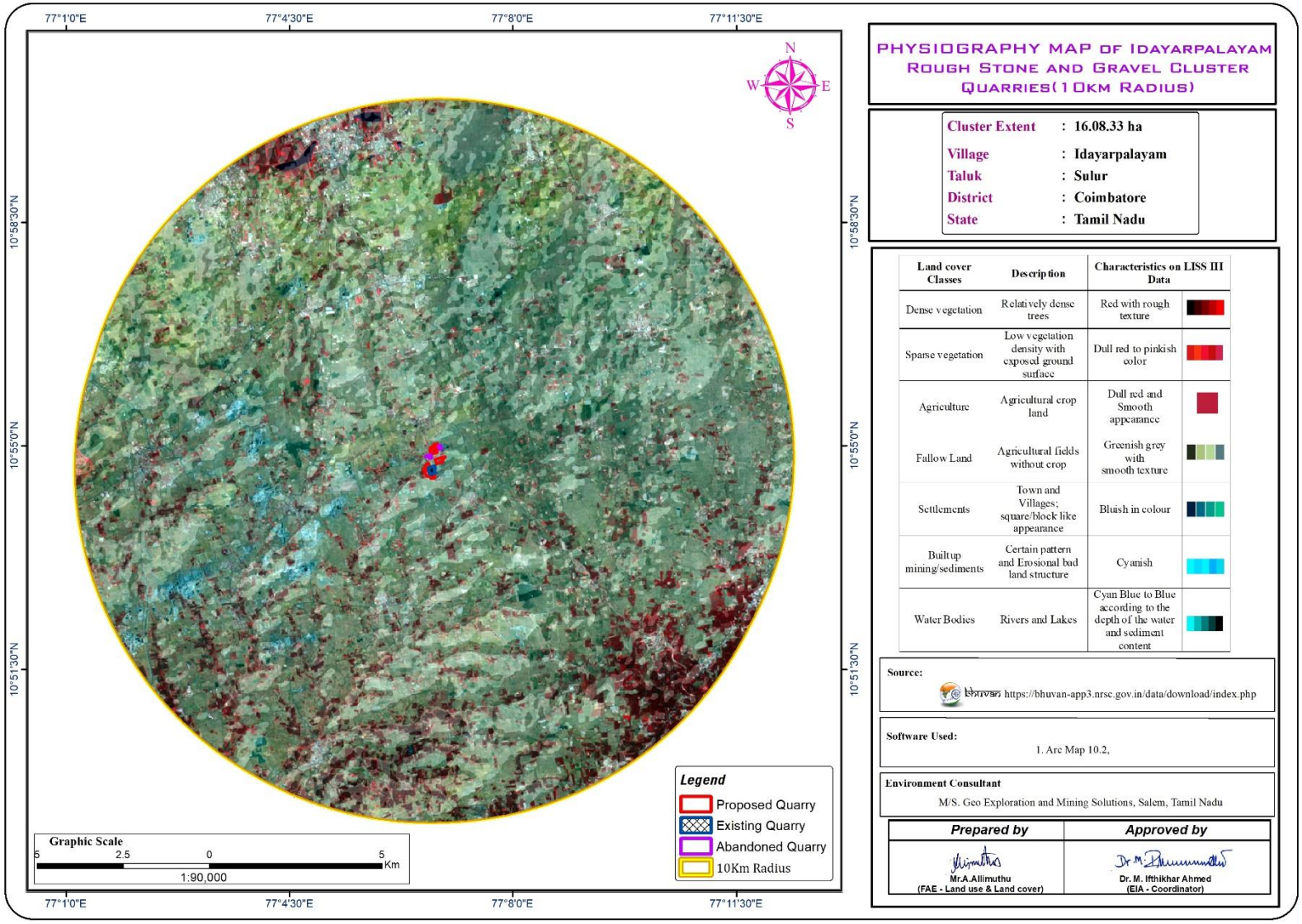
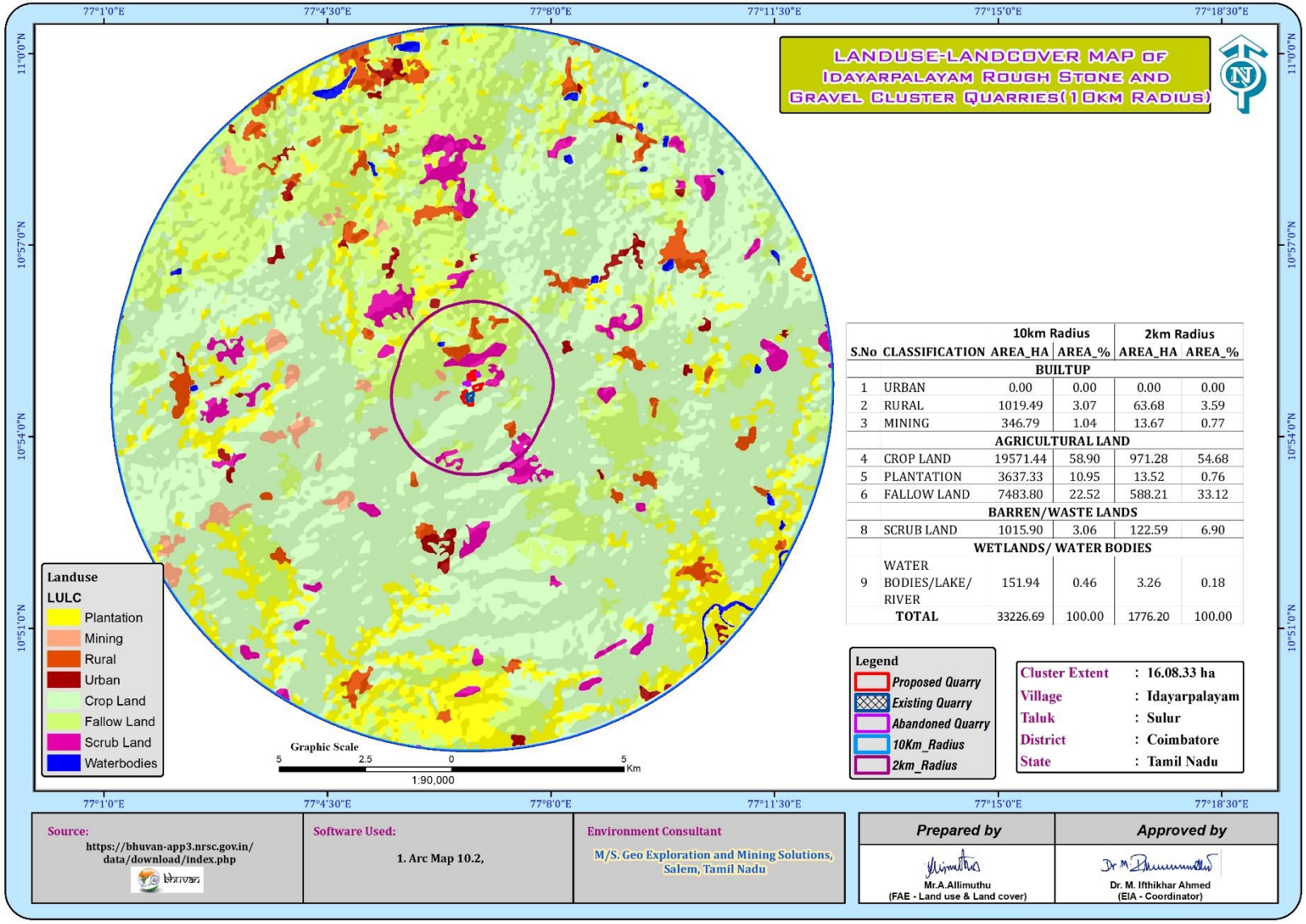


FIGURE 3.3: LAND USE LAND COVER MAP 10KM RADIUS



S.No	CLASSIFICATION	10km Radius AREA_HA	10km Radius AREA_%	2km Radius AREA_HA	2km Radius AREA_%
	BUILTUP				
1	URBAN	0.00	0.00	0.00	0.00
2	RURAL	1019.49	3.07	63.68	3.59
3	MINING	346.79	1.04	13.67	0.77
	AGRICULTURAL LAND				
4	CROP LAND	19571.44	58.90	971.28	54.68
5	PLANTATION	3637.33	10.95	13.52	0.76
6	FALLOW LAND	7483.80	22.52	588.21	33.12
	BARREN/WASTE LANDS				
8	SCRUB LAND	1015.90	3.06	122.59	6.90
	WETLANDS/ WATER BODIES				
9	WATER BODIES/LAKE/ RIVER	151.94	0.46	3.26	0.18
	TOTAL	33226.69	100.00	1776.20	100.00

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	Indiragandhi (Anamalai)	44km-South
2	Reserve Forest	Boluvampatti I R.F	17.5km-West
3	Tiger Reserve/ Elephant Reserve/ Biosphere Reserve	None	Nil within 10Km Radius
4	Critically Polluted Areas	Coimbatore - SIDCO Industrial Estate	Around 15.0 km- NW
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

Sl.No	Name	Distance & Direction
P1		
1	Odai	100m NW
2	Odai	1km SE
3	Canal	9km SE
4	Pallapalayam Lake	9.3km NW
P2		
1	Odai	370m NW
2	Odai	800m SE
3	Canal	8.8km SE
4	Pallapalayam Lake	9.5km NW

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 3.3.

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	10°54'40.21"N 77° 6'37.90"E
2	S-2	Bogampatti	1.5km SE	10°54'15.72"N 77° 7'25.98"E
3	S-3	Periyakuyili	3.7km SW	10°53'55.30"N 77° 4'39.06"E
4	S-4	Lakshminaickenpalayam	4.7km East	10°55'9.92"N 77° 9'16.54"E
5	S-5	Kavipalayam	4.5km SE	10°52'4.55"N 77° 7'11.01"E
6	S-6	Pappampatti	5.5km North	10°57'41.17"N 77° 6'15.44"E

Source: On-site monitoring/sampling by Global Lab and Consultancy Services 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

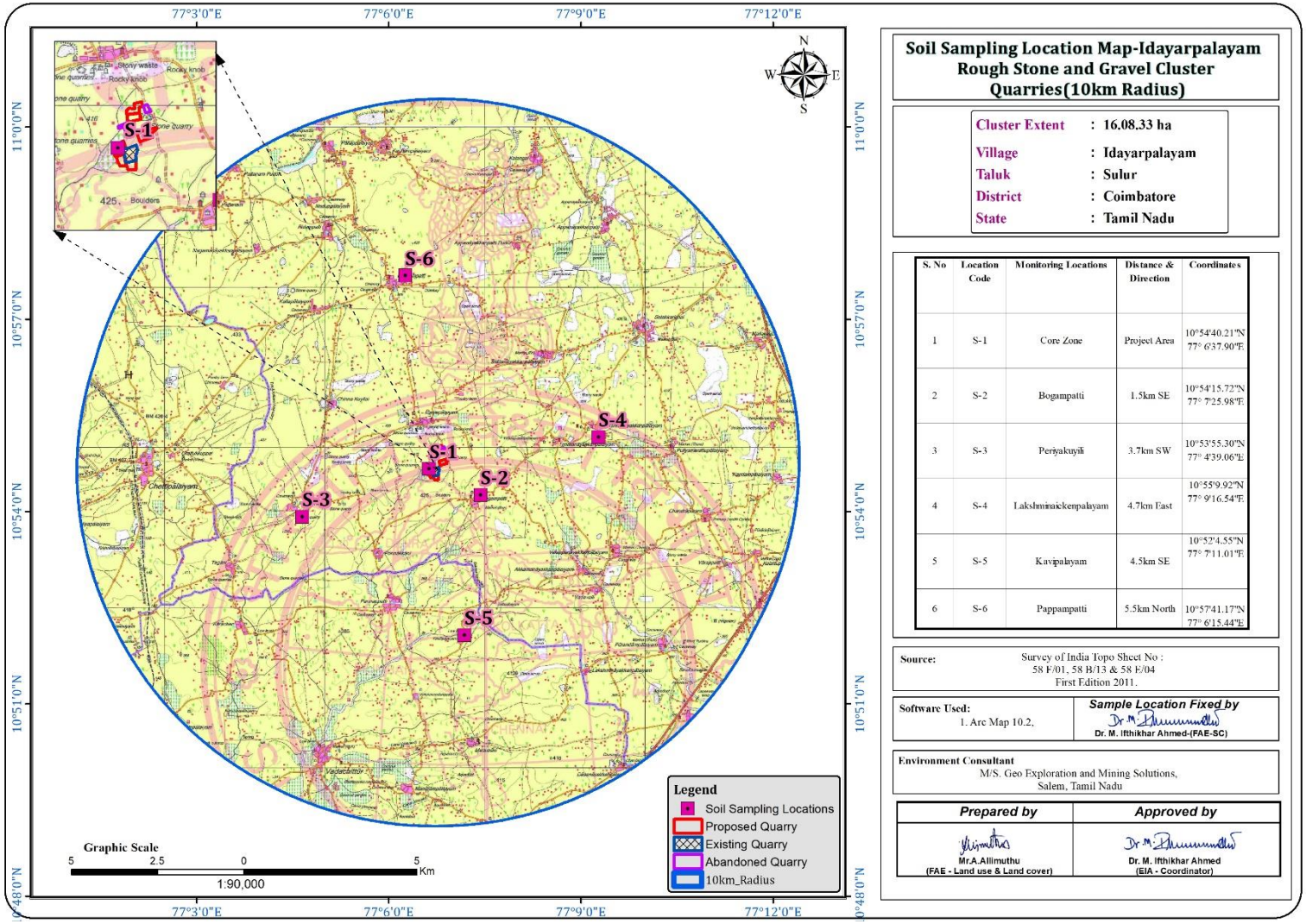
Particulars	Details
Frequency	One grab sample from each station-once during the study period
Methodology	Composite grab samples of the topsoil were collected from 3 depths, and mixed to provide a representative sample for analysis. They were stored in airtight Polythene bags and analysed at the laboratory.

Source: On-site monitoring/sampling by Global Lab and Consultancy Services

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 3.3: SOIL SAMPLING LOCATIONS AROUND 10 KM RADIUS



Soil Sampling Location Map-Idayarpalayam Rough Stone and Gravel Cluster Quarries(10km Radius)

Cluster Extent	: 16.08.33 ha
Village	: Idayarpalayam
Taluk	: Sulur
District	: Coimbatore
State	: Tamil Nadu

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	S-1	Core Zone	Project Area	10°54'40.21"N 77° 6'37.90"E
2	S-2	Bogampatti	1.5km SE	10°54'15.72"N 77° 7'25.98"E
3	S-3	Periyakuyili	3.7km SW	10°53'55.30"N 77° 4'39.06"E
4	S-4	Lakshminaickenpalayam	4.7km East	10°55'9.92"N 77° 9'16.54"E
5	S-5	Kavipalayam	4.5km SE	10°52'4.55"N 77° 7'11.01"E
6	S-6	Pappampatti	5.5km North	10°57'41.17"N 77° 6'15.44"E

Source: Survey of India Topo Sheet No : 58 F/01, 58 B/13 & 58 E/04 First Edition 2011.

Software Used: 1. Arc Map 10.2,

Sample Location Fixed by
Dr. M. Ifthikhar Ahmed-(FAE-SC)

Environment Consultant
M/S. Geo Exploration and Mining Solutions, Salem, Tamil Nadu

Prepared by	Approved by
Mr.A.Allimuthu (FAE - Land use & Land cover)	Dr. M. Ifthikhar Ahmed (EIA - Coordinator)

FIGURE 3.4: SOIL MAP

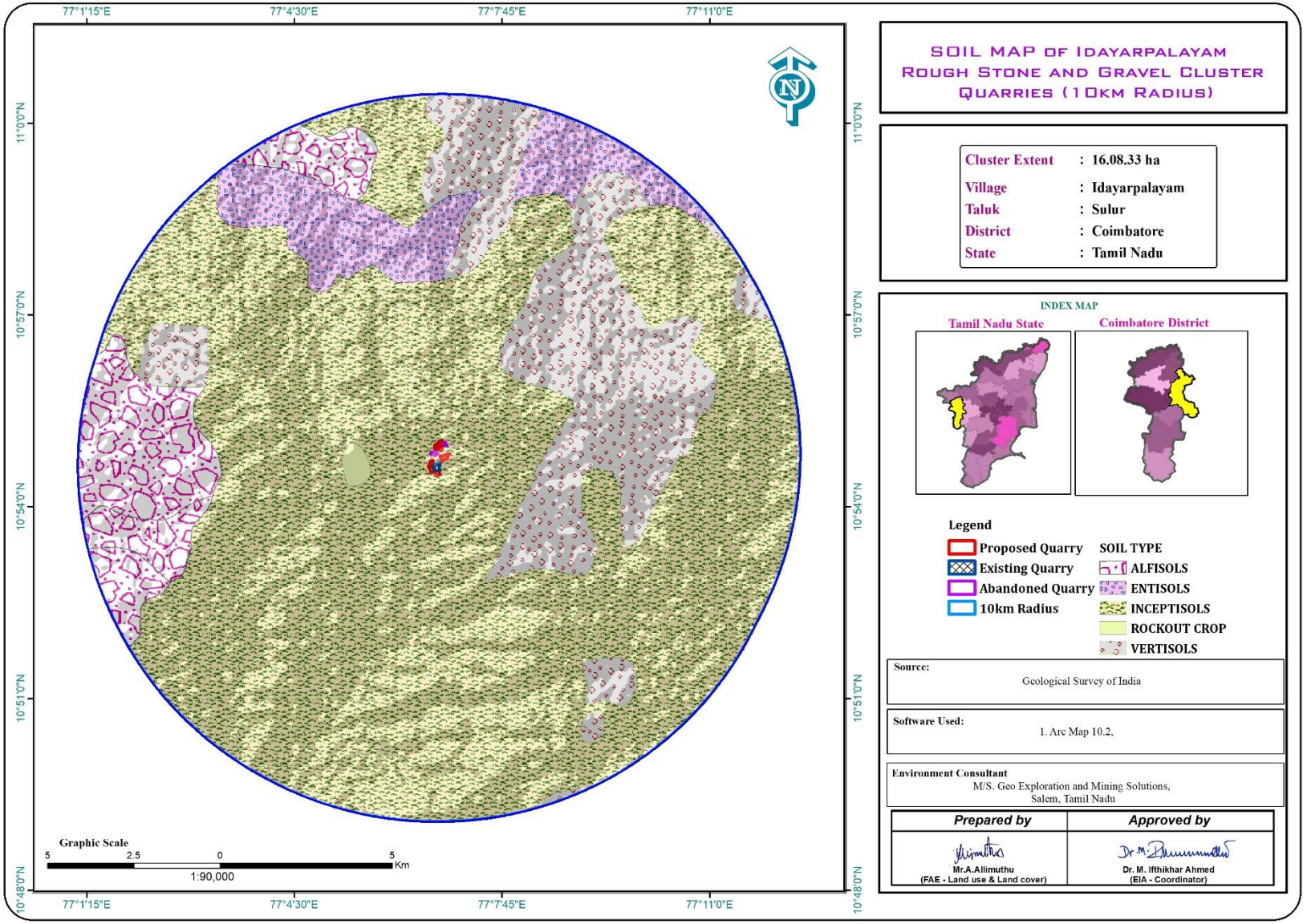


TABLE 3.7: SOIL QUALITY OF THE STUDY AREA

Sl.No	TEST PARAMETER	TEST METHOD	UNITS	S-1 Core Zone	S-2 Bogampatti	S-3 Periyakuyili	S-4 Lakshminaickenpalayam	S-5 Kavipalayam	S-6 Pappampatti
1	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	-	7.02	7.28	6.98	6.95	7.03	6.91
2	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	µS/cm	328	298.5	328.6	268.9	298.5	270.5
3	Clay	Gravimetric Method	%	30.3	31.9	28.9	26.9	31.8	31.4
4	Sand		%	36.9	35.9	36.3	37.2	34.9	35.9
5	Silt		%	32.8	32.2	34.8	35.9	33.3	32.7
6	Water Holding Capacity	By Gravimetric Method	%	40.3	46.5	46.4	45.6	46.5	47.5
7	Bulk Density	By Cylindrical Method	g/cc	1.19	1.10	1.27	1.23	1.14	1.21
8	Porosity	By Gravimetric Method	-	38.1	40.1	42.3	40.9	42.2	41.0
9	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	meq/100g	98.5	80.6	128.9	125.	121	141.8
10	Magnesium as Mg		meq/100g	38.9	36.9	65.8	58.5	55.6	75.8
11	Manganese as Mn		mg/kg	37.2	29.3	24.8	33.7	28.6	29.8
12	Zinc as Zn		mg/kg	1.37	2.03	1.05	1.08	1.06	1.52
13	Boron as B		mg/kg	1.28	1.98	2.13	1.32	1.21	2.14
14	Chloride as Cl	APHA 23rd Edn 2019 4500 Cl B	meq/l	156.8	156	178.5	152.8	115.5	162.5
15	Total Soluble Sulphate as SO_4	IS 2720 Part 27 : 1977 (Reaff:2015)	mg/100g	0.026	0.022	0.019	0.018	0.018	0.023
16	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	mg/100g	37.1	33.8	30.2	29.8	29.7	26.7
17	Total Phosphorus as P	IS 10158 : 1982 (Reaff: 2019)	mg/kg	6.21	2.62 g	4.63	3.24	3.41	3.12
18	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	kg/ha	312.5	346.5	298.6	298.5	328	298.5
19	Cadmium as Cd	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	mg/100g	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	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)
21	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)
22	Lead as Pb		mg/kg	0.89	1.09	0.89	0.92	0.9	0.93
23	Iron as Fe		mg/kg	5.63	3.18	6.98	3.64	4.03	3.98
24	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	mg/kg	2.22	2.31	2.49	2.89	2.91	2.79
25	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	%	1.29	1.34	1.45	1.68	1.69	1.62
26	Cation Exchange Capacity	USEPA 9080 – 1986	meq/100g	32.9	29.8	32.6	30.9	36.8	37.7

Source: Sampling Results by Global Lab and Consultancy Services.

Interpretation & Conclusion

Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay (26.9 % to 31.9 %) to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 1.1 – 1.27 g/cc. The Water Holding Capacity of the soil samples is found to be medium i.e. ranging from 40.3 – 47.5 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 6.91 to 7.28
- The available Nitrogen content range between 298.5 to 346.5 mg/kg
- The available Phosphorus content range between 3.12 to 6.21 mg/kg
- The available Potassium range between 26.7 mg/kg to 37.0031 mg/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:

Noyyal 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.

Ground water occurring in pheratic conditions in weathered and fractured gneiss rock formation. 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

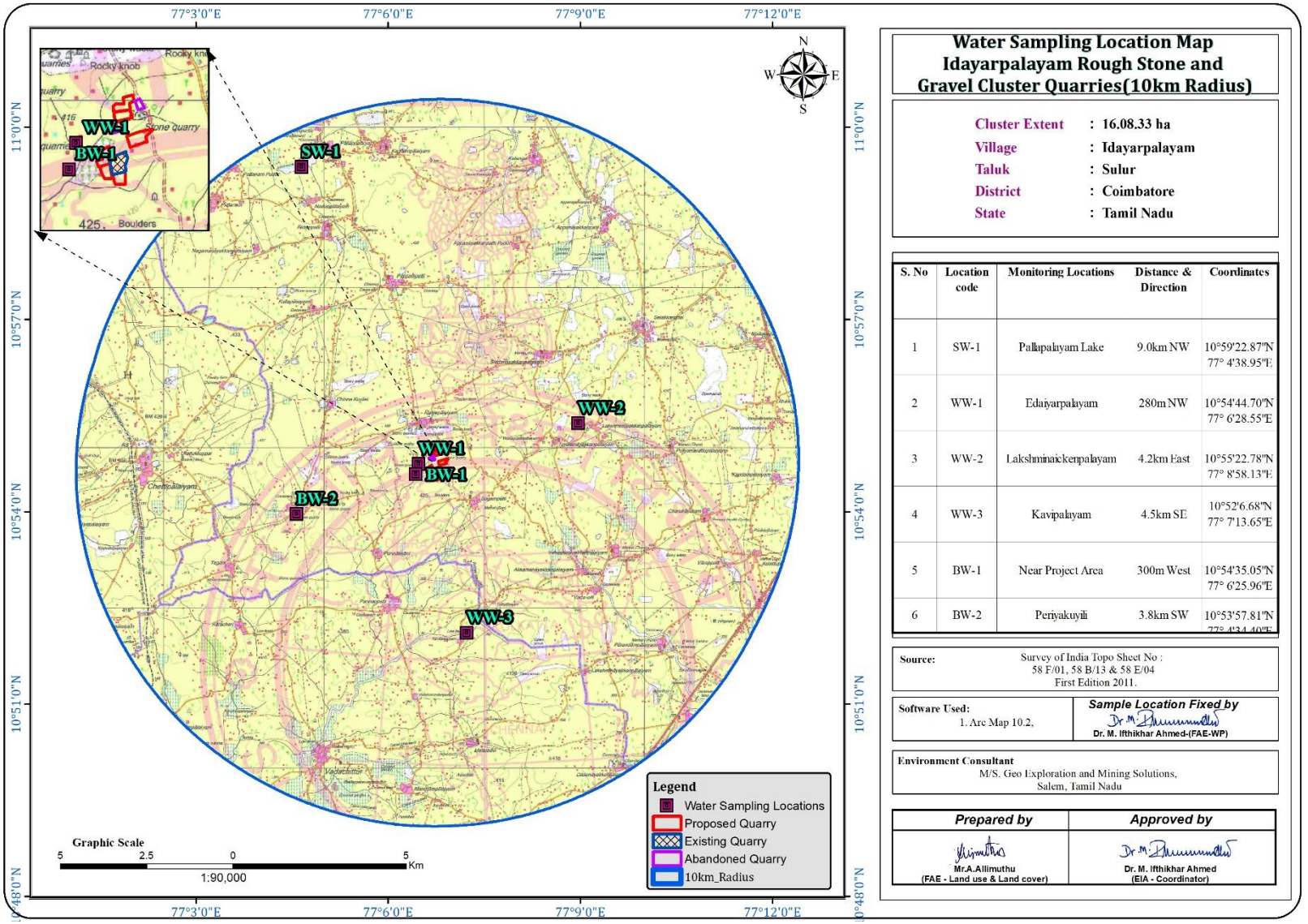
One (1) surface water and Five (5) ground water samples were collected from the study area and were analysed for physio-chemical, heavy metals and bacteriological parameters in order to assess the effect of mining and other activities on surface and ground water. The samples were analysed as per the 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 3.5.

TABLE 3.8: WATER SAMPLING LOCATIONS

S.NO	CODE	LOCATIONS	DISTANCE & DIRECTION	CO-ORDINATES
SURFACE WATER				
1	SW-1	Pallapalayam Lake	9.0km NW	10°59'22.87"N 77° 4'38.95"E
GROUND WATER				
3	WW-1	Edaiyarpalayam	280m NW	10°54'44.70"N 77° 6'28.55"E
4	WW-2	Lakshminaickenpalayam	4.2km East	10°55'22.78"N 77° 8'58.13"E
5	WW-3	Kavipalayam	4.5km SE	10°52'6.68"N 77° 7'13.65"E
6	BW-2	Near Project Area	300m West	10°54'35.05"N 77° 6'25.96"E
7	BW-3	Periyakuyili	3.8km SW	10°53'57.81"N 77° 4'34.40"E

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS

FIGURE 3.5: WATER SAMPLING LOCATIONS AROUND 10 KM RADIUS



Water Sampling Location Map
Idayarpalayam Rough Stone and Gravel Cluster Quarries(10km Radius)

Cluster Extent	: 16.08.33 ha
Village	: Idayarpalayam
Taluk	: Sulur
District	: Coimbatore
State	: Tamil Nadu

S. No	Location code	Monitoring Locations	Distance & Direction	Coordinates
1	SW-1	Pallapalayam Lake	9.0km NW	10°59'22.87"N 77° 4'38.95"E
2	WW-1	Edaiyarpalayam	280m NW	10°54'44.70"N 77° 6'28.55"E
3	WW-2	Lakshminaickenpalayam	4.2km East	10°55'22.78"N 77° 8'58.13"E
4	WW-3	Kavipalayam	4.5km SE	10°52'6.68"N 77° 7'13.65"E
5	BW-1	Near Project Area	300m West	10°54'35.05"N 77° 6'25.96"E
6	BW-2	Periyakuyili	3.8km SW	10°53'57.81"N 77° 4'34.40"E

Source: Survey of India Topo Sheet No : 58 F/01, 58 B/13 & 58 E/04 First Edition 2011.

Software Used: 1. Arc Map 10.2.

Sample Location Fixed by
Dr. M. Ifthikhar Ahmed-(FAE-WP)

Environment Consultant
M/S. Geo Exploration and Mining Solutions, Salem, Tamil Nadu

Prepared by	Approved by
Mr.A.Allimuthu (FAE - Land use & Land cover)	Dr. M. Ifthikar Ahmed (EIA - Coordinator)

TABLE 3.9: GROUND WATER SAMPLING RESULTS

1	TEST PARAMETER	TEST METHOD	UNITS	WW-1 Edaiyarpalayam	WW-2 Lakshminaickenpalayam	WW-3 Kavipalayam	BW-1 Near Project Area	BW-2 Periyakuyili
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	-	5	5	5	5	1
2	Odour	IS 3025 Part 5:2018	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	-	7.47	7.39	7.23	7.80	7.27
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	µmhos/cm	1366.0	1383.0	1283.0	1195.0	1166.0 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	NTU	1	1	1	1	1
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	mg/l	806.0	816.	757.0	705.0	688.0
7	Total Hardness as CaCO3	IS 3025 Part 21:2009 (Reaff:2019)	mg/l	238.3 l	230.2	214.1	197.9 l	181.8
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	mg/l	61.5	63.1	59.9	53.3	48.5
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	mg/l	20.6 l	17.6	15.7	15.7	14.7
10	Total Alkalinity as CaCO3	IS 3025 Part 23:1986 (Reaff:2019)	CU	215.8 l	215.9	199.6	178.5	174.5
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	mg/l	263.5	268.4	235.6	210.6	205.6
12	Sulphate as SO4	IS 3025 Part 24:1986 (Reaff:2019)	mg/l	42.6	49.8	45.3	45.6	42.6
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	mg/l	0.49	0.38	0.35	032	0.37
14	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)	BDL (DL:0.1)
15	Fluoride as F	APHA 23rd Edn. 2017:4500 F,D	mg/l	0.37 l	0.36	0.37	0.25	0.26
16	Nitrate as NO3	IS 3025 Part 34:1988 (Reaff:2019)	mg/l	8.3	8.0	8.2	7.2	7.4
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
18	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)	BDL (DL:0.02)
19	Mercury as Hg	USEPA 200.8	mg/l	BDL (DL:0.0005)	BDL (DL:0.0005)	BDL (DL:0.0005)	BDL (DL:0.0005)	BDL (DL:0.0005)
20	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)	BDL (DL:0.001)
21	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)	BDL (DL:0.005)
22	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)	BDL (DL:0.005)
23	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)	BDL (DL:0.005)
24	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)	BDL(DL :0.05)
25	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)	BDL(DL : 0.02)
26	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)	BDL(DL : 0.05)
27	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)	BDL(DL : 0.01)
28	Phenolic compounds as C6H5OH	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)	BDL (DL:0.0005)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
30	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)	BDL (DL:0.01)
31	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)	BDL(DL:0.05)
32	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)	BDL (DL:0.01)
33	Sulphide as H2S	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)	BDL (DL:0.01)
34	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)	BDL (DL:0.02)
35	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)	BDL (DL:0.005)
36	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)	BDL (DL:1.0)
37	Total Coliform	APHA 23rd Edn. 2017:9221B	MPN/100ml	193	186	135	132	128
38	Escherichia coli	APHA 23rd Edn. 2017:9221F	MPN/100ml	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8

* IS: 10500:2012-Drinking Water Standards; # within the permissible limit as per the WHO Standard. The water can be used for drinking purpose in the absence of alternate sources. Note: SW- Surface water, GW – Ground water

TABLE 3.10: SURFACE WATER SAMPLING RESULTS

Sl.No	TEST PARAMETER	TEST METHOD	UNITS	SW-1 Pallapalayam Lake
1	Aluminium	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL:0.005)
2	Ammoniacal Nitrogen as NH3-N	IS 3025 (Part 34)/Sec 1: 2023	mg/l	BDL (DL:0.01)
3	Arsenic as As	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL : 0.005)
4	Barium as Ba	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL(DL:0.05)
5	Biochemical Oxygen Demand (BOD) at 27ºC for 3 Days	IS 3025 (Part 44): 2023	mg/l	14.6
6	Boron as B	IS 3025 (Part 57): 2021	mg/l	BDL(DL : 0.05 l)
7	Cadmium as Cd	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL : 0.001)
8	Calcium as Ca	IS 3025 (Part 40): 1991 (Reaffirmed 2019)	mg/l	68.0
9	Chemical Oxygen Demand (COD)	IS 3025 (Part 58): 2023	mg/l	45.9
10	Chloride as Cl-	IS 3025 (Part 32): 1988 (Reaffirmed 2019)	mg/l	298.6
11	Chromium as Cr	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL : 0.02)
12	Color	IS 3025 (Part 4): 2021	CU	7
13	Copper as Cu	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL : 0.01)
14	Cyanide as CN	IS 3025 part 27/Sec 1: 2021	mg/l	BDL (DL : 0.01)
15	Dissolved Oxygen (DO)	IS 3025 (Part 38): 1989 (Reaffirmed 2019)	mg/l	6.5
16	Electrical Conductivity	IS 3025 (Part 14): 2013 (Reaffirmed 2019)	µS/cm	1738
17	Fluoride as F-	GLCS/SOP/W/015; Issue no :02: 2024	mg/l	0.59
18	Free Residual Chlorine as Cl2	IS 3025 (Part 26): 2021	mg/l	BDL (DL : 0.1)
19	Iron as Fe	IS 3025 (Part 53): 2024	mg/l	0.62

20	Lead as Pb	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL : 0.005)
21	Magnesium as Mg	IS 3025 (Part 46): 2023	mg/l	24.5
22	Manganese as Mn	IS 3025 (Part 59): 2023	mg/l	BDL (DL : 0.02)
23	Mercury as Hg	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL : 0.0005)
24	Molybdenum as Mo	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL : 0.02)
25	Nitrate as NO3	IS 3025 (Part 34)/Sec 1: 2023	mg/l	16.8
26	Odor	IS 3025 (Part 5): 2018	-	Agreeable
27	pH	IS 3025 (Part 11): 2022	-	8.12
28	Phenols	IS 3025 PART 43 SECTION 1: 2022	mg/l	BDL (DL : 0.0005)
29	Selenium as Se	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL : 0.005)
30	Sulphate as SO4	IS 3025 (Part 24) SECTION 1: 2022	mg/l	75.9
31	Sulphide as S (Iodometric Method)	GLCS/SOP/W/066: 2023	mg/l	BDL (DL : 0.01)
32	Total Alkalinity as CaCO3	IS 3025 (Part 23): 2023	mg/l	256.8
33	Total Dissolved Solids (TDS)	IS 3025 (Part 16): 2023	mg/l	1025
34	Total Hardness as CaCO3	IS 3025 (Part 21): 2009 (Reaffirmed 2019)	mg/l	270.6
35	Total Suspended Solids	is 3025 part 17: 2022	mg/l	28.9
36	Turbidity	IS 3025 (Part 10): 2023	NTU	6
37	Zinc as Zn	GLCS/SOP/W/62 Issue No:1:Dated:10.09.2022	mg/l	BDL (DL : 0.05)

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

3.2.4 Interpretation& Conclusion

Surface Water

Ph:

The pH -8.12 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 1025mg/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 298.6mg/l. Nitrates varied from 16.8 mg/l, while sulphates-75.9 mg/l.

Ground Water

The pH of the water samples collected ranged from 7.23 to 7.80 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 688 to 816mg/l in all samples. Total hardness varied between 181.8– 238.3mg/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 65-70m. The maximum depth proposed out of proposed projects is 57m (2m Gravel + 55m Rough stone) below ground level. 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. There is no necessity of stream, channel diversion due to these proposed projects.

During the rainy season there is a possibility of collection of seepage water from the subsurface levels which will be collected and stored in the mine sump pits and will be used for dust suppression and greenbelt development and during the end of the life of the mine this collected water will act as a temporary reservoir.

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

S.NO	LABEL	LONGITUDE	LATITUDE	Mar-25	Apr-25	May-25
1	OW-1	77° 06' 28.5500" E	10° 54' 44.7000" N	13.6	14.2	14.8
2	OW-2	77° 06' 09.1474" E	10° 54' 10.7176" N	13.9	14.5	15.1
3	OW-3	77° 06' 58.5539" E	10° 55' 02.9089" N	14.1	14.7	15.3
4	OW-4	77° 06' 57.1256" E	10° 55' 27.1742" N	14.5	15.1	15.7
5	OW-5	77° 07' 29.3441" E	10° 55' 14.8692" N	14.8	15.4	16
6	OW-6	77° 07' 28.7317" E	10° 54' 10.9722" N	13.8	14.4	15
7	OW-7	77° 06' 16.3047" E	10° 54' 52.8877" N	14.9	15.5	16.1
8	OW-8	77° 06' 17.6679" E	10° 55' 23.9527" N	13.7	14.3	14.9
9	OW-9	77° 06' 02.0987" E	10° 55' 12.1461" N	14.4	15	15.6
10	OW-10	77° 05' 50.8671" E	10° 54' 46.3908" N	14.2	14.8	15.4

Source: Onsite monitoring data

TABLE 3.12: POST MONSOON SEASON WATER LEVEL OF BOREWELLS 1 KM RADIUS

S.NO	LABEL	LATITUDE	LONGITUDE	Mar-25	Apr-25	May-25
1	BW1	77° 06' 25.9600" E	10° 54' 35.0500" N	60.8	61.4	62
2	BW2	77° 06' 54.4383" E	10° 54' 50.7308" N	59.9	60.5	61.1
3	BW3	77° 06' 42.3724" E	10° 55' 24.5966" N	60.5	61.1	61.7
4	BW4	77° 06' 08.5562" E	10° 54' 08.3874" N	60.3	60.9	61.5
5	BW5	77° 06' 51.9442" E	10° 53' 57.6231" N	59.8	60.4	61
6	BW6	77° 07' 08.7896" E	10° 54' 23.4315" N	61	61.6	62.2
7	BW7	77° 07' 34.6701" E	10° 54' 52.6052" N	60.8	61.4	62
8	BW8	77° 05' 55.6814" E	10° 55' 21.2316" N	60.1	60.7	61.3

Source: Onsite monitoring data

FIGURE 3.6: OPEN WELL CONTOUR MAP – MARCH 2025

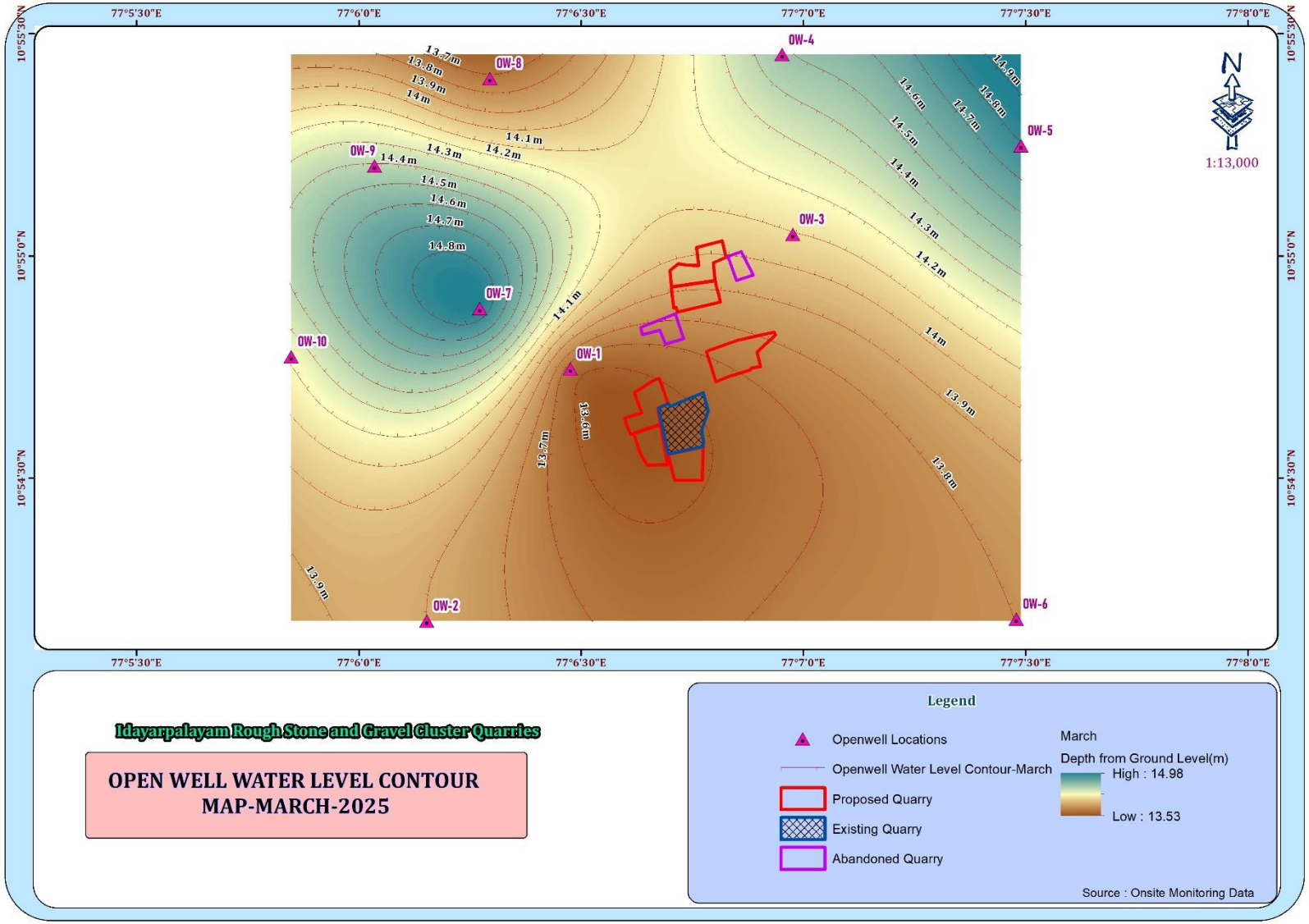


FIGURE 3.7: OPEN WELL CONTOUR MAP – APRIL 2025

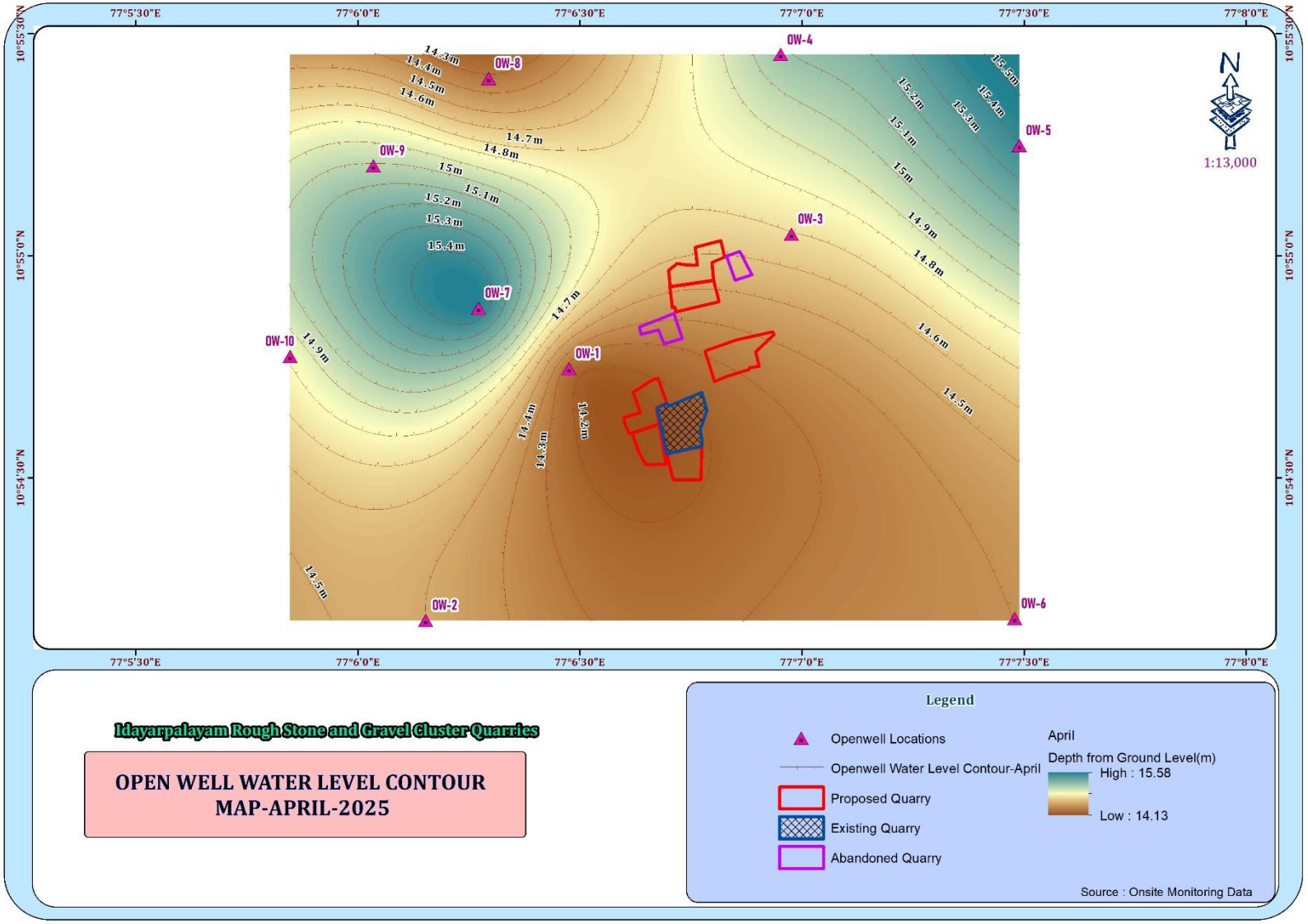


FIGURE 3.8: OPEN WELL CONTOUR MAP – MAY 2025

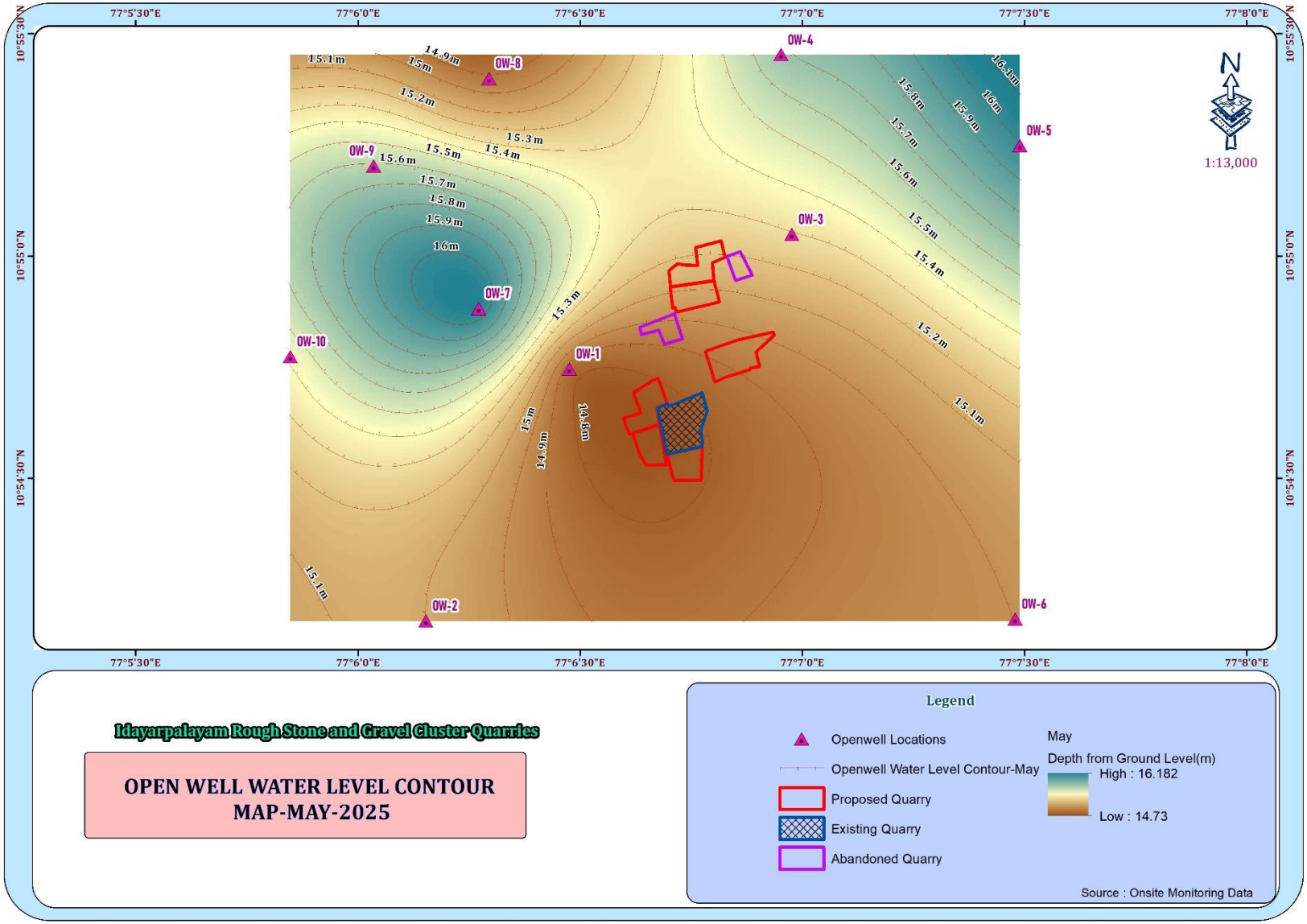


FIGURE 3.9: BOREWELL CONTOUR MAP – MARCH 2025

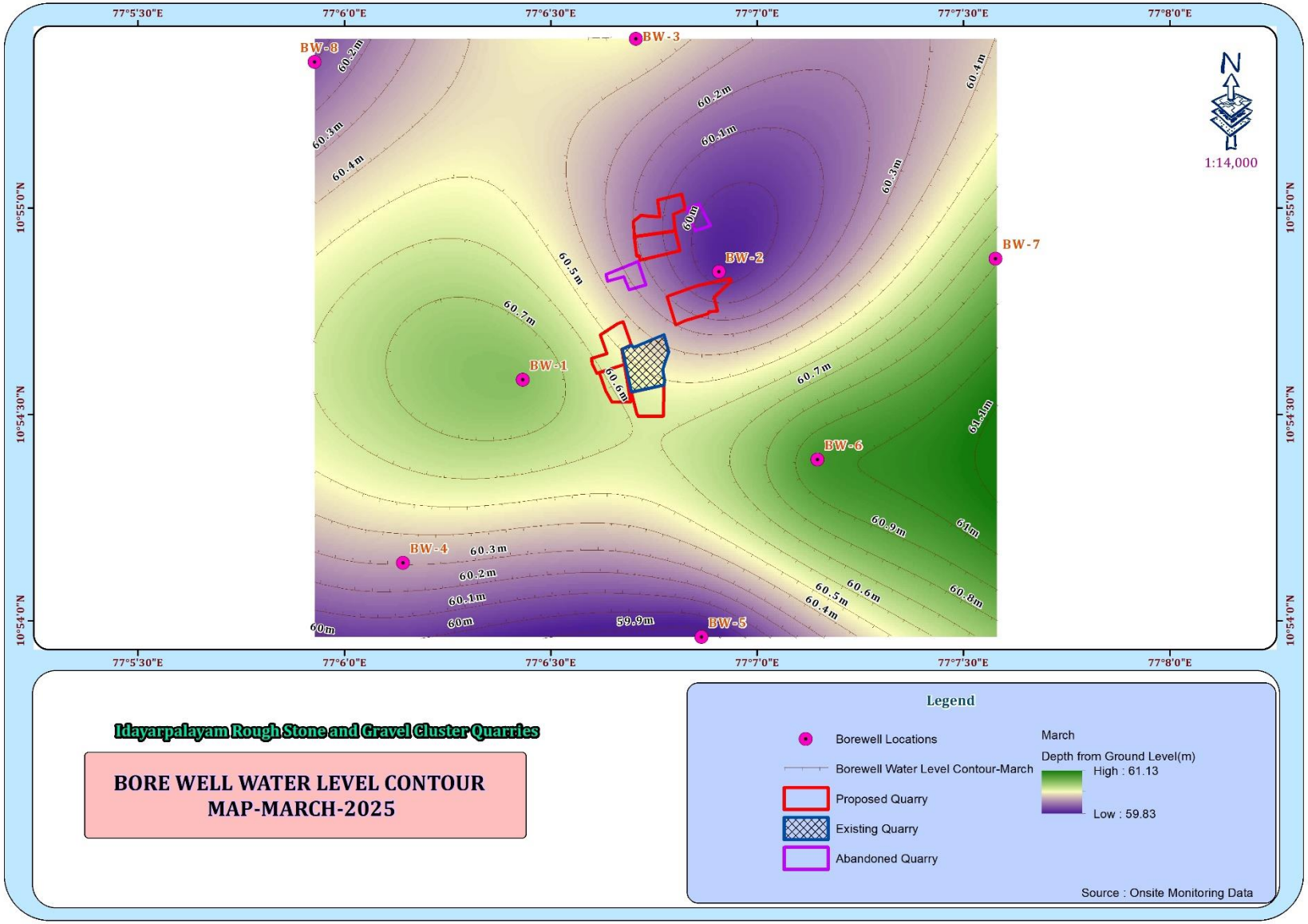


FIGURE 3.10: BOREWELL CONTOUR MAP – APRIL 2025

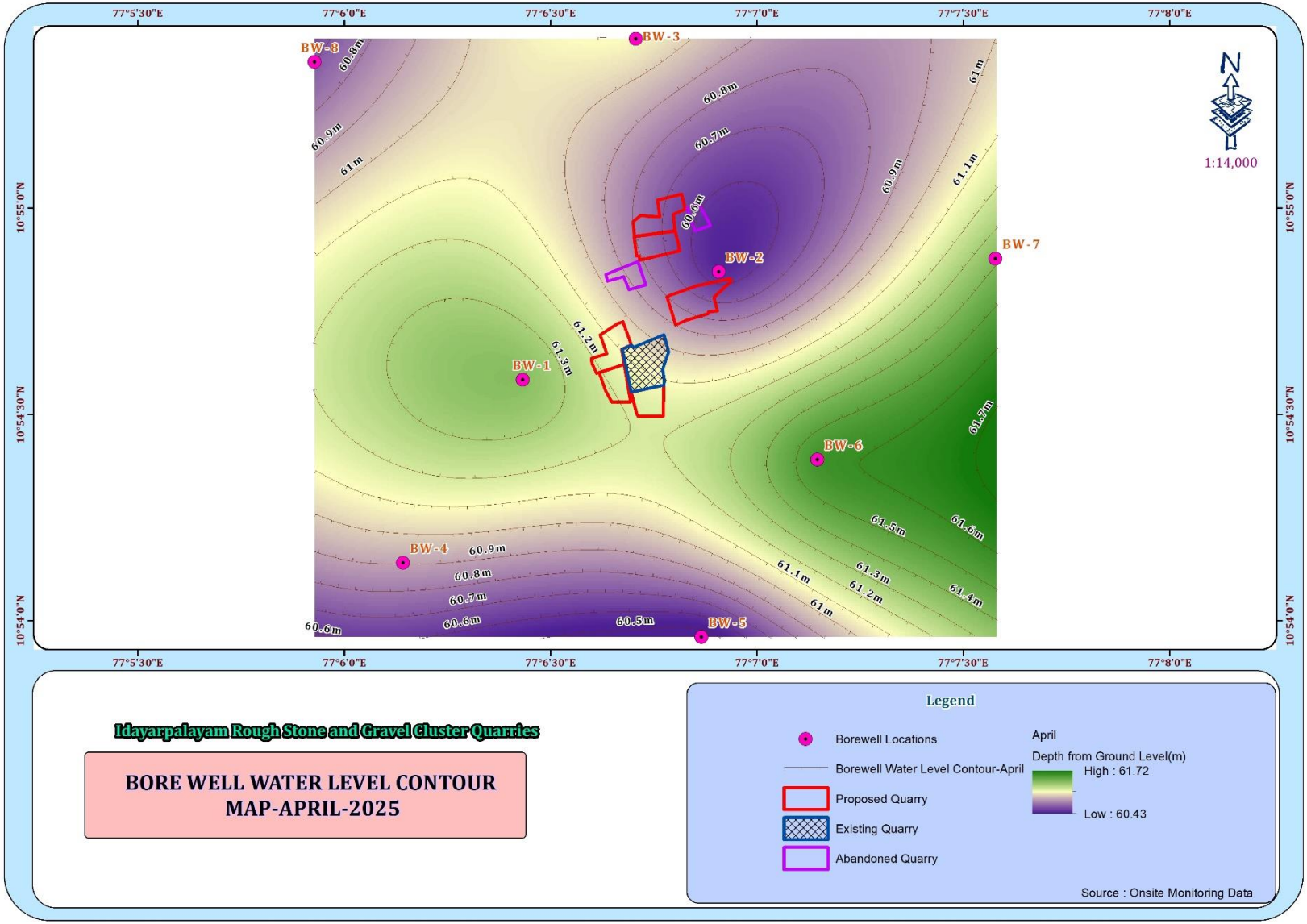


FIGURE 3.11: BOREWELL CONTOUR MAP – MAY 2025

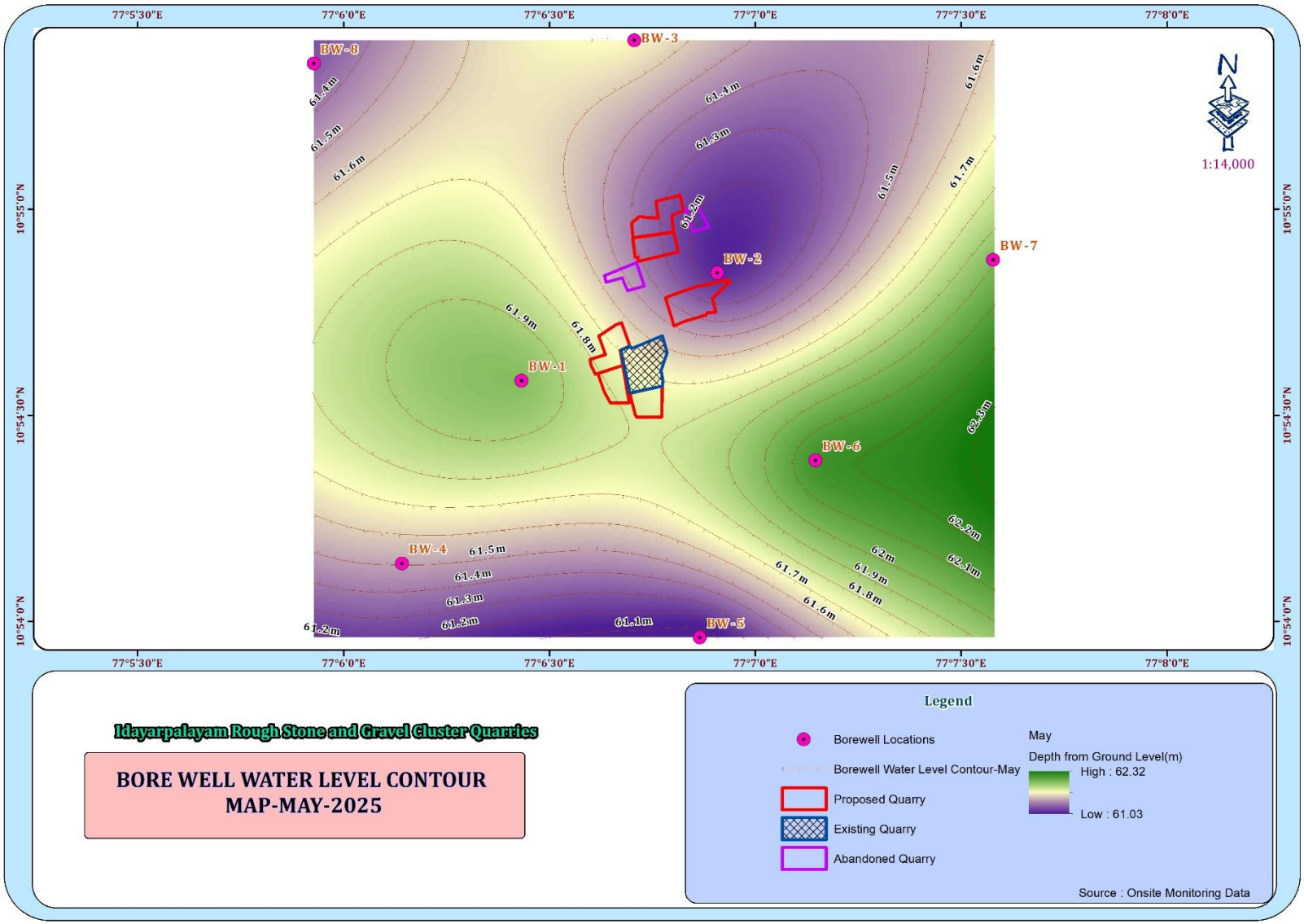


FIGURE 3.12: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE

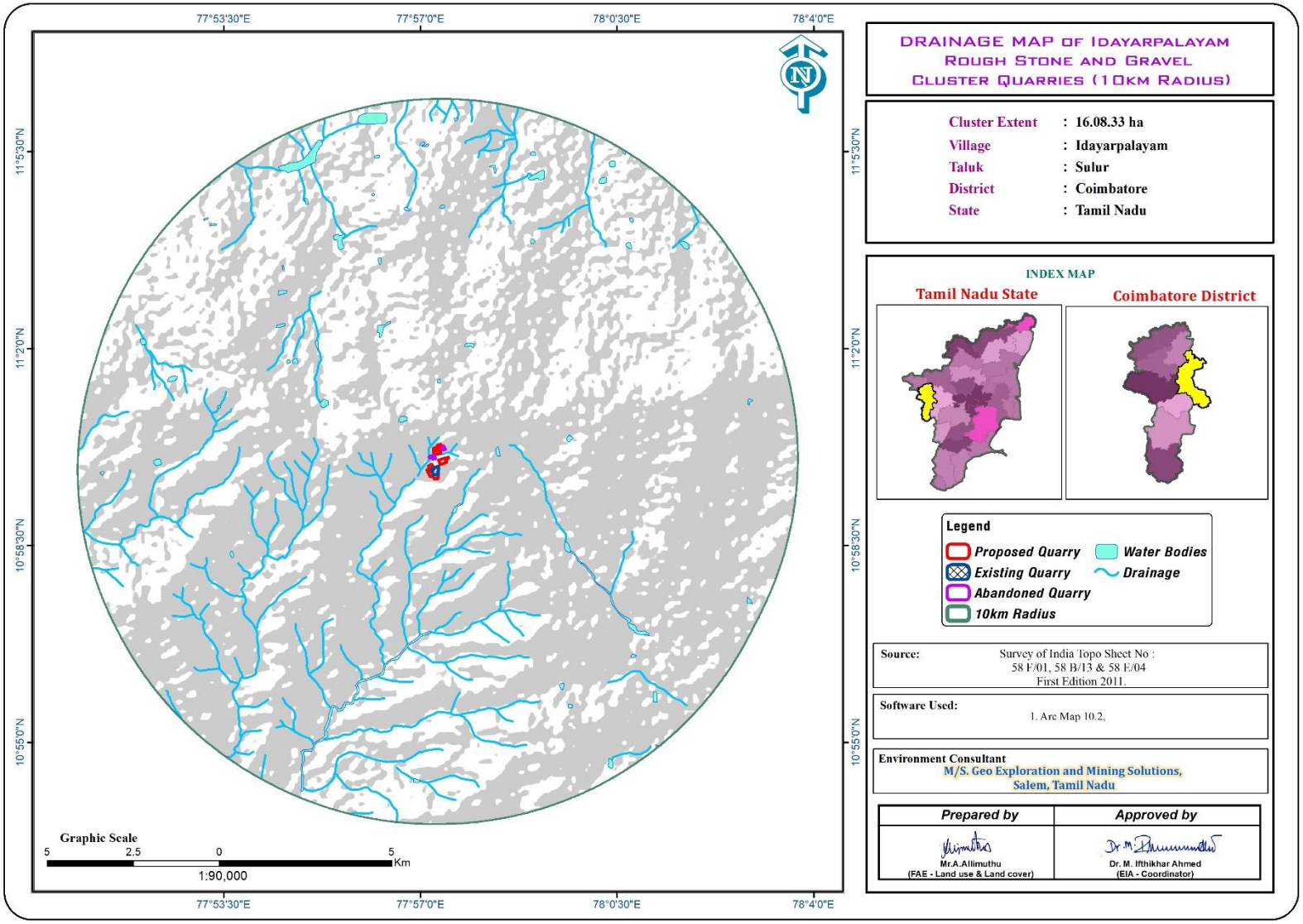
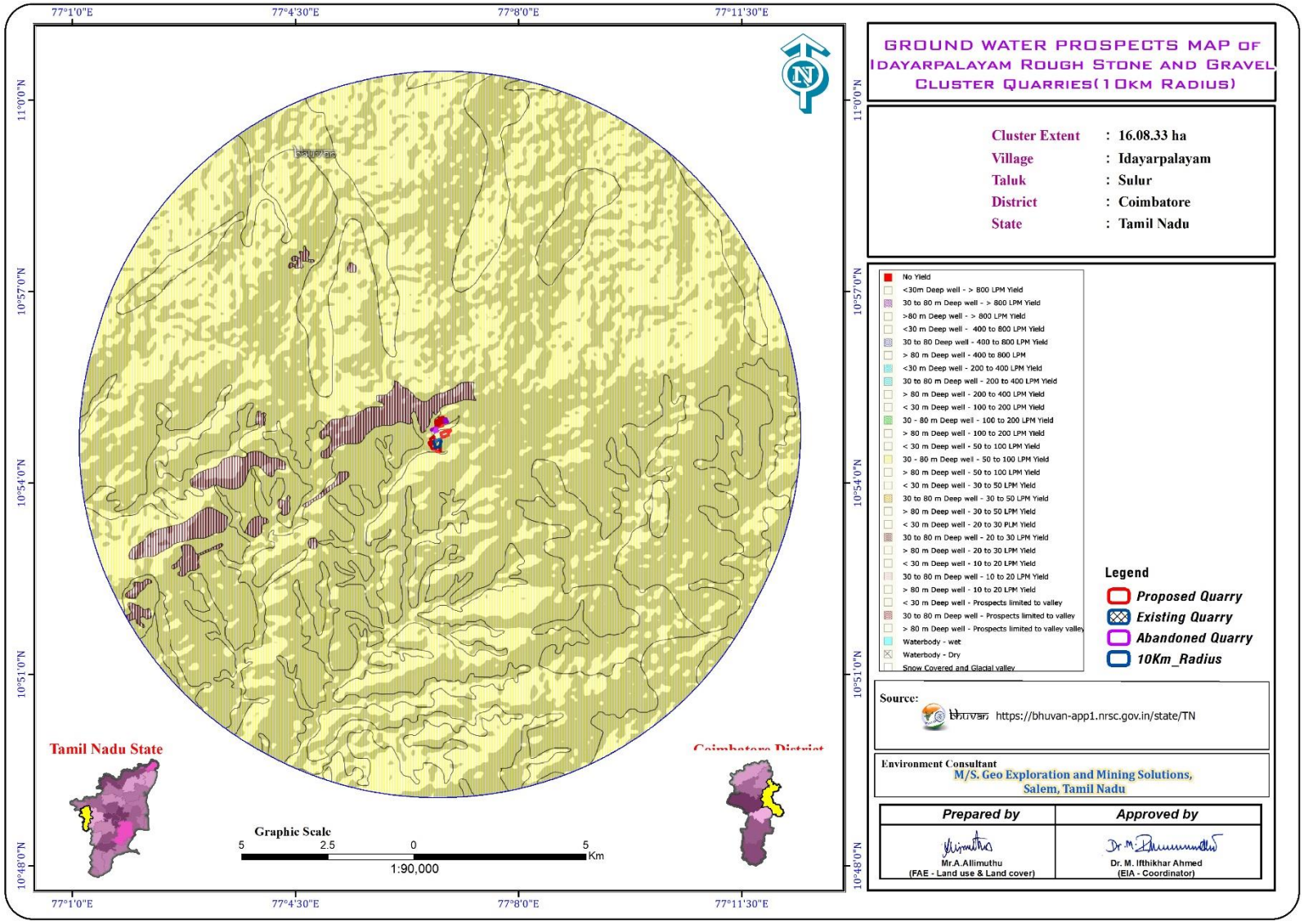


FIGURE 3.13: GROUND WATER PROSPECT MAP



3.2.5.1 Methodology and Data Acquisition

Electric Resistivity Method is well established for delineating lateral as well vertical discontinuities in the resistive structure of the Earth's subsurface. The present study makes use of vertical electric sounding (VES) to delineate the Vertical Resistivity structure at depth. 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 farm 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.

$$\rho_a = \frac{G\Delta V}{I}$$

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,

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

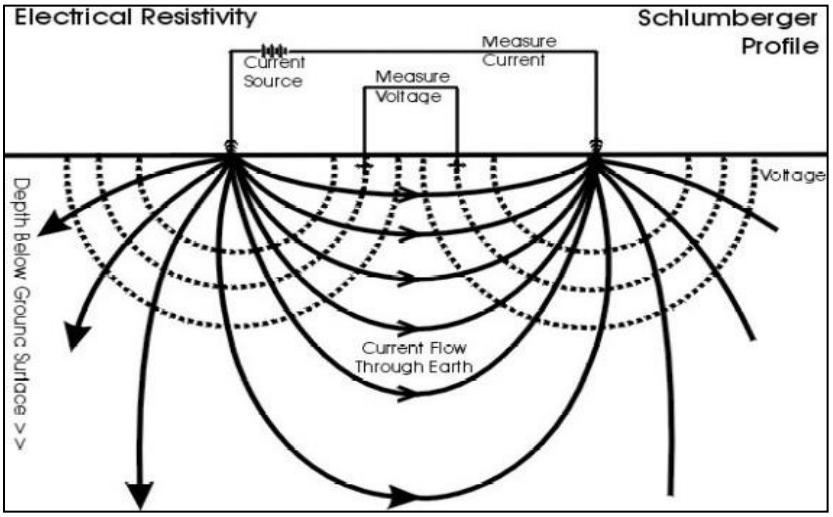
ρr = Resistivity of Rocks
ρw = Resistivity of water in pores of rock
F = Formation Factor
$\emptyset$ = Fractional pore volume
A = Constants with values ranging from 0.5 to 2.5

3.2.5.2 Survey Layout

The layout for a resistivity survey depends on the choice of the current and potential electrode arrangement, which is called electrode array. Here the present study is considered with Schlumberger array. In which the distance may be used for current electrode separation while potential electrode separation is kept on third to one fifth of the same. One interesting aspect in VES is the principle of reciprocity, which permits interchange of the potential and current electrode without any effect on the measured apparent resistivity.

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 nose 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 … (1+2...+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 68-70m. The maximum depth proposed out of proposed projects 57m 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.

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 sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities. 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.

This section describes the identification of sampling locations, methodology adopted during the monitoring period and sampling frequency.

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

Coimbatore is 421m above sea level. Coimbatore's climate is classified as tropical. The summers here have a good deal of rainfall, while the winters have very little rain. This location is classified as Aw by Köppen and Geiger. In Coimbatore –

- The climatic conditions in this region are characterized by a tropical climate. During the winter season, there is a significant decrease in precipitation levels within Coimbatore as compared to the summer months. Köppen and Geiger classify this climate as Aw. The average annual temperature in Coimbatore is 25.4 °C | 77.8 °F. Approximately 952 mm | 37.5 inch of rainfall occurs on a yearly basis.
- The region of Coimbatore is characterized by a temperate climate, and the summer season presents some challenges in terms of precise categorization. The most favored period for a visit is during the months of October, November, December
- During January, the amount of precipitation is at its lowest, with only 13 mm | 0.5 inch recorded. The month of October experiences the highest amount of precipitation, with an average value of 181 mm | 7.1 inch.
- The month of maximum warmth in a year is April. The average temperature during this period reaches up to 28.9 °C | 84.1 °F, making it the hottest time of the year. The month of December is characterized by the lowest temperatures, which have an average reading of 23.2 °C | 73.7 °F.

https://en.climate-data.org/asia/india/tamil-nadu/coimbatore-2788/

Rainfall

TABLE 3.13: RAINFALL DATA

Actual Rainfall in mm					Normal Rainfall in mm
2017	2018	2019	2020	2021	
873.4	1302	1272.4	1585.3	2119.1	1213.2

Source: https://www.twadboard.tn.gov.in/content/coimbatore

TABLE 3.14: METEOROLOGICAL DATA RECORDED AT SITE

S.No	Parameters		Mar–2025	Apr–2025	May-2025
1	Temperature (^{0}C)	Max	29.07	28.67	28.35
		Min	24.79	25.62	23.91
		Avg.	26.93	27.14	26.13
2	Relative Humidity (%)	Avg.	60.02	68.91	76.38
3	Wind Speed (m/s)	Max	5.04	3.06	7.60
		Min	1.17	1.01	1.24
		Avg.	3.10	2.03	4.42
4	Cloud Cover (OKTAS)		0-8	0-8	0-8
5	Wind direction		E,ESE	WSW,W	WSW,W

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS

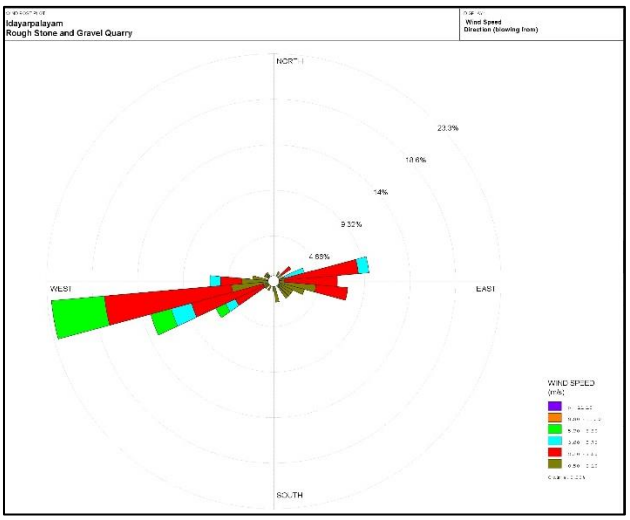
Correlation between Secondary and Primary Data

The meteorological data collected at the site is almost similar to that of secondary data collected from IMD Coimbatore_Agro. A comparison of site data generated during the three months with that of IMD, Coimbatore_Agro reveals the following:

- The average maximum and minimum temperatures of IMD, Coimbatore_Agro showed a higher in respect of on-site data i.e. in Idayarpalayam village.
- The relative humidity levels were lesser at site as compared to IMD, Coimbatore_Agro.
- The wind speed and direction at site shows similar trend that of IMD, Coimbatore_Agro.

Wind rose diagram of the study site is depicted in Figure. 3.14. Predominant downwind direction of the area during study season is East-North-East to West South West.

FIGURE 3.14: WINDROSE DIAGRAM



In the abstract of collected data wind rose were drawn on presented in figure No.3.14 during the monitoring period in the study area

1. Predominant winds were from ENE, E, SSE, WSW, W
2. Wind velocity readings were recorded between 1.01 to 7.60 m/s
3. Calm conditions prevail of about 0.00 % of the monitoring period
4. Temperature readings ranging from 23.91 to 29.07 °C
5. Relative humidity ranging from 76.38 to 68.91 %
6. The monitoring was carried out continuously for three months. (Mar-May 2025)

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
PM2.5	Gravimetric Method Beta attenuation Method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM10	Gravimetric Method Beta attenuation Method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO2	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NOx	IS-5182 Part II (Jacob & Hochheiser modifiedmethod)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology followed by GLOBAL LAB AND CONSULTANCY SERVICES & 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/m3)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	Nitrogen Dioxide (µg/m3)	Annual Avg. 24 hours	40.0 80.0	30.0 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 Mar - May 2025 The baseline data of ambient air has been generated for PM_{10}, $PM_{2.5}$, Sulphur Dioxide (SO_2) & Nitrogen Dioxide (NO_2) Monitoring has been carried out as per the CPCB, MoEF guidelines and notifications.

It was ensured that 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

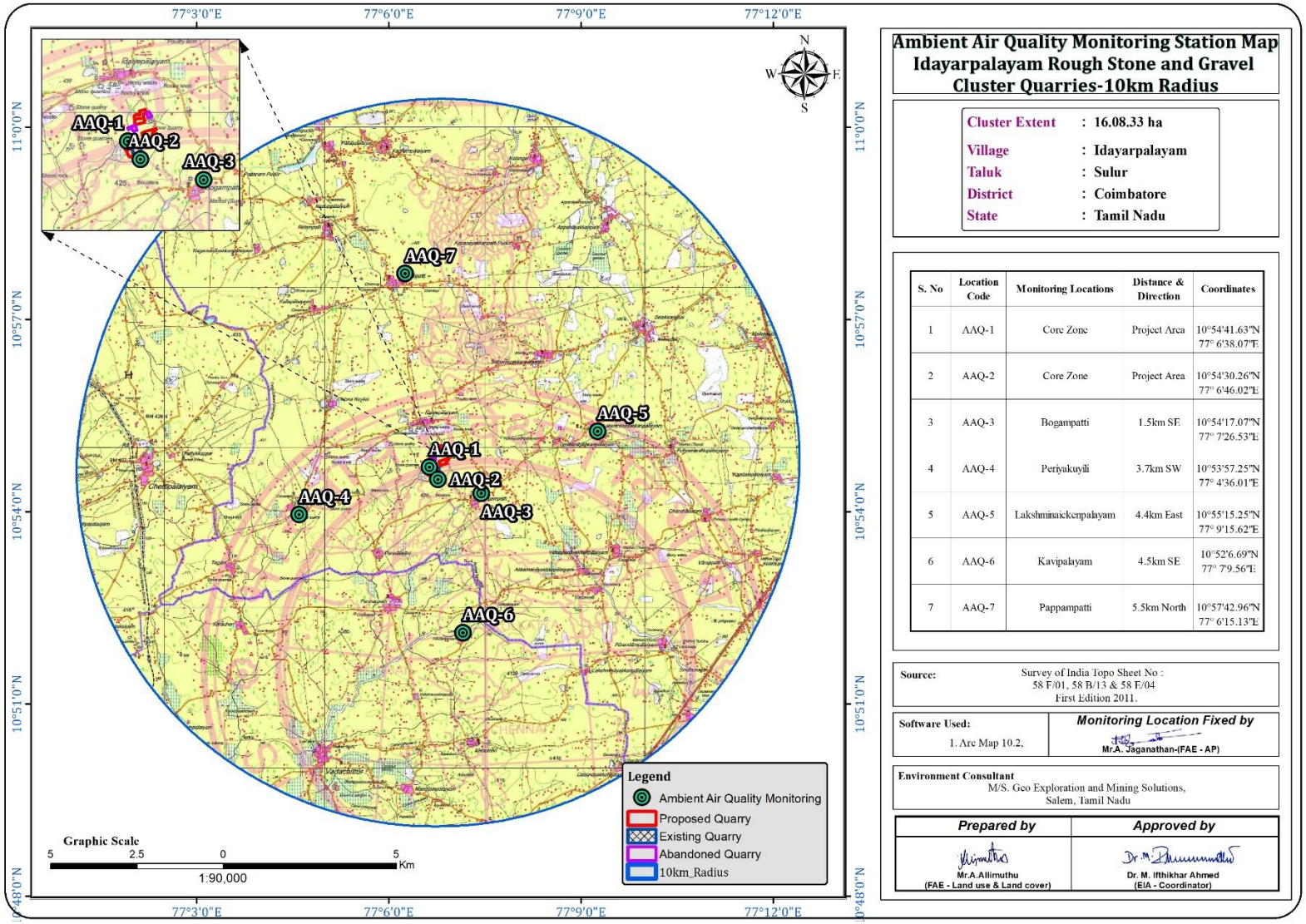
Seven (7) monitoring stations were set up in the study area as depicted in Figure 3.15 for assessment of the existing ambient air quality. Details of the sampling locations are as per given below.

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	10°54'41.63"N 77° 6'38.07"E
2	**AAQ-2**	Core Zone	Project Area	10°54'30.26"N 77° 6'46.02"E
3	**AAQ-3**	Bogampatti	1.5km SE	10°54'17.07"N 77° 7'26.53"E
4	**AAQ-4**	Periyakuyili	3.7km SW	10°53'57.25"N 77° 4'36.01"E
5	**AAQ-5**	Lakshminaickenpalayam	4.4km East	10°55'15.25"N 77° 9'15.62"E
6	**AAQ-6**	Kavipalayam	4.5km SE	10°52'6.69"N 77° 7'9.56"E
7	**AAQ-7**	Pappampatti	5.5km North	10°57'42.96"N 77° 6'15.13"E

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS.

FIGURE 3.15: AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS



S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ-1	Core Zone	Project Area	10°54'41.63"N 77° 6'38.07"E
2	AAQ-2	Core Zone	Project Area	10°54'30.26"N 77° 6'46.02"E
3	AAQ-3	Bogampatti	1.5km SE	10°54'17.07"N 77° 7'26.53"E
4	AAQ-4	Periyakuyili	3.7km SW	10°53'57.25"N 77° 4'36.01"E
5	AAQ-5	Lakshminaickenpalayam	4.4km East	10°55'15.25"N 77° 9'15.62"E
6	AAQ-6	Kavipalayam	4.5km SE	10°52'6.69"N 77° 7'9.56"E
7	AAQ-7	Pappampatti	5.5km North	10°57'42.96"N 77° 6'15.13"E

Source: Survey of India Topo Sheet No : 58 F/01, 58 B/13 & 58 F/04 First Edition 2011.

Software Used: 1. Arc Map 10.2,

Monitoring Location Fixed by
Mr.A. Jaganathan-(FAE - AP)

Environment Consultant
M/S. Geo Exploration and Mining Solutions, Salem, Tamil Nadu

Prepared by	*Approved by*
Mr.A.Allimuthu (FAE - Land use & Land cover)	Dr. M. Ifthikhar Ahmed (EIA - Coordinator)

TABLE 3.18: SUMMARY OF AAQ 1 to AAQ 7

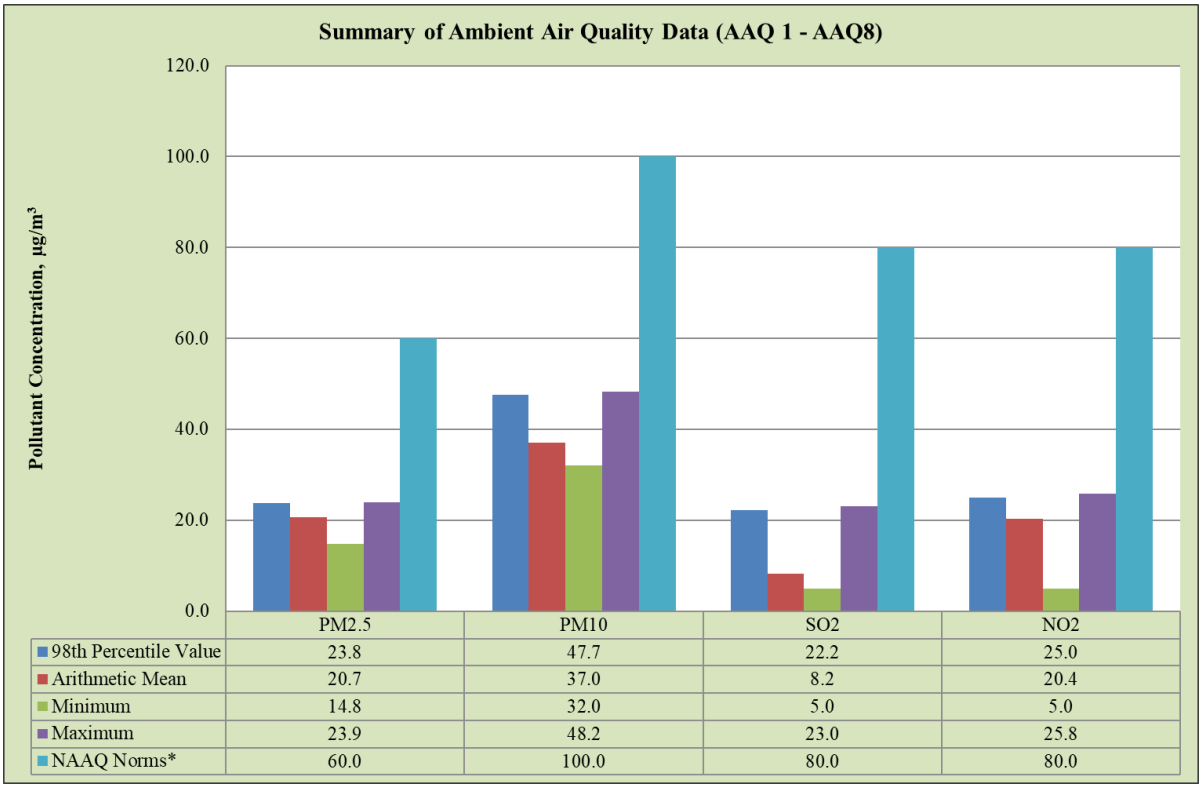
PM10	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**
Arithmetic Mean	35.3	35.8	35.4	35.5	35.7	36.2	35.6
Minimum	32.1	32.1	32.1	32.0	32.1	32.1	32.2
Maximum	39.5	40.0	39.4	40.0	40.0	40.0	39.9
NAAQ Norms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PM2.5	**AAQ1**	**AAQ2**	**AAQ3**	**AAQ4**	**AAQ5**	**AAQ6**	**AAQ7**
Arithmetic Mean	21.4	21.3	21.2	20.8	21.1	21.3	21.3
Minimum	19.0	19.5	19.2	19.0	19.5	19.0	19.1
Maximum	23.9	23.3	23.9	23.0	23.5	23.7	23.9
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	6.1	6.1	6.3	20.8	6.3	6.2	6.3
Minimum	5.1	5.1	5.2	19.0	5.2	5.3	5.0
Maximum	7.4	7.2	7.4	23.0	7.3	7.1	7.4
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	23.3	23.4	23.2	6.2	23.3	23.1	23.1
Minimum	21.2	21.1	21.1	5.0	21.2	21.0	20.2
Maximum	25.0	25.0	25.0	7.5	25.8	25.8	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 DATA

1	**Parameter**	**PM2.5**	**PM210**	**SO_2**	**NO_2**
2	No. of Observations	260	260	260	260
3	10^{th} Percentile Value	18.4	32.7	5.5	6.8
4	20^{th} Percentile Value	19.5	33.4	5.8	18.2
5	30^{th} Percentile Value	19.9	34.1	6.0	21.2
6	40^{th} Percentile Value	20.2	35.1	6.2	22.1
7	50^{th} Percentile Value	20.9	36.2	6.5	22.8
8	60^{th} Percentile Value	21.1	37.0	6.7	23.3
9	70^{th} Percentile Value	22.0	38.1	7.1	23.6
10	80^{th} Percentile Value	22.5	39.1	7.4	24.1
11	90^{th} Percentile Value	23.0	45.8	19.5	24.7
12	95^{th} Percentile Value	23.0	47.0	21.0	25.0
13	98^{th} Percentile Value	23.8	47.7	22.2	25.0

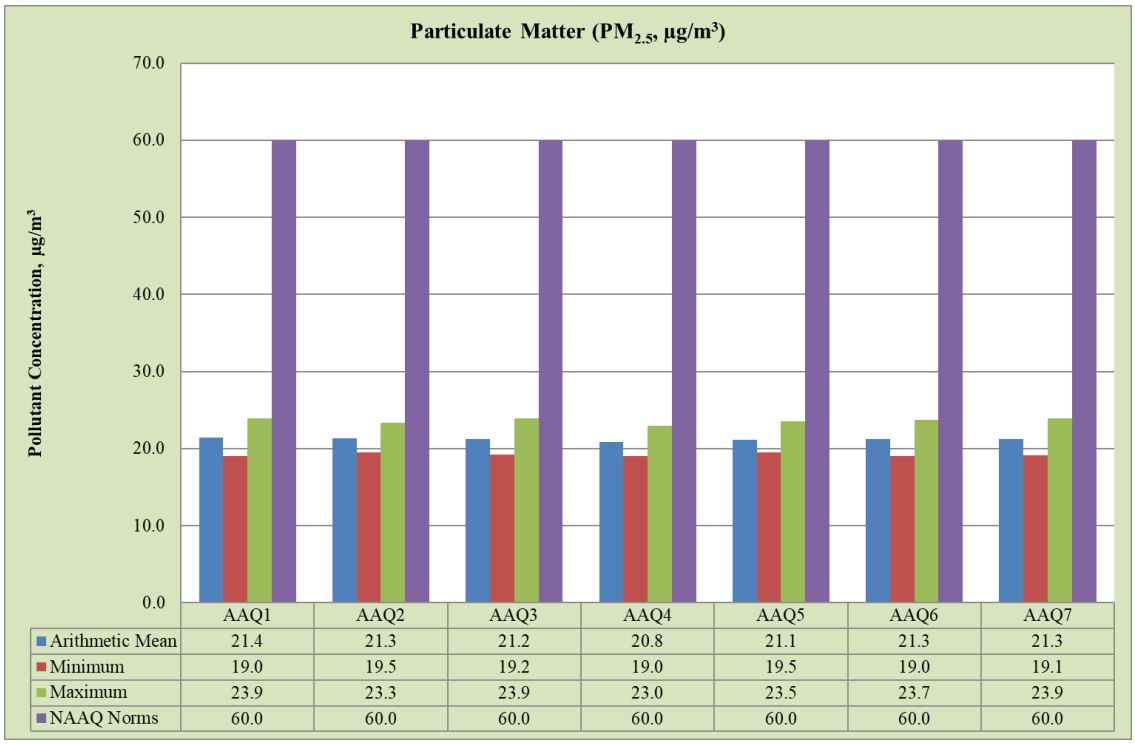
14	Arithmetic Mean	20.7	37.0	8.2	20.4
15	Geometric Mean	20.6	36.8	7.3	19.0
16	Standard Deviation	1.9	4.3	4.9	5.8
17	Minimum	14.8	32.0	5.0	14.8
18	Maximum	23.9	48.2	8.5	25.8
19	**NAAQ Norms***	**60.0**	**100.0**	**80.0**	**80.0**
	% Values exceeding Norms*	0.0	0.0	0.0	0.0

FIGURE 3.16: BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ7



Source: Table 3.17 to 3.27

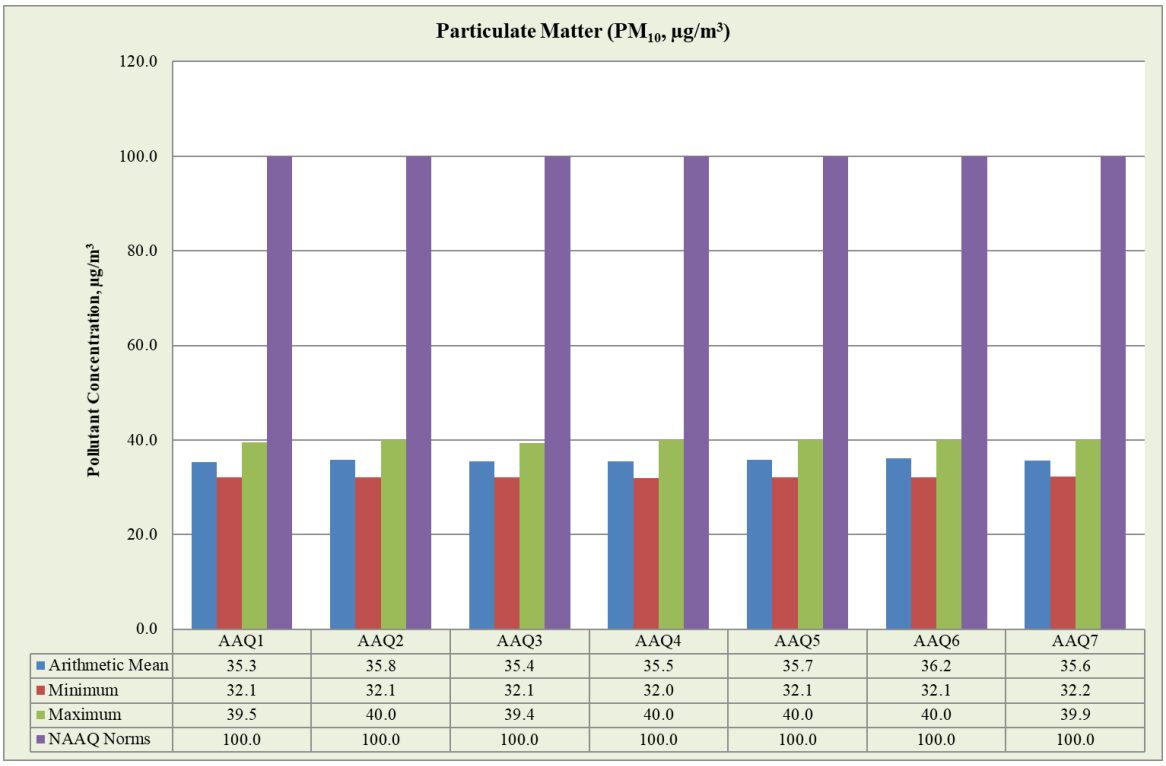
FIGURE 3.17: BAR DIAGRAM OF PARTICULATE MATTER $PM_{2.5}$



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	21.4	21.3	21.2	20.8	21.1	21.3	21.3
Minimum	19.0	19.5	19.2	19.0	19.5	19.0	19.1
Maximum	23.9	23.3	23.9	23.0	23.5	23.7	23.9
NAAQ Norms	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Source: Table 3.17 to 3.27

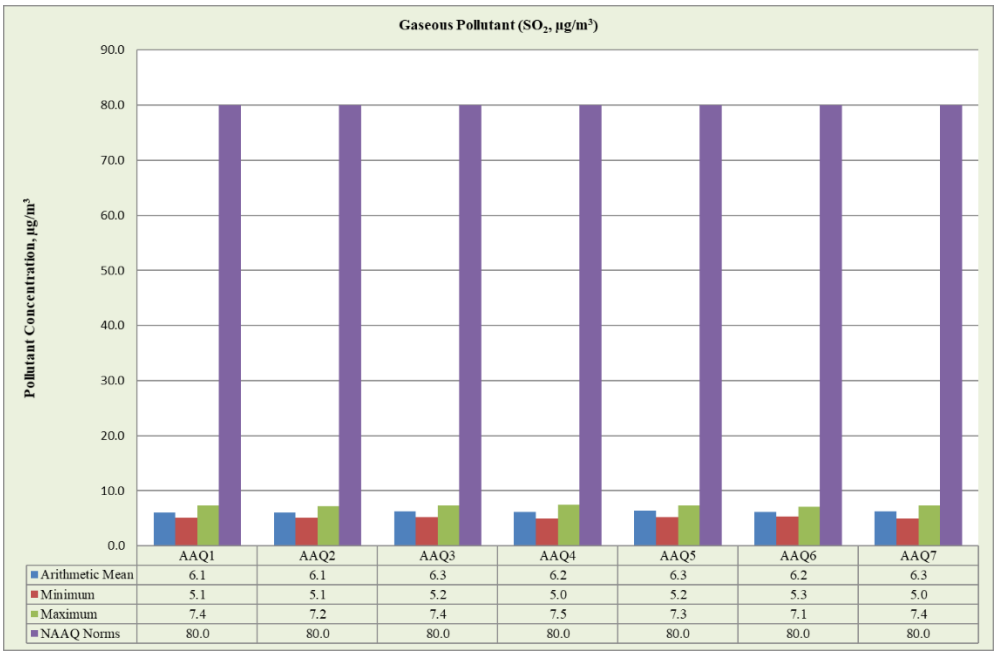
FIGURE 3.18: BAR DIAGRAM OF PARTICULATE MATTER PM_{10}



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	35.3	35.8	35.4	35.5	35.7	36.2	35.6
Minimum	32.1	32.1	32.1	32.0	32.1	32.1	32.2
Maximum	39.5	40.0	39.4	40.0	40.0	40.0	39.9
NAAQ Norms	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 3.17 to 3.27

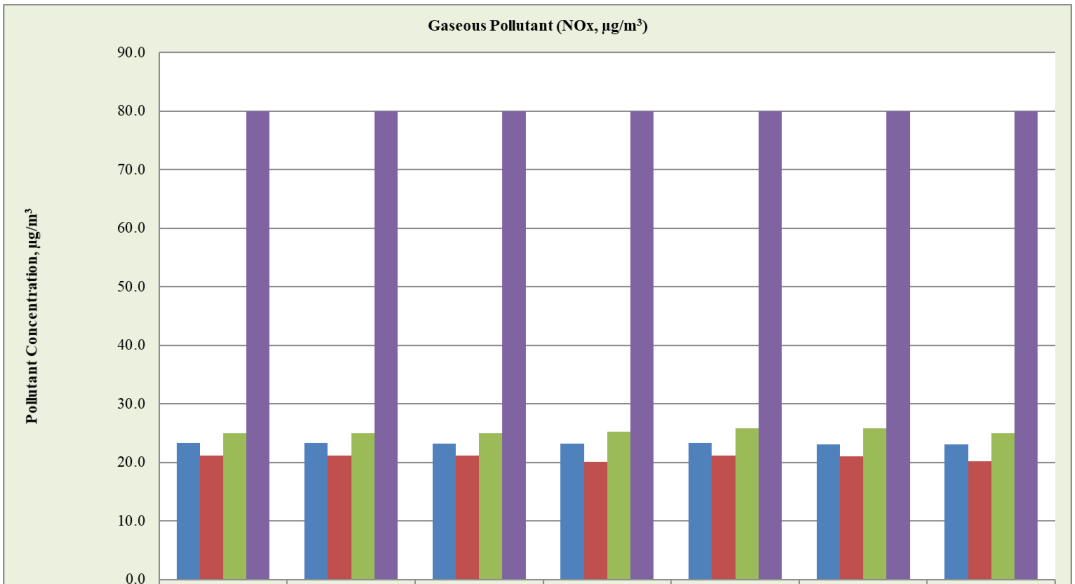
FIGURE 3.19: BAR DIAGRAM OF GASEOUS POLLUTANT SO_2



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	6.1	6.1	6.3	6.2	6.3	6.2	6.3
Minimum	5.1	5.1	5.2	5.0	5.2	5.3	5.0
Maximum	7.4	7.2	7.4	7.5	7.3	7.1	7.4
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

Source: Table 3.17 to 3.27

FIGURE 3.20: BAR DIAGRAM OF GASEOUS POLLUTANT NO_x



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	23.3	23.4	23.2	23.2	23.3	23.1	23.1
Minimum	21.2	21.1	21.1	20.1	21.2	21.0	20.2
Maximum	25.0	25.0	25.0	25.2	25.8	25.8	25.0
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

3.3.6 Interpretations & Conclusion

As per monitoring data, PM_{10} ranges from 32.0 µg/m^3 to 48.2 µg/m^3, $PM_{2.5}$ data ranges from 14.8 µg/m^3 to 23.9 µg/m^3, SO_2 ranges from 5.0 µg/m^3 to 8.5 µg/m^3 and NO_2 data ranges from 14.8µg/m^3 to 25.8 µg/m^3. 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 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 3.20: DETAILS OF SURFACE NOISE MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	N1	Core Zone	Project Area	10°54'37.55"N 77° 6'40.28"E
2	N2	Core Zone	Project Area	10°54'31.21"N 77° 6'45.93"E
3	N3	Bogampatti	1.5km SE	10°54'16.89"N 77° 7'26.00"E
4	N4	Periyakuyili	3.7km SW	10°53'54.90"N 77° 4'39.38"E
5	N5	Lakshminaickenpalayam	4.7km East	10°55'9.95"N 77° 9'17.07"E
6	N6	Kavipalayam	4.5km SE	10°52'5.78"N 77° 7'8.48"E
7	N7	Pappampatti	5.5km North	10°57'37.92"N 77° 6'15.18"E

Source: On-site monitoring/sampling by Global Lab and Consultancy Services 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 Leq, is used. Equivalent sound level, 'Leq', 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,

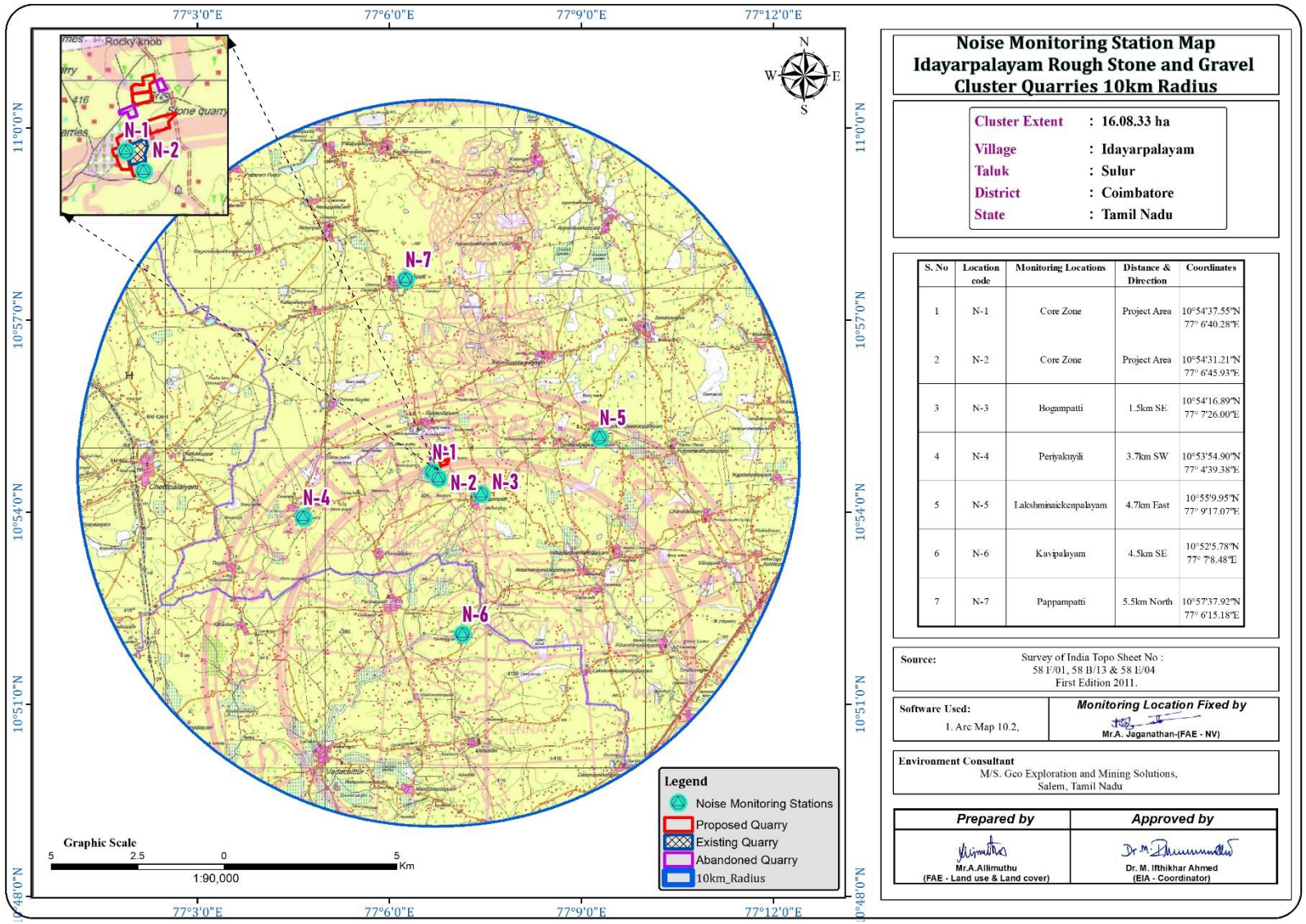
$Leq = 10 \text{ Log } L / T\sum (10Ln/10)$

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 3.23: NOISE MONITORING STATIONS AROUND 10 KM RADIUS



Noise Monitoring Station Map
Idayarpalayam Rough Stone and Gravel Cluster Quarries 10km Radius

Cluster Extent	: 16.08.33 ha
Village	: Idayarpalayam
Taluk	: Sulur
District	: Coimbatore
State	: Tamil Nadu

S. No	Location code	Monitoring Locations	Distance & Direction	Coordinates
1	N-1	Core Zone	Project Area	10°54'37.55"N 77° 6'40.28"E
2	N-2	Core Zone	Project Area	10°54'31.21"N 77° 6'45.93"E
3	N-3	Bogampatti	1.5km SE	10°54'16.89"N 77° 7'26.00"E
4	N-4	Periyakuyili	3.7km SW	10°53'54.90"N 77° 4'39.38"E
5	N-5	Lakshminaickenpalayam	4.7km East	10°55'9.95"N 77° 9'17.07"E
6	N-6	Kavipalayam	4.5km SE	10°52'5.78"N 77° 7'8.48"E
7	N-7	Pappampatti	5.5km North	10°57'37.92"N 77° 6'15.18"E

Source: Survey of India Topo Sheet No : 58 I/01, 58 B/13 & 58 I/04 First Edition 2011.

Software Used: 1. Arc Map 10.2,

Monitoring Location Fixed by
Mr.A. Jaganathan-(FAE - NV)

Environment Consultant
M/S. Geo Exploration and Mining Solutions, Salem, Tamil Nadu

Prepared by	*Approved by*
Mr.A.Allimuthu (FAE - Land use & Land cover)	Dr. M. Ifthikhar Ahmed (EIA - Coordinator)

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 3.32.

Day time: 6:00 hours to 22.00 hours.

Night time: 22:00 hours to 6.00 hours.

TABLE 3.21: AMBIENT NOISE QUALITY RESULT

S. No	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
1	Core Zone	49.0	42.5	**Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)**
2	Core Zone	49.2	42.7	
3	Bogampatti	51.5	43.9	**Residential Day Time– 55 dB (A) Night Time- 45 dB (A)**
4	Periyakuyili	50.3	40.3	
5	Lakshminaickenpalayam	50.0	45.4	
6	Kavipalayam	51.9	43.6	
7	Pappampatti	50.2	40.6	

Source: On-site monitoring/sampling by Global Lab and Consultancy Services in association with GEMS

FIGURE 3.24: DAY TIME NOISE LEVELS IN CORE AND BUFFER ZONE

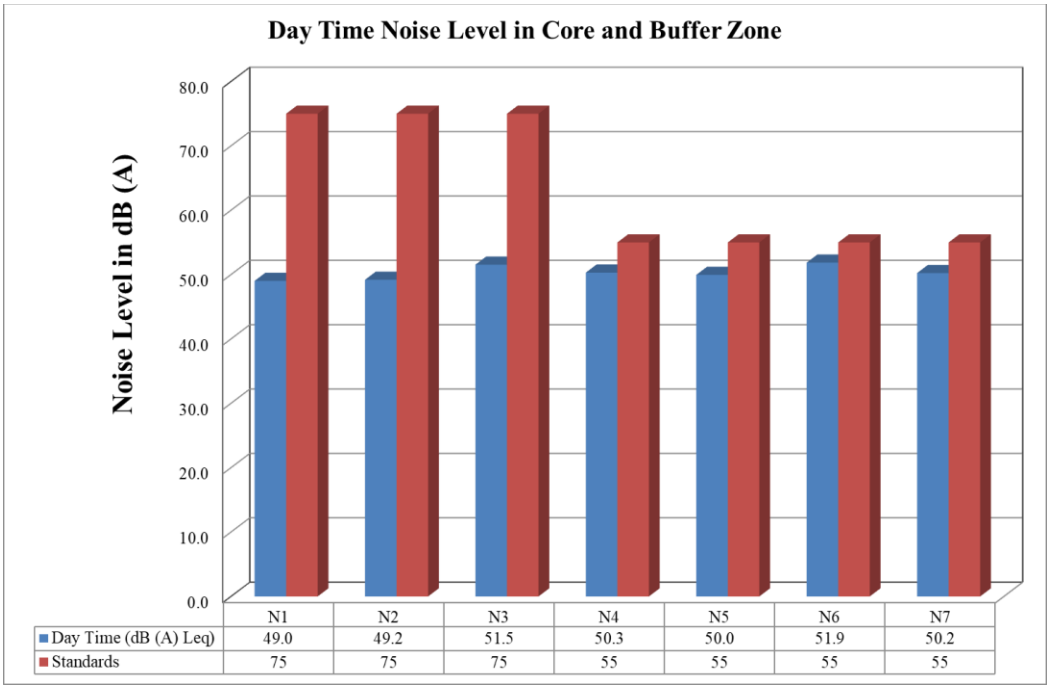
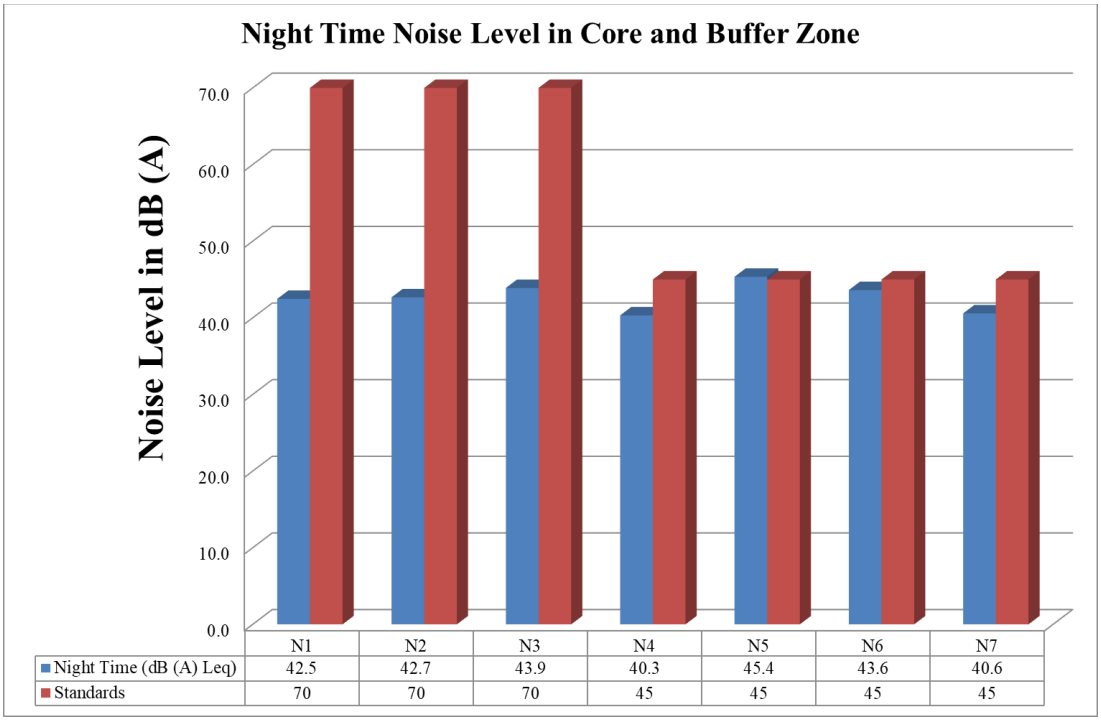


FIGURE 3.25: NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE



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 49.0-49.2 dB (A) Leq and during night time were from 42.5-42.7 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 50.0 to 51.9 dB (A) Leq and during night time were from 40.3 to 45.4 dB (A) Leq.

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

3.5 ECOLOGICAL ENVIRONMENT

3.5.1.Study area Ecology

The core area extent of 3.75.83Ha of Rough stone and Gravel 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 and Gravel quarry on the ecology and biodiversity of the core lease area with the proper mitigation and sustainable management plan. The proposed area applied area exhibits undulated topography. The following methods were applied during the baseline study of flora, fauna, and diversity assessment.

3.5.2. 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 & Schedule Category is listed as per the Wildlife (Protection) Amendment Act 2022.
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.

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.

3.5.3. Methodology of Sampling

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. 07:00 to 11:00 Hrs and 14:30 to 17:30 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 ordinates. 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).

3.5.3.1. 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.

3.5.3.2 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.

3.5.3.3. 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.

3.5.3.4. Observations from Sampling

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

3.5.3.5. 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.

3.5.4. Part I Field Sampling Techniques

3.5.4.1. 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 07:00 to 11:00Hrs and 14:30 to 17:30Hrs (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.

3.5.4.2. Modified Pollard Walk – for Butterflies

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

3.5.4.3. 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 the search. VES technique is one of the simplest methods and an appropriate technique for both inventory and monitoring Herpetofauna (Heyer et al. 1994).

3.5.4.4. 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.

3.5.4.5. 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 coloured 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).

3.5.5. 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 3.22: FLORA IN THE CORE ZONE – CLUSTER AREA

SI.No	English Name	Vernacular Name	Scientific Name	Family Name
Trees				
1.	Indian mulberry	Nuna maram	*Morinda tinctoria*	Rubiaceae
2.	Velvet mesquite	Mullu maram	*Prosopis juliflora*	Fabaceae
3.	Neem or Indian lilac	Vembu maram	*Azadirachta indica*	Meliaceae
4.	Horsetail She-oak	Savukku maram	*Casuarina equisetifolia*	Casuarinaceae
Shrubs				
1.	Avaram	Avarai	*Senna auriculata*	Fabaceae

2.	Indian mallow	Thuthi	*Abutilon indicum*	Meliaceae
3.	Milk Weed	Erukku	*Calotropis gigantea*	Apocynaceae
Herbs				
1.	Carrot grass	Parttiniyam	Parthenium hysterophorus	Asteraceae
2.	Fish poison	Kolinchi	*Tephrosia purpurea*	Fabaceae
3.	Coat buttons	Thatha poo	*Tridax procumbens*	Asteraceae
4.	Devil‘s thorn	Nerunji	*Tribulus terrestris*	Zygophyllales
5.	Asthma-plant	Amman pacharisi	*Euphorbia hirta*	Euphorbiaceae
6.	Desert cotton	Peru pollai	*Aerva javanica*	Amaranthaceae
7.	Indian Copperleaf	Kuppaimeni	*Acalypha indica*	Euphorbiaceae
8.	Holy basil	Thulasi	*Ocimum tenuiflorum*	Lamiaceae
Grasses				
1.	Eragrostis	Pullu	*Eragrostis ferruginea*	Poaceae
2.	Great brome	Thodappam	*Bromus diandrus*	Poaceae
3.	Indian doab	Arugampul	*Cynodon dactylon*	Poaceae
4.	Windmill grass	Chevvarakupul	*Chloris barbata*	Amaranthaceae
Climber/ Creeper				
1.	Wild water lemon	Sirupoonaikaali	*Passiflora foetida*	Passifloraceae

Sources: Species observation in the field study

TABLE 3.23: FLORA IN BUFFER ZONE

SI.No	English Name	Vernacular Name	Scientific Name	Family Name
Trees				
1.	Velvet mesquite	Mullu maram	*Prosopis juliflora*	Fabaceae
2.	Neem or Indian lilac	Vembu	*Azadirachta indica*	Meliaceae
3.	Mango	Manga	*Mangifera indica*	Anacardiaceous
4.	Wild Tamarind	Savundal	*Leucaena latisiliqua*	Mimosaceae
5.	Tree of heaven	Perumaram	*Ailanthus excelsa*	Simaroubaceae
6.	Coconut	Thennai maram	*Cocos nucifera*	Arecaceae
7.	Madras thorn	Kudukapuli	*Pithecellobium dulce*	Fabaceae
8.	River tamarind	Soundal maram	*Leucaena leucocephala*	Fabaceae
9.	Indian siris	Eayal vaagai	*Albizia lebbeck*	Mimosaceae
10.	Monkey pod tree	Thungumoonchi	*Samanea saman*	Fabaceae
11.	Cutch tree	Karangali	*Acacia chundra*	Mimosaceae
12.	Portia tree	Poovarasan	*Thespesia Populnea*	Malvaceae
13.	Sage-leaved alangium	Alangi	*Alangium salviifolium*	Alangiaceae
14.	Jack fruit	Bala maram	*Artocarpusintegrifolia*	Moraceae
15.	Indian siris	Vagai	*Albizia lebbeck*	Mimosaceae
16.	Bitter Albizia	Unja, Usilai	*Albizia amara*	Mimosaceae
17.	Tree of heaven	Perumaram	*Ailanthus excelsa*	Simaroubaceae
18.	Velvet mesquite	Mullu maram	*Prosopis juliflora*	Fabaceae
19.	Yellow Flame	Vagai	*Peltophorum pterocarpum*	Caesalpiniaceae
20.	Lemon	Ezhumuchaipalam	*Citrus lemon*	Rutaceae
21.	Jamun Fruit Plant	Naval maram	*Syzygium cumini*	Myrtaceae
22.	Gum arabic tree	Karuvelam	*Vachellia nilotica*	Fabaceae
23.	Yellow oleander	Ponarali	*Cascabela thevetia*	Apocynaceae
24.	Rain Tree	Mazlhimaram	*Samanaea saman*	Mimosaceae

25.	Chinese chaste tree	Nochi	*Vitex negundo*	Verbenaceae
26.	Umbrella thorn	Umbrella thorn	*Acacia planifrons*	Mimosaceae
27.	Golden shower tree	Sarakonnai	*Cassia fistula*	Caesalpiniaceae
28.	Asian Palmyra palm	Panai maram	*Borassus flabellifer*	Arecaceae
29.	Curry tree Plant	Karuveppilai	*Murraya koenigii*	Rutaceae
30.	Teak	Thekku	*Tectona grandis*	Verbenaceae
31.	Indian mulberry	Nuna maram	*Morinda tinctoria*	Rubiaceae
32.	Drumstick tree	Murunga maram	*Moringa oleifera*	Moringaceae
33.	Guava	Koyya	*Psidium guajava*	Myrtaceae
34.	Indian-almond	Inguti	*Terminalia catappa*	Combretaceae
35.	Cat Spider Flower	Cleome	*Cleome felina*	Capparaceae
36.	Eucalyptus	Thailam maram	*Eucalyptus tereticornis*	Myrtaceae
37.	Pongamia pinnata	Pongam	*Millettia pinnata*	Fabaceae
38.	Horsetail She-oak	Savukku maram	*Casuarina equisetifolia*	Casuarinaceae
39.	Henna	Marudaani	*Lawsonia inermis*	Lythraceae
40.	Indian gooseberry	Nelli	*Phyllanthus emblica*	Phyllanthaceae
41.	Peepal	Asoka maram	*Ficus religiosa*	legume
42.	Tamarind	Puliyamaram	*Tamarindus indica*	Legumes
43.	Rosewood	Eeti, Thodagathi, Tawadi	*Dalbergia latifolia*	Fabaceae
44.	Butter Tree	Kattu illupai	*Madhuca indica*	Sapotaceae
45.	Conkerberry	Sirukilaa	*Carissa spinarum*	Apocynaceae
46.	Malayan Cherry	Ten Pazham	*Muntingia calabura*	Muntingiaceae
47.	Sacred fig	Arasa maram	*Ficus religiosa*	Moraceae
48.	Jujube Trees	Elantha Pazham	*Ziziphus Mauritiana*	Rhamnaceae
49.	Papaya	Pappali maram	*Carica papaya L*	Caricaceae
50.	Mountain date	Malai eecham,	*Phoenix loureirii*	Arecaceae
51.	Java olive tree	Kutiraippitukku	*Sterculia foetida*	Malvaceae
52.	Ceylon satinwood	Purush, Porasu	*Chloroxylon swietenia*	Rutaceae
53.	Banana tree	Vazhaimaram	*Musa acuminata*	Musaceae
54.	Amati	Agathi keerai	*Sesbania grandiflora*	Fabaceae
55.	Custard apple	Seethapazham	*Annona reticulata*	Annonaceae
56.	Manilkara zapota	Sapota	*Manilkara zapota*	Sapotaceae
57.	Indian-almond	Badam	*Terminalia catappa*	Combretaceae
58.	Banyan tree	Alamaram	*Ficus benghalensis*	Moraceae
59.	Jack fruit	Palamaram	*Artocarpus heterophyllus*	Moraceae
Shrubs				
1.	Giant reed	Mudaampul	*Arundo donax*	Poaceae
2.	Devil's trumpet	Umathai	*Datura metel*	Solanaceae
3.	Senna Coffee	Payaveri	*Cassia occidentalis*	Caesalpiniaceae
4.	Avaram	Avarai	*Senna auriculata*	Fabaceae
5.	Water-hyacinth	Agayathamarai	*Eichhornia crassipes*	Pontederiaceae
6.	Kangkong	Sarkaraivalli	*Ipomeae aquatica*	Convolvulaceae
7.	Castor bean	Amanakku	*Ricinus communis*	Euphorbiaceae
8.	-	Vellai indu	*Acacia pennata*	Mimosaceae
9.	Green amaranth	Kuppaikeerai	*Amaranthus vividis*	Amaranthaceae
10.	Jungle geranium	Idly Poo	*Ixora coccinea*	Rubiaceae
11.	Birch-Leaved Cat Tail	Aathaathazhai	*Acalypha fruticosa*	Euphorbiaceae
12.	Horn of Plenty	Karu Umathai	*Datura metel*	Solanaceae

13.	Devil's claw	Thael kodukkukai	*Martynia annua*	Pedaliaceae
14.	Shoe flower	Chemparuthi	*Hibiscu rosa-sinensis*	Malvaceae
15.	Asian Bushbeech	Sirukumalaan	*Gmelina asiatica*	Verbenaceae
16.	Wild jasmine	Kattumalli	*Jasminum trichotomum*	Oleaceae
17.	Milk Weed	Erukku	*Calotropis gigantea*	Apocynaceae
18.	Rough cocklebur	Marlumuttu	*Xanthium indicum*	Asteraceae
19.	Mexican prickly poppy	Bramathndu	*Argemone mexicana*	Papaveraceae
20.	Orange Jasmine	Mock Orange	*Murraya paniculata*	Rutaceae
21.	Puriging nut	Kattamanakku	*Jatropha curcas*	Euphorbiaceae
22.	Cypress vine	Mayil maanikam	*Ipomoea quamoclit*	Convolvulaceae
23.	Indian Balm of Gilead	Mulkilluvai	*Commiphora berryi*	Burseraceae
24.	Malabar catmint	Pei veratti	*Anisomeles malabarica*	Lamiaceae
25.	Dwarf Heliotrope	Theelkoduku	*Heliotropium supinum*	Boraginaceae
26.	Clustered Morning Glory	Onan kodi	*Ipomoea staphylina*	Convolvulaceae
27.	Touch-me-not	Thottalchinungi	*Mimosa pudica*	Mimosaceae
28.	Indian mallow	Thuthi	*Abutilon indicum*	Meliaceae
29.	Night shade plan	Sundaika	*Solanum torvum*	Solanaceae
30.	Rosary pea	Kundumani	*Abrus precatorius*	Fabaceae
31.	Indian Oleander	Arali	*Nerium indicum*	Apocynaceae
32.	West Indian Lantana	Unni chedi	*Lantana camara*	Verbenaceae
33.	Rough cocklebur	Marlumutt	*Xanthium indicum*	Asteraceae
Herbs				
1.	Carrot grass	Parttiniyam	*Parthenium hysterophorus*	Asteraceae
2.	Sessile Joyweed	Ponnankanni	*Alternanthera sessilis*	Amaranthaceae
3.	Billygoat weed	Pumpillu	*Ageratum conyzoides*	Asteraceae
4.	Aloe barbadensis	Katrazhai	*Aloe vera*	Asphodelaceae
5.	Madagascar Periwinkle	Nithyakalyani	*Catharanthus roseus*	Apocynaceae
6.	Indian Mercury	Kuppamani	*Acalypha indica*	Euphorbiaceae
7.	Indian nettle	Nayuruvi	*Achyranthes aspera*	Amaranthaceae
8.	Chloris barbata	Kodai pul	*Chloris barbata*	Poaceae
9.	Spreading hogweed	Mookkaratti	*Boerhavia diffusa*	Nyctaginaceae
10.	Bui	Ciru-pulai	*Aervalanata*	Amaranthaceae
11.	Indian doab	Arugampul	*Cynodon dactylon*	Poaceae
12.	Spiny amaranth	Mullu keerai	*Amaranthus spinosus*	Amaranthaceae
13.	Prickly chaff flower	Uthrani	*Achyranthes aspera*	Amaranthaceae
14.	Malabar spinach	Pasalaikeerai, Paasaangalli	*Basella alba*	Basellaceae
15.	Tropical milkweed	Blood Flower	*Asclepias curassavica*	Asclepiadaceae
16.	Mexican prickly poppy	Mullu umathai	*Argemone mexicana*	Papaveraceae
17.	Dwarf morning-glory	Vishnu kiranthi	*Evolvulus alsinoides*	Convolvulaceae
18.	Datura metel	Oomathai	*Datura metel*	Solanaceae
19.	Carry me seed	Kizhar nelli	*Phyllanthus amarus*	Phyllanthaceae
20.	Malabar catmint	Peymarutti	*Anisomeles malabarica*	Lamiaceae
21.	Black-jack	Mukkuthi Asteraceae	*Bidens pilosa*	Aizoaceae

22.	Yellow elder	Manjarali	*Tecoma stans*	Apocynaceae
23.	Green amaranth	Kuppai keerai	*Amaranthus viridis*	Amaranthaceae
24.	Obscure Morning Glory	Siruthaali	*Ipomoea obscura*	Convolvulaceae
25.	Cleome viscosa	Nai kadugu	*Celome viscosa*	Capparidaceae
26.	Common leucas	Thumbai	*Leucas aspera*	Lamiaceae
27.	Waterhyssop	Nilappachai	*Bacopa monnieri*	Scrophulariaceae
28.	Century plant	Agave	*Agave america*	Agavaceae
29.	Sand Herbage	Manal keerai	*Gisekia pharnaceoides*	
30.	Fish poison	Kollukaivelai	*Tephrosia purpureae*	Papilionaceae
31.	Elephant Climber	Vettai chedi, Kanvali poo	*Argyreia cuneata*	Convolvulaceae
32.	Asthma-plant	Amman pacharisi	*Euphorbia hirta*	Euphorbiaceae
33.	Porcupine flower	Shemmuli	*Barleria prionitis*	Acanthaceae
34.	Holy basil	Thulasi	*Ocimum tenuiflorum*	Lamiaceae
35.	Peanut	Kadalai	*Arachis hypogaea*	Fabaceae
36.	Red Hogweed	Mukurattai	*Boerhavia diffusa*	Nyctaginaceae
37.	Tridax daisy	Thatha poo	*Tridax procumbens*	Asteraceae
38.	Gale of the wind	Keelaneeli	*Phyllanthus niruri*	Phyllanthaceae
39.	Eggplant	Kathirikai	*Solanum melongena*	Solanaceae
40.	European black nightshade	Manathakkali	*Solanumnigrum*	Solanaceae
Climber/ Creeper				
1.	Ivy gourd	Kovai	*Coccinia grandis*	Cucurbitaceae
2.	Cucumis maderaspatanus	Musumusukkai	*Mukia maderaspatana*	Cucurbitaceae
3.	Indian atalantia	Kattu naarangam,	*Atalantia monophylla*	Rutaceae
4.	Butterfly pea	Sangu poo	*Clitoria ternatea*	Fabaceae
5.	Wild water lemon	Sirupoonaikaali	*Passiflora foetida*	Passifloraceae
6.	Stemmed vine	Perandai	*Cissus quadrangularis*	Vitaceae
7.	Bottle Guard	Sorakkai	*Lagenaria siceraria*	Cucurbitaceae
8.	Rosary Pea	Gundumani	*Abrus precatorius*	Fabaceae
9.	Shatavari	Thaneervittaan	*Asparagus racemosus*	Liliaceae
10.	Pointed gourd	Kovakkai	*Trichosanthes dioica*	Cucurbitaceae
11.	Wild bitter	Pavarkai	*Momordica charantia*	Cucurbitaceae
Grass				
1.	Eragrostis	Pullu	*Eragrostis ferruginea*	Poaceae
2.	Giant reed	Elephant grass	*Arundo donax*	Poaceae
3.	Windmill grass	Chevvarakupul	*Chloris barbata*	Amaranthaceae
4.	Nut grass	Korai	*Cyperus rotandus*	Poaceae
5.	Great brome	Thodappam	*Bromus diandrus*	Poaceae
Cactus				
1.	Prickly pear	Nagathali	*Opuntia dillenii*	Cactaceae
2.	Triangular spruge	Chaturakalli	*Euphorbia antiquorum*	Euphorbiaceae

*E- Economical, M- Medicinal, EM- Both Economical and Medicinal, NE- Not evaluated

AQUATIC VEGETATION

The field survey for assessing the aquatic vegetation was also undertaken during the study period. The list of aquatic plants observed in the study area is given in Table 3.24.

TABLE 3.24: AQUATIC VEGETATION

Sl.No	Scientific name	Common Name	Tamil Name	IUCN List
1	*Eichornia crassipe*	Water hyacinth	Agayatamarai	NA
2	*Aponogetonnatans*	Floating laceplant	Kottikizhnagu	NA
3	*Nymphaea nouchali*	Blue waterlily	Nellambal	LC

*LC- Least Concern, NA-Not yet assessed

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. There are no rare, endangered, threatened (RET) and endemic species present in core area.

FAUNA METHODOLOGY

The study of fauna takes substantial amount of time to understand the specific faunal characteristics of the area. The assessment of fauna has been done on the bases of primary data collected from the lease sites. The presence was also confirmed from the local inhabitants depending on the animal sightings and the frequency of their visits in the project area. In addition, officials, local peoples were another source of information for studying the fauna of the area. Field activities are physical/active search, covering rocks, burrows, hollow inspection and location of nesting sites and habitat assessment etc. Taxonomical identification was done by the field guide book and wildlife ENVIS data base (wiienvis.nic.in/Database/Schedule Species Database) and Zoological Survey of India (ZSI).

Survey and Monitoring of Mammals

Intensive survey has been done by line transect methods (Walking and in vehicle) for all major habitats for surveying of mammals by direct and indirect evidence. Indirect methods such as faecal matter (i.e., scat) and pug mark by establishing 10 × 100-m linear transects depending on the habitat (i.e., existing wildlife game routes/forest trails used).

Direct observation technique has been used for surveying large and medium sized mammals. But this technique is perfectly suitable for surveying of diurnal mammals; however, good photographs were also taken for species identification.

Survey and Monitoring of Birds

Birds are sampled by using point count methods, and opportunistic bird sightings. By this bird vocal sounds and photographs, the species were identified in consultation with village local people.

Point count: in this method, the observer will stand in a randomly chosen point and birds seen or heard in 50m radius are recorded for 5-min. this observation is repeated in another point at least 30m from the first point. We have enumerated 20 point – counts in each quartile, which constitute a total of 80 points-count (20 x 4) within 10 km radius area.

Opportunistic bird sightings: while traveling in study area, many bird species will be detected in survey time. Such species are recoded by their appearance or by their call.

Survey and Monitoring of reptiles

Several survey techniques such as standard walk transect visual encounter survey methods were used to sampling reptiles in each and every habitat of the study area. While doing this survey, photographs were taken for

identification of species. Species identification was done by using standard field guides in consultation with village people expert.

The butterfly was enumerated by 2 linear transects of 10 × 100 m were laid within each quartile at minimum interval of 1 km. Further, amphibians and fishes documented in existing literature and secondary information in consultation with local people and wildlife experts.

FAUNA IN 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 6, Reptiles 2, Mammals 2, and Avian 8. The core site has avifauna species like crow, Black drongo, Koel, etc. None of these species are threatened or endemic in the study area and surroundings. There is no Schedule I species and 8 species are under Schedule II species remaining species not listed according to the Indian Wildlife Protection Amendment Act 2022. There are no critically endangered, endangered, vulnerable, and endemic species were observed.

TABLE 3.25: FAUNA IN CORE ZONE

SI. No	Common Name	Scientific Name	Schedule list WLPC, Amendment Act, 2022
Insects/Butterflies			
1.	Common Tiger	*Danaus genutia*	---
2.	Danaid Eggfly	*Hypolimnas misippus*	Schedule II
3.	Grasshopper	*Hieroglyphus sp*	----
4.	Dragonfly	*Ceratogomphus pictus*	---
5.	Common Crow	*Euploea core*	---
6.	Ant	*Camponotus Vicinus*	---
Reptiles			
1.	Oriental garden lizard	*Calotes versicolor*	---
2.	Indian forest skink	*Sphenomorphus indicus*	---
Mammals			
1.	Indian palm squirrel	*Funambulus palmarum*	---
2.	Indian Field Mouse	*Mus booduga*	---
Aves			
1.	Rose-ringed parkeet	*Psittacula krameri*	Schedule II
2.	Common myna	*Acridotheres tristis*	Schedule II
3.	Yellow-billed Babbler	*Argya affinis*	Schedule II
4.	Indian robin	*Copsychus fulicatus*	Schedule II
5.	Green Bee Eater	*Merops orientalis*	Schedule II
6.	Asian Koel	*Eudynamys scolopaceus*	Schedule II
7.	Black drongo	*Dicrurus macrocercus*	Schedule II
8.	House crow	*Corvus splendens*	---

***NE- Not evaluated; LC- Least Concern, NT –Near Threatened, T-Threatened**

FAUNA IN 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 is 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 drangos, Crows, Rose-ringed Parakeet etc.

Taxonomically a total of 78 species recorded were from the buffer zone area. Based on habitat classification the majority of species were Insects 5, followed by birds 32, Reptiles 6, Mammals 8, Amphibians 4, and Butterflies 23. There are 34 Schedule II species, according to the Indian Wildlife Protection Amendment Act 2022. A total of 32 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 3.26. List of Fauna & Their Conservation Status, Mammals: (*directly sighted animals & Secondary data)

SI. No	Common Name	Scientific Name	Schedule list The Wildlife (Protection) Amendment Act, 2022
1.	Brown rat	*Rattus norwegicus*	---
2.	Indian palm squirrel	*Funambulus palmarum*	---
3.	Indian hare	*Lepus nigricollis*	Schedule II
4.	Indian Field Mouse	*Mus booduga*	---
5.	Dog	*Canis lupus familiaris*	---
6.	Cat	*Felis catus*	---
7.	Cow	*Bos taurus*	---
8.	Goat	*Capra hircus*	---

Table 3.27. Listed birds (Primary & Secondary data)

SI. No	Common Name	Scientific Name	Schedule list The Wildlife (Protection) Amendment Act, 2022
1.	Rose-ringed Parakeet	*Psittacula krameria*	Schedule II
2.	Common myna	*Acridotheres tristis*	Schedule II
3.	Tawny pipit	*Anthus campestris*	Schedule II
4.	Cattle egret	*Bubulcus ibis*	Schedule II
5.	Indian roller	*Coracias benghalensis*	Schedule II
6.	Black-crowned night heron	*Nicticorax nicticorax*	Schedule II
7.	Greater Coucal	*Centropus sinensis*	Schedule II
8.	Purple sunbird	*Cinnyris asiaticus*	Schedule II
9.	Yellow browed Bulbul	*Acritillas indica*	Schedule II
10.	Black-rumped Flameback	*Dinopium benghalense*	Schedule II
11.	Tree Pipit	*Anthus trivialis*	Schedule II
12.	Yellow wagtail	*Motacilla flava*	Schedule II
13.	Spotted owlet	*Athene brama*	Schedule II
14.	House Sparrow	*Passer domesticus*	Schedule II
15.	Common HawkCuckoo	*Hieroccycx varius*	Schedule II
16.	Brown Shrike	*Lanius cristatus*	Schedule II
17.	Spotted dove	*Streptopelia chinensis*	Schedule II
18.	Square tailed Black Bulbul	*Hypsipetes ganeesa*	Schedule II
19.	Asian koel	*Eudynamys scolopacea*	Schedule II

20.	Common kingfisher	*Alcedo atthis*	Schedule II
21.	White-thoratd kingfisher	*Halcyon smyrnensis*	Schedule II
22.	Ashy Drongo	*Dicrurus leucophaeus*	Schedule II
23.	Blue-rock pigeon	*Colomba livia*	---
24.	House crow	*Corvus splendens*	---
25.	Large-billed Crow	*Corvus macrorhynchos*	Schedule II
26.	Black Drongo	*Dicrurus macrocercus*	Schedule II
27.	Ashy Prinia	*Prinia socialis*	Schedule II
28.	Red-vented Bulbul	*Pycnonotus cafer*	Schedule II
29.	Yellow-billed Babbler	*Argya affinis*	Schedule II
30.	Pale-billed Flowerpecker	*Dicaeum erythrorhynchos*	Schedule II
31.	Purple-rumped Sunbird	*Leptocoma zeylonica*	Schedule II
32.	Baya Weaver	*Ploceus philippinus*	Schedule II

Direct observation & Secondary data, Source: ebird.org

Table 3.28. List of Reptiles either spotted or reported from the study area

SI. No	Common Name	Scientific Name	Schedule list The Wildlife (Protection) Amendment Act, 2022
1.	Oriental garden lizard	*Calotes versicolor*	---
2.	Common krait	*Bungarus caeruleus*	---
3.	House lizards	*Hemidactylus flaviviridis*	---
4.	Green vine snake	*Ahaetulla nasuta*	---
5.	Common skink	*Mabuya carinatus*	---
6.	Bornze Grass Skink	*Eutropis macularia*	---

Table.3.29. List of Butterflies reported from the study area and Secondary data

SI. No	Common Name	Scientific Name	Schedule
1.	Indian palm bob	*Suastus gremius*	---
2.	Common Mormon	*Papilio polytes*	---
3.	Lemon Pansy	*Junonia lemonias*	---
4.	Common Crow	*Euploea core*	---
5.	Common rose	*Pachliopta aristolochiae*	---
6.	Spotless grass yellow	*Eurema laeta*	---
7.	Common Evening Brown	*Melanitis leda*	---
8.	Peacock Royal	*Tajuria cippus*	Schedule II
9.	Common Tiger	*Danaus genutia*	---
10.	Lime Butterfly	*Papilio demoleus*	---
11.	Blue Mormon	*Papilio polymnestor*	---
12.	Danaid Eggfly	*Hypolimnas misippus*	Schedule II
13.	Great Eggfly	*Hypolimnas bolina*	---
14.	Common emigrant	*Catopsilia pomona*	---
15.	Tiny Grass Blue	*Zizula hylax*	---
16.	Blue Tiger	*Tirumala limniace*	---
17.	Crimson tip	*Colotisdanae*	---
18.	Common Indian crow	*Euploea core*	---
19.	Yellow Pansy	*Junonia hierta*	---
20.	Chocolate Pansy	*Junonia iphita*	---
21.	Peacock Pansy	*Junonia almana*	---

22.	Plain Tiger Butterfly	*Danaus chrysippus*	---
23.	Common Mime	*Papilio clytia*	Schedule II

Table 3.30. List of insects either spotted or reported from the study area

SI. No	Common Name	Scientific Name	Schedule list WLPAA 2022
1.	Indian honey bee	*Apis cerana*	---
2.	Termite	*Hamitermes silvestri*	---
3.	Grasshopper	*Hieroglyphus daganensis*	---
4.	Ant	*Camponotus Vicinus*	---
5.	Dragonfly	*Ceratogomphus pictus*	---

*NL- Not listed, LC- Least concern, NT- Near threatened

FIGURE 3.24: FLORAL DIVERSITY IN CORE & BUFFER ZONE

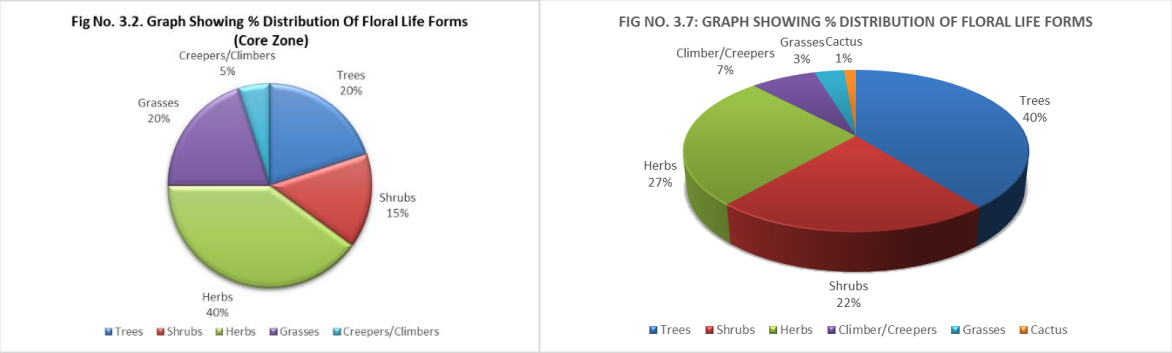


FIGURE 3.25: FAUNA DIVERSITY IN CORE & BUFFER ZONE

3.5.4 Interpretation& Conclusion:

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

3.6 SOCIO ECONOMIC ENVIRONMENT

The major developmental activities in mining /Industrial sector are required for economic development as well as creation of employment opportunities (direct and indirect) and to meet the basic/modern needs of the society, which ultimately results in overall improvement of the quality of life through upliftment of social, economic, health, education and nutritional status in the project region, state as well as the country. In this manner all developmental projects have direct as well as indirect relationships with socioeconomic aspects, which also include public acceptability for new developmental projects. Thus, the study of socioeconomic component incorporating various facets related to prevailing social and cultural conditions and economic status of the Roughstone and Gravel quarry project region is an important part of EIA study. The study of these parameters helps in identification, prediction and evaluation of the likely impacts on the socio economics and parameters of human interest due to the project.

3.6.1 Objectives of the Study

The objectives of the socio-economic impact assessment are as follows:

a) To study the socio-economic status of the people living in the study area of the project.
b) To identify the basic needs of the nearby villages within the study area.
c) To assess the impact on socio-economic environment due to the project.
d) To provide the employment and improved living standards.
e) To study the socio-economic status of the people living in the study area Rough Stone and Gravel Quarry project region
f) To assess the impact on socio-economic environment due to Rough Stone and Gravel Quarry project region
g) To analysis of impact of socio economic and Environmental Infrastructure facilities and road accessibility.

3.6.2 Scope of Work

- To study the Socio-economic Environment of area from the secondary sources
- Data Collection and Analysis
- Identification of impacts due to the mining projects
- Mitigation Measures

3.6.3 Methodology

The methodology adopted for the socio-economic impact assessment is as follows:
a) The details of the activities and population structure have been obtained from Census 2001 and 2011 and analyzed.
b) Based on the above data, impacts due to plant operation on the community have been assessed and recommendations for further improvement have been made.

3.6.4 Sources of Information and Data Base

To achieve the above objectives, the information has been collected from both primary and secondary sources. Both primary data and secondary data have been analyzed by means of suitable statistical techniques for the purpose of verifying the above selected hypotheses concerned with the surrounding area.

3.6.5 Primary Survey

The primary data collection includes the collection of data through a structured interview schedule by direct observation method. The questionnaire survey includes both open and closed methods. The sample size is limited respondents, who were selected on the basis of simple random sampling from Edayarpalayam Village, Sulur Taluk, Coimbatore District, Tamilnadu State, in the field survey has been divided into three major segments namely Primary Zone (0 - 3 km), Secondary Zone (3 - 7 km) and tertiary Zone (7 - 10 km).

The questionnaires were designed to suit the subjects considering their rural background enabling to furnish correct information and data as far as possible. Data were collected at village level and household level by questionnaires and focused group discussions.

The study area for the field survey has been divided into three major segments namely Primary Zone (0 - 3 km), Secondary Zone (3 - 7 km) and Outer Zone (7 - 10 km).

3.6.6 Collection of Data from Secondary Sources

Data from secondary sources were collected on following aspects:

- Demographic profile of the area
- Economic profile of the area

Table 3.31 Type of Information and Sources

Information	Source
Demography	District Census Handbook, Govt. of India
Economic profile of the area	Census of India, Tamil Nadu State

b) Data Presentation and Analysis

The data collected were presented in a suitable, concise form i.e., tabular or diagrammatic or graphic form for further analysis. These tabulated data were interpreted and analyzed with the help of various qualitative techniques and ideographic approaches.

3.7 Background Information of the Area

Tamil Nadu is the 11th largest states in India in terms of area. The state is the seventh most populous state in the country and its main language Tamil has origins that date back to 500 BC. Chennai is the capital of Tamil Nadu and lies on the eastern coast line of India. Tamil Nadu is famous for its wonderful temples and monuments that have been built 1000s of years ago and has places that have been marked as heritage sites by the United Nations. In a 180 degree paradigm shift, this state with a rich historical importance is also one of the fastest developing centre for technology and trade.

The State can be divided broadly into two natural divisions (a) the Coastal plains of South India and (b) the hilly western area. Parallel to the coast and gradually rising from it is the broad strip of plain country. It can further be subdivided into coromandal plains comprising the districts of Kancheepuram, Coimbatore, Cuddalore and Vellore. The alluvial plains of the Cauvery Delta extending over Thanjavur and part of Tiruchirapally districts and dry southern plains in Madurai, Dindigul, Ramanathapuram, Sivaganga, Virudhnagar, Tirunelveli and Tuticorin districts. It extends a little beyond Western Ghats in Kanyakumari District. The Cauvery Delta presents some extremely distinctive physical and human features, its power being a main factor in the remarkable growth, the towns of Tamilnadu have witnessed.

3.8 Geography of the Area

Tamil Nadu is one of the 28 states of India, located in the southernmost part of the country. It extends from 8°4'N to 13°35'N latitudes and from 76°18'E to 80°20'E longitudes. Its extremities are

• in eastern - Point Calimere
• in western - hills of Anaimalai
• in northern - Pulicat lake
• in southern - Cape Comorin

It covers an area of 1,30,058 sq.km and 11th largest state in India. It covers 4% of the area of our country. Tamil Nadu is bounded by the Bay of Bengal in the east, Kerala in the west, Andhra Pradesh in the north, Tamil Nadu in the northwest and Indian Ocean in the south. Gulf of Mannar and Palk Strait separate Tamil Nadu from the Island of Sri Lanka, which lies to the southeast of India.

Already we have learnt that the state of Tamil Nadu had only 13 districts at the time of its formation. After that, the state was reorganised several times for the administrative convenience. At present there are 37 districts in Tamil Nadu, including the newly created districts such as Kallakurichi, Tenkasi, Chengalpet, Ranipet and Tirupathur.

3.9 Population Growth Rate

In 1991, there were only 21 districts in the State of Tamil Nadu. In 2001, eight new districts were created by reorganising the territorial jurisdiction. The nine districts are – Coimbatore, Namakkal, Coimbatore, Perambalur, Viluppuram, Thiruvarur, Nagapattinam, and Theni. The population and its growth trend are important economic factors in a developing economy.

Year	Tamil Nadu	India
1941	11.91	14.22
1951	14.66	13.31
1961	11.85	21.51
1971	22.30	24.80
1981	17.50	24.66
1991	15.39	23.86
2001	11.19	21.34
2011	15.61	5.96
2021	5.96	1.0

3.10 Coimbatore District

Coimbatore is the third largest city of the state, one of the most industrialized cities in Tamil Nadu, known as the textile capital of South India or the Manchester of the South India, the city is situated on the banks of the river Noyyal, Coimbatore existed even prior to the 2nd or 3rd century AD by Karikalan, the first of the early Cholas. Among its other great rulers were Rashtrakutas, Chalukyas, Pandyas, Hoysalas and the Vijayanagara kings. When Kongunadu fell to the British along with the rest of the state, its name was changed to Coimbatore and it is by this name that it is known today, in local Tamil language it is also called as Kovai.

Coimbatore serves as an entry and exit point to neighboring Kerala State and the very popular hill station of Udhagamandalam (Ooty) is 70 kms from Coimbatore. It is the disembarking point for those who want to take the Mountain train that runs from Mettupalayam just 35 kms away from Coimbatore, regular bus services also available daily from Coimbatore to Ooty and other districts, towns and major cities.

Coimbatore lies at 11°1′6″N 76°58′21″E in south India at 427 metres above sea level on the banks of the Noyyal River, in northwestern Tamil Nadu.

3.11 Study Area

Detailed socio-economic survey was conducted in the study area (Core and buffer zone) within 10 km radius of the area at Kurunallipalayam Village, Kinathukadavu Taluk, Coimbatore District, Tamil Nadu State. In order to determine the impact of the proposed project on nature and inhabitant. To get an overview of the villagers and their perspectives about this proposed activity, different demographic parameters and social aspects such population density, sex ratio, literacy rate, worker ratio etc. has been identified, analyzed, studied together. These impacts may be beneficial or disadvantageous. If disadvantageous anticipated suggestions measures are advocated in order to have collective development.

3.12 Demographic pattern of 10km study area characteristics a comparative analysis

TABLE 3.32 SHOWS THE SOCIO-ECONOMIC PROFILE OF THE STUDY AREA AS COMPARED TO DISTRICT, STATE AND NATIONAL LEVEL SOCIO-ECONOMIC PROFILE

Particular	India	Tamil Nadu	Coimbatore District	Study Area (10km Radius)
Area (in sq. km.)	3,287,263	130058	7649	320
Population Density/ sq. Km.	368	554	452	269
No. of Households	249454252	13357027	958035	24865
Population	1210569573	72147030	3458045	86236
Male	623121843	36137975	1729297	43379
Female	587447730	36009055	1728748	42857
Scheduled Tribes	104281034	794697	28342	164
Scheduled Castes	201378086	14438445	535911	16977
Literacy Rate (%)	**72.99**	**80**	**76**	**77**
Sex Ratio (Females per 1000 Males)	**943**	**996**	**1000**	**988**

Source: Census of India, 2011

Table no 3.12.1 show demographic pattern of India, Tamil Nadu, Coimbatore District & Study area (10km Radius). In India had total area of 3.2 sqkm, State of Tamil Nadu area was 130058 sqkm, District of Coimbatore area was 642 sqkm and study area is about 320 sqkm. Population density is total population per sqkm. So, India population density was 368 sqkm, state of Tamil Nadu density was 554 sqkm, District had density about 452 sqkm and study area density is about 269 sqkm. As per Census 2011, about 5.96percent of population in the state lives in areas. Coimbatore had comparing state wise 4.79 percent of population lives in the district. In study area has 2.49 % around 10km radius. State, District and study area. In Tamil Nadu state SC categories people had about 19 %, district of Coimbatore about 15.49 % it has increasing to Study area about 19.68% increasing in the total population Similarly ST population is about 1.10%, 0.82% and 0.19% of the total population in the study area. State level Literacy rate is 80%, district level is 76% but study area has increased about 77%. There is literacy rate is study area Increase comparing district level decrease in the study area. Sex ratio female per thousand males about state level is 996, District level is 1000 and study area is 988.

The study area has population density 269 persons per sq.km of total population about 86236 as per census 2011. There were about 50.30 percent male and 49.70% female population. Study area has literate rate is about 71%. District had about 76% of literate rate as per census 2011.

3.13 Population Projection of the Study Area

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.

TABLE 3.33 TOTAL POPULATION OF STUDY AREA

Sl No.	Population in 2001	Population in 2011
1	74338	86236

Source: https://censusindia.gov.in/census.website/

TABLE 3.34 POPULATION PROJECTION OF STUDY AREA

S. No	Year	Projected Population (Approximately)
1.	2021	98134
2.	2031	110032
3.	2041	121930
4.	2051	133828

Source: Calculated by SPSS v29, 2022.

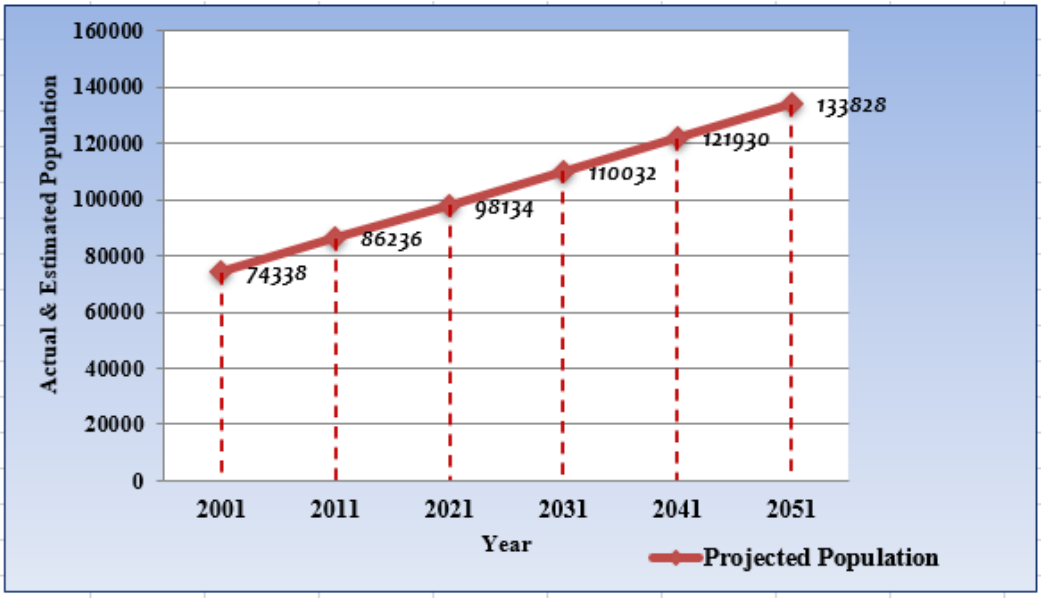


FIG 3.24 GRAPH SHOWING POPULATION PROJECTION

Following formula has been used for the projection of population.

$$Y=a+b_t$$

Where: Y= Dependent variable (Population)
a=Intercept
b=Slope
t=Interdependent variables (Time)

Above formula is applied to project population for the years (2021, 2031,2041,2051). Due to avoid the errors in manual calculation the statistical software SPSS (demo version 23) is used to calculate the intercept and the slope.

Due to the shortage of data on population the results show same value of growth for the years (2021,2031,2041,2051). If the researcher gets enough the data on population for earlier years the data projection will be accurate.

- Ref: Indian Economic survey, the SLR (Simple Linear Regression) techniques are used by statistical department, Government of India to project population.
- Source: https://www.ibm.com/in-en/analytics/spss-statistics-software

3.14 Population Growth of the Study Area

TABLE 3.35 POPULATION GROWTH RATE IN STUDY AREA

Year	Actual Population	Growth Rate %
2001	74338	-
2011	86236	11.60
2021	98134	11.38
2031	110032	11.21
2041	121930	11.08
2051	133828	10.98

Source: Compiled by Author-2022

Above table no 3.14.1 is showing the growth rate of population since 2001, as per census in 2001 the population of study area was 74338 and 2011 it was 86236 if the population growth rate is 11.60%, it will approximately 98134 in year 2021 and 133828 in the year of 2051. It has approximately population growth rate decline will be 10.98%.

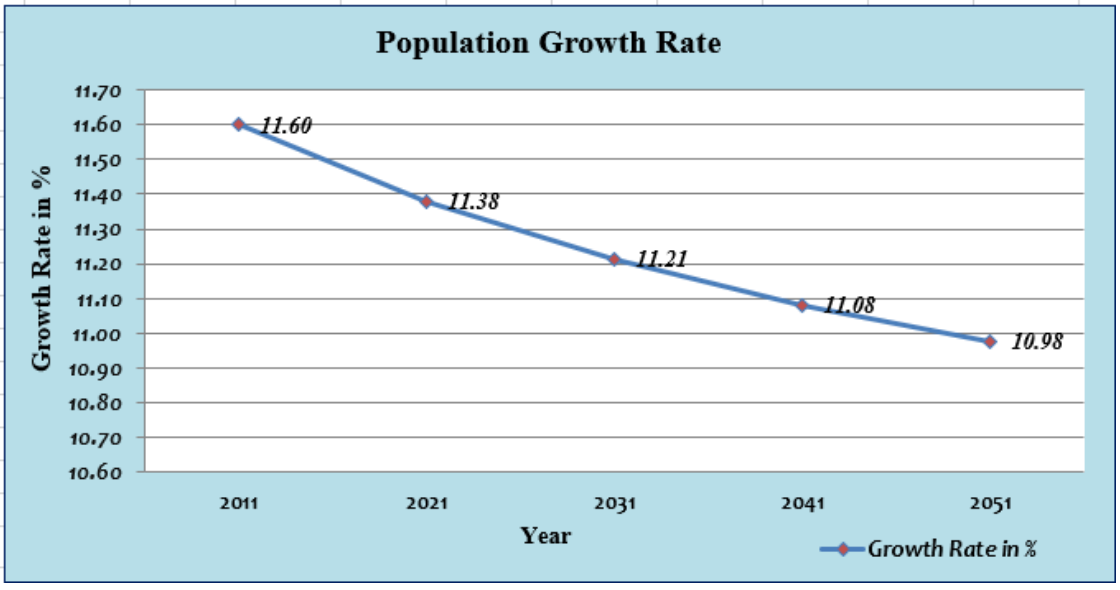


FIG.3.25 GRAPH SHOWING POPULATION GROWTH RATE

Planning Analysis:

Calculating Growth Rates

The percent change from one period to another is calculated from the formula:

Where:

$$PR = \frac{(V_{Present} - V_{Past})}{V_{Past}} x100$$

PR=Percent Rate

$V_{Present}$ =Present or Future Value

V_{Past} = Past or Present Value

The *annual* percentage growth rate is simply the percent growth divided by N, the number of years.

Source: https://pages.uoregon.edu/rgp/PPPM613/class8a.htm

3.15 Population Distribution and Composition of Study Area

The population as per 2011 Census records is 92015 (for 10 km radius buffer zone). Total no. of household is 24865, in study area zone. Sex ratio is 988 (females per 1000 males) observed in primary, secondary and tertiary zone respectively. Average household size is 3. Zone wise Demographic profile of study area is given in the table 3.15.1 below:

Source: **https://censusindia.gov.in/census.website/data/census-tables**

Table 3.36 ZONE WISE DEMOGRAPHIC PROFILE OF STUDY AREA

Zone	No. of Villages	Total Household	Total Population	Male Population	%	Female Population	%
Study Area (0-10 km)	17	24865	86236	43379	50.30	42857	49.70

Source: Census of India, 2011

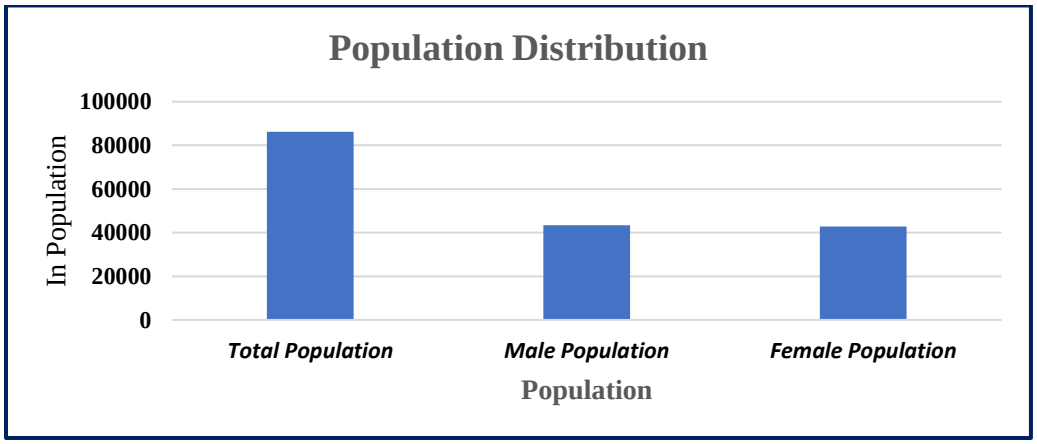


FIGURE 3.26 POPULATION OF STUDY AREA

Table 3.37 VILLAGE WISE DEMOGRAPHIC PROFILE OF THE STUDY AREA (CORE AND BUFFER ZONE)

Sno	Name	No.of Households	Total population	Total Male	Total Female	Population below 6	Male below 6	Female below 6	SC population	SC Male	SC Female	ST population	ST Male	ST Female	Literate population	Male Literate	Female Literate	Total workers	Main workers	Marginal workers	Non workers
1	Appanaickenpatti	1121	3992	1998	1994	337	170	167	947	478	469	0	0	0	2665	1413	1252	2199	2006	193	1793
2	Kalangal	1639	5590	2853	2737	500	272	228	784	400	384	0	0	0	3889	2158	1731	3112	2784	328	2478
3	Peedampalli	1134	3896	1955	1941	339	185	154	683	356	327	24	13	11	2982	1601	1381	1869	1465	404	2027
4	Kallapalayam	860	3066	1581	1485	253	130	123	686	346	340	4	3	1	2350	1293	1057	1547	1522	25	1519
5	Pappampatti	1172	4143	2052	2091	415	196	219	961	455	506	0	0	0	2865	1524	1341	1977	1761	216	2166
6	**Edayapalayam**	667	2251	1130	1121	193	98	95	269	128	141	4	3	1	1659	930	729	1150	977	173	1101
7	Sellakkarichal	1863	6209	3109	3100	443	205	238	1610	804	806	0	0	0	4368	2447	1921	3200	2662	538	3009
8	Varapatti	2315	7644	3790	3854	613	313	300	2031	1019	1012	3	2	1	5161	2813	2348	4485	3837	648	3159
9	Bogampatti	686	2415	1254	1161	155	85	70	170	87	83	0	0	0	1515	905	610	1165	985	180	1250
10	Pachapalayam	842	2933	1488	1445	271	141	130	556	278	278	0	0	0	1754	1003	751	1627	1466	161	1306
11	Poorandampalayam	933	3135	1554	1581	221	120	101	850	420	430	0	0	0	2131	1165	966	1852	1831	21	1283
12	Kannampalayam (TP)	4577	15868	7937	7931	1553	816	737	2077	1036	1041	4	3	1	12578	6615	5963	6915	6539	376	8953
13	Chettipalayam (TP)	2841	10366	5268	5098	880	480	400	2920	1460	1460	0	0	0	7304	3991	3313	4450	4078	372	5916
14	Panappatti	763	2635	1383	1252	199	113	86	450	219	231	0	0	0	1740	1026	714	1579	1566	13	1056
15	Mettubavi	719	2485	1281	1204	173	93	80	301	153	148	8	3	5	1671	971	700	1372	1325	47	1113
16	Vadasithur	1532	5080	2483	2597	342	173	169	940	459	481	2	1	1	3452	1878	1574	2512	2419	93	2568
17	Servakaranpalayam	1201	4528	2263	2265	372	189	183	742	376	366	115	62	53	2945	1624	1321	2491	2445	46	2037
		24865	**86236**	**43379**	**42857**	**7259**	**3779**	**3480**	**16977**	**8474**	**8503**	**164**	**90**	**74**	**61029**	**33357**	**27672**	**43502**	**39668**	**3834**	**42734**

Source: Village Wise Demographic Profile of the Study Area, *Census of India, 2011*

3.16 Gender and Sex Ratio

Sex ratio is used to describe the number of females per 1000 of males. Sex ratio is a valuable source for finding the population of women in India and what is the ratio of women to that of men in India. In the Population Census of 2011, it was revealed that the population ratio in India 2011 is 940 females per 1000 of males. The study area has 988 females per 1000 males. Gender and sex ratio determine the Human Development Index (HDI) of an area thereby understanding the status of women in that region. Following table entails information about sex ratio of 17 villages lying in study area (buffer zone).

TABLE 3.38 SEX RATIO OF THE STUDY AREA

Zone	Sex Ratio of Study area Female/ 1000 Male
Study area (0-10km)	**988**

Source: Census of India, 2011

3.17 Literacy Rate in Study Area

Literacy Rate is the percentage of people in a country with the ability to read and write. The analysis of the literacy levels is done in the study area. The 10 km radius of study area demonstrates a literacy rate of 73.42% as per census data 2011. The male literacy rate in the study area indicates 84.39% whereas the female literacy rate, which is an important indicator for social change, is observed to be 62.79% as per the census data 2011. This needs to focus on the region and enhance further development focusing on education. (Table no 3.17.1).

TABLE 3.39 LITERACY RATE OF THE STUDY AREA

Zone	No. of Villages	Male Literacy Population	Male literacy Rate	Female Literacy Population	Female literacy Rate	Total Literacy	Total Literacy Rate
Study Area (0-10km)	**17**	**33357**	**84.23**	**27672**	**70.27**	**61029**	**77**

Source: Census of India, 2011

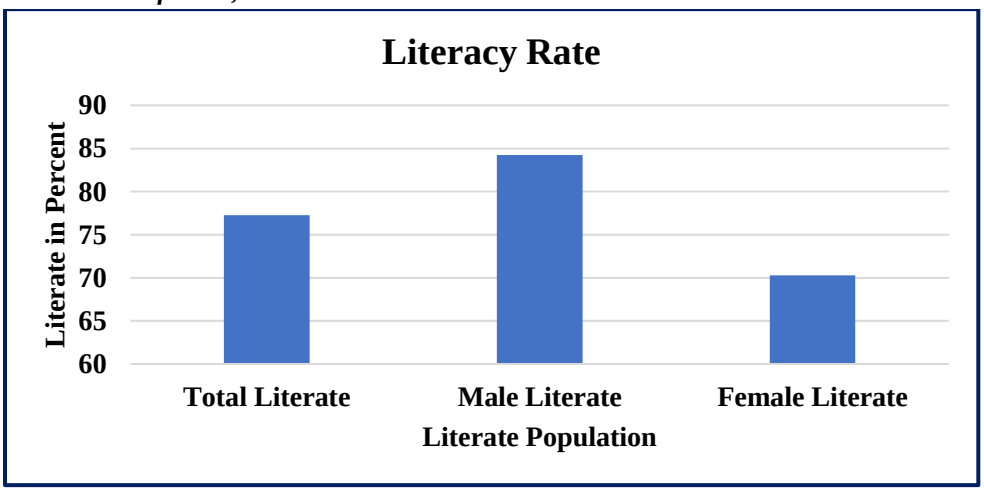


FIGURE 3.27 LITERACY RATE IN THE STUDY AREA

3.18 Family Size

Size of family also describes about family functioning, resource consumption, total income generated and their expenditure pattern. Census 2011 data suggests that most of these households have a family size of up to 3 members, knowing the size of family also give fair understanding of relating how much resource consumption is being incurred, and annual income being generated and spent.

3.19 Vulnerable Group

While developing an action plan, it is very important to identify the population who fall under the marginalized and vulnerable groups and special attention has to be given towards these groups while making action plans. Special provisions should be made for them. In the observed villages schedule caste (SC) population is 19.68% and Schedule Tribe population 0.19%, Other Population is 80% in total study area.

TABLE 3.40 VULNERABLE GROUPS OF THE STUDY AREA

Zone	No. of Villages	Vulnerable Groups					
		SC Population	%	ST Population	%	Other Population	%
Total area (10km)	17	16977	19.68	164	0.19	69095	80

Source: Census of India, 2011

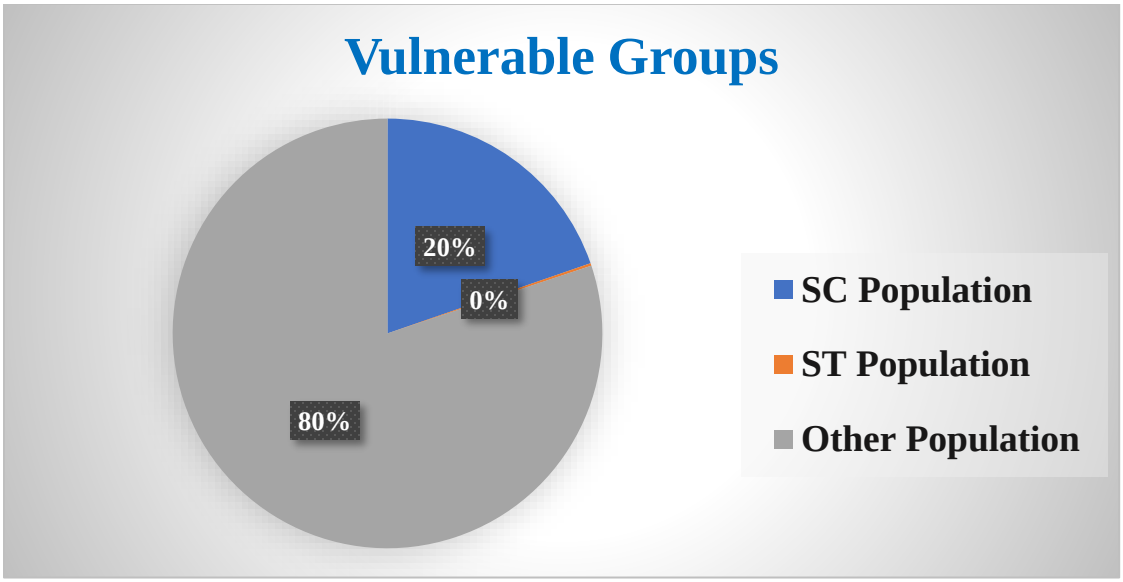


FIGURE 3.28 VULNERABLE GROUPS

3.20 Economic Activities

The economy of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to work category. The population is divided occupation wise into three categories, viz., main workers, marginal workers and non-workers. The workers include cultivators, agricultural laborers, those engaged in household industry and other services. The marginal workers are those workers engaged in some work for a period of less than 180 days during the reference year. The non-workers include those engaged in unpaid household duties, students, retired persons, dependents, beggars, vagrants etc. besides institutional inmates or all other non-workers who do not fall under the above categories.

TABLE 3.41 SHOWS THE WORK FORCE OF THE STUDY AREA

Zone	No. of Villages	Total Workers	%	Main Workers	%	Marginal Workers	%	Non-Workers	%
Study Area (10 Km)	17	43502	50.42	39668	46.0	3834	4.45	42734	49.55

Source: Census of India, 2011

The above table shows that out of the total working population, the percentage of main workers is 46 % while 4% are marginal workers. Number of working populations is 50% and non-working population is 50% in the study area. As per the data obtained from the survey (as mentioned previously in occupational structure) most of these people are employed for major period of the year. Also, to mention the natural environment also restricts the people in finding stable business is performed for only certain months. Thus, proposed project will act as possible exposure for them to get enroll and earn sustain livelihood.

As per the villages analysis most of them are non-working population. A major portion of working age people is not ideal worker because of limited sectors in which they are engaged with less training and not awareness of latest sectors in which maybe they can better other than traditional work.

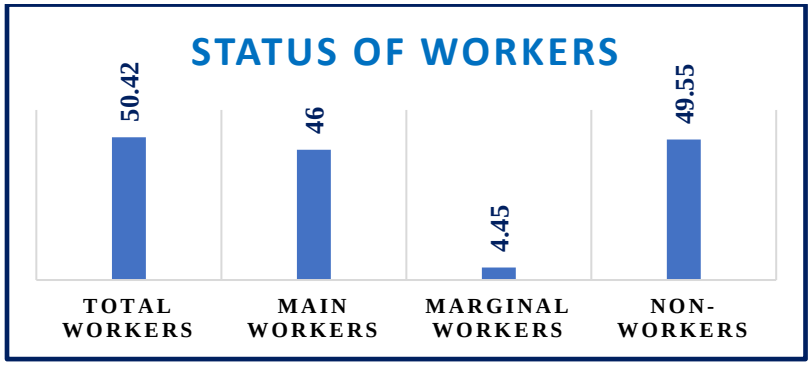


FIGURE 3.42 WORKING POPULATION IN THE STUDY AREA

3.21 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-operatives) is essential for the development of the rural economy. A review of infrastructure facilities available in the area has been done based on the information from baseline survey of the study area. In this review, the villages which fall within 10Km radius round the site has been considered. Infrastructure facilities available in the area have been described in the subsequent sections as below:

1. Educational Facilities

Education is considered to be one of the most dominant indicators towards the development of a region. According to baseline survey, education facilities are available in the villages within the study area. All the villages have schools only up to primary and middle level, higher level education facilities very less only one-degree college available in Sulur Taluk. Improved educational facilities will be provided by CCIL, which will contribute Improvement in awareness level of the villagers.

2. Health Facilities

Medical facilities are available. There are majorly non-Government medical facilities/medicine shop available in the area. There is only one dispensary / health center available and no Primary Health Sub-Centers available in the study area. There is no such case of epidemic or some special diseases in the region. Normal cases of diseases i.e. Cough, cold, fever, headache etc. are reported in the region.

3. Other Infrastructure Facilities

Basic facilities are available in study area as educational facilities, health, transportation, electricity, drinking water, market, bank, post office, petrol pump; Aanganbadi Centers, Community Hall, Cooperative bank and Commercial Bank etc. are available.

- **Transport Facilities**

The study area is served by road transport. Most of the villages connected by bus/other transport services. The area has a moderate road network, which includes state highway, major District Roads and other roads within 10 km radius of the lease boundary. Major District Road is passing through the adjacent of Quarry area.

- **Electrification in the Area**

100% villages in the study area are electrified. Electricity is available for domestic, commercial, industrial agricultural and public lighting purposes.

- **Drinking Water Facility**

Village people are availing Drinking water facilities generally from Tap water, Pond, Well, Tube well, Hand Pump, River etc. In few villages like Edayarpalayam, Vernapuspuram, Bogampatti, Villages etc. there is problem of drinking water facility.

3.22 Interpretation

Based on the data, following inferences could be drawn:

- Total literacy rate in the study area is 77%.
- The study area had average educational facilities. The overall status depicts that the education is limited to primary and middle level.
- The schedule tribe community forms 0.19% and Scheduled Caste forms 20% of the total population of study area.
- The Other Population forms 80% of the total population of study area.
- The study area is well connected by District/Village Road.
- The study area not well health facilities of primary level.
- Considering the above facts, the proposed project will boost the socio-economic development activities in the area and hence will leave positive impact.
- The study area has mobile connectivity

3.23 Recommendations and Suggestion

- Education Awareness program is being/will be conducted to make the population aware and better treatment for livelihood.
- Vocational training session is being/will be organized to provide self-employment to the women and unemployment youth.
- Healthcare Centre and Ambulance facility is being/will be provided to make the population get easy medical facilities.
- Natural Resource Management and Environmental Conservation.
- On the basis of qualification and skills local youths is being/will be employed. Long term and short-term employments are being/will be generated.
- Health care center and ambulance facility is being/will be provided to make the population get easy medical facilities.
- Basic amenities and facilities are being/will be made available to the people and there will be proper maintenance of the facilities already provided by the government in the study area through various CSR activities conducted by Tirupati Blue metals,

3.24 Conclusion

To evaluate the impacts of proposed rough stone and gravel quarry project on the surrounding area, it is vital to assess the baseline status of the environmental quality in the locality of the site. Socio-Economic Survey was also conducted during the study period which revealed that area further require improvement in the Economy and Infrastructure Development of the area. Hence it can be concluded that the present baseline environment status of the study area will not be affected by the proposed project as **Idayarpalayam Rough stone and Gravel Cluster quarries**, will adopt adequate control measures to protect the surrounding environment and will contribute in development of the study areas.

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.

3.25 STRUCTURE MAP UPTO 500M RADIUS

FIG NO:3.29 STRUCTURE MAP 500M – P1

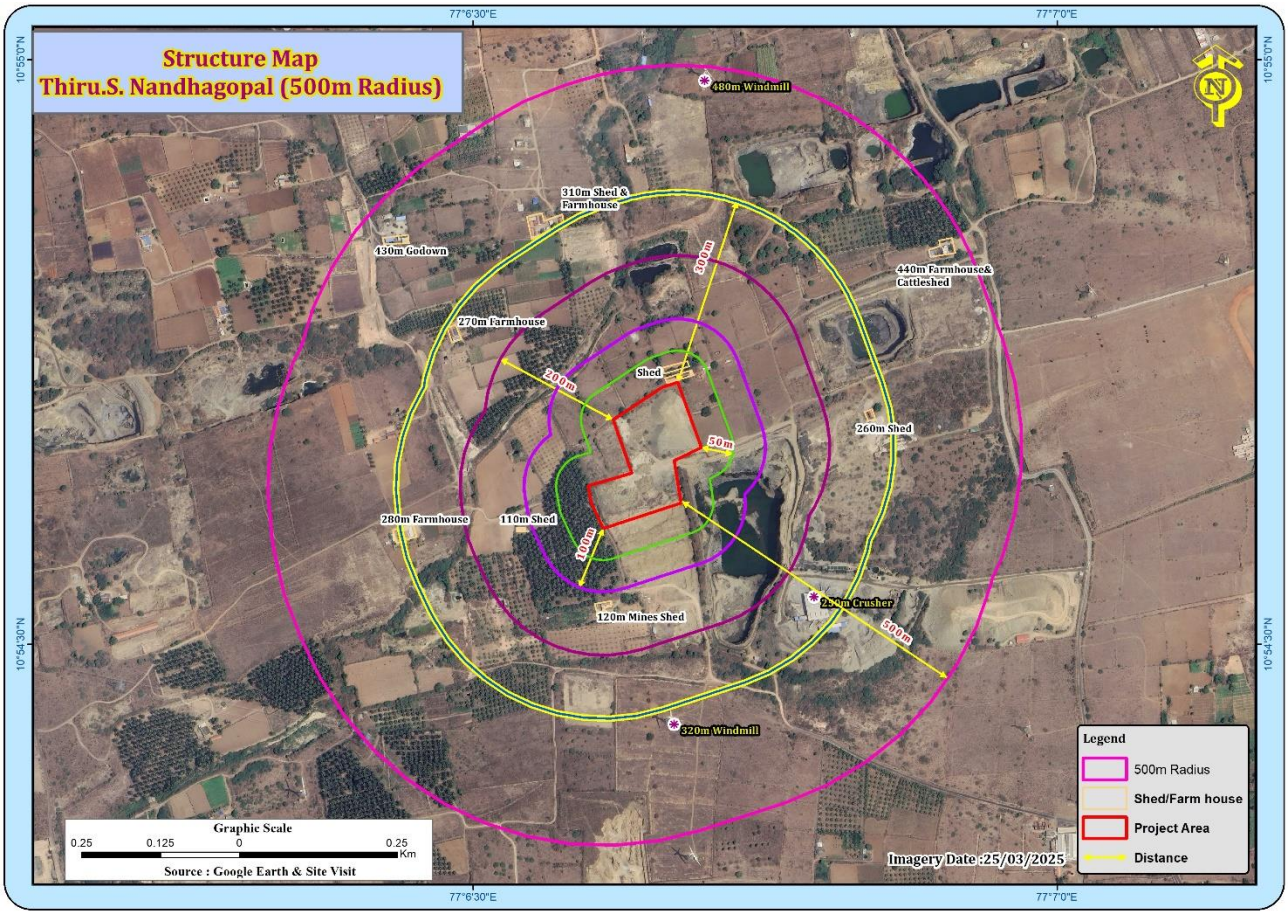


Table No 3.43 Structures details in the study area around 300m Radius- P1

Enumeration of Structures from 0 - 500m Radius						
S.No.	**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	Adjacent to lease area	Shed	Sheet Structure	Nil	No	Used to agriculture storage Only – No Stay
2	110m – West	Shed	Sheet Structure	Nil	No	Used to agriculture storage Only – No Stay
3	120m – SW	Mines Shed	Sheet Structure	Nil	Yes	Used to store Mine Documents
4	250m – SE	Crusher	Framed Structture	6 Nos	No	Used to produce M-Sand, P-Sand & Jelly
5	260m - East	Shed	Sheet Structure	Nil	No	Used to agriculture storage Only – No Stay
6	270m – NW	Farmhouse	RCC Structure	2 Nos	No	Used to store agriculture good and materials
7	280m - West	Farmhouse	RCC Structure	2 Nos	No	Used to store agriculture good and materials
8	310m – NW	Shed & Farmhouse	Sheet Structure & RCC Structure	2 Nos	No	Used to store agriculture good and materials
9	320m – South	Windmill	Framed Structture	Nil	No	Used to generate Electricity
10	430m – NW	Godown	Sheet Structure	Nil	No	Used as storage Unit
11	440m – NE	Farmhouse & Cattle shed	Sheet Structure & RCC Structure	2 Nos	No	Used to store agriculture good, materials & Cattle Feeds
12	480m - NE	Windmill	Framed Structture	Nil	No	Used to generate Electricity

FIG NO:3.30 STRUCTURE MAP 500M – P2

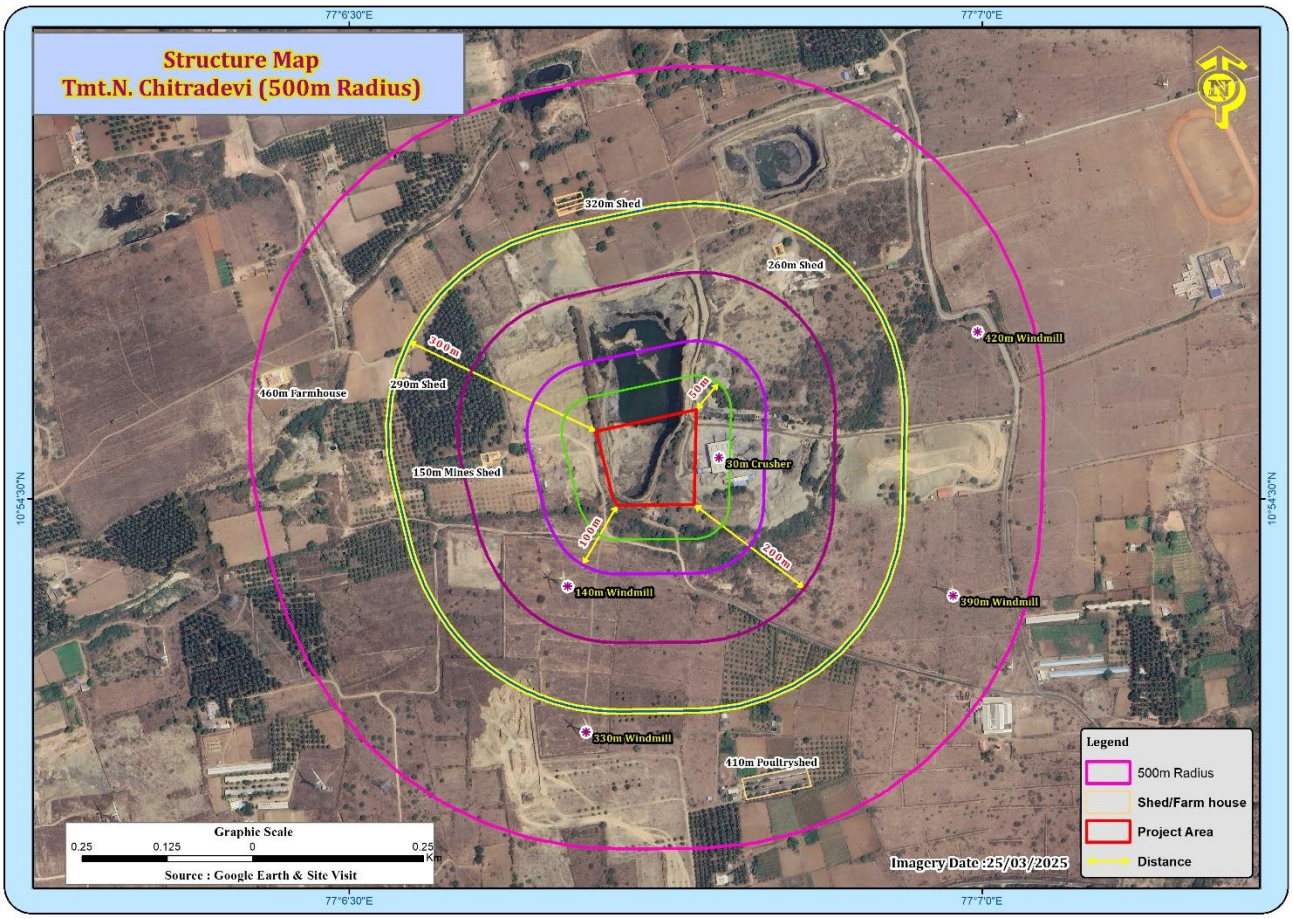


Table No 3.44 Structures details in the study area around 300m Radius- P2

Enumeration of Structures from 0 - 500m Radius						
S.No.	**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	30m – East	Crusher	Framed Structture	6 Nos	Yes	Used to produce M-Sand, P-Sand & Jelly
2	140m – SW	Windmill	Framed Structture	Nil	No	Used to generate Electricity
3	150m – West	Mines Shed	Sheet Structure	Nil	No	Used to store Mine Documents
4	260m – NE	Shed	Sheet Structure	Nil	No	Used to agriculture storage Only – No Stay
5	290m – NW	Shed	Sheet Structure	Nil	No	Used to agriculture storage Only – No Stay
6	320m – North	Shed	Sheet Structure	Nil	No	Used to agriculture storage Only – No Stay
7	330m – South	Windmill	Framed Structture	Nil	No	Used to generate Electricity
8	390m – SE	Windmill	Framed Structture	Nil	No	Used to generate Electricity
9	410m -SE	Poultry Shed	Sheet Structure	Nil	No	Used to produce Eggs and Meat
10	420m - NE	Windmill	Framed Structture	Nil	No	Used to generate Electricity
11	460m - NW	Farmhouse	RCC Structure	2 Nos	No	Used to store agriculture good and materials

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:

4.1.2 Anticipated Impact from all Proposed Projects

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

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

4.1.2 Common Mitigation Measures for Respective Individual Proposed Projects

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

4.1.3 Soil Environment

The proposed projects area is covered by thin layer of gravel formation and the average thickness is about 1m - 2m, the excavated gravel will be directly sold to needy customers in open market.

4.1.4 Impact on Soil Environment from all Proposed Projects

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).

4.1.5 Common Mitigation Measures for Respective Individual Proposed Projects

- Run-off diversion – Garland drains will be constructed all around the project boundary to prevent surface flows from entering the quarry works areas. And will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap 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.

4.1.6 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 from all Proposed Projects

- 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

Detail of water requirements in KLD as given below:

TABLE 4.1: WATER REQUIREMENT FOR THE PROJECT - P1

Purpose	Quantity	Source
Dust Suppression	0.6 KLD	From Existing bore wells from nearby area
Green Belt	1.0 KLD	From Existing bore wells from nearby area
Domestic & Drinking purpose	0.4 KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors
Total	**2.0 KLD**	

TABLE 4.2: WATER REQUIREMENT FOR THE PROJECT- P2

Purpose	Quantity	Source
Dust Suppression	0.6 KLD	From Existing bore wells from nearby area
Green Belt	1.0 KLD	From Existing bore wells from nearby area
Domestic & Drinking purpose	0.4 KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors
Total	**2.0 KLD**	

Source: Prefeasibility report

* Water for drinking purpose will be brought from approved water vendors
Source: Approved Mining Plan Pre-Feasibility Report

4.2.2 Common Mitigation Measures for Respective Individual Proposed Projects

- Garland drain, settling tank will be constructed along the proposed mining lease area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system.
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic (every 6 months once) analysis of quarry pit water and ground water quality in nearby villages.
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.
- Regular monitoring (every 6 months once) and analysing the quality of water in open well, bore wells and surface water

4.3 AIR ENVIRONMENT

4.3.1. Anticipated Impact from all Proposed Projects

- 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.

4.3.1.1. 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 PM_{10} & $PM_{2.5}$ and emissions of Sulphur dioxide (SO_2) & Oxides of Nitrogen (NOx) 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.**

The impact on Air Environment is due to the mining and allied activities during Land Development phase, Mining process and Transportation. The emissions of Sulphur dioxide (SO_2), Oxides of Nitrogen (NOx) due to excavation/loading equipment and vehicles plying on haul roads are marginal. Loading - unloading and transportation of Rough Stone, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the mining activities releasing Particulate Matter (PM_{10}) affecting Ambient Air of the area. Prediction of impacts on air environment has been carried out taking into consideration cumulative production three proposed quarries. Air environment and net increase in emissions by Open pit source modelling in AERMOD Software.

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 Frame work of Computation & Model details

By using the above-mentioned inputs, ground level concentrations due to the quarrying activities have been estimated to know the incremental concentration in ambient air quality and impact in the study area. The effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere. Air quality modelling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory standards and to apply mitigation measures

to reduce impact caused by quarrying activities. 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 4.3: EMISSION ESTIMATION FROM QUARRIES WITHIN 500 METER RADIUS

P1				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.066617007	g/s
	Blasting	Point Source	0.000317351	g/s
	Mineral Loading	Point Source	0.039783643	g/s
	Haul Road	Line Source	0.002487354	g/s/m
	Overall Mine	Area Source	0.052759238	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000346542	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000016687	g/s
P2				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.076996100	g/s
	Blasting	Point Source	0.000654573	g/s
	Mineral Loading	Point Source	0.040980015	g/s
	Haul Road	Line Source	0.002489145	g/s/m
	Overall Mine	Area Source	0.047153379	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000463726	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000017138	g/s

FIGURE 4.1: AERMOD TERRAIN MAP

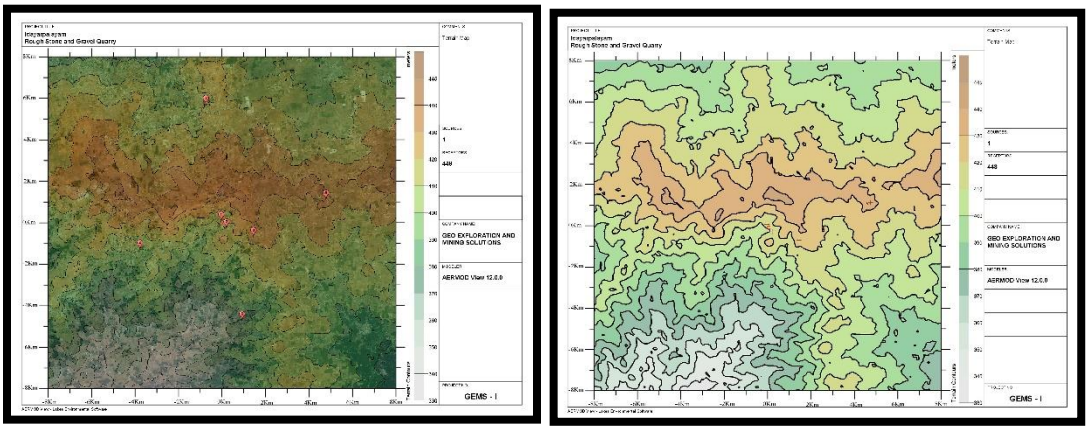


FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM_{10}

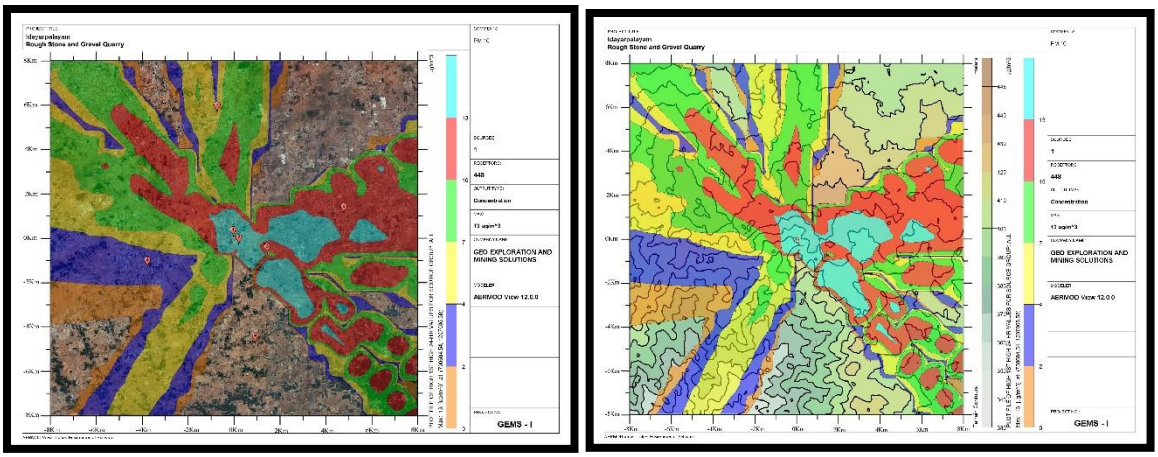


FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF $PM_{2.5}$

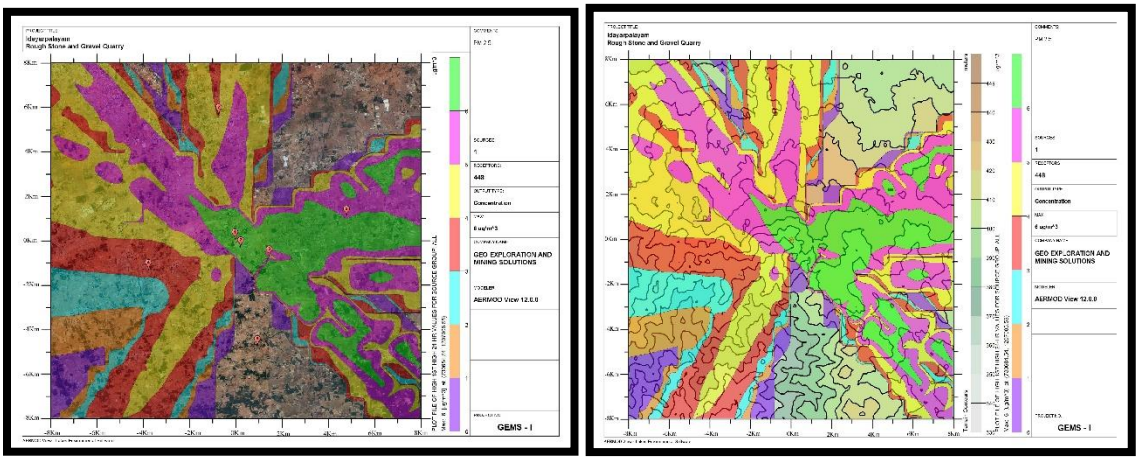


FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF NO_X

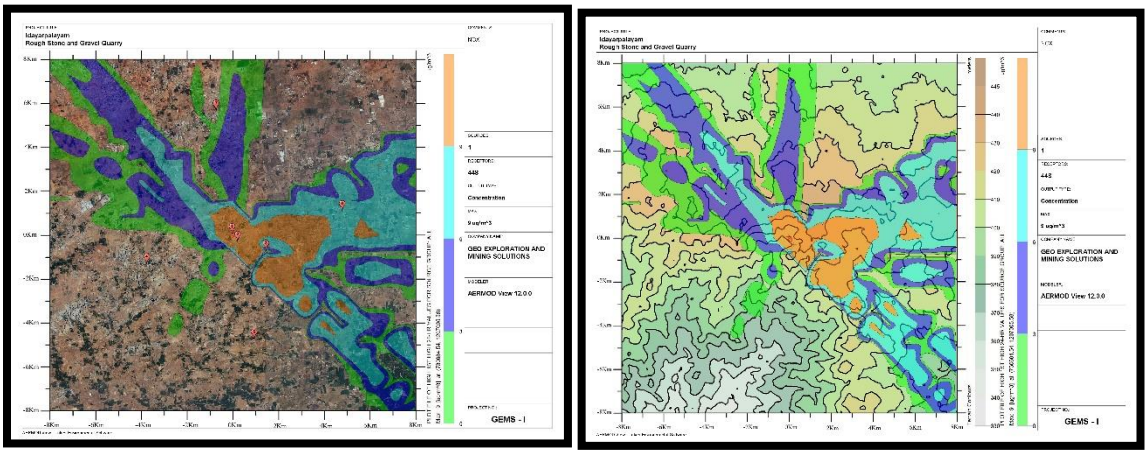


FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF SO2

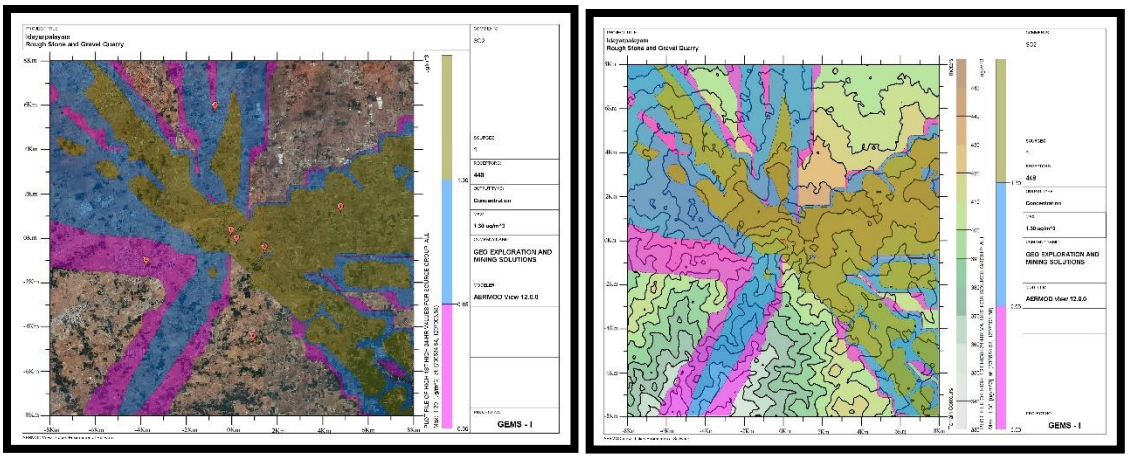
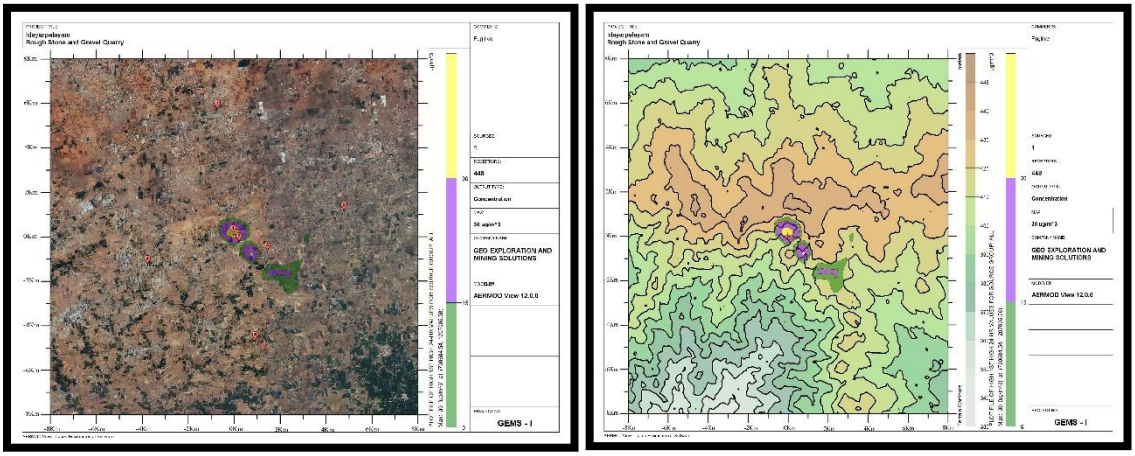


FIGURE 4.6: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE DUST



4.3.2.1 Model Results

The post project Resultant Concentrations of PM10, PM2.5, SO2& NOX (GLC) is given in Table below:

TABLE 4.4: INCREMENTAL & RESULTANT GLC OF PM_{10}

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM_{10} ($\mu g/m^3$)	Incremental value of PM_{10} due to mining ($\mu g/m^3$)	Total PM_{10} ($\mu g/m^3$)
AAQ1	10°54'41.63"N 77° 6'38.07"E	-41	54	35.3	13.63	48.93
AAQ2	10°54'30.26"N 77° 6'46.02"E	205	-300	35.8	13.22	49.02
AAQ3	10°54'17.07"N 77° 7'26.53"E	1446	-703	35.4	1.00	36.4
AAQ4	10°53'57.25"N 77° 4'36.01"E	-3773	-1321	35.5	3.00	38.5
AAQ5	10°55'15.25"N 77° 9'15.62"E	4782	1092	35.7	12.10	47.8
AAQ6	10°52'6.69"N 77° 7'9.56"E	927	-4740	36.2	0	36.2
AAQ7	10°57'42.96"N 77° 6'15.13"E	-739	5664	35.6	6.30	41.9

TABLE 4.5: INCREMENTAL & RESULTANT GLC OF $PM_{2.5}$

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline $PM_{2.5}$ ($\mu g/m^3$)	Incremental value of $PM_{2.5}$ due to mining ($\mu g/m^3$)	Total $PM_{2.5}$ ($\mu g/m^3$)
AAQ1	10°54'41.63"N 77° 6'38.07"E	-41	54	21.4	6.57	27.97
AAQ2	10°54'30.26"N 77° 6'46.02"E	205	-300	21.3	6.19	27.49
AAQ3	10°54'17.07"N 77° 7'26.53"E	1446	-703	21.2	2.50	23.7
AAQ4	10°53'57.25"N 77° 4'36.01"E	-3773	-1321	20.8	3.33	24.13
AAQ5	10°55'15.25"N 77° 9'15.62"E	4782	1092	21.1	5.87	26.97
AAQ6	10°52'6.69"N 77° 7'9.56"E	927	-4740	21.3	0	21.3
AAQ7	10°57'42.96"N 77° 6'15.13"E	-739	5664	21.3	3.79	25.09

TABLE 4.6: INCREMENTAL & RESULTANT GLC OF SO_2

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline SO_2 ($\mu g/m^3$)	Incremental value due to mining ($\mu g/m^3$)	Total SO_2 ($\mu g/m^3$)
AAQ1	10°54'41.63"N 77°6'38.07"E	-41	54	6.1	1.39	7.49
AAQ2	10°54'30.26"N 77°6'46.02"E	205	-300	6.1	1.35	7.45
AAQ3	10°54'17.07"N 77°7'26.53"E	1446	-703	6.3	0	6.3
AAQ4	10°53'57.25"N 77°4'36.01"E	-3773	-1321	6.2	0.21	6.41
AAQ5	10°55'15.25"N 77°9'15.62"E	4782	1092	6.3	1.30	7.6
AAQ6	10°52'6.69"N 77° 7'9.56"E	927	-4740	6.2	0	6.2
AAQ7	10°57'42.96"N 77°6'15.13"E	-739	5664	6.3	0.59	6.89

TABLE 4.7: INCREMENTAL & RESULTANT GLC OF NO_X

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline NOx ($\mu g/m^3$)	Incremental value due to mining ($\mu g/m^3$)	Total NOx ($\mu g/m^3$)
AAQ1	10°54'41.63"N 77° 6'38.07"E	-41	54	23.3	9.41	32.71
AAQ2	10°54'30.26"N 77° 6'46.02"E	205	-300	23.4	9.08	32.48
AAQ3	10°54'17.07"N 77° 7'26.53"E	1446	-703	23.2	0	23.2
AAQ4	10°53'57.25"N 77° 4'36.01"E	-3773	-1321	23.2	0	23.2
AAQ5	10°55'15.25"N 77° 9'15.62"E	4782	1092	23.3	8.00	31.3
AAQ6	10°52'6.69"N 77° 7'9.56"E	927	-4740	23.1	0	23.1
AAQ7	10°57'42.96"N 77° 6'15.13"E	-739	5664	23.1	0	23.1

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 & NOX respectively. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be further being controlled.

4.3.4. Common Mitigation Measures for Respective Individual Proposed Projects

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

Advantages of Wet Drilling: -

- In this system dust gets suppressed close to its formation. Dust suppression become very effective and the work environment will be improved from the point of occupational comfort and health.

- Due to dust free atmosphere, the life of engine, compressor etc., will be increased.
- The life of drill bit will be increased.
- The rate of penetration of drill will be increased.
- Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

Blasting –

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

Haul Road & Transportation –

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with taurpaulin
- The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-metaled haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials

Green Belt –

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

Occupational Health –

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical 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 in close proximity to the project area. 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 a 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.

$$Lp_2 = Lp_1 - 20 \log (r_2/r_1) - Ae_{1,2}$$

Where:
Lp_1& Lp_2 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.

$$Lp_{total} = 10 \log \{10^{(Lp1/10)} + 10^{(Lp2/10)} + 10^{(Lp3/10)} + \ldots\ldots\}$$

4.4.1 Anticipated Impact from all Proposed Projects

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 4.8: 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

*50 feet from source = 15.24 meters

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

The total noise to be produced by mining activity is calculated to be 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 nose prediction modelling.

TABLE 4.9: PREDICTED NOISE INCREMENTAL VALUES

Location ID	**N1**	**N2**	**N3**	**N4**	**N5**	**N6**	**N7**
Maximum Monitored Value (Day) dB(A)	56.7	55.9	59.7	58.9	58.7	58.6	58.7
Incremental Value dB(A)	60.1	60.1	36.6	28.7	26.7	27.0	25.3
Total Predicted Noise level dB(A)	61.7	61.5	59.7	58.9	58.7	58.6	58.7

The incremental noise level is found within the range of 61.5 – 61.7 dB (A) in Core Zone and 58.6 – 59.7 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 Common Mitigation Measures for Respective Individual Proposed Project

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;
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured though training and awareness.
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects

4.4.3 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 4.10: PREDICTED PPV VALUES DUE TO BLASTING

Code	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	20	930m - NE	0.098
P2	20	600m- NW	0.197

FIGURE 4.6: GROUND VIBRATION PREDICTION- P1

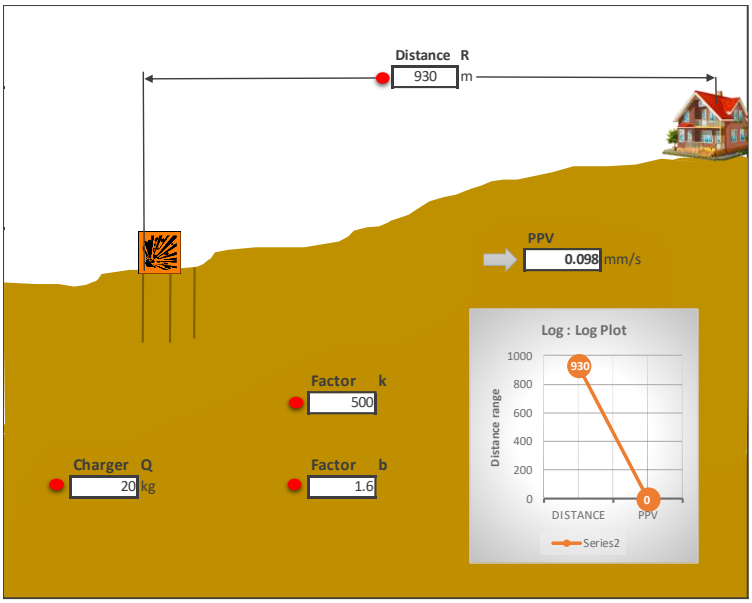
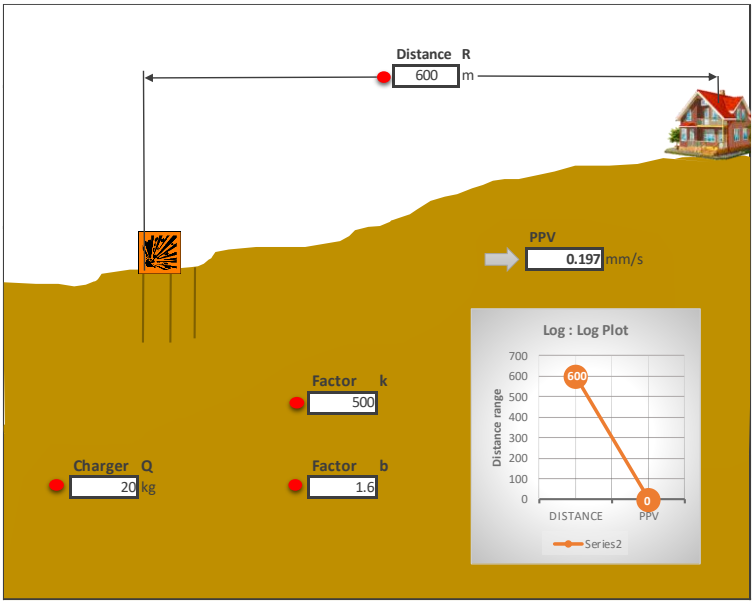


FIGURE 4.6: GROUND VIBRATION PREDICTION- P2



From the above graph, 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 proponents ensure that the charge per blast shall be less than 20 kg and 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**.**

4.4.3.1 Common Mitigation Measures for Respective Individual Proposed Projects

- 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 mm/s.
- Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices

4.5 ECOLOGY AND BIODIVERSITY

Mining activities generally result in deforestation, land degradation, and water, air, and noise pollution which directly or indirectly affect the faunal and floral status of the mine area. However, the occurrence and magnitude of these impacts are entirely dependent upon the project location, mode of operation, and technology involved. Existing roads will be used; new roads will not be constructed to reduce the impact on flora. Wildlife is not commonly found in the lease area and its immediate environments because of the lack of vegetal cover and surface water.

4.5.1. Anticipated Impact on Flora

- None of the plants will be cut during the operational phase of the mine.
- There shall be negligible air emissions or effluents from the project site. During the loading of the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.
- Most of the land in the buffer area is undulating terrain with croplands, grass patches, and small shrubs. Hence, there will be no effect on the flora of the region.

4.5.1.1. Mitigation Measures

The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. Although the project will not lead to any tree cutting, it is proposed to improve the greenery of the locality through plantation services. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

- 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:
    - **a.** It improves the ambient air quality by controlling Suspended Particulate Matter (SPM) in the air.
    - **b.** It helps in noise abatement for the surrounding area.

c. It helps in the settlement of new birds and insects within itself.
d. It maintains the ecological balance.
e. It increases the aesthetic value of the site.

TABLE No 4.10. LIST OF PLANT SPECIES PROPOSED FOR GREENBELT DEVELOPMENT

S. No	Scientific name	Family Name	Tamil Name	Habit
1	*Aegle marmelos*	Rutaceae	Vilvam	T
2	*Albizia lebbeck*	Fabaceae	Vaagai	T
3	*Borassus flabellifer*	Arecaceae	Panai-maram	T
4	*Cassia fistula*	Fabaceae	Sarakondrai	T
5	*Ficus amplissima*	Moraceae	Kal Itachi	T
6	*Lannea coromandelica*	Anacardiaceae	Odhiam	T
7	*Limonia acidissima*	Rutaceae	Vila maram	T
8	*Sapindus emarginatus*	Sapindaceae	Manipungan, Soapu kai	T
9	*Pterocarpus marsupium*	Fabaceae	Vengai	T
10	*Toona ciliata*	Meliaceae	Santhana Vembu	T

4.5.2. Anticipated Impact on Fauna

- No rare, endemic & or endangered species are reported in the buffer zone. However, during the course of mining, the management will practice the scientific method of mining with a proper Environmental Management Plan including pollution control measures especially for air and noise, to avoid any adverse impact on the surrounding wildlife.
- Fencing around the mine lease area to restrict the entry of stray animals.
- Green belt development will be carried out which will help in minimizing adverse impact on the flora found in the area.

4.5.2.1. Mitigation Measures

- A suitable plan for the conservation of Schedule-I Species have been prepared and the necessary fund for implementation for the same will be made.
- All the preventive measures will be taken for the growth & development of fauna.
- Creating and developing awareness for nature and wildlife in the adjoining 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 p.m.
- Topsoil has a large number of seeds of native plant species in the mining area.
- Checks and controls the movement of vehicles in and out of the mine.
- Undertaking mitigative measures for a conducive environment for the flora and fauna in consultation with the Forest Department.
- A dust suppression system will be installed within the mine and periphery of the mine.

4.5.3. Impact on Aquatic Biodiversity

Mining activities will not disturb the aquatic ecology as there is no effluent discharge proposed from the Rough Stone and Gravel 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 water bodies located in the study area. There are a few Odai and Canals 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 3.24. Aquatic biodiversity is observed in the study area.

4.5.4. 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.

4.5.5. Impacts on wildlife

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

4.5.5. Impact Assessment on Biological Environment

A detail of impact and assessments was mentioned in Table No 4.14

TABLE 4.11: ECOLOGICAL IMPACT ASSESSMENTS.

S.No	Attributes	Assessment
1	Impact of mining activity on agricultural land nearby the proposed project site.	Agricultural land is located away from 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	There is no National Park/ Wildlife Sanctuary/ Reserve Forest/ Mangroves and Eco-Sensitive zone/ Critically polluted area/ HACA/CRZ located within 10 km radius 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)

TABLE 4.12: RECOMMENDED SPECIES FOR GREENBELT DEVELOPMENT PLAN

SI.No	Name of the plant (Botanical)	Family Name	Common Name	Habit
1	*Aegle marmelos*	Rutaceae	Vilvam	Tree
2	*Borassus flabellifer*	Arecaceae	Panai-maram	Tree
3	*Pterocarpus marsupium*	*Pterocarpus marsupium*	Vengai	Tree
4	*Toona ciliata*	*Toona ciliata*	Santhana Vembu	Tree

The 7.5m Safety distance along the boundary has been identified to be utilized for subsequent Afforestation. However, the afforestation should always be carried out in a systematic and scientific manner. Regional trees like Neem, Pongamia, Pinnata will be planted along the Lease boundary and avenue plantation will be carried out in the project site. The rate of survival expected to be 80% in this area. Greenbelt development Plan is given in

TABLE 4.14: GREENBELT DEVELOPMENT PLAN- P1

No. of tress proposed to be planted	Area to be covered in m2	Name of the species
1080	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development.	Vembu, Pungan, Poovarasu, Athi Etc.,

TABLE 4.14: GREENBELT DEVELOPMENT PLAN- P2

No. of tress proposed to be planted	Area to be covered in m2	Name of the species
800	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development.	Vembu, Pungan, Poovarasu, Athi Etc.,

TABLE 4.15: BUDGET FOR GREENBELT DEVELOPMENT PLAN- P1

ACTIVITY		YEAR				RATE		COST (Rs.)
		I	II	III	IV	V		
Plantation under safety zone	Nos.	600	-	-	-	-	@200 Rs Per sapling	1,20,000/-
	Cost	1,20,000	-	-	-	-		
Plantation in the quarried out top benches , approach & Panchayat Roads	Nos.	600	-	-	-	-	@200 Rs Per sapling	1,20,000/-
	Cost	1,20,000	-	-	-	-		
Wire Fencing (In Mtrs) 600 Mtrs		1,80,000	-	-	-	-	@300 Rs Per Meter	1,80,000
Garland drain (In Mtrs) 550 Mtrs		1,65,000	-	-	-	-	@300 Rs Per Meter	1,65,000

TOTAL	5,85,000/-

TABLE 4.15: BUDGET FOR GREENBELT DEVELOPMENT PLAN- P2

ACTIVITY		YEAR					RATE	COST (Rs.)
		I	II	III	IV	V		
Plantation under Safety Zone	Nos.	600	-	-	-	-	@200 Rs Per sapling	1,20,000
	Cost	1,20,000	-	-	-	-		
Plantation in quarried out top bench and Haul Road	Nos.	500	-	-	-	-	@200 Rs Per sapling	1,20,000
	Cost	100000	-	-	-	-		
Wire Fencing (In Mtrs) 500 Mtrs		1,50,000					@300 Rs Per Meter	1,50,000
Garland drain (In Mtrs) 370 Mtrs		1,11,000					@300 Rs Per Meter	1,11,000
TOTAL								5,01,000/-

4.6 SOCIO ECONOMIC

4.6.1 Anticipated Impact from all Proposed Projects

- 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 Common Mitigation Measures for Respective Individual Proposed Projects

- 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

Long-term exposure to silica dust may cause silicosis the following measures are proposed:

- Cabins of excavators and tippers will be enclosed with AC and sound proof
- Use of personal dust masks will be made compulsory

4.7.2 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

4.7.3 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

4.7.4 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 from any of the proposed quarries.

4.9 MINE CLOSURE

Mine closure plan is the most important environmental requirement in mining projects. 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. Therefore, progressive mine closure plan should be specifically dealt with in the mining plan and is to be reviewed along with mining plan. 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

Idayarpalayam Rough Stone and Gravel Cluster Quarries Project at Idayarpalayam Village is a mining project for excavation of Rough Stone, which is site specific. All 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 – III, 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

Mechanized open cast mining operation with drilling and blasting method will be used to extract Rough Stone in the area. All the applied mining lease areas 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 monitoring and evaluation of environmental parameters indicates potential changes occurring in the environment, which paves way for implementation of rectifying measures wherever required to maintain the status of the natural environment. Evaluation is also a very effective tool to judge the effectiveness or deficiency of the measures adopted and provides insight for future corrections.

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 Respective Project Proponents. A comprehensive monitoring mechanism has been devised for monitoring of impacts due to proposed projects; 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 the Respective 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:

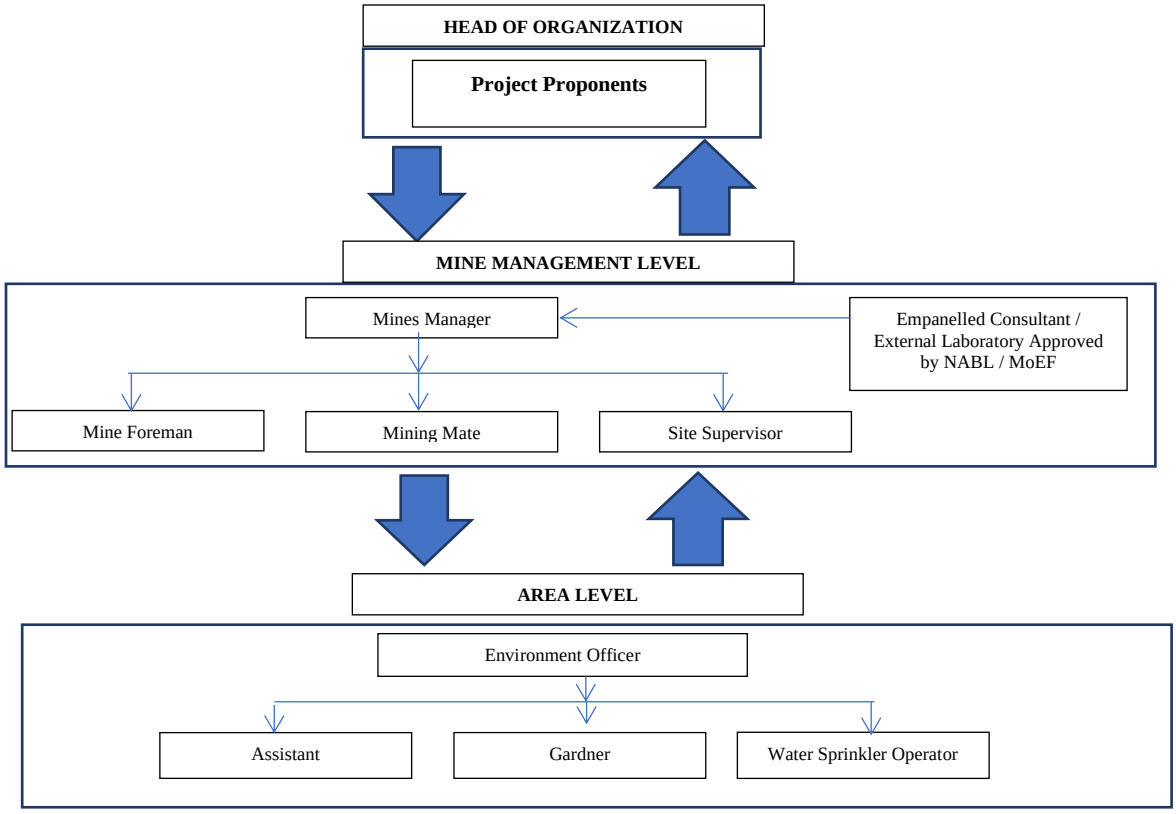
- Implementation of pollution control measures
- Monitoring programme implementation
- Post-plantation care
- To check the efficiency of pollution control measures taken
- Any other activity as may be related to environment
- Seeking expert’s advice when needed.

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 FOR P1& P2



* The Environmental Monitoring Cell will be formed for proposed project

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 FOR PROPOSED PROJECT

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

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges, emissions and wastes,

for measurement against statutory standards. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

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 – P1 & P2

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/- and the recurring cost is Rs 3,80,000/- per annum for Proposed Project.

TABLE 6.3 ENVIRONMENT MONITORING BUDGET-P1 & P2

Sl.No.	Parameter	Capital Cost	Recurring Cost per annum
1	Air Quality	Rs. 76,000/-	Rs. 3,80,000/-
2	Meteorology		
3	Water Quality		
4	Hydrology		
5	Soil Quality		
6	Noise Quality		
7	Vibration Study		
Total		**Rs. 76,000/-**	**Rs. 3,80,000/-**

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

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	Safe operating procedure established for drilling (SOP) will be strictly followed.

		Due to high pressure of compressed air, hoses may burst Drill Rod may break	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 III. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated

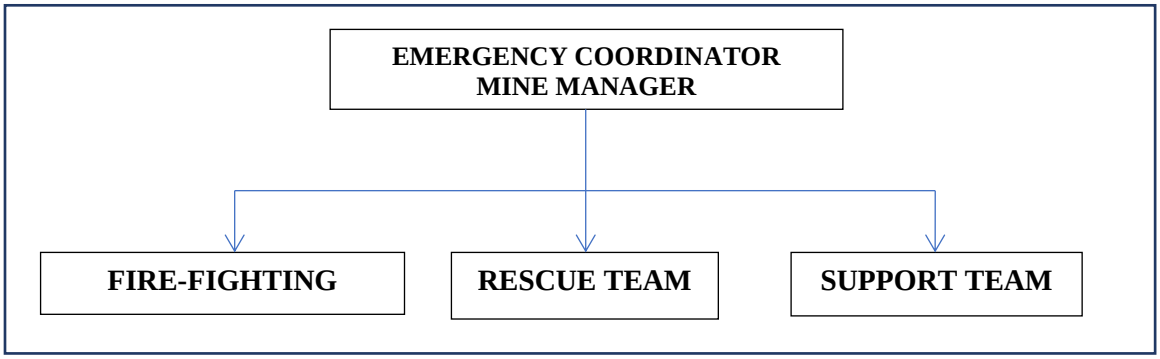
The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

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

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

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 for respective proposed quarries. 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.

The features of alarm system will be explained to one and all to avoid panic or misunderstanding during disaster. In order to prevent or take care of hazard / disasters if any the following control measures have been adopted.

- All safety precautions and provisions of Metalliferous Mines Regulations (MMR), 1961 is strictly followed during all mining operations.
- Observance of all safety precautions for blasting and storage of explosives as per MMR 1961.
- Entry of unauthorized persons into mine & allied areas is completely prohibited.
- Fire-fighting and first-aid provisions in the mines office complex and mining area are provided.
- Provisions of all the safety appliances such as safety boot, helmets, goggles, dust masks, ear plugs and ear muffs etc. are made available to the employees and the use of same is strictly adhered to through regular monitoring.
- Training and refresher courses for all the employees working in hazardous premises.
- Working of mine, as per approved plans and regularly updating the mine plans.
- Cleaning of mine faces is regularly done.
- Handling of explosives, charging and blasting are carried out only by qualified persons following SOP.
- Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit.
- Provision of high-capacity standby pumps with generator sets with enough quantity of diesel for emergency pumping especially during monsoon.
- A blasting SIREN is used at the time of blasting for audio signal.
- Before blasting and after blasting, red and green flags are displayed as visual signals.
- Warning notice boards indicating the time of blasting and NOT TO TRESPASS are displayed at prominent places.
- Regular maintenance and testing of all mining equipment were carried out as per manufacturer's guidelines.

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

PROPOSED QUARRIES					
CODE	**Name of the Owner**	**Village**	**S.F. Nos**	**Extent in Ha**	**Status**
P1	**S. Nandhagopal**	Idayarpalayam	180/1 & 181/3	2.15.83	File No. 11968 TOR Identification No. TO25B0108TN5897910N Dated:15.06.2025
P2	**N. Chitradevi**		179/2 (Part)	1.60.00	File No. 10996 TOR Identification No. TO24B0108TN5260870T Dated:23.12.2024
P3	V. Saravanan		171/2 (Part) & 176/2	1.84.0	File No. 10794 TOR Identification No. TO24B0108TN5892891N Dated: 05.08.2024
P4	N. Vivek Prithviraj		180/3 (Part)	1.62.0	Pending
P5	M/s. Ultra Readymix concrete pvt Ltd		168/2A (P), 168/2B (P),	2.94.01	Precise area communicated

			169/1C(P), 169/2A(P)		
P6	K. Ranganathan		174/4, 176/1	2.28.00	Precise area communicated
			TOTAL EXTENT	**12.43.84**	
EXISTING QUARRIES					
CODE	**Name of the Owner**	**Village**	**S.F. Nos**	**Extent in Ha**	**Status**
E1	N. Chitradevi	Idayarpalayam	179/2(P)	3.64.5	14.07.2021 to 13.07.2026
			TOTAL EXTENT	**3.64.5**	
ABANDONED QUARRIES					
A-1	Thiru.M.Arumugam	Idayarpalayam	172/2	0.49.5	18.05.2008 to 17.05.2013
A-2	Tmt. Ponnammal		178/2	2.34.5	22.10.2004 to 21.10.2009
			TOTAL EXTENT	**2.84.00**	
			TOTAL CLUSTER EXTENT	**16.08.34**	

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

TABLE 7.5: SALIENT FEATURES OF PROPOSAL "P1"

Name of the Project	Thiru. S. Nandhagopal Rough Stone & Gravel Quarry	
S.F. No.	180/1 and 181/3	
Extent	2.15.83 Ha	
Village, Taluk and District	Idayarpalayam Village, Sulur Taluk & Coimbatore District	
Land type	It is a Patta land (Barren land) which is not fit for vegetation/ Cultivation	
Land owner details	It is a Patta land, Registered in the name of the applicant Thiru. S. Nandhagopal vide Patta no.963. The S.F.No.181/3 is jointly registered in the name of the applicant and other 6 members vide patta no.958. The Applicant has purchased the S.F.No.181/3 and the same has been registered vide sale deed document no.7791/2020 dated:27.08.2020 in the sulur sub-registor office. But the name transfer in patta is pending till now.	
Toposheet No	58 - F/01	
Latitude between	**10°54'35.95.20"N to 10°54'43.4523"N**	
Longitude between	**77°06'35.9065"E to 77°06'41.7207"E**	
Highest Elevation	432m AMSL	
Mining Plan period	10 years	
Proposed Depth of Mining	42m below ground level.	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	8,90,600	44,530
Mineable Reserves	Rough Stone in m^3	Gravel in m^3
	2,31,510	30,964
Yearwise Production	Rough Stone in m^3	Gravel in m^3
	2,31,510	30,964
Ultimate Pit Dimension	S.No / Length(m) (Max) / Width(m) (Max) / Depth(m) (Max) Pit- I / 122 / 53 / 22m Pit – II / 98 / 92 / 42m	
Water Level in the surrounding areas	63 - 68m bgl	
Method of Mining	Opencast Mechanized Mining Method involving small drilling and Controlled blasting using Slurry Explosives	
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards Southwestern side. The altitude of the area is 432m (Max) above Mean sea level. The area is covered by the Gravel which is about 2m thickness. Massive Charnockite is found after 2m (Gravel) which is clearly inferred from the existing quarry pits.	
Machinery proposed	Jack Hammer	4 Nos
	Compressor	1 Nos

	Excavator with Bucket and Rock Breaker	1 No
	Tippers	2 Nos
	Water Sprinkling Tanker	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	23 Nos	
Project Cost	Rs. 1,42,24,000/-	
EMP Cost	Rs. 3,80,000/-	
Total Project cost	Rs. 1,60,59,000/-	
CER Cost	Rs. 3,00,000,/-	
Nearby Water Bodies	Odai	100m NW
	Odai	1km SE
	Canal	9km SE
	Pallapalayam Lake	9.3km NW
Greenbelt Development Plan	As per Mining plan it is Proposed to plant 1080 trees in the 7.5 m Safety Zone, approach road and panchayat roads.	
Proposed Water Requirement	2.0 KLD	
Nearest Habitation	930m – NE	
Nearest Reserve Forest	Boluvampatti I R.F. – 17.5 km –West	
Nearest Wild Life Sanctuary	Indira Gandhi (Anamalai) Wildlife Sanctuary- 44.0km - South	

TABLE 7.6: SALIENT FEATURES OF PROPOSAL "P2"

Name of the Project	Tmt. N. Chitradevi	
S.F. No.	179/2 (Part)	
Extent	1.60.0 ha	
Village, Taluk and District	Idayarpalayam Village, Sulur Taluk & Coimbatore District	
Land Type	Patta land	
Existing Quarry Operation	It is an existing quarry. The quarry lease was previously operated by Tvl. ROBO Silicon Private Limited, in S.F.No. 179/2(P) vide Rc.No.1571/2009/MM2, Dated:13.04.2010 for the period of five years from 13.04.2010 to 12.004.201.	
Toposheet No	58 - F/01	
Latitude between	**10° 54' 28.7892"N to 10° 54' 33.4185"N**	
Longitude between	**77° 06' 41.7857"E to 77° 06' 46.7711"E**	
Elevation of the area	421m AMSL	
Lease period	5 Years	
Mining Plan period	5 years	
Existing Depth	20m	
Proposed Depth of Mining as per ToR	57m BGL (2m Gravel + 55m Rough Stone)	
	Rough Stone in m^3	Gravel m^3
Geological Resources	7,22,748	10,824
Mineable Reserves	1,87,565	7,502
Year wise Production as per ToR	1,87,565	7,502
Peak Production	44,980	7,502
Existing Pit Dimension	115m(L) x 90m(B) x 20m(D)(BGL)	
Ultimate Pit Dimension	259m(L) x 202m(B) x 50m(D)(BGL)	
Water Level in the region	65m -70m bgl	
Method of Mining	Opencast Mechanized Mining Method involving small drilling and Controlled blasting using Slurry Explosives	
Topography	The lease applied area is exhibiting plain terrain. The area has gentle sloping towards Southernwestern side and altitude of the area is 421m above from Mean Sea Level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the nearby open well.	

Machinery proposed	Jack Hammer	6Nos
	Compressor	2Nos
	Excavator with Bucket and Rock Breaker	1 Nos
	Trucks	3 Nos
	Water Sprinkling Tanker	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.	
Proposed Manpower Deployment	29 Nos	
Operational Cost	Rs.1,63,24,000/-	
EMP Cost	Rs.3,80,000/-	
Total Project cost	Rs.1,78,75,000/-	
CER Cost	Rs. 3,00,000/-	
Nearby Water Bodies	Odai	370m NW
	Odai	800m SE
	Canal	8.8km SE
	Pallapalayam Lake	9.5km NW
Greenbelt Development Plan	Proposed to plant 800 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	600m – North West	
Nearest Reserve Forest	Boluvampatti I R.F. – 17.5 km –West	
Nearest Wild Life Sanctuary	Indira Gandhi (Anamalai) Wildlife Sanctuary- 44.0km - South	

Source: Approved Mining Plan

TABLE 7.7: SALIENT FEATURES OF PROPOSAL "E1"

Tmt	Tmt. N. Chitradevi Rough Stone & Gravel Quarry	
Toposheet No	58- F/01	
Latitude between	10° 54' 33.16"N to 10° 54' 41.78"N	
Longitude between	77° 06' 40.42"E to 77° 06' 47.14"E	
Geological Resources	Rough Stone in m^3	Gravel m^3
	16,40,250	72,900
Mineable Reserves	Rough Stone in m^3	Gravel m^3
	2,63,226	27,000
Year wise Production	2,63,226	27,000
Ultimate Pit Dimension	47m below ground level	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Machinery proposed	Jack Hammer	8 Nos
	Compressor	2 Nos
	Hydraulic Excavator	2 Nos
	Tipper	4 Nos
Proposed Manpower Deployment	31	
Project Cost	Rs. 1,46,40,700/-	

Source: Approved Mining Plan

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 & 7.8.

TABLE 7.8: CUMULATIVE PRODUCTION LOAD OF ROUGH STONE

Quarry	Production for five-year plan period	Per Year Production in m^3	Per Day Production in m^3	Number of Lorry Load Per Day
P1	2,31,510	23,151	77	7
P2	1,87,565	37,513	125	11
Total	4,19,075	60,664	202	18
E1	2,63,226	52,645	175	15
Total	**2,63,226**	**52,645**	**175**	**15**
Grand Total	**6,82,301**	**1,13,309**	**377**	**33**

TABLE 7.9: CUMULATIVE PRODUCTION LOAD OF GRAVEL

Quarry	Production for three-year plan period	Per Year Production in m^3	Per Day Production in m^3	Number of Lorry Load Per Day
P1	30,964	10,321	35	6
P2	7,502	7,502	25	2
Total	**38,466**	**17,823**	**60**	**8**
E1	27,000	9,000	30	3
Total	27,000	9,000	30	3
Grand Total	**65,466**	**26,823**	**90**	**11**

On a cumulative basis considering the proposed quarries, it can be seen that the overall production of Rough Stone is 377m^3 per day and overall production of Gravel is 90 m^3 per day with a capacity of 33 trips of Rough Stone per day and 11 Trips per day of Gravel from the cluster.

Note: Per day production of Rough Stone is calculated for 5 Years Lease Period and for Gravel production with 3 years, Weathered rock 3 years of production period. And the load of existing quarries is covered under existing environment of the cluster.

Based on the above production quantities the emissions due to various activities in all the 2 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 7.18.

TABLE 7.10: EMISSION ESTIMATION FROM QUARRIES WITHIN 500 METER RADIUS

EMISSION ESTIMATION FOR QUARRY "P1"				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.066617007	g/s
	Blasting	Point Source	0.000317351	g/s
	Mineral Loading	Point Source	0.039783643	g/s
	Haul Road	Line Source	0.002487354	g/s/m
	Overall Mine	Area Source	0.052759238	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000346542	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000016687	g/s
EMISSION ESTIMATION FOR QUARRY "P2"				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.076996100	g/s
	Blasting	Point Source	0.000654573	g/s
	Mineral Loading	Point Source	0.040980015	g/s
	Haul Road	Line Source	0.002489145	g/s/m
	Overall Mine	Area Source	0.047153379	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000463726	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000017138	g/s
EMISSION ESTIMATION FOR QUARRY "E1"				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.085235660	g/s

	Blasting	Point Source	0.001088231	g/s
	Mineral Loading	Point Source	0.042288879	g/s
	Haul Road	Line Source	0.002491726	g/s/m
	Overall Mine	Area Source	0.066196924	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000688027	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000053696	g/s

TABLE 7.11: INCREMENTAL & RESULTANT GLC WITHIN CLUSTER

PM_{10} in µg/m^3	
Background	35.3
Incremental	13.63
Resultant	48.93
NAAQ Norms	**100 µg/m^3**
$PM_{2.5}$ in µg/m^3	
Background	21.4
Incremental	6.57
Resultant	27.97
NAAQ Norms	**60 µg/ m^3**
So2 in µg/m^3	
Background	6.1
Incremental	1.39
Resultant	7.49
NAAQ Norms	**80 µg/ m^3**
No2 in µg/m^3	
Background	23.3
Incremental	9.41
Resultant	32.71
NAAQ Norms	**80 µg/ m^3**

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.

$$Lp_2 = Lp_1 - 20 \log (r_2/r_1) - Ae_{1,2}$$

Where:

Lp_1& Lp_2 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.

$$Lp_{total} = 10 \log \{10^{(Lp1/10)} + 10^{(Lp2/10)} + 10^{(Lp3/10)} + \ldots\ldots\}$$

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)	Residential Area Standards dB(A)
Habitation Near P1	48.3	40.7	49.0	55
Habitation Near P2	47.5	44.5	49.3	
Habitation Near E1	41.4	41.6	44.5	

Source: Lab Monitoring Data

The incremental noise level is found within the range of 44.5 – 49.3 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 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), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment(Protection) Act, 1986).

Ground Vibrations

Ground vibrations due to mining activities in the all the 3 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 the all the 6 mines 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 6 mines respectively are as in below Table 7.21.

TABLE 7.13: NEAREST HABITATION FROM EACH MINE

Location ID	Distance & Direction
Habitation Near P1	930m-North East
Habitation Near P2	600m – North West
Habitation Near E1	840m - North East

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 3 MINES

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	20	930m-North East	0.098
P2	20	600m – North West	0.197
E1	20	840m - North East	0.115

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 –

The 6 mines shall contribute towards CER and the community shall develop.

TABLE 7.15: SOCIO ECONOMIC BENEFITS FROM 8 MINES

Location ID	Project Cost	CER
P1	Rs.1,60,59,000/-	Rs.3,00,000
P2	Rs.1,78,75,000/-	Rs.3,00,000
Total	**Rs.3,39,34,000/-**	**Rs.6,00,000**
E1	Rs. 1,46,40,700/-	Rs.5,00,000

Total	**Rs.1,46,40,700/-**	**Rs.5,00,000**
Grand Total	**Rs.4,85,74,700/-**	**Rs.11,00,000**

As per para 6 (II) of the office memorandum, all the mines being a green field project & Capital Investment is ≤ 100 crores, they shall contribute 2% of Capital Investment towards CER as per directions of EAC/SEAC.

- Proposed Projects shall fund towards CER – **Rs 6,00,000/-**
- Existing Projects shall fund towards CER – **Rs. 5,00,000/-**
- Projects in Cluster shall fund towards CER – **Rs 11,00,000/-**

TABLE 7.16: EMPLOYMENT BENEFITS FROM 8 MINES

Description	Employment
P1	23
P2	29
Total	**52**
E1	31
Total	**31**
Grand Total	**83**

A total of 81 people will get employment due to 4 proposed mines in cluster and 93 people are already employed at existing mines.

TABLE 7.17: GREENBELT DEVELOPMENT BENEFITS FROM 8 MINES

CODE	No of Trees proposed to be planted	Area to be covered in m^2	Name of the Species
P1	1080	Plantation along 7.5m safety distance, along approach road.	Neem, Vilvam, Ashokha , Panai etc.,
P2	800		
E1	1820		
Total	**3700**		

Source: approved Mining Plan

Based on the Proposed Mining Plans it's anticipated that there shall growth of native species of Neem, Vilvam, Ashokha, Panai, etc in the Cluster at a rate of 3700 Trees Planted over a period of 5 Years with Survival Rate of 80%

7.5 PLASTIC WASTE MANAGEMENT PLAN

All 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.

8.PROJECT BENEFITS

8.0 GENERAL

The Proposed Project for Quarrying Rough Stone at Idayarpalayam Village aims to produce 4,19,075m^3 Rough Stone over a period of 5 Years and 38,466m^3 of Gravel over a period of 2 Years This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits

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

8.1 EMPLOYMENT POTENTIAL

It is proposed to provide employment to about 52 persons 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 is located in Idayarpalayam Village, Sulur Taluk and Coimbatore District of Tamil Nadu 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.,

CORPORATE SOCIAL RESPONSIBILITY

Individual Project Proponents 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.

Under this programme, the project proponents will take-up following programmes for social and economic development of villages within 10 km of the project site. For this purpose, separate budget will be provided every year. For finalization of these schemes, proponent will interact with LSG. The schemes will be selected from the following broad areas –

- Health Services
- Social Development
- Infrastructure Development
- Education & Sports
- Self-Employment

CSR Cost Estimation

- CSR activities will be taken up in the Pachapalayam 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.

CORPORATE ENVIRONMENT RESPONSIBILITY

For the existing quarries 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.
As per para 6 (II) of the office memorandum, all the mines being a green field project & Capital Investment is ≤ 100 crores, they shall contribute 2% of Capital Investment towards CER.

For the proposed project it is recommended to spent Rs 6,00,000/- towards CER Activities for the nearby Government School Idayarpalayam Village, Coimbatore District) for Renovation or reconstruction of Existing Toilet, Provding Note books to the school library, Plantation in the school ground & any other recommendations by the School Head masters.

TABLE 8.1 CER – ACTION PLAN

Code	CER
P1	Rs 3,00,000/-
P2	Rs 3,00,000/-
Total	**Rs 6,00,000/-**

Source: Field survey conducted by FAE, consultation with project proponent

9. ENVIRONMENTAL COST BENEFIT ANALYSIS

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

10. ENVIRONMENTAL MANAGEMENT PLAN- P1

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.S. Nandhagopal 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 (unutilized areas, infrastructure, haul Roads) will be utilized for greenbelt development. Aesthetic of the Environment will not be affected. 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
Refueling to be undertaken in a safe location, away from vehicle movement pathways&100 m away of any watercourse Refueling activity to be under visual observation at all times. Drainage of refueling 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

There is no overburden or waste anticipated from proposed project.

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 upto a depth of 42m BGL, the water table in the area is 63m – 68m 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 are 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 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 and Gravelquarry 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 1080nos. of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area with survival rate 80%. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

TABLE 10.7: PROPOSED GREENBELT ACTIVITIES FOR 5 YEAR PLAN PERIOD

No. of tress proposed to be planted	Area to be covered in m^2	Name of the species
1080	Plantation along 7.5m safety distance, along approach road.	Neem, Pungam, Poovarasu, Athi etc.,

Source: Approved Mining plan

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.

10.8.2. 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 10.8.: RECOMMENDED SPECIES TO PLANT IN THE GREENBELT

SI.No	Name of the plant (Botanical)	Family Name	Common Name	Habit
1	*Aegle marmelos*	Rutaceae	Vilvam	Tree
2	*Borassus flabellifer*	Arecaceae	Panai-maram	Tree
3	*Pterocarpus marsupium*	*Pterocarpus marsupium*	Vengai	Tree
4	*Toona ciliata*	*Toona ciliata*	Santhana Vembu	Tree

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 –

- Identifying workers with conditions that may be aggravated by exposure to dust & noise and establishing baseline measures for determining changes in health.
- Evaluating the effect of noise on workers
- Enabling corrective actions to be taken when necessary
- Providing health education

The health status of workers in the mine shall 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 10.9.: MEDICAL EXAMINATION SCHEDULE

Sl.No	Activities	1st Year	2nd Year	3rd Year	4th Year	5th 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)					

Medical Follow ups: - Work force will be divided into three targeted groups age wise as follows: -		
Age Group	**PME as per Mines Rules 1955**	**Special Examination**
Less than 25 years	Once in a Three Years	In case of emergencies
Between 25 to 40 Years	Once in a Three Years	In case of emergencies
Above 40 Years	Once in a Three Years	In case of emergencies
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.		

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.
- Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment.
- 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.
- Strict observance of the provisions of DGMS Acts, Rules and Regulations in respect of safety both by management and the workers.
- The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- 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.

TABLE 10.10.: LIST OF PERIODICAL TRAININGS PROPOSED FOR EMPLOYEES

Course	Personnel	Frequency	Duration	Instruction
New-Employee Training	All new employees exposed to mine hazards	Once	One week	Employee rights Supervisor responsibilities Self-rescue Respiratory devices Transportation controls Communication systems Escape and emergency evacuation Ground control hazards Occupational health hazards Electrical hazards First aid Explosives
Task Training Like Drilling, Blasting, Stemming, safety, Slope stability, Dewatering, Haul road maintenance,	Employees assigned to new work tasks	Before new Assignments	Variable	Task-specific health &safety procedures and SOP for various mining activity. Supervised practice in assigned work tasks.
Refresher Training	All employees who received new-hire training	Yearly	One week	Required health and safety standards Transportation controls Communication systems

				Escape ways, emergency evacuations Fire warning Ground control hazards First aid Electrical hazards Accident prevention Explosives Respirator devices
Hazard Training	All employees exposed to mine hazards	Once	Variable	Hazard recognition and avoidance Emergency evacuation procedures Health standards Safety rules Respiratory devices

Source: Proposed by FAE's & EIA Coordinator as per DGMS Norms

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 10.11 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

TABLE 10.11: 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 / Compentent 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 Scheme period (150 Saplings)	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 check up for workers will be provisioned	IME & PME Health check up 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**

*Marked cost is already discussed in the mining plan hence that is not included in the total Environmental Management plan cost Total Cost for the five years.

Year	Total Cost	Year	Total Cost
1st year	₹ 8,62,000	6th Year	₹ 3,85,437
2nd year	₹ 3,17,100	7th Year	₹ 4,04,709
3rd year	₹ 3,32,955	8th Year	₹ 4,24,944
4th year	₹ 3,49,603	9th Year	₹ 4,46,192
5th year	₹ 3,67,083	10th Year	₹ 4,68,501
Total		**44 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- P2

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 Tmt. N. Chitradevi Limited 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 (unutilized areas, infrastructure, haul Roads) will be utilized for greenbelt development. Aesthetic of the Environment will not be affected. 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.B: 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
Refueling to be undertaken in a safe location, away from vehicle movement pathways&100 m away of any watercourse Refueling activity to be under visual observation at all times. Drainage of refueling 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

There is no overburden or waste anticipated from proposed project.

TABLE 10.2.B: 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 upto a depth of 57 m BGL, the water table in the area is 65m – 70m below ground level, hence the proposed projects will not intersect the Ground water table during entire quarry period.

TABLE 10.3.B: 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.B: 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.B: 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 are 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 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.B: 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 800nos. of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area with survival rate 80%. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

TABLE 10.7.B: PROPOSED GREENBELT ACTIVITIES FOR 5 YEAR PLAN PERIOD

No. of tress proposed to be planted	Area to be covered in m^2	Name of the species
800	Plantation along 7.5m safety distance, along approach road.	Neem, Vilvam, Ahokha, Panai etc.,

Source: Approved Mining plan

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.

10.8.2. 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 10.8.B: RECOMMENDED SPECIES TO PLANT IN THE GREENBELT

SI.No	Name of the plant (Botanical)	Family Name	Common Name	Habit
1	*Aegle marmelos*	Rutaceae	Vilvam	Tree
2	*Borassus flabellifer*	Arecaceae	Panai-maram	Tree
3	*Pterocarpus marsupium*	*Pterocarpus marsupium*	Vengai	Tree
4	*Toona ciliata*	*Toona ciliata*	Santhana Vembu	Tree

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 –

- Identifying workers with conditions that may be aggravated by exposure to dust & noise and establishing baseline measures for determining changes in health.
- Evaluating the effect of noise on workers
- Enabling corrective actions to be taken when necessary
- Providing health education

The health status of workers in the mine shall 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 10.9.B: MEDICAL EXAMINATION SCHEDULE

Sl.No	Activities	1st Year	2nd Year	3rd Year	4th Year	5th 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)					

Medical Follow ups: - Work force will be divided into three targeted groups age wise as follows: -		
Age Group	**PME as per Mines Rules 1955**	**Special Examination**
Less than 25 years	Once in a Three Years	In case of emergencies
Between 25 to 40 Years	Once in a Three Years	In case of emergencies
Above 40 Years	Once in a Three Years	In case of emergencies
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.		

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.
- Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment.
- 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.
- Strict observance of the provisions of DGMS Acts, Rules and Regulations in respect of safety both by management and the workers.
- The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- 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.

TABLE 10.10.B: LIST OF PERIODICAL TRAININGS PROPOSED FOR EMPLOYEES

Course	Personnel	Frequency	Duration	Instruction
New-Employee Training	All new employees exposed to mine hazards	Once	One week	Employee rights Supervisor responsibilities Self-rescue Respiratory devices Transportation controls Communication systems Escape and emergency evacuation Ground control hazards Occupational health hazards Electrical hazards First aid Explosives
Task Training Like Drilling, Blasting, Stemming, safety, Slope stability, Dewatering, Haul road maintenance,	Employees assigned to new work tasks	Before new Assignments	Variable	Task-specific health &safety procedures and SOP for various mining activity. Supervised practice in assigned work tasks.
Refresher Training	All employees who received new-hire training	Yearly	One week	Required health and safety standards Transportation controls Communication systems

				Escape ways, emergency evacuations Fire warning Ground control hazards First aid Electrical hazards Accident prevention Explosives Respirator devices
Hazard Training	All employees exposed to mine hazards	Once	Variable	Hazard recognition and avoidance Emergency evacuation procedures Health standards Safety rules Respiratory devices

Source: Proposed by FAE's & EIA Coordinator as per DGMS Norms

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 10.11 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

TABLE 10.11.B: 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 / Compentent 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 Scheme period (150 Saplings)	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 check up for workers will be provisioned	IME & PME Health check up 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**

*Marked cost is already discussed in the mining plan hence that is not included in the total Environmental Management plan cost Total Cost for the five years.

Year	Total Cost
1st year	₹ 8,62,000/-
2nd year	₹ 3,17,100/-
3rd year	₹ 3,32,955/-
4th year	₹ 3,49,603/-
5th 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

Idayarpalayam Rough Stone and Gravel Cluster Quarries (Extent 16.08.34 ha) consisting of 6 Proposed,1 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 projects are 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 Oct- Dec 2024 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 52 people directly in the proposed projects and indirectly around 100 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 Idayarpalayam Rough Stone and Gravel Cluster Quarries (Extent – 16.08.34 ha).

12. DISCLOSURE OF CONSULTANT

The Project Proponent's –

1.Thiru.S.Nandhagopal

2.Tmt.N.Chitrdevi 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 for the proposed project.

Name and address of the consultancy:

GEO EXPLORATION AND MINING SOLUTIONS

No 17, Advaitha 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. M. Ifthikhar Ahmed**	**In-house**	**1** **38**	**A** **B**	WP GEO SC	A A A
2	Dr. P. Thangaraju	In-house	**1**	**A**	HG GEO	A A
3	Mr. N. Senthilkumar	Empanelled	**31** **38**	**A** **B**	AQ WP RH	A B A
4	Mr. J. R. Vikram Krishna	Empanelled	**1** **38**	**A** **B**	SHW RH NV	A A A
5	Mr. A. Jagannathan	In-house	-	-	AP NV SHW	A A B
6	Mrs. Jisha parameswaran	In-house	-	-	SW	B
7	Mr. Govindasamy	In-house	-	-	WP	B
8	Mr. Panneer Selvam	In-house	-	-	EB	B
9	Mr. A. Allimuthu	In-house	-	-	LU	B
10	Dr. T. Sasikala	Empanelled	-	-	SE	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

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA/EMP

Declaration by experts contributing to the Cluster Draft EIA/EMP for Idayarpalayam Rough Stone & Gravel Cluster Quarries Project over an Extent of 16.08.34 ha in Idayarpalayam Village of Sulur Taluk, Coimbatore District of Tamil Nadu. 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: **July 2022 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. A. Jagannathan	
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.	Dr. M. Ifthikhar Ahmed	
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.	Dr. P. Thangaraju	
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	Mr. J. R. Vikram Krishna	

		▪ Management plan for safety.		
8	LU	▪ Construction of Land use Map ▪ Impact of project on surrounding land use ▪ Suggesting post closure sustainable land use and mitigative measures.	Mr. A. Allimuthu	
9	NV	▪ Identify impacts due to noise and vibrations ▪ Suggesting appropriate mitigation measures for EMP.	Mr. A. Jagannathan	
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	Dr. M. Ifthikhar Ahmed	
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 the Draft EIA/EMP for Idayarpalayam Rough Stone & Gravel Cluster Quarries Project over an Extent of 16.08.34 ha in Idayarpalayam Village of Sulur Taluk, Coimbatore District of Tamil Nadu. 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: 20-02-2023**
Validity:	**Valid till 05.09.2025**