DRAFT EIA & EMP FOR

PROPOSED ROUGH STONE AND GRAVEL QUARRY

CATEGORY – B1

(Submitted for Public Hearing as per the provisions of EIA Notification 2006 & its amendments thereof)

ToR Identification No. TO25B0108TN5771345N (F.No. 12577), dated 25.09.2025

PROPOSED QUARRY LEASE DETAILS	
SURVEY NO	381/1 (P)
VILLAGE	MELKARAIPATTI
TALUK	PALANI
DISTRICT	DINDIGUL
EXTENT	5.57.00 ha
CLUSTER EXTENT	24.39.00 ha
PROPOSED PRODUCTION OF ROUGH STONE AND GRAVEL- FIVE YEARS	ROUGH STONE: 13,10,240m^3 GRAVEL: 92,026 m^3
PEAK PRODUCTION	ROUGH STONE : 2,62,925 m^3 GRAVEL - 56,172 m^3
LAND	PATTA LAND

(Sector No. 1(a) Sector No.1 as per NABET)
Category of the Project: B1 Cluster Mining, Total Cluster Area – 24.39.00 ha
Baseline Monitoring Period – March 2025 to May 2025.

APPLICANT

M/S.SHRI RAJRUDHRA MINERALS PRIVATE LIMITED,
NO.99/2B1B, 1ST FLOOR, VELLORE MAIN ROAD,
ARCOT TALUK, RANIPET DISTRICT

ENVIRONMENTAL CONSULTANT	LABORATORY
M/s. GLOBAL MINING SOLUTIONS *(NABET Accredited & ISO 9001 Certified Consultant)* Plot No. 6, S.F.No. 13/2, A2, VS City, RC Chettypatty, Kottamettupatty, Omalur, Salem, Tamil Nadu – 636 455. NABET Accreditation No: NABET/EIA/23-26/SA 0241, Valid Until - January 4, 2026 Contact: 97502 23535 & 94446 54520 Email: infoglobalmining@gmail.com, globalminingsolutionssalem@gmail.com	**M/s. SHRIENT ANALYTICAL & RESEARCH LABS PRIVATE LIMITED** (NABL Accredited Testing Laboratory) Valid Until -30.11.2025 #416/15, Dhargas Road, Perungalathur, West Tambaram, Chennai, Tamil Nadu, India.

November - 2025

AMENDMENT PAGE

SL	Page No.	Section / Clause / Para / Line (as Applicable)	Date of Amendment	Amendment Made	Reasons of amendment	Signature of Person Authorizing Amendment
1						
2						
3						
4						
5						
6						
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8						
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10						

ACKNOWLEDGEMENT

M/s. Global Mining Solutions, Salem is very much thankful M/s.Shri Rajrudhra Minerals Private Limited, Lessee for the confidence and trust placed on the organization for carrying out Environmental Impact Assessment (EIA) study for the proposed Rough Stone and Gravel quarry over a lease extent of 5.57.00 Ha., & Cluster extent of 24.39.00Ha., located at Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State and formulating the Environmental Management Plan (EMP). We also gratefully acknowledge the cooperation and assistance provided by concerned government authorities for collection of secondary information for the preparation of EIA/EMP report. Our sincere thanks to the local people of Melkaraipatti Village and the nearby villages for their whole hearted cooperation and constant involvement during the entire field study without which the study would not have been possible.

For: M/s. Global Mining Solutions

(M. Prabu)

Managing Director

UNDERTAKING

In line with MoEF OM No. J – 11013/41/2006-IA.II (I) dated 5th October 2011, we hereby give our undertaking for owning the content and information in the EIA/EMP report submitted for EC of the proposed Rough Stone and Gravel quarry over a lease extent of 5.57.00 Ha., & Cluster extent of 24.39.00Ha.., located at Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State.

For: M/s. Global Mining Solutions

Name: M.Manikandan

EIA Coordinator – Mining

UNDERTAKING

In Line with OM no. J-11013/41/2006-IA.II (1) dated 4th Aug 2009 and its Amendments, we hereby confirm that all Terms of Reference issued by Ministry of Environment, Forest and Climate Change vide ToR Identification No. TO25B0108TN5771345N, (File No – 12577), Dated 25.09.2025 of EIA/EMP report for the proposed Rough Stone and Gravel Quarry over a lease extent of 5.57.00 Ha., & Cluster extent of 24.39.00 Ha.., located at Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State for the production of 13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years from the proposed lease area and the details has been complied in the EIA/EMP report is factually correct.

The EIA/EMP report has been prepared by M/s. Global Mining Solutions (GMS), Salem. GMS is a NABET accredited consultant for preparation of EIA/EMP report of Mining of Minerals (Opencast & Under Ground Mining) vide certificate No. NABET/EIA/23-26/SA 0241, valid till 04.01.2026.

For: M/s. Global Mining Solutions

Name: M.Manikandan
EIA Coordinator – Mining

भारतीय गुणवत्ता परिषद्
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Certificate of Accreditation

Global Mining Solutions

Plot No - 6 SF No 13/2 A2, VS City, RC Chettypatty, Kottamettupatty,Omalur,
Salem, Tamil Nadu-636455

*The organization is accredited as **Category-A** under the QCI-NABET **Scheme for Accreditation of EIA Consultant Organization, Version 3**: for preparing EIA/EMP reports in the following Sectors-*

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast/ underground mining	1	1 (a) (i)	A
3	Thermal power plants	4	1 (d)	B
5	Metallurgical industries (ferrous)	8	3 (a)	A
6	Cement Plants	9	3 (b)	A
26	Building and construction projects	38	8 (a)	B
27	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated May 20, 2025, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/25/3638 dated May 30, 2025. The accreditation needs to be renewed before the expiry date Eco Chem Sales and Services, Surat following due process of assessment.

Valid up to
January 4, 2026

Issue Date
May 30, 2025

Certificate No.
NABET/EIA/23-26/SA 0241

Varinder Kanwar

Prof (Dr) Varinder S Kanwar
CEO - NABET

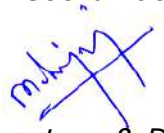
For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

DECLARATION BY EXPERTS

Declaration by Experts contributing to the proposed Rough Stone and Gravel Quarry over a lease extent of 5.57.00 Ha., & Cluster extent of 24.39.00 Ha., located at Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State for the production of 13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years.

I, hereby, certify that I was a part of the EIA team that developed the above EIA.

EIA Coordinator Name: M. Manikandan

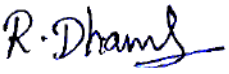
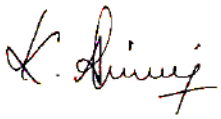
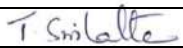


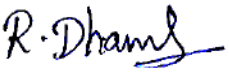
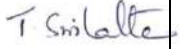
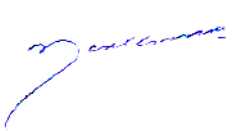
Signature & Date

Period of involvement: March 2025 to May 2025.

Contact information:

M/s Global Mining Solutions
Plot No.6, SF No. 13/2, A2, VS City, RC Chettypatty,
Kottamettupatty, Omalur,
Salem, Tamil Nadu – 636 455

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and Date
1	AP	Dhanalakshmi Ramanathan	Assessment of existing air quality, Impact of the project on ambient air and suggested mitigation measures for air pollution. Period: March 2025 to May 2025.	
2	WP	Abirami Kaliaperumal	Assessment of existing water quality, impact of the project on surface and ground water quality, suggested mitigation measures for minimizing the impact. Period: March 2025 to May 2025.	
3	SHW	Ramadoss N	Assessment of waste generated from the project, suggested waste management practices. Period: March 2025 to May 2025.	
4	SE	Sarasvathy K	Baseline SE studies. Data compilation and assessment. Impact of the project on SE status of the area. Formulation of CER plan. Period: March 2025 to May 2025.	
5	EB	Saravanan S	Baseline data collection of related to ecology of the area. Period: March 2025 to May 2025.	
6	HG	Ravinthiran N	Hydrogeological feature of the area. Ground water depth and impact of project on ground water of the area. Period: March 2025 to May 2025.	
7	AQ	Srilatha	Air quality modeling utilizing	

		Thiruveedhula	*the area source model. Predication of the ground level concentration of the dust. Suggesting suitable mitigation measures.* <u>*Period: March 2025 to May 2025*</u>*.*	
8	*NV*	*Dhanalakshmi Ramanathan*	*Ambient noise study of the area. Incremental noise generation due to quarry operation and impact of the noise due to the project.* <u>*Period: March 2025 to May 2025*</u>*.*	
9	*LU*	*Srilatha Thiruveedhula*	*Preparation of land use map based on satellite imagery. Land use classification and analysis. Impact prediction of the project on the surrounding land environment.* <u>*Period: March 2025 to May 2025*</u>*.*	
10	*RH*	*S.V. Prashant*	*Identification of the Risk related to the mining activities. Preparation of emergency disaster management plan. Plan for supply of safety equipment for the worker.* <u>*Period: March 2025 to May 2025*</u>*.*	
11	*SC*	*Shisupal Sing*	*Soil monitoring, secondary data collection on soil type, soil management practices, utilization of topsoil.* <u>*Period: March 2025 to May 2025*</u>*.*	
12	*GEO*	*Valliappan Meyyappan*	*Geological map, stability of quarry and dump, management plan for mine stability, after use of mining quarry and geological feature of the area.* <u>*Period: March 2025 to May 2025*</u>*.*	

EIA CONTENT

FIGURE LIST

TABLE LIST

LIST OF ANNEXURES

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1	TERMS OF REFERENCE (TOR)	1
2	PRECISE AREA COMMUNICATION LETTER	2
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4	500-METER RADIUS LETTER	4
5	VAO CERTIFICATE	5
6	LAND DOCUMENT	6
7	MONITORING REPORT	7
8	LAB NABL CERTIFICATE	8
9	STRUCTURES LOCATED WITHIN 500M RADIUS OF THE PROJECT	9
10	10KM MAP SHOWING FOREST AND SANCTUARIES	10
11	CER Letter	11

COMPLIANCE TO TERMS OF REFERENCE

S.No	ToR Points	Reply	Pg. No
1. Applicability of Specific Conditions:			
1	.In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.	Agreed	-
2	The above-mentioned proposal has been considered by SEIAA in the meeting held on 16.09.2025 The minutes of the meeting and all the Application and documents submitted [viz. Form-1 Part A, Part B] are available on PARIVESH portal which can be accessed by scanning the QR Code above.	Noted	
3	The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects recommended the proposal for grant of Terms of Reference with public hearing under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).	Agreed	
4	The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to issue the following Terms of Reference with public hearing for instant proposal of M/s. Shri Rajrudhra Minerals Private Limited under the provisions of EIA Notification, 2006 and as amended thereof.	Noted	
	The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.		

5	The Terms of Reference with public hearing to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.	Agreed	
6	This issues with the approval of the Competent Authority.	Noted	
7	The TORs with public hearing prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.	Agreed	
2	**SEAC Conditions - Site Specific**		
2.1	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.	A cluster management committee including all the proponents of the rough stone quarrying projects within the cluster of 500 m radius will be constituted for the effective implementation of appropriate environmental management plan. Affidavit in this regard will be submitted during final EIA/EMP Report.	-

2	The Boundary pillars to be erected as per the mine rules and the evidence should be submitted along with the EIA report.	Agreed. Proof photographs for erected pillars will be submitted in the Final EIA / EMP Report.	-
3	The details of enumeration of structures including schools, colleges, primary health centres should be submitted along with the EIA report.	Within a 300-meter radius, there is one brick unit, one farmhouse, three sheds, and three windmills. There are no schools, temples, or inhabited villages within a 300-meter radius. Enumeration study details are elaborated in Chapter 3.	-
4	The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & upto 1km shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations.	A Site survey has been conducted to identify and list structures located within a 300 m radius from the proposed Quarry and structures located within 300 m radius are given in section 3.5 of Chapter 3. Structures details from 300 m to 1 km will be incorporated in the Final EIA / EMP Report. Within a 300-meter radius, there is one brick unit, one farmhouse, three sheds, and three windmills. There are no schools, temples, or inhabited villages within a 300-meter radius.	Complied. Enclosed as Annexure 10.
5	The proponent shall furnish photographs of adequate fencing, garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	The green belt, fencing, garland drain work are in process and the proof photographs of the same will be submitted in the Final EIA/EMP Report. There are no permanent structures within a 50-meter radius of the proposed project site, and a safety distance of 7.5 meters along the boundary has been provided. There is tank situated on northeast side and is 160m away from the area, there is odai passing on east side and is 52m away from the area. Map showing the Safety distance is given in Figure 2.2 of Chapter 2.	-

6	The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report.	The bio diversity study has been carried out by our FAE is given in section 3.7.7 of Chapter 3.	117
7	The PP shall prepare the EMP for the entire project life of mine, i.e, 10 years and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	A detailed Environmental Management Plan has been prepared and are detailed in chapter 10. Affidavit stating to abide the EMP for the entire life of mine will be incorporated in the Final EIA / EMP Report.	-
8	The PP shall carry out the comprehensive studies on the cumulative environmental impacts of the existing & proposed quarries which included drilling & blasting, loading & hauling on the surrounding village and structures.	cumulative impact study due to mining operations in cluster are given in Section 7.4 of Chapter 7. Anticipated impacts and its mitigation measures for various attributes are detailed in Chapter 4.	-
9	For the safety of the persons employed in the quarry, the PP shall carry out the scientific studies to assess the slope stability of the existing quarry wall (exists without benches) **for spelling out the slope stability action plan with mitigation measures and working methodology**, by involving any one of the reputed Research and Academic Institutions such as CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IITMadras, NIT-Dept of Mining Engg, Surathkal, and Dept of Mining Engg., Anna University Chennai, etc. A copy of such scientific study report shall be submitted with an action plan accommodating the inclusion of haul road accessibility with maintaining the proper gradient by ensuring the slope stability of the working benches to be constructed and existing quarry wall.	This is fresh quarry and Slope Stability Study will be carried out through reputed institute once the quarry depth reaches 20 m.	

10	The PP shall install the CCTV camera for the continuous surveillance of mining activity & furnish the photographic/ videographic evidence along with the EIA report.	Agreed, The PP will install CCTV at the proposed mine lease area and submit proof in the Final EIA/EMP report.	-
3	**SEAC Standard Condition**		
1	In the case of existing/operation 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 lining lease area (viii) Condition of Safety zone/benches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6m height and ultimate depth of not exceeding 50m.	Not Applicable This is a proposed new project. No mining has been carried out in this lease area so far.	-
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.	There are no historical places, schools, cemeteries, temples, bird sanctuaries, and wildlife sanctuaries within 300 meters of the proposed project area. In this regard, the project proponent has received an official letter from the Village Administrative Officer, The letter copy enclosed as Annexure – 4.	Enclosed as Annexure 5

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.	A Site survey has been conducted to identify and list structures located within a 300 m radius from the proposed Quarry and structures located within 300 m radius are given in section 3.5 of Chapter 3. Structures details from 300 m to 1 km will be incorporated in the Final EIA / EMP Report. Within a 300-meter radius, there is one brick unit, one farmhouse, three sheds, and three windmills. There are no schools, temples, or inhabited villages within a 300-meter radius.	Enclosed as Annexure 10.
4	The PP shall submit a detailed hydrogeological report indicating the impact of proposed quarrying operations on the water bodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	A detailed hydro-geological report will be incorporated in the Final EIA Report.	-
5	The Project Proponent shall carry out Bio-diversity study through reputed institution and the same shall be included in the EIA report.	The bio diversity study has been carried out by our FAE is given in section 3.7.7 of Chapter 3.	117
6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries. Tiger reserve etc. upto a radius of 25 km from the proposed site.	The DFO letter will be incorporated in the Final EIA/EMP Report.	-
7	In 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/	Not Applicable This is a proposed new project. No mining has been carried out in this lease area so far.	**-**

	Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Suratkal 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.		
8	However, in case of the fresh/virgin quarries, the project 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 30m below ground level.	Slope stability study will be carried out once the quarry depth reaches 20 m.	-
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, ll/l Class mines manager appointed by the proponent	Affidavit will be incorporated in the Final EIA Report	-
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	Controlled blasting techniques using delay detonators and optimum charge per delay will be implemented in this quarry. The details on blasting parameters are given in section 2.9.2 of Chapter 2.	-
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.	The details to be incorporated at the time of final EIA Submission.	-
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	Not Applicable This is a proposed new project. No mining has been carried out in this lease area so far.	-

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 comer coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	Project coordinates superimposed in satellite imagery and given as Figure No – 2.2 in Chapter – 3. The geology and geomorphology map are provided in Figure No.3.24, 3.25 Chapter 3. The Soil map is provided under Figure No. 3.26, Chapter-3. The 10km Radius Index plan showing buffer zone is given in Figure No.3.1 & Figure 3.2a in Chapter – 3.	64 135 & 136 137 93 97
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing etc.,	The Drone survey will be caried out after commencement of the project operation.	-
17	The proponent shall furnish photographs of adequate fencing, greenbelt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan	There are no trees within ML area. Fencing and plantations are under process. Greenbelt / Plantation will be carried out in the safety zone to enhance the vegetative growth and aesthetic in the safety zone area. In the post mining stage, an area of 0.81.50 Ha will be under greenbelt and plantation.	-

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.	The geological reserves are estimated to be rough stone 35,80,590 m^3 and Gravel – 1,10,172 m^3 (67 m BGL). The mineable reserves of rough stone 13,10,240 m^3 and Gravel – 92,026 m^3(67 m BGL). The proposed total production quantity (Five years) is rough stone 13,10,240 m^3 and Gravel – 92,026 m^3(67 m BGL). Working methodology with justification details are given in Chapter 2.	76
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 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.	Complied. Please refer Fig. 10.1	188
20	The Project Proponent shall conduct the 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) 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 monitoring data, it may clearly be shown whether working all intersect ground water. Necessary data and documentation in this regard may be provided.	The hydrogeological study from a reputed institute is in progress and it will be incorporated in the final EIA report.	-

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.	The baseline data for all environments is collected for the Summer season (March to May 2025).	95
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 air pollution, water pollution, & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	Detailed cumulative impact study has been carried and the same is incorporated in the Chapter 4. Accordingly, a detailed Environment Management Plan is prepared considering air, water, noise and soil environment and the details are given in Chapter 10.	184
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Rain water harvesting Plan is given in chapter 4.	-
24	Land use of the study area delineating forest area, agricultural land, grazing land. Wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use 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 has been discussed in Section 3.7.6 of Chapter 3. details of surrounding ecological sensitive features have been provided in Table 3.1 under Chapter 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.4 under Chapter 2.	119
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. No dumps have been proposed outside the lease area. There is no overburden / waste generation from this quarry, the entire mined out minerals will be directly transported to the needy buyers.	-

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 famishedto the effect that the proposed mining activities could be considered.	No proximity to Critically polluted areas.	-
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.	The impact of the mining operations due to this quarry on water environment is studied and mitigation measures are proposed. Rain water harvesting plan is given Chapter 4.	-
28	Impact on local transport infrastructure due to the Project should be indicated	A traffic density study was carried out and are detailed in section 2.12 of Chapter 2.	-
29	A tree survey shall be carried out (Nos. name of species, age, diameter, etc) both within the mining lease applied area & 300m buffer zone and its management during mining activity	The details on tree survey covering 300 m radius is given in section 3.7.7 of chapter 3.	-
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific	The mine closure plan details are given in section 2.10 of Chapter 2 and section 7.6 of Chapter 7.	179
31	As 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, where ever possible	Accepted. It will be done.	-
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	Green belt is proposed in an area of 0.81.50 ha. Green belt development plan provided is given in Chapter 4.	143

	the DFO, State Agriculture University and local school/college authorities. 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.		
33	Taller/one year old saplings raised in appropriate size of bags; preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/horticulturist with regard to site-specific choices. The proponent shall earmark the green belt area with GPS coordinates all along the boundary of the project site with at least 3 m wide and in between blocks in an organized manner	The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the ecofriendly bags should be purchased and planted with the spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist.	-
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.	A disaster management plan is prepared and the details are given in Chapter 7.	177
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	Risk assessment and its management is given in Chapter 7.	173
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.	Occupational Health Impacts of the project and preventive measures are detailed under Chapter 4.	164
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.	No major impact on public health will be there since the villages are located more than 1km from the lease area. Details of CER and CSR are discussed under Chapter No. 8	-

38	The Socio-economic studies should be carried out within a 5km 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.	Socio economic study is conducted both by visits and secondary data collection. Details are given in Chapter 3	128
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.	No litigation is pending	-
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.	Benefits of the project is given in Chapter 8	181
41	If any quarrying operations were carried out in the proposed quarrying site for which now 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.	The lease applied area is fresh quarry.	-
42	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	The EMP is planned for the entire life of the mine. The affidavit for the same will be included in the Final EIA/EMP Report.	-
43	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the condition mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986	Agreed	-

3. Seiaa Specific Conditions			
3.1	The authority noted that the subject was appraised in the 611th meeting of SEAC-II held on 29.08.2025. 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 **13,10,240m3 of Rough Stone and 92,026m3 of Gravel upto the depth of 67m BGL and the annual peak production is 2,62,925m3 of Rough Stone and 56,172m3 of gravel** 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 SEIAA Standard conditions.	Agreed	
4.0 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.	There are three quarries (1 - Existing + 2 Proposed) including this proposal within a 500-metre radius. The proponent will take the initiative to form a cluster management committee once environmental clearance is obtained for this quarry as well as the other proposed quarry.	
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.,	Agreed. Will be complied.	-
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.	Agreed. The list of members of the committee formed will be submitted to AD/mines after obtaining Environmental Clearance.	-

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.	Agreed. Details of the Operation plan for cluster mining operations will be submitted once we get environmental clearance for all quarries proposed in the cluster area.	-
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	Risk management plan for the individual quarry is given in this report. As far as cluster working condition is concerned, once the committee is formed, risk management as a cluster including inundation of clusters and the evacuation plan will be elaborated and the same will be submitted to the EIA.	-
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.	Environmental policy for the cluster will be framed by the cluster management committee and the policy will be in accordance with EPA Act, 1986 and its amendments, guidelines by MoEF&CC/SEIAA and other regulatory bodies. This policy will be displayed in the quarry.	-
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.	Agreed. It will be complied as mentioned in the Point No.4	-
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.	Agreed. It will be complied as mentioned in the Point No.4.	-
Agriculture & Agro-Biodiversity			
9	Impact on surrounding agricultural fields around the proposed mining Area.	There are no Agriculture, forest area and traditional practices within the project area. However, there are some agricultural land around the project site. It may be affected due to the quarry operation as such dust particles sedimentation in the	-

		agricultural land. It will be controlled at the source level by proper dust suppression as such wet drilling, controlled blasting and water sprinkling on the project roads and project surrounding roads. As per Air Quality Modelling, the impact of the air quality limited to 400m radius. So, there is no impact for the Agriculture, Forestry & Traditional practices located within 10km radius.	
10	Impact on soil flora & vegetation around the project site.	The chemical and physical characteristics of the soil is given in Table 3.7.5 of Chapter 3. The anticipated impact and its mitigation measures for soil environment and biological environment are detailed in section 4.2.2 & 4.4.5 of Chapter 4 respectively.	116
11	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	There is no standing trees or vegetation within the mine lease area.	117
12	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	The ecological details have been provided in Section 3.7.7 under Chapter 3 and measures have been provided in Section 4.4.5 under Chapter 4.	117
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem, as discussed in Chapter 4.	117
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The impact of project on the land environment has been discussed in Section 4.2.1 under Chapter 4.	117

Forests			
15	The project proponent shall detailed study on impact of mining on Reserve Forests free ranging wildlife.	There are only one R.F in buffer zone of the project i.e. Dalavaipattinam R.F. – 6.6 km(N). □and there are no No R.F in 1 km radius of the project site.	91
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The impacts of the project on biological environment is given in section 4.4.5 under Chapter 4.	117
17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	There are no standing trees within lease area.	-
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	No R.F within 1 km radius and there is no, National Parks, Corridors and Wildlife pathways.	-
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.	The hydrogeological study from a reputed institute is in progress and it will be incorporated in the Final EIA report.	
20	Erosion Control measures.	There is no waste generation (OB) in this quarry has been envisaged. However, there may be erosion due to rainy season and that is limited within quarry area. The control measures are explained in 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.	Complied. The study details are incorporated in Chapter 3. Anticipated impacts and its mitigation measures are detailed in Chapter 4.	
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	There is no wastewater generation from this Quarry, so this is not applicable.	-
23	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	Fragmentation impact on environment may be due to drilling and blasting. The anticipated impacts and mitigation measures are discussed in Chapter 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 Flora and Fauna study covering 10 km radius are detailed in section 3.7.7 of chapter 3. The impacts anticipated with respect to the environment of the project area is very negligible and it will be minimized within the project area. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area.	117
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	The impact of mining on soil environment has been discussed in Section 4.2.2 under Chapter 4.	-
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	The anticipated impact and its mitigation measures for Water Environment are detailed in section 4.2.3 of Chapter 4.	92
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.	The proposed quarry operation is Opencast Mechanized operation with drilling, blasting, excavation, loading and transportation. So, the effect of Hydrothermal/Geothermal is not envisaged. This is a simple mining operation, so bio-geochemical processes are not envisaged.	92

		Due to mining operation, there may be minimum impact to the nearby water bodies due to dust sedimentation. It will be controlled by wet drilling, water sprinkling and plantation.	
Energy			
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilize the Energy shall be furnished.	The measures taken to control noise, air, water, and dust have been given under Chapter 4.	141
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.	The carbon emission and the measures to mitigate carbon emission have been discussed in Section 4.4.5 under Chapter. Only the best equipment will be used, and it will be properly and regularly maintained. Regular vehicular emission tests will be conducted on the transport vehicles to ensure minimal carbon emissions. To further reduce carbon emissions, a good greenbelt plan has been planned.	141
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.		141
31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.		141
Mine Closure Plan			
32	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Complied. Mine Closure Plan has been incorporated in the approved Mining Plan and the same is incorporated in the Chapter 7.	179
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.	Complied. The details are described in Chapter 10.	184
34	The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine	Complied. The details are described in Chapter 10.	190

	closure plan including disaster management plan.		
Risk Assessment			
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	Complied. The details are described in Chapter 7.	174
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.	Complied. The details are described in Chapter 7.	177
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.	There are no historical places, schools, cemeteries, temples, bird sanctuaries, and wildlife sanctuaries within 300 meters of the proposed project area. In this regard, the project proponent has received an official letter from the Village Administrative Officer, The letter copy enclosed as Annexure – 4.	-
38	As per the MoEF& CC office memorandum F.N0.22-65/2017-1A.11I dated: 30.09.2020 and20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	Noted. The concerns raised during the public consultation and all the activities proposed will be updated in the final EIA report.	-
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	Complied. The PP has framed detail solid waste management system for the project are and the same will be executed by proper awareness and sign boards. The sign boards will be	-

	environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	in two language i.e., Vernacular language (Tamil) and common language (English). The plastic waste generation is very negligible and it will be collected from the source level in specific dustbin and disposed through the municipal bins.	
Standard Terms of Reference for (Mining of minerals)			
1.1	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, the lease applied area is fresh quarry.	-
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given	This proposed project area is classified as Patta land registered in the name of Applicant (M/s. Shri Rajrudhra Minerals Private Limited) vide patta no. 2059.	-
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. All documents including approved mine plan, EIA and Public Hearing are compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and is in the name of the lessee.	-
1.4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the areashould be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)	Project coordinates superimposed in satellite imagery and given as Figure No – 2.1 in Chapter – 2. The geology and geomorphology map are provided in Figure No.3.24, 3.25 Chapter 3. The Soil map is provided under Figure No. 3.26, Chapter-3. The 10km Radius Index plan showing buffer zone is given in Figure No.3.1 & Figure 3.2 in Chapter – 3.	64 135 & 136 137 93 97

1.5	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	The following map in 1:50,000 Scale: Geology map of the project area covering 10km radius – Figure No. 3.17. Geomorphology Map of the Study Area covering 10 km radius – Figure No. 3.18. Drainage map – 3.16	119
1.6	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	(a) Precise Area Communication: The Project Proponent has obtained Precise Area Communication from the Assistant Director, Department of Geology and Mining, Dindigul, vide Rc.No.589/2025 (Kanimam) dated 28.07.2025. The letter copy enclosed as Annexure – 2. (b) Mining Plan Approval: The project proponent has prepared mining plan under rule 19(l),41 &42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and the same has been approved by the Assistant Director, Dept. of Geology & Mining, Dindigul vide Rc.No.589 / 2025 / Mines, Dated 07.08.2025. The approval letter along with approved plan is enclosed as Annexure – 3.	-
1.7	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 noncompliances	Environmental policy for the cluster will be framed by the cluster management committee and the policy will be in accordance with EPA Act, 1986 and its amendments, guidelines by MoEF&CC/SEIAA and other regulatory bodies. This policy will be displayed in the quarry.	-

	/ violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large,may also be detailed in the EIA Report.		
1.8	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	Risks are identified and the management is given in Chapter 7.	173
1.9	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	90
1.10	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	The land use of the study area was studied to demarcate various LULC categories and its details are provided under section 3.7.6. 0f Chapter-3. The land use pattern at present and at the end of the quarrying period has been provided in Table 2.4, Chapter-2. The Conceptual plan of mine lease area is shown in Figure No-2.10.	97
1.11	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	The entire material quarried out will be sold. No waste generation from this quarrying operation.	-
1.12	A 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	There is no Forest Land involved in the proposed project area. The proposed project area is a patta land. Approved Mining Plan is enclosed in Annexure – 2.	92

	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 State Expert Appraisal Committees		
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.	92
1.14	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.	-
1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given	There are only one R.F in buffer zone of the project i.e. Dalavaipattinam R.F. – 6.6 km(N)□and there are no R.F in 1 km radius of the project site.	92
1.16	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	The mining lease area and the 10 km buffer zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc.	-
1.17	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	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.	92

	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 Wildlifeand copy furnished.		
1.18	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	A detailed study of flora and fauna composition in the core and buffer zone of the project has been made. The details are furnished in section 3.7.7.	117
1.19	Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered	Not Applicable	-

1.20	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	-
1.21	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	The mining activities will be carried out within the mine lease area only. The entire mine lease area of 5.57.00 Ha is a patta land. There is no population within the ML area. Hence, the question of R& R does not arise.	

1.22	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. Sitespecific 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 for meteorology, ambient air quality, Water quality, noise level, soil and flora & fauna are collected during Pre-Monsoon season (March 2025 to May 2025) and detailed in Chapter-3.	95
1.23	Air quality modeling 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 modeling 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 and Detailed in Section 4.2.4.3.	160
1.24	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	The entire water requirement for the project is 5.0 KLD which will be sourced from outside agencies. Negligible sewage of 1.0 KLD will be generated, for which a septic tank with soak pit will be set up. The water balance diagram is shown in Chapter 2.	146

<table>
<tr><td>1.25</td><td>Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided</td><td>Not Applicable.

The required water will be outsourced from the nearby village.</td><td>-</td></tr>
<tr><td>1.26</td><td>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</td><td>Details of water conservation plan are given chapter 4.</td><td>146</td></tr>
<tr><td>1.27</td><td>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</td><td>Impact Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Section 4.2.3.</td><td>140</td></tr>
<tr><td>1.28</td><td>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 State Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished</td><td>The quarrying activity will not intersect ground water table as quarrying is proposed upto a depth of 67 m bgl and water table is found at a depth of 93 m BGL.</td><td>-</td></tr>
<tr><td>1.29</td><td>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</td><td>Not applicable.

There is no stream, seasonal or otherwise, passing through the lease area.</td><td>-</td></tr>
<tr><td>1.30</td><td>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</td><td><table><tr><td>Site Elevation above MSL</td><td>310 m from MSL</td></tr><tr><td>Ultimate Depth</td><td>67 m bgl</td></tr><tr><td>Ground water</td><td>90 - 93 m BGL.</td></tr></table></td><td>-</td></tr>
</table>

1.31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given.The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution	Greenbelt Development Plan & Recommended Species proposed for Greenbelt Development are detailed in Section 4.4.5.4. 0.81.50 hectares of land are allotted for greenbelt development (815 Saplings).	-
1.32	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	The traffic density study was carried out and the same is given in section 2.12 of Chapter 2.	-
1.33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report	Temporary Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in Section 2.11.4 of Chapter 2	-
1.34	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	The post mining land use/conceptual land use of the study area is given in Chapter 2.	82

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 and safety study is given in Para 10.1.5 of Chapter-3.	164
1.36	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 major impact on public health will be there since the villages are located more than 1km from the lease area.	-
1.37	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	This project provides employment to 38 people directly & indirectly. Local people will be hired for unskilled labour. Through CSR, nearby schools, villages will be benefitted. For CER, INR 5.0 Lakhs is allocated. Based on the demand of the people during public hearing, further funds will be allocated, if necessary.	-
1.38	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	Environmental Management plan details are given in Chapter 10.	184
1.39	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	During public hearing process, the opinions and demands of the people will be noted. The replies and commitment made by the proponent along with time bound action plan wherever applicable will be provided in Final EIA/EMP report.	-

1.40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given	There is no litigation pending against the project.	-
1.41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out	Project Cost is Rs. 159.35 Lakhs (including EMP & CER cost) CER Cost is Rs.5.0/- lakhs EMP Cost is Rs. 34.93 Lakhs Capital Cost is Rs. 16.36 Lakhs Recurring Cost is Rs. 18.57 Lakhs for five years. The break up of the EMP cost is given in Table 10.2 of Chapter 10.	190
1.42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report	The disaster and its management plan is given in Chapter-7.	177
1.43	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	This project will contribute financially through payment of taxes like royalty, GST, etc. The project will also contribute via CSR. The demands of people during public hearing will also be considered by the project proponent. This project provides employment to 38 people directly. Local people will be hired for unskilled labour. Through CSR, nearby schools, hospitals will be benefitted. For CSR, INR 5.0 Lakhs has been allocated.	-
1.44	Besides the above, the below mentioned general points are also to be followed:- a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) Project Proponent shall enclose all the analysis/testing reports	Yes, Complied.	

	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. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF 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. g) 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. h) 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. a. The EIA report should also include surface plan of the area indicating contours of main topographic features, drainage and mining area, b. eological maps and sections and c. sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area		

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CHAPTER 1

INTRODUCTION

1.1 PURPOSE OF THE REPORT

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.

Rough Stone are the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of all proposed & existing quarries located within 500 m radius of the project area.
M/s.Shri Rajrudhra Minerals Private Limited proposes to operate Rough Stone and Gravel Quarry over an extent of 5.57.00 Ha Patta Land in S.F. No. 381/1(P) of Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State and ToR obtained vide ToR Identification No. TO25B0108TN5771345N, (File No – 12577), Dated 25.09.2025.

This proposed project is categorized under category "B1" Activity 1(a) (mining lease area in cluster situation). This cluster includes the one existing quarry and two proposed Quarries including this proposed Quarry. The existing and proposed quarries located within 500m radius are detailed in below Table.

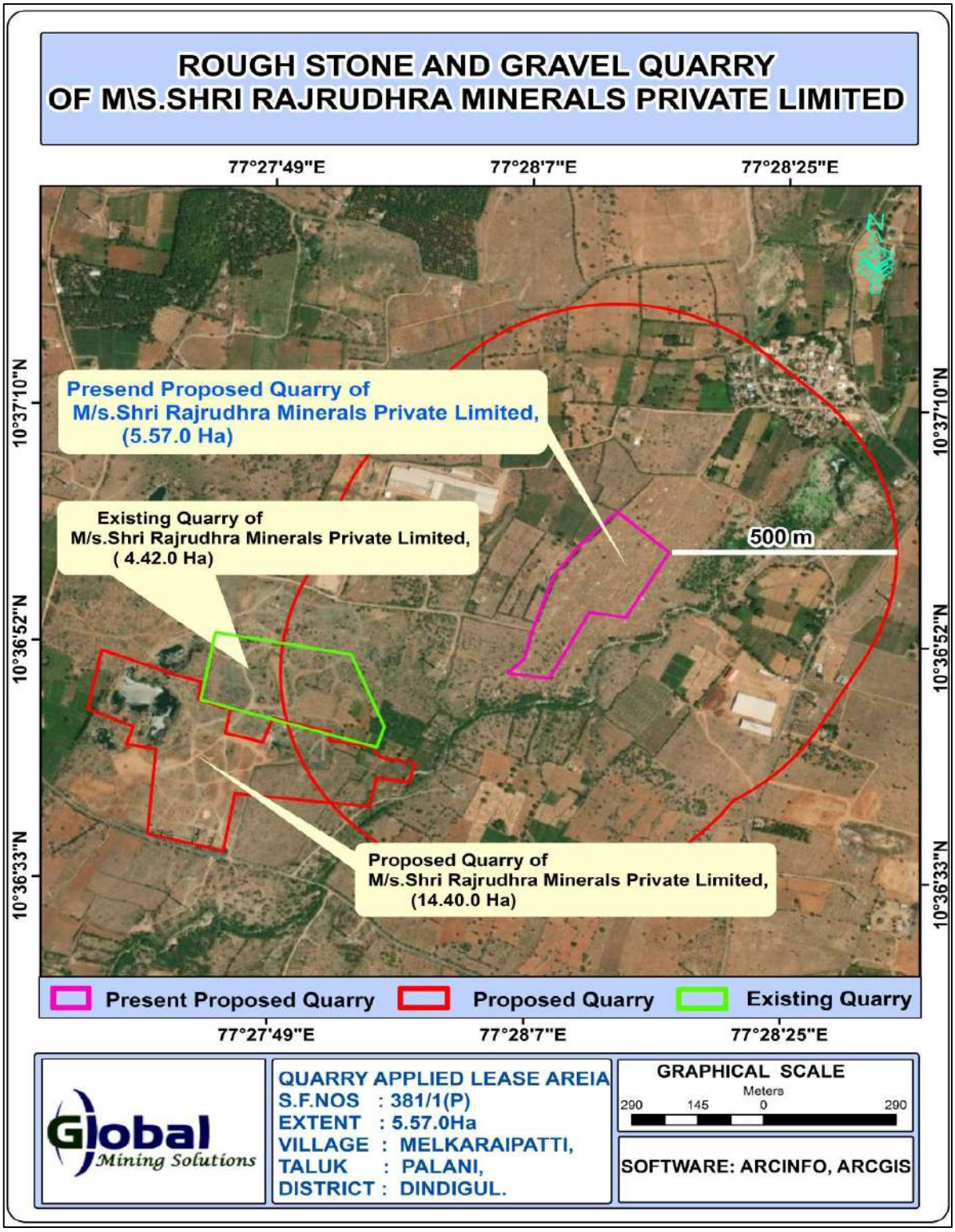
Table 1.1 – Details of Quarries within 500m Radius

Sl. No	Name of the Lessee	S. F. No.	Extent (Ha)	Lease Status
a. Existing Quarries				
1	M/s.Shri Rajrudhra Minerals, Private Limited, No.99/2B1B, 1st Floor, Vellore Main Road, Arcot Taluk, Ranipet District	392/2(P), 393/2(P), 394/1, 395, 396/1, 397, 398/1A1(P)	4.42.0 Ha	06.03.2024 – 05.03.2029
b. Proposed Quarries				
1	M/s.Shri Rajrudhra Minerals Private Limited, No.99/2B1B, 1st Floor, Vellore Main Road, Arcot Taluk, Ranipet District	381/1(P)	5.57.0 Ha	Applied (Rough stone)
2	M/s.Shri Rajrudhra Minerals Private Limited, No.99/2B1B, 1st Floor, Vellore Main Road, Arcot Taluk, Ranipet District	394/2, 396/2, 402(P), 403(P), 407/1A1,407/1A2, 407/1B,407/2A, 407/2B,408/1(P), 408/2(P),408/4, 409(P),698(P)	14.40.0 Ha	Proposed (Rough stone)
Total Cluster Area			**24.39.00 Ha**	

Cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016. Satellite image of Quarries in Cluster is shown in Fig 1.1.

As per MoEF&CC OM: F.No.L-11011/175/2018-IA-II(M), dated 12.12.2018, the EIA/EMP report has to be prepared for the cluster area based on ToR recommended by SEIAA. Therefore, the applicant applied for ToR through Parivesh website vide online proposal no. SIA/TN/MIN/547636/2025, Dated 09/08/2025. The ToR proposal was placed in 611h SEAC meeting, dt 29.08.2025 and 887th SEIAA meeting, dated 16.09.2025. Then ToR has been issued by the SEIAA vide ToR Identification No. TO25B0108TN5771345N, Dated: 25/09/2025 to prepare the draft EIA report as per the recommended ToR for conducting Public hearing and obtaining Environmental Clearance from the SEIAA.

Figure.1.1 Satellite Image showing cluster quarries



IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

1.1.1 IDENTIFICATION OF PROJECT

Table -1.2 Project Identification

Name of the Project	Rough Stone and Gravel Quarry of M/s.Shri Rajrudhra Minerals Private Limited
S.F No.	381/1(P)
Location of the Project	Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State
Extent	5.57.00 Ha
Type of Land	Patta Land

1.1.2 IDENTIFICATION OF PROJECT PROPONENT

Table -1.3- Details of Project Proponent

Name of the Project Proponent	M/s.Shri Rajrudhra Minerals Private Limited
Communication address	No.99/2B1B,1st floor, Vellore Main Road, Arcot Taluk, Ranipet District, Pincode-632 503
e-mail Address	-
Mobile No.	7867008858

1.2 BRIEF DESCRIPTION OF THE PROJECT

1.2.1 NATURE AND SIZE OF THE PROJECT

The quarrying operation is proposed to be carried out by Opencast Mechanized Mining Method by jack hammer drilling, slurry blasting by forming 5.0 m bench height and 5.0 m bench width. Excavator and tippers are proposed for Loading and transportation.

Table – 1.4 Brief Descriptions of the Project

Name of the Quarry	Rough Stone and Gravel Quarry of M/s.Shri Rajrudhra Minerals Private Limited	
Toposheet No	58 F/06	
Latitude	10°36'48.85"N to 10°37'01.96"N	
Longitude	77°28'05.89"E to 77°28'17.36"E	
The altitude of the area	310 m (AMSL)	
Proposed Depth of Mining	67 m BGL	
Geological Resources	35,80,590 m^3 Rough Stone & 1,10,172 m^3 Gravel	
Mineable Reserves	13,10,240 m^3 of Rough Stone & 92,026 m^3 Gravel	
Proposed Production (5 Years)	13,10,240 m^3 of Rough Stone & 92,026 m^3 Gravel	
Ultimate pit Dimension	407 m (L) X 116 m (W) X 67 m (D), Depth - 67 m BGL	
Water Level in the area	90 - 93 m BGL	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The area applied for quarry lease is exhibits almost plain topography covered by Gravel formation. The massive Charnockite formation is noticed below 2 m (Avg) Gravel and sloping towards Southeastern side of the area, the altitude of the area is above 310 m (maximum) from MSL.	
Machinery Proposed	Jack Hammer	14 Nos
	Compressor	4 Nos
	Excavator with bucket and rock breaker	2 Nos
	Tipper (10/20 T)	6 Nos
Environmental Setting within 500m Radius	Odai- 52m (E), Tank – 160 m (NE), Amaravathi River – 2.8km (NW), Shanmugha River – 2.6km (E), Tank – 1.4 km (S), Alangulam – 3.8 km (SE),	

<table>
<tr><td></td><td>Tank- 4.5km (NE).
Nearest Habitation - Kottathurai Habitation- 380m (NE).
Nearest RF -Nil within 500m Radius</td></tr>
<tr><td>Details of Habitation</td><td>
<table>
<tr><th>S. No</th><th>Name of the Village</th><th>Approximate distance & Direction from lease applied area</th><th>Approximate population</th></tr>
<tr><td>1.</td><td>Kottathurai</td><td>0.43 km-NE</td><td>400</td></tr>
<tr><td>2.</td><td>Rajampatti</td><td>2.3 Km – NW</td><td>500</td></tr>
<tr><td>3.</td><td>Melkaraipatti</td><td>1.7km – SE</td><td>800</td></tr>
<tr><td>4.</td><td>Panampatty</td><td>2.9km - SW</td><td>300</td></tr>
</table>
</td></tr>
<tr><td>Proposed Manpower Development</td><td>38 Nos</td></tr>
<tr><td>Water Requirement</td><td>5.0 KLD</td></tr>
<tr><td>Greenbelt Development</td><td>The safety zone of 0.81.50 Ha will be developed with about 815 Nos. of plantation.</td></tr>
<tr><td>Fuel Requirement</td><td>10,63,530 L of HSD (Entire Project Life)</td></tr>
<tr><td>Project Cost</td><td>Rs. 159.35 Lakhs (Including operational + Fixed Asset + EMP cost + CER cost).</td></tr>
<tr><td>EMP Cost</td><td>Total EMP Cost for 5 years is 34.93 lakhs i.e., Rs.16.36 Lakhs of Capital + Recurring cost Rs. 18.57 lakhs for five years</td></tr>
<tr><td>CER Cost</td><td>Rs. 5.0 Lakhs</td></tr>
<tr><td>Applicability of CRZ Clearance</td><td>Not Applicable</td></tr>
<tr><td>Nearest Crusher</td><td>730 m (SW)</td></tr>
</table>

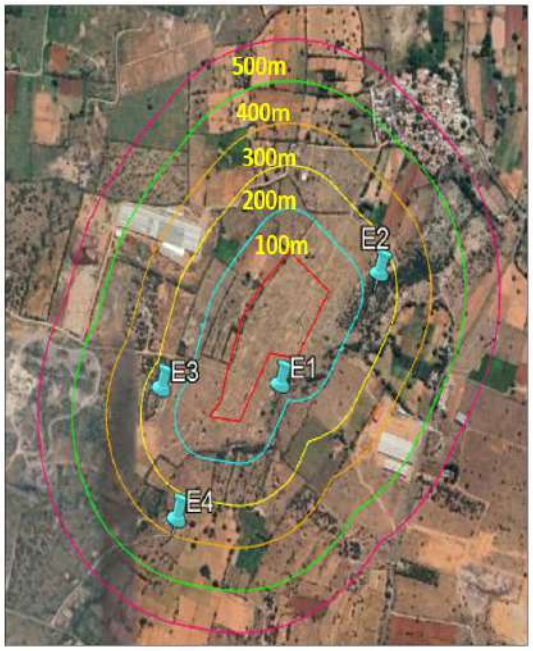
1.2.2 NATURE OF THE PROJECT

Sector	1(a) Non-Coal Mining
Type	Fresh Quarry
Category	B1 (Cluster Situation)
Mineral	Minor mineral of Rough Stone

1.2.3 LOCATION OF PROJECT

The proposed Quarry lease area is situated at S. F. No. 381/1(P) of Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State. The area lies in the north **Latitude:** 10°36'48.85"N to 10°37'01.96"N and **Longitude**: 77°28'05.89"E to 77°28'17.36"E. Location of the proposed project is shown in Figure 2.1 and the satellite imagery of the project site is shown in Fig 2.2. The details of Environmental Sensitivity within 500 m radius are shown below:

ENVIRONMENTAL FEATURES LOCATED WITHIN 500m RADIUS FROM THE PROPOSED QUARRY SITE



S. No.	Name of the Feature	Distance and Direction
E1	Odai	52m (E)
E2	Tank	160m(NE)
E3	Windmill	160(SW)
E4	Windmill	307m(S)

Figure 1.2 – Environmental Features Map

1.3 IMPORTANCE OF THE PROJECT TO THE REGION

Rough stone will continue to be a staple in construction, decoration and industry for years to come. As recycling picks up, mining and quarries may slow down, but we will always need rough stone in general construction and industry.

1.4 REGULATORY COMPLIANCES

Understanding of the applicable environmental legislative framework is crucial for understanding the scope of the EIA study. With respect to prevention and control of environmental pollution, the following Acts and Rules of MoEF&CC (Ministry of Environment Forests and Climate Change), GoI (Government of India) govern the proposed project. The applicable environmental legislation for the proposed mining project is detailed below,

- Environment protection Act, 1986
- EIA Notification, 2006 & Subsequent amendments
- Water Pollution (Prevention & Control) Act, 1974
- Air Pollution (Prevention & Control) Act, 1981
- Noise Pollution (Regulation 7 Control) Rules, 2000
- Mines Act,1952
- Tamil Nadu Minor Mineral Concession Rules, 1959
- Mines and Minerals (development and regulation) Act,1957
- Minor Minerals Conservation and Development Amendment Rules 2018
- State Minor Mineral Concession Rules (GMMCR), 2017
- Explosive Act ,1884
- Explosive Rules,2008
- Hazardous and other Wastes (management and Transboundry Movement) Rules, 2016
- Batteries (Management and Handling) Rules 2010
- Solid Waste Management Rule 2016

1.4.1PRESENT LEGAL STATUS

Table 1.5 – Present Legal Status

Description	Issuing Authority	Status	Letter number	Date	Reference
Precise Area Communication	Assistant Director, Department of Geology and Mining, Dindigul	Received	Rc.No. 589/2025(Kanimam)	28.07.2025	Annexure - 2
Mine Plan Approval Letter	Assistant Director, Department of Geology and Mining, Dindigul	Approved	Rc.No. 589/2025/Mines	07.08.2025	Annexure-3
500m radius Cluster Letter	Assistant Director, Department of Geology and Mining, Dindigul	Obtained	Rc.No. 589/2025/Mines	07.08.2025	Annexure-4
VAO NOC for features within 300m radius	VAO, Melkaraipatti	obtained	-	01.08.2025	Annexure-5

1.4.2 SCREENING

As per the Environmental Impact Assessment (EIA) Notification dated 14th September 2006 and its subsequent amendments the proposed quarry mining project falls under 'Category B1(Cluster Situation)', which requires Environmental Clearance from the State Environmental Impact Assessment Authority (SEIAA). The project proponent has appointed M/s. Global Mining Solutions, Salem, who are accredited by the National Accreditation Board for Education and Training (NABET), Quality Council of India (QCI), New Delhi, under the registration number NABET/EIA/23-26/SA 0241. Their role is to carry out an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) study in compliance with the Ministry of Environment, Forest and Climate Change (MoEF & CC) requirements.

1.4.3 SCOPING

The proposal was placed in the 611th meeting of SEAC on 29.08.2025. Based on the presentation and documents furnished by the project proponent, SEAC decided to recommend the proposal for the grant of Terms of Reference (ToR) to SEIAA and SEIAA recommended ToR in its 887th meeting dated 16.09.2025.

1.4.4 SCOPE OF THE STUDY

In line with the prescribed Terms of Reference (TOR), the area comprising 10 km radius around the proposed mine lease boundary is considered as the study area. The EIA/EMP report has been prepared following the generic structure specified in the EIA Notification 2006. The detailed studies have been conducted as per prescribed Standard TOR issued by SEIAA, TamilNadu vide ToR Identification No. TO25B0108TN5771345N, (File No – 12577), Dated 25.09.2025. The point wise compliance for the ToR has been incorporated in this EIA/EMP report.

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 this applied project area. 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 Period of March 2025 – May 2025 for various environmental components so as to assess the anticipated impacts due the cluster quarry projects on the environment and suggest suitable mitigation measures for likely adverse impacts due to this proposed project.

The scope of study broadly covered as below,

- Literature review and collection of secondary data relevant to the study area.
- Establish the baseline environmental aspects in and around the proposed project covering 10 km radius.
- Identify various existing pollution loads due to various mining activities.
- Predict incremental levels of pollutants in the study area due to the proposed operations.
- Establishing and analyzing demographic profile including sex ratio, literacy rate, SC/ST, workers classification, land use categorization, etc in the project influenced area
- Evaluate the predicted impacts on various environmental attributes in the study area by using scientifically developed and widely accepted environmental impact assessment methodologies.
- Prepare an Environment Management Plan (EMP) outlining the measures for improving the environmental quality and identify critical environmental attributes that are required to be monitored in the post-project scenario.
- To assess the impacts on human settlement in the project influence area Socio-Economic Assessment
- Cumulative impact assessment for the quarries in cluster.

1.5 NEED AND JUSTIFICATION OF THE PROJECT

- Proposed mining project will fulfill the local market requirement for real estate and infrastructure industry. This project will also provide employment to local people helping them earn livelihood.
- Employment generated consequent to the mining activity in the project will be benefit local and rural population and will have multiplier effects on local economy.
- The Project will give tremendous boosts to the local and regional economy benefiting the population.
- The social benefits arising out of this proposal can be expressed in terms of increase in the standards of living of local population, educational opportunities, training and development of skills etc.

1.6 STRUCTURE OF THE REPORT

As per the new guidelines of the MoEF & CC the report has been divided into the following chapters and presented as follows:

1. Introduction

This chapter describes the profile of the project proponent, name and contact address with email, project consultants, the purpose of the project, brief description of the project, applicable environmental regulations, objectives and methodology for EIA studies etc.

2. Project Description

This chapter gives a brief description of the project such as the type of project, need for the project, its location, approachability, layout, etc of the proposed project, the project implementation schedule, estimated cost of development etc.

3. Description of the Environment

This chapter presents details of the baseline environmental status for microclimate, air quality, noise, water quality (surface and ground), soil quality, flora, fauna and socioeconomic status etc.

4. Anticipated Environmental Impacts & Mitigation Measures

This chapter discusses the possible sources of pollution and environmental impacts due to the project during operation phases and suggests the mitigation measures.

5. Analysis of Alternatives (Site And Technology)

This chapter discusses the analysis of the various alternatives for the technology as well as the site and gives the selection of the most feasible alternative.

6. Environmental Monitoring Program

This chapter discusses the details about the environmental monitoring program during operation phases. The technical aspects of monitoring the effectiveness of mitigation measures are covered in this chapter.

7. Additional Studies

This chapter covers information about the additional studies conducted for this project such as the Risk Analysis, Emergency Response and Disaster Management Plan.

8. Project Benefits

This chapter presents the benefits from this project

9. Cost Benefit Analysis

Environmental Cost Benefit Analysis has not been recommended at Scoping Stage – thus no analysis carried out separately in this EIA/EMP Report.

10. Environmental Management Plan

This chapter deals with the EM for the proposed sand mining projects and indicates the measures proposed to minimize the likely impacts on the environment during and operation phases and budgetary allocation for the same.

11. Summary and Conclusion

This chapter deals with the overall justification for implementation of the project and explanation of how, adverse effects have been mitigated.

12. Disclosure of Consultant

This chapter deals with the details of consultants engaged and the NABET accreditation details of environmental consultants.

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CHAPTER 2

PROJECT DESCRIPTION

2.1 TYPE OF THE PROJECT

The proposed activity is the extraction of Rough Stone and Gravel Quarry by open cast mechanized mining method.

This project proposed to produce 13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years with ultimate depth up to 67 m BGL.

2.2 NEED FOR THE PROJECT

Rough stone is one of the important materials for the building construction. The rough stone is used as both as coarse aggregate and fine aggregate after the proper sizing of stone. The coarse and fine aggregate are essential for preparing concrete which is used in foundation, beam, column, roof slab work of the buildings. The infrastructure is the sign of development of nation. So, it is very need to excavate the rough stone for economic and infrastructure development of our Nation.

2.3 LOCATION OF THE PROJECT

This is a Rough Stone and Gravel Quarry located in Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State. The area lies in the north latitude of **Latitude:** 10°36'48.85"N to 10°37'01.96"N and **Longitude**: 77°28'05.89"E to 77°28'17.36"E and toposheet number 58 F/06. Location of the proposed project is shown in Figure 2.1 the satellite imagery of the project site is shown in Figure 2.2.

This proposed project area is classified as Patta Land & does not fall within 10 km radius of any Eco – sensitive zone, Wild life Sanctuary, National Park, Tiger Reserve, Elephant Corridor and Biosphere Reserves. The M.L area details are presented in below Table.

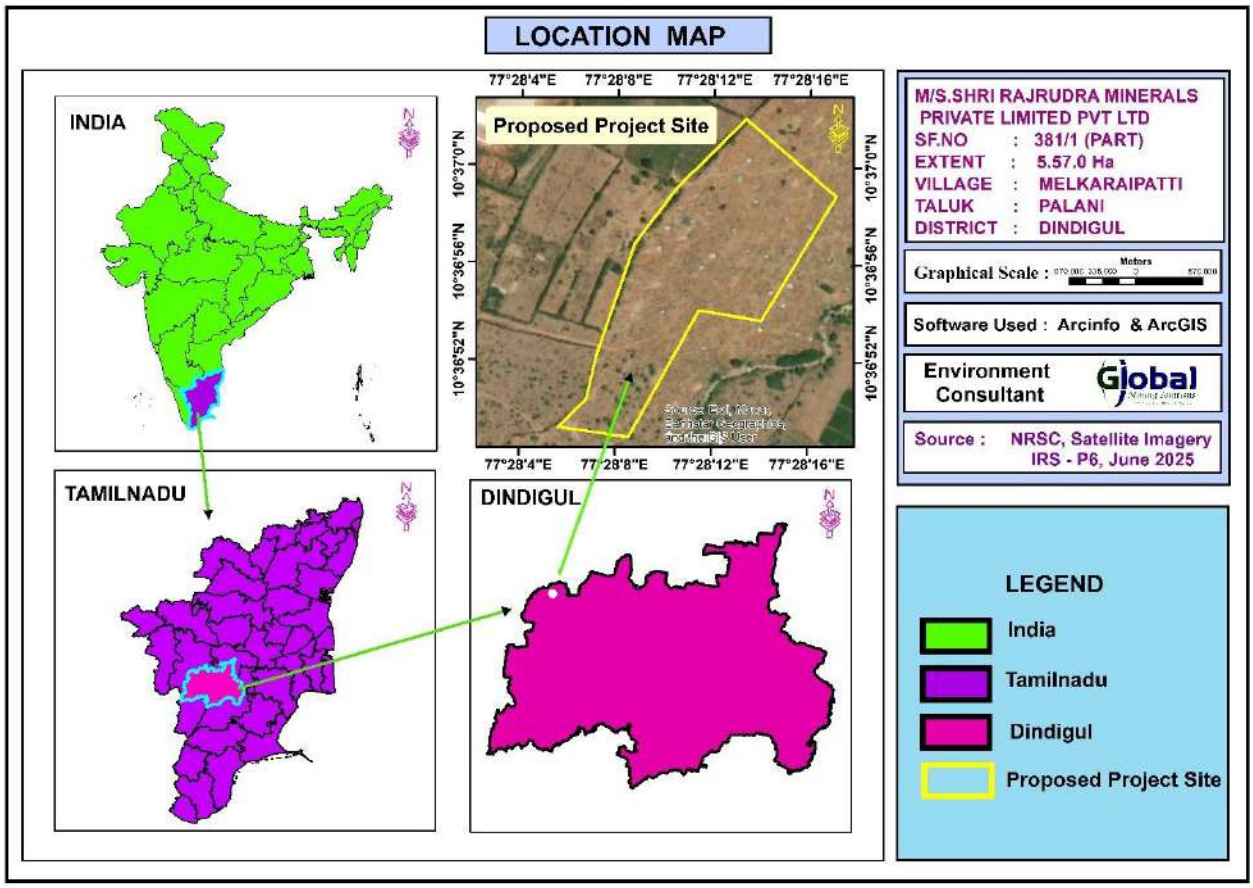


Figure 2.1 Location Map

Table 2.1 Boundary Coordinates of the Project Site

Corners	Co- ordinates		Distance between the corners
	Latitude	Longitude	
1	10° 36' 49.23"N	77° 28' 05.89"E	1-2 = 50.0m
2	10° 36' 50.39"N	77° 28' 07.04"E	2-3 = 62.4m
3	10° 36' 52.37"N	77° 28' 07.51"E	3-4 = 144.6m
4	10° 36' 56.83"N	77° 28' 09.02"E	4-5 = 87.2m
5	10° 36' 59.10"N	77° 28' 10.74"E	5-6 = 123.8m
6	10° 37' 01.96"N	77° 28' 13.60"E	6-7 = 150.0m
7	10° 36' 58.81"N	77° 28' 17.36"E	7-8 = 183.0m
8	10° 36' 53.68"N	77° 28' 14.30"E	8-9 = 80.0m
9	10° 36' 54.07"N	77° 28' 11.70"E	9-10 = 183.0m
10	10° 36' 48.85"N	77° 28' 08.82"E	10-1 = 90.0m

Figure 2.2 Google Image of the project site with Boundary Coordinates

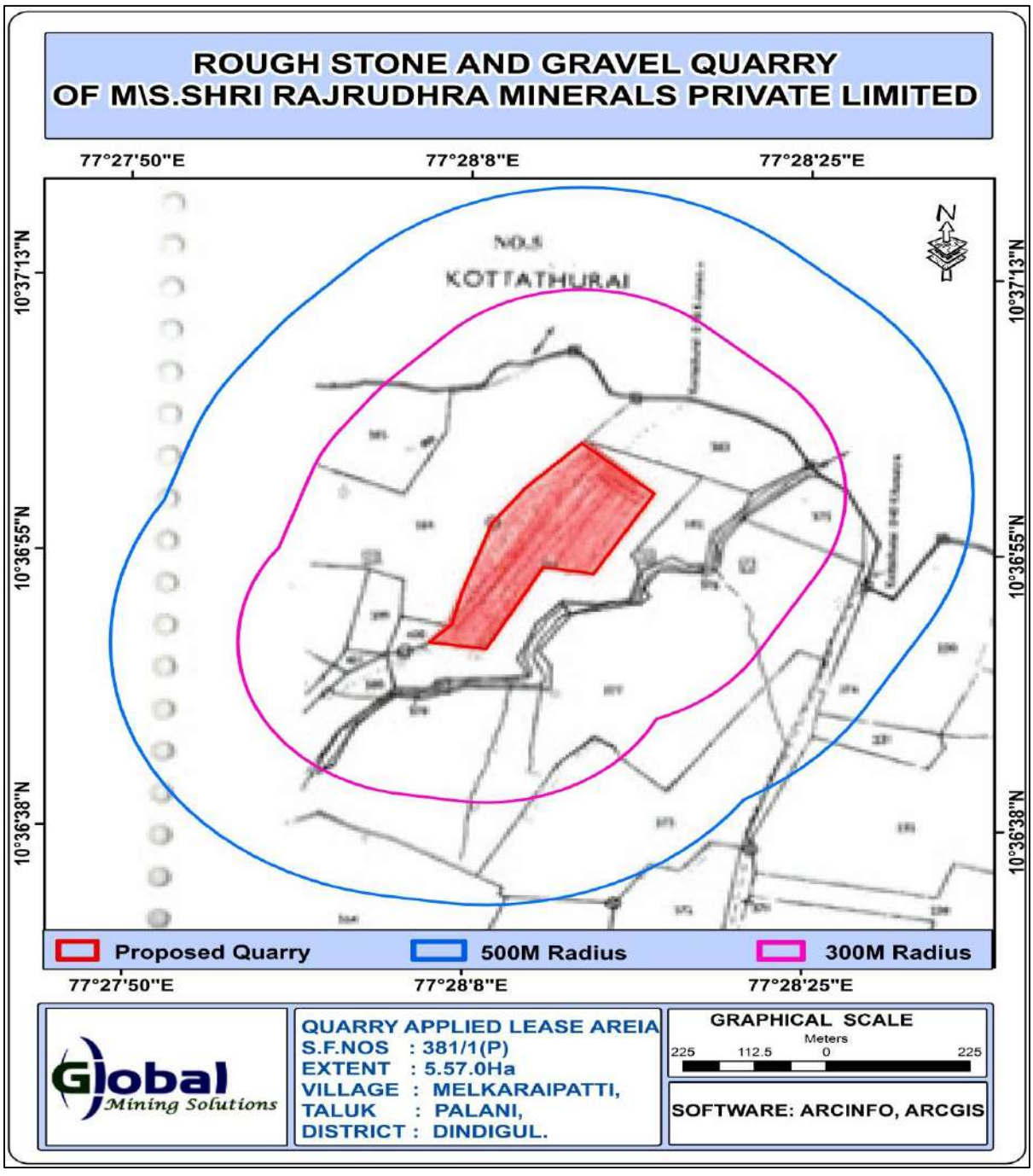


Figure 2.3 – Village Map showing 300 m and 500 m radius

Table 2.2 Mine Lease Area and its Ownership

Location	S.F. No	Area in Ha	Ownership
Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State.	381/1(P)	5.57.00	It is a Patta Land registered in the name of Applicant (M/s. Shri Rajrudhra Minerals Private Limited) vide patta no. 2059.
Total		5.57.00	

Table 2.3 Site Connectivity

Nearest Roadway	• There is an existing road from the area leads to Melkaraipatti - Rajampatti road on south side of the area. • The Nearest Railway line is Dindigul – Udumalaipet line which is about 10.7Km on the southwest side of the area. • The National Highway (NH-83) Dindigul – Coimbatore is about 10km on Southwestern side of the area. • The State Highway (SH-192) Idayakottai - Thalayuthu is about 1.9Km on Southeastern side of the area.
Nearest Village	Kottathurai Habitation- 380m (NE)
Nearest Railway	Pushpattur Railway Station (11km, SW))
Nearest Airport	Madurai International Airport (109 km, SE)

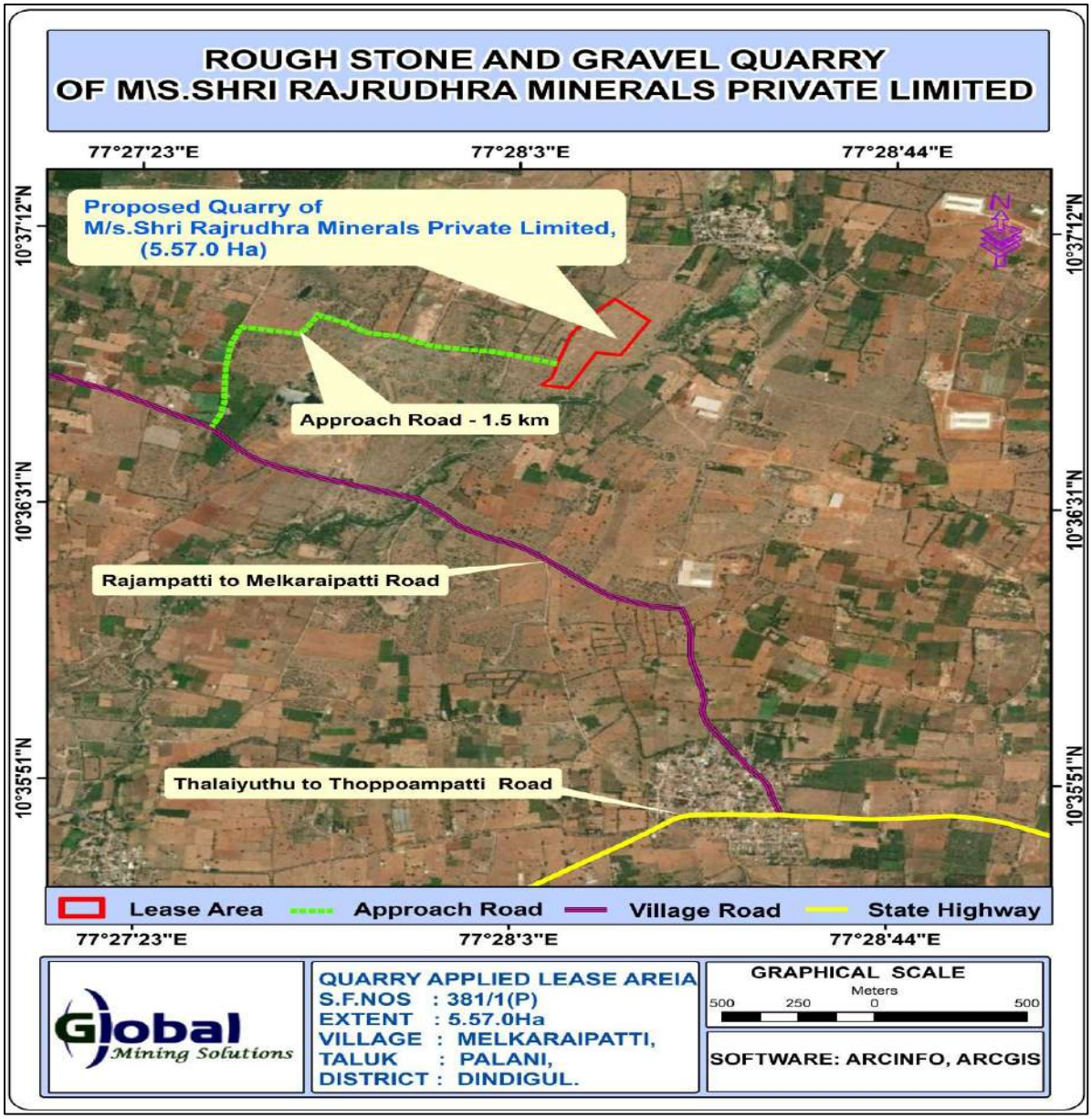


Figure 2.4 Site Connectivity Map

Table 2.4 Salient features of the Project

S. No.	Particulars	Details
1.	Name of the Quarry	Rough Stone and Gravel Quarry of M/s.Shri Rajrudhra Minerals Private Limited
2.	Proposed project	Rough Stone and Gravel Quarry
3.	Extent	5.57.00 Ha and the cluster area within 500 m radius including the proposed mine is 24.39.00 Ha > 5 Ha
4.	Location	S.F.No. 381/1(P), Melkaraipatti Village, Palani Dindigul District, Tamil Nadu State.
5.	Co-ordinates of the project site	Latitude: 10°36'48.85"N to 10°37'01.96"N Longitude: 77°28'05.89"E to 77°28'17.36"E
6.	Topography	Plain Terrain
7.	Site Elevation above MSL	310 m from MSL
8.	Topo Sheet No.	58-F/06
9.	Minerals of Mine	Rough Stone and Gravel
10.	Proposed production in m3	13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years with ultimate depth up to 67 m BGL.
11.	Ultimate Depth of mining	67 m (BGL)
12.	Method of Mining	Opencast Mining with a bench height of 5 m and bench width of 5 m is proposed
13.	Drilling/Blasting	Drilling and controlled Blasting is proposed
14.	No. of Working days	300 Days
15.	Water requirement & Source	5.0 KLD and will be sourced from local vendors
16.	Manpower	38 Nos.
17.	Project Cost	Rs. 159.35 lakhs including EMP and CER cost.
18.	Mining Plan Approval	Assistant Director, Department of Geology and Mining, Dindigul vide Roc.No. 589/2025/ Mines, dated 07.08.2025.

19.	Safety Zone	1.61.00 Ha will be maintained as safety zone and tree saplings (1610 Nos) will be planted in this area
20.	Ground water level	93 m in summer and 90 m in rainy seasons
21.	Distance of Stone Crusher	730 m (SW)
22.	Previous History & CCR	Fresh area. CCR is not applicable.

Table 2.5 Environmental Settings of the project site

S. No.	Particulars	Details
1.	Nearest Highway	(NH-83) Dindigul – Coimbatore Road- 10km (SW) (SH-192) Idayakottai - Thalayuthu Road- 1.9km (SE)
2.	Interstate Boundary	Not Applicable
3.	Nearest Railway Station	Pushpattur Railway Station (11km, SW))
4.	Nearest Airport	Madurai International Airport (109 km, SE)
5.	Nearest Village	Kottathurai Habitation- 380m (NE)
6.	Water bodies	Odai- 52m (E), Tank – 160 m (NE), Amaravathi River – 2.8km (NW), Shanmugha River – 2.6km (E), Tank – 1.4 km (S), Alangulam – 3.8 km (SE), Tank- 4.5km (NE)
7.	Reserved Forest	Dalavaipattinam R.F. – 6.6km (N)
8.	Eco Sensitive Zone and Wildlife Sanctuary (Notified)	Nil within a 10 km radius Kodaikanal Wildlife Sanctuary – 24.3km (SW)
9.	Archaeological important places	Nil within 10 km radius
10.	Defense Installations	Nil within 10 km radius
11.	Nearest Port	Nil within 10 km radius
12.	Seismic Zone	Zone – II (Least Active)

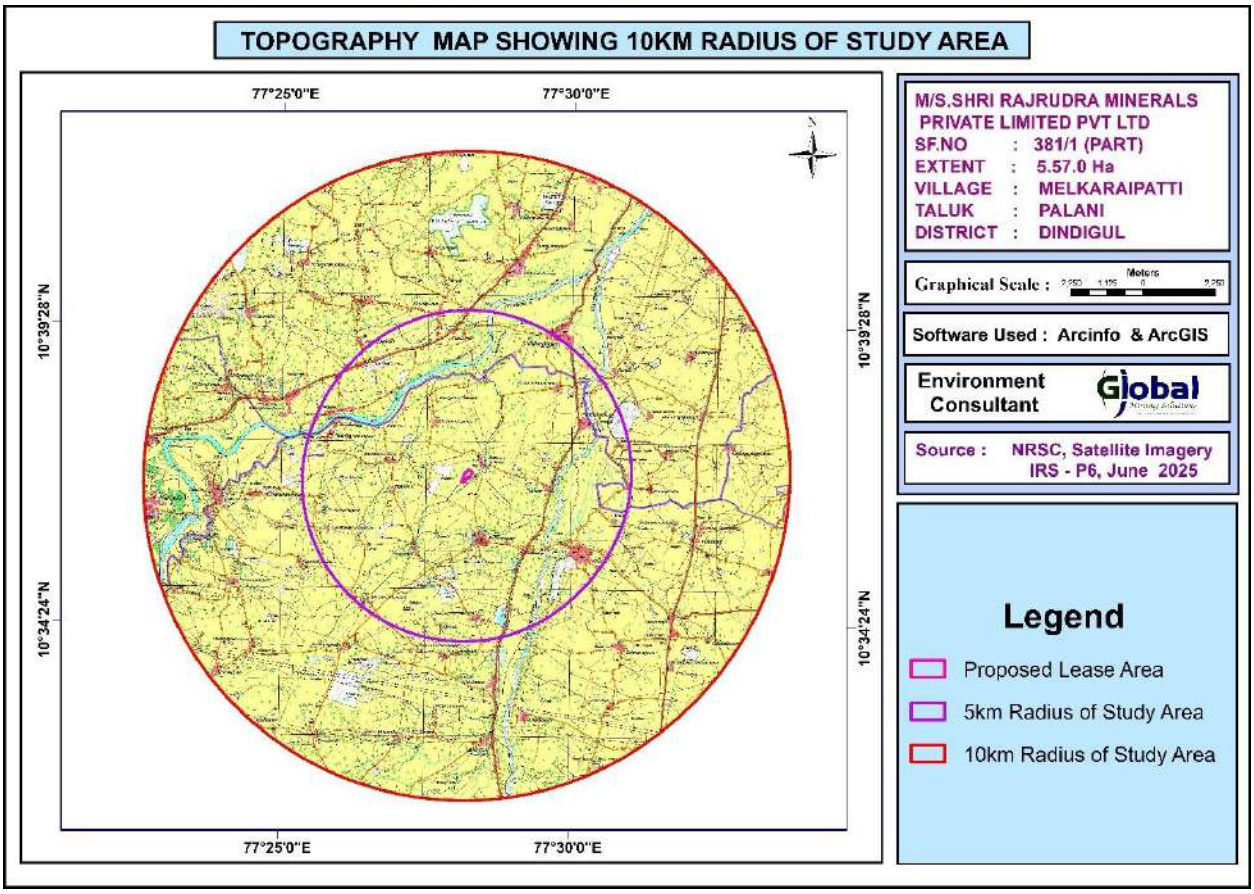


Figure 2.5 10km Radius TOPO Map

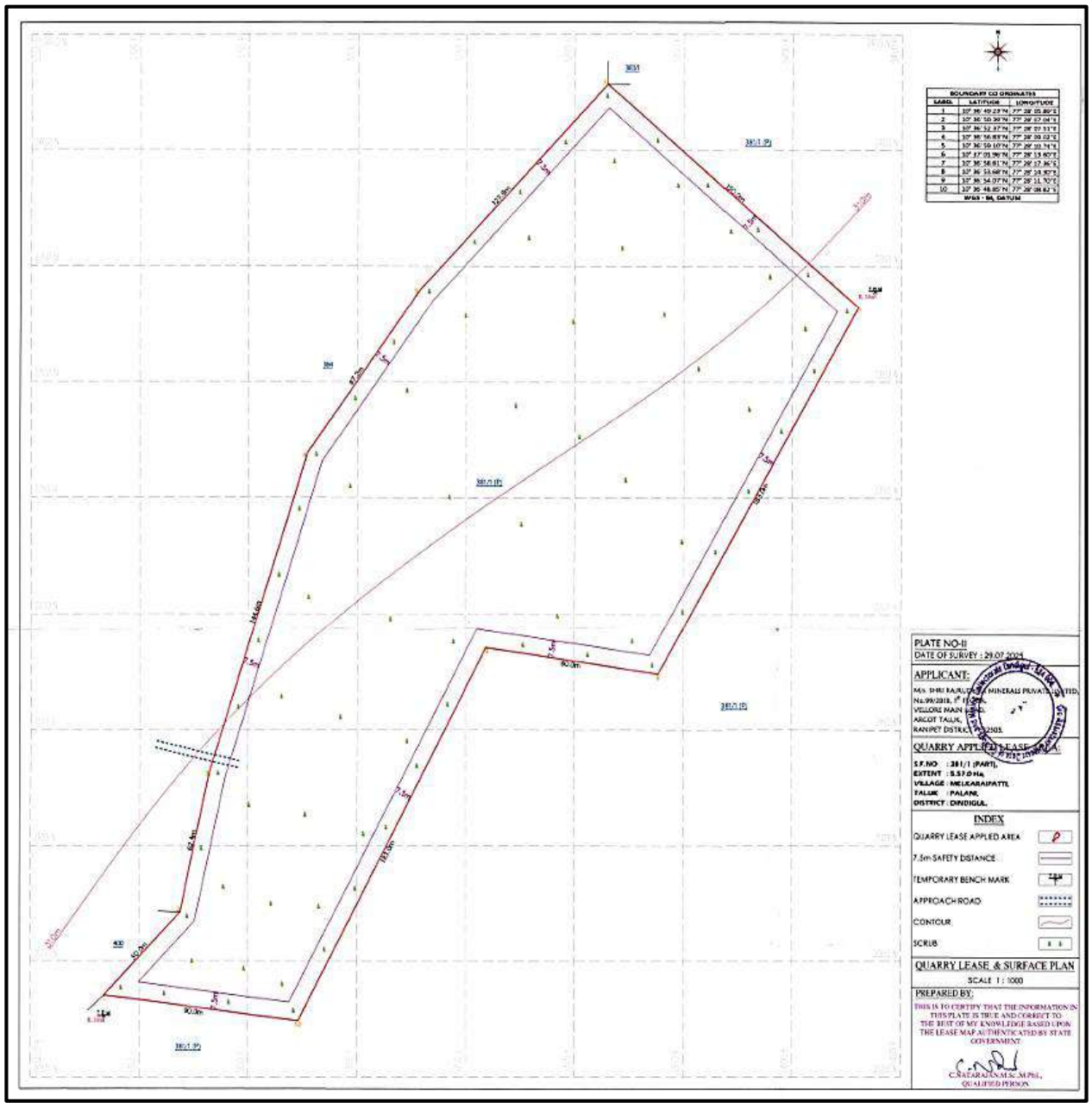


Figure 2.6 Lease Plan

LAND USE PATTERN OF THE PROJECT AREA

The entire project site is patta land registered in the name of Applicant M/s. Shri Rajrudhra Minerals Private Limited) vide patta no. 2059.

The land use pattern of the mine lease area as of today and conceptual stage given in Table No. 2.6.

Table 2.6 Land use pattern of the Project area

Description	Present Area in Ha.	Area at the end of life of Quarry in Ha.
Quarrying Pit	NIL	4.72.50
Infrastructure	Nil	0.01.00
Roads	Nil	0.02.00
Safety Zone / Green Belt	Nil	0.81.50
Unutilized	5.57.00	Nil
Total	**5.57.00**	**5.57.00**

2.4 SIZE AND MAGNITUDE OF THE OPERATION

The proposed activity is the extraction of Rough Stone and Gravel by open cast mechanized mining method over an extent of 5.57.00 Ha and to produce 13,10,240 m3 of Rough Stone and 92,026 m3 Gravel for the period of 5 years with ultimate depth up to 67 m BGL. The details of geological and mineable reserves in the lease area have been provided below in the subsequent sub section.

2.5 TOPOGRAPHY AND DRAINAGE

The area applied for quarry lease is exhibits almost plain covered by gravel formation.

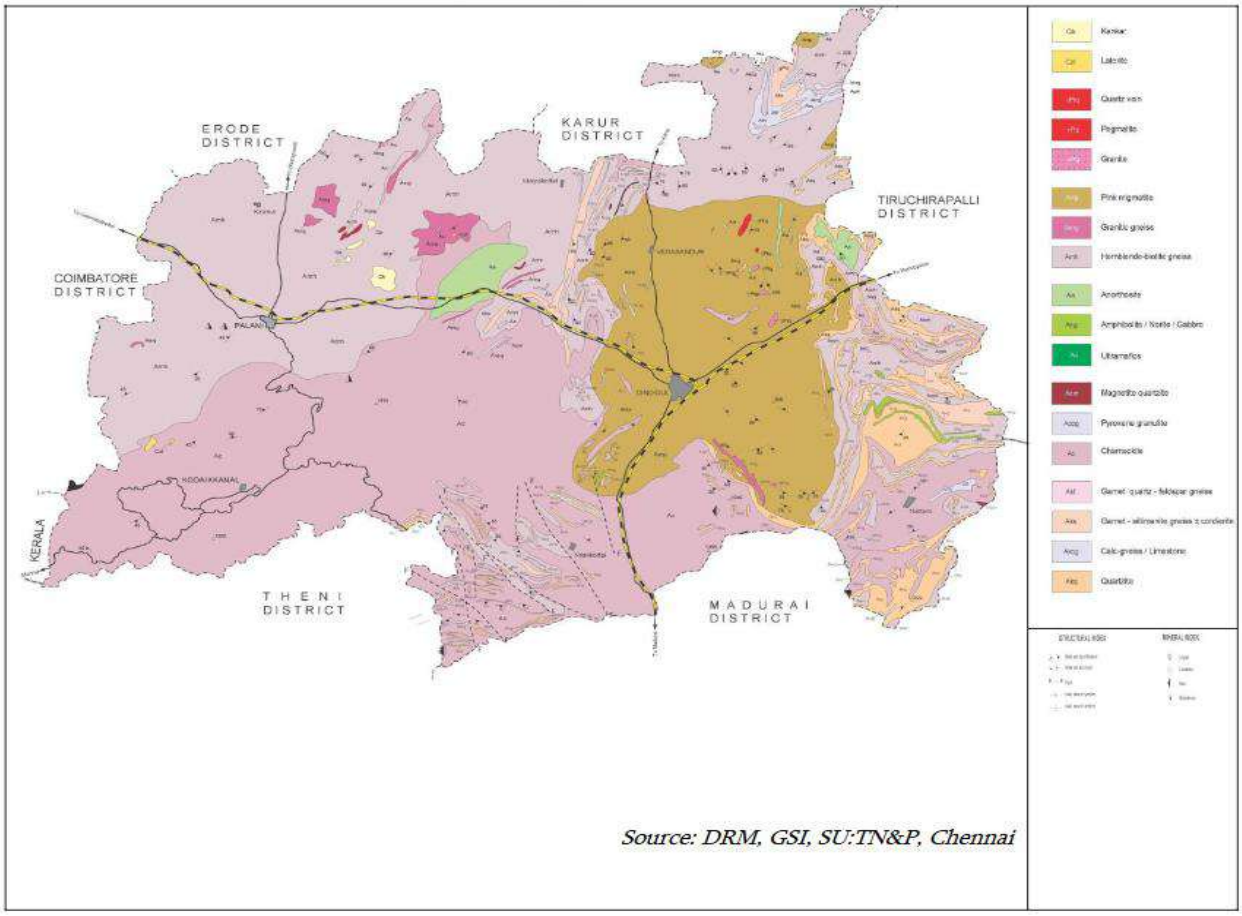
2.6 GEOLOGY

2.6.1 REGIONAL GEOLOGY

The district is essentially a high-grade gneissic terrain characterized by highly deformed rocks, which can be classified under three groups as 1) Khondalite Group, 2) Charnockite Group and 3) Migmatite Group. The terrain also exposes basic/ultrabasic and younger acid intrusives.

Age	Group	Lithology
QUATERNERY	Recent to Pleistocene	Kankar
		Laterite
PROTEROZOIC	Acid intrusives	Quartz veins
		Pegmatite
		Granite
ARCHAEAN-PROTEROZOIC	Migmatite Group	Pink migmatite
		Granitic gneiss
		Hornblende-biotite gneiss
	Basic/Ultabasic Intrusives	Anorthosite
		Amphibolite / Norite / Gabbro
		Ultramafics
	Charnockite Group	Magnetite quartzite
		Pyroxene granulite
		Charnockite
	Khondalite Group	Garnet quartz - feldspar gneiss
		Garnet - sillimanite gneiss ± cordierite
		Calc-gneiss / Limestone
		Quartzite

(Source: GSI, DRM & Misc. Pub. 30, 2006)



Source: District Survey Report, Dindigul

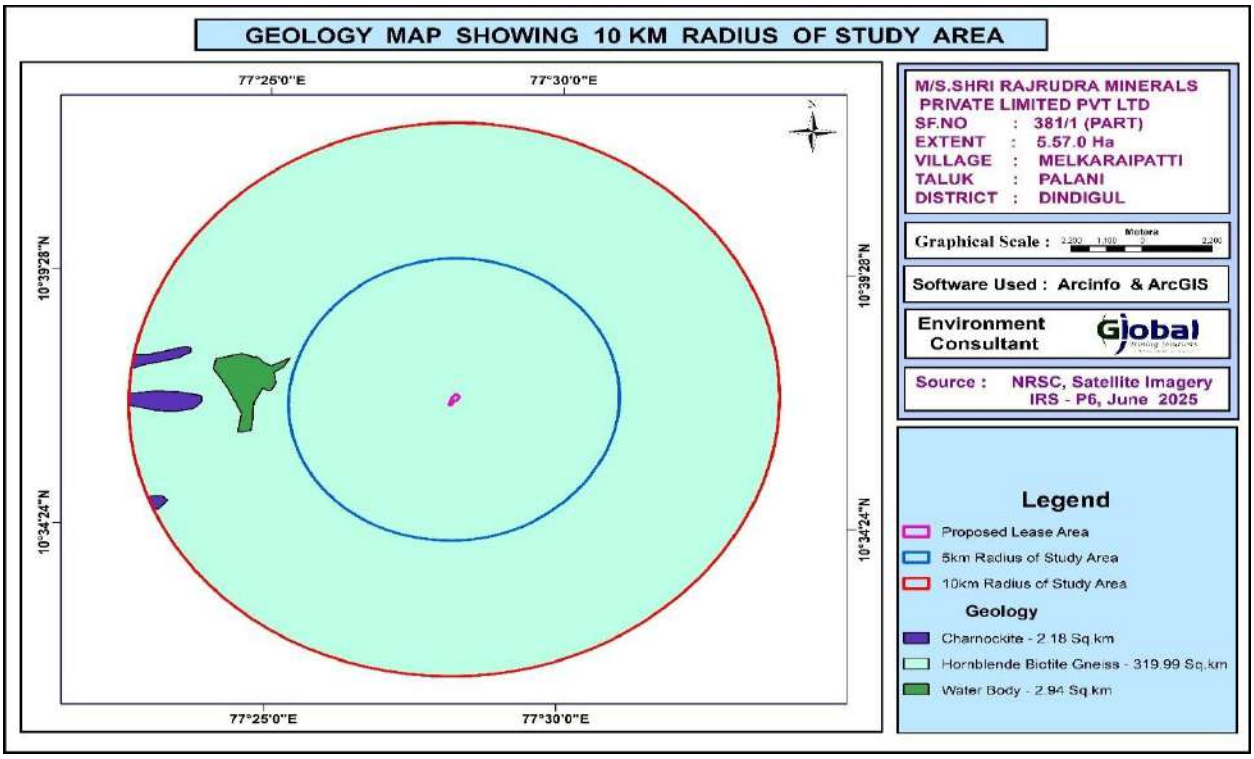


Figure 2.7 Geology Map – 10km Radius from the Project Site

2.6.2 LOCAL GEOLOGY:

The area is underlain by the wide range of metamorphic rocks of peninsular gneissic complex. These rocks are extensively weathered and overlain by the recent valley fills and alluvium at places. The geological formations found in the district are Archaean rocks like Gneisses, Granites, Charnockites basic granulites and calc-gneisses. The younger formations are Quartz veins and pegmatite.

The rock type noticed in the area for lease is Charnockite which contains mostly Quartz and Feldspar with some ferromagnesian minerals. The Charnockite is part of peninsular Gneisses, a high grade metamorphic rock.

The strike of the Charnockite formation is N50^{0}E –S50^{0}W with dipping towards SE60^0.

The general geological succession of the area is given as under.

AGE		ROCK TYPE
Recent	-	Gravelly soil
		Unconformity
Archaean	-	Dolerite dyke
		Charnockite.
		Peninsular Gneissic complex and Calc Gneiss

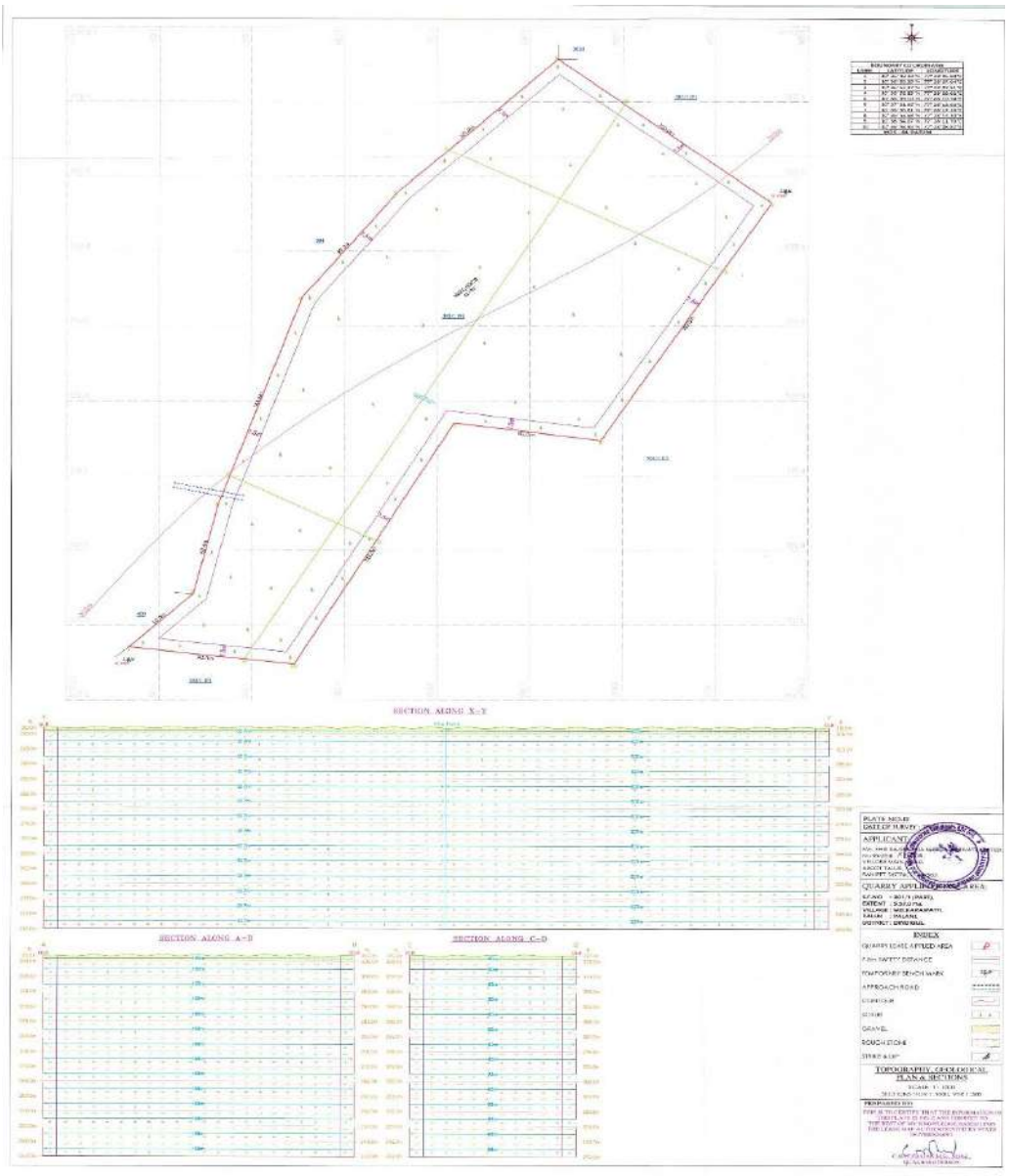


Figure 2.8 – Topography, Geological Plan and Sections

2.7 RESOURCES AND RESERVES

The Resources and Reserves of Rough Stone were calculated based on Cross-Section Method to cover the maximum lease area.

Geological Resources

The quarrying is restricted up to a depth of 67 m (below ground level) only, availability of resources is given below.

Table 2.7 Available Geological Resources

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Gravel in m^3	Geological Resources of rough stone in m^3	Bulk Density	Gravel in Ts	Geological Resources of Rough stone in Ts
XY-AB	I	217	168	2	72912	-	2	145824	-
	II	217	168	5	-	182280	2.75	-	501270.00
	III	217	168	5	-	182280	2.75	-	501270.00
	IV	217	168	5	-	182280	2.75	-	501270.00
	V	217	168	5	-	182280	2.75	-	501270.00
	VI	217	168	5	-	182280	2.75	-	501270.00
	VII	217	168	5	-	182280	2.75	-	501270.00
	VIII	217	168	5	-	182280	2.75	-	501270.00
	IX	217	168	5	-	182280	2.75	-	501270.00
	X	217	168	5	-	182280	2.75	-	501270.00
	XI	217	168	5	-	182280	2.75	-	501270.00
	XII	217	168	5	-	182280	2.75	-	501270.00
	XIII	217	168	5	-	182280	2.75	-	501270.00
	XIV	217	168	5	-	182280	2.75	-	501270.00
Total					**72912**	**2369640**	**-**	**145824**	**6516510.00**
XY-CD	I	207	90	2	37260	-	2	74520	-
	II	207	90	5	-	93150	2.75	-	256162.50
	III	207	90	5	-	93150	2.75	-	256162.50
	IV	207	90	5	-	93150	2.75	-	256162.50
	V	207	90	5	-	93150	2.75	-	256162.50
	VI	207	90	5	-	93150	2.75	-	256162.50
	VII	207	90	5	-	93150	2.75	-	256162.50
	VIII	207	90	5	-	93150	2.75	-	256162.50
	IX	207	90	5	-	93150	2.75	-	256162.50
	X	207	90	5	-	93150	2.75	-	256162.50
	XI	207	90	5	-	93150	2.75	-	256162.50
	XII	207	90	5	-	93150	2.75	-	256162.50
	XIII	207	90	5	-	93150	2.75	-	256162.50
	XIV	207	90	5	-	93150	2.75	-	256162.50
Total					**37260**	**1210950**	**-**	**74520**	**3330112.50**
Grand Total					**110172**	**3580590**	**-**	**220344**	**9846622.50**

The Geological Resource of Rough Stone : 35,80,590 m^3

Gravel : 1,10,172 m^3

Available Mineable Reserve:

The Available mineable reserve calculated by deducting 7.5m safety distance and bench loss.

Table 2.8 – Available Mineable Reserves

Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Gravel in m^3	Mineable Reserves of rough stone in m^3	Bulk Density	Gravel in (Ts)	Mineable Reserves of rough stone in (Ts)
XY-AB	I	209	151	2	63118	-	2	126236	-
	II	208	149	5	-	154960	2.75	-	426140.00
	III	203	139	5	-	141085	2.75	-	387983.75
	IV	198	129	5	-	127710	2.75	-	351202.50
	V	193	119	5	-	114835	2.75	-	315796.25
	VI	188	109	5	-	102460	2.75	-	281765.00
	VII	183	99	5	-	90585	2.75	-	249108.75
	VIII	178	89	5	-	79210	2.75	-	217827.50
	IX	168	79	5	-	66360	2.75	-	182490.00
	X	158	69	5	-	54510	2.75	-	149902.50
	XI	148	59	5	-	43660	2.75	-	120065.00
	XII	138	49	5	-	33810	2.75	-	92977.50
	XIII	128	39	5	-	24960	2.75	-	68640.00
	XIV	118	29	5	-	17110	2.75	-	47052.50
Total					**63118**	**1051255**	**-**	**126236**	**2890951.25**
XY-CD	I	198	73	2	28908	-	2	57816	-
	II	197	71	5	-	69935	2.75	-	192321.25
	III	192	61	5	-	58560	2.75	-	161040.00
	IV	187	51	5	-	47685	2.75	-	131133.75
	V	182	41	5	-	37310	2.75	-	102602.50
	VI	177	31	5	-	27435	2.75	-	75446.25
	VII	172	21	5	-	18060	2.75	-	49665.00
Total					**28908**	**258985**	**-**	**57816**	**712208.75**
Grand Total					**92026**	**1310240**	**-**	**184052**	**3603160.00**

The Available mineable reserve is computed as 13,10,240 m^3 of Rough stone, 92,026 m^3 of Gravel upto a depth 67 m (below ground level) only.

Figure 2.9 – Mineable Reserves Plan and Section

2.8 PROCESS DESCRIPTION AND TECHNOLOGY

2.8.1 PROCESS DESCRIPTON

The quarry operation involves shallow jack hammer drilling, slurry blasting, excavation, Loading and transportation of Rough stone to the needy buyers. The production of Rough stone in this quarry involves the following method which is typical for Rough Stone quarrying in contrast to other major mineral mining.

- 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 buyers.
- Occasionally hydraulic excavators are attached with rock breakers for fragmentation to avoid secondary blasting.
- The primary boulders thus splitted are removed from the pits by excavators and further made to smaller sizes by rock breakers attached in excavators.

The process diagram is provided in Figure 2.9. The production plan and cross section and conceptual plan and conceptual cross section is given in Figure No. 2.10 and Figure No. 2.11 respectively.

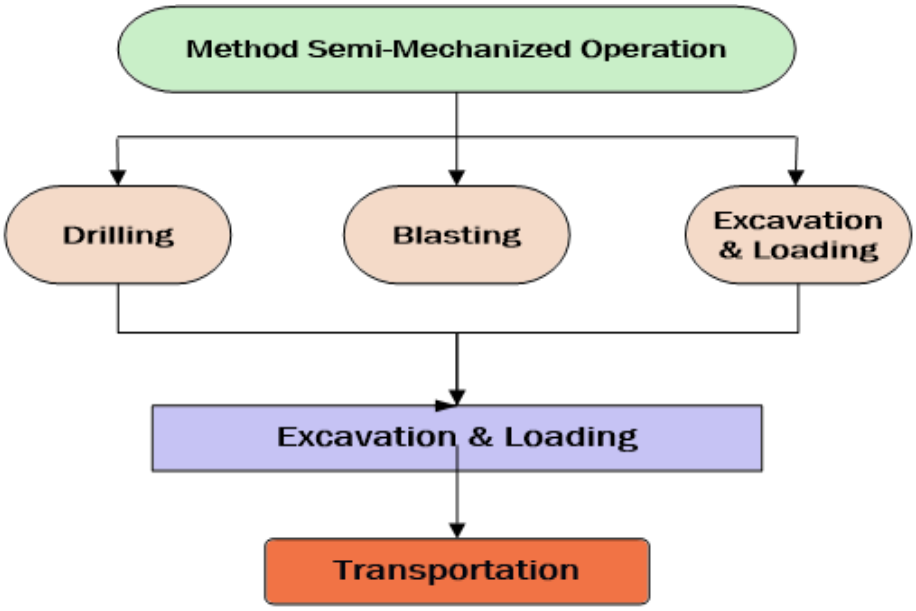


Figure 2.10 Process Flow Diagram

Table 2.9 – Machinery Details

S.No.	Name of the Equipment	Capacity	Requirement
1	Excavator with Rock breaker attachment	0.90 m^3	2
2	Compressor	400 psi	4
3	Jack hammer	32 mm Dia	14
4	Tipper	10/20 T	6

2.8.2 DRILLING AND BLASTING PARAMETERS

Drilling and Blasting will be carried out as per parameters given below,

Table 2.10 – Details of Blasting

Diameter of the hole	32-36 mm
Spacing	0.6m
Depth	1 to 1.5 m
Burden of hole	0.6m
Pattern of hole	Zig zag
Inclination of hole	70^0 from horizontal
Number of holes	800
Powder factor	6Ts/Kg of Explosives
Total explosive required	400 Kg slurry Explosives
Charge / hole	0.5Kg
Blasting time	12-2 Pm

2.8.3 TYPE OF EXPLOSIVE

Slurry explosive is proposed for shattering and heaving effect for removal of rough stone. No deep hole drilling or primary blasting is proposed. The Project Proponent have agreement with M/s. A.R. Enterprises to carry out the blasting operation for the proposed quarry. The Blasting Agreement is enclosed as Annexure – 6.

2.8.4 STORAGE OF EXPLOSIVES

No proposal for storage of explosives within the project area, the applicant will engage authorized explosive agency to carry out the blasting and it will be supervised by competent and statutory foreman / mines manager as per DGMS guidelines.

2.8.5 PRODUCTION SCHEDULE

The year wise production schedule upto lease period of 5 years is given below, the year wise production plan is given in Figure 2.10.

The applicant has proposed to carry out 13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel upto a depth of 67 m BGL for the period of five years. The peak production is 2,62,925 m^3 (IST YEAR) of rough stone and 56,172 m^3 (IST YEAR) of Gravel.

Table 2.11 Year wise Production Plan

Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Gravel in m^3	Mineable Reserves in of rough stone m^3	Bulk Density	Gravel in (Ts)	Mineable Reserves of rough stone in (Ts)
I	XY-AB	I	186	151	2	56172	-	2	112344	-
		II	185	149	5	-	137825	2.75	-	379018.75
		III	180	139	5	-	125100	2.75	-	344025.00
	Total					**56172**	**262925**	**-**	**112344**	**723043.75**
II	XY-AB	I	23	151	2	6946	-	2	13892	-
		II	23	149	5	-	17135	2.75	-	47121.25
		III	23	139	5	-	15985	2.75	-	43958.75
	XY-CD	I	198	73	2	28908	-	2	57816	-
		II	197	71	5	-	69935	2.75	-	192321.25
		III	192	61	5	-	58560	2.75	-	161040.00
		IV	187	51	5	-	47685	2.75	-	131133.75
	XY-AB	IV	82	129	5	-	52890	2.75	-	145447.50
	Total					**35854**	**262190**	**-**	**71708**	**721022.50**
III	XY-AB	IV	116	129	5	-	74820	2.75	-	205755.00
		V	193	119	5	-	114835	2.75	-	315796.25
	XY-CD	V	182	41	5	-	37310	2.75	-	102602.50
		VI	177	31	5	-	27435	2.75	-	75446.25
		VII	74	21	5	-	7770	2.75	-	21367.50
	Total					**-**	**262170**	**-**	**-**	**720967.50**
IV	XY-CD	VII	98	21	5	-	10290	2.75	-	28297.50
	XY-AB	VI	188	109	5	-	102460	2.75	-	281765.00
		VII	183	99	5	-	90585	2.75	-	249108.75
		VIII	132	89	5	-	58740	2.75	-	161535.00
	Total					**-**	**262075**	**-**	**-**	**720706.25**
V	XY-AB	VIII	46	89	5	-	20470	2.75	-	56292.50
		IX	168	79	5	-	66360	2.75	-	182490.00
		X	158	69	5	-	54510	2.75	-	149902.50
		XI	148	59	5	-	43660	2.75	-	120065.00
		XII	138	49	5	-	33810	2.75	-	92977.50
		XIII	128	39	5	-	24960	2.75	-	68640.00
		XIV	118	29	5	-	17110	2.75	-	47052.50
	Total					**-**	**260880**	**-**	**-**	**717420.00**
Grand Total						**92026**	**1310240**	**-**	**184052**	**3603160.00**

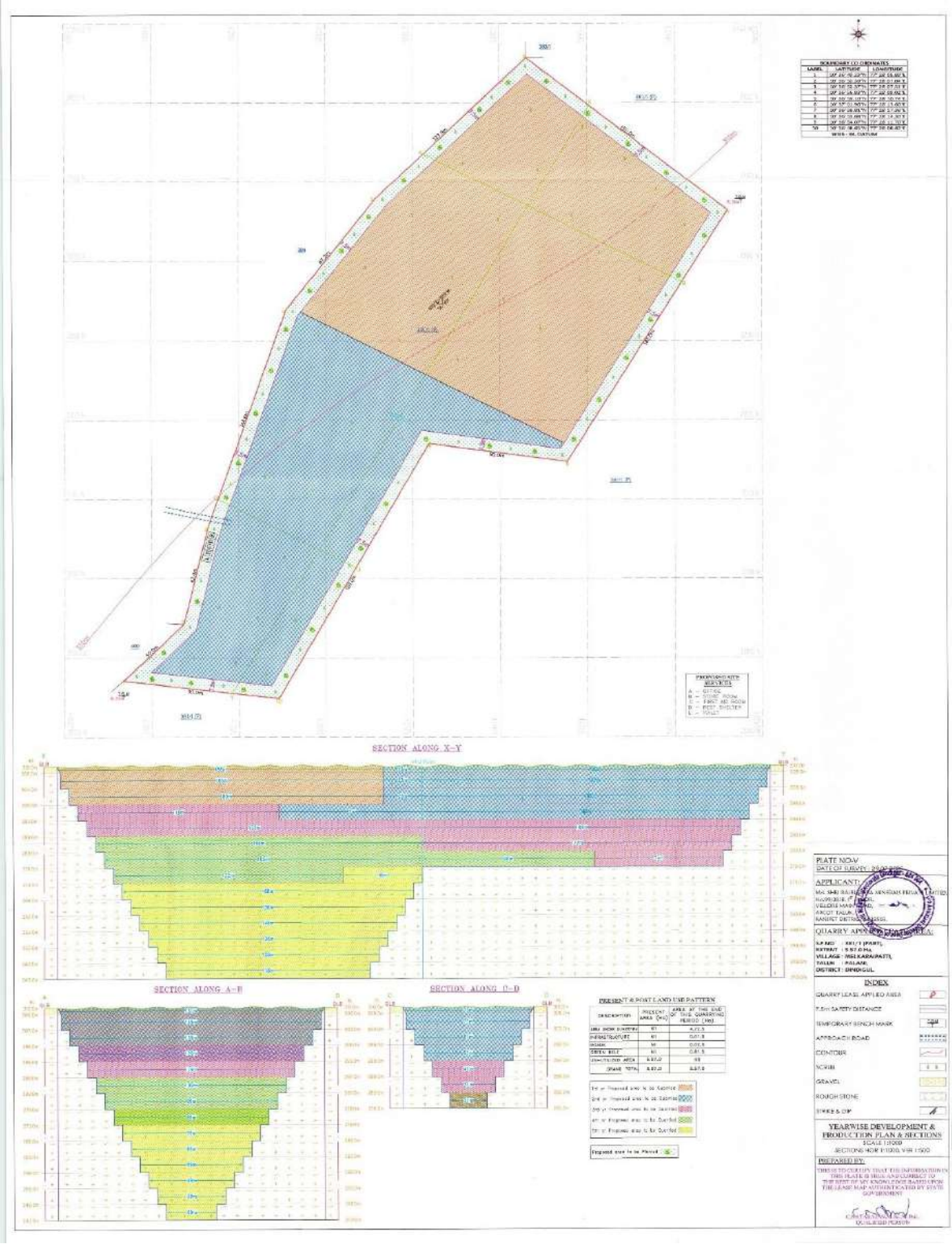


Figure 2.11 Year wise Development & Production Plan & Sections

2.8.6 DISPOSAL OF WASTE

There is no waste anticipated in this rough stone Quarry. The entire quarried minerals will be utilized. Rough Stone, after the excavation Rough Stone will be directly loaded into tipper to the needy buyers for road project and construction works for filling and leveling of low lying areas.

2.9 CONCEPTUAL MINING PLAN / FINAL MINE CLOSURE PLAN

Conceptual mining plan is prepared with an object of five years of systematic development of bench layouts, selection of ultimate pit limit, depth of quarrying, ultimate pit slope, selection of sites for construction of infrastructure etc.

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc. Conceptual cross section and mine closure plan is given in Figure 2.11.

Table 2.12 - Ultimate Pit Dimension at the end of Lease period

Pit	Length in m (Max)	Width in m (Max.)	Depth in m (Max.), bgl
I	407	116	67

Table 2.13 - Land use pattern of the Project site

Description	Present Area in Ha.	Area at the end of life of Quarry in Ha.
Quarrying pit	NIL	4.72.50
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Greenbelt	Nil	0.81.50
Unutilized	5.57.00	Nil
Total	**5.57.00**	**5.57.00**

- At the end of life of mine, the excavated mine pit / void of 4.72.50 Ha 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 (0.81.50 Ha.) will be developed along the safety barrier and top benches and 0.03 Ha are approach road and Infrastructure.

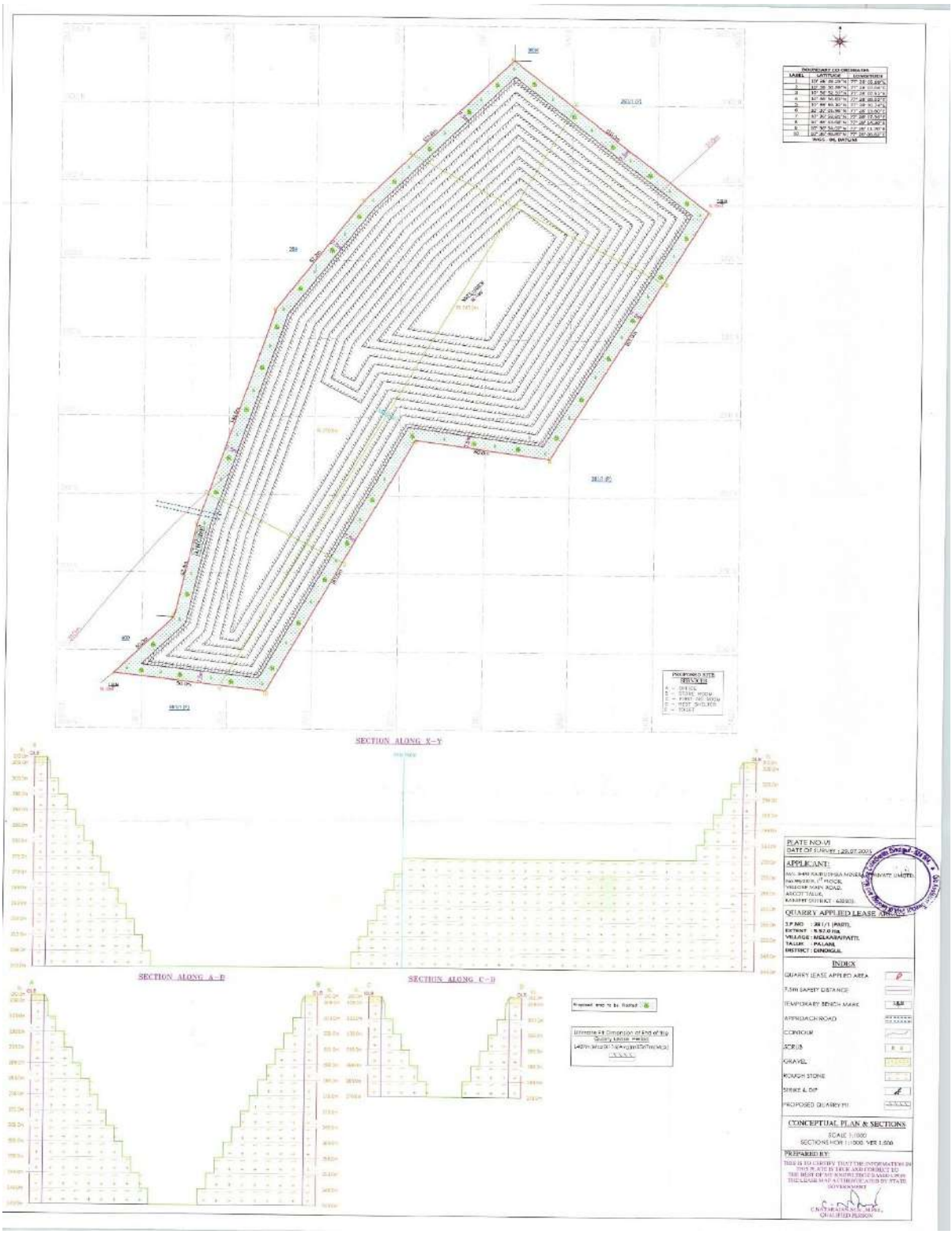


Figure 2.12 Conceptual Plan and Cross Section

2.10 PROJECT REQUIREMENT

2.10.1 WATER REQUIREMENT AND SOURCE

The total water requirement estimated for the quarry is 5.0 KLD. The required water will be procured from outside agencies initially and later rainwater harvested in the mine pit shall be used other than drinking purpose.

Table 2.14 Details of Water requirement

Activity	Water Requirement in KLD
Drinking & Domestic	1.5
Dust Suppression	2.0
Greenbelt Development	1.5
Total	**5.0**

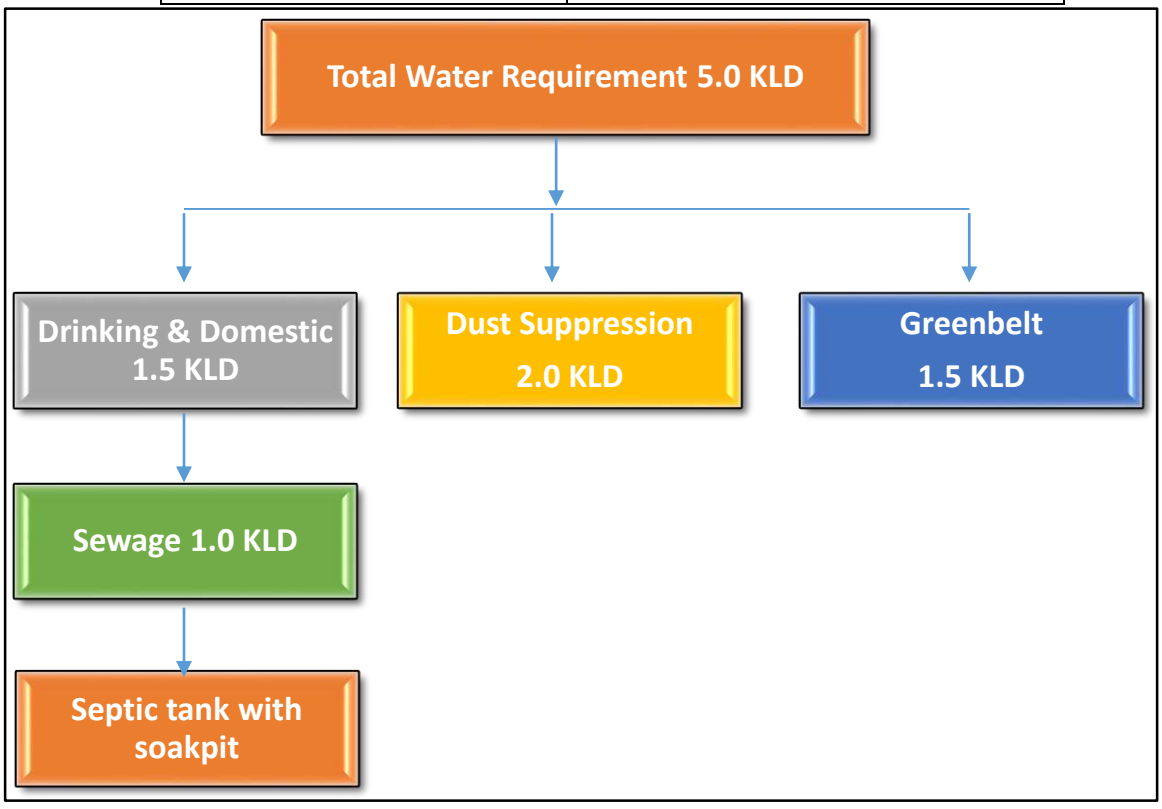


Figure 2.13 Water Balance Chart

2.10.2 POWER REQUIREMENT

All the equipment will be diesel operated. No electricity is needed for mining operation. The minimum power requirement for office, etc will be met from state grid.

2.10.3 FUEL REQUIREMENT

The Total fuel consumption is around 10,63,530 L of HSD for the entire period of life (5 years).

2.10.4 EMPLOYMENT GENERATION

The project will provide employment opportunities totally to 20 persons directly and 18 indirectly.

Table 2.15 Details of Manpower requirement

1.	Skilled	Mines Manager	1 No.
		Foreman / Mate	2 Nos.
		Operator	16 Nos.
		Mechanic	1 No.
2.	Semi–skilled	Driver	6 Nos.
3.	Unskilled	Labours	12 Nos
		Total =	38 Nos

2.10.5 GREEN BELT REQUIREMENT

The safety zone, covering an area of 0.81.50 Hectares, will be maintained as a green belt and planted with 815 Nos. of local species.

2.10.6 VEHICULAR TRAFFIC DENSITY

The final product of the quarry will be transported through Kottathurai to Melkaraipatti Village road, which is located at a distance of 715 m from the proposed quarry in SW side. Mineral transport route is shown below:

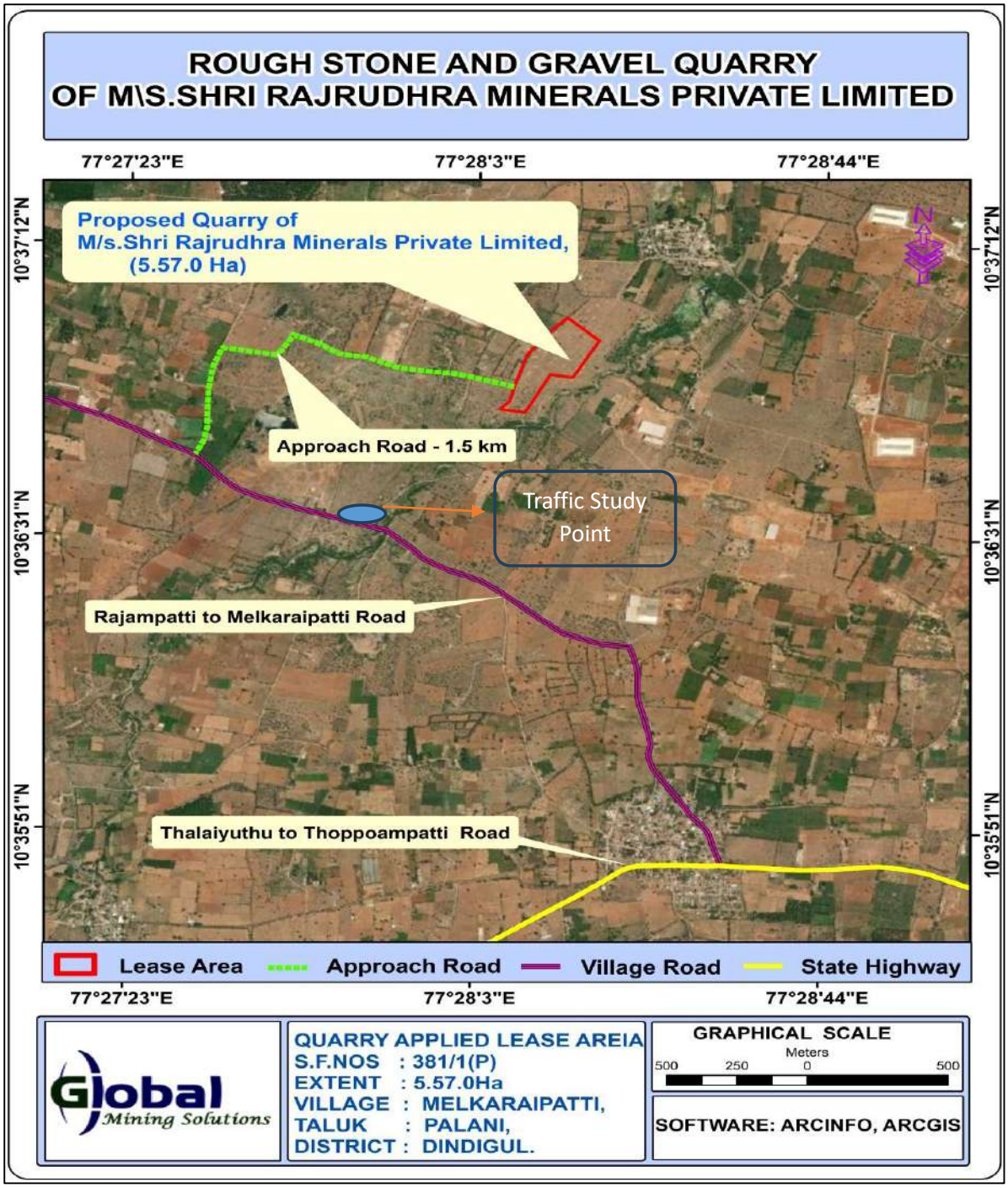


Figure 2.14 Mineral Transport Route

The vehicular traffic survey will be carried out in the route through which mined out minerals are transported. Within 500 m radius, there are two existing quarry and two proposed quarries including this proposal. The final product from this quarry will be transported through Kottathurai to Melkaraipatti Village road, which is located at a distance of 715 m from the proposed quarry in SW side.

Methodology

Vehicle Count

The vehicles passing through the road (in both ways) were counted separately for 24 hours at the one elected location from 0600 hrs to 0600 hrs next day continuously. Category wise vehicle counting has been done continuously and recorded in the traffic volume count on hourly basis under respective categories.

Categorization of Traffic

The engine driven vehicles were categorized into various heads viz. two wheelers, three wheelers, four wheelers and trucks/bus. The level of service is given below. **(Source: Recommended Design Service Volumes (PCUs per hour), IRC)**

Level of Service	General Operating conditions	Range of V/C
A	Free flow (traffic flows at or above speed limit and motorists have complete mobility between lanes)	<0.30
B	Reasonable flow (slightly more congested, with some maneuverability)	0.3 – 0.47
C	Stable flow (more congested than B, loads close to capacity)	0.48 – 0.68
D	Approaching unstable flow (speeds are somewhat reduced, example: busy corridor during middle of a weekday, or a functional urban highway during rush hour)	0.69 – 0.88
E	Unstable flow (flow becomes irregular, speed varies widely and rarely reaches speed limit)	0.88 - 1.00
F	Forced or breakdown flow (a constant traffic jam)	>1.00

Production Per day in tons		
Quarry	**Total Mineral in tons per day**	**No. of Lorry Load per day (20 tons /lorry)**
P1 (Proposed)	11434	572
P2 (Existing)	2072	104
P3 (Proposed)	2784	139
Total	**1892**	**815**

As one existing quarry is already exist, they are part of the current traffic. The proposed project will bring 711 trips per day.

Table 2.16 Summary on Traffic Volume

Route	Existing Traffic Survey in PCU	Incremental Traffic Survey due to project (cluster)	Total traffic survey volume	Hourly capacity in PCU as per IRC -1960 guidelines
Kottathurai to Melkaraipatti Village road	250	266	516	1500

Table 2.17 Modified Level of Service

Route	Existing Volume PCU/hr	Existing V/C Ratio	Additional Volume PCU/hr	Modified Volume PCU/hr	Modified V/C ratio	Modified LOS
Kottathurai to Melkaraipatti Village road	250	0.16	266	0.17	0.33	A*

2.10.7 INFRASTRUCTURE REQUIREMENT

This is a proposed project. Site services like mine office, first aid room, toilets etc. will be provided as semi-permanent structures.

2.10.8 PROJECT COST

The Project cost, including Operational, EMP & CER is 159.35 Lakhs. The proponent is financially sound to meet this financial requirement. Besides, he also has the technical capability to work at quarry.

A. FIXED ASSERT COST		
Particulars	**Amount**	
Land cost	Rs.33.42 Lakhs	
First aid room	1.00 Lakhs	
Labour Shed	1.00 Lakhs	
Sanitary Facility	1.00 Lakhs	
Total	**Rs.36.42 Lakhs**	
B. OPERATIONAL COST		
Machineries	Rs.80.00 Lakhs	
Fencing cost	3.00 Lakhs	
Total	**Rs. 83.00 Lakhs**	
C. EMP COST (FOR 5 YEARS) in Lakhs		
Mitigation Measures	**Capital cost**	**Recurring Cost /Annum**
Air Environment	13.80	2.23
Noise Environment	0.30	0.02
Waste Management	0.25	0.12
Mine Closure	0.82	0.16
Implementation of EC, Mining Plan & DGMS Condition	1.19	0.83
Total	**16.36**	**3.36**
The total EMP Cost of 34.93 Lakhs for a period of five years have been proposed. i.e., Capital cost of Rs. 16.36 Lakhs + Recurring cost of Rs. 18.57 lakhs (@ 5% Escalation).		
Total	**34.93 Lakhs**	
D. CER COST		
CER Cost	**5.00 Lakhs**	
Grand Total (A+B+C+D)	**159.35 Lakhs**	

2.10.9 PROJECT IMPLEMENTATION SCHEDULE

The proponent proposes to implement the production immediately after obtaining all the statutory approvals. The commercial operation will commence after the grant of Environmental Clearance. CTO and CTE 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.

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CHAPTER 3
DESCRIPTION OF THE ENVIRONMENT

3.1. STUDY AREA, PERIOD COMPONENTS AND METHODALOGY

The project area is located in Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State over an extent of 5.57.00 Ha., The project area is considered as Core zone and the area in the surrounding 10km radius is considered as Buffer Zone. The baseline environmental monitoring was conducted by M/s.Shrient Analytical & Research Labs Private Limited, Chennai it is an NABL and MOEF recognized laboratory for various components of environment, viz. Air, Noise, Water, Land was carried out during Summer Season i.e. March 2025 to May 2025 in the study area covering 10 km radial distance from the rough stone mine. Other environmental data on flora and fauna, land-use pattern, forest etc. were also generated through field surveys and secondary information collected from different State Govt. departments. Sampling methods and analysis. Socio-economic survey was conducted, through interaction with the people, sarpanch and medical officers by floating questionnaires and collection of information are supported by census data for demographic structures, amenities, and infrastructure availability within the study area. Baseline values for various environmental components are discussed in this Chapter.

ENVIRONMENTAL SETTING OF THE STUDY AREA

Table 3.1 Description of the lease area

S.No.	Areas	Distance from project site
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	Nil within 10 km radius
2	Areas which are important or sensitive for ecological reasons	

<table>
<tr><td>A</td><td>Wetlands, water courses or other water bodies,</td><td><table>
<tr><th>Water bodies</th><th>Distance</th><th>Direction</th></tr>
<tr><td>Odai</td><td>52 m</td><td>E</td></tr>
<tr><td>Tank</td><td>160 m</td><td>NE</td></tr>
<tr><td>Tank</td><td>1.4 m</td><td>S</td></tr>
<tr><td>Alangulam Tank</td><td>3.8 km</td><td>SE</td></tr>
<tr><td>Tank</td><td>4.5 km</td><td>NE</td></tr>
<tr><td>Amaravathi River</td><td>2.8 km</td><td>NW</td></tr>
<tr><td>Shanmukha River</td><td>2.6 km</td><td>E</td></tr>
</table></td></tr>
<tr><td>B</td><td>Coastal zone, biospheres,</td><td>Nil within 10km radius</td></tr>
<tr><td>C</td><td>Mountains, forests</td><td>Dalavaipattinam R.F. – 6.6 km(N)</td></tr>
<tr><td>3</td><td>Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, overwintering, migration</td><td>Nil within 10 km radius</td></tr>
<tr><td>4</td><td>Inland, coastal, marine or underground waters</td><td>Nil within 10 km radius</td></tr>
<tr><td>5</td><td>State, National boundaries</td><td>Nil within 10 km radius</td></tr>
<tr><td>6</td><td>Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas</td><td>Nil within 10 km radius</td></tr>
<tr><td>7</td><td>Defense installations</td><td>Nil within 10 km radius</td></tr>
<tr><td>8</td><td>Densely populated or built-up area</td><td>Palani – 17.00 km - SE</td></tr>
<tr><td>9</td><td>Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)</td><td>Palani – 17.00 km - SE</td></tr>
<tr><td>10</td><td>Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)</td><td>Nil</td></tr>
<tr><td>11</td><td>Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)</td><td>Nil</td></tr>
<tr><td>12</td><td>Areas susceptible to natural hazard which could cause the project to present environmental problems (earth quakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions) similar effects</td><td>No. The area is not prone to earthquakes, floods, etc.</td></tr>
</table>

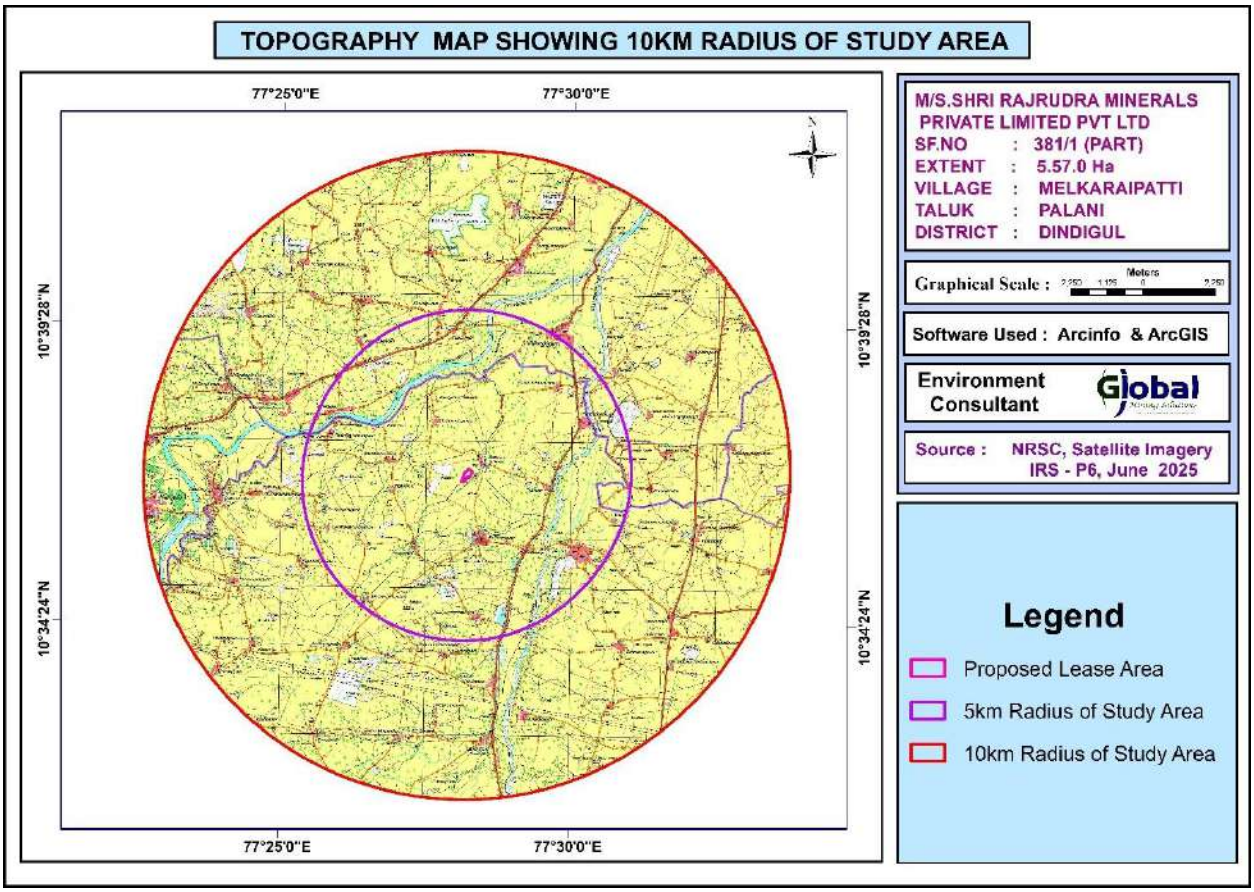


FIG 3.1 ENVIRONMENTAL SETTING OF THE STUDY AREA

STUDY PERIOD

The relevant information and data (both primary and secondary) were collected in core as well as buffer zone (10 km distance from the mine boundary) during Summer Season (March., to May., 2025) in accordance with the guidelines for preparation of EIA studies in order to assess the impact of the mine site within the 10 Km study area on existing physical, biological and social environment.

3.2 ESTABLISHMENT OF BASELINE FOR VALUED ENVIRONMENTAL COMPONENTS:

Information on the following components/parameters were collected to understand the existing scenario of the core and buffer area:

- Meteorological environment
- Air environment
- Water environment
- Noise environment
- Soil environment
- Biological environment
- Land use & Land cover
- Socio economic environment
- Hydrogeology

BASELINE DATA COLLECTION

Baseline environment data on various components of the environment in the study area were collected during Summer Season (March., to May., 2025) to assess the present scenario of the area. Details are given in the table given below.

Baseline data collection During Post Monsoon Season (March., to May., 2025)

Sr.No	Environmental Component	Primary data		
		Parameters	Frequency	Monitoring/Sampling locations
1	Land	Agriculture, Habitation, Industry, Stony waste/ Quarries, Forest area, Plantation/ Vegetation, Open scrub, Water bodies etc.	Once in a Season	10 km radius study area
2	Meteorology	Temperature, Relative Humidity, Wind Speed, Wind Direction.	Hourly	1
3	Air	PM10, PM2.5, SO2, NO2, CO & PAH	twice a week (24 hourly)	7
4	Noise	Equivalent noise levels in Leq in dB (A)	Once in a season (day	7

			& night time)	
5	Water	Parameters as per IS 10500 - 2012	Once in a season	
A	Surface Water	Parameters as per IS 10500 - 2012	Once in a season	2
B	Ground Water	Parameters As per IS 2720/USDA	Once in a season	7
6	Soil	Parameters As per IS 2720/USDA	Once in a season	7
7	Biological Environment	Flora and Fauna	Once in a season	Study Area
8	Socio-Economic Environment	Socio-Economic Environment	Once in a season	Study Area

INSTRUMENTS USED FOR ENVIRONMENTAL BASELINE DATA COLLECTION

The following instruments were used at the site for environmental baseline data collection work.

- Respirable Dust Sampler with attachment for gaseous Pollutants, Envirotech APM 460.
- Fine Particulate Matter (FPS) Sampler APM 550
- Sound Level Meter Model Envirotech SLM - 100
- Digital D.O. Meter Model - 831 E (CPCB Kit)
- Weather Monitoring Station Model Enviro WM 271
- Water Level Indicator and
- Global Positioning System (GPS) Apart from collecting samples of air, water, noise and soil from representative sampling points given in proceeding sections, the data on land use, vegetation and agricultural crops were also collected by the field team through interaction with a large number of local inhabitants of the study area and different Government departments/agencies. This provided an excellent opportunity to the members of the field team for obtaining clear scenario of the existing environment of the study area.

3.3. BASE MAP OF ALL ENVIRONMENTAL COMPONENTS

(ENUMERATION OF THE STRUCTURES LOCATED WITHIN 300 m RADIUS FROM THE PROPOSED QUARRY SITE)

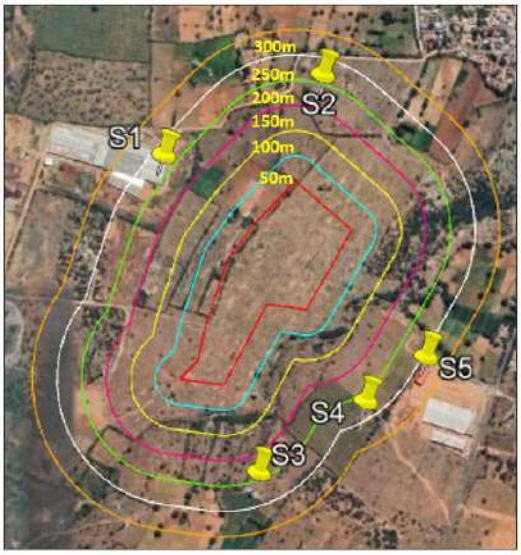
A site survey has been conducted to identify and list structures located within a 300 m radius from the proposed Quarry and are detailed below. The PP has obtained a letter from Village Administrative Office (VAO), Melkaraipatti stating that there are no structures situated within 300 Km radius.

Structures within 300 m radius

S. No	Name of the Structure	Distance and Direction	Ownership	Occupant	Type	Age
S1	NRS Bricks	203 m (W)	Does not belong to the PP	Nil	G.I. Sheet	>5 years
S2	Farm House	200m(NW)		Nil	Concrete	>3 years
S3	Shed	230m(SE)		Nil	G.I. Sheet	>2 years
S4	Farm Shed	273m(SE)		Nil	Masonry	>5 years
S5	Shed	265m(E)		Nil	G.I. Sheet	>2years

FIG 3.2 GOOGLE MAP SHOWING 50M INTERVAL FOR 300 M RADIUS FROM THE LEASE AREA

ENUMERATION OF THE STRUCTURES LOCATED WITHIN 300m RADIUS FROM THE PROPOSED PROJECT



S. No	Name of the Structure	Distance and Direction	Ownership	Occupant	Type	Age
S1	NRS Bricks	203 m (W)	Does not belong to the PP	Nil	G.I. Sheet	>5 years
S2	Farm House	200m(NW)		Nil	Concrete	>3 years
S3	Shed	230m(SE)		Nil	G.I. Sheet	>2 years
S4	Farm Shed	273m(SE)		Nil	Masonry	>5 years
S5	Shed	265m(E)		Nil	G.I. Sheet	>2years

Photographs of Structures located within 300 m radius

ENUMERATION OF THE STRUCTURES LOCATED WITHIN 300m RADIUS FROM THE PROPOSED PROJECT

S1 – NRS Bricks – 203 m(W)

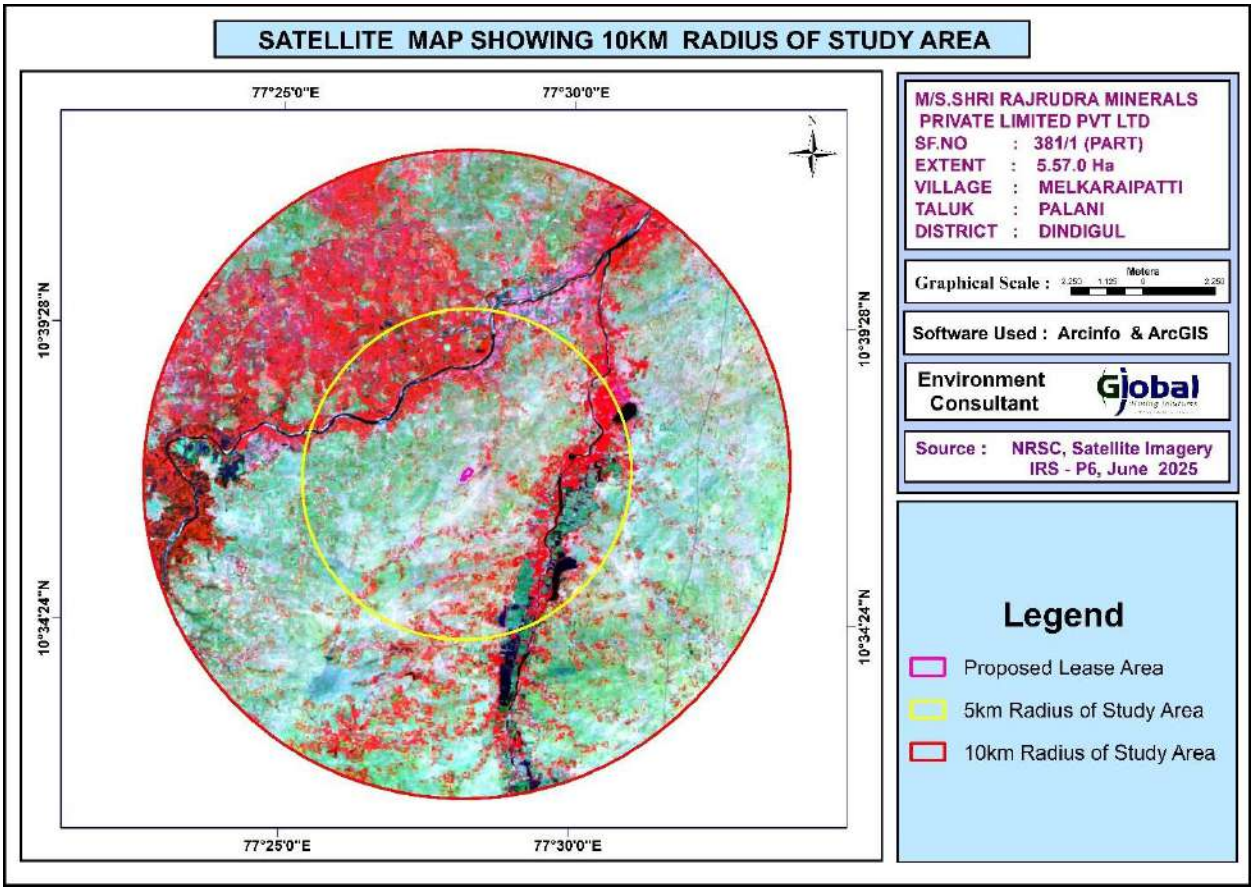
S2 – Farm House– 200 m(NW)

S3 – Shed– 230 m(SE)

S4 – Farm Shed– 273m(SE)

S5 – Shed– 265m(E)

FIGURE - 3.2a SATELLITE MAP OF THE PROJECT AREA (10 KM RADIUS)



3.3.1 METEOROLOGICAL ENVIRONMENT

Meteorological conditions prevailing in the buffer zone is given below

Climate

The climatic conditions of Dindigul are characterized by a tropical climate. This climate is considered to be Aw according to the Köppen-Geiger climate classification. In Dindigul, the average annual temperature is 27.2 °C | 80.9 °F. Each year, there is an approximate 1480 mm | 58.3 inch of precipitation that occurs.

Rainfall

The average annual precipitation amounts to about 1582 mm (62.3 inches) and receives 188 rainy days on the 1 mm (0.04 inches) threshold annually. The month with the most rainy days is October (21.60 days). The month with the fewest rainy days is February (4.13 days).

Rainfall received from 2017 to 2023 is given below.

Table 3.2 Rainfall data

Actual Rainfall in mm							Normal rainfall in mm
2017	2018	2019	2020	2021	2022	2023	
922.8	535.5	712.8	704.5	725.4	812	629.7	812

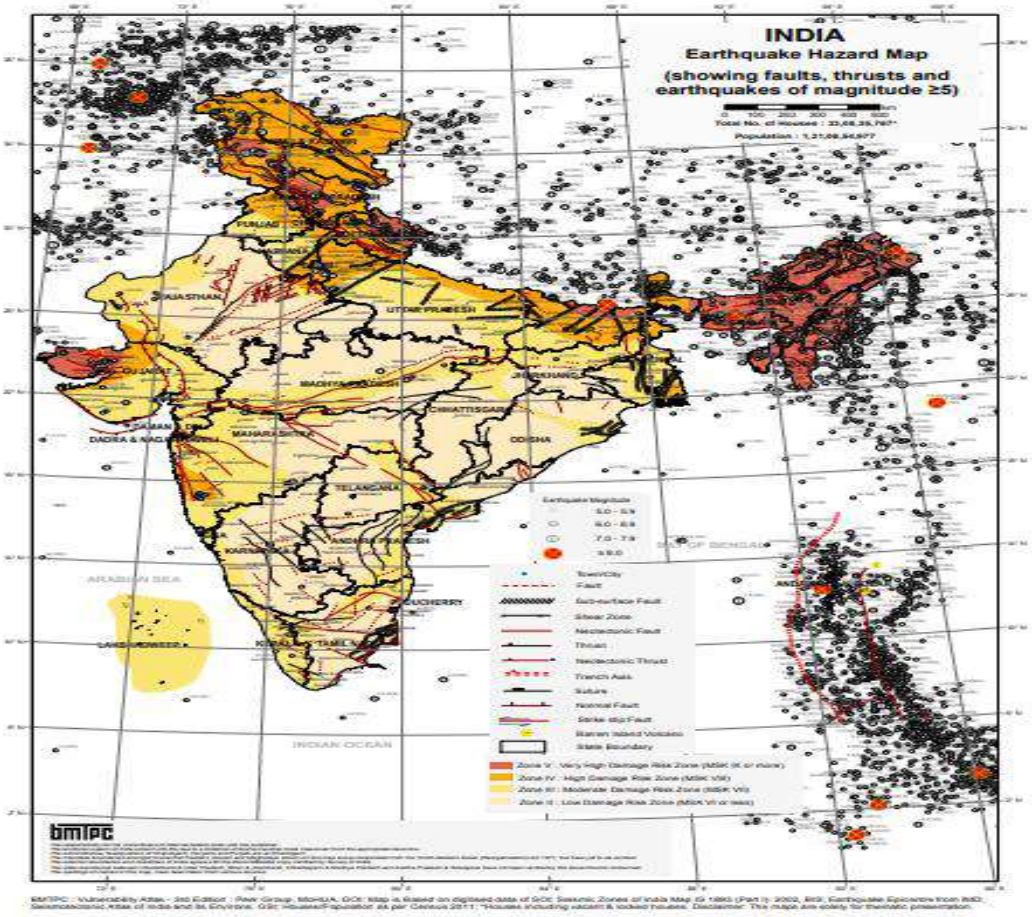
Relative Humidity

The month with the highest relative humidity is November (78.37). The month with the lowest relative humidity is March (51.20 percent).

Seismic information

The study area falls in Zone II, which comes under the least active zone. The seismic map of India is given as Fig 3.3.

FIG 3.3 SEISMIC MAP OF INDIA



Meteorological Data Recorded at Site

S.NO	Parameters		October to December 2023
1.	Temperature (^{0}C)	Min	15
		Max.	35
		Avg	26
2.	Relative Humidity (%)	Min	16
		Max	96
		Avg	66
3.	Wind Speed (m/s)	Min	0
		Max	6.2
		Avg	3.1
4.	Wind Direction	Blowing From – W	

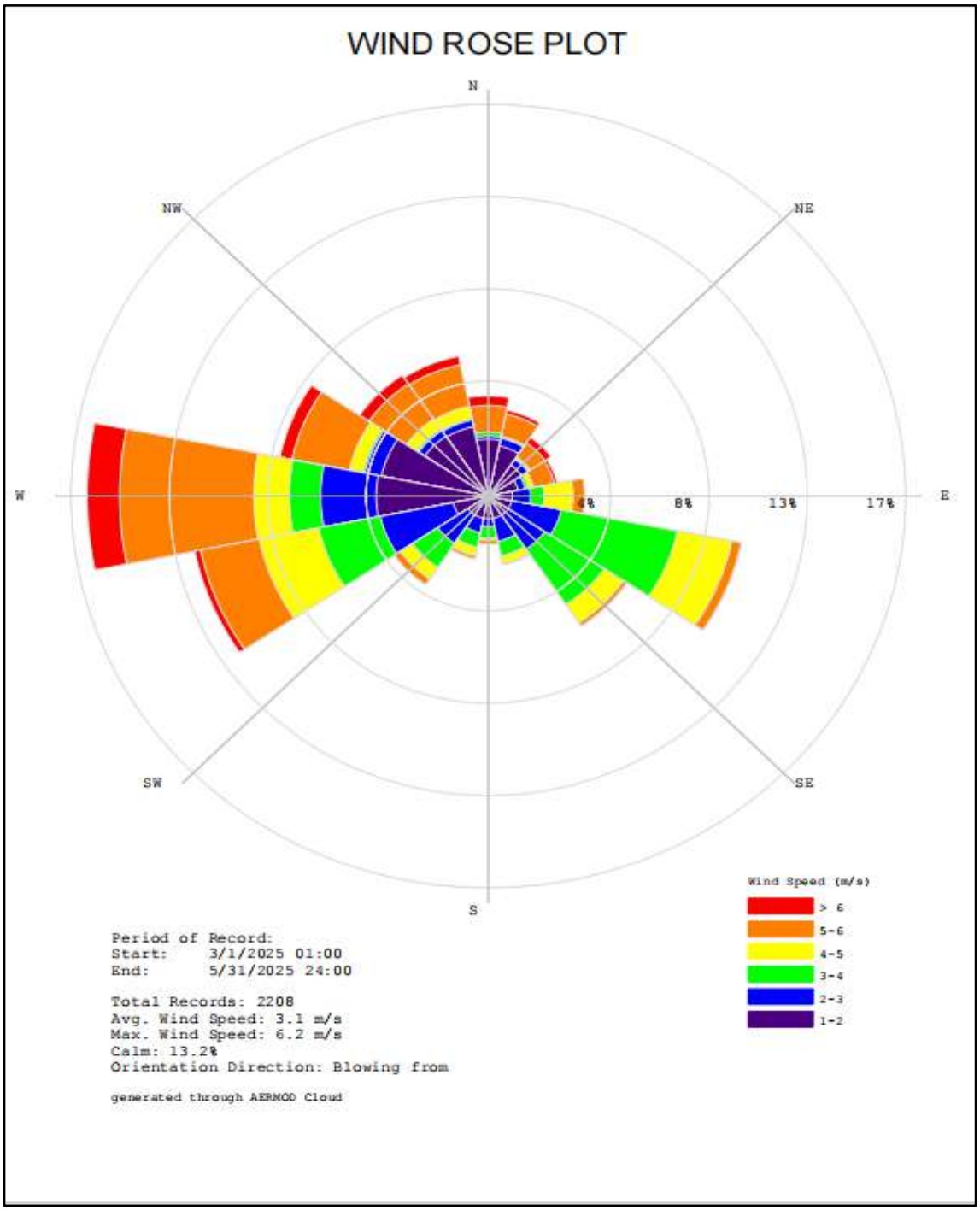


FIG 3.4 WIND ROSE PLOT DURING MARCH TO MAY 2025

3.3.2 AMBIENT AIR MONITORING DATA

Ambient air quality monitoring has been carried out in 7 locations. One in the core zone and remaining six locations in the buffer zone areas. Monitoring locations have been chosen such that the measurement represents the overall air condition prevailing in the area. The study area represents mostly rural environment with stone mining quarries & crushers.

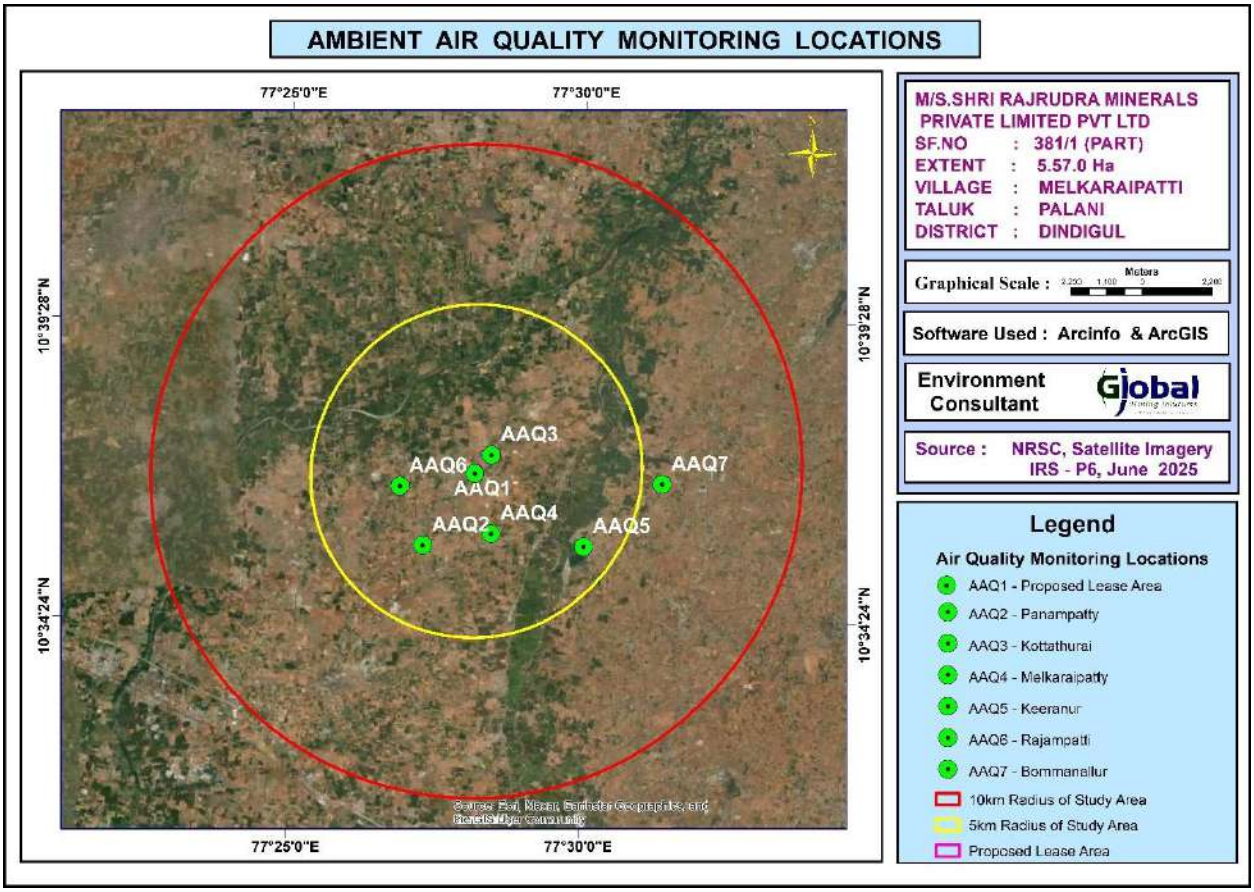
The regional climatologically data, was used as a guideline to know the predominant wind direction during study period. The locations were identified keeping in view predominant wind directions prevailing during study period, sensitive receptors, human settlements, and mining activities around.

The levels of Respirable Particulate Matter (PM10), Fine Particulates (PM2.5), Sulphur Dioxide (SO2) and Oxides of Nitrogen (NOx) were monitored for establishing the baseline status. PM10 were sampled with the help of Respirable Dust Samplers on filter papers and SO2 & NOx were absorbed in the respective absorption media in the impingers attached to RD samplers and analyzed Spectro-photometrically. PM2.5 was monitored with the help of Fine Particulate Samplers. The monitoring locations for ambient air study are given in Table – 3.3 and Figure 3.5 below.

Table 3.3: Details Of Ambient Air Quality Monitoring Locations

S. No.	Station Code	Locations	Distance & Direction	Coordinates
1	AAQ 1	Project site	Core Zone	10°36'55.79"N 77°28'11.63"E
2	AAQ 2	Panampatty	1.90 km (SW)	10°35'38.89"N & 77°27'19.75"E
3	AAQ 3	Kottathurai	1.21 km (NE)	10°37'11.27"N & 77°28'26.86"E
4	AAQ 4	Melkaraipatty	1.74 km (SE)	10°35'52.90"N & 77°28'24.56"E
5	AAQ 5	Keeranur	3.98 km (SE)	10°35'49.56"N & 77°29'53.13"E
6	AAQ6	Rajampatti	1.52 km (W)	10°37'10.21"N & 77°26'52.67"E
7	AAQ7	Bommanallur	6.18 km (E)	10°36'43.79"N & 77°31'22.60"E

FIG 3.5 BASE MAP OF AMBIENT AIR MONITORING LOCATIONS



The concentrations of various air pollutants at the 7 locations are given below. For all the components in the table, the unit are in µg/m^3.

Table.3.4 Results of Air sampling Analysis in 7 locations

Station ID	Min	Max	Avg.
Particulate matter PM-$_{2.5}$ ($\mu g/m^3$)			
AAQ-1	25.5	37.1	31.8
AAQ-2	24.8	32.6	27.9
AAQ-3	22.4	27.6	24.4
AAQ-4	19.7	29.2	24.1
AAQ-5	23.3	31.4	26.8
AAQ-6	24.3	29.5	26.3
AAQ-7	20.5	25.7	22.5
CPCB NAAQS 2009 for PM $_{2.5}$ - 60 $\mu g/m^3$			
Particulate matter PM-$_{10}$ ($\mu g/m^3$)			
AAQ-1	55.6	80.4	69.0
AAQ-2	52.8	69.4	59.4
AAQ-3	48.6	59.9	53.1
AAQ-4	42.8	59.4	51.8
AAQ-5	50.8	68.4	58.3
AAQ-6	52.8	64.1	57.3
AAQ-7	44.4	55.7	48.9
CPCB NAAQS 2009 for PM $_{10}$ - 100 $\mu g/m^3$			
Sulphur Di-oxide as SO_2 ($\mu g/m^3$)			
AAQ-1	6.4	9.3	7.5
AAQ-2	4.9	7.2	6.0
AAQ-3	4.6	6.6	5.7
AAQ-4	4.4	6.7	5.5
AAQ-5	5.7	7.7	6.7
AAQ-6	5.5	7.5	6.6
AAQ-7	4.8	6.8	5.9
CPCB NAAQS 2009 for SO_2 – 80 $\mu g/m^3$			
Oxide of Nitrogen as NO_2 ($\mu g/m^3$)			
AAQ-1	10.4	15.1	12.4
AAQ-2	7.1	10.2	8.8
AAQ-3	6.7	9.9	8.3
AAQ-4	6.0	8.3	7.2
AAQ-5	9.4	11.4	10.5
AAQ-6	9.7	12.9	11.3
AAQ-7	7.7	10.9	9.3
CPCB NAAQS 2009 for NO_2 – 80 $\mu g/m^3$			

The results are summarized in graph and given as below Fig. 3.6

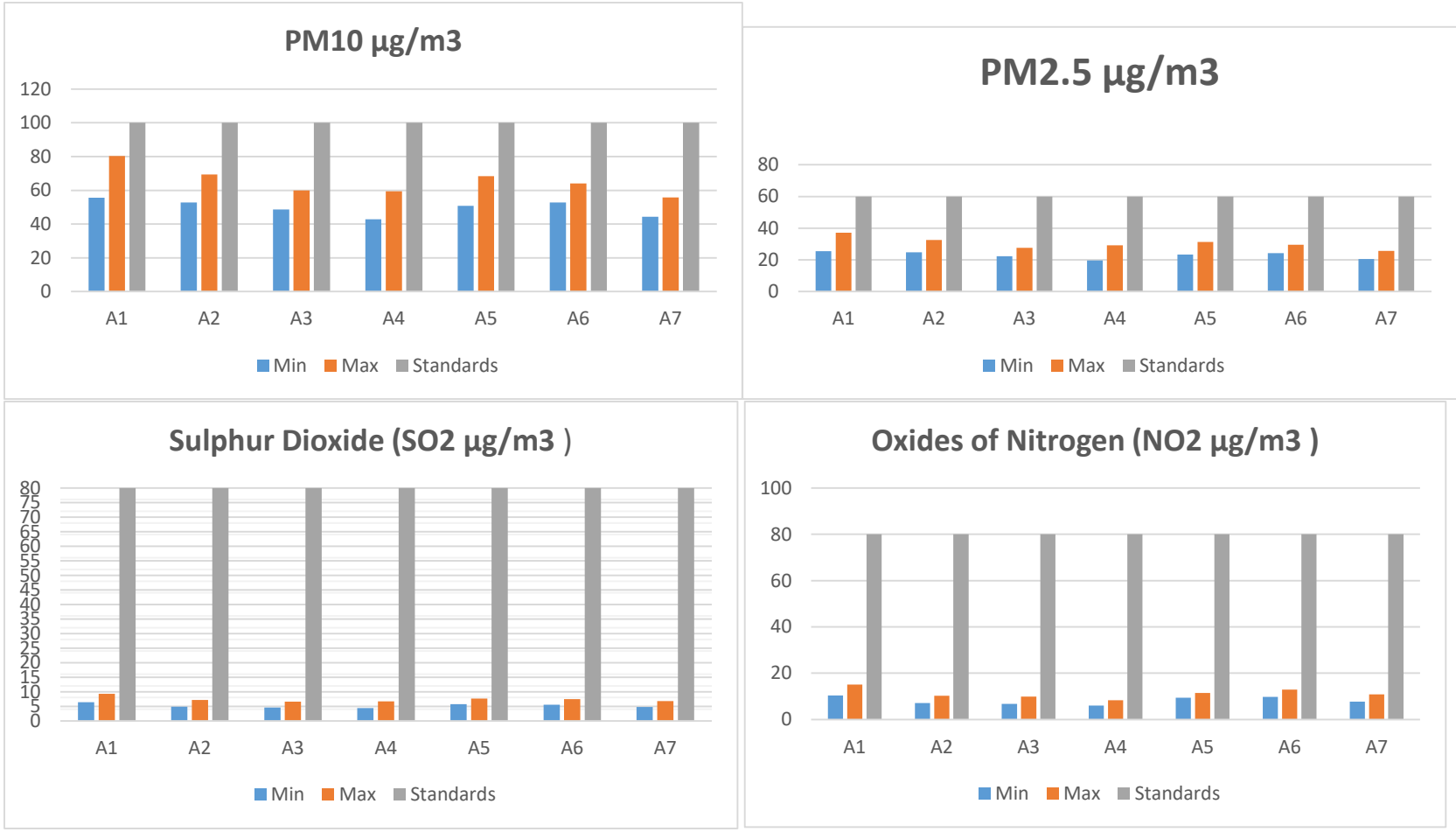


FIG 3.6 GRAPHICAL REPRESENTATION OF AMBIENT AIR QUALITY DATA

Interpretations & Conclusion

As per monitoring data, PM10 ranges from 42.80 µg/m^3 to 80.40 µg/m^3, PM2.5 data ranges from 19.70 µg/m^3 to 37.10 µg/m^3, SO2 ranges from 4.40 µg/m^3 to 9.30 µg/m^3 and NO2 data ranges from 6.0 µg/m^3 to 15.10 µg/m^3.

The monitoring data indicates that the maximum values of monitored parameters—PM10, PM2.5, SO2, and NO2—are observed in the mine lease area. The main contributing factor is that there is a bricks unit (203 m – W) and a crusher at 730 m in SW side, also one existing quarries within 500 m radius of the project site, where the vehicular traffic will be more.

The minimum values of PM10, PM2.5, SO2 and No2 are found in Melkaraipatty Village.

From the above results, it is observed that the ambient air quality with respect to PM_{10}, $PM_{2.5}$, SO_2, and NO_2 at all the monitoring locations was within the permissible limits specified by CPCB. CO value at all the monitored locations BDL.

3.3.3 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 standard guidelines issued by CPCB for analysis.

Reconnaissance survey was undertaken and monitoring locations were selected based on:

- Location of the major water bodies
- Location of project site, their water intake and effluent disposal locations
- Likely areas that can represent baseline conditions
- The water samples were collected and were analyzed for physical, chemical, and biological characteristics as per guidelines issued by IS code No.10500/2012.

Assessment of baseline data on water environment includes:

- Identification of water resources
- Collection of water samples
- Analyzing water samples collected for physico-chemical parameters as per standards.

Surface Water

There are one tank and an odai situated within 1 km radius of the area. The following water bodies are in the study area.

Water bodies	Distance	Direction
Odai	52 m	E
Tank	160 m	NE
Tank	1.4 m	S
Alangulam Tank	3.8 km	SE
Tank	4.5 km	NE
Amaravathi River	2.8 km	NW
Shanmukha River	2.6 km	E

The rainfall over the area is moderate, the rainwater storage in open wells, trenches is in practice over the area and the stored water acts as source of freshwater. The prevailing status of surface water quality has been assessed during the study period. Surface water quality locations and results are provided in Table 3-14 and Figure 3.11.

Ground Water

In Dindugal District, during the pre monsoon, the water level generally in declining trend ranges from G.L. to 15m. The depth of well below Ground Level 12.0m are become dry during hot season like May, June, July. In the post monsoon, the water level generally in upward trend due to rainfall and it may reach the Ground Level also.

Total Seven (07) ground water monitoring locations were identified for assessment in different villages around the project site based on the usage of sub surface water by the settlements/ villages in the study area. The groundwater results are compared with the acceptable and permissible water quality standards as per IS: 10500 (2012) for drinking water. Groundwater quality monitoring locations and results are given in Table 3.5 and Figure 3.11.

Sampling Locations

Two (2) surface water samples and Seven (7) 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 water bodies. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012. The water sampling locations are given in Table 3.5 and shown as Figure 3.12.

The monitoring locations were selected based on:

- Location of the major water bodies
- Location of project site,
- Likely areas that can represent baseline conditions Water bodies nearby

Table 3.5 Water Sampling Locations

S.NO	Location Code	Monitoring Locations	Latitude and longitude
Surface Water			
1	SW1	Amaravathi River – up stream	10°38'46.33"N & 77°27'57.72"E
2	SW2	Amaravathi River – down stream	10°37'48.63"N & 77°26'27.16"E
Ground Water			
1	GW1	Project site	10°36'55.79"N 77°28'11.63"E
2	GW2	Panampatty	10°35'38.89"N & 77°27'19.75"E
3	GW3	Kottathurai	10°37'11.27"N & 77°28'26.86"E
4	GW4	Melkaraipatty	10°35'52.90"N & 77°28'24.56"E
5	GW5	Keeranur	10°35'49.56"N & 77°29'53.13"E
6	GW6	Rajampatti	10°37'10.21"N & 77°26'52.67"E
7	GW7	Bommanallur	10°36'43.79"N & 77°31'22.60"E

FIG 3.7 BASE MAP OF GROUND WATER SAMPLING LOCATIONS

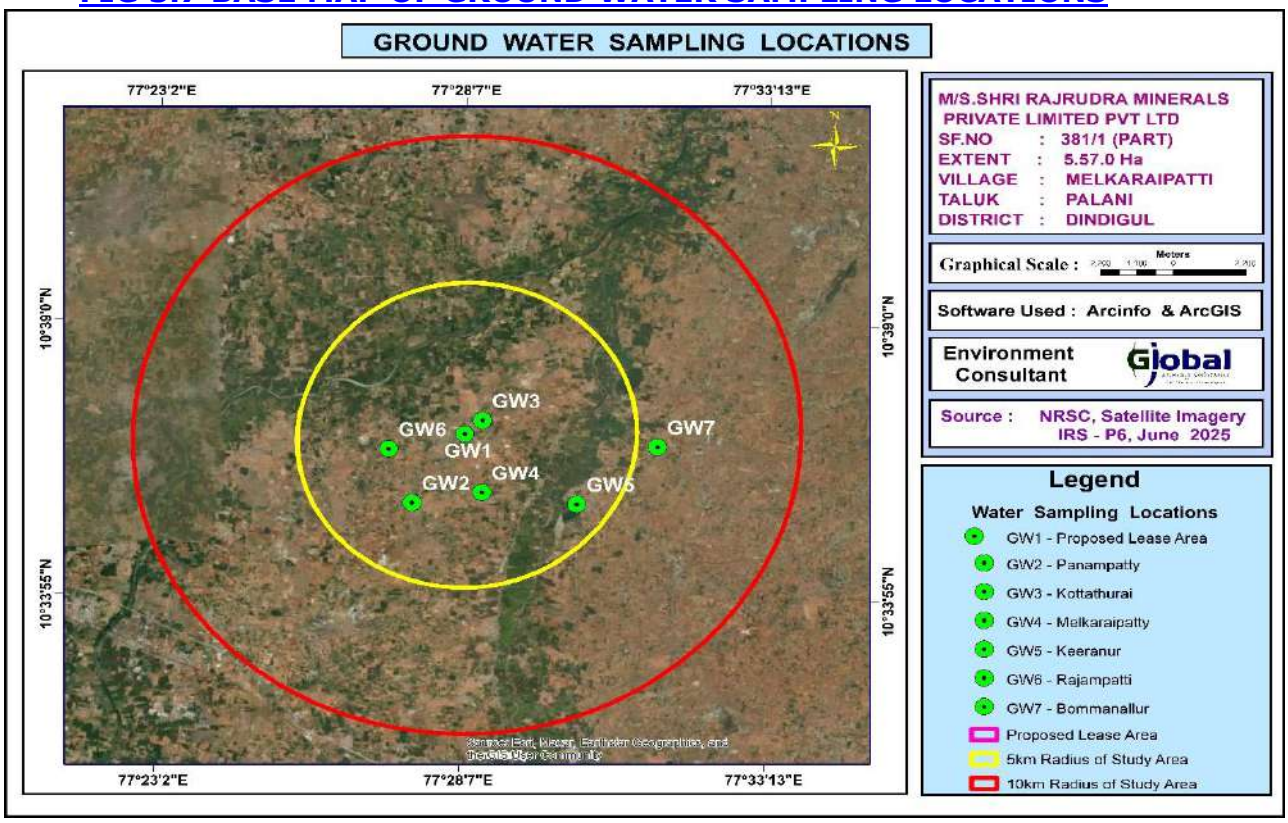


FIG 3.8 BASE MAP OF SURFACE WATER SAMPLING LOCATIONS

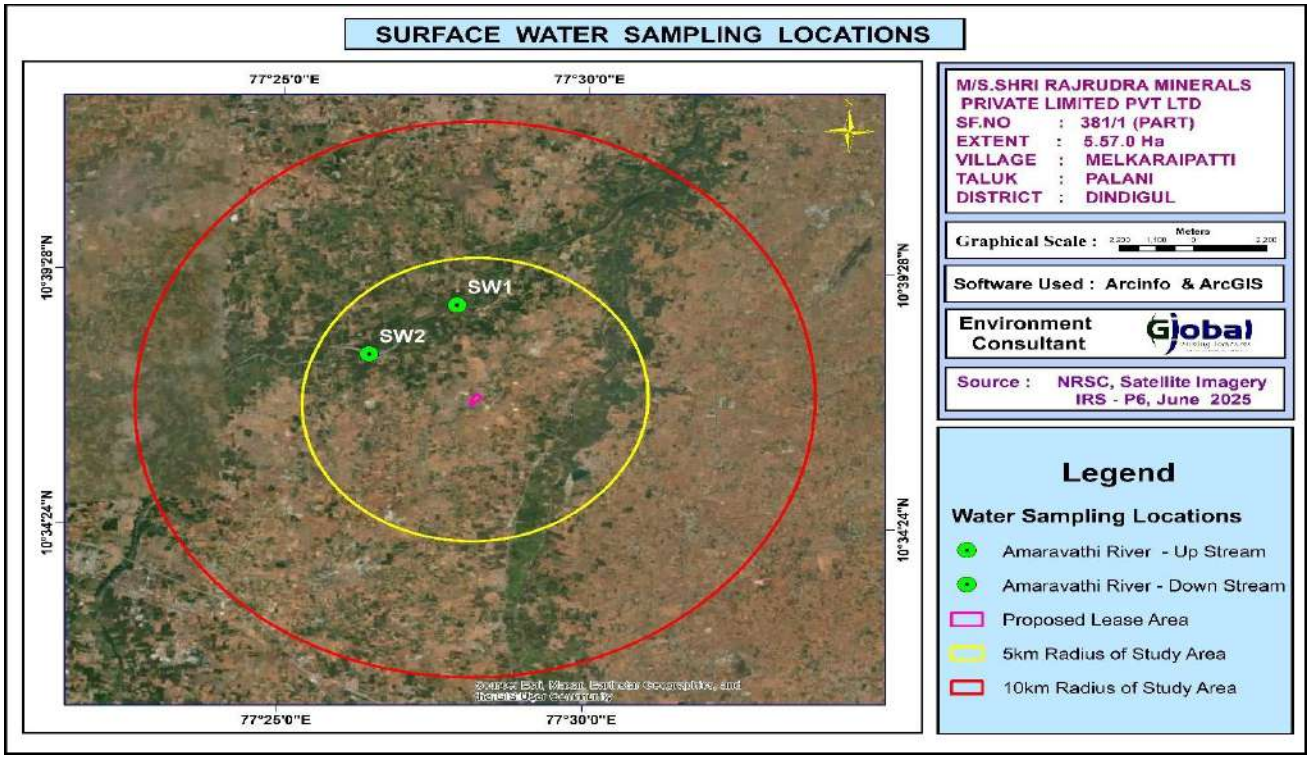


Table 3.6 Surface Water Analysis Results

Sr.No	Parameter	Unit	SW1	SW2	Surface water standards (IS 2296 Class-A)
1	Odour	-	Agreeable	Agreeable	-
2	Turbidity	NTU	<1.0	<1.0	1
3	pH at 25 °C	-	7.90	7.82	6.5-8.5
4	Electrical Conductivity	µs/cm	228	194	-
5	Total Dissolved Solids	mg/l	138	116	500
6	Total hardness as CaCO3	mg/l	80.2	75	-
7	Calcium as Ca	mg/l	16.1	15.4	300
8	Magnesium as Mg	mg/l	9.6	8.8	-
9	Calcium as CaCO3	mg/l	40.3	38.4	-
10	Magnesium as CaCO3	mg/l	39.9	36.8	-
11	Total alkalinity as CaCO3	mg/l	42.8	36.7	-
12	Chloride as Cl-	mg/l	30.6	35.2	250
13	Free Residual chlorine as Cl-	mg/l	BDL (D.L - 0.2)	BDL (D.L - 0.2)	-
14	Sulphates as SO42-	mg/l	14.9	15.2	400
15	Iron as Fe	mg/l	BDL(D.L - 0.01)	BDL(D.L - 0.01)	0.3
16	Nitrate as NO3	mg/l	BDL(DL-1.0)	1.65	20
17	Fluoride as F	mg/l	0.26	0.21	1.5
18	Manganese as Mn	mg/l	BDL (D.L - 0.05)	BDL(D.L-0.05)	0.5
19	COD	mg/l	BDL (D.L - 4.0)	BDL (D.L - 4.0)	-
20	BOD	mg/l	BDL (D.L - 2.0)	BDL (D.L - 2.0)	-
21	TSS	mg/l	BDL(DL-2.0)	BDL(DL-2.0)	-
22	DO	Mg/l	6.3	6.2	6.0

The samples were analyzed by M/s.Shrient Analytical & Research Labs Private Limited; Chennai and the results are summarized below.

Table 3.7 - Results of Ground Water Sampling Analysis

parameter	GW1	GW2	GW3	GW4	GW5	GW6	GW7	**Specification/Limit (As per IS:10500: 2012)**	
								Acceptable	**Permissible Limits**
Odour	agreeable	agreeable	agreeable	agreeable	agreeable	agreeable	agreeable	**Agreeable**	**Agreeable**
Turbidity	<1	<1	<1	<1	<1	<1	<1	1	**5**
pH at 25 °C	7.29	7.75	7.26	7.39	7.25	7.99	7.42	**6.5- 8.5**	No relaxation
Electrical Conductivity	1096	1020	1334	1422	920.2	735.8	846.9	**-**	**-**
Total Dissolved Solids	658	612	800	854	552	442	510	500	**2000**
Total hardness as $CaCO_3$	338	172	575	482	387	214	282	200	**600**
Calcium as Ca	82.4	43.2	132	108	106	48.4	72.0	75.0	**200**
Magnesium as Mg	31.7	15.4	58.8	50.9	29.0	22.3	24.5	30.0	**100**
Calcium as $CaCO_3$	206	108	330	270	266	121	180	**-**	**-**
Magnesium as $CaCO_3$	132	64.0	245	212	121	93.0	102	**-**	**-**
Total alkalinity as $CaCO_3$	449	176	382	438	284	201	234	200	**600**
Chloride as Cl^-	125	374	255	211	146	138	155	250	**1000**
Free Residual chlorine as Cl^-	BDL (D.L - 0.2)	BDL(D.L-0.2)	BDL(D.L-0.2)	BDL (D.L-0.2)	BDL(D.L-0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	0.2	**1**
Sulphates as SO_4^{2-}	149	76.5	104	155	33.2	53.6	57.9	200	**400**
Iron as Fe	BDL(D.L - 0.01)	BDL(D.L - 0.01)	BDL(D.L - 0.01)	BDL(D.L - 0.01)	BDL(D.L - 0.01)	0.06	0.07	0.30	**0.3**
Nitrate as NO_3	3.59	1.66	3.05	2.57	2.96	1.45	2.77	45	**45**
Fluoride as F	0.36	0.32	0.48	0.39	0.34	0.49	0.44	1	**1.5**
Manganese as Mn	BDL (D.L - 0.05)	BDL(D.L-0.05)	BDL(D.L-0.05)	BDL(D.L-0.05)	BDL(D.L-0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	1	**0.3**

Some of the common parameters including EC, TDS, Total Hardness, Total Alkalinity, Chlorides and Sulphates in the 7 locations were plotted and the graph is provided below.

FIG 3.9 VALUES OF FEW COMMON PARAMETERS IN GROUND WATER ANALYSIS

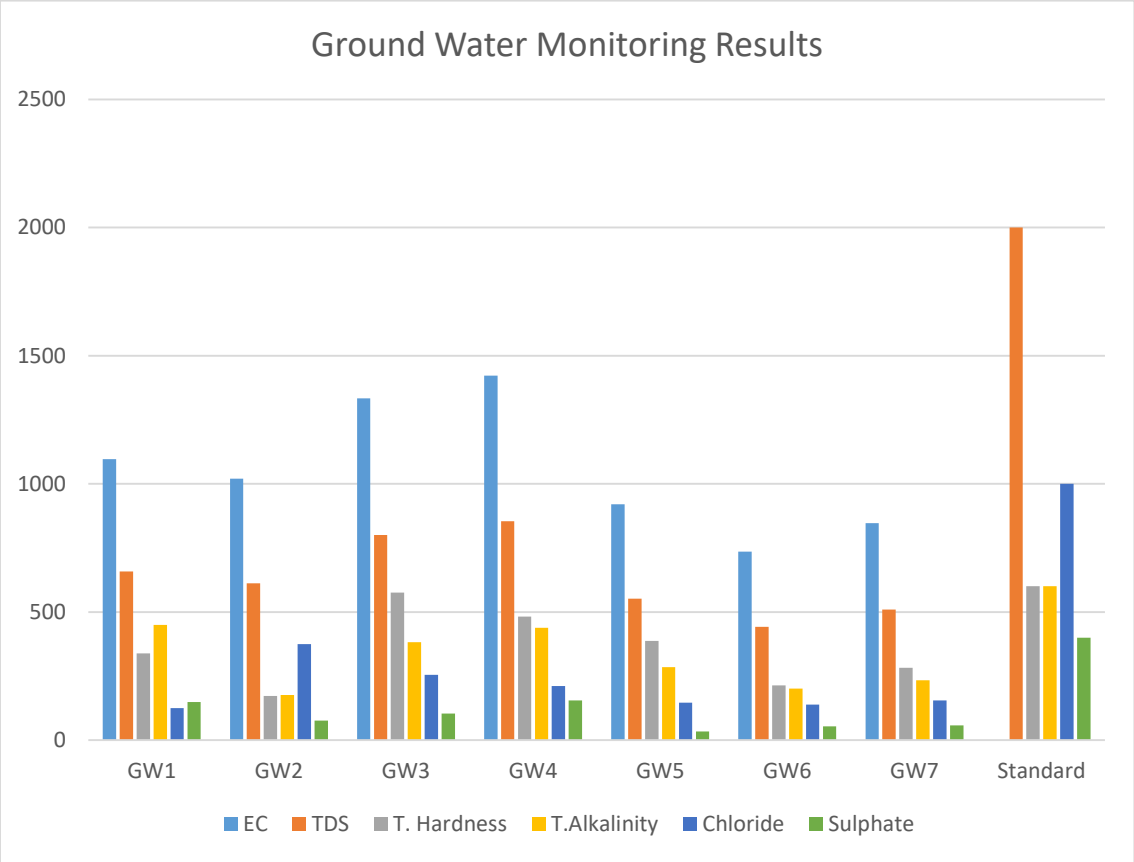
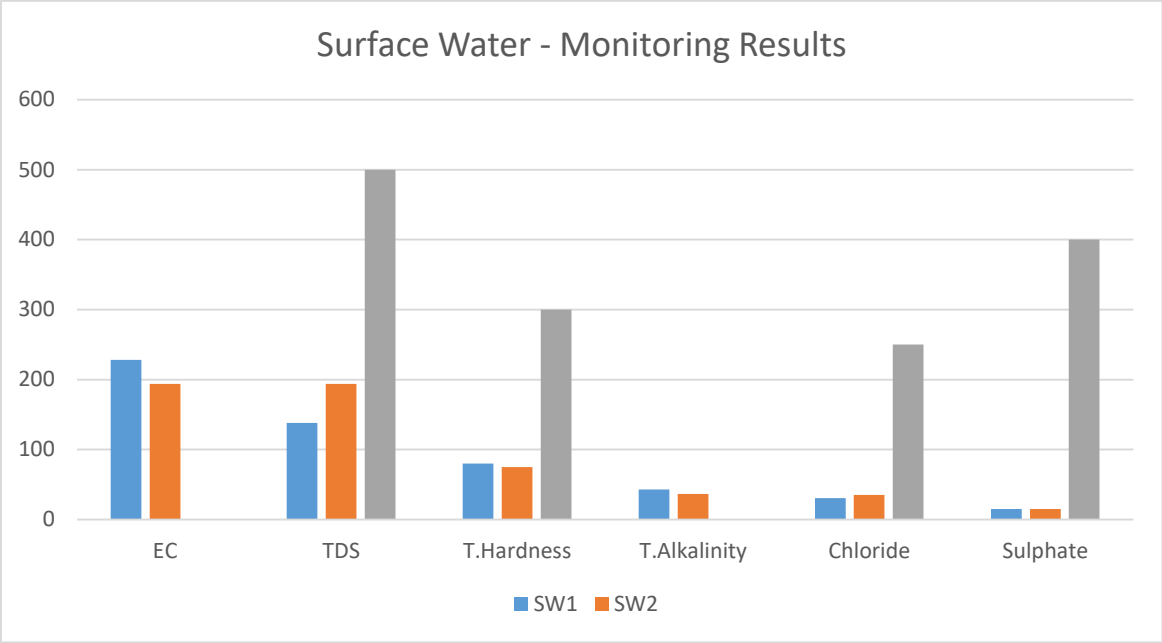


FIG 3.10 VALUES OF FEW COMMON PARAMETERS IN SURFACE WATER ANALYSIS



Interpretation& Conclusion

Ground Water Quality

Ground Water Quality results were compared with Acceptable limits for Drinking Water as per the Standard IS 10500:2012. Some parameters of Water samples did not meet the acceptable limits of IS 10500: 2012, as the values of few of the tested parameters in source exceed the acceptable limits.

- pH of the water samples ranged from 7.25 -7.99 pH in water samples collected from all the locations are within the acceptable limits limit.
- Iron in water samples collected from all the locations were also within permissible limits.
- Total Dissolved Solids found in the range of 442 – 854 mg/l from Seven locations and in some locations the values were exceeds the acceptable limits. The maximum TDS value was found at Melkaraipatty Village.

- Total Hardness of water sample varied between 172 - 575 mg/l and the maximum value recorded at Kottathurai Village. All seven sample's TH exceeds the Acceptable limits except one location i.e. Panampatty Village.
- Chloride in the water samples ranged from 125 – 374 mg/l. Chlorides values are within the within the acceptable limits except in two locations i.e in Panampatty Village and Kottathurai Village. Turbidity from the water samples were within the acceptable limit.

Surface Water Quality

pH:

The pH varied from 7.82 to 7.90 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH)

Total Dissolved Solids:

Total Dissolved Solids varied from 116 to 138 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phospates and nitrates of calcium, agnesium, sodium and other organic matter.

Other parameters:

Chloride varied between 30.6 mg/l and 35.2 mg/l. Nitrates varied from 0 to 1.65 mg/l, while sulphates varied from 14.9 to 15.2 mg/l.

All the values were found to be within the permissible limits.

3.3.4 NOISE MONITORING

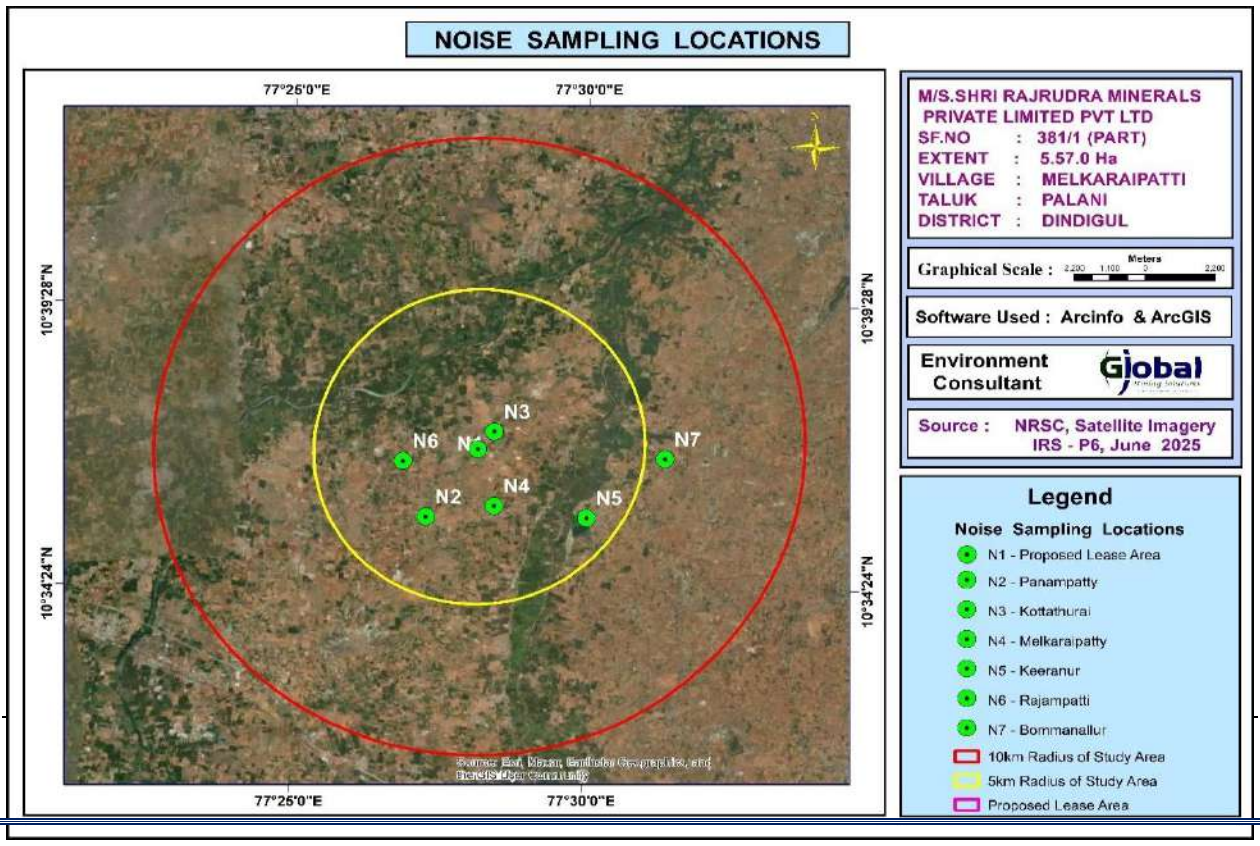
The vehicular movement on road and mining activities is the major sources of noise in study area, the environmental assessment of noise from the mining activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses, 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.

Noise Level Monitoring

1	**Monitoring Period**		Summer (March – May 2025)		
2	**Monitoring Locations**				
	Code	Location Name	Distance in km	Direction	Coordinates
	N1	Project site	Core Zone	-	10°36'55.79"N 77°28'11.63"E
	N2	Panampatty	1.90 km	SW	10°35'38.89"N & 77°27'19.75"E
	N3	Kottathurai	1.21 km	NE	10°37'11.27"N & 77°28'26.86"E
	N4	Melkaraipatty	1.74 km	SS	10°35'52.90"N & 77°28'24.56"E
	N5	Keeranur	3.98 km	SE	10°35'49.56"N & 77°29'53.13"E
	N6	Rajampatti	1.52 km	W	10°37'10.21"N & 77°26'52.67"E
	N7	Bommanallur	6.18 km	E	10°36'43.79"N & 77°31'22.60"E
3	**Methodology**		Noise levels were measured using sound level meter. Sound Pressure Level (SPL) measurements were measured at all locations where ambient air quality monitored; one reading for every hour was taken for 24 hours.		

FIG 3.11 BASE MAP OF NOISE MONITORING LOCATIONS



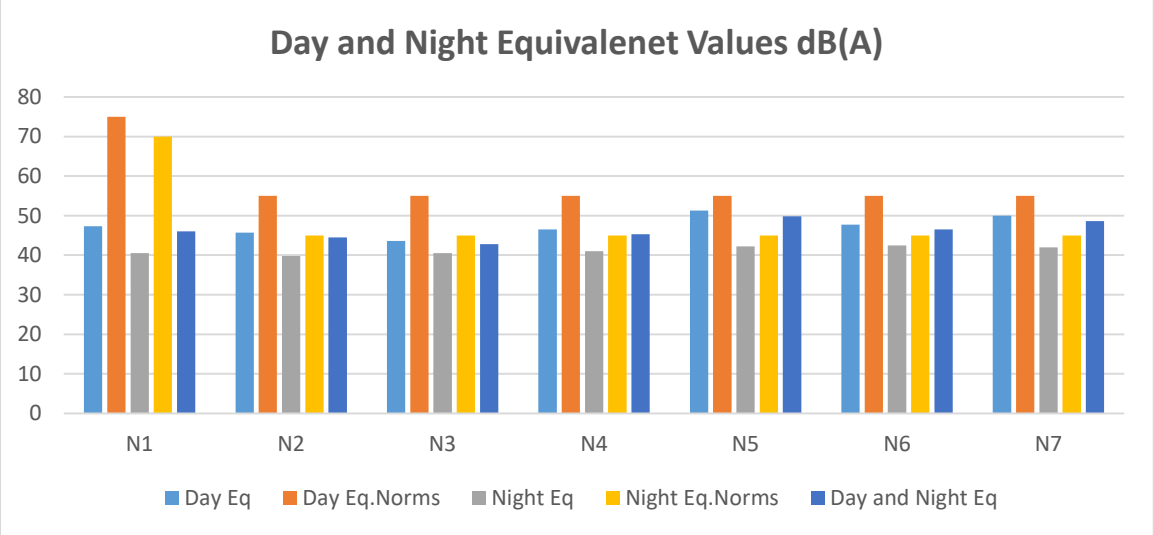
The results are given in Table below.

Table 3.8 Noise monitoring results

S. No	Location	Day equivalent	Night equivalent	Day equivalent limits by CPCB	Night equivalent limits by CPCB
1	Project site	47.3	40.5	75	70
2	Panampatty	45.7	39.8	55	45
3	Kottathurai	43.6	40.5		
4	Melkaraipatty	46.5	41.0		
5	Keeranur	51.3	42.2		
6	Rajampatti	47.7	42.5		
7	Bommanallur	50.0	42.0		

The results are plotted as below.

FIG 3.12 DAY AND NIGHT EQUIVALENT VALUES IN 5 LOCATIONS



Interpretation& Conclusion

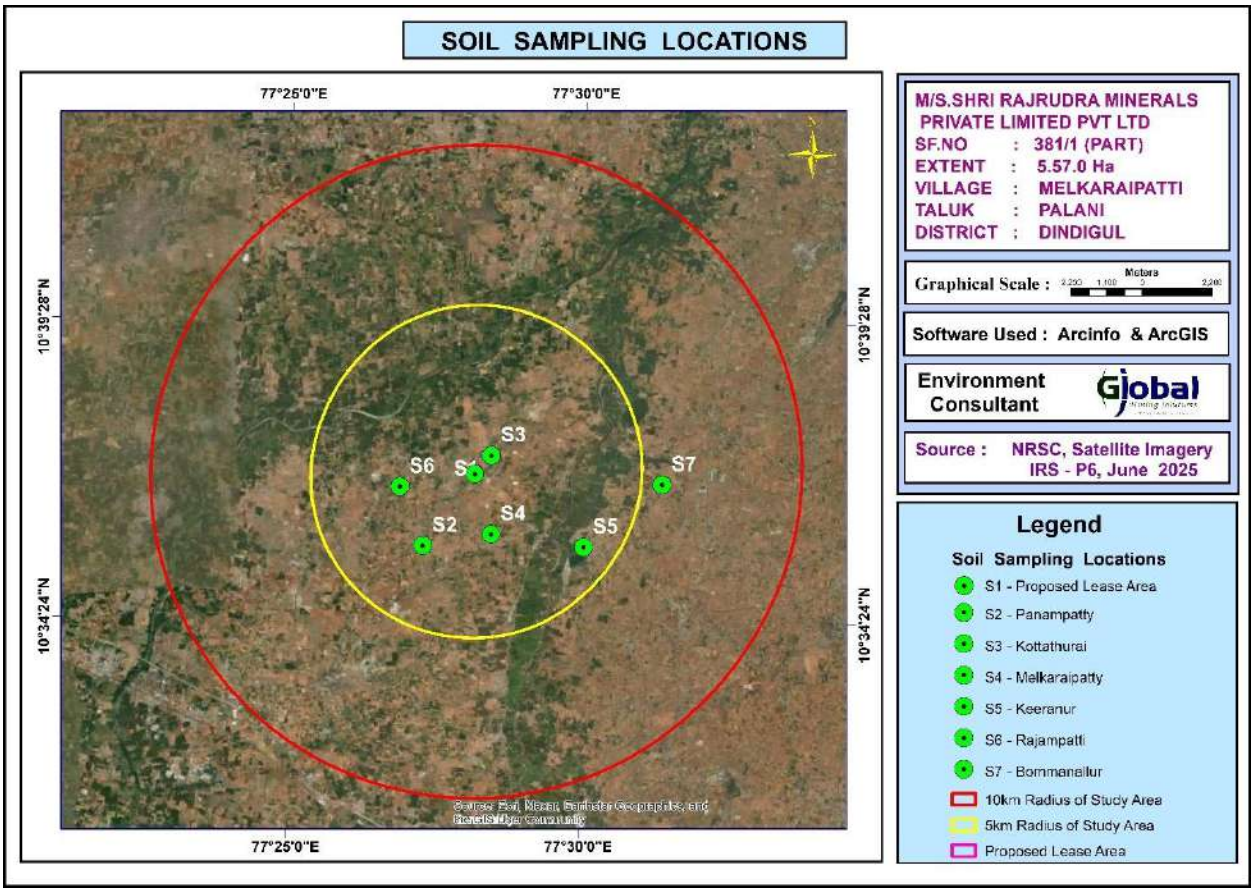
Day Time Noise Levels: The day time noise levels at Core zone were observed as 47.3 dB (A) being well within the Industrial area prescribed limit of 75 dB (A) whereas the noise levels at all locations of Buffer zone were observed to be in the range of 43.6 – 51.30 dB (A) being well within the Residential area prescribed limit of 55 dB (A) as per CPCB Standard.

Night Time Noise Levels: The night time noise levels at all locations of buffer zone villages were observed to be in the range of 39.8 – 42.50 dB (A) being well within the residential area prescribed limit of 45 dB (A) whereas the Noise level in the core Zone was observed as 40.5 dB (A) which is also within the prescribed limit of 70 dB (A) as per CPCB Standard for Industrial Areas.

SOIL SAMPLING ANALYSIS

The major soil types found in the study area are Loamy sand, Sandy Clay Loam and sandy loam. Soil samples have been collected from the mine lease area and 6 other locations from Panampatty, Kottathurai, Melkaraipatty, Keeranur, Rajampatti and Bommanallur Villages. The locations are shown in figure below.

FIG 3.13 BASE MAP OF SOIL SAMPLING LOCATIONS



The results are summarized in the table below.

Table 3.9 RESULTS OF SOIL SAMPLE ANALYSIS

S.No	Parameter	Unit	S1	S2	S3	S4	S5	S6	S7
1	pH at 25 °C	-	7.89	6.52	6.97	7.05	7.12	6.78	6.99
2	Electrical Conductivity	µmhos/ cm	110	75.62	152	90.47	165	89.74	95.47
3	Dry matter content	%	90.33	94.65	94.72	95.74	94.21	95.66	94.23
4	Water Content	%	9.67	5.35	5.28	4.26	5.79	4.34	5.77
5	Organic Matter	%	0.66	1.33	1.21	0.94	1.24	1.05	1.33
6	Soil texture	-	SILT LOAM	silty clay	silty clay loam	silt loam	silty clay loam	silt loam	loam
7	Grain Size Distribution i. Sand	%	26.59	8.92	13.55	24.74	13.69	29.21	34.52
8	ii. Silt	%	58.69	47.46	47.52	68.72	48.21	53.64	50.33
9	iii. Clay	%	14.72	43.62	38.93	6.54	38.10	17.15	15.15
10	Phosphorous as P	mg/kg	0.95	1.72	2.31	1.74	1.89	1.77	1.34
11	Sodium as Na	mg/kg	772	432	725	597	705	375	402
12	Potassium as K	mg/kg	524	662	895	794	870	712	616
13	Nitrogen and Nitregenous Compounds	mg/kg	348	269	288	642	321	230	450
14	Total Soluble Sulphate	%	BDL(D.L. 0.02)	BDL(D.L. 0.02)	BDL(D.L .0.02)	BDL(D. L.0.02)	BDL(D. L.0.02)	BDL(D .L.0.02)	BDL(D .L.0.02)
15	Porosity	%	19.6	18.5	19.4	18.3	19.2	19.6	19.8
16	Water Holding Cabacity	Inches/ foot	42	40	42	40	42	40	42

Interpretation

Results of the soil samples show that the pH values were found to be 6.52 to 7.89 and Electrical Conductivity values were ranging between 75.62 – 165 µmhos/cm. Soils are generally Silt Loam. Organic matter values were ranging between 0.66 – 1.33 %. Total Nitrogen values were ranging between 230 – 642 mg/kg. Phosphorus values were ranging between 0.95 – 2.31µg/g. Potassium values were ranging between 524 – 895 mg/kg. Sodium values were ranging between 350 – 772 mg/kg. Total Sulphate values were observed to be BDL. The soil quality data for the 6 samples collected and analyzed are provided in Table no – 3.13.

3.3.5 BIOLOGICAL ENVIRONMENT

Study of the biological environment of any area comprises of well-planned ecological survey for the floristic and faunal composition of the areas through various scientifically planned techniques. Accordingly, the ecological survey for the proposed Rough stone quarry area including core and buffer zone were carried out to identify various species occurring in the area.

Flora in the study area

Field survey is done. For measuring the extent of flora present in the study area, the area is divided in to 4 quadrants. The flora population in each quadrant is summed up for the total population in the study area. Also, data from the State Forest department is used.

An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological (Terrestrial) conditions. The objective of the survey is as follows:

- Generate existing data from field observations of various terrestrial floristic occurrences.
- Collect secondary data from Government records as well as through discussion with Forest officials, knowledgeable public etc.,
- Compare the data with authentic past records to identify changes, if any.
- Identify the impact of project operations on the biological aspects.

To accomplish the above objectives, a general ecological survey covering an area of 10 km radius was conducted. The locations were identified for phyto-sociological aspects to assess the current status.

Methodology

Sampling locations were selected with reference to topography, land use, vegetation pattern, etc. In this study, quadrats of 10m × 10 m were laid down to assess trees and quadrats of 5m × 5m were laid down for shrubs.

National Park/Sanctuary:

There are no Wildlife Sanctuary and National Park present near to 10km radius of mining lease area. The nearest Sanctuary is Kodaikanal Wildlife Sanctuary - 24.30 km (SW).

Reserve Forest

There are no forest within 1 km radius of the project site. The forest in study area is given below.

- Dalavaipattinam R.F. – 6.6 km(N)

Core Zone

During the field visit, it is observed that there are no national parks / Sanctuaries / forests in the 10km buffer area. The study area is devoid of any major plantations.

Table 3.10 Flora in Core Zone

S.No.	Scientific name	Vernacular/English name	Type of flora
1	Calotropis gigantea	Erukku	Shrubs
2	Cassia auriculata	Aavarai	
3	Achyranthes aspera	Nayuruvi	

Flora in 300 m radius zone

It contains a total of 13 species belonging to 12 families have been recorded from the buffer zone of 300 m radius. Trees 4 (30%), Shrubs 4 (30 %) Herbs 5 (40%) were identified.

Table 3.11 Flora in 300 m radius

S. No	Local Name	Scientific Name	Family Name	IUCN Conservation Status
Trees				
1	Kondrai	*Cassia fistula*	Caesalpiniaceae	Not Listed
2	Seetha	*Annona squamosa*	Annonaceae	Not Listed
3	Vembu	*Azadirachta Indica*	Meliaceae	Not Listed
4	Karuvelam	*Vachellia Nilotica*	Fabaceae	Not Listed
Shrubs				
1	Erukku	*Calotropis Gigantea*	Apocynaceae	Not Listed
2	Chundai	*Solanum torvum*	Solanaceae	Not Listed
3	Thuthi	*Abutilon Indicum*	Meliaceae	Not Listed
4	Unnichedi	*Lantana camara*	Verbenaceae	Not Listed

Herbs				
1	Kuppaimeni	*Acalypha indica*	Euphorbiaceae	Not Listed
2	Nelavembu	*Andrographis paniculata*	Acanthaceae	Not Listed
3	Kovakkai	*Trichosanthes Dioica*	Cucurbitaceae	Not Listed
4	Perandai	*Cissus Quadrangularis*	Vitaceae	Not Listed
5	Thumbai	*Leucas Aspera*	Lamiaceae	Not Listed

Buffer zone

Taxonomically a total of 77 species distributed among 45 families have been recorded from the buffer area. Based on habitat classification of the enumerated plants the majority of species were Trees 27 and Shrubs 18 followed by herbs (21), climbers 11. Details of flora with the scientific name were mentioned in Table No. 3.17.

Table 3.12 List of Flora

S.No	Species	Family	Common Name	IUCN
Trees				
1.	Acacia nilotica	Mimosaceae	Karuvelam	LC
2.	Acacia planifrons	Mimosaceae	Kodaivelam	NA
3.	Aegle marmelos	Rutaceae	Vilvam	NA
4.	Annona squamosa	Annonaceae	Seetha	NA
5.	Atalantiamonophylla	Rutaceae	Kaattunaragam	NA
6.	Carica papaya	Caricaceae	Pappali	NA
7.	Cassia fistula	Caesalpiniaceae	Kondrai	NA
8.	Chamaecrista nigricans	Caesalpiniaceae		
9.	Citrus aurantifolia	Rutaceae	-	NA
10.	Delonix regia	Caesalpiniaceae	MayilKondrai	NA
11.	Dichrostachys cinerea	Mimosaceae	Vidathalamthazhai	NA
12.	Euphorbia antiquorum	Euphorbiaceae	Sadura-kalli	NA
13.	Ficus benghalensis	Moraceae	Aalamaram	NA
14.	Ficus religiosa	Moraceae	Arasu	NA
15.	Leucaena leucocephala	Mimosaceae	Soundil	NA
16.	Melia azedarach	Meliaceae	Malaivaembu	NA
17.	Morindapubescens	Rubiaceae	Manjanatti	NA
18.	Nyctanthes arbor-tristis	Nyctanthaceae	Parijaatham	NA
19.	Phyllanthus acidus	Euphorbiaceae	Aranelli	NA
20.	Phyllanthus emblica	Euphorbiaceae	Nelli, Muzhunelli	NA
21.	Pithecellobium dulce	Mimosaceae	Kodukkaaipuli	NA
22.	Pongamia pinnata	Fabaceae	Punga maram	NA
23.	Prosopis juliflora	Mimosaceae	Velikkaathaan	NA
24.	Psidium guajava	Myrtaceae	Koyya	NA
25.	Senna occidentalis	Caesalpiniaceae	Peiyavarai	NA

26.	Tamarindus indica	Caesalpiniaceae	Puliyamaram	NA
27.	Tectona grandis	Verbenaceae	Thekku	NA
		Shrub		
1.	Tecoma stans	Bignoniaceae	Sornapatti	NA
2.	Solanum torvum	Solanaceae	Chundai	NA
3.	Senna auriculata	Caesalpiniaceae	Avaram	NA
4.	Ricinus communis	Euphorbiaceae	Amanakku	NA
5.	Punica granatum	Punicaceae	Madhulai	NA
6.	Polygala javana	Polygalaceae		NA
7.	Phyllanthus reticulatus	Euphorbiaceae	Inkipazham	NA
8.	Ocimumgratissimum	Labiatae	Elumichanthulasi	NA
9.	Ocimumtenuiflorum	Labiatae	Thulasi	NA
10.	Nerium oleander	Apocynaceae	Karaviram, Sevvarali	NA
11	Lantana camara	Verbenaceae	Unnichedi	NA
12.	Justicia adhatoda	Acanthaceae	Adathodai	NA
13	Jatropha curcas	Euphorbiaceae	Kaatu-amanakku	NA
14	Abrusprecatorius	Fabaceae	Kundumani	NA
15	Abutilon indicum	Malvaceae	Perun thuthi	NA
16	Agave americana	Agavaceae	Kathazhai	NA
17	Calotropisgigantea	Asclepiadaceae	Erukku, Arkkam	NA
18	Cissus quadrangularis	Vitaceae	Pirandai	NA
		Herb		
1.	Acalypha indica	Euphorbiaceae	Kuppaimeni	NA
2.	Achyranthes aspera	Amaranthaceae	Nayurivi	NA
3.	Ageratum conyzoides	Compositae	Poompillu	NA
4.	Alternanthera sessilis	Amaranthaceae	Ponnanganni	NA
5.	Andrographis paniculata	Acanthaceae	Nelavembu	NA
6.	Arachis hypogaea	Fabaceae	Verkadalai	NA
7.	Argemone Mexicana	Papaveraceae	BramanThandu	NA
8.	Aristolochiabracteolata	Aristolochiaceae	Aduthinnappalai	NA
9.	Blumealacera	Compositae	Navakkarandai	NA
10.	Boerhaviadiffusa	Nyctaginaceae	Mookarattai	NA
11.	Boerhaviaerecta	Nyctaginaceae	Seemaimookarattai	NA
12.	Celosia argentea	Amaranthaceae	Pannaikeerai	NA
13.	Centella asiatica	Apiaceae	Vallarai	NA
14.	Cleome viscosa	Capparidaceae	Naikadugu	NA
15	Croton bonplandianum	Euphorbiaceae	Rail poondu	NA
16	Hygrophilaschulli	Acanthaceae	Neermulli	NA
17	Leucas aspera	Labiatae	Thumbai	NA
18	Opuntia stricta	Cactaceae	Chappathikkalli	NA
19	Phyllanthus amarus	Euphorbiaceae	Kizha-nelli	NA
20	Scoparia dulcis	Scrophulariaceae	Sarakkotthini	NA
21	Solanum melongena	Solanaceae	Kathiri	NA
		Climber		
1.	Asparagus racemosus	Asparagaceae	Sadhavaeri	NA
2.	Capparis roxburghii	Capparidaceae	-	NA
3.	Coccinia grandis	Cucurbitaceae	Kovai	NA
4.	Cocculushirsutus	Menispermaceae	Kattukodi	NA
5.	Cucumis sativus	Cucurbitaceae	Vellarikkaai	NA

6.	Lagenaria siceraria	Cucurbitaceae	Surakkaai	NA
7.	Passiflora foetida	Passifloraceae	Siruppoonaikkaali	NA
8.	Rhynchosiaviscosa	Fabaceae	-	NA
9.	Riveahypocrateriformis	Convolvulaceae	Boodhikeerai	NA
10	Solanum trilobatum	Solanaceae	Thoodhuvalai	NA
11	Tinospora cordifolia	Menispermaceae	Seendhil	NA

Fauna in the study area

A total of 34 species belonging were recorded in the buffer zone. Based on habitat classification the majority of species were 15 Birds, followed by 7 Insects, 4 Reptiles, 5 Mammals and 3 Amphibians. There are two schedule II species, 31 schedule IV species and one Schedule V species according to Indian wild life Act 1972. There are no critically endangered, vulnerable and endemic species observed. List of fauna in the buffer zone is mentioned in Table 3.18.

Table 3.13 List of Fauna

S.No.	Scientific Name	Common Name	Conservation status as per Indian Wildlife Protection Act (1972)
Avifauna			
1	*Ardeola grayii*	Pond heron/ Paddy Bird	Sch-IV
2	*Ploceus philippinus*	Weaver bird	Sch-IV
3	*Tachybaptus ruficollis*	Little Grebe	Sch-IV
4	*Corvus splendens*	House crow	Sch-V
5	*Acridotheres tristis*	Common myna	Sch-IV
6	*Dicrurus macrocerus*	Black drongo	Sch-IV
7	*Quills contronix*	Grey quail	Sch-IV
8	*Apus affinis*	House swift	Sch-IV
9	*Columba livia*	Blue Rock pigeon	Sch-V
10	*Streptopelia chinensis*	Spotted Dove	Sch-IV
11	*Passer domesticus*	House Sparrow	Sch-IV
12	*Egretta garzetta*	Little egret	Sch-IV
13	*Himantopus Himantopus*	Black Winged Stilt	Sch-IV
14	*Ceryule rudis*	Lesser Pied Kingfisher	Sch-IV
Reptiles			
1	*Naja naja*	India cobra	Sch-II
2	*Calotes versicolor*	Common garden lizard	Sch-IV
3	*Bangarus caerleus*	Krait	Sch-IV
4	*Ptyas mucosus*	Rat snake	Sch-II
Amphibians			
1	*Rana hexadactyla*	Frog	Sch-IV
2	*Rana tigrine*	Bull frog	Sch-IV
3	*Bufo melanosticus*	Common Indian toad	Sch-IV

Mammals			
1	*Rattus sp*	Rat	Sch-V
2	*Lepus nigricollis*	Indian Hare	Sch-IV
3	*Funambulus palmarum*	Indian Palm squirrel	Sch-IV
4	*Rattus norvegicus*	Field mouse	Sch-IV
5	*Rusty spotted Cat*	Felis rubiginosa	Sch-IV
Insects			
1	*Danainae*	Milkweed butterfly	NL
2	*Apis cerana*	Indian honey bee	Sch-IV
3	*Ceratogomphus pictus*	Dragonfly	Sch-IV
4	*Hieroglyphus sp*	Grasshopper	NL
5	*Danaus chrysippus*	Tawny coster	Sch-IV
6	*Sympetrum fonscolombii*	Red-veined darter	NL
7	*Tirumala limniace*	Blue tiger	Sch-IV

3.3.6 Land Environment

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

Land use Pattern of the Project Area

The present and the post mining land use pattern is shown below.

Table 3.14 Land use pattern of the project site

Description	Present Area in Ha.	Area at the end of life of Quarry in Ha.
Quarrying Pit	NIL	4.72.50
Infrastructure	Nil	0.01.00
Roads	Nil	0.02.00
Safety Zone / Green Belt	Nil	0.81.50
Unutilized	5.57.00	Nil
Total	**5.57.00**	**5.57.00**

- At the end of life of mine, the excavated mine pit / void of 4.72.50 Ha. 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 (0.81.50 Ha.) will be developed along the safety barrier and top benches and 0.03 ha are approach road and Infrastructure.

Land use pattern of the study area

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. The land use map of the study area is given in Figure 3.14.

Table 3.15 Land use pattern of the Study area of 10 km radius

Sl.No.	LAND USE / LAND COVER	Area in Sq.Km	Area in Percentage
1	Built-up land	5.37	1.66
3	Crop land	154.59	47.72
4	Existing mining area	1.48	0.46
5	Fallow land	4.62	1.43
6	Land with scrub	3.12	0.96
7	Land without scrub	95.4	29.45
	Plantation	52.05	16.07
8	Water bodies	7.33	2.26
	Total Area	**332.16**	**100.00**

Source : Survey of India Toposheet and Landsat Satellite Imagery

From above table it is inferred that the majority of the land in the study area is Crop Land (47.72 %) followed by Land without scrub (29.45 %).

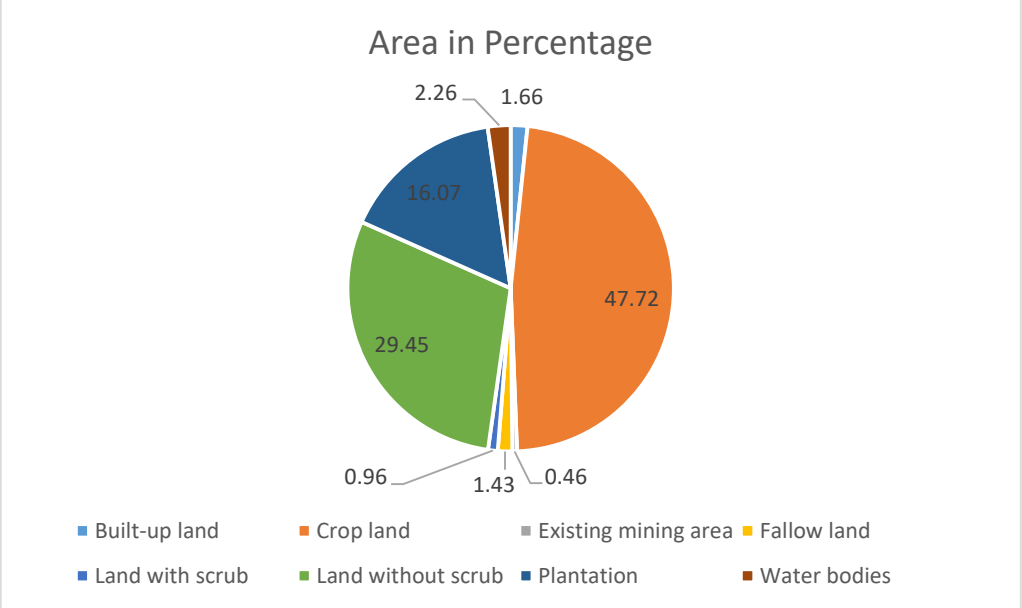
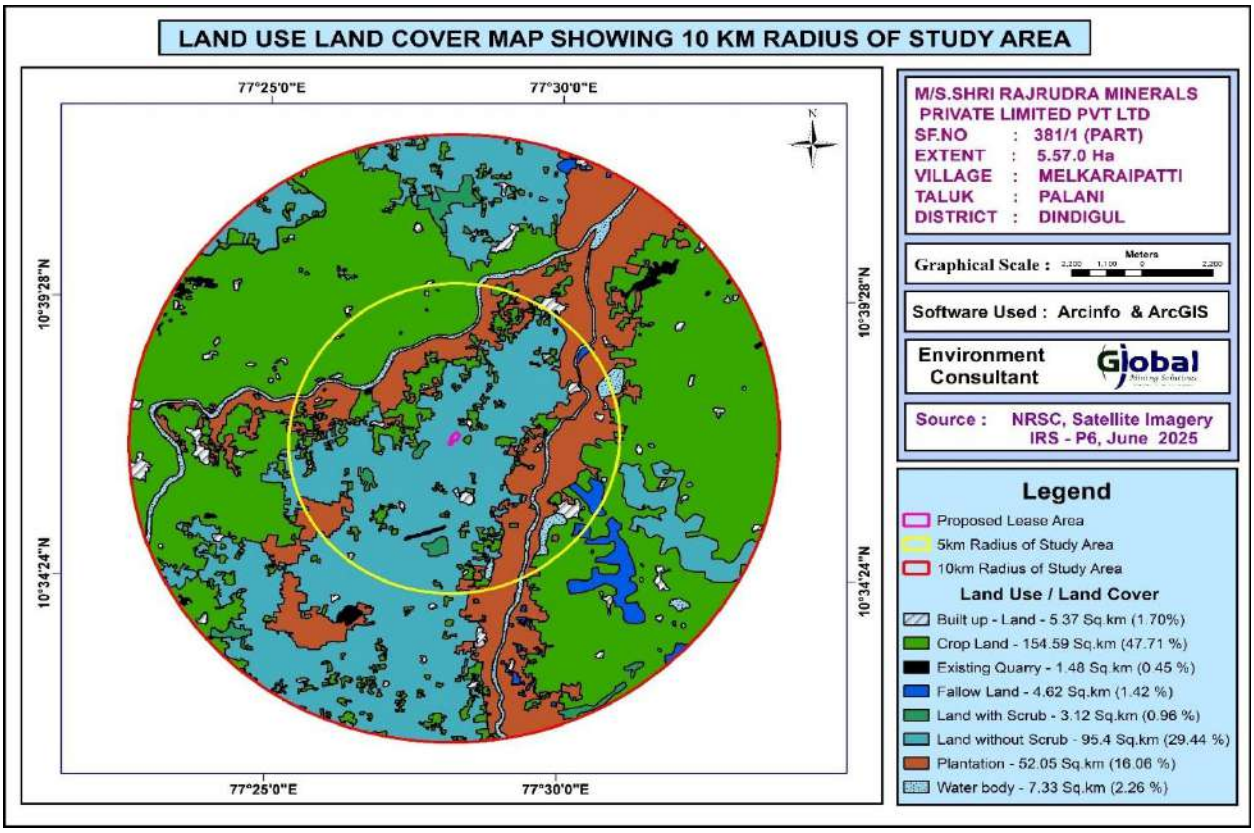


FIG 3.14 LAND USE/LAND COVER MAP OF THE STUDY AREA



3.3.7 SOCIOECONOMIC ENVIRONMENT

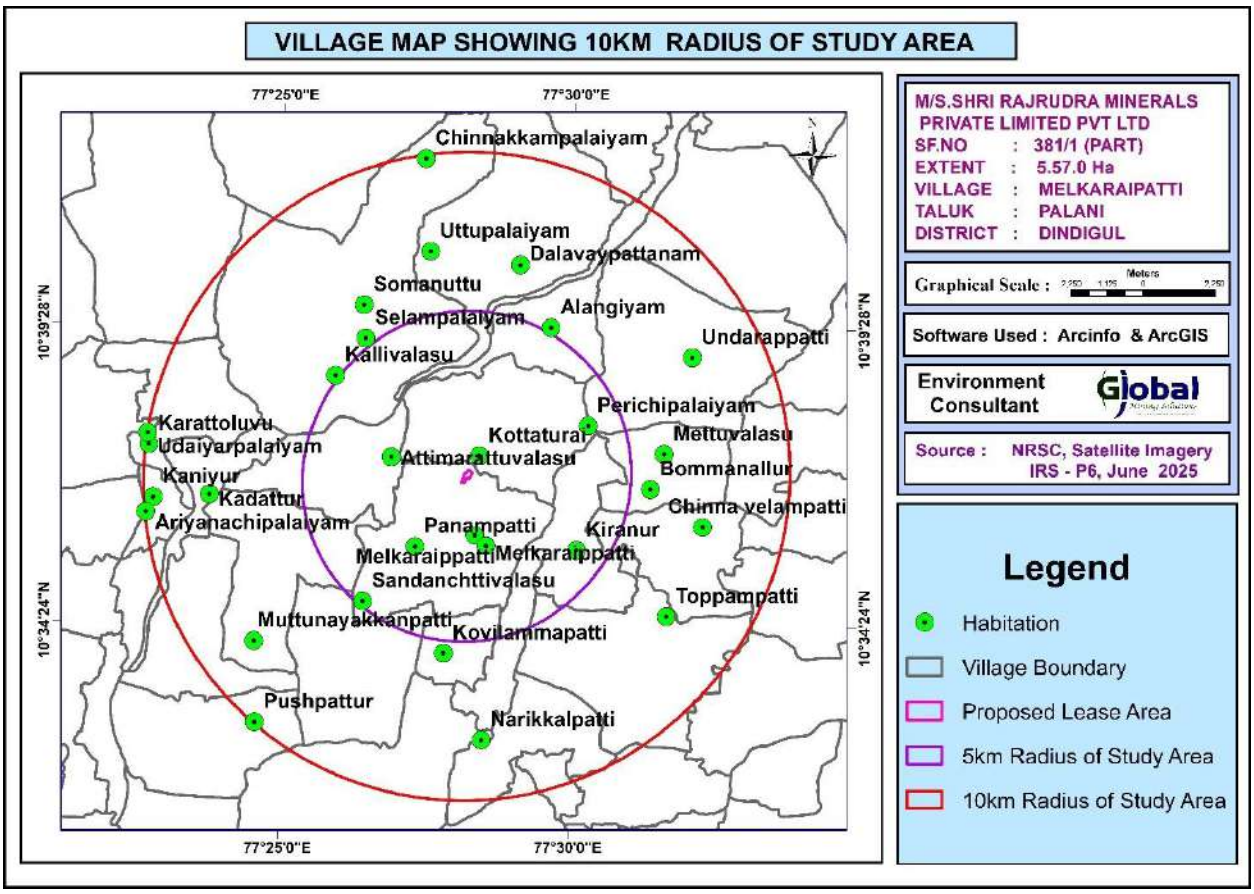
The socio-economic environment of the study area is studied by conducting primary sites through site visits and conducting sample surveys. The secondary data obtained from Census 2011 is also used. The following data area collected from secondary data:

- Demographic pattern.
- Health pattern
- Occupational structure.

3.11.1 DETAILS OF VILLAGES

The profile of the villages located in the study area is given in Fig 3.15 below.

FIG 3.15 VILLAGE MAP OF THE STUDY AREA



DETAILS OF VILLAGES

The project is located in Melkaraipatti Village, Palani Taluk, Dindigul District. There are 23 villages in the study area. Village map is given in Figure and the population profile of the study area are detailed below.

Table 3.16 - Population profile of the study area

Population profile of the study area		
Particulars	**No of Population**	**Percentage (%)**
A. Population break-up by Gender		
Male Population	94219	50.03
Female Population	94097	49.97
Total	**188316**	100
B. Population break-up by Caste		
Scheduled Caste	**42010**	22.31
Scheduled Tribes	**180**	0.09
Others	146126	77.60
Total	**188316**	100
C. Literacy Level		
Total Literate Population	120556	64.07
Total Illiterate Population	67760	35.93
Total	**188316**	100
D. Occupational structure		
Main workers	99894	53.04
Marginal workers	11977	6.36
Total Workers	111871	59.40
Total Non-workers	76445	40.60
Total	**188316**	**100**

The above table shows that the male and female population ratio are almost equal. Among the total population 0.09 % belong to Scheduled Tribes, 22.31 % are Scheduled Caste and the balance 77.60 % people belong to other castes. Among the total population, 64.07 % of the people are literate. The results are plotted in figures below.

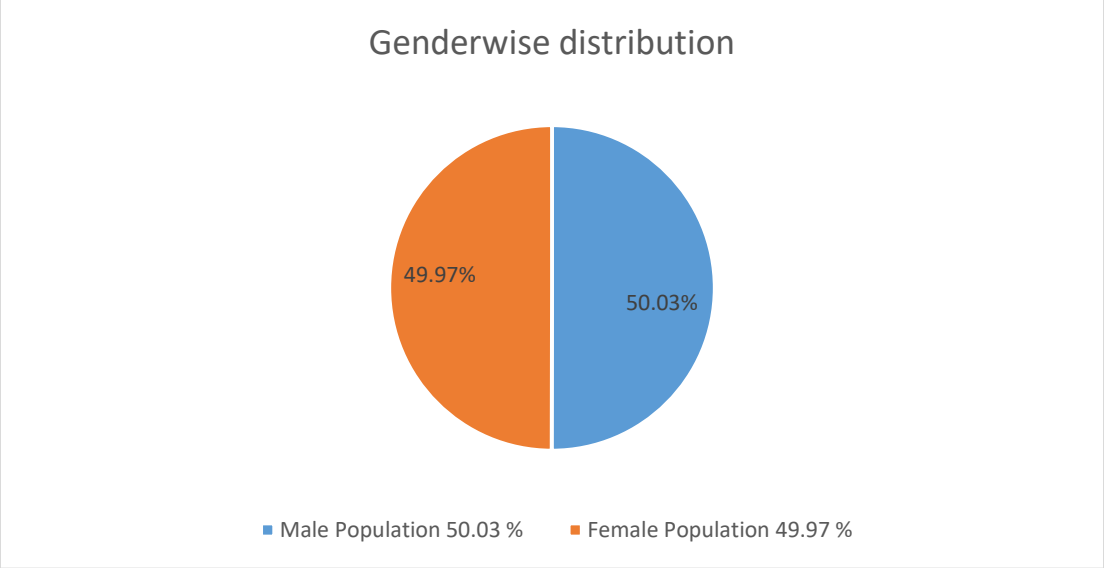


FIG 3.16 GENDER-WISE POPULATION DISTRIBUTION

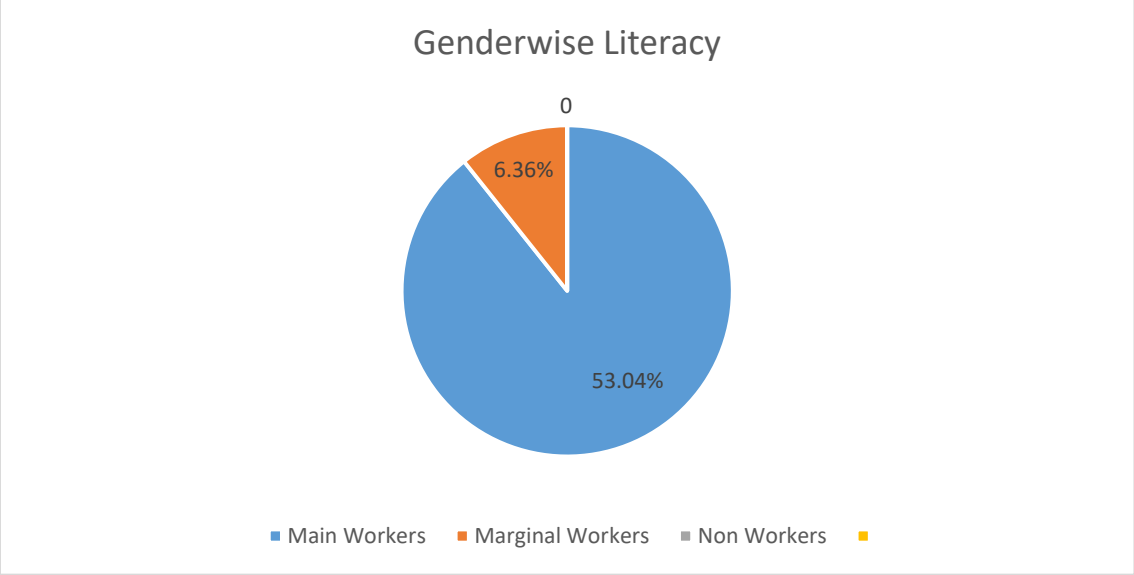


FIG 3.17 GENDER WISE LITERACY DISTRIBUTION

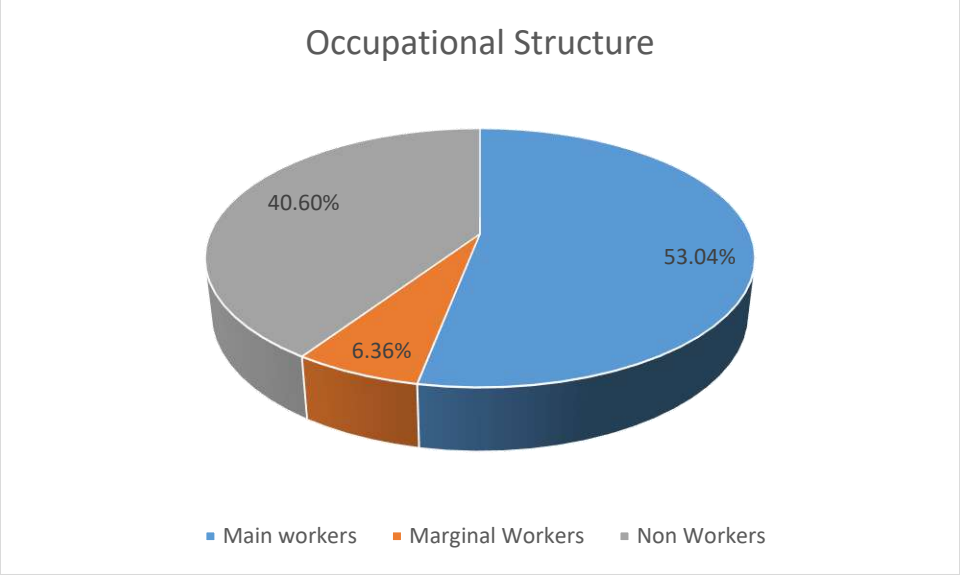


FIG 3.17 OCCUPATIONAL STRUCTURE WITHIN BUFFER ZONE

Population profile - Melkaraipatty		
Particulars	**No of Population**	**Percentage (%)**
A. Population break-up by Gender		
Male Population	1700	49.60
Female Population	1727	50.40
Total	**3427**	100
B. Population break-up by Caste		
Scheduled Caste	**850**	24.80
Scheduled Tribes	**0**	0
Others	2577	75.20
Total	**3427**	100
C. Literacy Level		
Total Literate Population	2309	67.37
Total Illiterate Population	1118	32.63
Total	**3427**	100
D. Occupational structure		
Main workers	1970	57.48
Marginal workers	93	2.71
Total Workers	2063	60.20
Total Non-workers	1364	39.80
Total	**3427**	**100**

Sample Survey

The expert visited 6 villages in the study area namely Panampatty, Kottathurai, Melkaraipatty, Keeranur, Rajampatti and Bommanallur Villages. Discussions were held with the people from nearby locality to study the social and economic conditions prevailing in the area. The expert also visited nearby hospitals and primary health centres.

3.3.8 HYDROGEOLOGY OF THE STUDY AREA

In Dindugal District, during the pre monsoon, the water level generally in declining trend ranges from G.L. to 15m. The depth of well below GrundLevel 12.0m are become dry during hot season like May, June, July. In the post monsoon, the water level generally in upward trend due to rainfall and it may reach the Ground Level also. Dindugul district is almost made up of hard rock covered by thin soil.

Hard rock:

More than 97% of the district is covered by hard rocks. The gneissic rock type is the country rock seen commonly.

Charnockiterock occurs in Kodaikkanal hills and in parts of Nilakottai and Nattamtaluks. Calc Gneisses are seen in parts of Oddanchatram, Gujiliyamparai, Vedasandhur and Reddiarchatram blocks. Quartzites are seen in patches in Vadamadurai, Sanarpatti and in Oddanchatram blocks.

Valley-fill sediments admixed with sand, silt and clay are found in parts of Nattam and Sanarpatti blocks. They are the transported weathered rocks from the adjoining hill slopes.

Topography

The area applied for quarry lease is exhibits almost plain covered by gravel formation. The massive Charnockite formation is noticed below 2m Gravel formation and sloping towards southeastern side of the area, the altitude of the area is above 310 m (maximum) from MSL.

Drainage pattern of the Area

The following water bodies are located in the study area.

Odai- 52m (E), Tank – 160 m (NE), Amaravathi River – 2.8km (NW), Shanmugha River – 2.6km (E), Tank – 1.4 km (S), Alangulam – 3.8 km (SE), Tank- 4.5km (NE). The drainage map of the study area is given in Figure 3.16.

GEOMORPHOLOGY

Predominantly the buffer zone is dominated by Shallow weathered buried Pediplain, and the lease area falls under the same category. Geomorphology of the study area is detailed below. The geomorphology of the study area is given in Figure 3.18.

Sl.No.	GEOMORPHOLOGY	Area in Sq.Km	Area in Percentage
1	Pediment – Inselberg Complex	2.08	0.64
2	Pediplain	117.77	36.35
3	Shallow weathered buried pediplain	203.54	62.83
4	Structural Hills	0.57	0.18
	Total Area	323.96	100.00

Geology

The regional geology of the study area is shown below in Figure 3.17. Predominantly the buffer zone is dominated by Hornblende biotite gneiss, and the lease area falls under the same category. The geology of the study area is detailed below.

Sl.No.	GEOLOGY	Area in Sq.Km	Area in Percentage
1	Charnockite	2.18	0.67
2	Hornblende biotite gneiss	319.99	98.43
3	Water Body	2.94	0.90
Total Area		325.11	100

Soil:

The Soil of the study area is shown below in Figure 3.17. Predominantly the buffer zone is dominated Loamy Sand category, and the lease area falls under the same category. The soil texture of the study area is detailed below.

Sl.No.	Soil Type	Area in Sq.Km	Area in Percentage
1	Loamy Sand	196.64	60.48
2	Sandy Loam	128.47	39.52
Total Area		325.11	100

FIGURE 3. 19 10 KILOMETER RADIUS OF THE DRAINAGE MAP

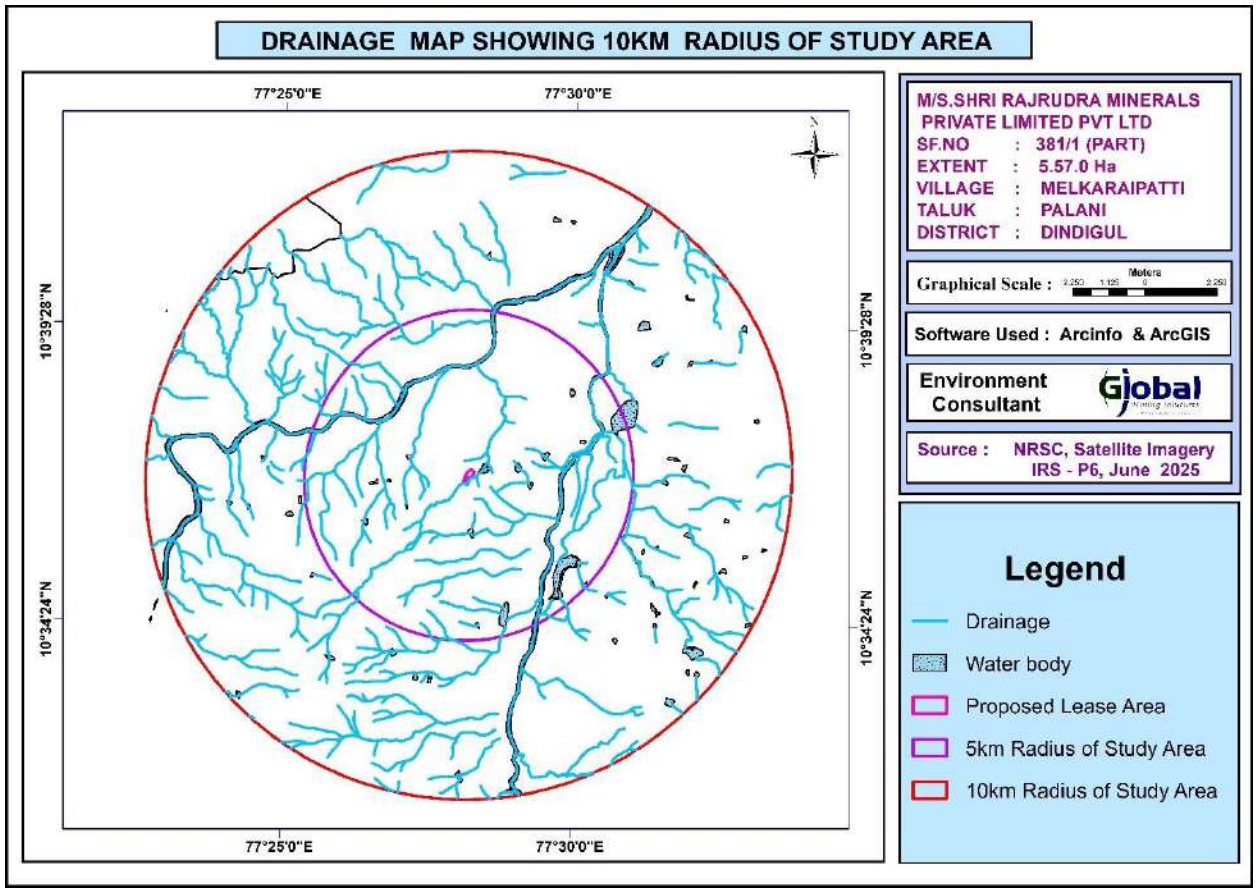


FIGURE 3. 20 10 KILOMETER RADIUS OF THE GEOLOGY MAP

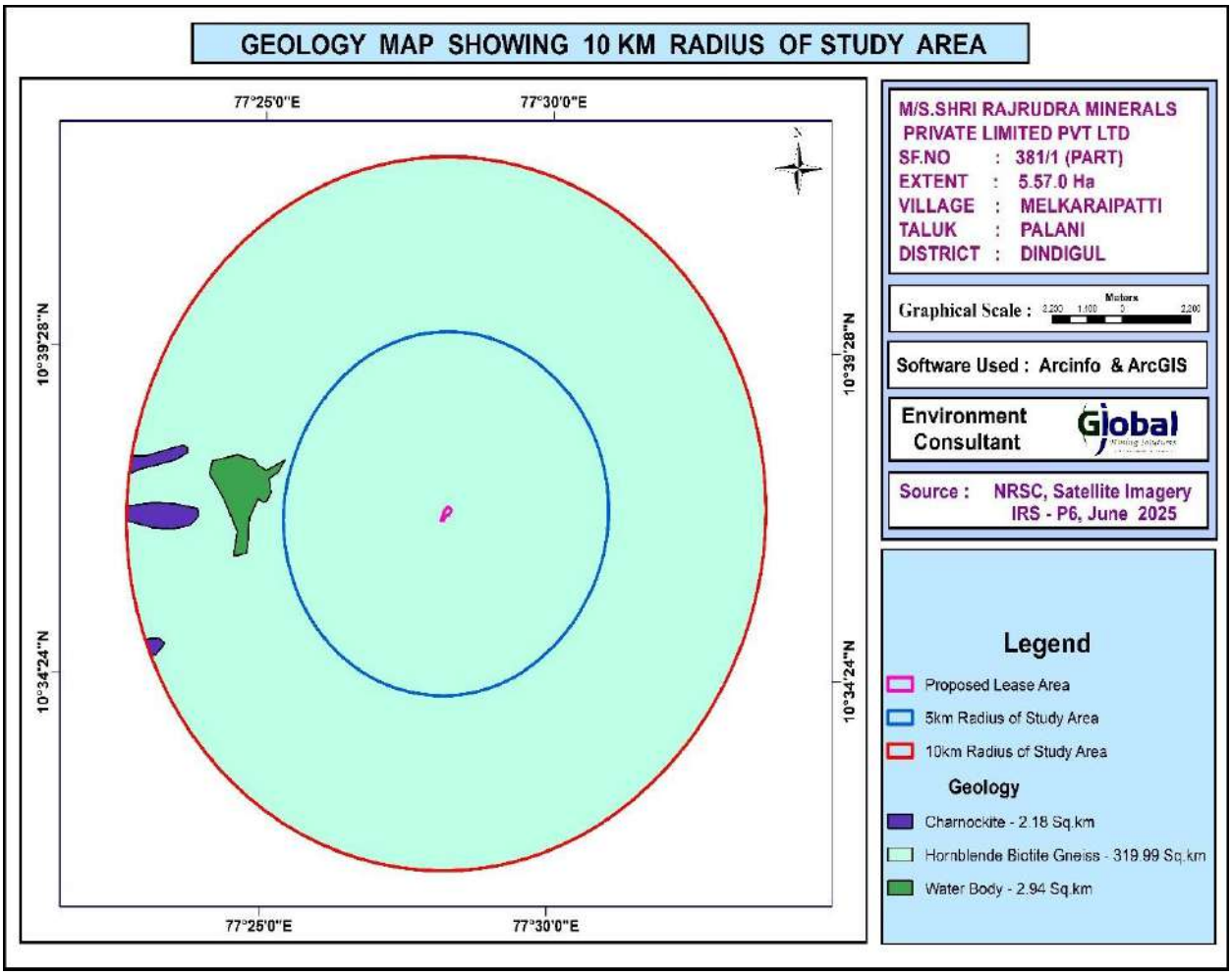


FIGURE 3. 21 10 KM RADIUS OF THE STUDY AREA GEOMORPHOLOGY MAP

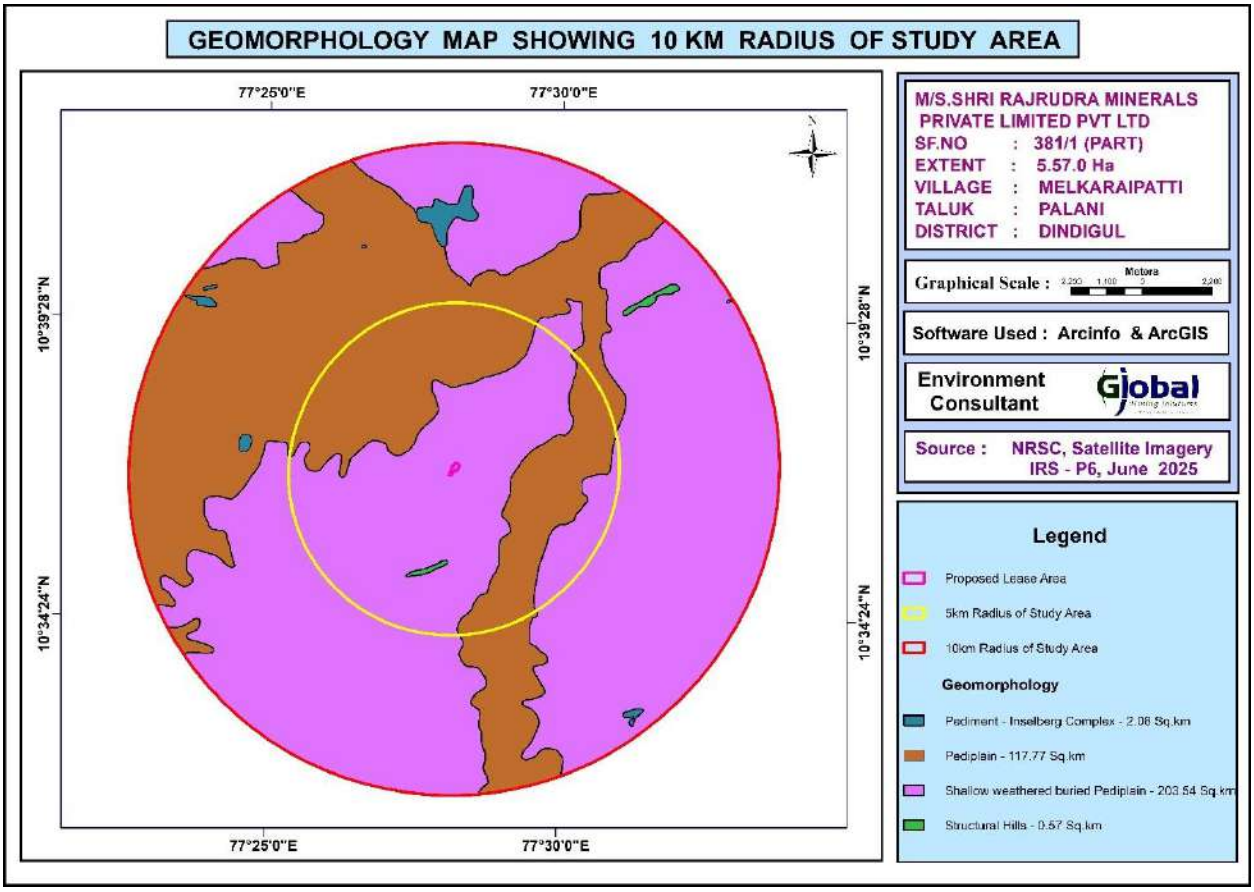


FIGURE 3.22 10 KM RADIUS OF THE STUDY AREA SOIL TYPE MAP

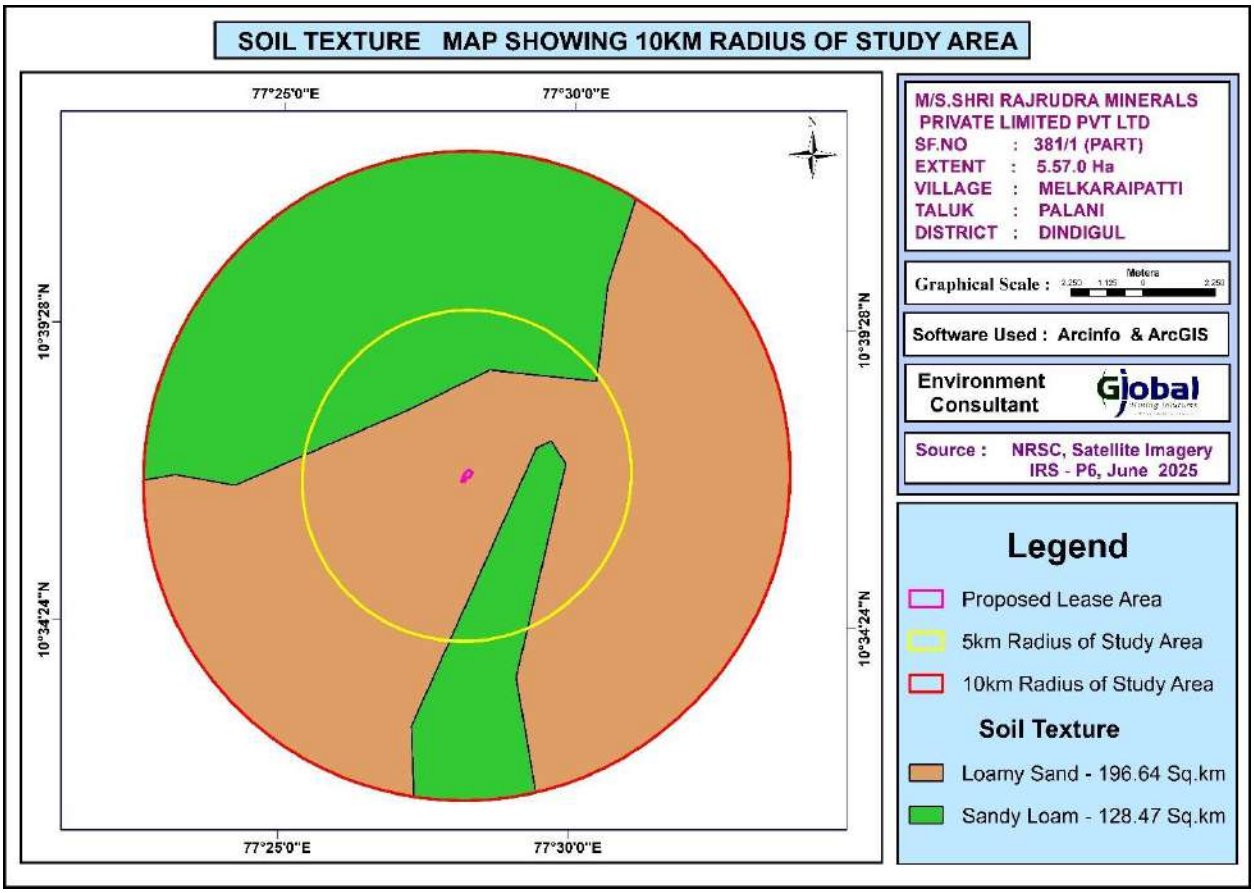
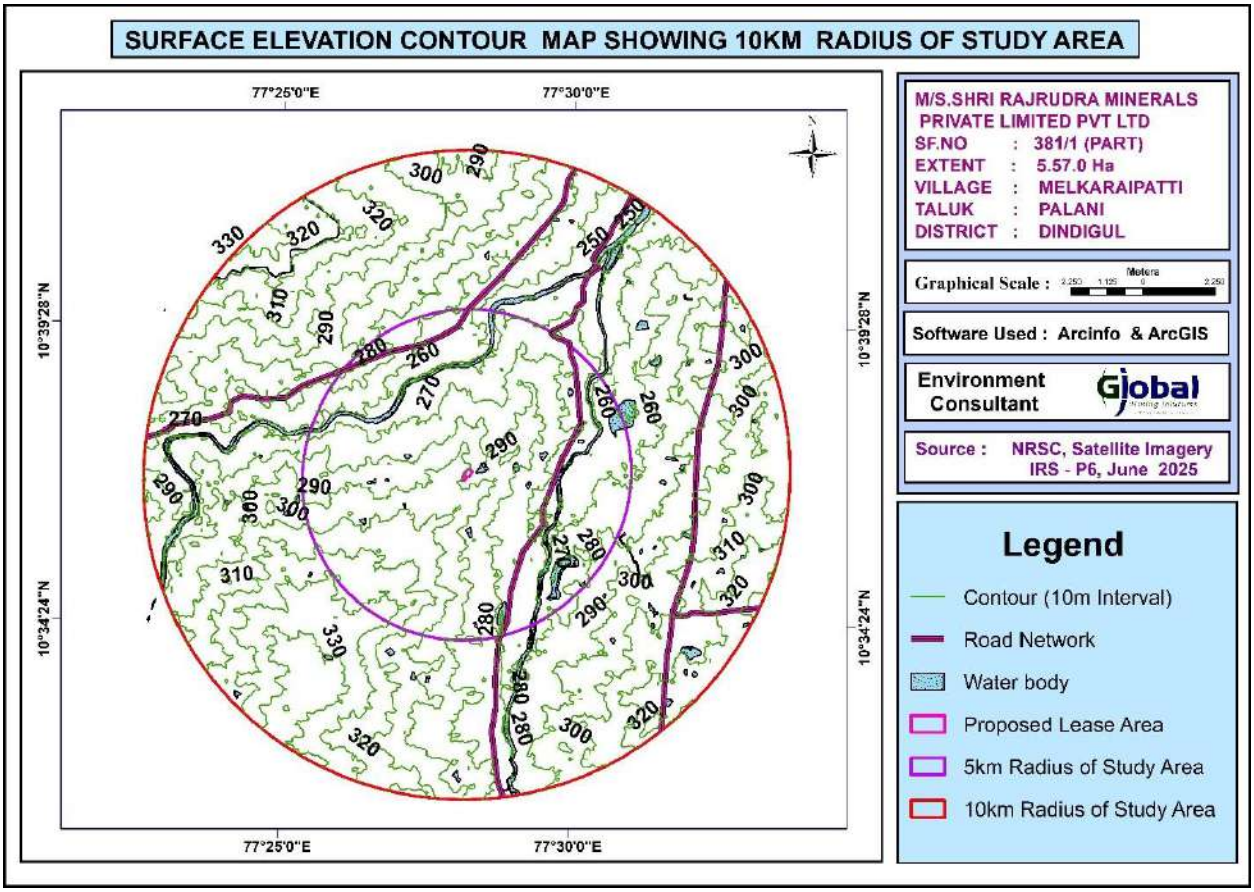


FIGURE 3.23 CONTOUR MAP OF THE STUDY AREA



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CHAPTER 4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

INTRODUCTION

This chapter deals with the various anticipated environmental impacts and mitigation measures of the proposed mining activity. The proposed method of mining is Opencast Mechanized and the quarry operation involves Shallow Jack Hammer Drilling, Blasting, Excavation, Formation of benches, Loading and Transportation of minerals. The above activities may affect the surrounding environment like removal of rock mass, Loss of flora and fauna of the area, surface water discharge, change in air and water quality, etc., If adequate measures are not taken for the proposed operations, it will cause the environmental degradation of the area and it will lead to affect to the ecosystem of the surrounding environment.

In order to maintain the existing environmental scenario of the proposed mine lease area it is mandatorily required to assess the present ecology and environment of the proposed mine lease area and buffer area of the project before starting mining operations. The various environmental impacts which are identified by the proposed quarrying activities have been discussed below and its subsequent paragraphs.

- Land Environment
- Soil Environment
- Water Environment
- Air Environment
- Noise Environment
- Biological Environment
- Socio Economic Environment

4.1 DETAILS OF INVESTIGATED ENVIRONMENTAL IMPACTS DUE TO PROJECT LOCATION POSSIBLE ACCIDENTS, PROJECT DESIGN, PROJECT CONSTRUCTION, REGULAR OPERATIONS FINAL DECOMMISSIONING OR REHABILITATION OF A COMPLETE PROJECT.

This is a proposed Rough Stone and Gravel Quarry in S.F.No. 381/1 (P) over an extent of 5.57.00 Ha in Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State. The method of mining is Opencast mechanized with a bench width and height of 5m. It is proposed to excavate to 13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years with ultimate depth up to 67 m BGL. There is no stream/odai within the mine lease area.

The main anticipated impact on the Land Environment due to quarrying operation is change in Landscape, change in Land – use Pattern.

The entire mine lease area is Patta Land. The total project area is 5.57.00 Ha. It is proposed to be altered by effective quarrying operation such as excavation (4.72.50 Ha), Infrastructure (0.01.0), Road (0.02.0 Ha) and green belt will be developed in the safety zone of 0.81.50 Ha. The ultimate depth of quarrying is proposed with maximum depth of 67 m BGL and will not intersect the ground water table.

4.2 MEASURES FOR MINIMIZING AND /OR OFFSETTING ADVERSE IMPACTS IDENTIFIED

<table>
<tr><th>Aspect</th><th>Impact</th><th>Mitigation measures</th></tr>
<tr><td>Topography</td><td>The area is Plain topography covered by rough stone and Gravel formation. Quarrying activity will lead to change in geological setting of the area i.e., Due to the quarrying activity in the mine lease area will leads to affect the aesthetic view on the environment. Further, due to the movement of heavy vehicles in and around the mine lease area will leads to affect the surrounding agricultural lands, ecology and biodiversity, human habitations due to the emissions from vehicles like SO_2, NO_x, PM_{10}, $PM_{2.5}$, etc., The existing land use pattern is given as under.
<table>
<tr><th>Land Use</th><th>Present Area (Hect)</th><th>Area in use during the quarrying period (Hect)</th></tr>
<tr><td>Quarrying Pit</td><td>NIL</td><td>4.72.50</td></tr>
<tr><td>Infrastructure</td><td>Nil</td><td>0.01.00</td></tr>
<tr><td>Roads</td><td>Nil</td><td>0.02.00</td></tr>
<tr><td>Green Belt</td><td>Nil</td><td>0.81.50</td></tr>
<tr><td>Unutilized</td><td>5.57.00</td><td>Nil</td></tr>
<tr><td>Total</td><td>5.57.00</td><td>5.57.00</td></tr>
</table>
The ultimate pit dimension of the mine lease area is given below.</td><td>The major impact due to this project on land environment is the change in land use. Mining activity will be carried out upto a depth of 67 m below ground level. At the end of mining period, the quarried pit will act as a water reservoir to store the rain water.
Land Use at the end of mine will be as follows.
<table>
<tr><th>Land Use</th><th>Area in use during the quarrying period (Hect)</th></tr>
<tr><td>Area left for water body</td><td>4.72.50</td></tr>
<tr><td>Green Belt</td><td>0.81.50</td></tr>
<tr><td>Remaining area</td><td>0.03.00</td></tr>
<tr><td>Total</td><td>5.57.00</td></tr>
</table>
At the mine closure stage 4.72.50 Ha of lease area will be left as rain water harvesting pond and 0.81.50 Ha will be developed with green belt.
Greenbelt shall be developed around the mine lease area and the details has been given below.</td></tr>
</table>

Ultimate Pit dimension at the end of Mining plan Period			
Pit No.	**Length (max) (m)**	**Width (Avg) (m)**	**Depth (max) (m)**
I	407	116	67 m BGL

If mining is not done systematically it will leads to the dumping failure in the mining area.

Year	**Species**	**No. of trees**	**Spacing**	**Survival**
I	Pungai, Vagai, Vembu, Manjal konrai, Naval, Puvarasu, etc	820	3m x 3m	85%
II		-		
III		-		
IV		-		
V		-		
Total		**820**		

Due to the thick vegetation around the mine lease area and sprinkling of water around the haul roads the dust emissions arise from the vehicles will be controlled.

At the end of mining period, fencing will be provided around the mine lease area to arrest the entry of public/cattle to the mining area.

The rough stone are proposed to quarry 5m bench height and 5m width with 45^0 slope and with conventional opencast Mechanized method. As per the approved mining plan a safety distance of 7.5m shall be provided. There is no overburden anticipated during the entire Rough Stone quarrying operation. The excavated rough stone will be directly loaded into tipper to the needy crusher/other buyers.

Drainage	Mine drainage is surface water or groundwater that drains from an active or abandoned mine. One of the adverse impact of mine drainage is it will contaminate the ground water.	As per the approved mining plan the ultimate pit limit is 67 m (BGL). The ground water table is reported as 93 m. In the proposed mining plan only 67 m Below ground level has been envisaged as workable depth for safe & economic quarrying for the entire lease period. Hence the quarrying operation may not affect the ground water.
Soil Quality and Agriculture	In monsoon seasons due to the excavation of minerals soil erosion and sediment deposition will occur in the nearby water bodies.	It is proposed to quarry upto a depth of 67 m below ground level and the nearby water table is 93 m. So, the mining activity will not affect the ground water. To prevent the soil erosion during monsoon season, garland drain will be constructed with silt traps.
Visual impact on surrounding environment	Quarrying activities and rock extraction generally cause several environmental effects on the surrounding areas. The alteration of landscape due to activities like excavation, drilling or blasting, in particular, often generates a visual impact on the receptors set in the surroundings. Among these effects, the shape, extent, or chromatic contrast of the mining surface with the original land form may represent a huge loss of appeal for the growth of new urban settlements.	The reclamation of the post mined quarry surface is aimed at restoring the ecological balance taking into account geological parameters but also local flora and climate. Further the ultimate depth of mining is 67 m bgl. In the post mining stage, the quarried out pit will be used for rainwater harvesting.

4.2.1 SOLID WASTE GENERATION AND MANAGEMENT

The plastic waste generation is very negligible and it will be collected from the source level in specific dustbin and disposed through the municipal bins.

- Identification of solid waste generations
- Providing dustbins to collect with different color coding
- Creating awareness among the employees
- Developing common storage yards
- Disposal to the nearby municipal yards
- Record keeping
- Review once in quarter

4.2.2 Soil Environment

Anticipated Impact

Mining activities often disrupt the existing environment as they involve disturbing the untouched earth materials. There is no overburden/ waste generation from this project. the surface consists of Gravel formation followed by Rough stone which is proposed to excavate completely during the quarrying operation. Erosion of Gravel extracted fine material can result in substantial sediment loading to surface waters and drainage ways. During rainy season surface run off may cause sedimentation in low lying areas.

Mitigation Measures for Soil Erosion and Soil Conservation

- Runoff water will be collected in bottom of the quarry and used for plantation and dust suppression during dry season.no run off water will be discharged beyond lease area.
- Wet drilling and haul road water sprinkling will be carried out to minimise air born dust at source level, which may cause soil pollution due to sedimentation.
- Garland drains will be constructed around the project area with silt traps to control the soil erosion during rainy seasons.

- Greenbelt development (0.81.50 Ha.) all along the periphery of the project area (i.e., 7.5 m safety barrier) will ensure binding strength and minimizes soil erosion.
- Soil sampling will be carried out in the core zone for every season to ensure the soil quality is not affected due to the quarrying activities.
- Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season.

4.2.2 WATER ENVIRONMENT

Impact on Surface Water Resources

There is no seasonal or perennial Odai within the M.L area. The drainage pattern of the region is plane to sub-dendritic. Surface run-off water of the M.L. area is drained through proposed drainage and collected in the bottom of the quarry and collected water will be used for same quarry operation as such for plantation & dust suppression.

The following water bodies are located in the study area.

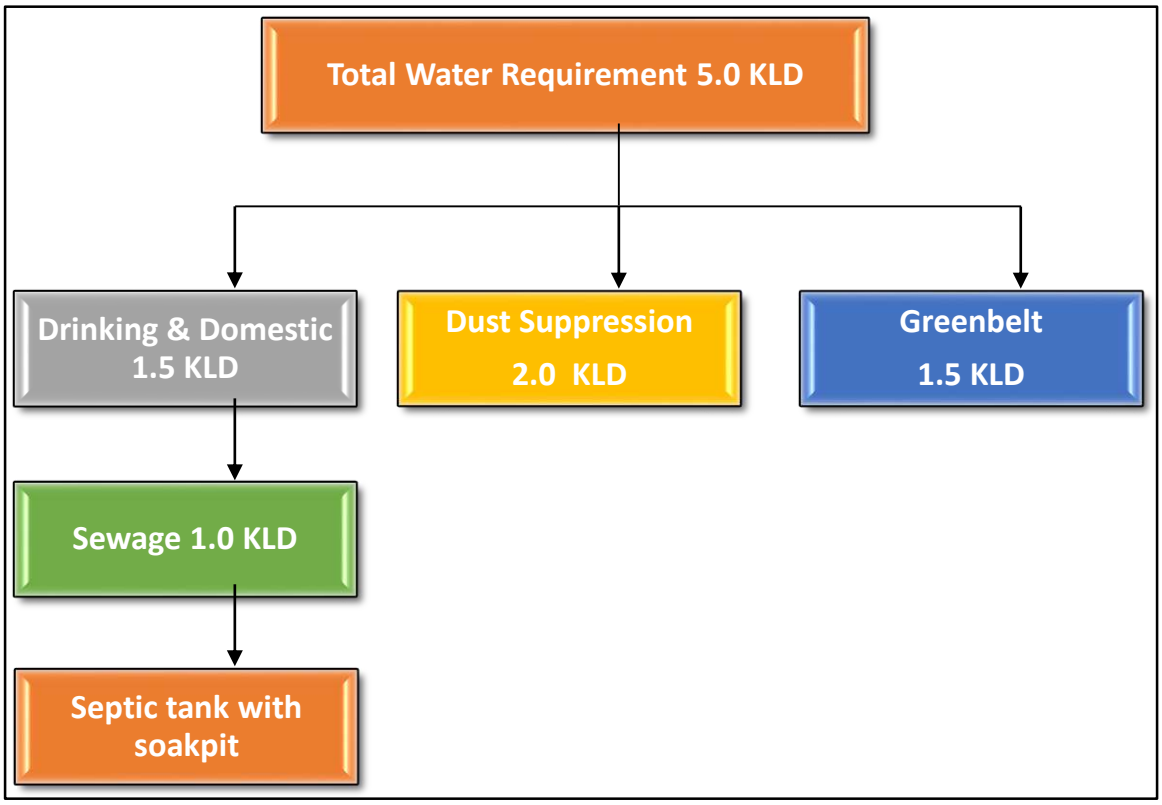
Odai- 52m (E), Tank – 160 m (NE), Amaravathi River – 2.8km (NW), Shanmugha River – 2.6km (E), Tank – 1.4 km (S), Alangulam – 3.8 km (SE), Tank- 4.5km (NE)

Since these water bodies are located outside the lease area and there is no discharge of effluent or any untreated water from the mines will be made into these water bodies, there is no major impact. The project proponent will restrict the mining operation only within the lease and no other work will be carried out near the canal or any area outside the mining lease.

Impact due to Water use in Mines

In the proposed mines water will be mainly used for domestic purpose, dust suppression & plantation. Total water requirement for the project is 5.0 KLD which will be sourced from outside agencies. Negligible sewage of 1.0 KLD will be generated, for which a septic tank with soak pit will be set up. The water balance diagram is given below.

FIG 4.1 WATER BALANCE DIAGRAM



Impact on Ground Water

The mining activity is not likely to intersect ground water as the ground water table occurs at a depth of 93 m. The mining will go up to the maximum depth of 67 m BGL. So, there will be no chance of intersecting the ground water table by the mining activity. So, the impact of mining on the ground water is not envisaged.

Mitigation measures

- Entire lease area will be provided with proper garland drains.
- Check wears will be provided to prevent solids from wash off.
- Construction of garland drains around freshly excavated so that flow of water with loose material is prevented.
- The mine water will be passed through the natural slopes and valleys and gets accumulated in the settling tank (Bottom pit)

Ground water environment in buffer zone

The scenario of ground water in Dindigul District, Palani Taluk is given below.

TABLE 4.1 Ground Water Level Status in Dindigul District

S. No.	Assessment Unit (Firka)	Net Annual Ground water availability	Existing gross ground water consumption for irrigation	Existing gross ground water consumption for domestic and industrial water supply	Existing gross ground water consumption for all uses	Stage of ground water development	Category
1	Palani	2,179.58	985.6	106.28	1091.88	50	SAFE

Source: nwm.gov.in

It is planned to carryout appropriate rainwater harvesting schemes and artificial recharge schemes in the area.

Rainwater Harvesting Plan

Since the lease proximate areas are with less water potential and the rainwater is the major source for replenishment of ground water, effective rainwater harvesting and other water augmentation measures are proposed in this project.

- Development of garland drain around the quarry connected to settling tank.
- Cleaning of drain periodically to prevent siltation
- The supernatant clear water from the settling pond will drain into the nearby channel on the eastern side of the lease.
- Utilizing the rainwater harvested in the mine pit to meet the water requirement of the project.

The average annual rainfall of the area is 812 mm. Taking into consideration of 0.35 as runoff co-efficient for mining area, the total quantity of rain water can be harvested per annum from the area has been tabulated as below.

Table 4.2 – Rainwater Harvesting Plan

S.NO	Rainwater Harvesting Area	Area in Sq.m	Average annual rainfall	Volume of harvestable quantity (Cum) of rain water per annum
1	Total Mine Lease Area	55700	0.8	15,596
Total Harvested Rainfall				15,596

Total surface water runoff is 15,596 Cum per Annum. 10% of this amount will be evaporated and rest 14,036 m^3 will be recharged in the rain water harvesting pit.

Five sumps will be proposed to harvest rain water and each sump capacity will be 5000 Cu.m. The rain water stored in the pond will be utilized for plantation, dust suppression activities. The capacity of Rain water harvesting post will be sufficient to arrest the surface runoff from the lease area considering the highest amount of rain fall.

4.2.3 VEGETATIONVEGETATION IN THE CORE ZONE

The mine lease area is devoid of major plantation. Shrubs and bushes are majorly found within the lease area. The proponent has planned to develop green belt in an area of 0.81.50 Ha. Trees like Pongamia pinnata, Syzigium cumini, Albizia lebbeck, Thespesia populnea, Bauhinia racemose, Cassia siamea, Azadirachta indiaca will be planted around the mine lease area. A total of 820 trees are planned to be planted. Spacing will be 3m x 3m.

FAUNA

There are no sanctuaries/national parks in the buffer zone of 10km study area. The commonly found fauna in the buffer zone are given in Chapter 3. During mining activity the impacts and mitigation measures for Fauna are given in below table.

Table 4.3 Impacts and mitigation measures for Fauna

S.No.	Impact	Mitigation measure
1	Fauna is affected due to noise and vibration.	Sirens will be blown before blasting in the mines. To reduce noise levels, plantation will be done. Blasting will be carried out only in the allotted time.
2	Dust generation due to mining activities	To reduce dust generation, mist sprayers will be used. During transportation, the material will be covered with tarpaulin. Water sprinkling will be done to reduce generation of pollutants.
3	Change in land use of the lease area	After the mine closure stage, the mine pit will be left as rain water collecting tank, which can attract bird population in the nearby areas.
4	Accidental falling of animals	To prevent entry of animals, the mine lease surrounding area will be properly fenced with barbed wire.

4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL COMPONENTS.

4.3.1 IMPACT DUE TO MINING OPERATION

Impact prediction is a very important phenomenon in evaluating the environmentally potential adverse impacts for any proposed mine project. The impact prediction is always carried out under worst possible conditions so as to mitigate or to eliminate the environmental hazards. These predictions thus calculated are superimposed over the baseline data to calculate the net impact on the environment after the proposed mine Project comes into production.

4.3.2 IMPACT ON AIR ENVIRONMENT

The impacts on air environment from a mining activity depend on various factors like production capacity, machinery involved, operations and maintenance of various equipment and vehicle. Apart from these, there will be other activities associated viz transportation of mineral and waste, stocking facilities and dump management within the mine lease area that may contribute to pollution.

4.3.3 Quantitative Estimation of Impacts on Air Environment

An attempt has been made to predict the incremental rise of various ground level concentrations above the baseline status in respect of air pollution due to proposed is 13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years with ultimate depth up to 67 m BGL.

The pollutants released into the atmosphere will disperse in the down wind direction and finally reach the ground at farther distance from the source. The concentration of ground level concentrations mainly depends upon the strength of the emission source and micrometeorology of the study area.

In order to estimate the ground level concentrations due to the emission from the proposed project, EPA approved Industrial Source Complex ISC AERMOD View Model has been employed.

The mathematical model used for predictions on air quality impact in the present study is ISC-AERMOD View-6.8.6. It is the next generation air dispersion model, which incorporates planetary boundary layer concepts.

The AERMOD is actually a modeling system with three separate components:

AERMOD (AERMIC Dispersion Model), AERMAP (AERMOD Terrain Preprocessor) and AERMET (AERMOD Meteorological Preprocessor).

Special features of AERMOD include its ability to treat the vertical in homogeneity of the planetary boundary layer special treatment of surface releases, irregularly shaped area sources, a plume model for the convective boundary layer, limitation of

vertical mixing in the stable boundary layer, and fixing the reflecting surface at the stack base.

The AERMET is the meteorological preprocessor for the AERMOD. Input data can come from hourly cloud cover observations, surface meteorological observations and twice-a-day upper air soundings. Output includes surface meteorological observations and parameters and vertical profiles of several atmospheric parameters.

The AERMAP is a terrain preprocessor designed to simplify and standardize the input of terrain data for the AERMOD. Input data include receptor terrain elevation data. Output includes, for each receptor, location and height scale, which are elevations used for the computation of airflow around hills.

Salient features of the AERMOD model are given hereunder:

- Excavation operations are considered as area sources.
- Transportation of material on haulage roads has been considered as line source

The predicted ground level concentrations for study period computed using AERMOD model are plotted as isopleths.

4.3.4 Sources of Dust Emission

The proposed mining is carried out by mechanized opencast method. The air borne particulate matter generated by ore handling operations, transportation and screening of ore is the main air pollutant. The emissions of sulphur dioxide (SO_2), Oxides of Nitrogen (NOx) contributed by diesel operated excavation/loading equipment and vehicles plying on haul roads are marginal. Prediction of impacts on air environment has been carried out taking into consideration proposed production and net increase in emissions. Based on the various operations involved in the production of minerals, the various emission sources has been identified as given below.

a. Area sources.

b. Line sources.

Extraction of mineral from mine, are considered as area sources. Transportation of material from mining benches to various end points are considered as line sources. The impact of above sources on air environment is discussed below:

The other sources of air pollution are the dust generated during the movement of tippers on the haul road. Water tankers with spraying arrangement will be used for regular water sprinkling on the haul roads to ensure effective dust suppression. The tippers are well maintained so that exhaust smoke does not contribute abnormal values of noxious gases and un-burnt hydrocarbons.

4.3.5 Emission Details

All the emissions discussed above are quantified for proposed maximum production of is 13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years with ultimate depth up to 67 m BGL by the open-cast mechanised mining method. The existing air quality levels are covered in the baseline scenario. Excavation, loading and transportation through tippers are the major sources, which are of significance. Therefore, the emissions considered for modeling are from drilling blasting, excavation & transportation rough stone.

The emissions are computed based on AP-42 emission factors. Operational hours, activity rate, wind speed and moisture content have been considered for estimation of emissions from point and area sources. For line source, apart from operational hours, activity rate, moisture, silt content and vehicle weight have been considered. Predictions are carried out for the worst-case scenario of simultaneous operation of excavators (area sources) and tippers for transportation from mine pit to loading pit (line sources) over a distance of 500 m.

The number of working days has been taken at 300 days per year with 8 hours of operation/day, hence the concentrations predicted are considered to be the worst case. With control measures, the emissions have been taken at 30% of uncontrolled emissions for handling and 10% of uncontrolled emissions for transportation.

4.3.6 Meteorological Data

The meteorological data recorded continuously during the month of March 2025 – May 2025 on hourly basis on wind speed, wind direction and temperature has been processed to extract the 24- hourly mean meteorological data as per the guidelines of IMD and MoEF for application of AERMOD model. Stability classes computed for the mean hours is based on guidelines issued by CPCB on modeling. Mixing heights representative of the region have been taken from the available published literature.

4.3.7 Summary of Predicted Ground Level Concentrations

Ground level concentrations due to the mining activities have been estimated to know the incremental raise and extent of impact in the study area.

The maximum ground level concentration is estimated to be about 1.41 µg/m^3 of PM 2.5 & 2.20 µg/m^3 of PM10 within the mine area and surrounding cluster area 1.95 µg/m^3 of PM 2.5 & 2.96 µg/m^3 of PM10, where mining operations are being carried out. The impact of mining operations would be negligible beyond 0.5 km.

4.3.8 Emission sources & Quantification

Various point and non-point sources of emissions from Proposed Rough stone and Gravel Quarry of M/s. Shri Rajrudhra Minerals Private Limited is quantified and presented below:

Area Emissions – Total Material handling (Rough Stone)

Quantity, TPA	M/s. Shri Rajrudhra Minerals Private Limited Rough Stone : 13,10,240 m3 Gravel: 92,026 m3 (Five Years)
Operational Hours Per Year	2400
Activity Rate, t/hr.	400.9645
Emission of dust, g/t.	0.15
Emission of dust, g /hr.	53.456
Area of influence, m^2	620
Uncontrolled emission rate g/s/m^2	0.000034761
Controlled emission rate, PM10 g/s/m^2	0.00003476
Controlled emission rate, PM2.5 g/s/m^2	0.00021439

Line Source – Transport of Rough Stone from Pit to Boundary

Quantity, TPA	M/s. Shri Rajrudhra Minerals Private Limited Rough Stone : 13,10,240 m3 Gravel: 92,026 m3 (Five Years)
Operational Hours Per Year	2400
Capacity of each Dumper (T)	10
Total No. of Tippers/ year	75555
Lead length/trip, Km	0.6
Total VKT/Year	45345
Emission Kg/VKT	0.22
Total emission Kg/Year	45636
Uncontrolled emission rate g/s/m	3.4564
Controlled emission rate, PM10 g/s/m	0.34564
Controlled emission rate, PM2.5 g/s/m	0.25786

Area Emissions – Total Material handling (Cluster Rough Stone)

Quantity, m3	• M/s. Shri Rajrudhra Minerals Private Limited Rough Stone : 13,10,240 m3 Gravel: 92,026 m3 • M/s.Shri Rajrudhra Minerals Private Limited Rough Stone: 57,26,860 m3 Gravel: 2,154,10 m3 (Five Years) • M/s. Shri Rajrudhra Minerals Private Limited Rough Stone : 787185 m3 Gravel 98172 m3
Operational Hours Per Year	2400
Activity Rate, t/hr.	386.55
Emission of dust, g/t.	0.32
Emission of dust, g /hr.	91.45
Area of influence, m2	627
Uncontrolled emission rate g/s/m2	0.0009534
Controlled emission rate, PM10 g/s/m2	0.0009534
Controlled emission rate, PM2.5 g/s/m2	0.00062323

Line Source – Transport of Rough Stone (Cluster)

Quantity, m3	• M/s. Shri Rajrudhra Minerals Private Limited Rough Stone : 13,10,240 m3 Gravel: 92,026 m3 • M/s.Shri Rajrudhra Minerals Private Limited Rough Stone: 57,26,860 m3 Gravel: 2,154,10 m3 (Five Years) • M/s. Shri Rajrudhra Minerals Private Limited Rough Stone : 787185 m3 Gravel 98172 m3
Operational Hours Per Year	2400
Capacity of each Dumper (T)	10
Total No. of Tippers/ year	594585
Lead length/trip, Km	0.24
Total VKT/Year	984526
Emission Kg/VKT	0.25
Total emission Kg/Year	25433
Uncontrolled emission rate g/s/m	5.65645
Controlled emission rate, PM10 g/s/m	0.5656
Controlled emission rate, PM2.5 g/s/m	0.49764

Note: *Emission factor computed based on wind speed of 2 m/s, and moisture content of 10 %. + Emission factor computed based on silt content of 10 % and moisture content of 10 %

FIG 4.2 Isopleth of GLC Prediction for $PM_{2.5}$

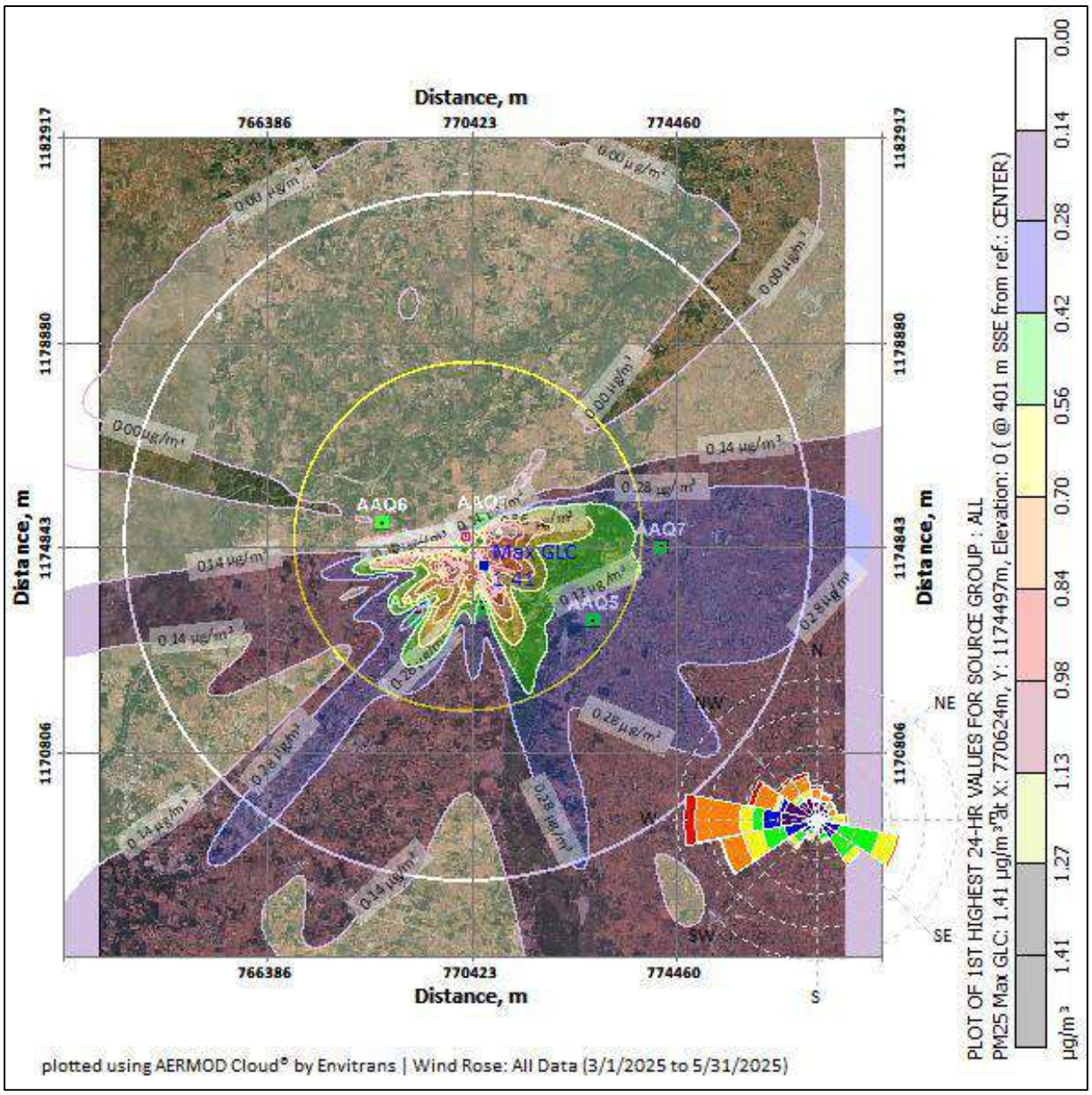
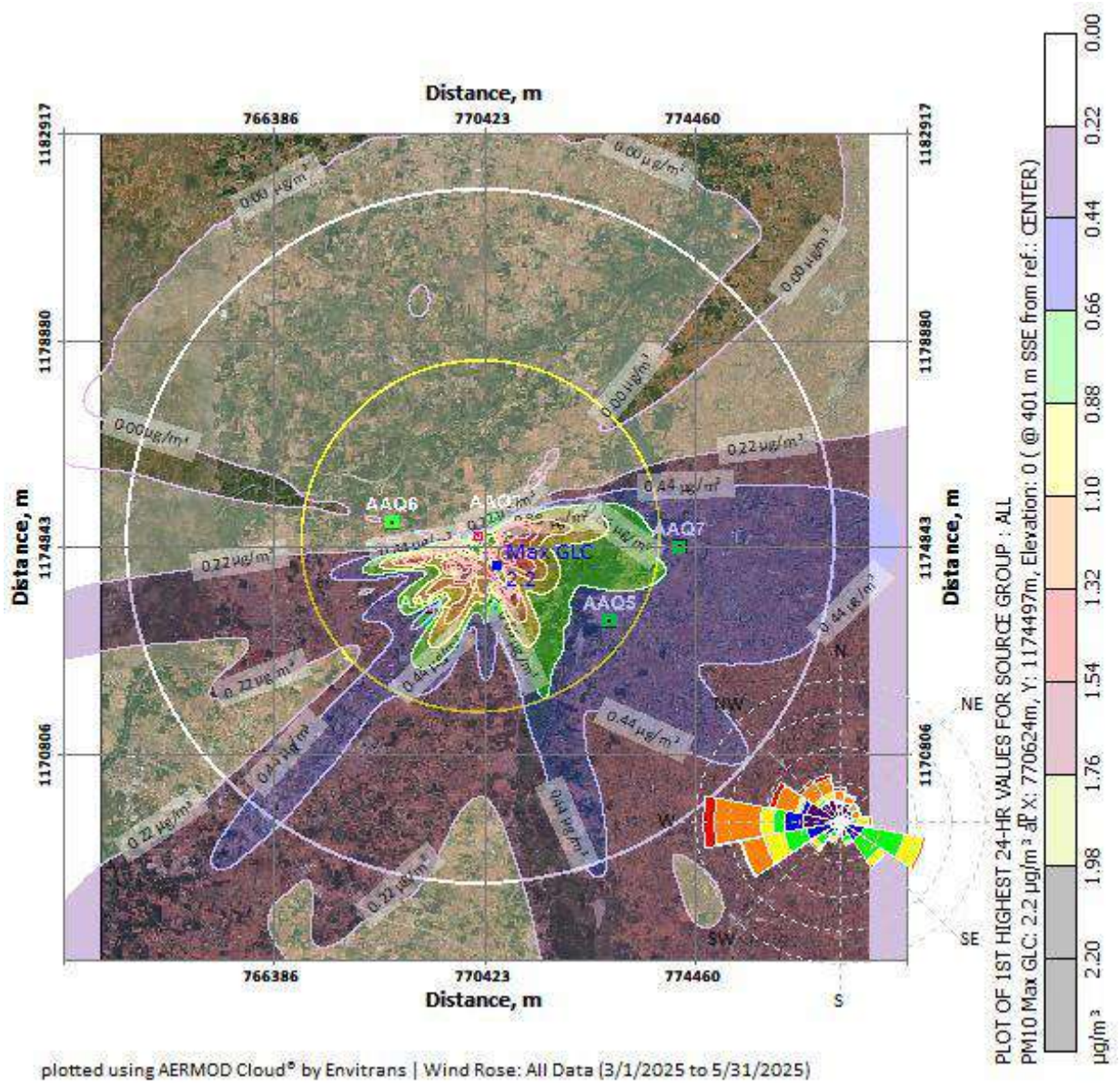


FIG 4.3 Isopleth of GLC Prediction for PM_{10}



plotted using AERMOD Cloud® by Envitrans | Wind Rose: All Data (3/1/2025 to 5/31/2025)

FIG 4.4 Isopleth of GLC Prediction –Cumulative for $PM_{2.5}$

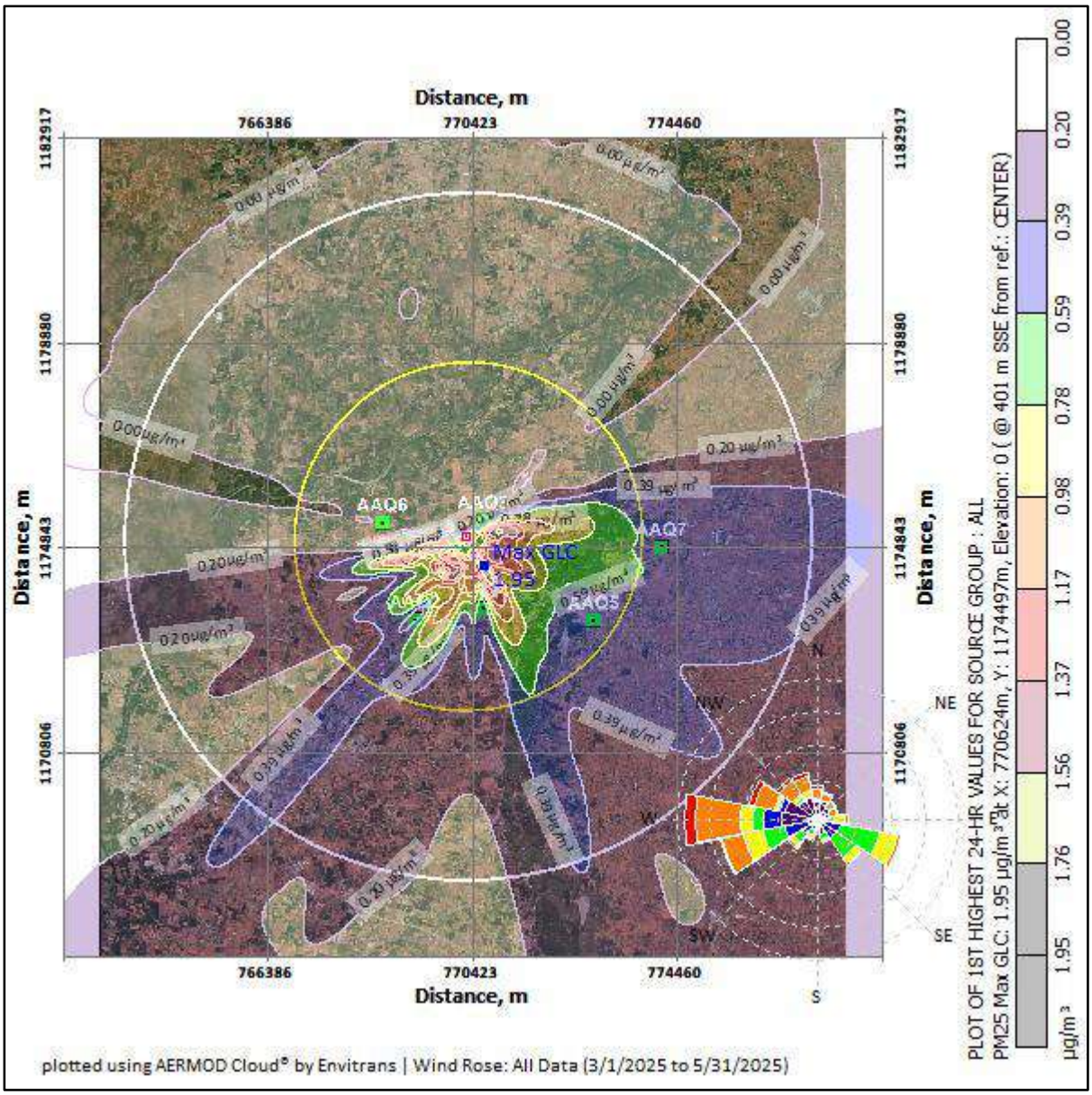
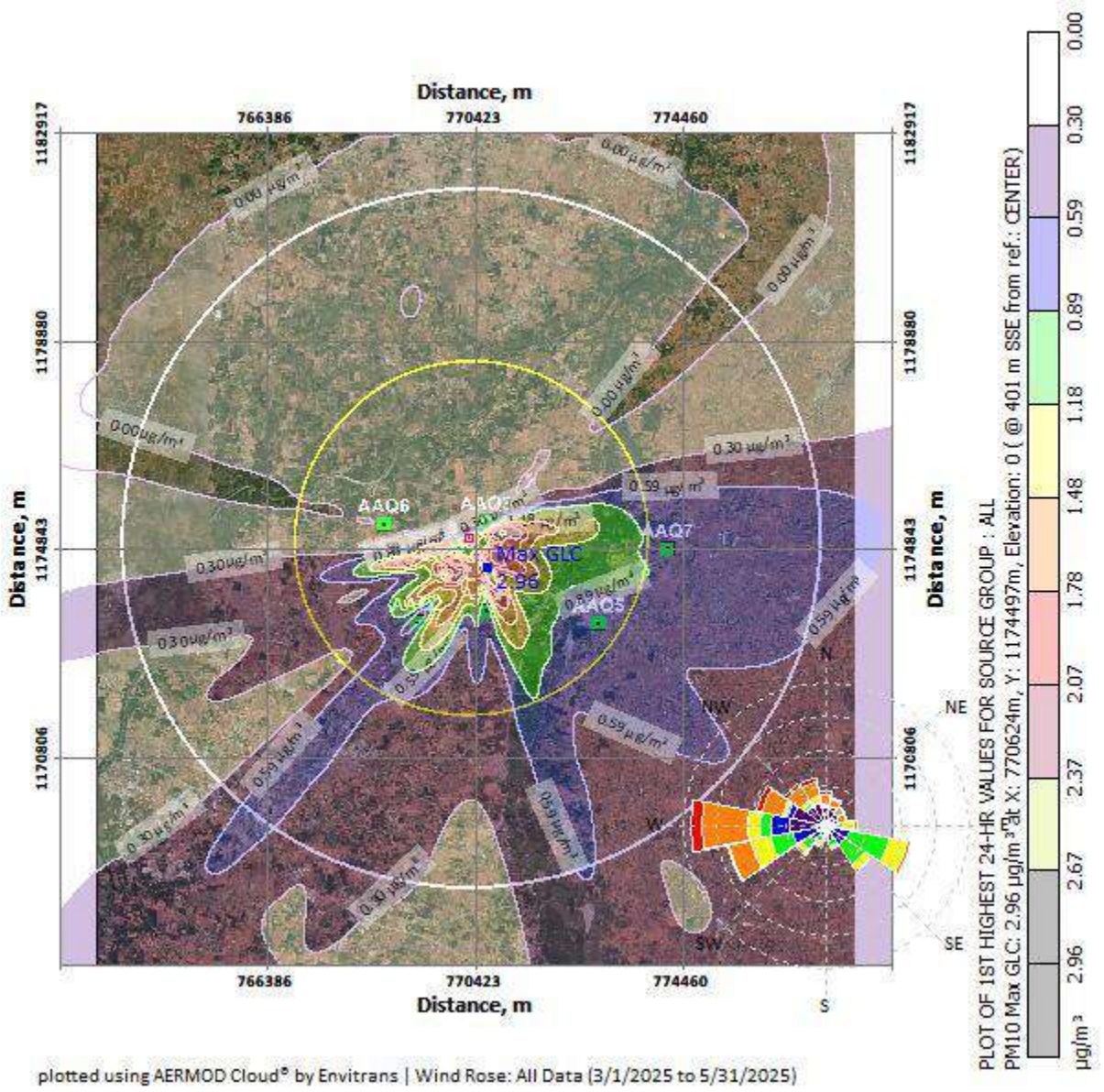


FIG 4.5 Isopleth of GLC Prediction –Cumulative for PM_{10}



plotted using AERMOD Cloud® by Envitrans | Wind Rose: All Data (3/1/2025 to 5/31/2025)

PREDICTED AMBIENT AIR QUALITY:

The post project Concentrations of PM10, PM2.5, (GLC) (base line + incremental) after adopting necessary control measures is given in Table No - 4.4

Table 4.4 Concentrations of PM2.5 after Project Implementation					
SL. No	**Location**	**Background Concentration**	**Predicted incremental Concentration**	**Post Project Concentration**	**Statutory Limits in µg/m³**
1	Project site	37.1	1.41	38.51	60
2	Panampatty	32.6	1.27	33.87	
3	Kottathurai	27.6	1.13	28.73	
4	Melkaraipatty	29.2	<1.0	30.2	
5	Keeranur	31.4	<1.0	32.4	
6	Rajampatti	29.5	<1.0	30.5	
7	Bommanallur	25.7	<1.0	26.7	
Cluster Concentrations of PM2.5 after Project Implementation					
SL. No	**Location**	**Background Concentration**	**Predicted incremental Concentration**	**Post Project Concentration**	**Statutory Limits in µg/m³**
1	Project site	37.1	1.95	39.05	60
2	Panampatty	32.6	1.76	34.36	
3	Kottathurai	27.6	1.56	29.16	
4	Melkaraipatty	29.2	1.37	30.57	
5	Keeranur	31.4	1.17	32.57	
6	Rajampatti	29.5	<1.0	30.5	
7	Bommanallur	25.7	<1.0	26.7	
Concentrations of PM10 after Project Implementation					
SL. No	**Location**	**Background Concentration**	**Predicted incremental Concentration**	**Post Project Concentration**	**Statutory Limits in µg/m³**
1	Project site	80.4	2.20	82.6	100
2	Panampatty	69.4	1.98	71.38	
3	Kottathurai	59.9	1.76	61.66	
4	Melkaraipatty	59.4	1.54	60.94	
5	Keeranur	68.4	1.32	69.72	
6	Rajampatti	64.1	1.10	65.2	
7	Bommanallur	55.7	<1.0	56.7	

Cluster Concentrations of PM10 after Project Implementation					
SL. No	**Location**	**Background Concentration**	**Predicted incremental Concentration**	**Post Project Concentration**	**Statutory Limits in µg/m³**
1	Project site	80.4	2.96	83.36	100
2	Panampatty	69.4	2.67	72.07	
3	Kottathurai	59.9	2.37	62.27	
4	Melkaraipatty	59.4	2.07	61.47	
5	Keeranur	68.4	1.78	70.18	
6	Rajampatti	64.1	1.48	65.58	
7	Bommanallur	55.7	1.18	56.88	

The above report seems that, even in the worst-case scenario, the resultant added concentrations with baseline figures show that the values of ambient air quality for PM_{10} are in the range of 56.70 µg/m³ to 82.60 µg/m³ and for $PM_{2.5}$ are in the range of 26.7 µg/m³ to 38.51 µg/m³ and PM_{10} are surrounding area range of 56.88 µg/m³ to 83.36 µg/m³ and for $PM_{2.5}$ are in the range of 26.70 µg/m³ to 39.05 µg/m³ which are within the statutory limits in each case. The mitigation measures undertaken in the mine for control of air pollution are given below.

- Wet drilling will be practiced in drilling operation.
- Water sprinkling will be done in haul roads & loading etc.
- The mines workers are provided with the dust masks.
- Three-layer plantation in the safety zone.
- DG sets shall be periodically maintained as per manufacturer's specifications.

4.4 ASSESSMENT OF SIGNIFICANCE OF IMPACTS (CRITERIA FOR DETERMINING SIGNIFICANCE, ASSIGNING SIGNIFICANCE).

4.4.1 NOISE ENVIRONMENT

The main noise generating source during mining operation and related activities are drilling, excavation, loading and transportation. Intermittent noise is generated due to operation of diesel generator.

4.4.2 Likely Noise Levels in Lease Area due to mining activity

S.No.	Source Name	Noise Level in dB (A)
1	Diesel generator	90
2	Excavator Operation	86
3	Trucks movement	82
4	Drilling	96
5	Blasting	102

It is expected that the generated noise will be limited within the mine lease area and there will be no profound effect of noise on the buffer zone. The noise level will be maintained below the threshold limit by vigorous maintenance of the machineries. Wet drilling with dust extractor is being used to reduce the noise level during the mining operation.

Noise levels were measured in the lease area and in the buffer zone area are given below.

TABLE 4.5 Noise Levels in Monitoring Locations

S. No.	Location	Distance and direction from Mine lease area	Day Equivalent (in dBA)	Night Equivalent (dBA)
1	Project site	Core Zone	47.3	40.5
2	Panampatty	1.90 km, SW	45.7	39.8
3	Kottathurai	1.21 km, NE	43.6	40.5
4	Melkaraipatty	1.74 km, SS	46.5	41.0
5	Keeranur	3.98 km, SE	51.3	42.2
6	Rajampatti	1.52 km, W	47.7	42.5
7	Bommanallur	6.18 km, E	50.0	42.0

The noise levels are within the MoEF & CC limits of 70 dB(A) in the working area and in the buffer areas, the values are below the limit of 75 dB(A). Since, the residential area norm has been considered for all six locations mentioned above, during mining operation mine lease area will be considered as industrial area/quarry area for which DGMS norms 85 dB(A)/CPCB guidelines 75 dB(A).

4.4.3 Impact of Noise due to mining

- Noise generation in mining is due to operation like drilling, blasting and transportation of minerals within and outside the lease area.
- As per DGMS (Directorate General of Mines Safety) limits, the acceptable noise level is 85 dB(A) for an exposure period of 8 hours.
- Exposure to loud noise can also cause high blood pressure, heart disease, sleep disturbances, and stress. Noise pollution also impacts the health and well-being of wildlife.
- Noise exceeding prescribed limits may cause impairment like abnormal loudness perception, tinnitus which causes a persistent high-pitched ringing in the ears, paracusis or distorted hearing.

4.5 MITIGATION MEASURES

4.5.1 Noise level control.

- As the distance between the source and receptor increases, the noise level decreases. Hence, there will be a natural attenuation.
- The proponent has planned to develop green belt in the periphery of the lease area which diminishes sound volume by dampening them.
- All the equipment/machinery/tippers involved will be properly maintained to control noise generation.
- Conducting regular health checkups for employees involved.
- Employees will be made to work on shifts to reduce their exposure time.
- Providing earplugs to all employees.
- Providing green walls/nets wherever possible.

By adopting these measures, the noise levels will be maintained well within MoEF & CC limits since the baseline value is low.

4.5.2 IMPACTS DUE TO VIBRATION

There will be negligible vibration of ground due to the following activities.

- Due to Blasting
- Due to Drilling
- Due to movement of machinery

Impacts

- Though vibration will be only felt by the people working inside the lease area it is usually undesired.
- Vibration may also cause fly rocks.
- It may frighten the birds and small insects in the lease area. However, it will be felt only for a short period.

Mitigation measures

- The DG set will be kept within the acoustic enclosure made by the stone blocks.
- Drills will be equipped with sharp bits and wet drilling will be adopted.
- A well-planned green belt is proposed for the mining to reduce noise level.
- Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.
- Regular maintenance of the machineries and vehicles to reduce the noise level.
- Use of ear muffs by the workers with occupational exposure to noise.
- Carrying out blasting on limited scale, only from 12:00 PM to 2:00 PM
- Control of fly rock and vibration by maintaining peak particle velocity within the standard as prescribed by the DGMS and MOEF & CC.
- Shallow depth jackhammer drilling and blasting is proposed to be carried out with minimum use of explosive.
- Supervising blasting by competent and statutory Foreman/ Mines Manager.

4.5.3 SOCIO ECONOMIC IMPACT

From the primary Socio-economic survey & through secondary data available from established literature and census data 2011, it is found that there would be positive impact on Socio-economic condition of the nearby area. There is no habitation within 300 m of the proposed mining lease area. Therefore, no major impact is anticipated on the nearby habitation during the entire life of the mine. The entire lease area is in the proponent's possession. Hence, there are no habitations or hutments in the core zone area and no rehabilitation or resettlement problems will arise here.

The mining operations in the proposed mine will employ about 38 persons directly and indirect basis through allied opportunities in logistics, trading, repairing works etc. good employment potential will arise, which will provide raising income levels and standards of living in the area through various service related activities connected with the project operations as shown under.

- Project related logistical operations for transport of Rough Stone, etc,
- Various trading services for consumer goods, spare parts, sundry items, etc.
- Contractual services connected with the project.
- Green belt and horticultural works in the project.
- Casual labor needs for various activities.

The State and the Central governments will also get benefited through financial revenues by way of royalty, tax etc from this project.

Mine management will contribute for the upliftment of these villages by conducting regular medical camps, assistance in developing necessary infrastructure facilities like maintenance of schools, village roads, drinking water supply, etc.

From above details, it is clear that the project operations will have highly beneficial positive impact in the area. However, towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.5.0 Lakhs under Corporate Environmental Responsibility.

4.5.4 OCCUPATIONAL HEALTH

Impacts on humans due to various mining activities

The occupational risk due to proposed mining may be due to drilling, blasting, excavation and transportation. A total of 66 workers will be engaged in the mining activity. Mining activity may cause various health problems to the mines workers as follows:

- Dust generated during excavation, drilling, stone cutting, sizing and transportation may cause health problems like Silicosis, Asthma, Tuberculosis and other respiratory lungs disorders.
- Heavy weight lifting by the workers may cause injuries to arms, legs and back.
- Noise generated during the mining activity may cause Noise Induced Hearing Loss (NIHL).

Table 4.6 Impacts on humans due to various mining activities

S.No.	Type of activity	Impact
1	Dust generation due to drilling and blasting	Continuous exposure to dust causes Pneumonia, Tuberculosis, Rhematic arthritis and Segmental Vibration
2	Noise generation due to drilling and blasting	Short term impact will be lack of sleep, high blood pressure and heart ailments. Long term exposure may lead to partial or permanent deafness
3	Unexpected accidents	Risks include fly rocks, cracks or fissures due to improper mining methods

Mitigation measures

- The mines worker will be provided with dust mask to minimize the inhalation of the dust.
- Water sprinkling twice in a day is in practice on the haul roads, near excavation and roads to reduce the fugitive dust emission.
- Wet drilling and drilling with dust extractor will be practiced.
- Ear muffs will be supplied to the workers working in the noise prone area
- The mining site will be supplied with first aid facilities and the entire mines worker will have access to that.
- The mines workers will be well trained about the safety practices in the mining activities.
- As per Mines Rules, 1955, medical examination of employees at the initial stage and periodically, shall be done by a team of qualified medical officers provided by the project proponent.

- Regular medical checkup camps shall also be arranged for detection of occupational diseases and minor disease in the nearby rural population.
- Free checkup and medicine for treatment for their acute and chronic illness shall be provided by the lessee. Conducting periodical Medical Examination as per DGMS.
- Making all first aid kits available in mines office
- Keeping fire extinguisher in place
- Educating the employees about how to handle unexpected happenings
- Posting information containing emergency contact numbers in mines office
- By adopting all these measures, the safety of the employees working in the quarry will be ensured.

4.5.5 WASTE MANAGEMENT

Solid Waste

Since the entire mined out material will be utilized there will not be any solid waste generation from this project. However, the Solid waste (MSW) generated from administrative activities will be properly collected and disposed to Govt. Authorized yards / Re-cylers / Disposers.

Liquid Waste

There is no process effluent generation from this mine. Hence no liquid waste is generated. Domestic wastewater i.e 1.0 KLD will be discharged in soak pit via septic tank.

Hazardous Waste Management

In this project the following management practices will be followed:

In the quarrying operation, the source of hazardous waste is from machinery maintenance activities that are waste oil/ Waste lubricants / Used filters / Used Hydraulic horses. it will be properly collected in the source level, stored in impervious storage yards and disposed of as per the Hazardous waste (Trans-boundary Movement) Management Rules, 2016.

Plastic Waste

Single use plastics/ use and throwaway plastics will be banned in the site as directed by the Tamil Nadu Government vide GO(Ms)No.84 regarding ban on use of plastic products. The employees will be encouraged to use compostable material or reusable material.

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CHAPTER 5

ANALYSIS OF ALTERNATIVES

5.1 DESCRIPTION OF EACH ALTERNATIVE

Analysis of alternative site helps in selection of best possible site for the project. On one hand it helps to closeness to the existing infrastructure and on other hand it also helps to minimize the impact of project on environment.

5.2 SUMMARY OF ADVERSE IMPACTS OF EACH ALTERNATIVE

The project proponent has prepared mining plan under rule 19, 41 & 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and the same has been approved by the Assistant Director, Dept. of Geology & Mining, Dindigul vide Rc.No. 589/2025/Mines, dated 07.08.2025.

- There is no forest land or other Eco-sensitive places.
- Proposed mine site is selected on the basis of occurrence of mineral for suitable end use.

Hence seeking alternative site is not required.

5.3 MITIGATION MEASURES PROPOSED FOR EACH ALTERNATIVE

The mining technology is mechanized Opencast in single-shift operation without any change in technology. The operation will be carried out as per DGMS norms. No alternate technology will be used. Details of the technology used are given in Chapter 2.

5.4 SELECTION OF ALTERNATIVE

In case of Mining projects alternate site selection is not necessary as the mining is site specific and the area in which mining will be carried out has been adequately proved for presence of mineral. The deposit is also having good infrastructural facilities for access and development.

The mining technology is mechanized Opencast in single-shift operation without any change in technology. The operation will be carried out as per DGMS norms. No alternate technology will be used. Details of the technology used are given in Chapter 2.

CHAPTER 6

ENVIRONMENTAL MONITORING PROGRAMME

6.1 TECHNICAL ASPECTS OF THE MONITORING THE EFFECTIVENESS OF MITIGATION MEASURES (INCL MEASUREMENTS, METHODOLOGIES, FREQUENCY LOCATION DATA ANALYSIS, REPORTING SCHEDULES EMERGENCY PROCEDURES DETAILED BUDGET AND PROCUREMENT SCHEDULES)

6.1.1 ENVIRONMENTAL MONITORING

Monitoring is done to measure the efficiency of control measures implemented. Regular monitoring of various environmental parameters like air, water, noise and soil environments is needed to assess the status of environment during the project operation.

A schedule is framed with timeline to monitor various parameters during the operation of the project. The schedule is framed based on MoEF & CC and Tamil Nadu State Pollution Control Board. In case the SEIAA/TNPCB/MoEF & CC or other statutory bodies demand monitoring of any additional parameter/factor, the same will also be done.

The proposed quarry is a small quarry. Hence the Mines-in-charge will be responsible for environmental related activities. After obtaining EC, the conditions mentioned in EC will be strictly followed. The Mines-in-charge will be responsible for implementing the conditions. EC compliance report will also be submitted periodically.

6.1.2 OBJECTIVES OF ENVIRONMENTAL MONITORING

The objectives of Environmental Monitoring are as follows.

- Monitoring and analysis of air and water samples
- Implementing the control and protective measures.
- Coordinating the environment related activities within the project as well as with outside agencies. Collecting statistics of health of workers and population of the surrounding villages. Green belt development etc.
- Monitoring the progress of implementation of Environmental Management Programme.
- Monitoring the noise generation in and around the project areas.

- Monitoring of wastewater treatment and disposal of solid waste.
- The laboratory will be suitably equipped for sampling/testing for various environmental pollutants.

6.1.3 ENVIRONMENTAL MONITORING SCHEDULE

To evaluate the effectiveness of Environmental Management Programme, regular monitoring of the important environmental parameters will be taken up. The frequency of monitoring different parameters is given in table 6.1.

Table 6.1 Environmental Monitoring Schedule

Sl.No.	Description of Parameters	Parameters	Frequency
1	Air	Air Quality for SPM, PM-10, PM-2.5, SO_2 and NO_x	24-hour average samples Once in a 3 month.
2	Water	General, Physical, and chemical parameters	Once per season
3	Noise	L_{eq}, L_{max}, L_{min}, L_{eq} Day & L_{eq} Night dB(A)	8-hour average samples Once in a 3 month.
4	Soil	Physical and Chemical characteristics.	Once per season

6.1.4 LOCATION

Monitoring of the above-mentioned environmental parameters would be done at appropriate and sensitive areas. The exact location of monitoring is given as Figure – 3.4, 3.10, 3.12 & 3.14.

6.1.5 MEASUREMENT METHODOLOGY

(a) Ambient Air Quality

Ambient air quality will be monitored for SO_2, NO_x, PM_{10} and $PM_{2.5}$. The instruments like high volume air samplers and Respirable dust samplers would be used for this purpose. These parameters will be monitored as mentioned in the monitoring schedule previously.

(b) Water Quality

Water quality analysis will be done quarterly and the monitored parameters include pH, Temperature, TDS, etc. as specified by SPCB from time to time.

(c) Noise Monitoring

Noise level will be monitored in working environment mainly noise producing sources over the boundary and around the mining area**.**

(d) Green Belt and Afforested Areas

Continuous vigilance and monitoring of green belt will be done for performance and survival rate of the saplings. Watch and ward personnel will properly guard the plantation. Provision will be made for fertilizers application and watering on schedule.

(e) Socio-Economics

Socio-economic of the core and buffer zone details elaborated in Chapter-3.

6.1.6 TECHNICAL ASPECTS OF MONITORING THE EFFECTIVENESS OF MITIGATION MEASURES

The above monitoring schedule will be followed periodically. After collection of the data, the mines-in-charge will analyze the data obtained. The data thus obtained will be incorporated in the EC Compliance report submitted to the regional office, MoEF & CC. The measurement methodologies will be as per CPCB/BIS/MoEF & CC/DGMS norms.

6.1.7 EMERGENCY PROCEDURES

In case of any emergency due to environmental conditions, the mines in-charge will immediately report to the top-level management and the emergency response protocol will be implemented as per MoEF & CC/ SPCB / DGMS norms.

6.1.8 REPORTS TO BE GENERATED

The Project Proponent will maintain records of each test and its interpretation so as to formulate an adequate Environmental Management Plan. The set of records planned to be maintained by Project Proponent are given in below table 6.2.

Table 6.2 Important Records to be maintained by PP	
S.No.	**Particulars**
1	Monitoring results for Air, Water & Soil.
2	Records of slope failure, land erosion & drainage.
3	Plantation Records
4	Environmental and related standards/ norms
5	Records pertaining to statutory consents, approvals.
6	Periodic Medical examination (PME) records.
7	Complain register (Environmental pollution)
8	Records on water and electricity consumption
9	Periodic progress records.
10	Environmental Expenses Records

6.1.9 DETAILED BUDGET AND PROCUREMENT SCHEDULES

The budget planned for environmental monitoring is given below

Table 6.3 - Environmental Management Plan Budget

Sl. No	Budget planned for	Capital Cost Amount (INR)	Recurring Cost/Annum Amount (INR)
1	Air Environment	13.80	2.23
2	Noise Environment	0.30	0.02
3	Waste Management	0.25	0.13
4	Mine Closure	0.82	0.16
5	Implementation of EC, Mining Plan & DGMS Condition	1.19	0.83
Total		**16.36**	**3.36**

Total EMP Cost for 5 years is 34.93 lakhs

i.e., Rs.16.36 Lakhs of Capital Cost + Rs.18.57 Lakhs of Recurring cost (For 5 Years)

CHAPTER 7
ADDITIONAL STUDIES

The following Additional Studies were done as per items identified by project proponent and the regulatory authority.

- Public Consultation
- Risk Assessment
- Disaster Management Plan
- Cumulative Impact Study
- Mine Closure Plan
- Slope Stability Plan

7.1 PUBLIC CONSULTATION

This draft EIA/EMP report will be exposed to public consultation as per mandatory procedures through the District Collector and State Pollution Control Board officials after giving 30 days advance notice in two local newspapers about the scheduled date and time for conduct of the public hearing procedures. The opinions, concerns and objections of stakeholders will be recorded during the public hearing. All the public queries and the replies to the query by the project proponent and officials concerned will be recorded and incorporated in the EIA/EMP report for approval by SEIAA, Tamil Nadu.

7.2 RISK ASSESSMENT

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 person holding certificate of competency to manage a metalliferous mine granted by the DGMS. Factors of risks involved due to human induced activities in connection with this proposed mining & allied activity with detailed analysis of causes and control measures for the mine is given in below Table 7.1.

Table 7.1 Risk Assessment and Control Measures

S.NO	Risk Factor	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. • 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. • Quarry operation will be done as per approved mining plan and other applicable statutory guidelines issued by DGMS, Dept. of Mining & Geology-TamilNadu. • Handling of explosives, charging and firing shall be carried out under competent statutory persons. • A comprehensive standard operating procedure (SOP) will be prepared as per DGMS guidelines and the same will be circulated to all the employees and it will be strictly followed in the all face of mining operation.
2	Drilling	Improper and unsafe practices. Due to high pressure of compressed air, hoses may burst. Drill Rod may break.	• Safe operating procedure established for drilling (SOP) will be strictly followed. • Only trained operators will be deployed. • No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places. • Drilling shall not be carried on simultaneously on the benches at places directly one above the other. • Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. • Drills unit shall be provided with wet drilling to ensure efficient working.

3	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 approved mining plan. • Proper blasting design with optimum spacing & burden, Charge per delay and stemming. • SOP for Charging, Stemming & Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation. • Shots are fired during day time only. • Charging and firing shall be carried out in the same day. • Siren will be done for each blasting. Blasting evacuation plan prepared and executed. • 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. Unauthorized person will not be allowed to operate or ride on the vehicle. • Loading according to the vehicle capacity. • Periodical maintenance of vehicles as per operator manual.
6	Natural calamities	Unexpected happenings	• An emergency management plan will be prepared considering all possible national calamity and the same will be executed if any such situation occurs. • Escape Routes will be provided to prevent inundation of storm water. • Fire Extinguishers & Sand Buckets in the designated areas.
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.

7.3 DISASTER MANAGEMENT PLAN

This being a small rough stone project that too working in a safe area, no major disaster is expected after following all the statutory rules and regulations.

7.3.1 MODEL DISASTER MANAGEMENT PLAN

The lessee has formulated the disaster Management plan keeping all eventualities in mind.

The mining operation will be carried out under the direction of qualified mines manager and supervisors, based on the guidelines and directions of Directorate General of Mines Safety (DGMS) and Indian Bureau of Mines. Code of practice of different operations will be formulated to ensure safety of men and machines and to avoid various hazards mentioned above. Mine workers will be provided training on safe work practices. The following natural/ industrial hazards may occur during normal operation; slope failure at the mine faces; accident due to heavy equipment/ machinery.

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.
- 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.

7.3.2 OBJECTIVE OF DISASTER MANAGEMENT PLAN

The objective of disaster management plan is to identify mitigation measures to avoid hazards turning in to risk, the materials required for implementing the same, the personnel requirement and their roles and responsibilities, and the communication and operating procedures to be adopted in case of an emergency.

Communication System

The telephone numbers and addresses of mine sites in the vicinity, nearest fire station, police station, local hospital, electricity department, ambulance, and local public representatives and revenue officials shall be prepared and kept in custody of PP.

Facilities

The office shed will have provision of first aid center to provide first aid in the event of an emergency. The office shed will also function as emergency control room. It will be provided with telephone and mobile phones, and a vehicle for emergency transport.

Personnel

The PP is responsible for overall supervision of the disaster management plan. He will be assisted by supervisors, in implementing the emergency management plan and procedures.

Operating Procedures

The operating procedures during emergencies are related communication to the immediate supervisor, who would relay the same to PP. The PP may assess the requirement of first aid, external assistance, transportation to nearby hospital contingent on the emergency. In the absence of mines manager, the senior most supervisor will be made responsible for disaster management.

7.4 CUMULATIVE IMPACT STUDY

There are one existing Quarries and two proposed quarry are located within a radius of 500 m from this proposed project area. The existing and proposed quarries situated within 500 m radius are presented in below Table 7.2 and the

letter received from Dept. of Geology and Mining, Dindigul stating the quarries detail within 500m radius is enclosed in Annexure – 4.

Table 7.2 Details of Quarries within 500m radius

Sl. No	Name of the Lessee	S. F. No.	Extent (Ha)	Lease Status
a. Existing Quarries				
1	M/s.Shri Rajrudhra Minerals, Private Limited, No.99/2B1B, 1st Floor, Vellore Main Road, Arcot Taluk, Ranipet District	392/2(P), 393/2(P), 394/1, 395, 396/1, 397, 398/1A1(P)	4.42.0 Ha	06.03.2024 – 05.03.2029
b. Proposed Quarries				
1	M/s.Shri Rajrudhra Minerals Private Limited, No.99/2B1B, 1st Floor, Vellore Main Road, Arcot Taluk, Ranipet District	381/1(P)	5.57.0 Ha	Proposed (Rough stone)
2	M/s.Shri Rajrudhra Minerals Private Limited, No.99/2B1B, 1st Floor, Vellore Main Road, Arcot Taluk, Ranipet District	394/2, 396/2, 402(P), 403(P), 407/1A1,407/1A2, 407/1B,407/2A, 407/2B,408/1(P), 408/2(P),408/4, 409(P),698(P)	14.40.0 Ha	Applied (Rough stone)

As seen above, although the individual lease area of this project is more than 5 hectares, Also there are one existing Quarry and two proposed quarries including this proposal located within a 500-meter radius, along with this subject project, add up to more than 5 hectares i.e. 24.39.00 Ha. A map showing the existing and proposed quarry located within 500m radius is given in Figure 1.1.

The cumulative production load of existing and proposed Rough stone quarries within cluster is shown in below table.

Table 7.x – Salient Feature of Cluster Quarries

Description		P1	P3	P4
Name of the Quarry		M/s. Shri Rajrudhra Minerals Private Limited	M/s. Shri Rajrudhra Minerals Private Limited – 5.57 Ha	M/s. Shri Rajrudhra Minerals Private Limited – 14.40 Ha
Geological Resources in m3	Rough stone	2201300	35,80,590	1,11,59,390
	Weathered Formation	-	-	-
	Gravel	132078	1,10,172	2,38,210
Mineable Reserves in m3	Rough stone	787185	13,10,240	57,26,860
	Weathered Formation	-	-	-
	Gravel	98172	92,026	2,15,410
Five years plan period as in the approved mining plan / EC	Rough stone	698915	13,10,240	57,26,860
	Weathered Formation	-	-	-
	Gravel	98172	92,026	2,15,410
Production per day in Tons		2072	2784	11434
Lorry Loads per day in Nos		207	279	1143
Employment in Nos		35	38	66
Proposed Depth in meters		38 m BGL	67 m BGL	82 m BGL
Status of the quarry		Existing	Proposed	Proposed

7.5 CLUSTER MINE CLOSURE PLAN

In the mine closure stage all necessary measures will be taken as per Act & Rules, there is no proposal for back filling, reclamation and rehabilitation in any of the proposals. The quarried pits after the end of life of mine will be properly fenced all around to prevent inherent entry of public and cattle and all the statutory requirements will be fulfilled. As already explained, in the post mining stage the rainwater harvested in the mined- out void shall be utilized for irrigation and domestic needs locally. The mine closure plan is provided in Figure 2.11.

7.6 SLOPE STABILITY PLAN

The factors that affect slope stability of the mine are detailed below.

- Geological structure comprising dip, intervening shear zone formation, clay intrusion, joints / discontinuities, faults etc.,
- Lithology of formation
- slope geometry
- Ground water availability which may cause increased thrust on the faces

Site Specific Analysis

- The quarry lease area is plain terrain which is covered by Gravel formation. The rock type noticed in the lease area is Charnockite which contains mostly Quartz and Feldspar with some ferromagnesian.
- Since the formation is of homogeneous rock type probability of slope failure is low and can be avoided if proper measures are adopted.
- There will be a 7.5m safety zone which will form a ridge which can also take care of the top section and as such no risk is envisaged on this front.

Mitigation Measures

- Regular inspection of the mine faces to be carried out by pp for ensuring absence of any structural features like faults, joints, dyke, intrusive material in the rock strata which may affect the slope stability and cleared.
- No loose material or boulders is to be stacked on the mine top or pit benches.
- Height of the benches should be 5m.
- Haul road formation will be at 1 in 15 slope with adequate road width.
- There will be no ground water table intersection.
- No seepage is expected due to formation. Adequate drainage management system comprising peripheral garland drain, settling pond to regulate monsoon water will be created to prevent saturation of compact layers, apparent drainage over the bench slope to avert damages to quarry face and manage the water flow.

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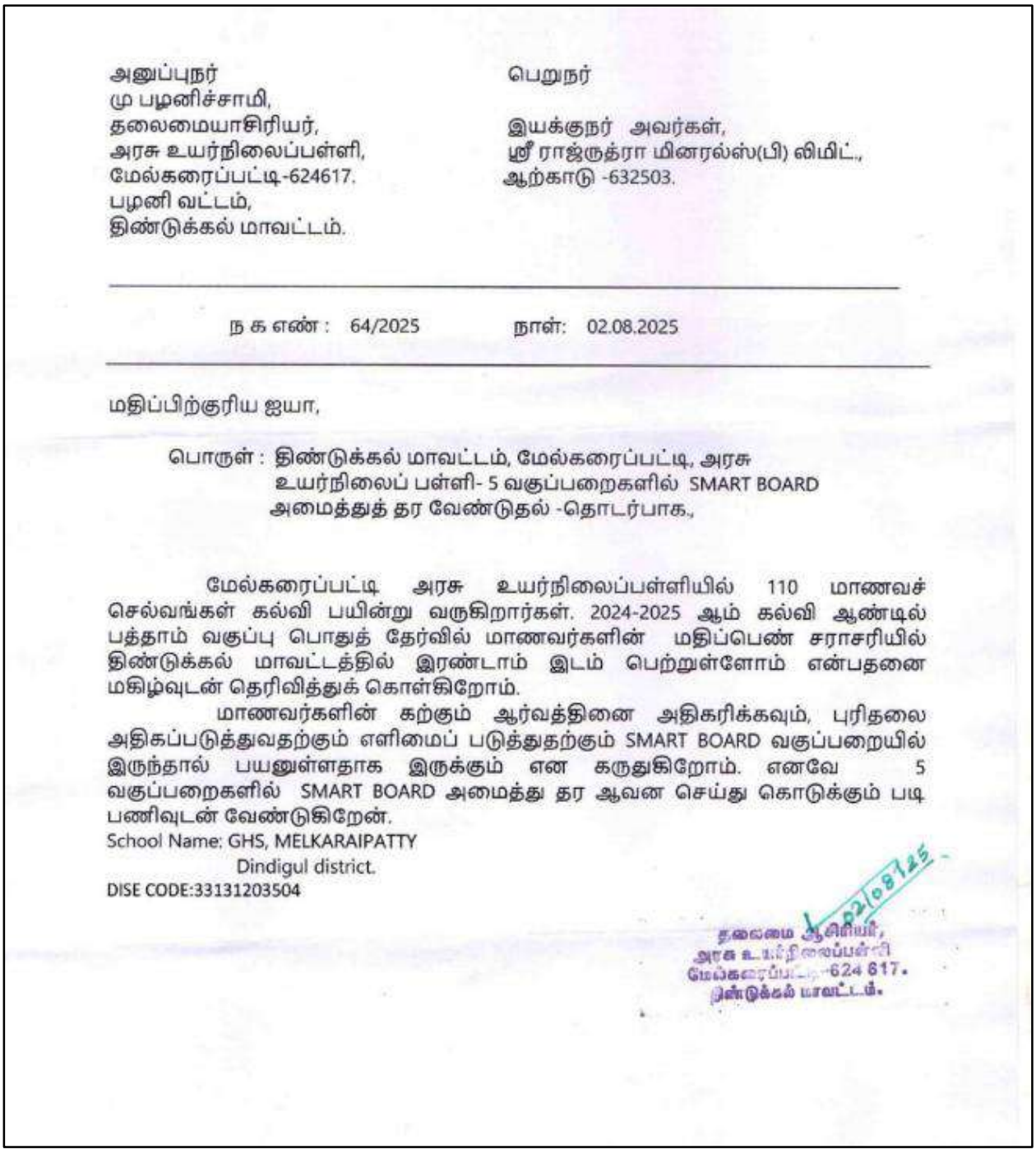
CHAPTER 8

PROJECT BENEFITS

The project area is located on barren land, thereby causing no impact on the loss of agriculture or forest land. The project will create employment opportunities in the area. There will be no adverse effect of mining on the socioeconomic status of the people; rather, mining activities will improve their standard of living. The mining activity creates employment opportunities for the local people, and this definitely raises their economic status. Apart from the overall beneficial impact of the project on the local people of the region, it is felt necessary to augment facilities in the fields of education, health, and social awareness, including concern for the environment and ecosystem.

The mining activity at proposed Rough Stone Quarry of **M/s. Shri Rajrudhra Minerals Private Limited** will create direct employment opportunity for 38 local people.

Based on the request letter received from Government High School, Melkaraipatti, the PP has proposed CER amount of Rs. 5.0 Lakhs for various activities. The copy of the letter is enclosed below.



அனுப்புநர்
மு பழனிச்சாமி,
தலைமையாசிரியர்,
அரசு உயர்நிலைப்பள்ளி,
மேல்கரைப்பட்டி-624617.
பழனி வட்டம்,
திண்டுக்கல் மாவட்டம்.

பெறுநர்

இயக்குநர் அவர்கள்,
ஸ்ரீ ராஜ்ருத்ரா மினரல்ஸ்(பி) லிமிட்.,
ஆற்காடு -632503.

ந க எண் : 64/2025 நாள்: 02.08.2025

மதிப்பிற்குரிய ஐயா,

பொருள் : திண்டுக்கல் மாவட்டம், மேல்கரைப்பட்டி, அரசு உயர்நிலைப் பள்ளி- 5 வகுப்பறைகளில் SMART BOARD அமைத்துத் தர வேண்டுதல் -தொடர்பாக.,

மேல்கரைப்பட்டி அரசு உயர்நிலைப்பள்ளியில் 110 மாணவச் செல்வங்கள் கல்வி பயின்று வருகிறார்கள். 2024-2025 ஆம் கல்வி ஆண்டில் பத்தாம் வகுப்பு பொதுத் தேர்வில் மாணவர்களின் மதிப்பெண் சராசரியில் திண்டுக்கல் மாவட்டத்தில் இரண்டாம் இடம் பெற்றுள்ளோம் என்பதனை மகிழ்வுடன் தெரிவித்துக் கொள்கிறோம்.

மாணவர்களின் கற்கும் ஆர்வத்தினை அதிகரிக்கவும், புரிதலை அதிகப்படுத்துவதற்கும் எளிமைப் படுத்துதற்கும் SMART BOARD வகுப்பறையில் இருந்தால் பயனுள்ளதாக இருக்கும் என கருதுகிறோம். எனவே 5 வகுப்பறைகளில் SMART BOARD அமைத்து தர ஆவன செய்து கொடுக்கும் படி பணிவுடன் வேண்டுகிறேன்.

School Name: GHS, MELKARAIPATTY
Dindigul district.
DISE CODE:33131203504

02/08/25
தலைமை ஆசிரியர்,
அரசு உயர்நிலைப்பள்ளி
மேல்கரைப்பட்டி-624 617.
திண்டுக்கல் மாவட்டம்.

Figure 8.1 – CER Letter

The list of activities proposed for CER is mentioned below

Table 8.1 CER Activities

S. No.	PROPOSED CER ACTIVITIES	COST IN LAKHS.
1	Plantations inside and outside the school premises	5.0
2	To provide Smart Board facility – 5 Nos	
Total		**5.0**
The above-mentioned CER activities will be spent for Government High School, Melkaraipatti		

****

CHAPTER 9

ENVIRONMENTAL COST BENEFIT ANALYSIS

As per EIA Notification dated 14th Sept., 2006, as amended from time to time, 'Environmental Cost Benefit Analysis' is applicable only if the same is recommended at the Scoping stage.

As per the ToR points issued by SEIAA-TN vide ToR Identification No. TO25B0108TN5771345N, (File No – 12577), Dated 25.09.2025 for the proposed project, the 'Environmental Cost Benefit Analysis' is not prescribed.

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CHAPTER 10

ENVIRONMENTAL MANAGEMENT PLAN

10.1 DESCRIPTION OF THE ADMINISTRATIVE ASPECTS OF ENSURING OF ENSURING THAT MITIGATIVE MEASURES ARE IMPLEMENTED AND THEIR EFFECTIVENESS MONITORED AFTER APPROVAL OF THE EIA.

10.1.1 OBJECTIVES

The Environmental Management Plan is developed to ensure that a project is implemented in an environmentally sustainable manner, where all contractors and subcontractors, including consultants, understand the potential environmental risks arising from the project and take appropriate actions to minimize those risks. EMP also ensures that the project implementation is carried out in accordance with the planned design and by taking appropriate mitigation measures to reduce adverse environmental impacts during the project's life cycle. The impacts due to this mining project are detailed in Chapter 4 and Mitigation measures at the source level and an overall Management Plan at the site level are elaborated on in this chapter.

10.1.2 BASIC OF EMP

The Environmental Management Plan for the proposed project activities is formulated taking into considerations the following key environmental issues.

- Project activities
- Studies on Environmental Impact Assessment
- Air & water pollution control
- Working zone environment improvement
- Occupational hazards & safety
- Environmental monitoring facilities
- Environmental management costs

EMP covers all phases of the project considering the impacts with mitigation measures and monitoring programme. The plan outlines the measures that will be undertaken to ensure compliance with environmental legislations and to minimize adverse impact. Details of EMP measures for implementation in the mine are given below.

Table 10.1 Environmental Management Plan

Environmental Parameter	Mitigation Measures
Air	Wet drilling to suppress the dust emission from drill machine
	Regular water sprinkling on haulage road through fixed water sprinkler.
	2.0 KLD of water will be used for dust suppression.
	Avoiding blasting during high wind period, night times and temperature inversion periods.
	Regular grading of haul road to clear accumulation of loose material.
	It will be ensured that vehicles are properly maintained to comply with exhaust emission requirements
	Maintenance as per operator manual of the equipment and machinery in the mines to minimizing air pollution
	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.
	Afforestation for control of dust.
Surface water	The following water bodies are located in the study area. Odai- 52m (E), Tank – 160 m (NE), Amaravathi River – 2.8km (NW), Shanmugha River – 2.6km (E), Tank – 1.4 km (S), Alangulam – 3.8 km (SE), Tank- 4.5km (NE)
	Surface runoff management structures like garland drain of required length which is connected to a settling pond will be constructed around the quarry to collect the rain water. Monthly or after rainfall, inspection will do to ensure performance of water management structures and systems. There is no discharge of any effluent into nearby water bodies.
Ground Water	The quarrying operation is proposed upto a depth of 67 m below ground level, Water table is found at a depth of 93 m, hence the project will not intersect the Ground water table during entire quarry period.
Water Consumption and Wastewater generation	Water required for this project will be sourced from vendors.
	Domestic wastewater generation of 1.0 KLD will be treated in septic tank with soak pit.
	Conduct ground water and surface water monitoring for parameters

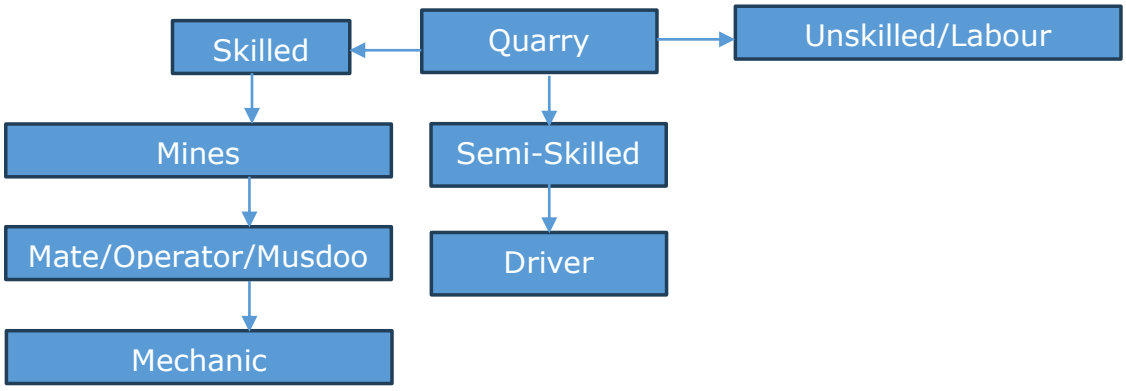
	specified by CPCB
Noise	The workers employed are provided with protection equipment, earmuffs and ear- plugs for the protection from high noise level generated at the mine site wherever required.
	Noise levels are controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes.
	Development of thick greenbelt all along the safety Zone (7.5 m) of the project area to attenuate the noise and the same will be maintained.
	Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation.
	Annual ambient noise level monitoring is 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.
Ground Vibration and Fly Rock Control	Controlled blasting using delay detonators will be carried out to maintain the PPV value well within the prescribed standards of DGMS.
	Drilling and blasting will be carried under the supervision of qualified persons.
	Will be Ensured that blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material.
	To be Undertake noise or vibration monitoring.
Land Environment	At conceptual stage, the mining pits will be converted into Rain Water Harvesting pit. Remaining area will be converted into greenbelt area.
	No external dumping i.e., outside the project area. The entire material will be sold.
	Garland drains with catch pits / settlement traps to be provided all around the project area to prevent run off affecting the surrounding lands.
	The periphery of Project area will be planted with thick plantation to arrest the fugitive dust, which will also act as acoustic barrier.
	Frequent Soil and ground water testing as per Environmental Monitoring Plan.
Top Soil / Overburden	There is no overburden anticipated during the quarrying operation.
Biological Environment	During mining, thick plantation will be carried out on the mentioned safety zone areas.
	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.
	Regular review on green belt development programme.
	Year wise greenbelt development plan mentioned in Chapter III will be monitored.

10.1.3 ADMINISTRATION AND TECHNICAL SETUP

Since this is a very small quarry, the mines in-charge will take care of all environment related aspects. He will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level. The action plan for monitoring consists of monitoring of following environmental components.

- 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.

Fig. 10.1 Organization Chart



1	Skilled	Mines Manager(II Class)	1 No
		Foreman/Mine Mate	2 Nos
		Operator	16 Nos
		Mechanic	1 No
2	Semi-Skilled	Diver	6 Nos
3	Un-skilled	Labours	12 Nos
		Total	**38Nos**

10.1.4 ENVIRONMENTAL POLICY

- The Project Proponent has stipulated a well-defined Environmental policy by which the lessee is committed to conducting business with a strong environmental conscience towards the community, customers, and employees. The Environment policy is given as below.
- The Environment policy of "Rough Stone and Gravel Quarry of M/s. Shri Rajrudhra Minerals Private Limited is that the rules and commitment are driven towards conservation of the environment.
- The lessee is committed to efficient use of natural resources based on the reduce, recycle and reuse method.
- The project is committed to the identification of possible impacts and will take the necessary management steps to mitigate the impacts.
- Environment performance will be regularly monitored and reported for continual improvement of our environment and health performance.

10.1.5 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT

Occupational safety and health are very closely related to productivity and a good employer-employee relationship. The main factors affecting occupational health in quarries are fugitive dust and noise. Safety of employees during quarrying operations and maintenance of mining equipment will be taken care of as per the Mines Act 1952 and Rule 29 of the Mines Rules 1955. To avoid any adverse effect on the health of workers due to dust, noise, and vibration, sufficient measures have been provided. The health status of workers in the mine will be regularly monitored under an occupational surveillance programme. Under this programme, all employees are subjected to a detailed medical examination at the time of employment. Before the induction of employees, a pre-medical checkup is done. In addition, a periodical medical checkup will be done annually for all employees.

10.1.6 COST OF ENVIRONMENTAL CONTROL MEASURES

The effective implementation of EMP is not only reduce pollution load and comply the regulatory requirement but also increase productivity and improve marketability of product. The capital and recurring cost of EMP for the cluster of mines has been given in below table.

Table 10.2 - Environmental Management Plan Budget

Activities	Mitigation Measure	Capital cost	Recurring Cost per Annum
Air Environment	Compaction, gradation and drainage on both sides for Haulage Road	0.28	0.28
	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	10.0	0.25
	Muffle blasting – To control fly rocks during blasting	0.00	0.05
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	1.40	0.28
	No overloading of trucks/tippers/tractors	0.00	0.05
	Stone carrying trucks will be covered by tarpaulin	0.00	0.10
	Enforcing speed limits of 20 km/hr within ML area	0.12	0.01
	Regular monitoring of exhaust fumes as per RTO norms	0.00	0.05
	Regular sweeping and maintenance of approach roads for at least about 200 m from ML Area	0.00	1.11
	Installing wheel wash system near gate of quarry	2.00	0.05

Sub-Total (A)		**13.80**	**2.23**
Noise Environment	Provision for Portable blaster shed	0.30	0.02
Sub-Total (B)		**0.30**	**0.02**
Activities	**Mitigation Measure**	**Capital cost**	**Recurring Cost per Annum**
Waste Management	Provision for domestic waste collection and disposal through authorized agency	0.20	0.10
	Installation of dust bins	0.05	0.02
Sub-Total (C)		**0.25**	**0.12**
Mine Closure	Plantation inside ML area (800 Nos.)	0.82	0.16
Sub-Total (D)		**0.82**	**0.16**
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	0.05	0.01
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	0.00	0.50
	Workers will be provided with Personal Protective Equipment's	0.38	0.04
	Health check up for workers will be provisioned	0.00	0.19
	First Aid facility Provision	0.00	0.06
	Signage & boards for safety precautions	0.05	0.01
	No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	0.56	0.01
	Installation of CCTV cameras in the mines and mine entrance	0.15	0.02
Sub-Total (E)		**1.19**	**0.83**
Grand Total		**16.36**	**3.36**
Total EMP Cost for 5 years is 34.93 lakhs i.e.,16.36 Lakhs of Capital Cost + 18.57 Lakhs of Recurring cost (For 5 Years)			

10.1.7 CONCLUSION

Various aspects of mining activities were considered, and related impacts were evaluated. Considering all the possible ways to mitigate the Environmental concerns, an Environmental Management Plan was prepared, and INR 34.93 lakhs has been allocated for the same. The EMP is dynamic, flexible, and subjected to periodic review. For projects where major environmental impacts are associated, EMP will be under regular review. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP, and the project will have a positive impact on the study area.

CHAPTER 11

SUMMARY& CONCLUSION

11.1 OVER ALL JUSTIFICATION FOR IMPLEMENTATION OF THE PROJECT

INTRODUCTION

M/s. Shri Rajrudhra Minerals Private Limited has obtained Precise Area Communication Letter from Assistant Director, Department of Geology and Mining, Dindigul, vide Rc.No. 589/2025 (Kanimam) dated 28.07.2025, to quarry out 13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years with ultimate depth up to 67 m BGL, located in S.F. No. 381/1 (P) of Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State.

As per EIA notification, 2006 and its subsequent amendments the proposed "Rough Stone and Gravel Quarry of M/s. Shri Rajrudhra Minerals Private Limited, mines cluster falls under Schedule 1(a) of EIA Notification and its subsequent amendments the project comes under Category B1. The ToR for preparation of EIA/EMP report of the project was approved vide ToR Identification No. TO25B0108TN5771345N, (File No – 12577), Dated 25.09.2025. This report has been prepared in line with the approved TOR for production of maximum excavation of 13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years with ultimate depth up to 67 m BGL.

S.No.	Description	Status/Remarks
1.	Sector	1(a), non-coal mining
2.	Category of the project	B1
3.	Proposed mineral	Rough Stone and Gravel
4.	Type of Lease	Fresh Quarry
5.	Extent of the lease	5.57.00 Ha
6.	Proposed depth of Mining	67 m BGL
7.	Method of mining	Opencast Mechanized
8.	Proposed lease period	5 Years
9.	Proposed Environmental Clearance	5 Years
10.	Proposed production quantity for five years	13,10,240 m^3 of Rough Stone and 92,026 m^3 Gravel for the period of 5 years with ultimate depth up to 67 m BGL.

11.1.3 LOCATION

The proposed Quarry lease area is situated at S. F. No. 381/1 (P) of Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State. The area lies in the north **Latitude:** 10°36'48.85"N to 10°37'01.96"N and **Longitude**: 77°28'05.89"E to 77°28'17.36"E with Survey of India Topo Sheet No. 58-F/06. To conduct the study, the proposed mine lease area (core zone) and an impact zone of 10 km radius (called buffer zone) around the proposed mine site were considered. The EIA report is based on three months baseline data (i.e. March 2025 to May 2025)

11.1.2 GEOLOGY

The rock type noticed in the area for lease is Charnockite which contains mostly Quartz and Feldspar with some ferromagnesian minerals. The Charnockite is part of peninsular Gneisses, a high-grade metamorphic rock. The strike of the Charnockite formation is $N50^0W$ –$S50^0E$ with dipping towards $SE60^0$.

11.1.3 PROJECT DESCRIPTION

This is a proposed Rough Stone and Gravel quarry by Opencast Mechanized mining method with drilling and blasting. The quarrying is restricted up to a depth of 67 m below ground level. The geological reserves are estimated to be 35,80,590 m^3 of Rough Stone & 1,10,172 m^3 of Gravel. The mineable reserve calculated by deducting 7.5 m safety distance and bench loss. The mineable reserves are 13,10,240 m^3 of Rough Stone & 92,026 m^3 Gravel which will be recovered at the rate of 100% recovery upto a depth of 67 m Below ground level for the period of five years.

- It is proposed to quarry out rough stone with 5m bench height, 5m width with 45° slope using conventional Open cast Mechanized method. The quarry operation involves shallow jack hammer drilling, slurry blasting, excavation, Loading and transportation of Rough Stone.
- There is no overburden anticipated during entire rough stone quarrying operation.

S.No.	Type of Detail	Description
1	Sector	1(a) Non coal mining
2	Fresh/Existing project	Fresh Quarry
3	Category	B1
4	Nature of mineral	Minor mineral
5	Production	13,10,240 m3 of Rough Stone and 92,026 m3 Gravel for the period of 5 years.
6	Life	5 years
7	Waste generation and management	There is no overburden anticipated during the quarrying operation. Hence, no waste generation.
8	Bench height and width	Height and Width – 5m
9	Ultimate pit depth	67 m (BGL)
10	End use	Rough Stone will be loaded into tippers to needy buyers for producing aggregates, M-sand.

11.1.4 PROJECT REQUIREMENTS

The requirements of the project is given below.7

S.No.	Nature of requirement	Description
1	Water requirement	Total water requirement of 5.0 KLD which will be procured from the outside agencies. Out of 1.5 KLD drinking water requirements, Green belt development is 1.5 KLD and dust suppression is 2.0 KLD.
2	Power requirement	No electricity is needed for mining operations, for office demands, it will be met from the state grid. Total Fuel requirement is 10,63,530 L (Entire Project Life) for entire life of the project**.**
3	Manpower requirement	38 Nos
4	Financial requirement	Rs. 159.35 Lakhs (Including operational + Fixed Asset + EMP cost + CER cost).
5	Funds for Socio economic development	INR 5.0 Lakhs is allocated. In addition, any demand raised by people during public hearing will also be met.

11.1.5 DESCRIPTION OF LEASE AREA

The features in the study area is given below.

<table>
<tr><th colspan="5">Description of the lease area</th></tr>
<tr><th>S.No.</th><th>Areas</th><th colspan="3">Distance from project site</th></tr>
<tr><td>1</td><td>Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value</td><td colspan="3">Nil within 10 km radius</td></tr>
<tr><td>2</td><td colspan="4">Areas which are important or sensitive for ecological reasons</td></tr>
<tr><td>A</td><td>Wetlands, water courses or other water bodies,</td><td colspan="3"><table><tr><td>Water bodies</td><td>Distance</td><td>Direction</td></tr><tr><td>Odai</td><td>52 m</td><td>E</td></tr><tr><td>Tank</td><td>160 m</td><td>NE</td></tr><tr><td>Tank</td><td>1.4 m</td><td>S</td></tr><tr><td>Alangulam Tank</td><td>3.8 km</td><td>SE</td></tr><tr><td>Tank</td><td>4.5 km</td><td>NE</td></tr><tr><td>Amaravathi River</td><td>2.8 km</td><td>NW</td></tr><tr><td>Shanmukha River</td><td>2.6 km</td><td>E</td></tr></table></td></tr>
<tr><td>B</td><td>Coastal zone, biospheres,</td><td colspan="3">Nil within 10km radius</td></tr>
<tr><td>C</td><td>Mountains, forests</td><td colspan="3">Dalavaipattinam R.F. – 6.6 km(N)</td></tr>
<tr><td>3</td><td>Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, overwintering, migration</td><td colspan="3">Nil within 10km radius</td></tr>
<tr><td>4</td><td>Inland, coastal, marine or underground waters</td><td colspan="3">Nil within 10 km radius</td></tr>
<tr><td>5</td><td>State, National boundaries</td><td colspan="3">Nil within 10 km radius</td></tr>
<tr><td>6</td><td>Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas</td><td colspan="3">Nil within 10 km radius</td></tr>
<tr><td>7</td><td>Defense installations</td><td colspan="3">Nil within 10 km radius</td></tr>
<tr><td>8</td><td>Densely populated or built-up area</td><td colspan="3">Palani – 17.00 km - SE</td></tr>
</table>

9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Palani – 17.00 km - SE
10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)	Nil
11	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)	Nil
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earth quakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions) similar effects	No. The area is not prone to earthquakes, floods, etc.

The baseline data collection for meteorology, air, water, noise and soil environments have been carried out during March 2025 to May 2025.

Air, water, noise and soil samples are collected and analyzed through NABL accredited lab.

11.2 EXPLANATION OF HOW ADVERSE EFFECTS HAVE BEEN MITIGATED

11.2.1 AIR ENVIRONMENT

The air monitoring have been carried out in 7 locations and the results are given below.

Details Of Ambient Air Quality Monitoring Locations				
S. No.	**Station Code**	**Locations**	**Distance & Direction**	**Coordinates**
1	AAQ 1	Project site	Core Zone	10°36'55.79"N & 77°28'11.63"E
2	AAQ 2	Panampatty	1.90 km (SW)	10°35'38.89"N & 77°27'19.75"E
3	AAQ 3	Kottathurai	1.21 km (NE)	10°37'11.27"N & 77°28'26.86"E
4	AAQ 4	Melkaraipatty	1.74 km (SE)	10°35'52.90"N & 77°28'24.56"E
5	AAQ 5	Keeranur	3.98 km (SE)	10°35'49.56"N & 77°29'53.13"E
6	AAQ6	Rajampatti	1.52 km (W)	10°37'10.21"N & 77°26'52.67"E
7	AAQ7	Bommanallur	6.18 km (E)	10°36'43.79"N & 77°31'22.60"E

Station ID	Min	Max	Avg.
Particulate matter PM-$_{2.5}$ (µg/m^3)			
AAQ-1	25.5	37.1	31.8
AAQ-2	24.8	32.6	27.9
AAQ-3	22.4	27.6	24.4
AAQ-4	19.7	29.2	24.1
AAQ-5	23.3	31.4	26.8
AAQ-6	24.3	29.5	26.3
AAQ-7	20.5	25.7	22.5
CPCB NAAQS 2009 for PM $_{2.5}$ - 60 µg/m^3			
Particulate matter PM-$_{10}$ (µg/m^3)			
AAQ-1	55.6	80.4	69.0
AAQ-2	52.8	69.4	59.4
AAQ-3	48.6	59.9	53.1
AAQ-4	42.8	59.4	51.8
AAQ-5	50.8	68.4	58.3
AAQ-6	52.8	64.1	57.3
AAQ-7	44.4	55.7	48.9
CPCB NAAQS 2009 for PM $_{10}$ - 100 µg/m^3			
Sulphur Di-oxide as SO_2 (µg/m^3)			
AAQ-1	6.4	9.3	7.5
AAQ-2	4.9	7.2	6.0
AAQ-3	4.6	6.6	5.7
AAQ-4	4.4	6.7	5.5
AAQ-5	5.7	7.7	6.7
AAQ-6	5.5	7.5	6.6
AAQ-7	4.8	6.8	5.9
CPCB NAAQS 2009 for SO_2 – 80 µg/m^3			
Oxide of Nitrogen as NO_2 (µg/m^3)			
AAQ-1	10.4	15.1	12.4
AAQ-2	7.1	10.2	8.8
AAQ-3	6.7	9.9	8.3
AAQ-4	6.0	8.3	7.2
AAQ-5	9.4	11.4	10.5
AAQ-6	9.7	12.9	11.3
AAQ-7	7.7	10.9	9.3
CPCB NAAQS 2009 for NO_2 – 80 µg/m^3			

All the values of pollutant concentrations were found to be within the NAAQs Standards.

11.2.2 WATER ENVIRONMENT

Surface Water Analysis Results

Sr.No	Parameter	Unit	SW1	SW2	Surface water standard s (IS 2296 Class-A)
1	Odour	-	Agreeable	Agreeable	-
2	Turbidity	NTU	<1.0	<1.0	1
3	pH at 25 °C	-	7.90	7.82	6.5-8.5
4	Electrical Conductivity	µs/cm	228	194	-
5	Total Dissolved Solids	mg/l	138	116	500
6	Total hardness as CaCO3	mg/l	80.2	75	-
7	Calcium as Ca	mg/l	16.1	15.4	300
8	Magnesium as Mg	mg/l	9.6	8.8	-
9	Calcium as CaCO3	mg/l	40.3	38.4	-
10	Magnesium as CaCO3	mg/l	39.9	36.8	-
11	Total alkalinity as CaCO3	mg/l	42.8	36.7	-
12	Chloride as Cl-	mg/l	30.6	35.2	250
13	Free Residual chlorine as Cl-	mg/l	BDL (D.L - 0.2)	BDL (D.L - 0.2)	-
14	Sulphates as SO42-	mg/l	14.9	15.2	400
15	Iron as Fe	mg/l	BDL(D.L - 0.01)	BDL(D.L - 0.01)	0.3
16	Nitrate as NO3	mg/l	BDL(DL-1.0)	1.65	20
17	Fluoride as F	mg/l	0.26	0.21	1.5
18	Manganese as Mn	mg/l	BDL (D.L - 0.05)	BDL(D.L-0.05)	0.5
19	COD	mg/l	BDL (D.L - 4.0)	BDL (D.L - 4.0)	-
20	BOD	mg/l	BDL (D.L - 2.0)	BDL (D.L - 2.0)	-
21	TSS	mg/l	BDL(DL-2.0)	BDL(DL-2.0)	-
22	DO	Mg/l	6.3	6.2	6.0

Ground Water Quality Data

parameter	GW1	GW2	GW3	GW4	GW5	GW6	GW7	**Specification/Limit (As per IS:10500: 2012)**	
								Acceptable	**Permissible Limits**
Odour	agreeable	agreeable	agreeable	agreeable	agreeable	agreeable	agreeable	**Agreeable**	**Agreeable**
Turbidity	<1	<1	<1	<1	<1	<1	<1	1	**5**
pH at 25 °C	7.29	7.75	7.26	7.39	7.25	7.99	7.42	**6.5- 8.5**	No relaxation
Electrical Conductivity	1096	1020	1334	1422	920.2	735.8	846.9	**-**	**-**
Total Dissolved Solids	658	612	800	854	552	442	510	500	**2000**
Total hardness as $CaCO_3$	338	172	575	482	387	214	282	200	**600**
Calcium as Ca	82.4	43.2	132	108	106	48.4	72.0	75.0	**200**
Magnesium as Mg	31.7	15.4	58.8	50.9	29.0	22.3	24.5	30.0	**100**
Calcium as $CaCO_3$	206	108	330	270	266	121	180	**-**	**-**
Magnesium as $CaCO_3$	132	64.0	245	212	121	93.0	102	**-**	**-**
Total alkalinity as $CaCO_3$	449	176	382	438	284	201	234	200	**600**
Chloride as Cl^-	125	374	255	211	146	138	155	250	**1000**
Free Residual chlorine as Cl^-	BDL (D.L - 0.2)	BDL(D.L-0.2)	BDL(D.L-0.2)	BDL (D.L-0.2)	BDL(D.L-0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	0.2	**1**
Sulphates as SO_4^{2-}	149	76.5	104	155	33.2	53.6	57.9	200	**400**
Iron as Fe	BDL(D.L - 0.01)	BDL(D.L - 0.01)	BDL(D.L - 0.01)	BDL(D.L - 0.01)	BDL(D.L - 0.01)	0.06	0.07	0.30	**0.3**
Nitrate as NO_3	3.59	1.66	3.05	2.57	2.96	1.45	2.77	45	**45**
Fluoride as F	0.36	0.32	0.48	0.39	0.34	0.49	0.44	1	**1.5**
Manganese as Mn	BDL (D.L - 0.05)	BDL(D.L-0.05)	BDL(D.L-0.05)	BDL(D.L-0.05)	BDL(D.L-0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	1	**0.3**

All the values were found to be within permissible limits

11.2.3 NOISE ENVIRONMENT

Noise levels were measured in 7 locations and the results are given below.

Noise monitoring results					
S. No	**Location**	**Day equivalent**	**Night equivalent**	**Day equivalent limits by CPCB**	**Night equivalent limits by CPCB**
1	Project site	47.3	40.5	75	70
2	Panampatty	45.7	39.8	55	45
3	Kottathurai	43.6	40.5		
4	Melkaraipatty	46.5	41.0		
5	Keeranur	51.3	42.2		
6	Rajampatti	47.7	42.5		
7	Bommanallur	50.0	42.0		

11.2.4 SOIL ENVIRONMENT

Soil samples are collected from 7 locations and the results are given below.

S.No	Parameter	Unit	S1	S2	S3	S4	S5	S6	S7
1	pH at 25 °C	-	7.89	6.52	6.97	7.05	7.12	6.78	6.99
2	Electrical Conductivity	µmhos/ cm	110	75.62	152	90.47	165	89.74	95.47
3	Dry matter content	%	90.33	94.65	94.72	95.74	94.21	95.66	94.23
4	Water Content	%	9.67	5.35	5.28	4.26	5.79	4.34	5.77
5	Organic Matter	%	0.66	1.33	1.21	0.94	1.24	1.05	1.33
6	Soil texture	-	SILT LOAM	silty clay	silty clay loam	silt loam	silty clay loam	silt loam	loam
7	Grain Size Distribution i. Sand	%	26.59	8.92	13.55	24.74	13.69	29.21	34.52
8	ii. Silt	%	58.69	47.46	47.52	68.72	48.21	53.64	50.33
9	iii. Clay	%	14.72	43.62	38.93	6.54	38.10	17.15	15.15
10	Phosphorous as P	mg/kg	0.95	1.72	2.31	1.74	1.89	1.77	1.34
11	Sodium as Na	mg/kg	772	432	725	597	705	375	402
12	Potassium as K	mg/kg	524	662	895	794	870	712	616
13	Nitrogen and Nitregenous Compounds	mg/kg	348	269	288	642	321	230	450
14	Total Soluble Sulphate	%	BDL(D.L. 0.02)	BDL(D.L. 0.02)	BDL(D.L .0.02)	BDL(D. L.0.02)	BDL(D. L.0.02)	BDL(D .L.0.02)	BDL(D .L.0.02)
15	Porosity	%	19.6	18.5	19.4	18.3	19.2	19.6	19.8
16	Water Holding Cabacity	Inches/ foot	42	40	42	40	42	40	42

11.2.5 BIOLOGICAL ENVIRONMENT

FLORA

For measuring the extent of flora present in the study area, the area is divided in to 4 quadrants. The flora population in each quadrant is summed up for the total population in the study area. Field survey is done. Erukku, Aavarai and Nayuruvi are found in lease area. In the buffer zone, common trees like Neem, papaya, mango, teak, etc and shrubs like Avarai, Aloe vera, etc, climbers like Kovai,jasmine etc are found.

FAUNA

In the study area, commonly found animals like dogs, cats, bush rat, cows, birds like crow, Myna, Sparrow, etc were found.

11.2.6 LAND USE

The land use land cover data is found using the LANDSAT – 9 satellite imagery. The number of bands used are 11. The land use pattern is given below:

Sl.No.	LAND USE / LAND COVER	Area in Sq.Km	Area in Percentage
1	Built-up land	5.37	1.66
3	Crop land	154.59	47.72
4	Existing mining area	1.48	0.46
5	Fallow land	4.62	1.43
6	Land with scrub	3.12	0.96
7	Land without scrub	95.4	29.45
	Plantation	52.05	16.07
8	Water bodies	7.33	2.26
	Total Area	**332.16**	**100.00**

11.2.7 SOCIO ECONOMIC ENVIRONMENT

The socio economic environment of the study area is studied by conducting primary sites through site visits and conducting sample surveys. The secondary data obtained from Census 2011 is also used.

The following data area collected from secondary data.

- Demographic pattern.
- Health pattern
- Occupational structure.
- Amenities available.

The expert visited 6 villages in the study area namely Panampatty, Kottathurai, Melkaraipatty, Keeranur, Rajampatti and Bommanallur Villages. Discussions were held with the people from nearby locality to study the social and economic conditions prevailing in the area. The expert also visited nearby hospitals and primary health centres.

11.2.8 HYDROGEOLOGY OF THE LEASE AREA

In Dindugal District, during the pre monsoon, the water level generally in declining trend ranges from G.L. to 15m. The depth of well below Ground Level 12.0m are become dry during hot season like May, June, July. In the post monsoon, the water level generally in upward trend due to rainfall and it may reach the Ground Level also. Dindugul district is almost made up of hard rock covered by thin soil.

There are many tanks located in the study area, which are mostly dry throughout the year. These tanks get water only during monsoons. The factors may be monsoon failure, insufficient rainfall, poor rain water management and water consuming patterns.

11.2.9 GROUND WATER STUDY

For Ground water study, satellite imagery is used. Water levels from monitoring levels are collected through imaging. The pre-monsoon and post-monsoon data are collected and the results are analyzed.

During field visit, it is observed that water is available in wells only after monsoon. The yield is obtained at deep levels only.

As far as the mining lease area is considered, the area is rocky and no major seepage is envisaged. The depth proposed is 67 m BGL. Hence, there will not be any major impact due to mining on water levels or ground water levels in the area.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental impacts on the following environments are identified.

- Land environment
- Water environment
- Vegetation
- Fauna
- Air environment
- Noise environment
- Socio-economic impacts

11.2.10 LAND ENVIRONMENT: IMPACT AND MITIGATION MEASURES

The major impact due to this project on land environment is the change in land use. Since this quarry is a small one and the production is less, mining activity will be carried out upto 67 m BGL. Other than quarrying of minerals, no other change will be done since there is no dumping. To prevent soil erosion during monsoon season, garland drain will be constructed with silt traps. At the mine closure stage, 4.72.50 Ha of lease area will be left as rain water harvesting pond. 0.81.50 Ha will be developed with green belt. For this, plants like Pongamia pinnata, Syzigium cumini, Albizia lebbeck, Thespesia populnea, Bauhinia racemose, Cassia siamea, Azadirachta indiaca are selected. A total of 820 trees are planned to be planted. Spacing will be 3m x 3m.

11.2.11 WATER ENVIRONMENT: IMPACT AND MITIGATION MEASURES

There is no water body present inside the lease area. The entire water requirement for the project is 5.0 KLD which will be sourced from outside agencies. Negligible sewage will be generated, for which a septic tank with soak pit will be set up.

During monsoon season, the excess rain water, if any, will be led through garland drain of 0.6m width and 0.3 m depth to the collection pond with silt traps.

Since the mining operation will be limited upto depth of 67 m (BGL), there will not be any seepage. However, the rain water percolation and collection of water from seepage shall be less than 300lpm and it shall be pumped out periodically by a stand by diesel powered Centrifugal pump motivated with 7.5H.P. Motor. The quality of water is expected to be potable. Hence, water stored in the quarry pit will be pumped into the adjacent agricultural fields. Further the water can also be used for plantation purposes

The major water bodies found in the buffer zone are.

Water bodies	Distance	Direction
Odai	52 m	E
Tank	160 m	NE
Tank	1.4 m	S
Alangulam Tank	3.8 km	SE
Tank	4.5 km	NE
Amaravathi River	2.8 km	NW
Shanmukha River	2.6 km	E

Since these water bodies are located outside the lease area and there is no discharge of effluent or any untreated water from the mines will be made in to these water bodies, there is no major impact. The proponent will restrict the mining operation only within the lease and no other work will be carried out near the tank or any area outside the lease.

It is planned to carryout appropriate rainwater harvesting schemes and artificial recharge schemes in the area.

- Rain water falling in the quarry will be collected efficiently through garland drains.
- Water thus collected will be passed through collection tank with silt traps. This water can be used by the proponent for water sprinkling and for green belt purposes.
- Excess water after desiltation will be provided to downstream users, if any

11.2.12 BIOLOGICAL ENVIRONMENT: IMPACT AND MITIGATION MEASURES

Impacts

- Fauna is affected due to noise and vibration.
- Dust generation due to mining activities
- Change in land use of the lease area
- Accidental falling of animals

Mitigation measures

- Sirens will be blown before blasting in the mines. To reduce noise levels, plantation will be done. Blasting will be carried out only in the allotted time.
- To reduce dust generation, mist sprayers will be used. During transportation, the material will be covered with tarpaulin. Water sprinkling will be done to reduce generation of pollutants
- After the mine closure stage, the mine pit will be left as rain water collecting tank, which can attract bird population in the nearby areas.
- To prevent entry of animals, the mining area will be properly fenced.

11.2.13 AIR ENVIRONMENT: IMPACT AND MITIGATION MEASURES

The major air pollutants due to mining operations are fugitive emissions like PM_{10}, $PM_{2.5}$. Other than these pollutants, gaseous emissions of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are the cause of air pollution in the project area.

The major impacts are Dust emission due to drilling, blasting and transportation. The major mitigation measures include Using Wet drilling methods, Allowing drilling only with PPE, Carrying out blasting only during specified times, Avoiding blasting during unfavourable weather conditions, Using explosives of good quality, Using mist sprayers Regular wetting of transport, Covering the materials carried in tippers with tarpaulin, Proper maintenance of vehicles used for transportation, Conducting regular emission tests for vehicles used for transport Development of greenbelt is proposed in the safety zone 7.5m barriers in the lease area.

The anticipated data is calculated using AERMOD software and the projected values are found to be within limits.

11.2.14 NOISE ENVIRONMENT: IMPACT AND MITIGATION MEASURES

Impacts

- Noise generation in mining is due to operation like drilling, blasting and transportation of minerals within and outside the lease area.
- As per DGMS (Directorate General of Mines Safety) and OSHA (Occupational Safety and Health Administration) limits, the acceptable noise level is 85 dB(A) for an exposure period of 8 hours.
- Exposure to loud noise can also cause high blood pressure, heart disease, sleep disturbances, and stress. Noise pollution also impacts the health and well-being of wildlife.
- Noise exceeding prescribed limits may cause impairment like abnormal loudness perception, tinnitus, which causes a persistent high-pitched ringing in the ears, paracusis or distorted hearing

Mitigation measures

- As the distance between the source and receptor increases, the noise level also decreases. Hence, there will be a natural attenuation
- The proposed has planned to develop green belt in the periphery of the lease area, which diminishes sound volume by dampening them.
- All the equipment/machinery/trucks involved will be properly maintained to control noise generation
- Conducting regular health checkups for employees involved
- Employees will be made to work on shifts to reduce their exposure time
- Providing earplugs to all employees

By adopting these measures, the noise levels will be maintained well within MoEF & CC limits since the baseline value is low.

11.2.15 VIBRATION: IMPACT AND MITIGATION MEASURES

Impacts

- Though vibration will be only felt by the people working inside the lease area, it is usually undesired.
- Vibration may also cause fly rocks
- It may frighten the birds and small insects in the lease area. However, it will be felt only for a short period

Mitigation measures

- Carrying out blasting on limited scale, only from 12:00 PM to 2:00 PM
- Control of fly rock and vibration by maintaining peak particle velocity with in standard as prescribed by the DGMS and MOEF & CC.
- Shallow depths jackhammer drilling and blasting is proposed to be carried out with minimum use of explosive
- Supervising blasting by competent and statutory foreman/ mines manager

11.2.16 SOCIO ECONOMIC ENVIRONMENT

Impact and Mitigation measures

No land is acquired from anyone. No rehabilitation is needed. Hence, there is no negative impact. The proponent has planned to spend INR 5,00,000 for CER activities. This amount will be subjected to change after public hearing.

11.2.17 OCCUPATIONAL HEALTH

Impacts

Dust generation due to drilling and blasting, Noise generation due to drilling and blasting, unexpected accidents. Continuous exposure to dust causes Pneumonia, Tuberculosis, Rhematic arthritis and Segmental Vibration, Short term impact will be lack of sleep, high blood pressure and heart ailments. Long term exposure may lead to partial or permanent deafness, Risks include fly rocks, cracks or fissures due to improper mining methods

Mitigation measures

- Using dust suppression measures like water spraying on roads to reduce rise of air pollutants
- Providing green belt for air pollutant and noise attenuation
- Ensuring slope stability
- Employing only trained professionals for blasting
- Conducting Pre-Medical Examination for employees before inducting
- Conducting periodical Medical Examination once in 6 months.
- Making all first aid kits available in mines office
- Keeping fire extinguisher in place
- Educating the employees about how to handle unexpected happenings
- Posting information containing emergency contact numbers in mines office
- By adopting all these measures, the safety of the employees working in the quarry will be ensured.

11.2.18 ENVIRONMENTAL MONITORING PROGRAMME

Monitoring is done to measure the efficiency of control measures implemented. Regular monitoring of various environmental parameters like air, water, noise and soil environments is needed to assess the status of environment during the project operation. A schedule is framed with timeline to monitor various parameters during the operation of the project. To evaluate the effectiveness of environmental management programme, regular monitoring of the important environmental parameters will be taken up. Air monitoring will be carried out once in 3 months, water sample will be collected once in a season, noise will be monitored once in 3 months, soil samples will be analyzed once per season. For EMP, a budget of INR 34.93 lakhs is allocated.

11.2.19 PROJECT BENEFITS

Financial benefits

- This project will contribute financially through payment of taxes like royalty, GST, etc
- The project will also contribute via CSR.
- The demands of people during public hearing will also be considered by the project proponent

Social benefits

- This project provides employment to 38 people. Local people will be hired for unskilled labour.
- Through CSR, nearby schools, hospitals will be benefitted.
- For CSR, INR 5,00,000 is allocated.
- Based on the demand of the people during public hearing, further funds will be allocated, if necessary.

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 34.93 lakhs for the five years has been allocated as EMP cost. 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. 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.

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CHAPTER 12

DISCLOSURE OF CONSULTANTS

Global Mining Solutions is a NABET Accredited EIA consultant as per NABET certificate NABET/EIA/23-26/SA 0241. The registered office of Global Mining Solutions is at Plot No.6, S.F.No.13/2 A2, VS City, RC Chettypatty, Kottamettupatty, Omalur, Salem, Tamilnadu-636455.

Declaration by Experts contributing to the proposed proposed Rough Stone and Gravel quarry over a lease extent of 5.57.00 Ha., & Cluster extent of 24.39.00Ha.., located at Melkaraipatti Village, Palani Taluk, Dindigul District, Tamil Nadu State.

I, hereby, certify that I was a part of the EIA team that developed the above EIA.

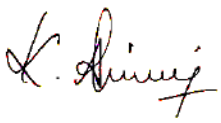
EIA Coordinator Name: M. Manikandan

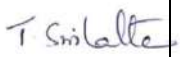
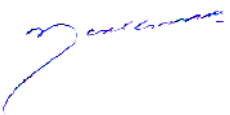
Signature & Date

Period of involvement: March 2025 to May 2025.

Contact information:

M/s Global Mining Solutions
Plot No.6, SF No. 13/2, A2, VS City, RC Chettypatty,
Kottamettupatty, Omalur,
Salem, Tamil Nadu – 636 455

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and Date
1	AP	Dhanalakshmi Ramanathan	Assessment of existing air quality, Impact of the project on ambient air and suggested mitigation measures for air pollution. Period: March 2025 to May 2025.	
2	WP	Abirami Kaliaperumal	Assessment of existing water quality, impact of the project on surface and ground water quality, suggested mitigation measures for minimizing the impact. Period: March 2025 to May 2025	
3	SHW	Ramadoss N	Assessment of waste generated from the project, suggested waste management practices. Period: March 2025 to May 2025	
4	SE	Sarasvathy K	Baseline SE studies. Data compilation and assessment. Impact of the project on SE status of the area. Formulation of CER plan. Period: March 2025 to May 2025	
5	EB	Saravanan S	Baseline data collection of related to ecology of the area. Period: March 2025 to May 2025	
6	HG	Ravinthiran N	Hydrogeological feature of the area. Ground water depth and impact of project on ground water of the area. Period: March 2025 to May 2025	

7	*AQ*	*Srilatha Thiruveedhula*	*Air quality modeling utilizing the area source model. Predication of the ground level concentration of the dust. Suggesting suitable mitigation measures.* *Period: March 2025 to May 2025*	
8	*NV*	*Dhanalakshmi Ramanathan*	*Ambient noise study of the area. Incremental noise generation due to quarry operation and impact of the noise due to the project.* *Period: March 2025 to May 2025*	
9	*LU*	*Srilatha Thiruveedhula*	*Preparation of land use map based on satellite imagery. Land use classification and analysis. Impact prediction of the project on the surrounding land environment.* *Period: March 2025 to May 2025*	
10	*RH*	*S.V. Prashant*	*Identification of the Risk related to the mining activities. Preparation of emergency disaster management plan. Plan for supply of safety equipment for the worker.* *Period: March 2024 to May 2024*	
11	*SC*	*Shisupal Sing*	*Soil monitoring, secondary data collection on soil type, soil management practices, utilization of topsoil.* *Period: March 2025 to May 2025*	
12	*GEO*	*Valliappan Meyyappan*	*Geological map, stability of quarry and dump, management plan for mine stability, after use of mining quarry and geological feature of the area.* *Period: March 2025 to May 2025*	

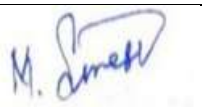
TM- EC

S. No	*Name of TM (EC)*	*Sector (s) proposed*	*Approved (to work under)*	*Period of involvement*	*Type of work*	*Signature*
1.	Abirami Kaliyaperumal	*1(a)*	*Manikandan Manickam*	*Period: March to May 2025.*	*Associated with EIA Coordinator in overall preparation of Draft EIA/EMP report.*	

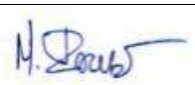
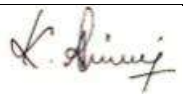
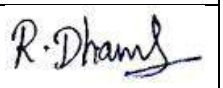
TM- FAE:

S. No	**Name of TM (FAE)**	**Functional Area**	**Approved FAE (to work under)**	**Period of involvement**	**Type of work**	**Signature**
1	Kamaraj S	HG	Ashok Kumar Rajagopal	*Period: March to May 2025.*	Associated with Experts in studying hydrogeological pattern of study area, Studying ground water and the impact of the project on ground water	
2	B.J.Sampatkkumar	SE	Saraswathy K	*Period: March to May 2025.*	Assisted by the Expert in preparation of socio-economic report.	
		SC	Shishupal Singh	*Period: March to May 2025.*	Assisted by the Expert in interpretation of soil sampling	

					and their quality involved in the project.	
3	Mownica Balaji	NV	Dhanalakshmi Ramanathan	*Period: March to May 2025.*	Associated with the expert team in suggesting control measures for noise and Ground Vibration.	Mownica.
		AP	Dhanalakshmi Ramanathan		Associated with expert team in assessing existing air quality, impact of the project on ambient air and suggesting mitigation measures for air pollution	
4	Balasubramani G	NV	Dhanalakshmi Ramanathan	*Period: March to May 2025.*	Associated with the expert in selection of base line monitoring stations, Review of Noise quality results, Review of emission sources – drilling, blasting, excavation and transportation, Identification of impacts on	

					environment, identification of remedial measures and input to EIA preparation	
		Geo	Valliappan Meyyappan		Associated with the expert in preparing Geological map.	
5	Suresh Mani	LU	Srilatha Thiruveedhula	*Period: March to May 2025.*	Associated with Experts in preparing Land use map based on satellite imagery, Land use classification and analysis, Impact prediction on surrounding land environment.	
		HG	Ashok Kumar Rajagopal		Associated with Experts in studying hydro-geology pattern of study area, studying water and the impact of the project on ground water.	
6	Asan Ali S	NV	Srilatha Thiruveedhula	*Period: March to May 2025.*	Associated with the expert in monitoring and analysis of blast induced ground vibration in	

					order to develop the site-specific equation for its prediction, monitoring of fly rocks & air blast (noise), preparation of SOP's for the safety blasting practice in the mines.	
		Geo	Valliappan Meyyappan		Associated with the Qualified Person & Experts in preparing Geological map, assessing stability of quarry slope faces and dump, management plan for mine stability and after use of mining quarry and geological features of the area during mine plan preparation.	S. Asan ali

7	Prabu M	Geo	Valliappan Meyyappan	*Period: March to May 2025.*	Associated with Experts and involved in Field Investigations, Mapping /Geo-referencing	
8	Abirami Kaliyaperumal	RH	S V Prashant	*Period: March to May 2025.*	Associated with experts and involved in the identification risk and hazard, suggesting safeguard measures.	
9	Dhanalakshmi Ramanathan	AQ	Srilatha Thiruveedhula	*Period: March to May 2025*	Involved with Expert team and involved in calculating air emission values using Meteorological data and Providing inputs for running modelling (ISCT3, AERMOD).	
10	Manikandan Manickam	AP	Ramadoss N	*Period: March to May 2025.*	Associated with expert team in assessing existing air quality, impact of the project on ambient air and suggesting mitigation measures for air pollution	

		WP	Abirami Kaliyaperumal		Involved in the identification of source of water and waste generation, suggesting treatment for safe disposal of wastewater	