EXECUTIVE SUMMARY OF EIA DRAFT

FOR

SIRUTHAMUR ROUGH STONE AND GRAVEL QUARRY

Environmental Clearance under EIA Notification – 2006

"B1" CATEGORY – MINOR MINERAL – CLUSTER – NONFOREST LAND

CLUSTER EXTENT = 20.27.5 hectares

At

Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, TamilNadu.

ToR issued vide Lr. No. SEIAA-TN/F. No. 8904/SEAC/ToR-1126/2021,

Dated:23.03.2022

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F. Nos.
Thiru. N. Kanniyappan, **S/o. Narayanapillai,** **No.55, Mariyamman Kovil,** **Aanampakkam Post,** **Neerkundram, Uthiramerur Taluk,** **Kancheepuram District-603107.**	**3.11.50 hectares** **&** **277/1A, 277/1B, 277/1C, 277/1D, 277/1E, 277/1** **277/2 & 280/2**

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

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Oddapatti, Collectorate Post office,
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NABET ACC. NO: NABET/EIA/2124/SA 0184

Valid till: Dec 31, 2023

ENVIRONMENTAL LAB

ACCURACY ANALABS LABORATORY

NABL Accredited & Recognised Laboratory

Baseline Study Period – March - May, 2022

APRIL-2023

CHAPTER I

INTRODUCTION

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 projects.

As the proposed rough stone mining project, known as P1 falls within the 500m radius cluster of quarries with the total extent of >5 hectares, it is classified under category "B1" and requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The cluster with the extent of 20.27.5 ha contains 5 proposed projects, known as P1, P2, P3, P4 and P5 one existing project, known as E1. The cluster area was calculated as per MoEF & CC Notification S.O. 2269(E) dated 1st July 2016. This EIA report has been prepared by considering the cumulative load of two proposed quarries in a cluster in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, and Tamil Nadu State.

This EIA draft discusses the cumulative impacts of Kancheepuram proposed projects in a cluster on the environment and provides a detailed Environmental Management Plan (EMP) to minimize the adverse impacts of those projects situated in a cluster with the total extent of 20.27.5 ha in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District and Tamil Nadu State. It has been prepared in compliance with ToR issued vide letter no. SEIAA-TN/F.No.8904/ToR-1126/2021 dated 23.03.2022, for the proposed project by conducting the baseline monitoring study during the period of April to June 2022.

Details of the project proponent and the list of quarries within the cluster of 500 m radius have been provided in Tables 1.1 and 1.2, respectively.

Table 1.1 Details of Project Proponent

Name of the Project Proponent	Thiru.N. Kanniyyappan
Address	S/o. Narayanapillai No,55, Mariyamman Koil Street, Neerkundram Village,Aanampakkam Post, Uthiramerur Taluk, Kancheepuram District
Status	Proprietor

Table 1.2 List of Quarries within 500 Meter Radius

Proposed Quarries					
ID	**Name of the Owner**	**Name of the Village, and Taluk, & S.F. Nos.**	**Extent in (ha)**	**Status**	**Remarks**
P1.	**N. Kanniyappan ,** S/o. Narayanapillai, No.55, Mariyamman Koil Street, Neerkundram Village, Aamambakkam Post,· Salavakkam Via, Uthiramerur Taluk, Kancheepuram.	Sirudhamur Village, Uthiramerur Taluk 277/1A,277/1C, 277/1E,277/1F, 277/2, 280/2,277/1B,277/1D	3.11.50	Applied area	-
P2.	**M.S. Blue Stones,** No.192, 1st Floor, Ambattur Plots, Red Hills Road, Ambattur, Chennai - 600 053.	Sirudhamur Village, Uthiramerur Taluk 167/1 (Part-1) Govt. Land	3.00.00	Under Processing	-
P3.	**V. Sekar,** S/o. Vadivel, No.28&29, S 1 Dream Homes, Dr. K.V.K. Nagar, Selaiyur, Chennai - 600 073.	Sirudhamur Village, Uthiramerur Taluk 167 /1 (Part-2) Govt. Land	3.00.00	Under Processing	-
P4.	**Thiru..S.Hemaprasath,** S/o. G. Shanmugavel (late), No.97, Rajaveethi, Walajabad Taluk, Kancheepuram District.	Sirudhamur Village, Uthiramerur Taluk 170/2170/3,170/4,236/lB,236/lC,236/lD and 220/l A 1 P	4.88.00	Under Processing	-
P5	**S. Rajendiran,** S/o. Sevugaperumal, No.2/4, Jothi Nagar Main Road, Ekkattuthangal, Chennai - 32.	Sirudhamur Village, Uthiramerur Taluk 275/lB,275/2A,238/l,238/lC,238/l D.	3.35.50	Under Processing	-
		Total	**17.35.00**		

Existing Quarries					
SL .No.	**Name of the Owner**	**Name of the Village, and Taluk, & S.F. Nos.**	**Extent (ha)**	**Lease Period**	
E1.	**R. Selvendrakumar,** S/o.Rajendiran, No.2/4, Jothinagar main road, Ekkattuthangal, Chennai -32	Sirudhamur Village, Uthiramerur Taluk 308/1,2,3A,3B,3C, 3D,3E,3F,5,6,7A, 7B,8,9,10A,10B, 10C,11.	2.92.50	08.11.2018 To 07.11.2023	-
		Total	**2.92.50**		
Abandoned Quarries					
Sl. No.	**Name of the Owner**	**Name of the Village, and Taluk, & S.F. Nos.**	**Extent (ha)**	**Lease Period**	
EX 1.	**M/s. NAPC Mines &** Ores Pvt. Ltd., Khivraj Complex- II, 480, Anna Salai, Nandhanam, Chennai -35.	Sirudhamur Village, Uthiramerur Taluk 171/18 (Govt. Land)	2.00.0	04.06.2009 To 03.06.2014 Lease Expired	-
		Total Cluster Extent	**20.27.50**		

Source: i). AD Letter – Rc.No.257/Q3/2020 dated 30.09.2021

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

CHAPTER II

PROJECT DESCRIPTION

2.0 INTRODUCTION

The proposed project is rough stone and gravel quarrying project. The quarrying operation will be carried out by the opencast mining method involving drilling and blasting for splitting the massive rock, and excavators for loading the fragmented rocks. Details about the proposed projects have been given in Table 2.1.

Table 2.1 Brief Description of the Project

Name of the Quarry	**Thiru. N. Kanniyappan Rough Stone & Gravel Quarry**	
Toposheet No	57- P/14	
Latitude	12°43'17.34"N to 12°43'25.86"N	
Longitude	79°51'33.42"E to 79°51'40.03"E	
Highest Elevation	57m AMSL	
Proposed Depth of Mining five years period	25m BGL (2m Gravel +23mRoughstone	
Geological Resources	**Rough Stone in m^3**	**Gravel m^3**
	13,36784	62,176
Minable Reserves	6,10,354	50,456
Five-year Production	4,37,744	50,456
Existing Pit Dimension	-	
Ultimate Pit Dimension	158m (L) x 136m (W) x 25m (D)	
Water Level in the surrounding area	50-55m BGL	
Method of Mining	Opencast Semi Mechanized Mining involving drilling and blasting	
Topography	The applied lease area is exhibits plain with altitude of 57m maximum and minimum of 55m from the MSL. The area is sloping towards Southwestern side covered clayey soil with Rough Stone which does not sustain any type of vegetation.	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Excavator	1
	Tippers	4
Blasting Method	Controlled blasting method by shot hole drilling and small dia. of 25mm slurry explosives are proposed to be used for shattering and heaping effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Project Cost	Rs. 69,50,000/-	
CER Cost @ 2% of Project Cost	Rs. 1,39,000/-	
Proposed Water Requirement	3.8 KLD	
Nearest Habitation	0.350 km South	

2.1 LOCATION OF THE PROJECT

The proposed project falls in Siruthamur Village, Uthiramerur Taluk and Kancheepuram District. The project area is located about 21 km Southwest of Kancheepuram, 21km Southwest of Uthiramerur and 1 km Northeast of Village. Boundary coordinates of corner pillars of the project site and accessibility details of accessibility to the project site have been given in Tables 2.2 and 2.3, respectively. The lease area of the project site boundary coordinates of corner pillars has been overlaid on Google earth image (Figure 2.1) and the overall view of the cluster quarries has been shown in Figure 2.2.

Table 2.2 Geographic Coordinates of Corner Pillars

Pillar ID	Latitude	Longitude	Pillar ID	Latitude	Longitude
1	12°43'22.95"N	79°51'40.03"E	9	12°43'23.86"N	79°51'35.71"E
2	12°43'20.90"N	79°51'39.52"E	10	12°43'23.88"N	79°51'35.89"E
3	12°43'18.42"N	79°51'39.05"E	11	12°43'25.86"N	79°51'36.72"E
4	12°43'18.21"N	79°51'36.50"E	12	12°43'25.77"N	79°51'37.36"E
5	12°43'17.41"N	79°51'36.29"E	13	12°43'25.49"N	79°51'38.44"E
6	12°43'17.60"N	79°51'35.04"E	14	12°43'25.24"N	79°51'38.78"E
7	12°43'17.34"N	79°51'34.92"E	15	12°43'24.21"N	79°51'39.13"E
8	12°43'17.86"N	79°51'33.42"E	16	12°43'23.19"N	79°51'38.63"E

Table 2.3 Accessibility Details to the Project Site

Nearest Roadways	Melavalampattam-Nelvoy Road (MDR-789)	1.87 km West
	Salavakkam -Tirumukkudal village Road	1km NE
	Chengalpattu -kancheepuram Road (SH 132B)	5.32km North
Nearest Town	Chengalpattu	12 km SE
Nearest Railway Station	Palur	7 km NE
Nearest Airport	Chennai	43 km NE
Nearest Seaport	Chennai	61 km NE

2.2 OPERATIONAL DETAILS FOR PROPOSED PROJECT

Operational details of the project including yearly and daily production, and mine closure have been extracted from mining plans shown in Figures 2.1 and 2.2 and given in Table 2.4. Mine closure budget required for the closure of this project have been provided in Table 2.7.

Table 2.4 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m^3	Gravel in m^3
Geological Resource in m^3	13,36,784	62,176
Mineable Reserves in m^3	6,10,354	50,456
Production for five-year plan period	4,37,744	50,456

Based on the year wise development and production plan and sections, the year wise production results have been given in Table 2.5.

Table 2.5 Year-Wise Production Details

Year	Rough Stone (m^3)	Gravel m^3
I	87,310	22,440
II	83,190	14,960
III	84,874	13,056
IV	88,440	---
V	93,930	---
Total	**4,37,744**	**50,456**

Source: Approved Mining Plan & ToR

2.3 LAND USE PATTERN

Land use and land cover information for the proposed project site has been given in Table 2.6.

Table 2.6 Land use data at present, during scheme of mining, and at the end of mine life

Description	Present Area (ha)	Area at the end of life of quarry (ha)
Area under quarry	Nil	2.39.0
Infrastructure	Nil	0.01.00
Roads	Nil	0.02.00
Green Belt	Nil	0.32.8
Unutilized area	3.11.5	0.36.7
Total	**3.11.50**	**3.11.50**

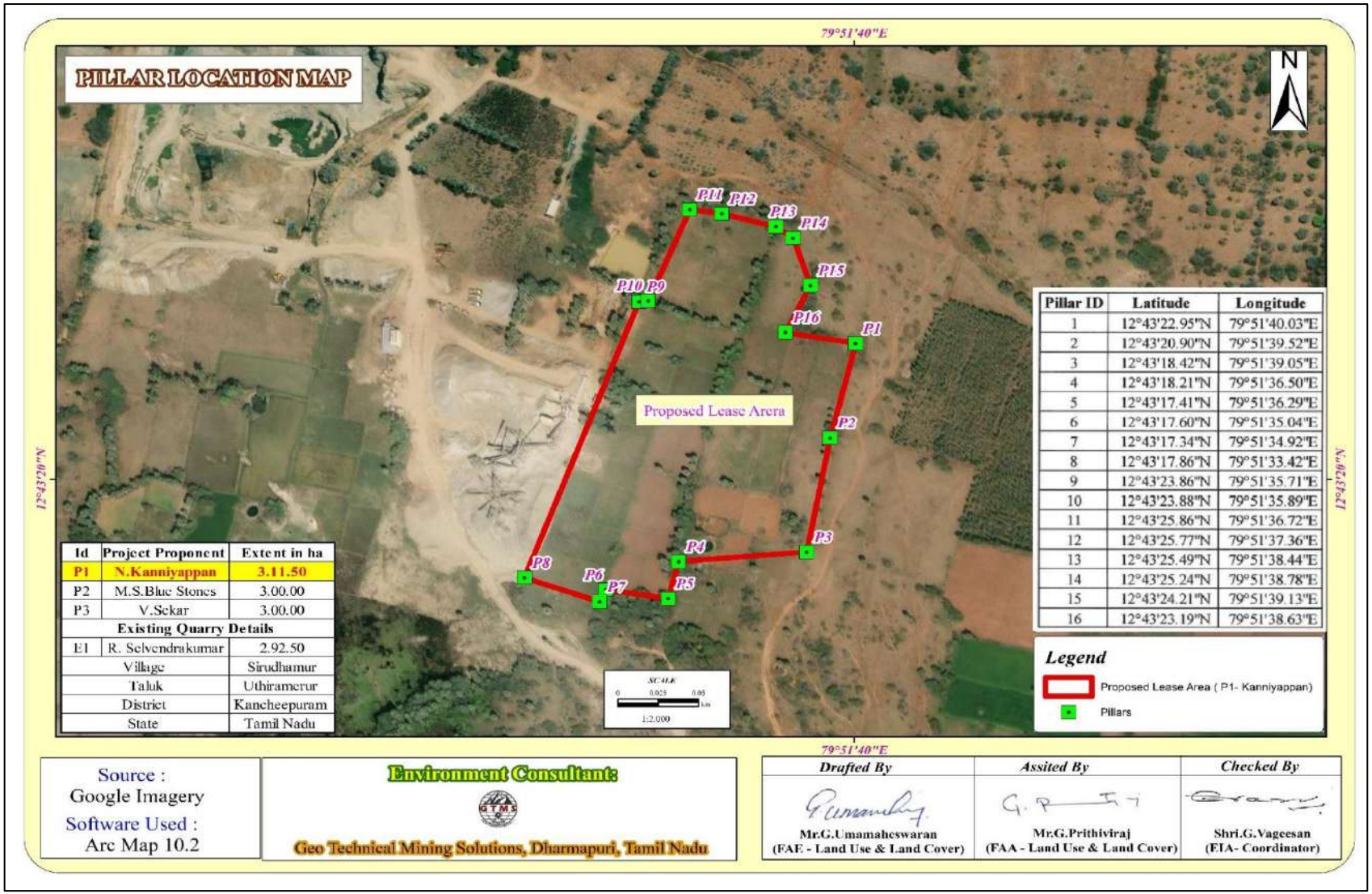


Figure 2.1 Google Earth Image Showing Lease Area with Pillars

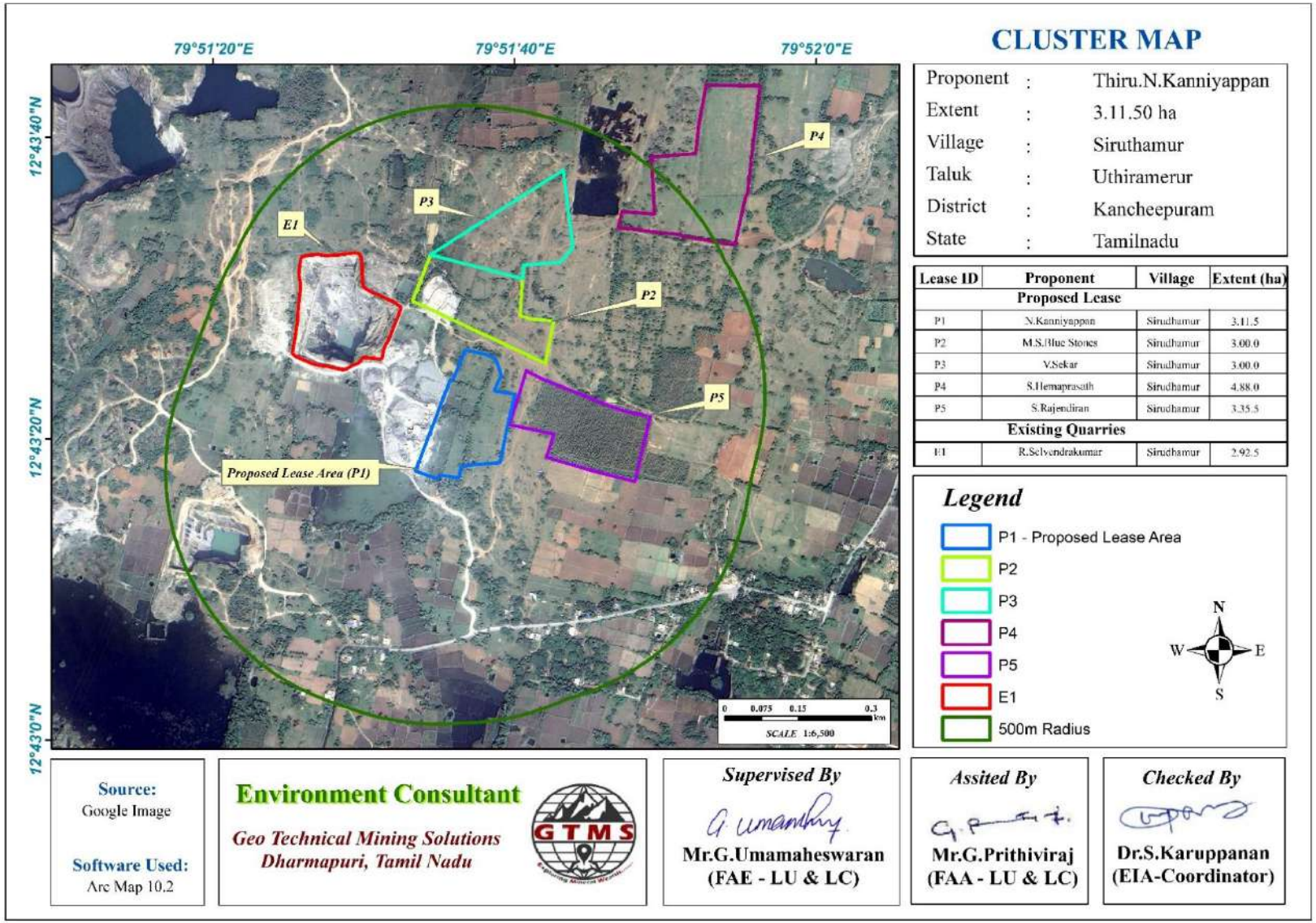


Figure 2.2 Google earth image showing 500m radius limits and the proposed project and existing quarries

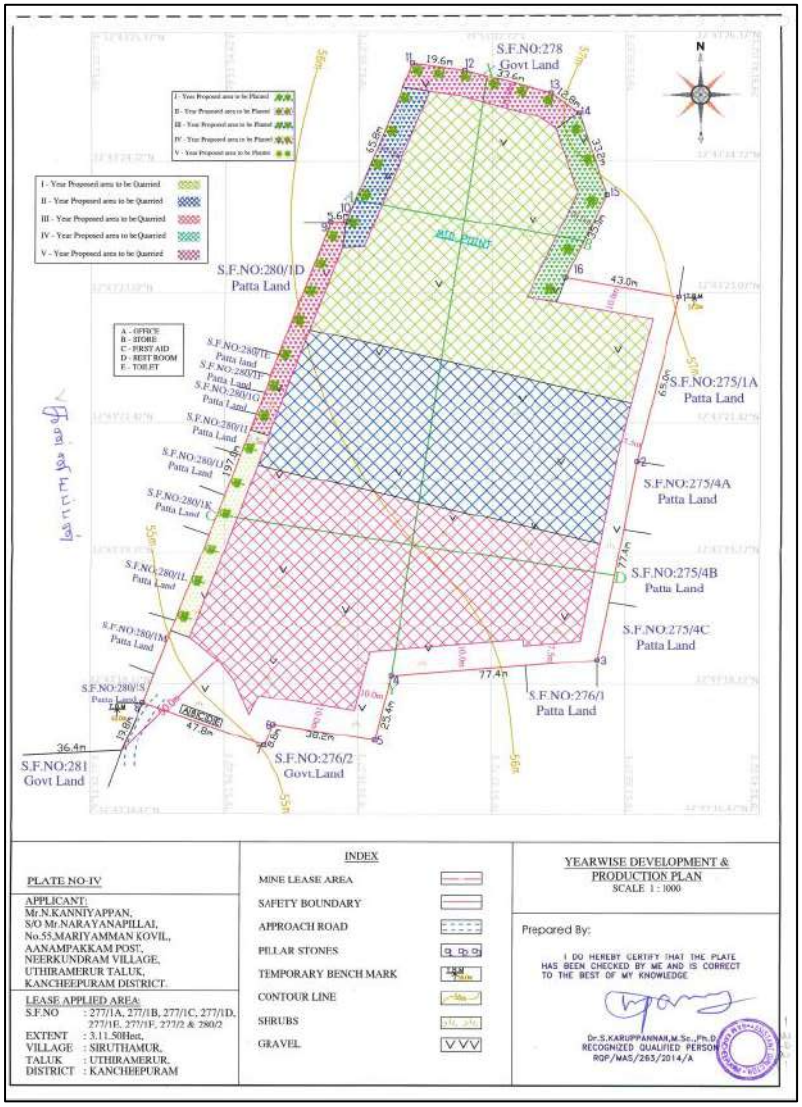
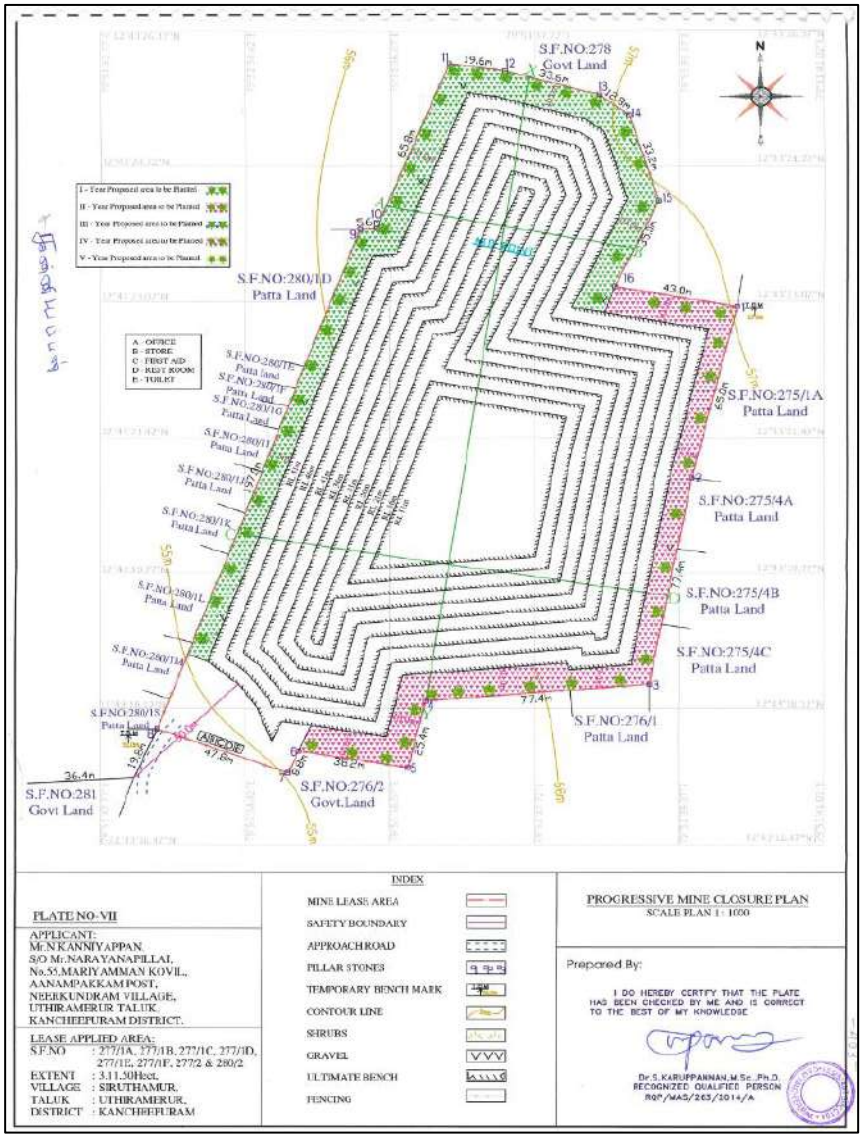


Figure 2.3 Geological plan, year wise development and production plan and sections



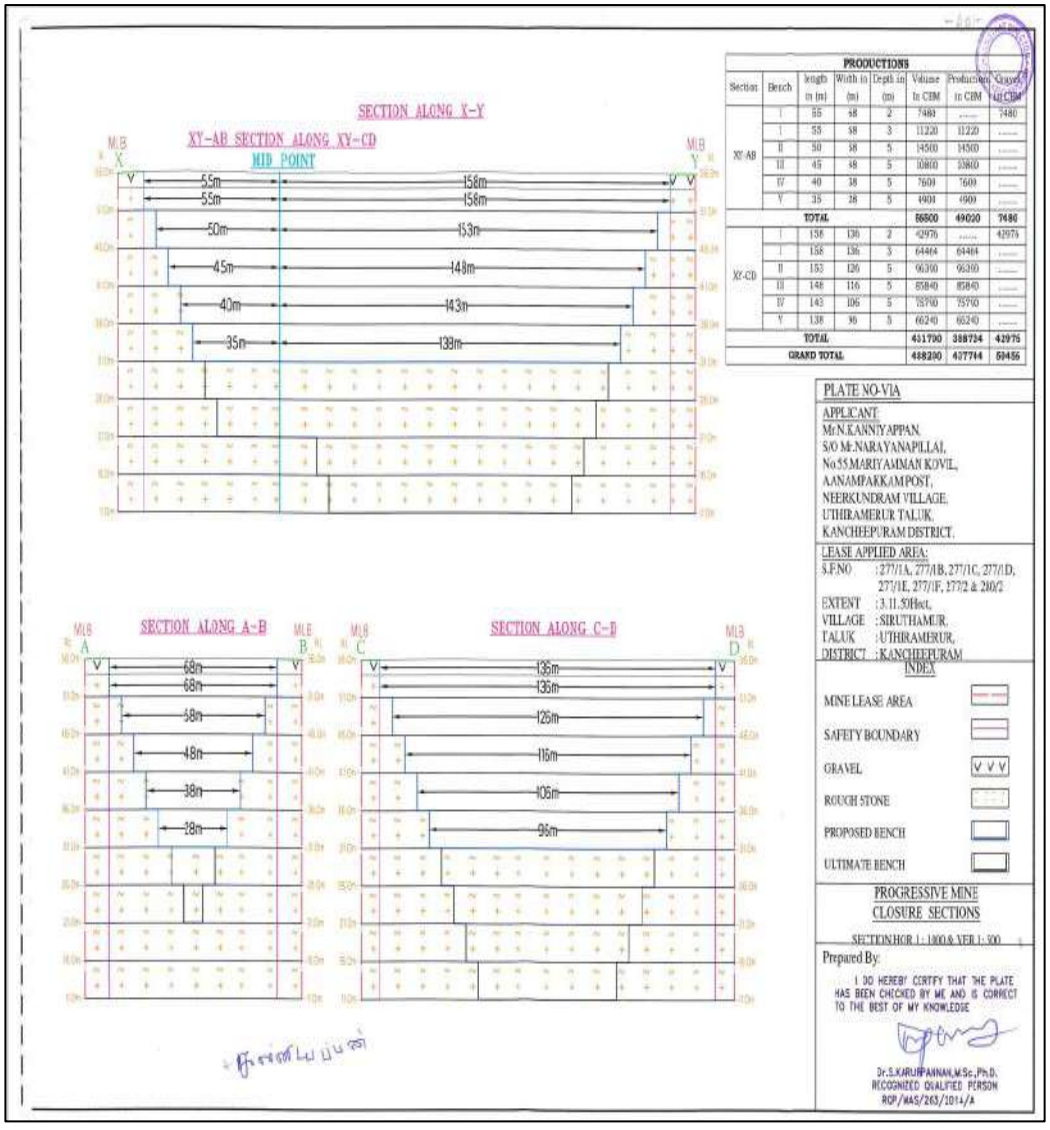


Figure 2.4 Progressive Quarry Closure Plan and Sections

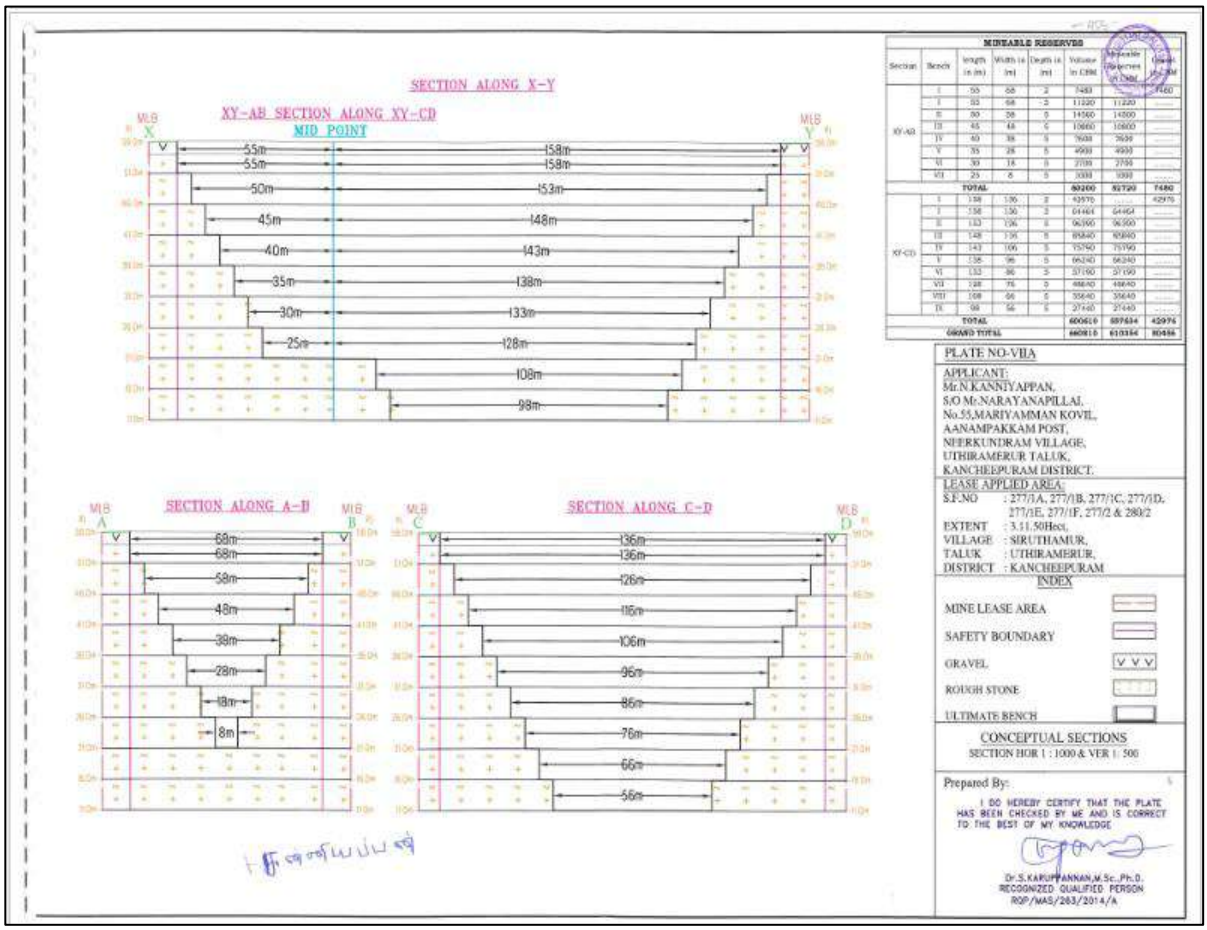


Figure 2.5 Conceptual Plan and Sections

Table 2.7 Mine Closure Budget

Activity	Capital Cost	Recurring Cost/Annum
623 plants inside the lease area	124600	18690
935 plants outside the lease area	280350	28035
Wire Fencing (3.11.5 ha)	623000	31150
Renovation of Garland Drain (3.11.5 ha)	31150	15575
Total	1059100	93450

Source: Environment Management Plan

Figure 2.6 An FMP sketch showing Proposed project lease area in red colour

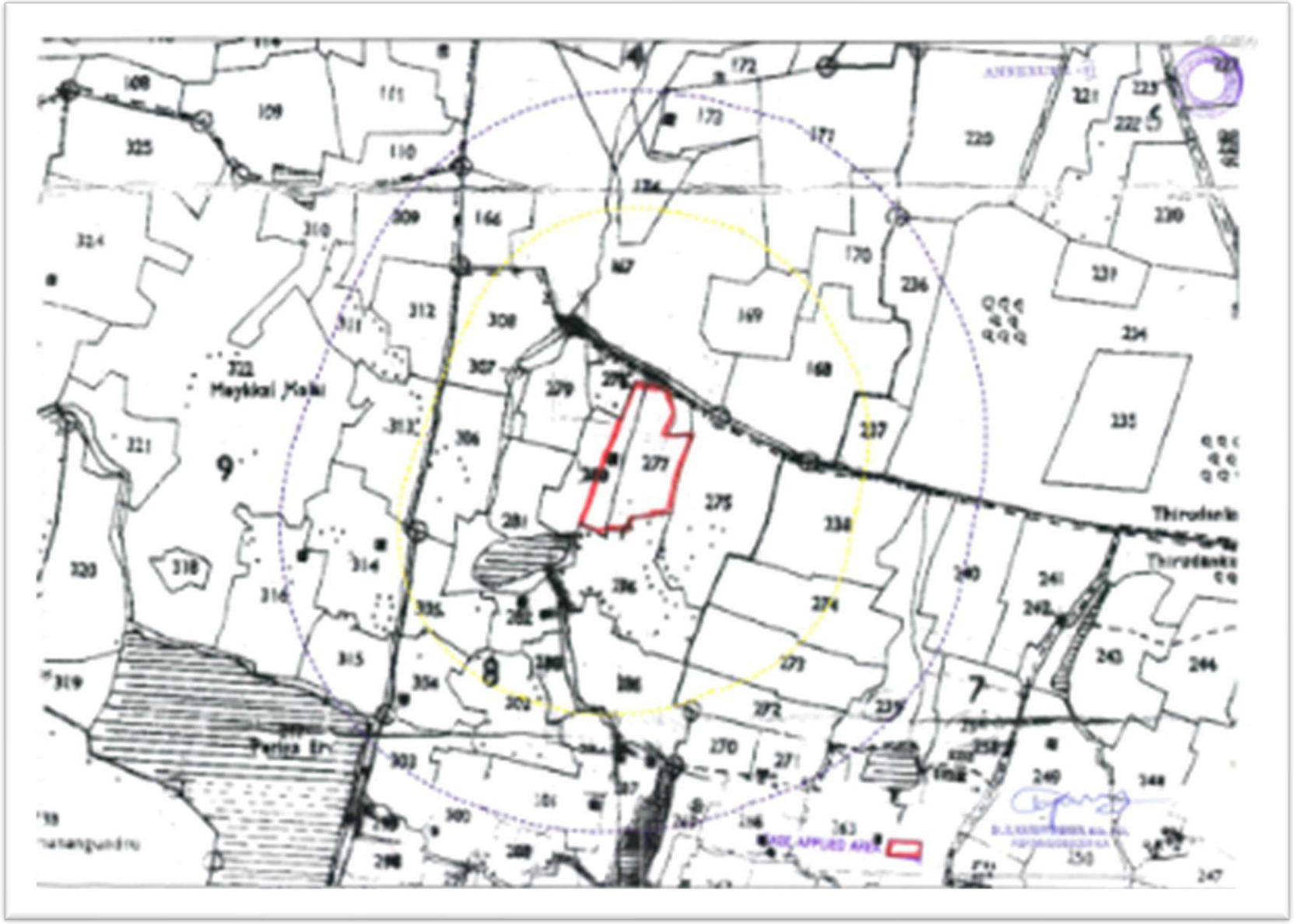


Figure 2.7 Village map showing proposed project lease area in red colour

10/23/2021, 4:54 PM வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விவரங்கள்

ANNEXURE

தமிழ்நாடு அரசு

வருவாய்த் துறை

நில உரிமை விவரங்கள் : ப. எண் 10(1) பிரிவு

மாவட்டம் : காஞ்சிபுரம் வட்டம் : உத்திரமேரூர்

வருவாய் கிராமம் : சிறுதாமூர் பட்டா எண் : 4202

உரிமையாளர்கள் பெயர்

1. நாராயணப்பிள்ளை மகன் கன்னியப்பன்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
277	1A	0 - 16.00	0.30	--	--	--	--	2019/0103/03/179467- -- -- 05-12-2019
277	1C	0 - 16.50	0.30	--	--	--	--	2019/0103/03/179467- -- -- 05-12-2019
277	1E	0 - 16.50	0.30	--	--	--	--	2019/0103/03/179467- -- -- 05-12-2019
277	1F	0 - 15.50	0.29	--	--	--	--	2019/0103/03/179467- -- -- 05-12-2019
277	2	1 - 17.50	2.18	--	--	--	--	2019/0103/03/157315- -- -- 30-07-2019
280	2	0 - 97.50	1.81	--	--	--	--	2019/0103/03/179467- -- -- 05-12-2019
277	8	0 - 16.00	0.30	--	--	--	--	2019/0103/03/179467- -- -- 05-12-2019
277	10	0 - 16.00	0.30	--	--	--	--	2019/0103/03/179467- -- -- 05-12-2019
		3 - 11.50	5.78					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் தகவல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் https://eservices.tn.gov.in என்ற இணைய தளத்தில் 03/03/083/04202/40358 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 23-10-2021 அன்று 04:54:06 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

1/1

2.8 Land Property ownership document

2.4 METHOD OF MINING

Opencast Semi Mechanized mining method has been proposed for the proposed project. It involves formation of benches with 5 m height and 5 m width. The rough stone will be mined using drilling, blasting, and excavators. The excavators attached with rock breaker will be used for breaking large boulders to blocks of required size and the excavators attached with bucket unit will be used for loading the rough stone into the tippers and then, the stone will be transported from the quarry to the nearby crushers. Machineries proposed for this project have been given in Table 2.8.

2.5 PROPOSED MACHINERY DEPLOYMENT

Table 2.8 Proposed Machinery Deployments

S. No.	Type	No of Unit	Capacity	Make	Motive Power
1	Jack Hammers	2	1.2 m to 2 m	Atlas Copco	Compressed Air
2	Compressor	1	400 psi	Escorts formtrac	Diesel Drive
3	Excavator with Bucket / Rock Breaker	1	300 HP	Tata Hitachi	Diesel Drive
Haulage & Transport Equipment					
4	Tipper	4	15tons	BMW	Diesel Drive

Source: Approved Mining Plan

2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

- Mine closure is a process of returning a disturbed site to its natural state for other productive uses to minimize adverse effects on the environment or threats to humans' health and safety.
- The objective of the mine closure plan is to transform quarries to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting, and non-contaminating.
- At the end of mining life, the mine pit will act as an artificial reservoir for collecting rain wapter and will help to meet the water demand during drought season.
- After mine closure, the greenbelt will be developed along the safety barrier and over top benches. Water from the pit will be used to the greenbelt development and maintenance.

CHAPTER III

DESCRIPTION OF THE ENVIRONMENT

3.0 INTRODUCTION

Field monitoring studies were carried out to evaluate the existing environmental condition of the project site during April 2022 – June 2022 as per CPCB guidelines. Data on the existing environmental condition were collected by **Accuracy Analabs Laboratory** for the main environmental components including land, water, air, ecology, and socio-economy.

3.1 LAND ENVIRONMENT

Land use pattern of the area of 10km radius was studied using LISS III imagery of ISRO. LULC types have been identified and given in Table 3.1.

Table 3.1 LULC Statistics of the Study Area

S. No.	CLASSIFICATION	AREA (hectare)	AREA (%)
1	Crop land	14435	47%
2	Land with or without Scrub	2085	6.8%
3	Land affected by salinity/alkalinity Coastal	1711	5.6%
4	Man made features	8	0.0
5	Mining/Industrial waste lands	52	0.2%
6	Fallow land	3001	9.8%
7	Dense forest	1458	4.8
8	Water Bodies	3501	11.4%
9	Plantations	3525	11.5%
10	Sands-Desertic/ Coastal	37	0.1%
11	Barren rocky/ stony waste/ sheet rock area	518	1.7%
12	Settlement	359	1.2%
	Total Area	**30691**	**100.00**

Source: LISS III Satellite Imagery

3.2 SOIL ENVIRONMENT

Eight locations were selected for soil sampling on the basis of soil types, vegetative cover, and industrial and residential activities to assess the existing soil conditions such as physical and chemical properties in and around the project site.

Physical Characteristics

- The soil texture found in the study area is sandy loam.
- PH of the soil varies from 6.09 to 7.26 indicating slightly alkaline nature.
- Electrical conductivity of the soil varies from 58.97 to 120.4 µs/cm and

❖ The water content varies from 5.13 to 10.24 %.

Chemical Characteristics

- ❖ The soil texture found in the study area is sandy loam.
- ❖ PH of the soil varies from 6.09 to 7.26 indicating slightly alkaline nature.
- ❖ Electrical conductivity of the soil varies from 58.97 to 120.4 µs/cm and
- ❖ The water content varies from 5.13 to 10.24 %.

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 critical water quality parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

Surface Water

- ❖ The pH of surface water sample is 6.9 and 7.1
- ❖ Turbidity is 5 NTU.
- ❖ TDS is 72-142 mg/l, whereas TH is 41-48 mg/l.
- ❖ Calcium is 21.6-54.72 mg/l and magnesium 18-27 mg/l.
- ❖ Chloride is 42-52 mg/land sulphate 28-37 mg/l.

Ground Water

- ❖ The pH of the water samples ranges from 7.35 to 7.59.
- ❖ TDS are found in the range of 289 - 912 mg/l.
- ❖ The total hardness varies between 290 -561 mg/l.
- ❖ Calcium varies from 32 to 92mg/l and magnesium from 17 mg/l to 21.
- ❖ Chloride varies from 138 to 275 mg/l; sulphate from 32-84 mg/l; and fluoride from 0.41 to 0.72 mg/l.

When speaking about microbiological parameters, the water samples from all the locations meet the requirement.

When compared to IS 10500:2012 all the parameters thus analysed fall within the prescribed limits.

3.4 AIR ENVIRONMENT

The existing ambient air quality of the area is important for evaluating the impact of mining activities on the ambient air quality. The baseline studies on air environment include identification of specific air pollutants and their existing levels in ambient air. The ambient air quality in the study area of 5 km radius around the proposed quarry sites provides the baseline ambient air quality information.

3.4.1 Wind Pattern

Local wind pattern will largely influence the dispersion pattern of air pollutants and noise from the proposed project site. Analysis of wind pattern requires hourly site-specific data of wind speed and direction over a period of 3 months. The wind rose thus produced, as shown in Figure 3.1 reveals that:

❖ The measured average wind velocity during the study period is 3.69m/s

3.4.2 Ambient Air Quality

As per the monitoring data, PM10 ranges from 40.34 µg/m^3 to 45.84µg/m^3; PM2.5 from 20.10 µg/m^3 to 26.15 µg/m3; SO_2 from 6.06µg/m^3 to 9.61 µg/m^3; NO_2 from 16.73 µg/m3 to 23.56µg/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

3.5 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 locations around the proposed project area. Noise levels recorded in core zone during day time was 48.6 dB (A) Leq and during night time was 36.5 dB (A) Leq. Noise levels recorded in buffer zone during day time varied from 38 to 45.6dB (A) Leq and during night time from 27.6 to 35.6 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

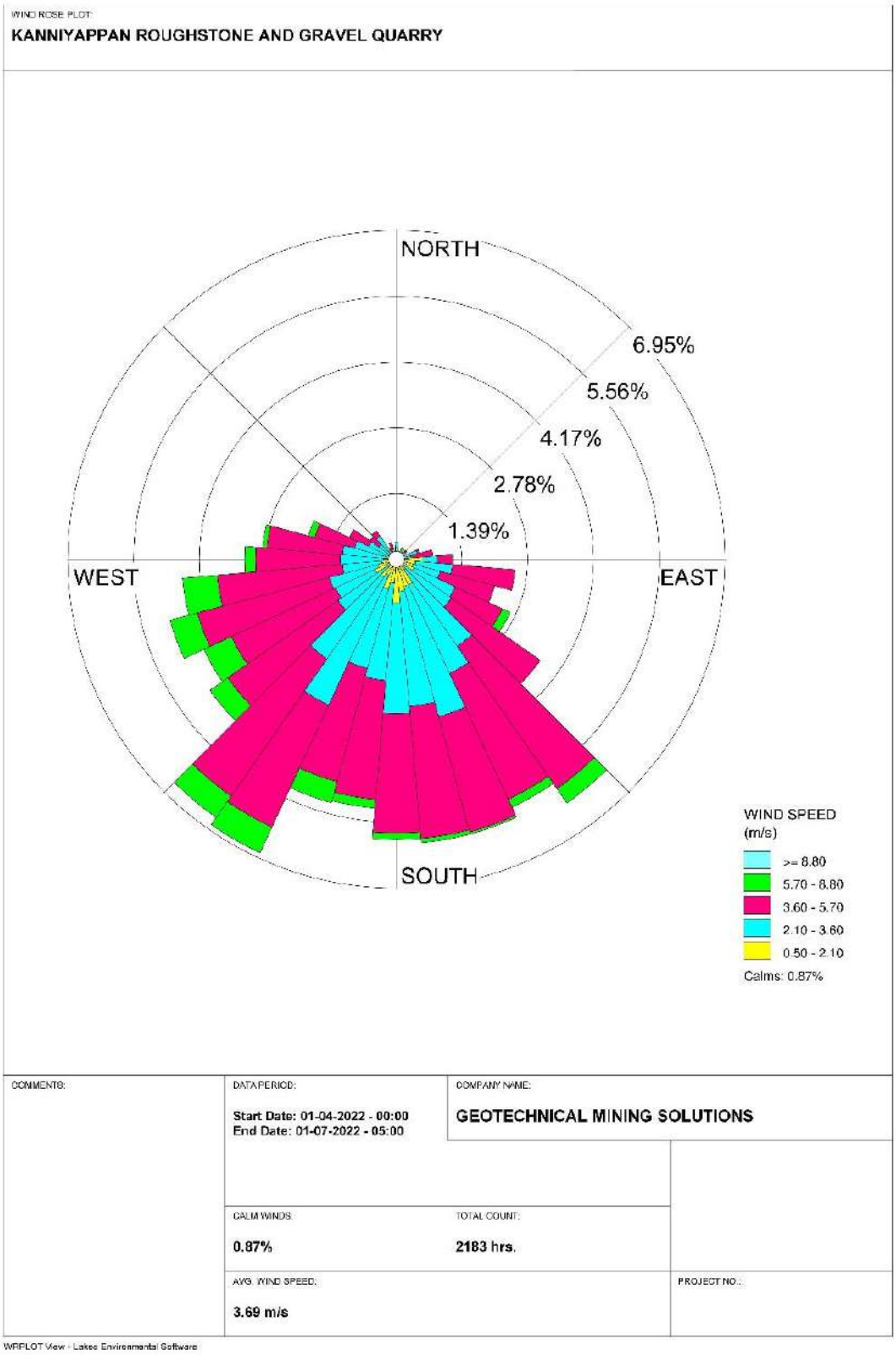


Figure 3.1 Onsite Wind Rose Diagram

3.6 ECOLOGICAL ENVIRONMENT

The main objective of biological study is to collect the baseline data regarding flora and fauna in the study area and identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora and fauna in the core zone as well as buffer zone. The study has also been designed to suggest suitable mitigation measures, if necessary, to protect wildlife habitats and conservation of REET species if any.

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

3.7 SOCIO ECONOMIC ENVIRONMENT

Socio-economic study is an essential part of environmental study. It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as features like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis. The proposed project will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 INTRODUCTION

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans for sustainable resource extraction.

4.1 LAND ENVIRONMENT

4.1.1 Anticipated Impact

The main anticipated impact on the land environment due to quarrying operation is changes in landscape and land use pattern. The mining activities in the cluster occupies about 12.04.0 ha. The size of lands used for mining is insignificant when compared to the size of other LULCs. This small size of mining activities shall not have any significant impact on the land environment. While speaking the impact of the mining project on groundwater resources, the mining activity will not reach the groundwater aquifers. Therefore, it will not affect groundwater quality and quantity.

4.1.2 Mitigation Measures

The mining activity will be progressively implemented along with other mitigative measures as discussed below:

- Garland drains will be constructed all around the quarry pit and a check dam will be constructed at the suitable location in lower elevations to prevent erosion due to surface runoff during heavy rainfall and to collect the storm water for various uses.
- Green belt will be developed in safety zone. The water stored in the quarry will be used for greenbelt.
- Thick plantation will be done on unutilized area, top benches, safety barrier, etc.
- At conceptual stage, the land use pattern of the quarry will be changed into greenbelt area and temporary reservoir.
- Natural vegetation surrounding the quarry will be retained to minimize dust emissions.
- Proper fencing will be established at the conceptual stage and security will be posted round the clock to prevent inherent entry of the public and cattle.

4.2 SOIL ENVIRONMENT

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

4.2.1 Impact on Soil Environment

4.2.2 Mitigation Measures for Soil Conservation

- *Run-off diversion* – Garland drains will be constructed all around the project boundary to prevent surface flows from entering the quarry area. The water from garland drainage system will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- *Sedimentation ponds* - Run-off from working areas will be routed towards sedimentation ponds. These ponds trap sediments and reduce suspended sediment loads before runoff is discharged from the quarry sites. Sedimentation ponds will be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- *Retention of vegetation* – Existing vegetation will be retained or the vegetation will be planted at the site wherever possible.
- *Monitoring and maintenance* –Erosion control systems will be maintained to make sure seamless performance of the systems during rainy season.

4.3 WATER ENVIRONMENT

4.3.1 Anticipated Impact

The impact of mining on the water quality is insignificant because of no use of chemicals or hazardous substances during quarrying process. The quarrying activity will not intersect ground water table as the proposed depth is 25m below ground level and water table is found at the depth of 50-55 m below ground level.

There is no intersection of surface water bodies in the project area. As there is no proposal for rough stone processing or workshop within the project area there will be no effluent anticipated from the mines.

4.3.2 Mitigation Measures

- Water softening will be adopted to make it fit for drinking purposes. But it can be used for other domestic purposes.
- Rainwater will be collected in the mining pit and the water will be pumped out to surface settling tank of the dimension of 15m x 10m x 3m to remove suspended solids if any. The water stored in the settling tank will be used for dust suppression, greenbelt development and rainwater harvesting.

- ❖ A drainage network, known as garland drains will be constructed to divert surface run-off into the quarrying area.
- ❖ The quality of water in the quarry will be analysed periodically.
- ❖ Domestic sewage from site office and latrines in the mining site will be discharged to septic tanks followed by soak pits.
- ❖ Wastewater from the mining site will be treated in settling tanks before using it for dust suppression and tree plantation purposes.
- ❖ Desilting will be carried out before and immediately after the monsoon season.
- ❖ The quality of water in open and bore wells, and surface water bodies will be monitored regularly.

4.4 AIR ENVIRONMENT

The air borne particulate matter is the main air pollutant in the opencast mining involving drilling, blasting, and loading.

4.4.1 Anticipated Impact

The emission of sulphur dioxide (SO_2), oxides of nitrogen (NO_2) due to excavation and loading equipment and vehicles plying on haul roads are marginal. But, loading/unloading and transportation of rough stone, wind erosion of the exposed area and movement of vehicles will be the main polluting sources releasing Particulate Matter (PM_{10}) affecting ambient air quality of the area.

Anticipated increase of the air pollutants due to the proponents' quarrying activities and the existing quarrying activities within the area of 500m radius around the project sites have been predicted by modelling using AERMOD software and the modelling results shown in Tables 4.1 to 4.4 will be used in providing mitigation measures.

Table 4.1 Incremental & Resultant GLC of PM_{10}

Station Code	Location	Average Baseline PM_{10}($\mu g/m^3$)	Incremental value of PM_{10} due to mining ($\mu g/m^3$)	Total PM_{10} ($\mu g/m^3$)
AAQ1	12°43'19.87"N, 79°51'35.87"E	52.23	16.36	68.59
AAQ2	12°42'48.39"N,79°50'46.86"E	45.23	5	50.23
AAQ3	12°41'53.58"N,79°49'51.00"E	39.58	0.5	40.08
AAQ4	12°44'30.33"N,79°52'56.85"E	40.99	1	41.99
AAQ5	12°44'19.05"N 79°51'12.97"E	43.43	5	48.43
AAQ6	12°44'10.33"N,79°49'20.52"E	38.86	0	38.86
AAQ7	12°41'20.08"N,79°52'28.96"E	44.68	0	44.68
AAQ8	12°45'30.23"N,79°51'37.33"E	42.18	5	47.18

TABLE 4.2 Incremental and Resultant GLC of $PM_{2.5}$

Station Code	Location	Average Baseline $PM_{2.5}$($\mu g/m^3$)	Incremental value of $PM_{2.5}$ dueto mining ($\mu g/m^3$)	Total $PM_{2.5}$ ($\mu g/m^3$)
AAQ1	12°43'19.87"N,79°51'35.87"E	32.40	8.5	40.9
AAQ2	12°42'48.39"N,79°50'46.86"E	25.08	1	26.08
AAQ3	12°41'53.58"N,79°49'51.00"E	20.27	0.1	20.37
AAQ4	12°44'30.33"N,79°52'56.85"E	22.30	0.5	22.8
AAQ5	12°44'19.05"N 79°51'12.97"E	24.39	5	29.39
AAQ6	12°44'10.33"N,79°49'20.52"E	20.10	0	20.1
AAQ7	12°41'20.08"N,79°52'28.96"E	23.30	0	23.3
AAQ8	12°45'30.23"N,79°51'37.33"E	23.52	1	24.52

Table 4.3 Incremental & Resultant GLC of SO_2

Station Code	Location	Average Baseline SO_2 ($\mu g/m^3$)	Incremental value due to mining ($\mu g/m^3$)	Total SO_2($\mu g/m^3$)
AAQ1	12°43'19.87"N, 79°51'35.87"E	11.53	6.74	18.27
AAQ2	12°42'48.39"N,79°50'46.86"E	8.70	1	9.7
AAQ3	12°41'53.58"N,79°49'51.00"E	5.89	0.1	5.99
AAQ4	12°44'30.33"N,79°52'56.85"E	6.48	0.5	6.98
AAQ5	12°44'19.05"N 79°51'12.97"E	7.23	5	12.23
AAQ6	12°44'10.33"N,79°49'20.52"E	6.08	0	6.08
AAQ7	12°41'20.08"N,79°52'28.96"E	8.66	0	8.66
AAQ8	12°45'30.23"N,79°51'37.33"E	8.63	1	9.63

Table 4.4 Incremental & Resultant GLC of NOx

Station Code	Location	Average Baseline Nox ($\mu g/m^3$)	Incremental value of Nox due to mining ($\mu g/m^3$)	Total Nox ($\mu g/m^3$)
AAQ1	12°43'19.87"N, 79°51'35.87"E	23.85	7.91	31.76
AAQ2	12°42'48.39"N, 79°50'46.86"E	22.24	1	23.24
AAQ3	12°41'53.58"N, 79°49'51.00"E	16.78	0.1	16.88
AAQ4	12°44'30.33"N, 79°52'56.85"E	18.75	0.5	19.25
AAQ5	12°44'19.05"N 79°51'12.97"E	20.85	5	25.85
AAQ6	12°44'10.33"N, 79°49'20.52"E	18.70	0	18.7
AAQ7	12°41'20.08"N, 79°52'28.96"E	22.40	0	22.4
AAQ8	12°45'30.23"N, 79°51'37.33"E	21.72	1	22.72

The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further.

4.4.2 Mitigation Measures

4.4.2.1 Drilling

- Wet drilling will be practiced to control dust at source. Where water is unavailable, suitably designed dust extractor will be provided for dry drilling.

4.4.2.2 Blasting

- Blasting time will be determined according to the local conditions.
- Blasting will be avoided when temperature changes suddenly and strong wind blows towards residential areas.
- Controlled blasting will be done and the blasting will be restricted to a particular time of the day (i.e., at the time lunch hours).
- Before loading of rough stone, water will be sprayed on the blasted rough stone.
- Dust mask will be provided to the workers and their use will be strictly monitored.

4.4.2.3 Haul Road and Transportation

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
- Rough stone will be properly covered with tarpaulin and transported during the day time.
- The speed of tippers plying on the haul road will be limited to below 20 km/hr to avoid generation of dust.
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of vehicles and other machines will be done to improve combustion process and reduce the emission of pollutants.
- The haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC (Pollution Under Control) certificate.

4.4.2.4 Green Belt

- Trees will be planted all along the main haul roads and haul roads will often be levelled to prevent the generation of dust due to movement of tippers.
- Green belt of adequate width will be developed around the project areas.

4.4.2.5 Occupational Health

- ❖ Dust masks will be provided to the workers and their use will be strictly monitored.
- ❖ Annual medical check-ups, trainings and campaigns will be arranged to create awareness about the importance of wearing dust masks among all mine workers and tipper drivers.
- ❖ Ambient air quality monitoring will be conducted six months once to assess the effectiveness of mitigation measures proposed for the projects.

4.5 NOISE ENVIRONMENT

The incremental noise level is found to be 57.73 dB (A) in core zone and ranges between 38.3 and 48.96 dB (A) in buffer zone.

4.5.1 Anticipated Impact

Noise pollution poses a major health risk to the mine workers. Drilling, blasting, loading and movement of vehicles are the sources of noise in the existing open cast mining projects.

Table 4.5 Predicted Noise Incremental Values

Noise Monitoring Location	Distance From Project Site(m)	Baseline Noise Level (dBA)m During Day Time	Predicted Noise Level(dBA)	Total(dBA)
Core	100	48.6	57.16	57.73
Sirudamur	350	45.6	46.28	48.96
Kattankulam	3980	42.5	25.16	42.58
Pazhaveri	3100	42.9	27.33	43.02
Sirudamur	1790	40.2	32.10	40.83
Vayalakkavoor	4250	39.8	24.59	39.93
Edamichi	3910	38.0	25.32	38.23
Sirumailur	3810	44.9	25.54	44.95

4.5.2 Mitigation Measures

- ❖ Sharp drill bits will be used while drilling to reduce noise.
- ❖ Secondary blasting will be avoided and rock breaker will be used for breaking boulders.
- ❖ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system (NONEL).
- ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise.

- ❖ Sound insulated chambers will be provided for the workers working on machines producing higher levels of noise.
- ❖ Silencers / mufflers will be installed in all machineries.
- ❖ Green belt will be developed around the project area and along the haul roads to minimize propagation of noise.
- ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of heavy machines and persons working near the heavy machines and their use will be ensured though training and awareness.
- ❖ Regular medical check–up and proper training will be provided to personnel to create awareness about adverse noise level effects.

Ground Vibrations

Table 4.6 Predicted PPV Values due to Blasting

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	82	350	1.44

4.5.3.1 Common Mitigation Measures

- ❖ The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations.
- ❖ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting.
- ❖ Adequate safe distance from blasting will be maintained as per DGMS guidelines.
- ❖ Blasting shelter will be provided as per DGMS guidelines.
- ❖ Blasting operations will be carried out only during day time.
- ❖ The charge per delay will be minimized and preferably a greater number of delays will be used per blasts.
- ❖ During blasting, other activities in the immediate vicinity will be temporarily stopped
- ❖ Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast.
- ❖ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed.
- ❖ A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public.

- Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire.
- The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used.
- The detonation delay sequence shall be designed to ensure that firing of the holes is in the direction of free faces to minimise vibration effects.
- Appropriate blasting techniques shall be adopted in such a way that the peak particle velocity shall not exceed 1.59 mm/s.
- Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

4.6 BIOLOGICAL ENVIRONMENT

4.6.1 Anticipated Impact

- None of the plants will be cut during operational phase of the projects.
- There shall be negligible air emissions or effluents from the project sites. Dust generation during loading will be a temporary effect and is not anticipated to affect the surrounding vegetation significantly.
- Most of the land in the buffer area consists of crop lands, grass patches and small shrubs. Hence, there will be no effect on the flora.
- Wildlife except few domestic animals, reptiles, hares and some common birds is not found in the cluster and its immediate surrounds because of lack of vegetal cover and surface water.

4.6.2 Mitigation Measures

The proposed projects will develop the green belt within the lease area, along roads and other vacant areas to provide a barrier between the source of pollution and the surrounding areas. Although the project will not lead to any tree cutting, it is proposed to improve the greenery of the locality by plantation. During green belt development,

- Plants that grow fast will be preferred.
- High canopy plants with local varieties will be preferred.
- Perennial and evergreen plants will be preferred.

Green belt development plan and the cost for the greenbelt development for the proposed project have been given in Table 4.7 and 4.8, respectively.

Table 4.7 Greenbelt Development Plan

S. No.	No. of trees proposed for plantation	Survival %	Area to be covered(m^2)	Name of the species	No. of trees expected to be grown
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area			*Azadirachta indica, Albizia lebbeck, Delonix regia, Techtona grandis,* etc.,	
	623	80%	5,607		498
	Number of plants outside the mine lease area				
	935	80%	8,411		748

Table 4.8 Budget for Greenbelt Development Plan

Activity	Plantation in the construction phase(3Months)	Cost	Capital Cost (Rs.)	Recuring Cost-per annum
Plantation inside the mine lease area (in safety margins)	623	Site clearance, preparation of land, digging of pits / trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	124600	18690
Plantation outside the area	935	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	280350	28035
Total			**404950**	**46725**

Source: EMP budget

4.7 SOCIO ECONOMIC ENVIRONMENT

4.7.1 Anticipated Impact

The project will generate employment for about 28 persons and indirectly will generate employment for around 30 persons.

4.7.2 Mitigation Measures

- Good maintenance practices will be adopted for plant machinery and equipment to avert potential noise problems.
- Green belt will be developed in and around the project sites as per Central Pollution Control Board (CPCB) guidelines.
- Appropriate air pollution control measure will be provided to minimize the environmental impact within the core zone.
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per the mines act and rules.
- Both the State and the Central governments will be benefited through financial revenues by way of Royalty, Tax, DMF, NMET etc. from the projects directly and indirectly.

CHAPTER V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

The mineral deposits are site specific in nature; hence, question of seeking alternate sites do not arise for the projects.

CHAPTER VI

ENVIRONMENT MONITORING PROGRAM

6.0 PURPOSE

Regular monitoring program of environmental components is essential to take into account the changes in the environmental components as shown in Table 6.1. The Objectives of monitoring is:

- To check or assess the efficiency of the controlling measures
- To establish a data base for future impact assessment studies

Table 6.1 Post Environmental Clearance Monitoring Schedule

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 locations (1 core & 1buffer)	24 hours	Once in 6 months	Fugitive dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 locations (1Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting Operation	Peak Particle Velocity
7	Soil	2 locations (1 core & 1 Buffer)	–	Once in 6 months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

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

6.2 BUDGETARY PROVISION FOR EMP

The cost in respect of monitoring of environmental components has been shown in Table 6.2.

Table 6.2 Environment Monitoring Budget

S. No.	Parameter	Capital Cost	Recurring Cost Per Annum
1	Air Quality	Rs. 5,25,000/-	Rs. 1,05,000/-
2	Meteorology		
3	Water Quality		
4	Hydrology		
5	Soil Quality		
6	Noise Quality		
7	Vibration Study		
Total		**Rs. 5,25,000/-**	**Rs. 1,05,000/-**

Source: Approved Mining Plan

CHAPTER VII

ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

Risk assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The methodology for the risk assessment is based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad vide circular no.13 of 2002 dated 31st December 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and assess the risk levels of those hazards in order to prioritize those that need an immediate attention. Further, mechanisms responsible for these hazards are identified and control measures are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a qualified competent mine manager certified by the DGMS, Dhanbad.

7.2 DISASTER MANAGEMENT PLAN

The objective of the disaster management plan is to make use of the combined resources of the mine and the outside services to:

- Rescue and treat casualties;

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

7.3 CUMULATIVE IMPACT STUDY

This section deals with the cumulative impacts of the mining projects in the cluster area on the environment. For this study, the data provided in the tables 7.1-7.8 were used.

Table 7.1 Cumulative Production Load of Rough Stone

Quarry	Production for five years	Annual Production in m^3	Daily Production in m^3	Number of Lorry Load Per Day
P1	437744	87549	324	54
P2	309684	61937	229	38
P3	329770	65954	244	41
P4	442582	88516	328	55
P5	638665	127733	473	79
Total	**2158175**	**431635**	**1598**	**267**

Table 7.2 Cumulative Production Load of Gravel

Quarry	Production for 3 Years (m^3)	Yearly Production(m^3)	Daily Production in m^3	Number of Lorry Load Per Day
P1	50456	10091	37	6
P2	--	--	--	--
P3	--	--	--	--
P4	31734	10578	39	7
P5	55070	18357	68	11
Grand Total	**137260**	**39026**	**144**	**24**

Table 7.3 Cumulative Impact Results from the 5 proposed projects

Pollutants	Baseline Data(µg/m^3)	Incremental Values (µg/m^3)					Cumulative Value (µg/m^3)
		P1	P2	P3	P4	P5	
$PM_{2.5}$	32.40	8.51	4.02	4.41	5.51	4.41	59.0
PM_{10}	52.23	16.40	7.60	7.35	8.40	7.35	98.13
SO_2	11.53	6.75	4.78	5.09	6.75	5.09	39.01
NO_2	23.85	7.91	5.60	5.96	7.91	5.96	53.72

Table 7.4 Predicted Noise Incremental Values from Cluster

Location ID	Distance (m)	Direction	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	350	S	45.6	46.28	48.96	55
Habitation Near P2	530	S	45.6	42.67	47.39	
Habitation Near P3	720	S	45.6	40.01	46.66	
Habitation Near P4	850	S	45.6	46.28	48.96	
Habitation Near P5	370	S	45.6	45.80	48.71	
Cumulative Noise (dB(A)					**53.4**	

Source: Lab Monitoring Data

Table 7.5 Ground Vibrations at 6 Mines

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	82	350	1.44
P2	58	530	0.56
P3	61	720	0.35
P4	82	850	0.34
P5	119	370	1.77
E1	71	660	0.46
Total			**4.92**

Source: Blasting Calculations

Table 7.6 Socio Economic Benefits from 5 Mines

Location ID	Project Cost	CER as per SEAC Suggestion (Rs.)
P1	69,50,000	5,00,000
P2	5,70,70,000	5,00,000
P3	5,70,70,000	5,00,000
P4	40,90,590	5,00,000
P5	44,25,000	5,00,000
Total	**12,96,05,590**	**25,00,000**

Table 7.7 Employment Benefits from 5 Mines

Description of quarries	Employment
P1	28
P2	21
P3	21
P4	28
P5	29
Total	**127**

A total of 127people will get employment due to 5 proposed mine in cluster

Table 7.8 Greenbelt Development Benefits From 3 Mines

CODE	No of Trees proposed to be planted	Area Covered Sq.m	Name of the Species	No. of Trees expected to be grown
P1	1558	14018	Neem, Casuarina, etc	1246
P2	1500	13500		1,200
P3	1500	13500		1,200
P4	2440	21960		1,952
P5	1678	15098		1,342
Total	8676	78076		**6940**

CHAPTER VIII

PROJECT BENEFITS

The proposed project at Siruthamur Village aims to produce **437744 m^3** of rough stone and gravel 50456 over a period of 5 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

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

CHAPTER IX

ENVIRONMENT MANAGEMENT PLAN

The environment monitoring cell formed by the mine management will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through mine management level. The said team will:

- Monitor the water/ waste water quality, air quality and solid waste generated
- Analyse the water and air samples collected through external laboratory
- Implement and monitor the pollution control and protective measures/devices including financial estimation, installation of air pollution control equipment, waste water treatment plant, etc.
- Co-ordinate the environment related activities
- Collect health statistics of the workers and population of the surrounding villages
- Develop Green belt and monitor the progress of the environmental monitoring programme;
- Comply with statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance.

CHAPTER X

CONCLUSION

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