

EXECUTIVE SUMMARY OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
AND
ENVIRONMENTAL MANAGEMENT PLAN
FOR OBTAINING
Environmental Clearance under EIA Notification – 2006
Schedule Sl. No. 1 (a) (i): Mining Project

“B1” CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND
CLUSTER EXTENT = 20.27.5 hectares

Mr. S.RAJENDIRAN ROUGH STONE AND GRAVEL QUARRY
At
Siruthamur Village, Uthiramerur Taluk, Kancheepuram District

ToR issued vide Letter No. SEIAA-TN/F.NO.9689/TOR-1387/2023 Dated
07.03.2023.

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.No.
Thiru.S.Rajendiran S/o Sevagaperumal 2/4 Jothinagar main Road Ekkattutahngal Guindy, Chennai.	3.35.5 ha & 275/1B, 275/2A, 238/1A, 238/1B, 238/1C & 238/1D

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS



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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

As the proposed Rough Stone and Gravel Quarry mining project, known as P1 falls within the 500 m radius cluster of quarries with the total extent of >5 ha (i.e., **20.27.5 ha**), it is classified under category “B1” and requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The cluster contains only five proposed projects, known as P1, P2, P3, P4, P5 and One Expired Projects known as EX1. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O. 2269 (E) Dated 1st July 2016, as shown in Figure 1.1.

This EIA draft discusses the cumulative impacts of 5 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 the cluster falling in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District and Tamil Nadu State. In compliance with TOR obtained vide Letter No. SEIAA-TN/F.NO.9689/SEAC/TOR-1387/2023 Dated 07.03.2023. This EIA report has been prepared for the project proponent Thiru.S.Rajendiran applied for rough stone and gravel quarry lease in the patta land falling in S.F.Nos.275/1B, 275/2A, 238/1A, 238/1B, 238/1C & 238/1D over an extent of 3.35.5 ha in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District and Tamil Nadu. This EIA report takes into account the rough stone and gravel quarry within the cluster of 500 m radius from the periphery of the proposed project site. The cluster contains five proposed projects, known as P1, P2, P3, P4, P5 and one Expired Projects known as EX1. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O. 2269 (E) dated 1st July 2016. The total extent of all the quarries is 3.35.5 ha, also known as the cluster extent. The quarries involved in the calculation of cluster extent are shown in Figure 1.1.

Table 1.1 Details of Project Proponent

Name of the Project Proponent	Mr.S.Rajendiran
Address	S/o. Mr. Sevagaperumal, No.2/4, Jothi Nagar Main Road, Ekattuthangal, Guindy, Chennai- 600 0032, Tamil Nadu
Status	Proprietor

Table 1.2 Details of Quarries within the Cluster Area of 500 m Radius

Proposed Quarries				
Code	Name of the Owner	S.F. No/ Village	Extent (ha)	Status
P1	S. Rajendiran	275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D Siruthamur	3.35.50	Applied Area
P2	M. S. Blue Stones	167/1(Part-1) Siruthamur	3.00.0	Proposed Area
P3	V. Sekar	167/1 (Part-2)	3.00.0	Proposed Area
P4	S. Hemprasath	170/2, 170/3, 170/4, 236/1B, 236/1C, 236/1D, 220/1A1(P) Siruthamur	4.88.0	Proposed Area
P5	N. Kanniyappan	277/1A, 277/1C, 277/1E, 277/1F, 277/2, 280/2, 277/1B, 277/1D	3.11.50	Proposed Area
Existing Quarry				
E1	R.Selvendrakumar	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 Cluster Extent			20.27.5	---

Source:

DD Letter - Rc.No.302/Q3/2020, Dated:07.10.2021.

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

Dated:01.07.2016.

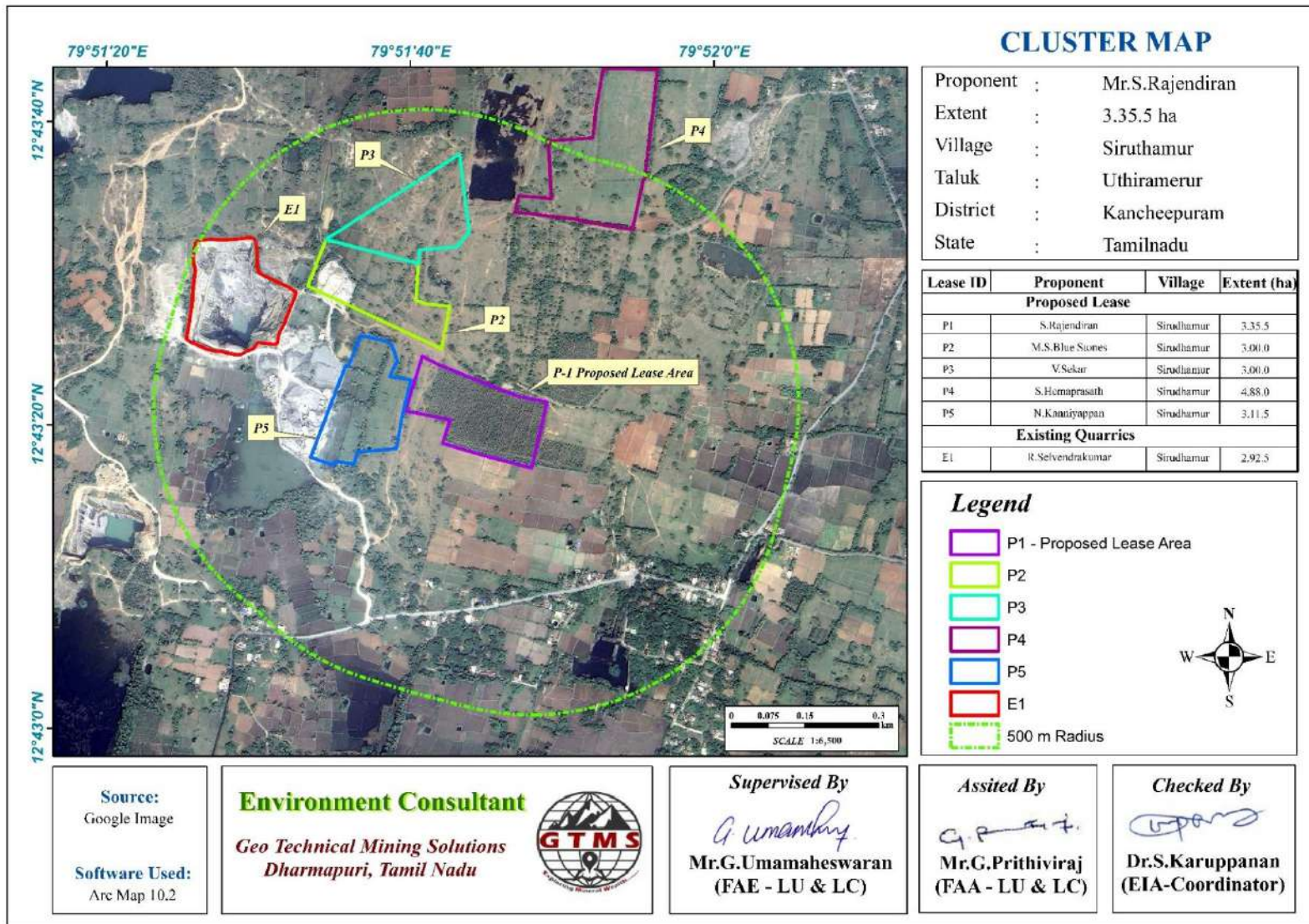


Figure 1.1 Google earth image showing 500m radius limits and the proposed project and existing quarries within the limit

CHAPTER II

PROJECT DESCRIPTION

The proposed project deals with excavation of rough stone and gravel quarry which is primarily used in construction projects. The method adopted for rough stone and gravel quarry excavation is an open cast semi-mechanized mining method. The proposed project area is located between latitudes from 12°43'17.41"N to 12°02'23.38"N and Longitudes from 79°41'16.53"E to 79°41'23.40"E in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District and Tamil Nadu. The project site is a Patta land with the extent of 3.35.5 ha owned by the project proponent. The proponent had applied for quarry lease on 28.12.2022 to extract rough stone and gravel and obtained the precise area communication letter issued by Department of Geology and Mining, Kancheepuram vide Rc.No.302/Q3/2020, dated: 06.09.2021. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Deputy Director of Geology and Mining, Kancheepuram (Rc.No.302/Q3/2020, dated:07.10.2021). According to the approved mining plan, about 638665 m³ of rough stone and 55070 gravel will be mined up to the depth of 50 m BGL in five years. To achieve the estimated production, 1 Excavator and 4 Tippers will be deployed. To operate the machineries about 29 persons will be employed. At the end of the quarry life, the dimension of the ultimate pit will be 172 m*121 m*50 m and about 3.35.5 ha of land is used for quarrying; about 0.60.0 ha of land is unutilized. about 0.09.5 ha of land will have been green belt and the rest will be used for road and infrastructures.

The final mine closure plan shows that about Rs.100650 with the annual recurring cost of Rs.1140700 will be spent towards mine closure. Boundary coordinates of corner pillars of the project site and accessibility details to the location of the project site are given in Tables 2.1 & 2.2 respectively. The lease area of the project site overlaid on Google earth image is shown in Figure 2.1.

Table 2.1 Corner Geographic Coordinates of Proposed Project

Pillar ID	Latitude	Longitude
1	12°43'21.50''N	79°51'49.00''E
2	12°43'17.16''N	79°51'47.98''E
3	12°43'18.01''N	79°51'44.68''E
4	12°43'18.79''N	79°51'42.12''E
5	12°43'20.32''N	79°51'42.61''E

6	12°43'20.69''N	79°51'40.84''E
7	12°43'20.92''N	79°51'39.66''E
8	12°43'24.52''N	79°51'40.78''E
9	12°43'23.97''N	79°51'41.84''E
10	12°43'22.46''N	79°51'45.59''E
11	12°43'21.88''N	79°51'47.10''E
12	12°43'21.57''N	79°51'48.64''E

Table 2.2 Site Connectivity to the Project Area

Nearest Roadways	SH-789 Kancheepuram-Uthiramerur Road	2.5 km SW
Nearest Town	Palur	8.0 km N
Nearest Railway Station	Palayaseevaram	7.5 km N
Nearest Airport	Chennai	52 km E
Nearest Seaport	Chennai	65 km NE

2.3 DETAILS OF RESERVES

Reserves were calculated using cross-section method after leaving the safety distance as shown in Figure 2.2. Details of resources and reserves of the project are given in Table 2.3.

Table 2.3 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m ³	Gravel in m ³
Geological Resource in m ³	1609056	67044
Mineable Reserves as per ToR in m ³	638665	55070
Proposed production as per ToR for 5 years m ³	638665	55070

Based on the year wise development and production plan and sections, as shown in Figures 2.3 the year wise production results are given in Table 2.4.

Table 2.4 Year-Wise Production Details

Year	Rough Stone in (m ³)	Gravel in (m ³)/ 3years
I	134159	24336
II	128070	21780
III	127736	8954
IV	126490	--

V	122210	--
Total	638665	55070

2.3 LAND USE PATTERN

Land use and land cover information for the proposed project site has been given in Table 2.5.

Table 2.5 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	2.63.0
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt & Dump	Nil	0.09.5
Unutilized area	3.35.5	0.60.0
Total	3.35.5	3.35.5

Source: Approved mining plan

2.4 METHOD OF MINING

The quarrying operation is proposed to be carried out by Open -Cast Semi-Mechanized mining method.

2.5 PROPOSED MACHINERY DEPLOYMENT

List of machineries proposed for the quarrying operation is given in Table 2.6.

Table 2.6 Proposed Machinery Deployments

S. No.	Type	No of Unit	Capacity	Make	Motive Power
1	Jack Hammers	4	Hand held	-	Diesel Drive
2	Compressor	1	Air	-	Diesel Drive
3	Excavator	1	-	-	Diesel Drive
Haulage & Transport Equipment					
4	Tipper	4	15 M. T	-	Diesel Drive

Table 2.7 Conceptual Blasting Design

Blast hole Diameter (D) in mm	32
Burden (B) in m	1
Spacing (S) in m	0.97
Sub drill in m	0.3
Charge length (C) in m	0.64

Stemming	1
Hole Length (L) in m	1.9
Bench Height (BH) in m	1.6
Mass of explosive/hole in g	400
Stemming material size in mm	3.2
Burden stiffness ratio	1.64
Blast volume/hole in m ³	1.59
Production of rough stone/day in m ³	473
Number of blastholes/day	297
Blasthole pattern	Staggered/Rectangular
Mass of explosive /day in kg	119
Powder factor in kg/m ³	0.25
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL
Fly rock distance in m	23

Table 2.8 Fuel Requirement Details

Fuel Requirement for Excavator			
Details	Rough Stone (638665 m³)	Gravel/3year (55070 m³)	Total Diesel (litre)
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m ³ /hr)	20	60	---
Time Required (hours)	31933	918	---
Total Diesel Consumption for 5 years (litre)	510932	9178	520110
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	---	---
Number of Drillholes/day	297	---	---
Total Diesel Consumption for 5 years (litre)	160380	---	160380
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m ³	6	6	---

Number of Trips / days	79	7	---
Number of Trips / 5 years	106444	9178	---
Total Diesel Consumption for 5 years (litre)	2128883	183567	2312450
Total Diesel Consumption by Excavator, Compressor and Tipper			2992940

Table 2.9 Capital Requirement Details

S. No.	Description	Cost (Rs.)
1	Fixed Asset Cost	25,25,000
2	Operational Cost	10,00,000
3	EMP Cost	5,25,000
4	Expenditure Cost	3,75,000
Total Project Cost		44,25,000

Source: Approved Mining Plan

2.5 CONCEPTUAL 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 water 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. Budgetary provision for mine closure is provided in Table 2.9.

Table 2.10 Mine Closure Budget

Activity	Capital Cost	Recurring Cost/Annum
671 plants inside the lease area	134200	20130
1007 plants outside the lease area	301950	30195
Wire Fencing (3.35.5 ha)	671000	33550
Renovation of Garland Drain (3.35.5 ha)	33550	16775
Total	1140700	100650

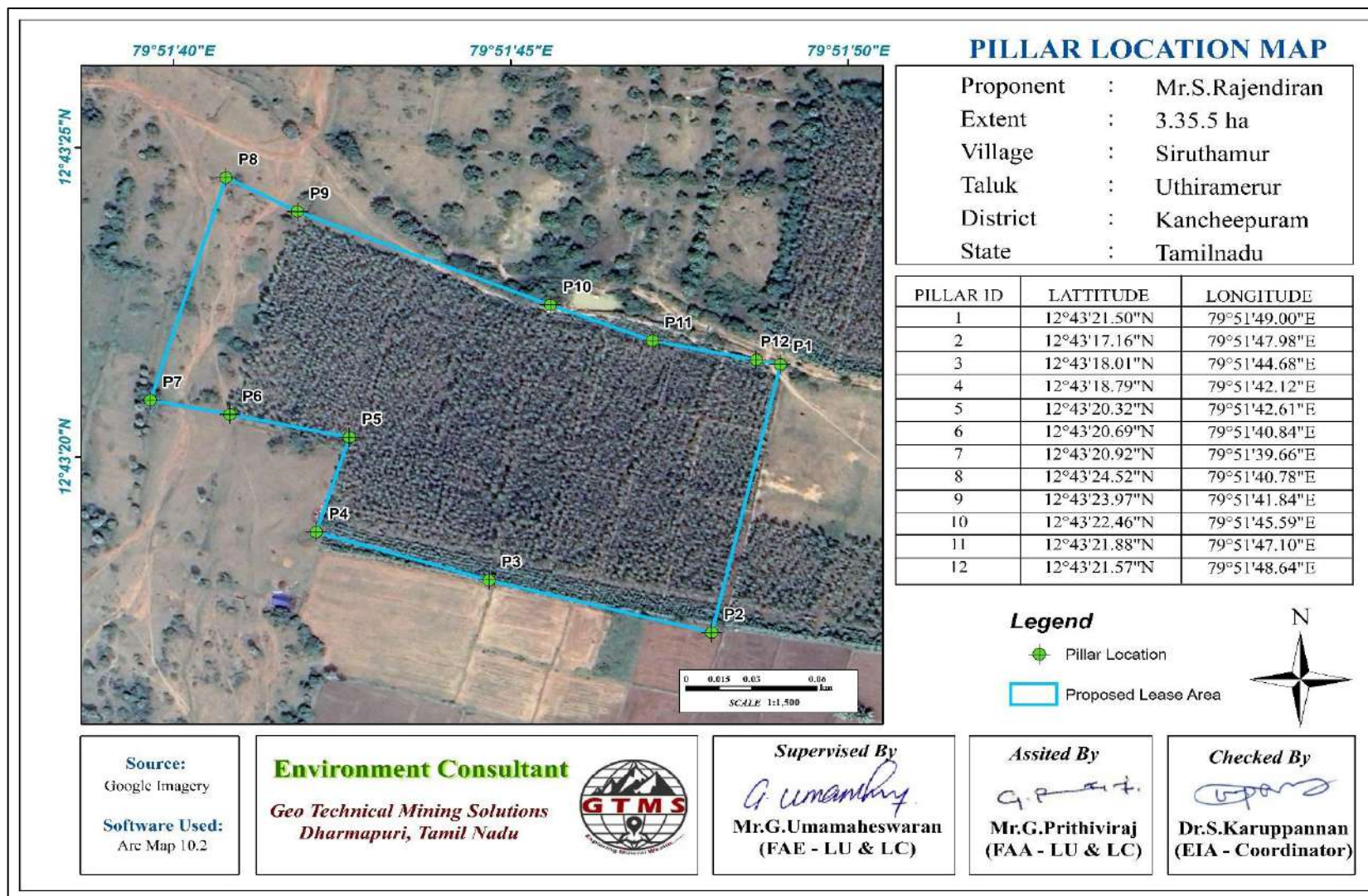


Figure 2.1 Google Earth Image Showing Lease Area with Pillars

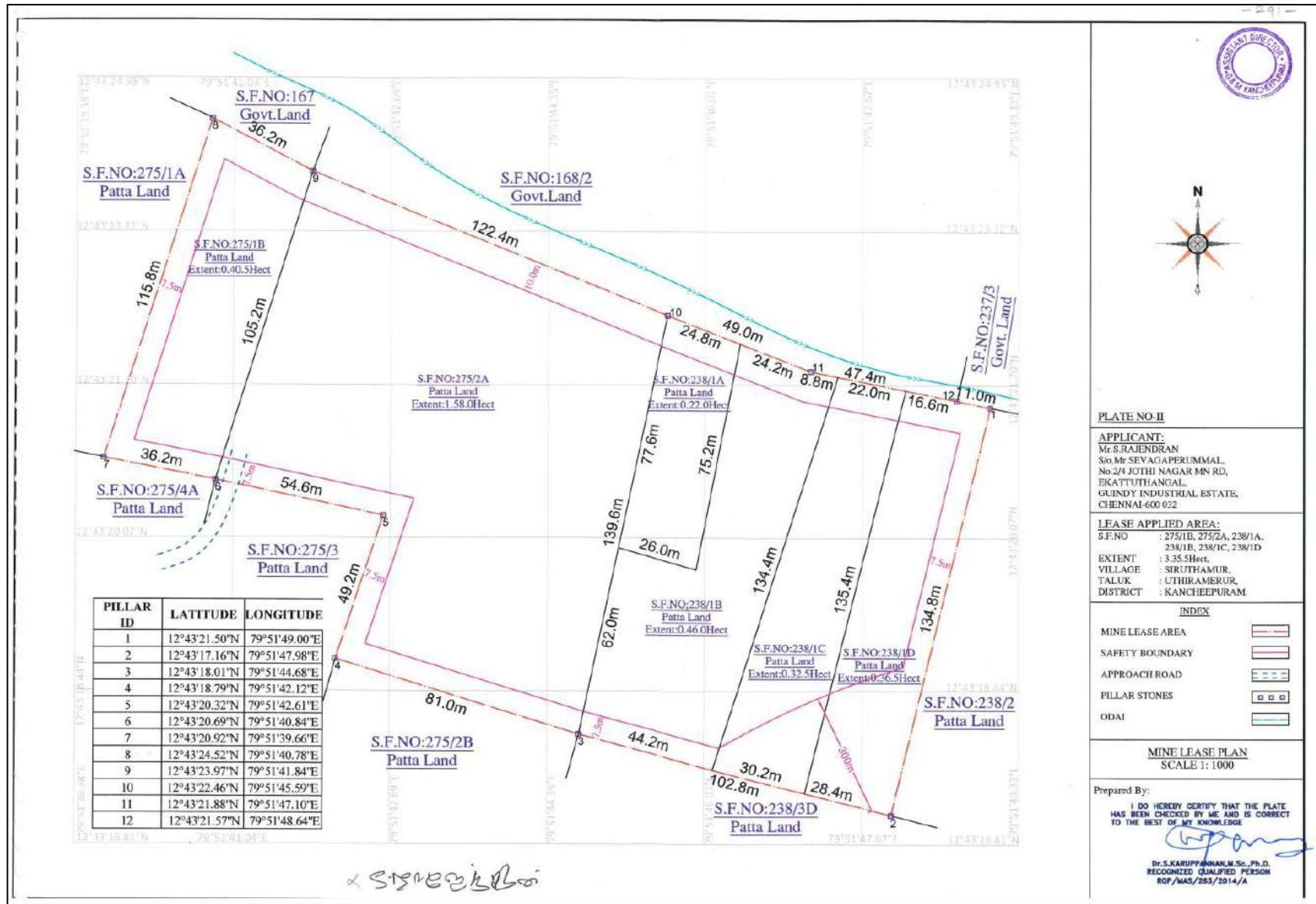


Figure 2.2 Mine Lease Plan

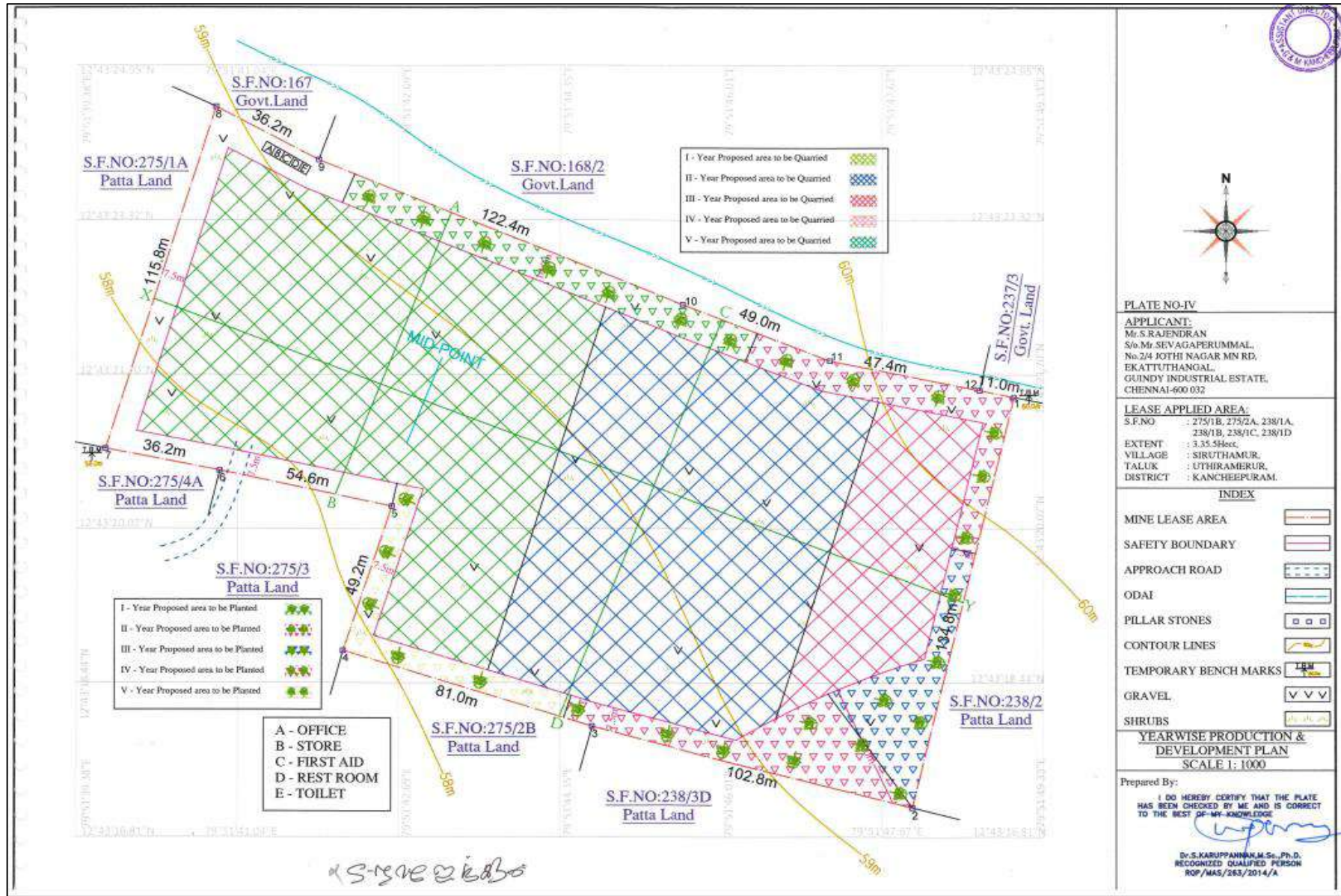


Figure 2.3 Year wise Development and Production Plan



Figure 2.3a Year wise Development and Production Sections

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 **March through May 2022** as per CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified Excellence Laboratory for the environmental attributes including soil, water, noise, air and by FAEs for ecology and biodiversity, traffic, and socio-economy.

3.1 LAND ENVIRONMENT

Land use pattern of the area of 5 km radius was studied using Sentinel II imagery. LULC types and their extent are given in Table 3.1.

Table 3.1 Land Use / Land Cover Statistics for the Area of 5 km Radius

S. No.	Classification	Area (ha)	Area (%)
1	Barren Rocky/ Stony Waste	327.26	4.26
2	Crop Land	3043.79	39.63
3	Dense Forest	326.46	4.25
4	Fallow Land	1157.96	15.08
5	Land with or without scrub	790.38	10.29
6	Mining/Industrial lands	206.43	2.69
7	Plantations	1156.81	15.06
8	Settlements	5.20	0.07
9	Water Bodies	666.03	8.67
Total		7680.31	100

Source: Sentinel II Satellite Imagery

3.2 SOIL ENVIRONMENT

Eleven locations were selected for soil sampling based on soil types, vegetative cover, and industrial & residential activities including infrastructure facilities. The physical and chemical characteristic results of soil samples are provided below.

Physical Characteristics

The soil samples in the study area show loamy textures varying between sandy loam, silty loam and silty clay. pH of the soil varies from 6.09 to 7.26 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 58.97 to 120.4 $\mu\text{s}/\text{cm}$. Dry matter content ranges between 64.19 and 94.87 g/cm^3 .

Chemical Characteristics

Sodium ranges between 20 and 654 mg/kg. Potassium ranges between 308 and 910 mg/kg. Nitrogen ranges between 75.1 and 150 mg/kg. Phosphorus ranges between 0.84 and 1.9 mg/kg. Organic matter content ranges between 0.48 and 1.52%.

Soil Erosion

Soil Erosion

Soil erosion map shows that:

- ❖ Soil erosion is very low in the proposed lease area
- ❖ Low to moderate soil erosion is in mine lease area.

3.3 WATER ENVIRONMENT

Surface Water

Surface Water Resources and Quality

Sirudamur Lake, Kattankulam Lake and Edamichi Lake are the three prominent surface water resources present in the study area. These are ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 0.4 N of Sirudamur Lake, 4.30 km SW of Kattankulam Lake and 2.40 km S of Edamichi Lake, as shown in Table 3.5 and Figure 3.7. Three surface water samples, known as SW1, SW2 and SW3 were collected from the three surface water bodies to assess the baseline water quality. Table 3.6 summarizes surface water quality data of the three samples. Results for surface water samples in the Table 3.6 indicate that the physical and chemical parameters, and heavy metals are within permissible limits.

Ground Water Resources

Groundwater in the study area occurs in the crystalline rocks of Archaean age and Recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose. Four groundwater samples, known as GW1, GW2, GW3 and GW4 were collected from bore wells and analyzed for physico-chemical conditions and heavy metals contents in order to assess baseline quality of ground water. The physical, chemical, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

Groundwater Levels and Flow Direction

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is

must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 9 open wells and 9 bore wells at various locations within 2 km radius around the proposed project sites for the period from October through December, 2022 (Post Monsoon Season) and from March through May, 2022 (Pre-Monsoon Season). Average depths to the static water table in open wells range from 7.27 to 9.43 m BGL in post monsoon and from 13.43 to 16.37 m BGL in pre monsoon. The bore well data thus collected onsite are provided in Tables 3.10 and 3.11. The average depths to static potentiometric surface in bore wells for the period of October through December 2022 (Post-Monsoon Season) vary from 47.33 to 51.60 m and from 55.43 to 58.43 m for the period of March through May, 2022 (Pre-Monsoon Season).

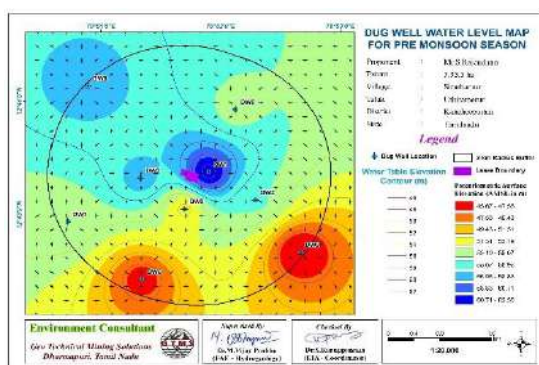


Figure 3.1 Open Well Static Groundwater Elevation Map Showing the Direction of Groundwater Flow During Pre-Monsoon Season

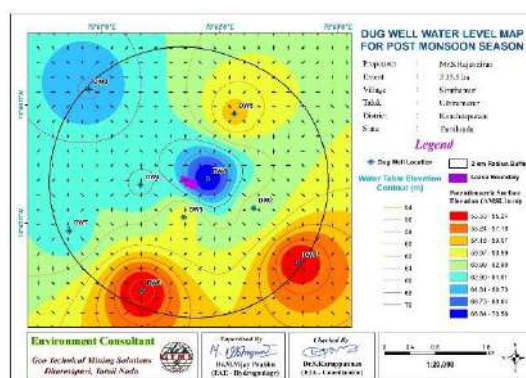


Figure 3.2 Open Well Static Groundwater Elevation Map Showing the Direction of Groundwater Flow During Post-Monsoon Season

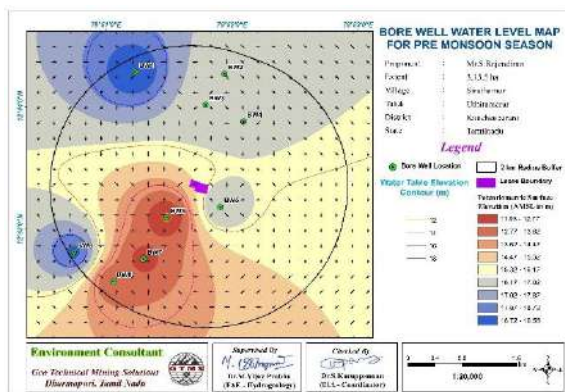


Figure 3.3 Borewell Static Groundwater Elevation Map Showing the Direction of Groundwater Flow During Pre-Monsoon Season

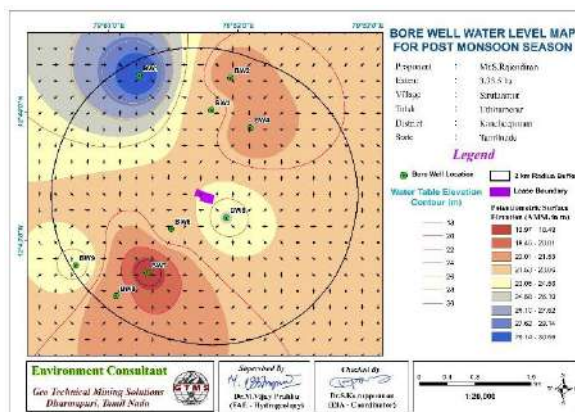


Figure 3.4 Borewell Static Groundwater Elevation Map Showing the Direction of Groundwater Flow During Post-Monsoon Season

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.

Ambient Air Quality

As per the monitoring data, PM_{2.5} from 20.10 µg/m³ to 26.15 µg/m³, PM₁₀ ranges from 40.34 µg/m³ to 45.84 µg/m³; SO₂ from 6.06 µg/m³ to 9.61 µg/m³; NO_x from 16.73 µg/m³ to 23.56 µg/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

3.5 NOISE ENVIRONMENT

The 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 45.6 dB (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.

3.6 BIOLOGICAL ENVIRONMENT

Biological assessment of the site was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora & fauna in the core area as well its buffer zone to be impacted. The study has also been designed to suggest suitable mitigation measures, if necessary, for protection of wildlife habitats and conservation of REET species if any. The study found that there is no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species. 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 is a measure of an individual's or family's or group of people's economic and social position based on education, income, health, and occupation. Socio-economic most important determinant of livelihoods as levels of knowledge, skill and income conditions which mean for their living. The study 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, which will in turn improve the social standards.

3.8 TRAFFIC ENVIRONMENT

Table 3.2 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village Road	0.79 km-E	Village Road
TS2	Walajabad – Maduranthakam (SH-789)	2.59 km-N	Walajabad – Maduranthakam (SH-789)

Source: On-site monitoring by GTMS FAE & TM

Table 3.3 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	31	93	38	38	65	33	164
TS2	92	276	51	51	94	47	374

Source: On-site monitoring by GTMS FAE & TM

3.9 SITE SPECIFIC FEATURES

Table 3.4 Details of Environmentally Sensitive Ecological Features in the Study Area

SI. No	Sensitive Ecological Features	Name	Areal Distance in km from cluster
1	National Park / Wild life Sanctuaries	None	Nil within 10 km radius
		None	Nil within 10 km radius
2	Reserve Forest	Kavanippakkam R. F	0.83 km E
		Idimichi	2.45 km S
		Marudam RF	7.35 km SW
3	Lakes/Reservoirs/ Dams/Streams/Rivers	Pinayur Near Lake	0.72 km North
		Small Pond	70 m SW
		Sirudamur Near Lake	0.6 km NW
		Lake	0.93 km SE
		Kavanipakkam Lake	2.5 km NE
		Cheyyar River	4.14 km NW
Palar River	4.39 km North		

4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	None	Nil within 10 km radius
5	Critically Polluted Areas	None	Nil within 10 km radius
6	Mangroves	None	Nil within 10 km radius
7	Mountains/Hills	None	Nil within 10 km radius
8	Notified Archaeological Sites	Thirumukkoodal Sri Appan Prasanna Venkatesa Perumaal Temple	4.31km North
		Kalvettu Kovil Mandapam-Uthiramarur	16.26 km NE
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10 km radius

Source: Survey of India Toposheet

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

Anticipated Impact

- ❖ Permanent or temporary change on land use and land cover.
- ❖ Change in topography of the mine lease area will change at the end of the life of the mine.
- ❖ Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- ❖ Degradation of the aesthetic environment of the core zone due to quarrying
- ❖ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season

- ❖ Siltation of water course due to wash off from the exposed working area

Common Mitigation Measures from Proposed Project

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

Anticipated Impact

This project does not result in any impact on the soil of the project site as topsoil is neither removed from the project site nor preserved in the safety margin area. However, some of the common mitigation measures have been discussed in the following sections to protect the immediate soil environment surrounding the lease area.

4.2 SOIL EROSION

- ❖ Low to moderate soil erosion is observed in the south side of the lease area

Mitigation Measures

- ❖ Soil erosion is very low in the proposed lease area. Therefore, the lease area will not cause soil erosion in any way. but Run-off diversion – Garland drains will be constructed around the project boundary to prevent surface flows from entering the quarry works areas and will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- ❖ Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before

runoff is discharged from the quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.

- ❖ Retain vegetation – Retain existing or re-plant the vegetation at the site wherever possible.
- ❖ Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season.

4.3 WATER ENVIRONMENT

Anticipated Impact

- ❖ As the water required for the mining operations, obtained from the approved water supplying agency, the project does not develop any abstraction structures in the lease area. Therefore, no impact responsible for the water table declination is anticipated.
- ❖ Surface and ground water resources may be contaminated due to mine pit water discharge, domestic sewage, waste water from vehicle washing, washouts from surface exposure or working areas, discharge of oil & grease, and suspended solids due to waste from washing of machineries. To address this impact, some of the important mitigation measures is provided as below.

Mitigation Measures

- ❖ Garland drainage system and settling tank will be constructed along the proposed mining lease area. The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- ❖ Rainwater from the mining pits will be collected in sump and will be allowed to store and pumped out to surface settling tank of 15 m x 10 m x 3 m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system.
- ❖ The water collected will be reused during storm for dust suppression and greenbelt development within the mines.
- ❖ Interceptor traps/oil separators will be installed to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse.
- ❖ Flocculating or coagulating agents will be used to assist in the settling of suspended solids during monsoon seasons.

- ❖ Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted.
- ❖ Domestic sewage from site office and urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- ❖ Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- ❖ De-silting will be carried out before and immediately after the monsoon season.
- ❖ Regular monitoring (once every 6 months) and analysing the quality of water in open well, bore wells and surface water.

4.4 AIR ENVIRONMENT

Anticipated Impact

- ❖ Emission of air pollutants such as particular matter (PM), gases such as sulphur dioxide, oxides of nitrogen at various stages of activities such as excavation and transportation of materials. The rate of emission and the incremental concentration of pollutants is estimated in the following sections before providing mitigation measures.

Table 4.1 Incremental and Resultant PM_{2.5}

Station ID	Distance to core area (km)	Direction	PM 2.5 concentrations (µg/m ³)			Comparison against air quality standard (60 µg/m ³)	Magnitude of change (%)	Significance
			Base line	Pred icted	Total			
AAQ1	0.12	W	23.1	8.25	31.35	Below standard	35.71	Not significant
AAQ2	1.88	SW	19.7	0.5	20.2		2.54	
AAQ3	4.24	SW	23.9	0	23.9		0.00	
AAQ4	2.94	NE	22.0	0.5	22.5		2.27	
AAQ5	1.87	NNW	21.0	0.5	21.5		2.38	
AAQ6	4.46	NW	19.1	0	19.1		0.00	
AAQ7	3.80	SSE	23.7	0.5	24.2		2.11	
AAQ8	3.87	N	19.9	0	19.9		0.00	

Table 4.2 Incremental and Resultant PM₁₀

Station ID	Distance to core area (km)	Direction	PM ₁₀ concentrations (µg/m ³)			Comparison against air quality standard (100 µg/m ³)	Magnitude of change (%)	Significance
			Base line	Pred icted	Total			
AAQ1	0.12	W	45.5	15.2	60.7	Below standard	33.41	Not significant
AAQ2	1.88	SW	34.2	0.5	34.7		1.46	
AAQ3	4.24	SW	43.3	0	43.3		0.00	
AAQ4	2.94	NE	41.0	1	42		2.44	
AAQ5	1.87	NNW	39.2	0.5	39.7		1.28	
AAQ6	4.46	NW	37.0	0	37		0.00	
AAQ7	3.80	SSE	47.4	0.5	47.9		1.05	
AAQ8	3.87	N	36.4	0	36.4		0.00	

Table 4.3 Incremental & Resultant SO₂

Station ID	Distance to core area (km)	Direction	SO ₂ concentrations (µg/m ³)			Comparison against air quality standard (80 µg/m ³)	Magnitude of change (%)	Significance
			Base line	Pred icted	Total			
AAQ1	0.12	W	9.43	5.77	15.2	Below standard	61.19	Not significant
AAQ2	1.88	SW	9.08	0	9.08		0.00	
AAQ3	4.24	SW	10.00	0	10		0.00	
AAQ4	2.94	NE	8.71	0.5	9.21		5.74	
AAQ5	1.87	NNW	9.15	0.5	9.65		5.46	
AAQ6	4.46	NW	9.99	0	9.99		0.00	
AAQ7	3.80	SSE	9.03	0.5	9.53		5.54	
AAQ8	3.87	N	9.14	0	9.14		0.00	

Table 4.4 Incremental & Resultant NO_x

Station ID	Distance to core area (km)	Direction	NO _x concentrations(µg/m ³)			Comparison against air quality standard (80 µg/m ³)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.12	W	20.0	4.44	24.44	Below standard	22.20	Not significant
AAQ2	1.88	SW	16.8	0.1	16.9		0.60	
AAQ3	4.24	SW	17.9	0	17.9		0.00	
AAQ4	2.94	NE	17.8	0.1	17.9		0.56	
AAQ5	1.87	NNW	18.2	0.5	18.7		2.75	
AAQ6	4.46	NW	19.1	0	19.1		0.00	
AAQ7	3.80	SSE	18.4	0.1	18.5		0.54	
AAQ8	3.87	N	17.0	0	17		0.00	

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.

Mitigation Measures

Haul Road and Transportation

- ❖ Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- ❖ Transportation of material will be carried out during day time and material will be covered with tarpaulin
- ❖ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust
- ❖ Water sprinkling on haul roads and loading points will be carried out twice a day
- ❖ Main source of gaseous pollution will be from vehicle used for transportation of mineral. Therefore, weekly maintenance of machines improves combustion process and reduces pollution.
- ❖ The un-metalled haul roads will be compacted weekly before being put into use.

- ❖ Overloading of tippers will be avoided to prevent spillage.
- ❖ It will be ensured that all transportation vehicles carry a valid PUC certificate.
- ❖ Haul roads and service roads will be graded to clear accumulation of loose materials.

Green Belt

- ❖ Planting of trees all along mine haul roads outside the lease and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of tractors/tippers.
- ❖ Green belt of adequate width will be developed around the project site.

Occupational Health

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

4.5 NOISE ENVIRONMENT

Anticipated Impact

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)
Kanniyappan Lease	140	48.6	54.24	55.29
Sirudamur	370	45.6	45.80	48.71
Kattankulam	4190	42.5	24.72	42.57
Pazhaveri	2900	42.9	27.91	43.04
Madhur	1870	40.2	31.72	40.78
Vayalakkavoor	4380	39.8	24.33	39.92
Edamichi	3780	38.0	25.61	38.24
Thirumukkudal	3850	44.9	25.45	44.95
NAAQ Standards	Industrial Day Time - 75 dB (A) & Night Time- 70 dB (A) Residential Day Time -55 dB (A) & Night Time- 45 dB (A)			

Total noise level in all the sampling areas is well below the CPCB standards for industrial and residential areas. By adopting suitable mitigation measures, the noise levels due to the project can be controlled further.

Mitigation Measures

- ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- ❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise.
- ❖ Silencers / mufflers will be installed in all machineries
- ❖ Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise
- ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness
- ❖ Regular medical check-up and proper training 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	Fly rock distance in m	Air Blast	
					Pressure (kpa)	Sound Level (dB)
P1	119	370	1.77	23	0.85	153

Table 4.7 Predicted PPV Values due to Blasting at 100-500 m radius

Location ID	Maximum Charge in kgs	Radial Distance in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kpa)	Sound Level (dB)
P1	119	100	14.43	23	4.06	166
		200	4.76		1.77	159
		300	2.48		1.09	155
		400	1.57		0.77	152
		500	1.09		0.59	149

The peak particle velocity produced by the charge of 119 kg is well below that of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. But the project proponent ensures that the charge per blast shall be less than 94 kg and that the proponent shall carry out blasting twice or thrice a day based on the onsite conditions under the supervision of competent person employed. However, as per statutory requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

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 so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ❖ Appropriate blasting techniques shall be adopted in such a way that the predicted peak particle velocity shall not exceed 0.251mm/s

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

4.6 BIOLOGICAL ENVIRONMENT

Impact on Ecology and Biodiversity

- 75% of Eucalyptus trees in the lease area are artificially planted, and 4 Phoenix sylvestris trees are in the quarry lease area.
- Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region.

Carbon released from quarrying machineries and tippers during quarrying would be 5942 kg per day, 1604216 kg per year and 8021080 kg over five years

Table 4.8 Carbon Released During Two Years of Rough stone and gravel Production

	Per day	Per year	Per five years
Fuel consumption of excavator	385	104022	520110
Fuel consumption of compressor	119	32076	160380
Fuel consumption of tipper	1713	462490	2312450
Total fuel consumption in liters	2217	598588	2992940
Co ₂ emission in kg	5942	1604216	8021080

Mitigation Measures on Flora

- ❖ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- ❖ Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- ❖ None of the plants in the lease area will be cut during operational phase of the mine. We recommend uprooting and planting 3 trees in the 7.5-meter safety zone to prevent general damage during quarrying. As the survival rate due to uprooting was only 30%, 90 seedlings were procured at the rate of 10 seedlings per tree. Seedlings are planted and protected in 7.5-meter safety zone.

Carbon Sequestration

- ❖ To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 24 kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.

- ❖ 75% of the leased area is covered by eucalyptus trees. It is cultivated trees and 4 Phoenix sylvestris trees. Since the survival rate of uprooting is 30%, 10 seedlings per tree are procured and planted in a safety zone of 7.5 meters and protected.
- ❖ As per the greenbelt development plan as recommended by SEAC (Table 4.13), about 2183 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 149 kg of the total carbon, as provided in Table 4.7.

Table 4.9 CO₂ Sequestration

CO ₂ sequestration in kg	149	40220	201099
Remaining CO ₂ not sequestered in kg	5793	1563996	7819981
Trees required for environmental compensation	65167		
Area required for environmental compensation in hectares	130		

4.7 SOCIO ECONOMIC ENVIRONMENT

Anticipated Impact

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

Mitigation Measures

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

4.8 OCCUPATIONAL HEALTH MEASURES

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

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

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

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

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 & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM _{2.5} , PM ₁₀ , SO ₂ and NO _x .
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall

3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in m BGL
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Soil	2 Locations (1 Core & 1 Buffer)	-	Once in six months	Physical and chemical characteristics
7	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 60,000/-
2	Meteorology	-	Rs 15,000/-
3	Water Quality	-	Rs 20,000/-
4	Water Level Monitoring		Rs 10,000/-
5	Soil Quality	-	Rs 20,000/-
6	Noise Quality	-	Rs 10,000/-
7	Vibration Study	-	Rs 1,50,000/-
8	Greenbelt	-	Rs 10,000/-
Total		-	Rs 2,95,000 /-

Source: Field Data

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

- The results on the cumulative impact of the three proposed projects on air environment of the cluster do not exceed the permissible limits set by CPCB for air pollutants.
- The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time.
- PPV resulting from five proposed projects is well below the permissible limit of Peak Particle Velocity of 8 mm/s.
- The five proposed projects will allocate Rs. 2500000/- towards CER as recommended by SEAC.
- The five proposed projects will directly provide jobs to 127 local people, in addition to indirect jobs.
- The five proposed project will plant 8676 about trees in and around the lease area.
- The five proposed projects will add 873 PCU per day to the nearby roads.

7.4 PLASTIC WASTE MANAGEMENT PLAN

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

Objective

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

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

CHAPTER VIII

PROJECT BENEFITS

Various benefits are envisaged due to the proposed mine and benefits anticipated from the proposed project to the locality, neighbourhood, region and nation as a whole are:

- ❖ Direct employment to 29 local people
- ❖ Rain water harvesting structures to augment the water availability for irrigation and plantation and ground water recharge

- ❖ Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- ❖ Strengthening of existing community facilities through the Community Development Program
- ❖ Skill development & capacity building like vocational training
- ❖ Awareness program and community activities, like health camps, medical aids, sports & cultural activities, plantation etc.,
- ❖ CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Siruthamur Village, CSR budget is allocated as 2.5% of the profit.
- ❖ Rs. 5,00,000 will be allocated for CER.

Table 8.1 CER Action Plan

S. No.	Activity	Budget (Rs.in Lakh)
1	The applicant Indents to involve in corporate environment responsibilities (CER) activities such as renovation of existing toilet, plantation within the school premises, donating environment related books to the nearby school library, etc.	Rs.5,00,000
	Total	Rs. 5,00,000

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

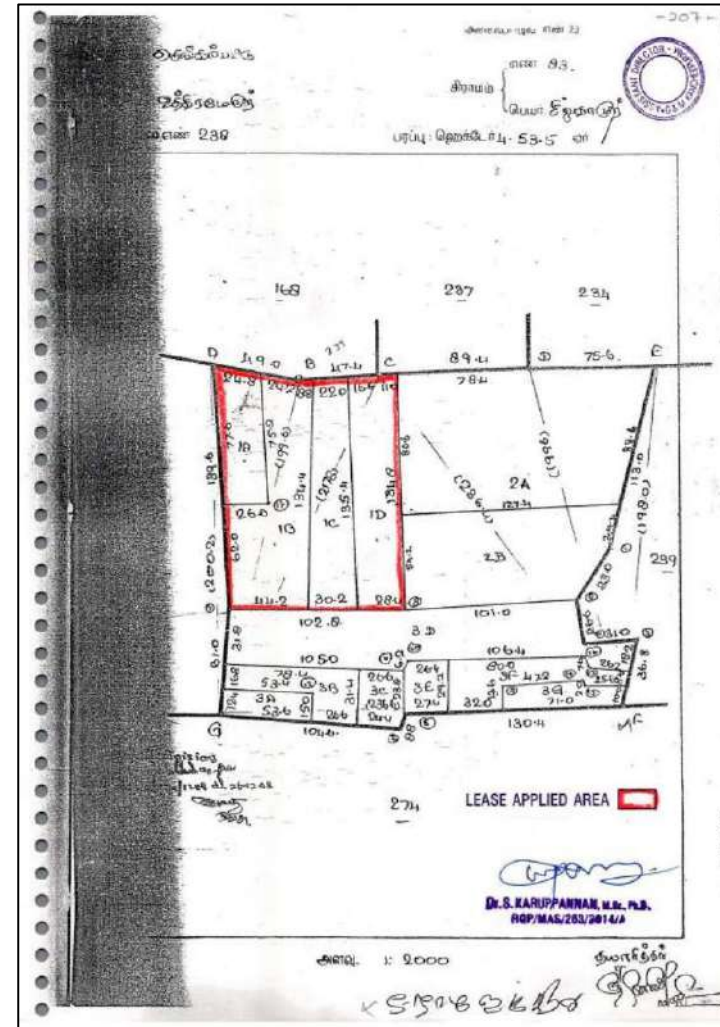
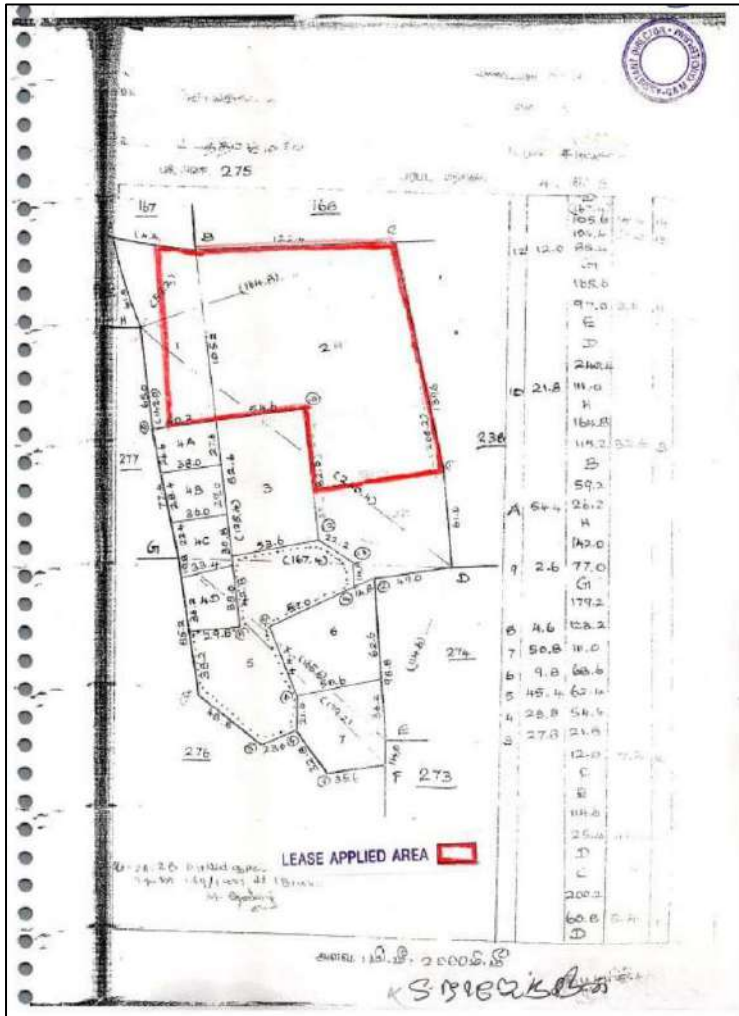
CHAPTER X

ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of Rs. **6507855** as capital cost and recurring cost as Rs. **3061532** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be Rs. **23538821**.

LAND DOCUMENTS


Some of the important land related documents are shown in below.



An FMP sketch showing proposed lease area in red colour

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ANNEXURE - V




1	2	3	4	5	6	7	8	9	10	11	12	
			7-4	6	1	85	0	19.5	0	30	0.21	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
												3 44 5 6 47
	2											
	225-1	P	7-4	6	1	85	0	51.5	0	9	856	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
			7-4	6	1	85	2	00.0	3	71	23	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
			7-4	6	1	85	4	44.5	0	81	762	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
	4A		7-4	6	1	85	0	11.1	0	20	256	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
	4B		7-4	6	1	85	0	11.0	0	21	433	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
	4C		7-4	6	1	85	0	11.0	0	21	256	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
	4D		7-4	6	1	85	0	11.0	0	20	413	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
	5							0	56.5			பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
	6		7-4	6	1	85	0	31.0	0	59	761	

* தி. சீரணி (1) மற்றும் (2) இல் உள்ளவை

செ. சீரணி

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பி. சீரணி (1) மற்றும் (2)



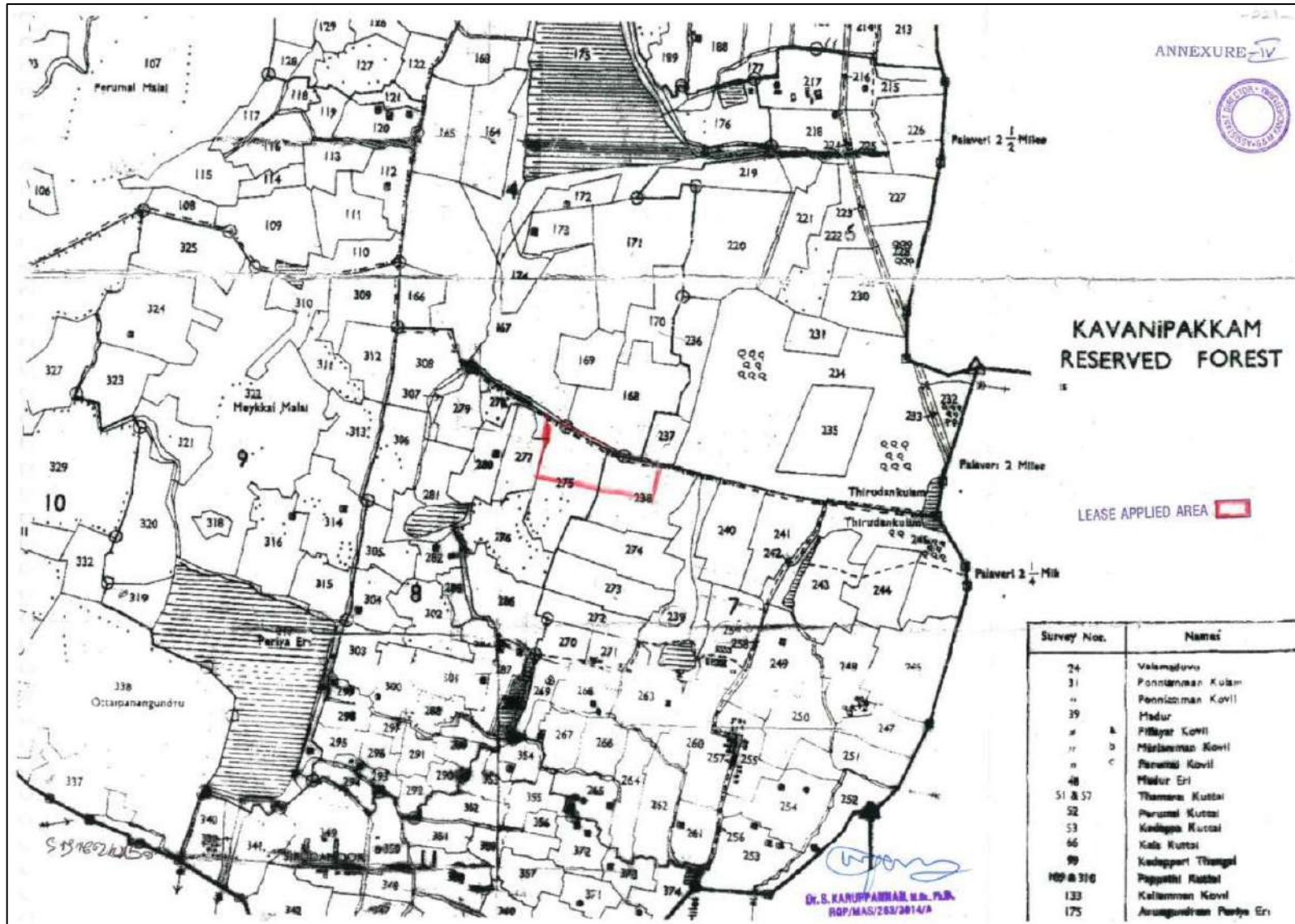
1	2	3	4	5	6	7	8	9	10	11	12		
	257-1	P						0	22.0				
	1A		7-2	6	1	85	0	22.0	0	40	141	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	1B		7-2	6	1	85	0	26.0	0	85	402	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	1C		7-2	6	1	85	0	32.5	0	62	377	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	1D		7-2	6	1	85	0	36.5	0	67	106	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	2							1	72.0	3	19	759	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
	3A		7-2	6	1	85	0	08.0	0	15	418	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	3B		7-2	6	1	85	0	18.0	0	33	107	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	3C		7-2	6	1	85	0	08.0	0	15	418	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	3D		7-2	6	1	85	0	74.5	1	38	418	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	3E		7-2	6	1	85	0	08.0	0	15	107	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	3F		7-2	6	1	85	0	18.5	0	35	418	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	3G		7-2	6	1	85	0	09.5	0	18	117	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)	
	259-1	P						0	23.5	0	74	416	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
	2							0	16.0	0	49	215	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)
	3							0	09.0	0	28	275	பி. சீரணி (1), க. சீரணி (2), பி. சீரணி (2)

* தி. சீரணி (1) மற்றும் (2) இல் உள்ளவை

செ. சீரணி

Dr. S. EARUPPANNAR, I.R. M.A.
RGP/MAS/283/2014/A

A Register Documents



Copy of Village Map