

# EXECUTIVE SUMMARY

“B1” CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND

Project Proponent - P1	Project Proponent - P2
<b>Thiru. S. A. Ganesan,</b> S/o. S.R. Arumugam, No. 12/4C, Kalangal Road, Arima Nagar, Sulur Taluk, Coimbatore District – 641 402. <b>Extent: 1.76.5 ha</b>	<b>Tmt. S. Maheshwari</b> W/o. Subramaniyam, No. 2/3, Panchayat Office Street, Periya Kuyilai Post, Sulur Taluk, Coimbatore - 641 201 <b>Extent: 1.61.5 ha</b>

## PACHAPALAYAM CLUSTER ROUGH STONE AND GRAVEL QUARRY

S.F. Nos: **260/1A1, 260/1B1, 260/1C1 & 260/1D1, 344/4, 344/6A & 344/6B1**  
Pachapalayam Village, Sulur Tauk, Coimbatore District  
Tamil Nadu State

**CLUSTER EXTENT = 24.39.35 ha**

**Complied as per ToR Obtained vide**

**P1- Lr.No. SEIAA-TN/F.No.8805/ToR-1105/2021 Dated: 21.03.2022**

**P2-Lr.No. SEIAA-TN/F.No.9391/ToR-1288/2022 Dated: 08.10.2022**

**Environmental Consultant**

**GEO EXPLORATION AND MINING SOLUTIONS** 

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**Accredited for sector 1 Category ‘A’ & 38 Category ‘B’**  
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\* Calculated as per MoEF & CC Notification – S.O. 2269(E) Dated: 01.07.2016

## 1. 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 project.

Rough Stone & Gravel is the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of proposed & existing quarries of Pachapalayam Rough Stone Quarry consisting of one Proposed and Three Existing Quarry with total extent of Cluster of 24.39.35 ha in Pachapalayam Village, Sulur Taluk, Coimbatore District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

Baseline Monitoring study has been carried out during the period of March 2022 to May 2022 and this EIA and EMP report is prepared for considering cumulative impacts arising out of this project, the Cumulative Environmental Impact Assessment study is undertaken, which is followed by preparation of a detailed Environmental Management Plan (EMP) individually to minimize those adverse impacts.

**“Draft EIA report prepared on the basis of ToR Issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu”**

### 1.1 DETAILS OF PROJECT PROPONENT –

Project	P1	P2
Name of the Project Proponent	S.A.Ganesan	S.Maheshwari
Address	S/o. S.R. Arumugam, No. 12/4C, Kalangal Road, Arima Nagar, Sulur Taluk, Coimbatore District – 641 402	W/o. Subramaniam, No. 2/3, Panchayat Office Street, Periya Kuyilai Post, Sulur Taluk, Coimbatore -641 201.
Mobile	+91 9942599259	+91 98942 44471
Status	Individual	Individual

**1.2 QUARRY DETAILS WITHIN 500 M RADIUS**

CODE	Name of the Owner	S.F. Nos & Village	Extent in Ha	Status
P1	Thiru. S.A. Ganesan, S/o. S.R. Arumugam, No. 12/4C, Kalangal Road, Arima Nagar, Sular Taluk, Coimbatore – 641 402.	260/1A1, 260/1B1, 260/1C1 & 260/1D1 & Pachpalayam	1.76.5	TOR obtained vide Lr.No. SEIAA- TN/F.No.8805/SEAC/ToR -1105/2021 Dated: 21.03.2022
P2	Tmt. S. Maheshwari W/o. Subramaniam, No. 2/3,Panchayat Office Street,Periya Kuyilai Post, Sular Taluk, Coimbatore - 641 201	344/4, 344/6A & 344/6B1 & Pachpalayam	1.61.5	TOR obtained vide Lr.No. SEIAA-TN/F.No.9391 /ToR-1288/2022 Dated: 08.10.2022
P3	Thiru. K. Ganesh, S/o. Krishnasamy, No. 7A/15, K.G. Pudur, Chettipalayam, Coimbatore – 641 201	407/1F & 407/1G & Pachpalayam	2.46.0	Under process in Geology Department
P4	Thiru. Ramji S/o. K. Chinnasamy, No.3/142A,Kangayampal ayam,Sular Taluk, Coimbatore - 641 401	261/3 & Pachpalayam	1.98.5	EC obtained
P5	Thiru. M.Muralikrishnan, No.5/118- B,J.K.Farms, Thegani, Sular Taluk, Periyakuyilai, Coimbatore –641 201	343/2A, 343/2A1, 343/4A & 343/3A & Pachpalayam	2.35.85	EC obtained
<b>TOTAL EXTENT</b>			<b>10.18.35</b>	
<b>EXISTING QUARRIES</b>				
CODE	Name of the Owner	S.F. Nos	Extent in Ha	Status
E1	N. Muruganantham	261/1 (P), 261/2 (P)	1.63.0	12.06.2020 to 11.06.2025
E2	R.Durairaj	163/1, 163/2 (P)	2.79.0	10.11.2017 to 09.11.2022
E3	M.Muralikrishnan	333/1, 343/1A & 343/1B	3.55.5	11.11.2017 to 10.11.2022
E4	M. Meyyarasu	333/1	2.61.5	12.08.2017 to 11.08.2022
E5	A. Selvaraj	342/7D	1.33.5	22.01.2019 to 21.01.2024
E6	S. Sakthivel	334/2B, 334/3B, 334/4A & 334/4B	2.28.5	24.11.2018 to 23.11.2023
<b>TOTAL EXTENT</b>			<b>14.21.0</b>	
<b>EXPIRED QUARRY</b>				
EX-1	Tlv.Ultra Readymix concrete Pvt Ltd	-	0.69.0	-
<b>TOTAL EXTENT</b>			<b>0.69.0</b>	
<b>TOTAL CLUSTER EXTENT</b>			<b>24.39.35</b>	

**TABLE 1.3 SALIENT FEATURES OF THE PROPOSAL**

Name of the Project	Thiru.S.A. Ganesan Rough stone quarry	
Toposheet No	58-F/01	
Latitude between	10° 53'28.09" N to 10°53'34.20" N	
Longitude between	77° 04'22.54" E to 77°04'25.72" E	
Highest Elevation	388m AMSL	
Proposed Depth of Mining	62 m bgl (2 m topsoil + 60m Rough Stone)	
Geological Resources	Rough Stone in m <sup>3</sup>	Topsoil m <sup>3</sup>
	4,27,412	512
Mineable Reserves	Rough Stone in m <sup>3</sup>	Topsoil m <sup>3</sup>
	1,14,360	-
Yearwise production recommended in ToR	Rough Stone in m <sup>3</sup>	Topsoil m <sup>3</sup>
	1,14,360	-
Existing pit Dimension	172m (L) x 80m (W) x 39m (D) (Below the Ground level)	
Environmental Clearance	Lr.No. SEIAA-TN/F.No.3604/EC/1(a)/2691/2015 dated: 08.01.2016.	
Consent to Operate (CTO) from TNPCB	Proceedings No. F.1100CBS/RS/DEE/TNPCB/CBS/W/2016 Dated: 04/05/2016.	
Ultimate Pit Dimension	172m (L) x 80m (W) x 62m (D)	
Water Level measured in the surrounding area	73m-68m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits undulated terrain. The area has gentle sloping towards South side. The altitude of the area is 388m (max) above mean sea level. The area is covered by 2m thickness of topsoil formation. Massive Charnockite is found after 2m of topsoil formation which is clearly inferred from the existing quarrying pit.	
Machinery proposed	Jack Hammer	3 Nos
	Compressor	1 No
	Hydraulic Excavator	1 No
	Tippers	2 Nos
Blasting method and type of Explosives proposed	Controlled Blasting Method by shot hole drilling (30.-32mm dia hole) and small dia of 25mm slurry explosive are proposed to use for winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	18 Nos	
Project Cost	Rs.42,53,000/-	
CER Cost	Rs.5,00,000/-	
Nearby Water Bodies	Odai	80 m SE
	Odai	2km SE
	Kothavadi Lake	8.5km South
Greenbelt Development Plan	1080 trees will be planned in safety area, approach road and panchayat roads	
Proposed Water Requirement	3.2 KLD	
Nearest Habitation	770m Northeast	

**TABLE 1.3A: BRIEF DESCRIPTION OF THE PROJECT**

Name of the Project	Tmt. S.Maheshwari Rough stone and Gravel quarry	
Toposheet No	58-F/01	
Latitude between	10° 53'44.59" N to 10°53'50.95" N	
Longitude between	77° 04'52.24" E to 77°04'56.71" E	
Highest Elevation	400m AMSL	
Proposed Depth of Mining	47 m bgl (2m Gravel + 45m Rough Stone)	
Geological Resources	Rough Stone in m <sup>3</sup>	Gravel m <sup>3</sup>
	490297	906
Mineable Reserves	Rough Stone in m <sup>3</sup>	Gravel m <sup>3</sup>
	70486	-
Yearwise production After Bench reduction	Rough Stone in m <sup>3</sup>	Gravel m <sup>3</sup>
	61,615	-
Existing pit Dimension	153m (L) x 127m (W) x 22m (D) (Below the Ground level)	

Environmental Clearance	Lr.No. SEIAA-TN/F.No.3550/1(a)/EC.No.3154/2015 dated: 11.03.2016. Lr.No.DEIAA-CBE-V/F.No.407/1(a)/EC.No.60/2018 dated 10.12.2018	
Consent to Operate (CTO) from TNPCB	Proceedings No. R.C.No.455/MM2/2013 Dated 04.08.2016	
Ultimate Pit Dimension	153m (L) x 127m (W) x 47m (D)	
Water Level measured in the surrounding area	65m-70m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is flat terrain. The area has gentle sloping towards Southwestern side. The altitude of the area is 400m (max) above mean sea level. The area is covered by 2m thickness of Gravel formation. Massive Charnockite is found after 2m of Gravel formation which is clearly inferred from the existing quarrying pit.	
Machinery proposed	Jack Hammer	2 Nos
	Compressor	1 No
	Hydraulic Excavator	1 No
	Tippers	1 No
Blasting method and type of Explosives proposed	Controlled Blasting Method by shot hole drilling (30.-32mm dia hole) and small dia of 25mm slurry explosive are proposed to use for winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	13 Nos	
Project Cost	Rs. 46,31,000/-	
CER Cost	Rs.5,00,000/-	
Nearby Water Bodies	Odai	350m NW
	Odai	1.3km SE
	Kothavadi Lake	9.0km South
Greenbelt Development Plan	970 trees will be planned in safety area, approach road and panchayat roads	
Proposed Water Requirement	1.6 KLD	
Nearest Habitation	330m Northwest	

### 1.3 STATUTORY DETAILS

#### Proponent – P1

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 16.12.2020
- Precise Area Communication Letter was issued by the District Collector, Coimbatore, vide letter no. Rc.No.1645/Mines/2020 Dated: 03.08.2021
- The Mining Plan was prepared by Qualified Person and approved by Assistant Director, Geology and Mining, Coimbatore District, vide R.C.No. 1645/Mines/2020, Dated:24.08.2021
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/67678/2021 Date: 18.09.2021

#### Proponent – P2

- The proponent applied for Rough Stone Quarry Lease Dated: 16.12.2021.
- Precise Area Communication Letter was issued by the District Collector, Coimbatore Rc.No.1361/Mines/2021, Dated: 20.04.2022

- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Coimbatore District, vide Rc.No1361/Mines/2021 Dated 18.05.2022.
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/79909/2022 Date: 11.07.2022.

## 2. PROJECT DESCRIPTION

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

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

### 2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Nearest Roadway	National Highway (NH-83) Dindigul – Coimbatore – 9km - West State Highway (SH-163) Chettipalayam – Pappampatti – 5km - Northwest.
Nearest Village	Pachapalayam – 1.0Km – NW
Nearest Town	Sulur – 15km – NE
Nearest Railway	Chettipalayam Railway Station – 5km – NW
Nearest Airport	Coimbatore Airport – 18km – NW
Seaport	Kochi - 140km - SW

## 2.2 LAND USE PATTERN OF THE PROPOSED PROJECT

PROJECT – P1		
Description	Present area in (ha)	Area at the end of life of quarry (Ha)
Area under quarry	1.28.5	1.28.5
Infrastructure	Nil	0.01.0
Road	0.02.0	0.02.0
Green Belt	Nil	0.10.0
Unutilized area	0.46.0	0.35.0
<b>Grand Total</b>	<b>1.76.5</b>	<b>1.76.5</b>
PROJECT – P2		
Description	Present area in (ha)	Area at the end of life of quarry (Ha)
Area under quarry	1.43.5	1.43.5
Infrastructure	Nil	Nil
Road	0.01.0	0.02.0
Green Belt	Nil	0.15.0
Unutilized area	0.17.0	0.01.0
<b>Grand Total</b>	<b>1.61.5</b>	<b>1.61.5</b>

## 2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

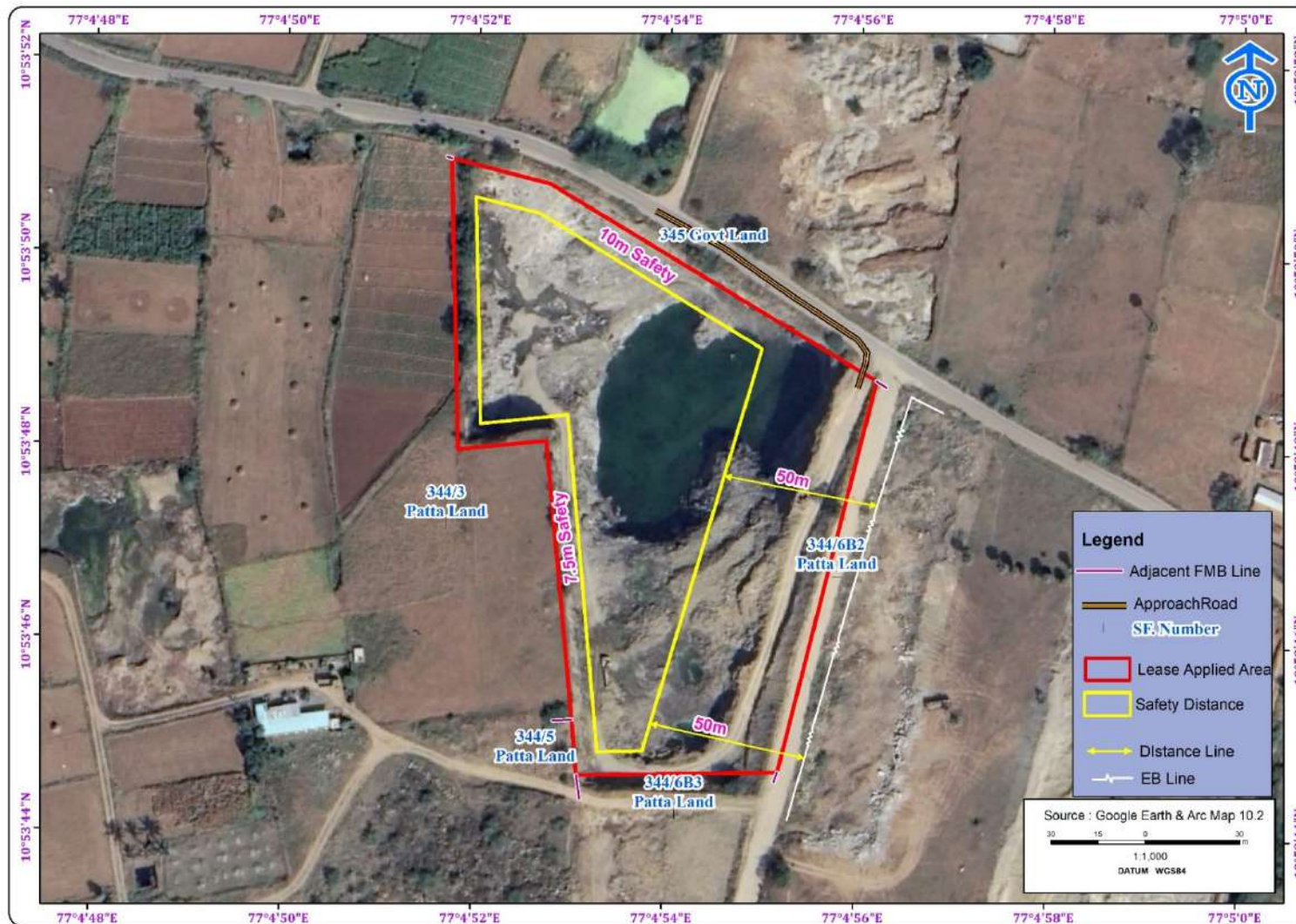
PROJECT – P1		
PARTICULARS	DETAILS	
	Rough Stone in m <sup>3</sup> (5Year Plan period)	Gravel in m <sup>3</sup>
Geological Resources	4,27,412	512
Mineable Reserves	1,14,360	-
Production for five-year plan period as per ToR	1,14,360	-
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day	76 m <sup>3</sup>	-
No of Lorry loads (6m <sup>3</sup> per load)	13	-
Total Depth of Mining	62m bgl	
PROJECT – P2		
PARTICULARS	DETAILS	
	Rough Stone in m <sup>3</sup> (5Year Plan period)	Gravel in m <sup>3</sup>
Geological Resources	4,90,297	906
Mineable Reserves	70,486	-
Production for five-year plan period After Bench reduction	61,615	-
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day	41	-
No of Lorry loads (6m <sup>3</sup> per load)	4	-
Total Depth of Mining	47m bgl	

FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA

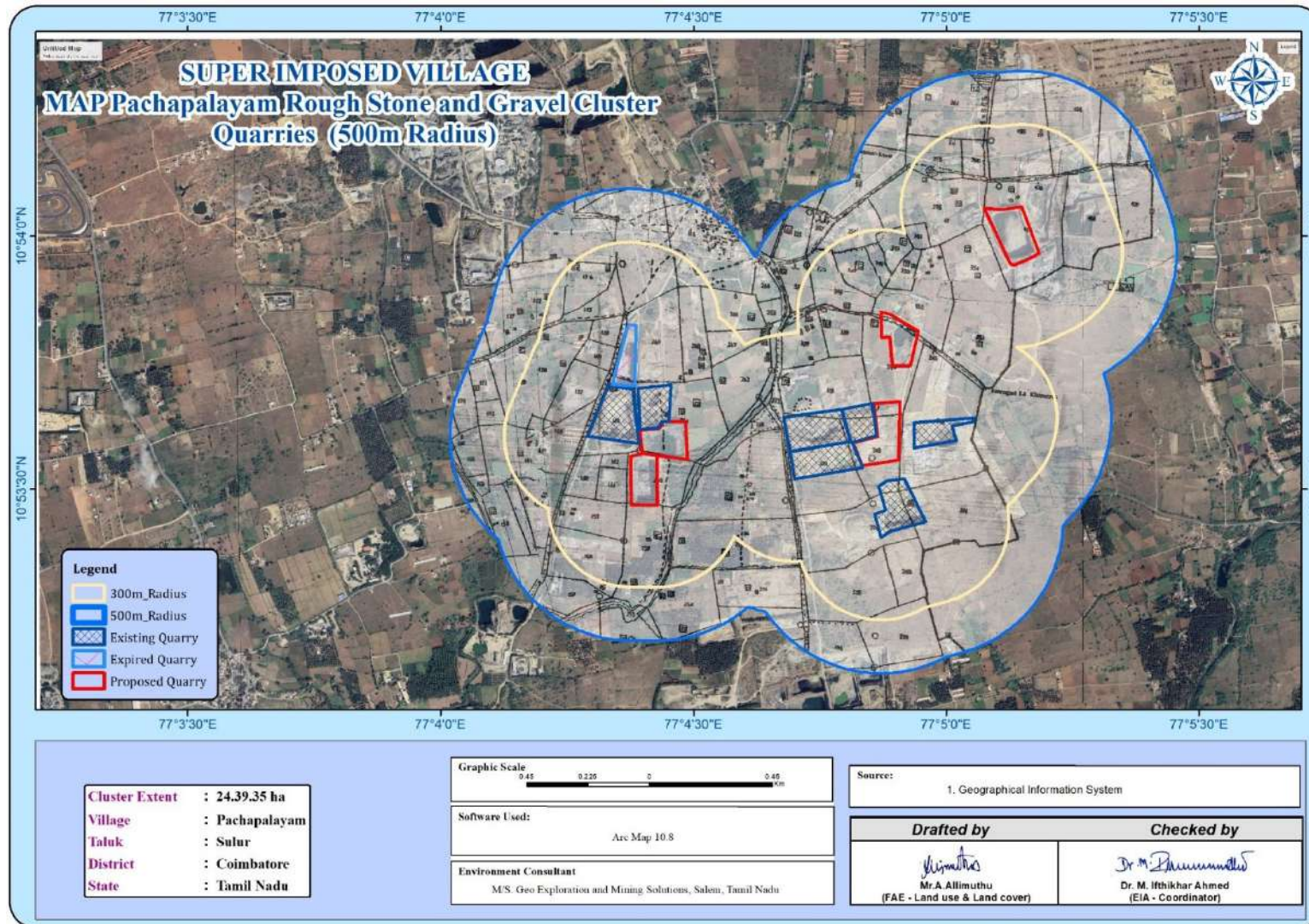




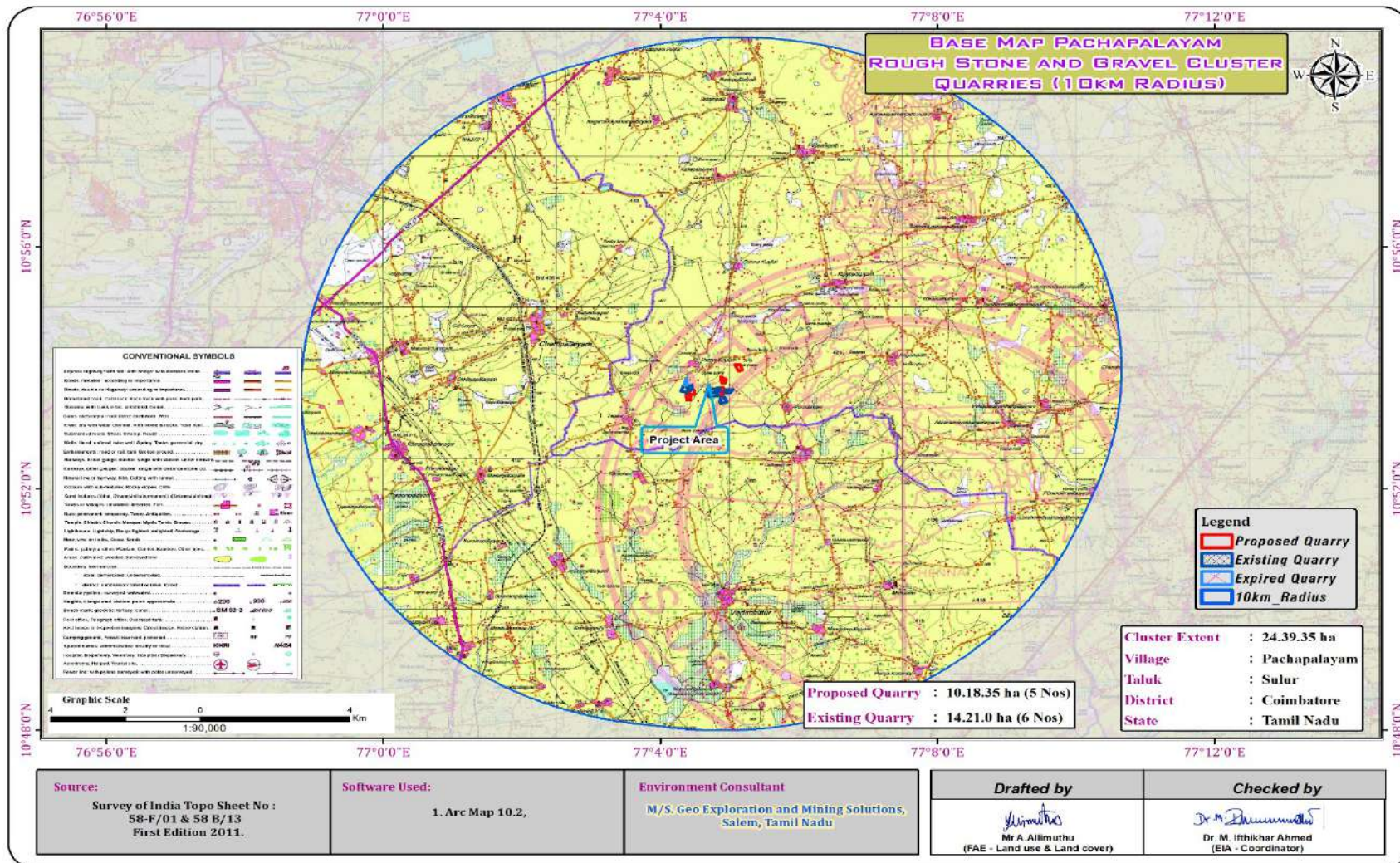
FIGURE – 1A: GOOGLE IMAGE SHOWING PROJECT AREA



**FIGURE – 2: GOOGLE IMAGE SHOWING PROPOSED PROJECT (500 m)**



**FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS**



**FIGURE – 4: QUARRY LEASE PLAN & SURFACE PLAN**

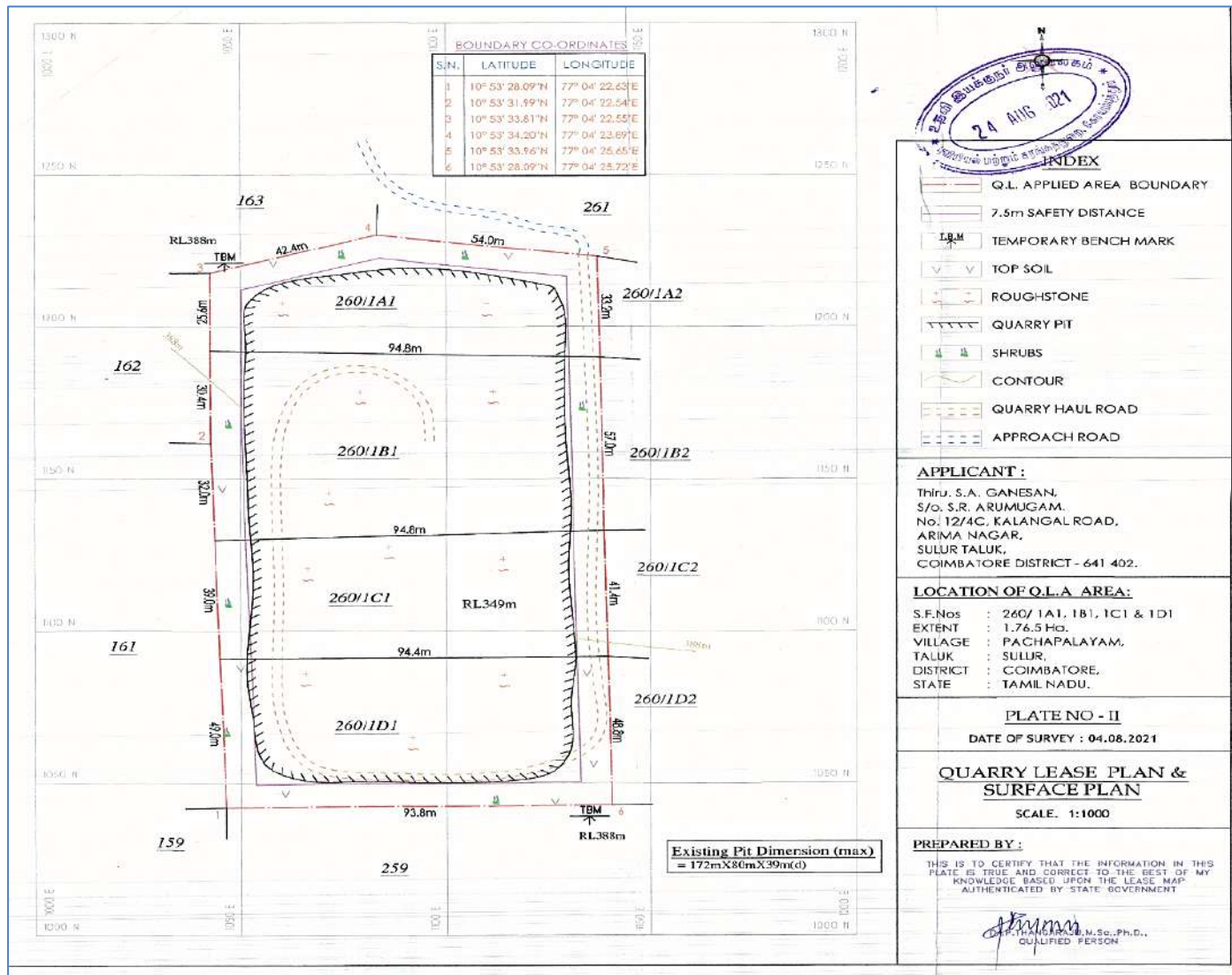
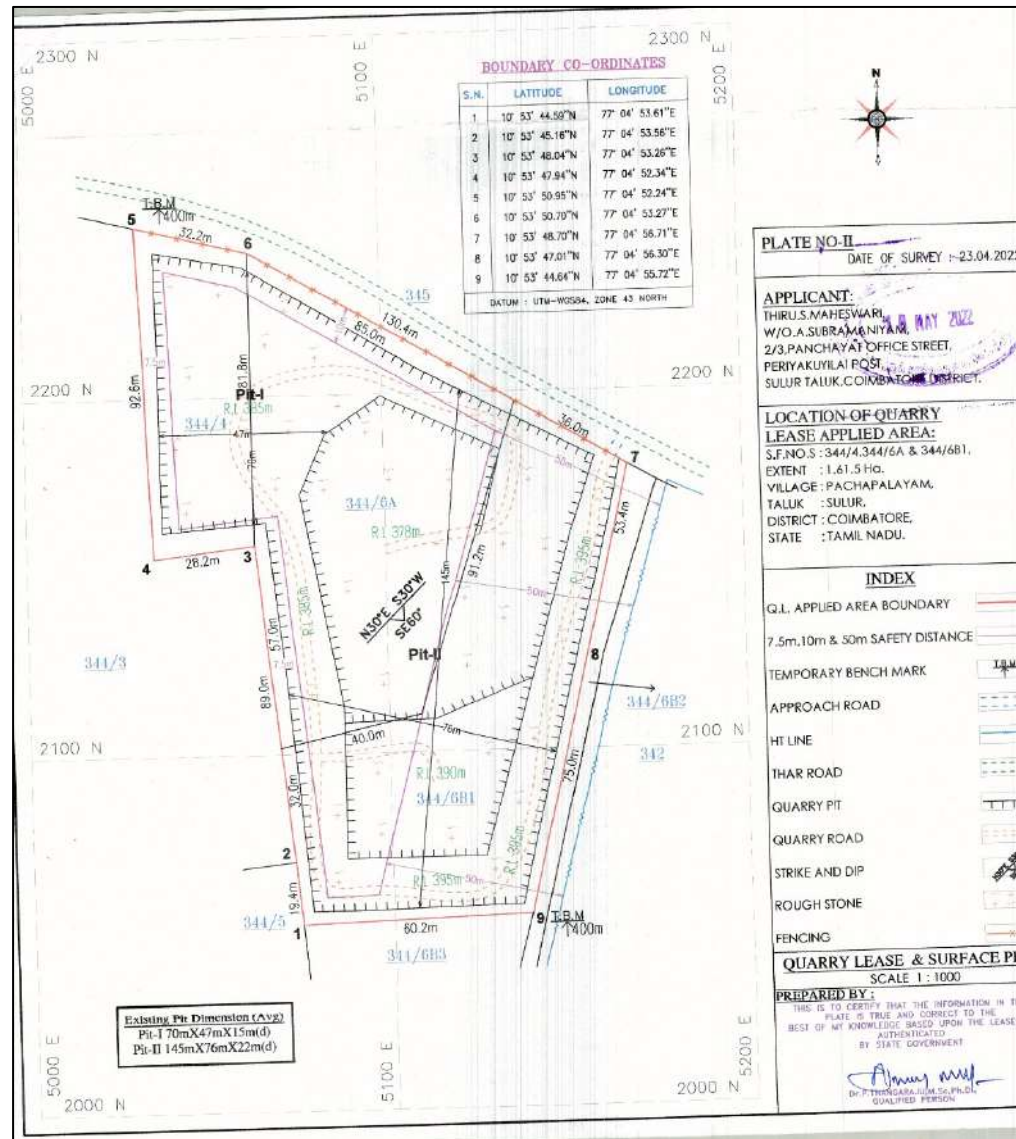


FIGURE – 4A: QUARRY LEASE PLAN & SURFACE PLAN



## 2.4 METHOD OF MINING

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

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

## 2.5 PROPOSED MACHINERY DEPLOYMENT

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

## 2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

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

## 2.7 ULTIMATE PIT DIMENSION

PROPOSAL – P1			
Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
1	172	80	62
PROPOSAL – P2			
Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
1	153	127	47

### 3.0 DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out covering March, April & May 2022 with CPCB guidelines. Environmental data has been collected with reference to cluster quarries by Chennai Mettix Lab Private Limited Approved by AAI, AGMARK, APEDA, BIS, EIC FSSAI, GAFTA, IOPEPC, MOEF & TEA BOARD Certified & MoEF Notified Laboratory, for the below attributes –

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

#### 3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Data's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (1 core & 5 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (2 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automat ic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourly twice a week (March 2022 to May 2022)	8 (1 core & 7 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	8 (1 core & 7 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

### 3.2 LAND ENVIRONMENT

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

**TABLE 3.1: LAND USE / LAND COVER TABLE 10 KM RADIUS**

S.No	CLASSIFICATION	AREA_HA	AREA_%
<b>BUILTUP</b>			
1	URBAN	268.10	0.80
2	RURAL	895.70	2.66
3	MINING	1850.40	5.49
<b>AGRICULTURAL LAND</b>			
4	CROP LAND	18963.30	56.24
5	PLANTATION	3273.47	9.71
6	FALLOW LAND	7455.25	22.11
<b>BARREN/WASTE LANDS</b>			
7	SCRUB LAND	934.21	2.77
<b>WETLANDS/ WATER BODIES</b>			
8	WATER BODIES/LAKE	78.57	0.23
<b>TOTAL</b>		<b>33719.00</b>	<b>100.00</b>

From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture and fallow land (includes crop land) 87.74% followed by Built-up Lands - 9.1%, Scrub lands – 2.77%, and Water bodies 0.23%.

The total mining area within the study area is 1850.40 ha i.e., 5.66%. The cluster area of 8.86.0 ha contributes about 0.49% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

### 3.3 SOIL ENVIRONMENT

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

#### Interpretation & Conclusion

##### Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 1.12-1.32 g/cc. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e. ranging from 44.6 – 50.2 %.



**Chemical Characteristics –**

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.54 to 8.54
- The available Nitrogen content range between 148 to 180 kg/ha
- The available Phosphorus content range between 1.10 to 1.64 kg/ha
- The available Potassium range between 36.8 to 44.2 mg/kg.

**3.4 WATER ENVIRONMENT**

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

**Surface Water**

The pH varied from 7.30 to 7.54 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

**Total Dissolved Solids:**

Total Dissolved Solids varied from 502 to 504 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

**Other parameters:**

Chloride content is 128 to 184 mg/l. Nitrates varied from 12.8 to 18.2 mg/l, while sulphates varied from 30 to 32 mg/l..

**Ground Water**

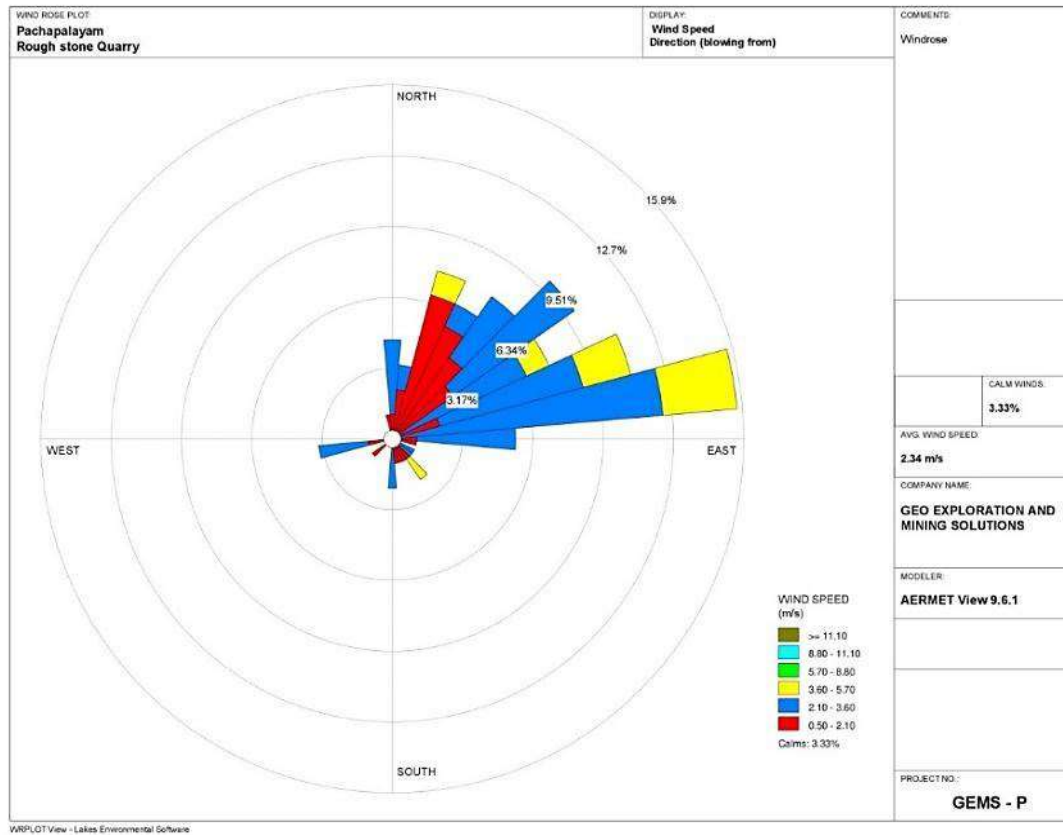
The pH of the water samples collected ranged from 7.28 to 7.52 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 516 - 618 mg/l in all samples. The Total hardness varied between 162 – 252 mg/l for all samples.

On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits

**3.5 AIR ENVIRONMENT**

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the proposed quarry forms the baseline information.

**FIGURE – 6: WIND ROSE DIAGRAM**



### 3.6 SUMMARY OF AMBIENT AIR QUALITY

As per monitoring data, PM10 ranges from 50.2 µg/m<sup>3</sup> to 69.8 µg/m<sup>3</sup>, PM2.5 data ranges from 20.2 µg/m<sup>3</sup> to 39.8 µg/m<sup>3</sup>, SO<sub>2</sub> ranges from 8.7µg/m<sup>3</sup> to 10.3 µg/m<sup>3</sup> and NO<sub>2</sub> data ranges from 20.7 µg/m<sup>3</sup> to 23.7 µg/m<sup>3</sup>. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

### 3.7 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 (Seven) locations around the proposed project area. Noise levels recorded in core zone during day time 59.2 dB (A) Leq and during night time were from 49.6 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 50.4 to 52.1 dB (A) Leq and during night time were from 39.8 to 42.0 dB (A) Leq

The values of noise observed in some of the areas are primarily owing to quarrying activities due to cluster of quarries within 500m radius, movement of vehicles and other anthropogenic activities.

### **3.8 ECOLOGICAL ENVIRONMENT**

Ecology is a branch of science which dealing the relations and interactions between organisms and their environment. An ecological survey of the study area was conducted, particularly with reference to listing of species and assessment of the existing baseline ecological conditions in the study area. The main objective of biological study is to collect the baseline data regarding flora and fauna in the study area. Data has been collected through extensive survey of the area with reference to flora and fauna. Information is also collected from different sources i.e. government departments such as District Forest Office, Government of Tamil Nadu. On the basis of onsite observations as well as forest department records the checklist of flora and fauna was prepared.

### **3.9 SOCIO ECONOMIC ENVIRONMENT**

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

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

The proposed project will aim to provide preferential 31 persons to the local people there by improving the indirect employment opportunity for 50 persons and in turn the social standards will improve.

## **4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

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

### **4.1 LAND ENVIRONMENT:**

#### **ANTICIPATED IMPACT**

- Permanent or temporary change on land use and land cover.
- Change in Topography: Topography of the ML area will change at the end of the life of the mine.
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.

- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.
- If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course

#### **MITIGATION MEASURES**

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

## **4.2 SOIL ENVIRONMENT**

### **IMPACT ON SOIL ENVIRONMENT**

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

### **MITIGATION MEASURES FOR SOIL CONSERVATION**

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

## 4.2 WATER ENVIRONMENT

### ANTICIPATED IMPACT

- The major sources of water pollution normally associated due to mining and allied operations are:
  - Generation of waste water from vehicle washing.
  - Washouts from surface exposure or working areas
  - Domestic sewage
  - Disturbance to drainage course in the project area
  - Mine Pit water discharge
- Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of Oil & grease, suspended solids.
- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining
- Abstraction of water may lead to depletion of water table.

### MITIGATION MEASURES

- Garland drain, settling tank will be constructed along the project area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting system.
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;

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

### 4.3 AIR ENVIRONMENT

#### ANTICIPATED IMPACT

- During mining, at various stages activities such as excavation, drilling, blasting, and transportation of materials, particular matter (PM), gases such as Sulphur dioxide, oxides of Nitrogen from vehicular exhaust are the main air pollutants.
- Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area.

#### MITIGATION MEASURES

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

#### **Advantages of Wet Drilling:-**

- In this system dust gets suppressed close to its formation. Dust suppression become very effective and the work environment will be improved from the point of occupational comfort and health.
- Due to dust free atmosphere, the life of engine, compressor etc., will be increased.
- The life of drill bit will be increased.
- The rate of penetration of drill will be increased.
- Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

### **Blasting –**

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

### **Haul Road & Transportation –**

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

### **Green Belt –**

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

### **Occupational Health –**

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical check-ups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers & tipper drivers
- **Ambient Air Quality Monitoring will be conducted** six month once to assess effectiveness of mitigation measures proposed

## 4.4 NOISE ENVIRONMENT

### ANTICIPATED IMPACT

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

- Source data
- Receptor data
- Attenuation factor

### MITIGATION MEASURES

- Usage of sharp drill bits while drilling which will help in reducing noise;
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders;
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained;
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness.
- **Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.**

## 4.5 BIOLOGICAL ENVIRONMENT

### ANTICIPATED IMPACT

The proposed mining activities include removal of some scattered bushes and other thorny species. Although impacts on key habitat elements will occur on a local scale, but on a regional scale they would not be critical for the life cycle needs of the species observed or expected. Moreover, during conceptual stage, the mined-out areas on 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.

Wild life is not commonly found in the project area and its immediate environs because of lack of vegetal cover and surface water. Except few domestic animals, reptiles, hares and some common birds are observed in the study area.



- I. None of the plants will be cut during operational phase of the mine.
- II. There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.
- III. 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

## MITIGATION MEASURES

Keeping all this in mind the mitigations have been suggested under environmental management plan. With the understanding of the role of plant species as bio-filter to control air pollution, appropriate plant species (mainly tree species) have been suggested conceding the area/site requirements and needed performance of specific species.

The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas

In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly in proposed areas falls in the cluster earmarked for plantation program as per Approved Mining Plan in different phases. This habitat improvement program would ensure the faunal species to re-colonize and improve the abundance status in the core zone.

### The objectives of the green belt cover will cover the following:

- Noise abatement
- Ecological restoration
- Aesthetic, biological and visual improvement of area due to improved vegetative and plantations cover.

## GREENBELT DEVELOPMENT PLAN

PROPOSAL – P1					
Year	No. of trees proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
I	1080	80%	Safety barrier, Village roads & Approach roads	Neem, Pongamia Pinnata, etc.,	864
PROPOSAL – P2					
Year	No. of trees proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
I	970	80%	Safety barrier, Village roads & Approach roads	Neem, Pongamia Pinnata, etc.,	800

## **4.6 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

## **5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)**

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

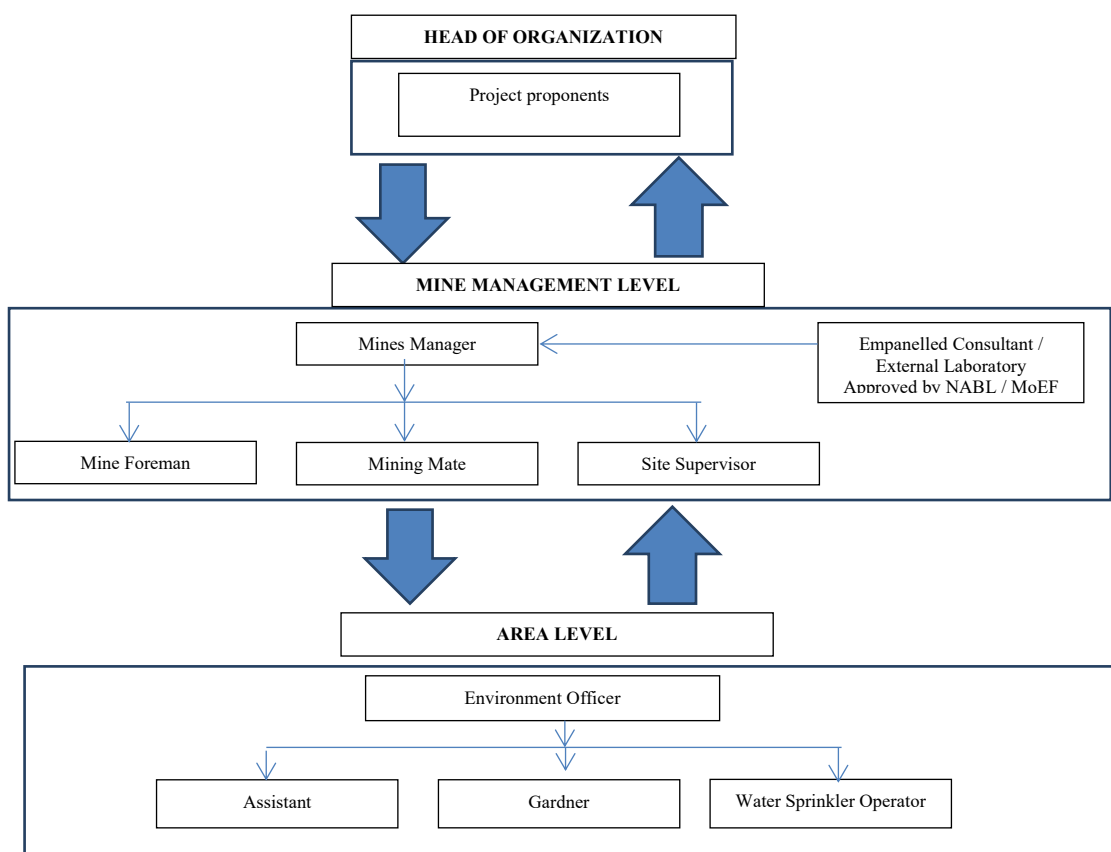
## **6. ENVIRONMENT MONITORING PROGRAM**

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

The responsibilities of this cell will be:

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

### 6.1 ENVIRONMENTAL MONITORING CELL



### 6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	8 Locations (2 Core & 6 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM2.5, PM10, SO2 and NOx.
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	7 Locations (2SW & 5 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	7 Locations (2 Core & 5 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	5 Locations (2 Core & 3 Buffer)	-	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

## **7. ADDITIONAL STUDIES**

### **7.1 RISK ASSESSMENT**

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

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

### **7.2 DISASTER MANAGEMENT PLAN**

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

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

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

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

### 7.3 CUMULATIVE IMPACT STUDY

**TABLE 7.1: CUMULATIVE PRODUCTION LOAD OF ROUGH STONE**

Quarry	Production for five year plan period	Per Year Production in m <sup>3</sup>	Per Day Production in m <sup>3</sup>	Number of Lorry Load Per Day
P1	1,14,360	22,872	76	6
P2	61,615	14,097	47	4
P3	1,83,078	36,616	122	10
P4	2,11,150	42,230	141	12
P5	2,15,125	43,025	143	12
<b>Total</b>	<b>7,94,199</b>	<b>1,58,840</b>	<b>529</b>	<b>44</b>
E1	1,46,240	29,248	97	8
E2	90,680	18,136	60	5
E3	2,10,125	42,025	140	12
E4	1,96,670	39,334	131	11
E5	1,09,550	21,910	73	6
E6	3,41,635	68,327	228	19
<b>Total</b>	<b>10,94,900</b>	<b>2,18,980</b>	<b>729</b>	<b>61</b>
<b>Grand Total</b>	<b>18,89,099</b>	<b>3,77,820</b>	<b>1,258</b>	<b>105</b>

**TABLE 7.2 CUMULATIVE PRODUCTION LOAD OF GRAVEL**

Quarry	Production for five year plan period	Per Year Production in m <sup>3</sup>	Per Day Production in m <sup>3</sup>	Number of Lorry Load Per Day
P1	-	-	-	-
P2	-	-	-	-
P3	-	-	-	-
P4	-	-	-	-
P5	57,700	19,233	64	5
<b>Total</b>	<b>57,700</b>	<b>19,233</b>	<b>64</b>	<b>5</b>
E1	10336	3445	11	1
E2	-	-	-	-
E3	57,700	19,233	64	5
E4	6,080	2,026	6	1
E5	27,903	9,301	31	3
E6	36,182	12,060	40	3
<b>Total</b>	<b>1,38,201</b>	<b>46,065</b>	<b>152</b>	<b>13</b>
<b>Grand Total</b>	<b>1,95,901</b>	<b>65,298</b>	<b>216</b>	<b>18</b>

**TABLE 7.3: EMPLOYMENT BENEFITS FROM 4 MINES**

Description	Employment
P1	18
P2	13
P3	20
P4	19
P5	32
<b>Total</b>	<b>102</b>
E1	23
E2	21
E3	32
E4	12
E5	23
E6	11
<b>Total</b>	<b>122</b>
<b>Grand Total</b>	<b>224</b>

**TABLE 7.4: SOCIO ECONOMIC BENEFITS FROM 4 MINES**

Location ID	Project Cost	CER
P1	Rs.42,53,000	Rs.5,00,000
P2	Rs. 46,31,000	Rs.5,00,000
P3	Rs.80,92,200	Rs.5,00,000
P4	Rs.48,54,580	Rs.5,00,000
P5	Rs. 63,50,200	Rs.5,00,000
<b>Total</b>	<b>Rs. 2,43,53,280</b>	<b>Rs.25,00,000</b>
E1	Rs.57,99,000	Rs.1,16,000
E2	Rs.59,20,000	Rs.1,18,400
E3	Rs.63,50,200	Rs. 1,27,000
E4	Rs.61,44,500	Rs. 1,22,890
E5	Rs.46,79,393	Rs. 93,587
E6	Rs.45,17,000	Rs. 90,340
<b>Total</b>	<b>Rs. 3,34,10,093</b>	<b>Rs 6,68,217</b>
<b>Grand Total</b>	<b>Rs. 5,77,63,373</b>	<b>Rs. 31,68,217</b>

## 8. PROJECT BENEFITS

- ✚ Pachapalayam Rough Stone & Gravel for Quarrying Rough Stone at Pachapalayam Village aims to produce 1,81,951 m<sup>3</sup> Rough Stone 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

## 9. ENVIRONMENT MANAGEMENT PLAN

The Environment Monitoring Cell discussed 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 be responsible for:

- ✚ Monitoring of the water/ waste water quality, air quality and solid waste generated
- ✚ Analysis of the water and air samples collected through external laboratory
- ✚ Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- ✚ Co-ordination of the environment related activities within the project as well as with outside agencies
- ✚ Collection of health statistics of the workers and population of the surrounding villages
- ✚ Green belt development
- ✚ Monitoring the progress of implementation of the environmental monitoring programme
- ✚ Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

## **10. CONCLUSION**

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