EXECUTIVE SUMMARY

"B1"CATEGORY (Cluster) – MINOR MINERAL – CLUSTER –

PATTA LAND- EXISTING QUARRY

PACHAPALAYAM & KALLAPALAYAM ROUGH STONE AND GRAVEL QUARRIES

Cluster Extent – 19.55.9Ha

Project Proponents

Code	Project Proponents	PROJECT LOCATION	PROPOSED PRODUCTION
P1	Thiru. V.Gopalakrishnan	291/1A **Extent: 2.43.5Ha** of Pachapalayam Village, Sulur Taluk, Coimbatore District	**Reserves: 2,26,170m³ of Rough stone, Gravel = 7,764m³** **Peak Production = 51,660m³ of Rough Stone, Gravel= 6,620 r Proposed Depth = 46m (1m Gravel + 45m Rough stone) bgl**
P2	M/s.Tamilnadu Blue metals	263/1A(P), 264/1(P) **Extent: 1.91.0 ha** of Kallapalayam Village, Sulur Taluk, Coimbatore District,	**Reserves: 1,51,295m³ of Rough stone** **Peak Production = 30,810m³ of Rough Stone Proposed Depth = 27m bgl**

Complied as per ToR Obtained Vide

Lr. No. SEIAA-TN/F.No.10502/SEAC/1(a)ToR-1666/2023 Dated:08.02.2024-P1

Lr.No. F.No.10786/ToR Identification No: TO24B0108TN5672058N Dated: 31/05/2024-P3

Environmental Consultant	Laboratory
GEO EXPLORATION AND MINING SOLUTION Old No. 260-B, New No. 17, Advaitha Ashram Road, Alagapuram, Salem – 636 004, Tamil Nadu, India Accredited for sector 1 Category 'A' ,31 & 38 Category 'B' Certificate No: NABET/EIA/2225/RA0276 Phone: 0427-2431989, Email: ifthiahmed@gmail.com, geothangam@gmail.com Web: www.gemssalem.com	EHS 360 LABS PRIVATE LIMITED, 10/2 Ground floor, 50th street, 7th Avenue, Ashok Nagar, Chennai – 600 083.

Baseline Monitoring Period: March to May 2024

JUNE-2024

1.0 INTRODUCTION

Rough Stone and Gravel are the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of all proposed quarries of Pachapalayam & Kallapalayam Rough Stone and Gravel Cluster Quarries consisting of 4 proposal Quarries and 3 Exiting quarries, 4 expired quarries and 2 abandoned quarries forming Cluster Category {Total Extent of the Cluster is 19.55.9Ha}- in Pachapalayam and Kallapalayam 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. This EIA Report is prepared in compliance with ToR obtained for the below proposals in Table 1.1 and the Baseline Monitoring study has been carried out during the period of March 2024-May 2024.

TABLE 1.1: ToR OBTAINED PROJECTS

CODE	Name of the proponent	Extent (Ha)	Terms of Reference (ToR)
P1	Thiru.V. Gopalakrishnan	2.43.5	**Lr. No. SEIAA-TN/F.No.10502/SEAC/1 (a)ToR-1666/2023 Dated:08.02.2024.**
P2	M/s.Tamilnadu Blue metals	1.91.0	**Lr.No. F.No.10786/ToR Identification No: TO24B0108TN5672058N Dated: 31/05/2024**

Source: ToR Letters of the respective project proponents

"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 PROPONENTS

TABLE 1.1: DETAILS OF PROJECT PROPONENT -P1

Name of the Project Proponent	Thiru. V. Gopalakrishnan
Address	S/o. R.Velusamy, No.2/20, Kongu Illam, Old Post Office Street, Kangayampalayam, Sulur Taluk, Coimbatore District-641 401
Mobile	+91 98422 39937
Email	kgbluemetals@gmail.com
Status	Individual

Source: Approved Mining Plan of respective proposal.

TABLE 1.3: DETAILS OF PROJECT PROPONENT -P2

Name of the Company	Tvl. Tamilnadu Blue Metals Rough Stone & Gravel Quarry Project
Address	1678, Trichy Road, Ramanathapuram, Coimbatore District
Mobile	+9841085555
Status	Partnership firm (Mr. Rajkumar, Managing Partner)

Source: Approved Mining Plan of respective proposal

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRIES					
CODE	**Name of the Owner**	**Village**	**S.F. Nos**	**Extent in Ha**	**Status**
P1	Thiru. V.Gopalakrishnan	Pachapalayam	291/1A	2.43.5	Lr.No. SEIAA-TN/F.No.10502/SEAC/1 (a)ToR-1666/2023 Dated:08.02.2024
P2	Tvl.Tamilnadu Blue metals	Kallapalayam	263/1A(P), 264/1(P)	1.91.0	F.No.10786/ToR Identification No: TO24B0108TN5672058N Dated: 31/05/2024
P3	Thiru.D.Ramesh	Pachapalayam	291/1B1A	0.91.0	F.No.7812/ ToR Identification No TO24B0108TN5380920A Dated:03.06.2024
P4	M/s.Ultra sahara Sand	Orattukuppai	320 (P)	6.36.0	Application Processed
	TOTAL EXTENT			**11.61.5Ha**	
EXISTING QUARRIES					
CODE	**Name of the Owner**	**Village**	**S.F. Nos**	**Extent in Ha**	**Lease Period**
E-1	M/S. Ultra Readymix Concrete P Ltd,	Orattukuppai	320 (P), 332/2A (P)	3.07.4	22.12.2018 -21.12-2023
E-2	M/S.Ultra sahara Sand P Ltd	Orattukuppai	188 (P), 190/1	2.37.0	14.12.2022 -13.12-2027
E-3	M/S.Ultra sahara Sand P Ltd	Orattukuppai	191(P), 198(P)	2.50.0	14.12.2022 -13.12-2027
TOTAL EXTENT				**7.94.4Ha**	
EXPIRED QUARRIES					
CODE	**Name of the Owner**	**Village**	**S.F. Nos**	**Extent in Ha**	**Lease Period**
Ex-1	Thiru.V. Velusamy	Pachapalayam	291/1B2,291/1D1,291/1D2	2.43.5	07.04.2017 -06.04-2020
Ex-2	Thiru.K. Balakrishnan	Pachapalayam	291/1B1B(P)	2.40.5	15.09.2017 -14.09-2022
Ex-3	Thiru.K. Natarajan	Pachapalayam	291/2A2,291/2B	1.83.5	02.06.2016-01.06.2021
Ex-4	M/s.Tamilnadu Blue metals	Kallapalayam	263/2A	6.09.0	EC granted Lr. No. SEIAA-TN/F.No.5418/1(a)/EC No:3288/2016 Dated:11.07.2016
			TOTAL EXTENT	**12.76.5Ha**	
ABANDONED QUARRIES					
A-1	Thiru.N.Boopathyraja	Orattukuppai	291/2A2, 291/2B	1.06.5	02.06.2016 to 01.06.2021
A-2	Tvl.Tamil Nadu Blue metals	Kallapalayam	263/2A	1.60.0	22.05.2011 to 21.05.2016
			TOTAL EXTENT	**2.66.5Ha**	
			CLUSTER EXTENT	**19.55.9Ha**	

TABLE 1.4: SALIENT FEATURES OF THE PROPOSED PROJECTS IN CLUSTER

SALIENT FEATURES OF THE PROPOSED PROJECT-P1

Name of the Project	Thiru. V. Gopalakrishnan Rough stone and Gravel quarry
S.F. No.	291/1A
Extent	2.43.5 ha
Village Taluk and District	Pachapalayam Village, Sulur Taluk, Coimbatore District.
Land Type	Proponent own patta land
Land Ownership	It is a Patta land. Registered in the name of the Thiru. R. Palaniappan vide **Patta No.296.** The applicant has obtained consent from the pattadars for the period of five years from the date of execution of lease.

Existing quarry operation	It is a fresh lease application but, the quarry lease was previously granted in favour of Thiru.R. Palaniappan, over an extent of 2.43.5 Hectares of Patta land in S.F.No.291/1A of Pachapalayam Village, Sulur Taluk, Coimbatore District vide Rc.No.418/Mines/2015, dated: 07.10.2017 for the period of five years from 07.10.2017 to 06.10.2022. The applicant (Thiru.R. Palaniappan) has obtained Environmental Clearance from the State Level Environment Impact Assessment Authority, Tamil Nadu vide Lr. No. SEIAA – TN / F.No.5797 / 1(a) / EC.No.3873 / 2016, Dated: 19.06.2017. Now the applicant (Thiru. V.Gopalakrishnan) has applied a quarry lease for the period of five years on 12.07.2022 over an extent of 2.43.5 Hectares of patta lands in S.F.No. 291/1A of Pachapalayam Village, Sulur Taluk, Coimbatore District.	
EC certificate	Lr. No. SEIAA – TN / F.No.5797 / 1(a) / EC.No.3873 / 2016, Dated: 19.06.2017.	
Explosive certificate	Selva Nandhini Explosives and chemicals (Licence no-E/SC/TN/22/654 (E85920)	
Toposheet No	58 -F/01	
Latitude between	10° 54’ 56.99"N to 10° 55’ 03.75‘’N	
Longitude between	77° 03’ 54.96"E to 77° 04’ 00.37"E	
Elevation of the area	424m AMSL	
Lease period	5 Years	
Mining Plan period	5 years	
Proposed Depth of Mining	46m (1m Gravel + 45m Rough stone) bgl	
	Rough Stone in m^3	Gravel m^3
Geological Resources	8,72,511	8,822
Mineable Reserves	2,26,170	7,764
Proposed Production quantity for the current mining plan	2,26,170	7,764
Peak Production	51,660	6,620
Ultimate Pit Dimension	186m(L) x 142m(W) x 46m(D) (BGL)	
Existing Pit Dimension	Pit I: 140m(L) x 98m(W) x 21m(D) Pit II: 79m(L) x 34m(W) x 1m(D)	
Water Level in the region	70-65 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving small drilling and Controlled blasting using Slurry Explosives	
Topography	The lease applied area is flat terrain. The area has gentle sloping towards Southwestern side and altitude of the area is 424m above from Mean Sea level. The area is covered by 1m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the existing quarry pit.	
Machinery proposed	Jack Hammer	7 Nos
	Compressor	2 No
	Excavator with Bucket and Rock Breaker	2 Nos
	Tippers	3 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	31 Nos	
Operational Cost	Rs. 82,85,000 /-	
EMP Cost	Rs. 3,80,000/-	
Total Project cost	Rs. 86,85,000/-	

CER Cost	Rs. 5,00,000/-	
Nearby Water Bodies	Seasonal Odai	930m South
	Odai	2km NE
	Pallapalayam Lake	7.7km NE
	Noyyal River	8km NW
	Vellalore Lake	8.5km NW
	Singanallur Tank	8.7km NW
Greenbelt Development Plan	Proposed to plant 1220Nos of trees considering 500 Nos of trees/ Ha criteria The plantation will be developed around the project site and nearby village roads	
Proposed Water Requirement	1.5 KLD	
Nearest Habitation	430m – SE	
Nearest Reserve Forest	Bolampatti I R.F – 12.88km –West	
Nearest Wild Life Sanctuary	Indira Gandhi (Anamalai) Wildlife Sanctuary – 44km - South	

Source: Approved Mining & Land Documents.

SALIENT FEATURES OF THE PROPOSED PROJECT-P2

Name of the Quarry	Tvl. Tamilnadu Blue Metals Rough Stone & Gravel Quarry Project	
Toposheet No	58 -I/16	
Latitude between	10°55'05.8546" N to 10°55'11.5313" N	
Longitude between	77°03'56.3316"E to 77°04'02.1862" E	
Highest Elevation	455 m AMSL	
Proposed Depth of Mining (As Per ToR)	27m bgl	
Geological Resources	Rough Stone in m^3	Gravel m^3
	4,37,000	17,912
Mineable Reserves	Rough Stone in m^3	Gravel m^3
	1,51,295	10,064
Proposed Production quantity for the current mining plan (As per ToR)	1,51,295	10,064
Ultimate Pit Dimension	Section XY-AB 148m (L) * 158 m (W) * 27 m Bgl (D)	
Water Level in the surrounds area	45 – 50 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits plain topography. The area has gentle sloping towards South side and altitude of the area is 455m above from Mean Sea Level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the existing quarry pit.	
Machinery proposed	Jack Hammer	5 Nos
	Compressor	1 No
	Excavator with Bucket and Rock Breaker	1 No
	Tippers	2 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	26 Nos	
Operational Cost	Rs.1,27,94,000/-	
EMP cost	Rs.3,80,000/-	
Total Project cost	Rs. 1,31,74,000/-	
CER Cost	Rs.5,00,000/-	
Nearby Water Bodies	Seasonal Odai	1.2km South
	Odai	1.8km NE
	Pallapalayam Lake	7.5km NE

	Noyyal River	7.8km NW
	Vellalore Lake	8.3km NW
	Singanallur Tank	8.5km NW
Greenbelt Development Plan	Proposed to plant 1000 trees in 4,120 Sq.m area in the 7.5 m Safety Zone	
Proposed Water Requirement	2.0 KLD	
Nearest Habitation	680m South East	
R.F boundary	Boluvampatti R.F – 12.8km-W	
Wildlife Sanctuary	Indira Gandhi (Anamalai) -45km-S	

Source: Approved Mining & Land Documents

1.3STATUTORY DETAILS

SCREENING: P1

- Proponent applied for rough stone and Gravel quarry lease on 12.07.2022.
- Precise area communication letter was issued by the District Collector vide Rc.No.797/Mines/2022, Dated: 16.12.2022.
- The Mining plan has been prepared by the Qualified person and got approval vide Letter Rc.No.797/Mines/2022, Dated: 01.06.2023.
- 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/450291/2023 dated 26.10.2023.

SCOPING: P1

- The proposal was placed in 436th SEAC meeting held on 29.12.2023 and the committee recommended for issue of ToR.
- The proposal was considered in 693th SEIAA meeting held on 08.02.2024, issued ToR vide **Lr.No. SEIAA-TN/F.No.10502/SEAC/1 (a)ToR-1666/2023 Dated:08.02.2024.**

SCREENING -P2

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 01.03.2022 & 25.10.2023.
- Precise Area Communication Letter was issued by the District Collector, Coimbatore R.C.198/Mines/2022 Dated:25/10/2023.
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Coimbatore District, vide R.C.No. 198/Mines/2022 Dated:28.11.2023.
- 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 vides online Proposal No. SIA/TN/MIN/466957/2024 Dated: 22.03.2024.

SCOPING -P2

- The proposal was placed in 464th SEAC meeting held on 03/05/2024 and the committee recommended for issue of ToR.
- The proposal was considered in 723th SEIAA meeting held on 24/05/2024 & 27.05.2024 and 30/05/2024 and issued ToR vide File No: 10786/ TOR Identification No: TO24B0108TN5672058N dated: 31.05.2024

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. Rough Stone and Gravel are 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	NH (544) - Salem – Palakad - 6.0 km – North West SH (83) - Othakalmandapam – Pollachi Road- 7.0km –South West SH (163) – Palladam-Kochi Road–2.0km-West
Nearest Village	Pachapalayam -2.0km- SE
Nearest Town	Coimbatore - 14.0 km – NW
Nearest Railway	Coimbatore Junction - 14.0 km – North West
Nearest Airport	Coimbatore– 13km –NW
Seaport	Kochi- 142m – SW

Source: Survey of India Toposheet

2.2 LAND USE PATTERN OF THE PROPOSED PROJECT

TABLE 2.2: LAND USE PATTERN -P1

Description	Present area (Ha)	Area at the end of this quarrying period (Ha)
Area Under Quarrying	1.64.50	2.07.50
Infrastructure	0.01.00	0.01.00
Roads	0.01.00	0.02.00
Green Belt	Nil	0.32.40
Dump	0.16.55	Nil
Unutilized Area	0.60.45	0.00.60
Grand Total	**2.43.50**	**2.43.50**

Source: Approved Mining Plan

TABLE 2.4: LAND USE PATTERN -P2

Description	Present area (Ha)	Area at the end of lease period (Ha)
Area Under Quarry	1.20.0	1.46.0
Site Services	Nil	0.01.0
Roads	0.01.0	0.01.0
Green Belt	Nil	0.41.2
Unutilized Area	0.69.8	0.01.8
Grand Total	**1.91.0**	**1.91.0**

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

TABLE 2.5: RESOURCES AND RESERVES-P1

PARTICULARS	DETAILS	
	Rough Stone	Gravel in m^3 (2year)
Geological Resources	8,72,511	8,822
Mineable Reserves	2,26,170	7,764
Production for five-year plan period	2,26,170	7,764
Peak Production	51,660	6,620
Mining Plan Period / Lease Applied Period	5 Years	
Number of Working Days	300 Days	
Production per day	151	13
No of Lorry loads ($12m^3$ per load)	13	1
Total Depth of Mining	46m (1m gravel +45m Roughstone) below ground level	

Source: Approved mining plan.

TABLE 2.7: RESOURCES AND RESERVES-P2

PARTICULARS	DETAILS	
	Rough Stone	Gravel in m^3 (3 year)
Geological Resources	4,37,000	17,912
Mineable Reserves	1,51,295	10,064
Production for five-year plan period	1,51,295	10,064
Peak Production	30,810	6,868
Mining Plan Period / Lease Applied Period	5 Years	
Number of Working Days	300 Days	
Production per day	101	17
No of Lorry loads ($12m^3$ per load)	8	1
Total Depth of Mining	27m below ground level	

Source: Approved mining plan

FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA

SATELLITE IMAGERY OF P1

SATELLITE IMAGERY OF P2

FIGURE – 2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)

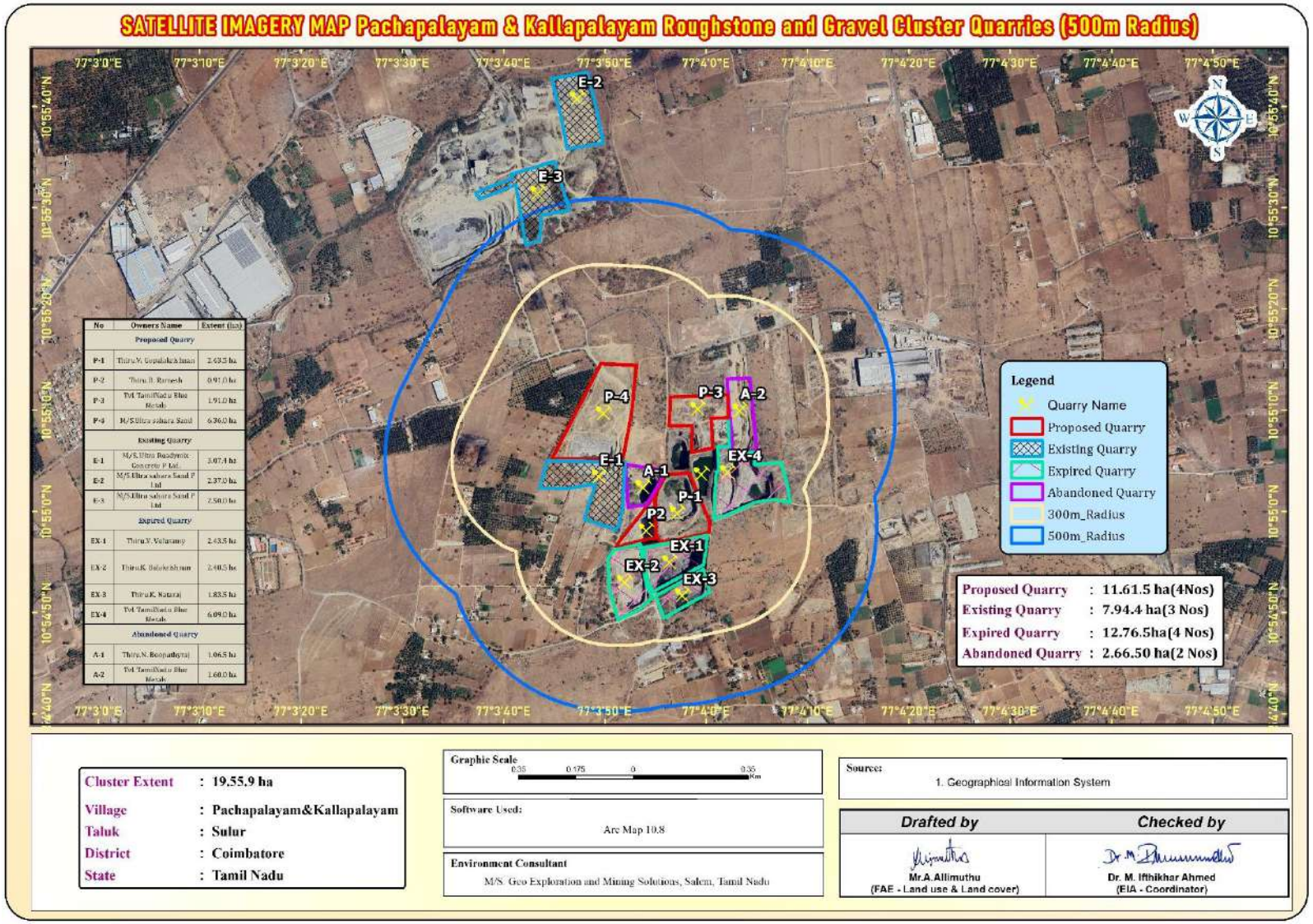


FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS

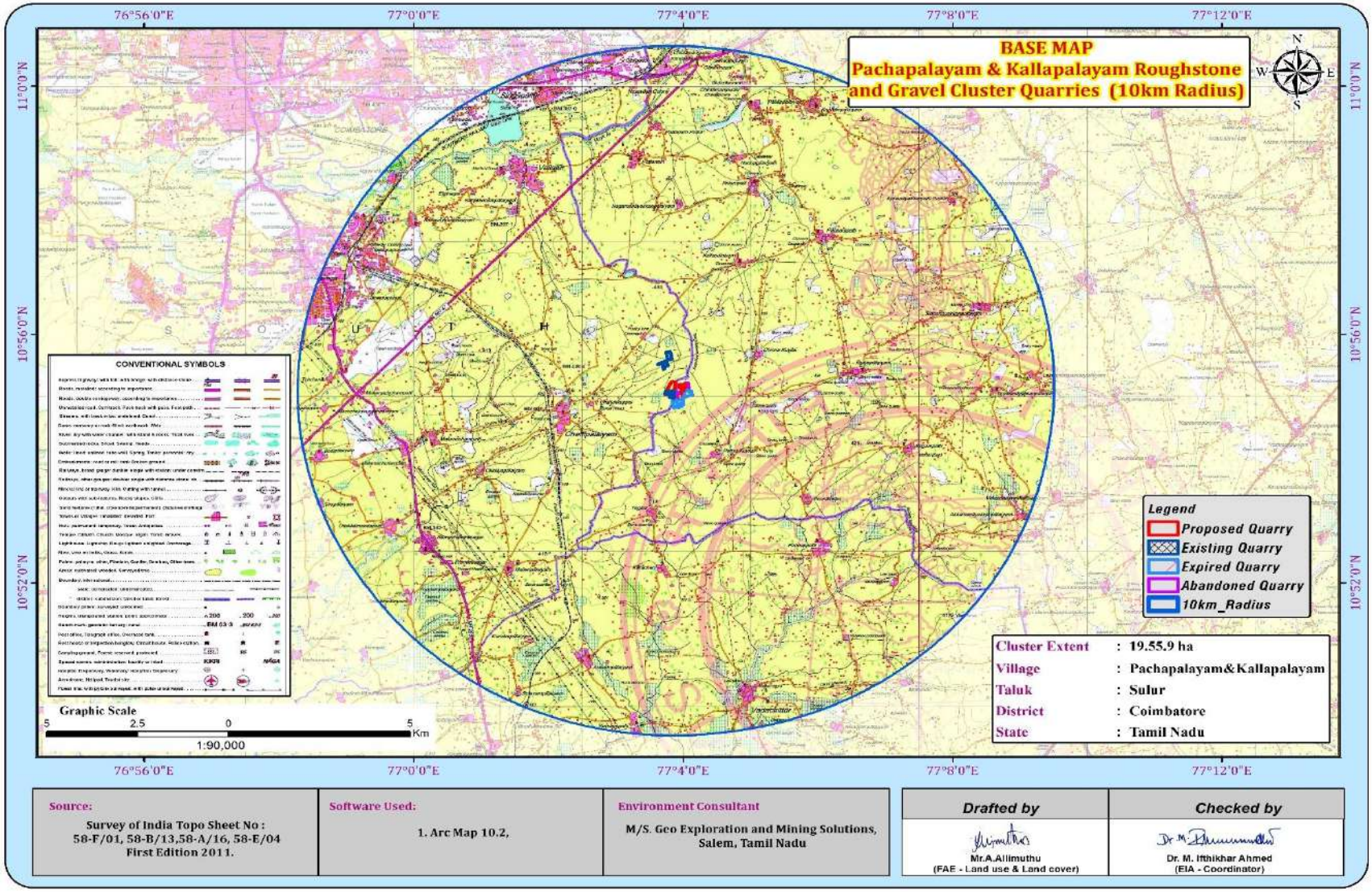


FIGURE – 4: QUARRY LEASE PLAN & SURFACE PLAN -P1

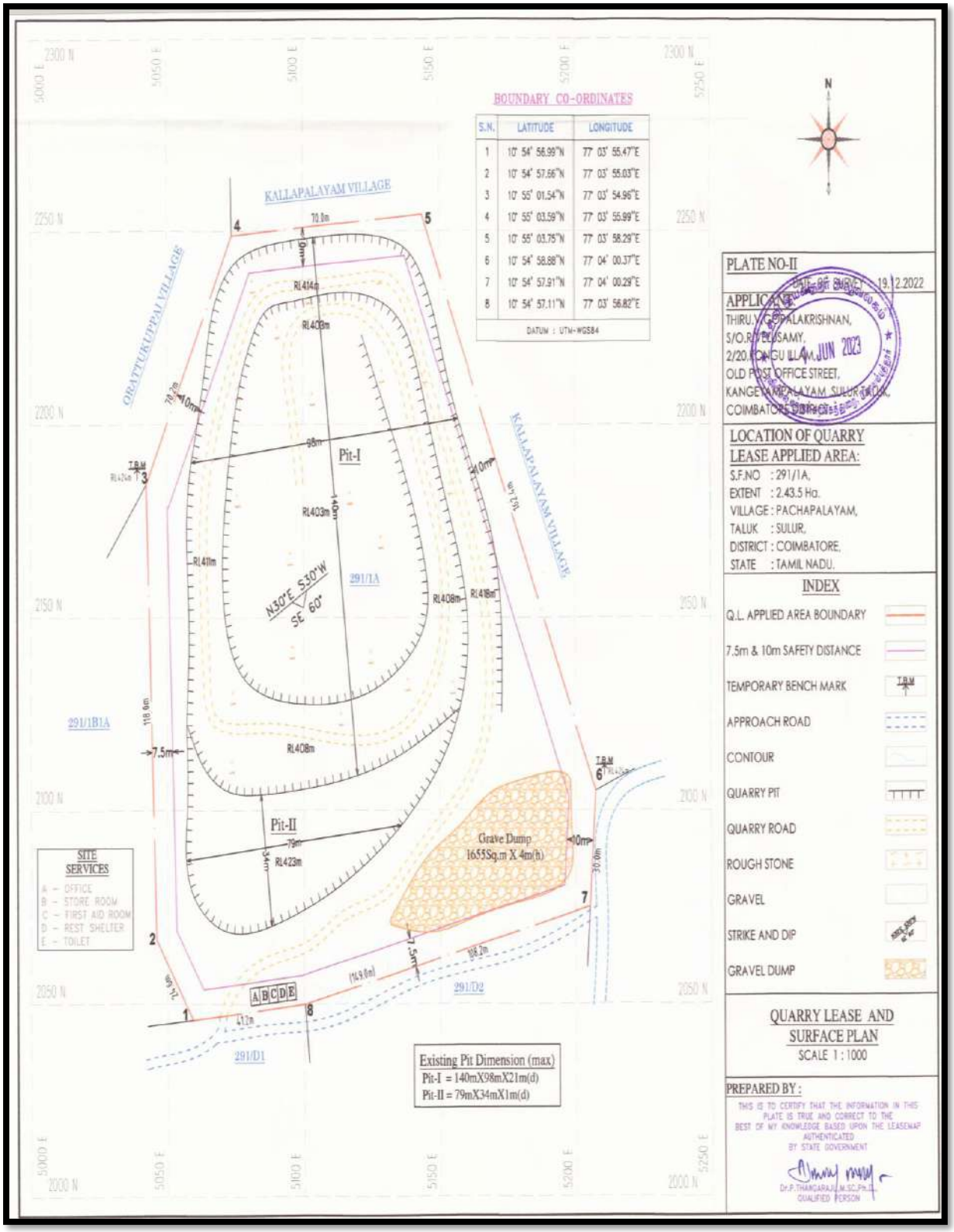
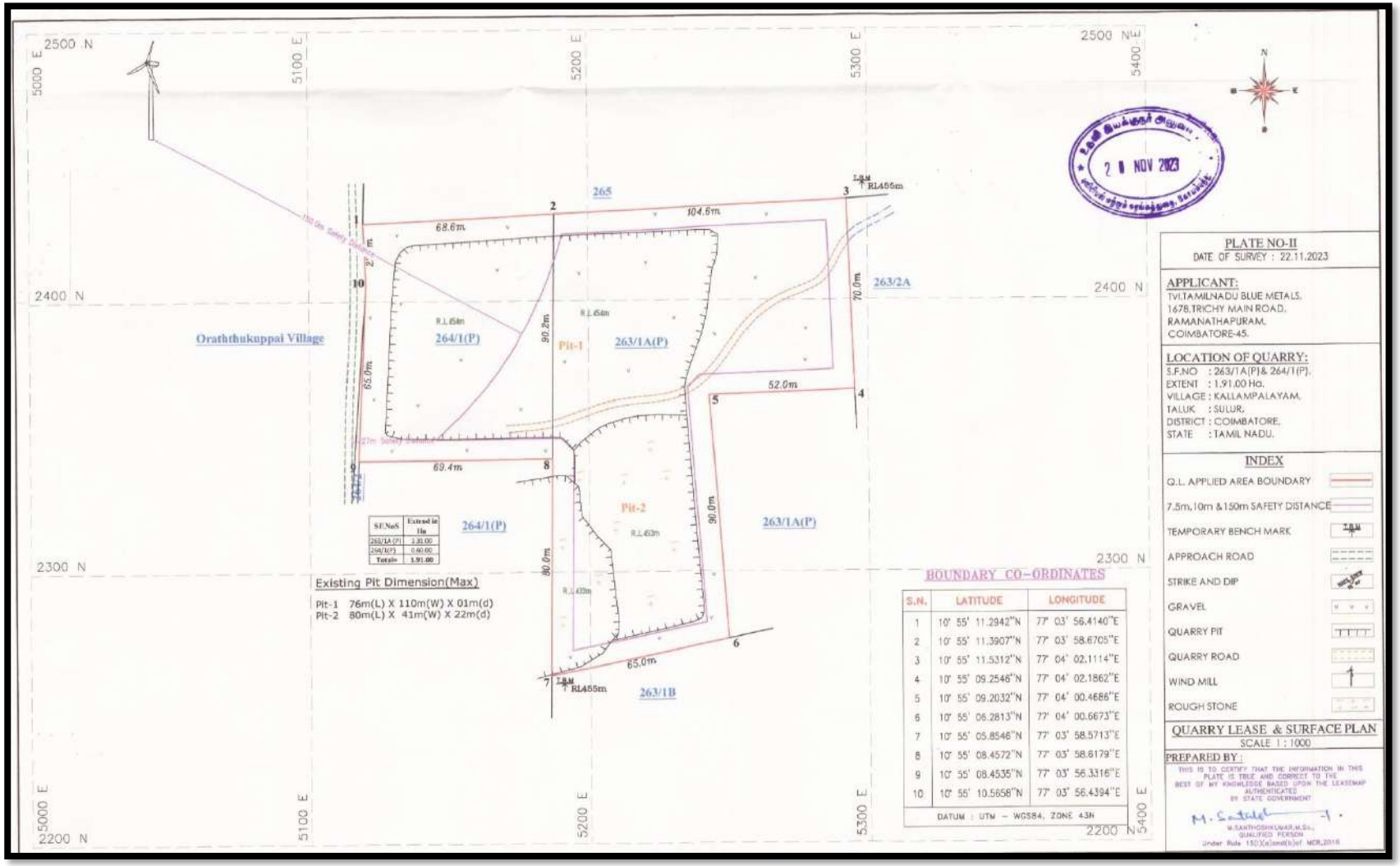


FIGURE – 6: QUARRY LEASE PLAN & SURFACE PLAN -P2



2.4 METHOD OF MINING

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 top layer of Topsoil will be Excavate directly by Hydraulic Excavators and preserved all along the safety barrier to facilitate greenbelt development during Mine Closure Stage. 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

TABLE 2.8 PROPOSED MACHINERY DEPLOYMENT-P1

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	7	1.2m to 2.0m	Compressed air
2	Compressor	2	400psi	Diesel Drive
3	Excavator with Bucket and Rock Breaker	2	300 HP	Diesel Drive
4	Tippers	3	20 Tonnes	Diesel Drive

Source: Approved Mining Plan

TABLE 2.10 PROPOSED MACHINERY DEPLOYMENT-P2

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

Source: Approved Mining Plan

2.6 WATER REQUIREMENTS

TABLE 2.11: WATER REQUIREMENT FOR THE PROJECT-P1

Purpose	Quantity	Source
Dust Suppression	0.7KLD	From Existing bore wells from nearby area
Green Belt	0.5KLD	From Existing bore wells from nearby area
Sanitation & Drinking	0.3KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors.
Total	**1.5 KLD**	

TABLE 2.13: WATER REQUIREMENT FOR THE PROJECT-P2

Purpose	Quantity	Source
Dust Suppression	0.8KLD	From Existing bore wells from nearby area
Green Belt	0.7KLD	From Existing bore wells from nearby area
Sanitation & Drinking purpose	0.5KLD	From existing, bore wells and drinking water will be sourced from Approved water vendors.
Total	**2.0 KLD**	

Source: Prefeasibility report

2.7 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.,

2.8 ULTIMATE PIT DIMENSION P1, P2

P1			
Pit	**Length (Max) (m)**	**Width (Max) (m)**	**Depth (Max)**
I	186	142	46m bgl
P2			
Section XY-AB	148	158	27m Bgl

3.0 DESCRIPTION OF THE ENVIRONMENT

The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering March 2024 -May 2024 as per CPCB & MoEF & CC guidelines.

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 (1 surface water & 5 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature	1 Hourly Continuous	1	Site specific primary data& Secondary Data from IMD Station

	Cloud cover Dry bulb temperature Rainfall	Mechanical/Automatic Weather Station		
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourly twice a week (March 2024 – May 2024)	7 (2 core & 5 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	8 (2 core & 6 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

3.2 LAND ENVIRONMENT

To study the land use pattern of the core as well as a buffer zone, land use/land cover details have been identified/ maps have been prepared in accordance with the Standard ToR point**.** A visual interpretation technique has been adopted for land use supervised classification based on training site by Level III classification with 1:50,000 scale for the preparation of land use mapping. Land use pattern of the area was studied through **LISSIII** imagery of **NRSC-Bhuvan** The 10 km radius map of study area was taken for analysis of **Land use/Landcover.**

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

S.No	CLASSIFICATION	AREA_HA	AREA_%
	BUILTUP		
1	RURAL	1508.43	4.56
2	URBAN	1400.87	4.23
3	MINING	465.26	1.41
	AGRICULTURAL LAND		
4	CROP LAND	16682.80	50.41
5	FALLOW LAND	7887.55	23.84
6	PLANTATION	3603.16	10.89
	BARREN/WASTE LANDS		
7	SCRUB LAND	1222.99	3.70
	WETLANDS/ WATER BODIES		
8	WATER BODIES/LAKE	320.42	0.97
TOTAL		33091.49	100.00

LU/LC Interpretation:

- From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Crop and fallow land is 74.25% followed by Built-up Lands – 8.79%, Scrub land – 3.70%, and Water bodies 0.97%.
- The total mining area within the study area is 465.26 ha i.e., 1.41%. The cluster area of 19.55.9ha contributes about 0.04% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

The project site falls under the Roughstone and gravel region. Therefore, the area is appropriate for developing Road development and building etc., it shows that the region has good prospects in the future. Due to proposed Roughstone and gravel quarry in this region, economic condition of locals is expected to be improved directly & indirectly. Hence project will prove to be the best economic proposal for the coming times.

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 (30.9 % 34.5%) to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 1.02– 1.17 g/cc. The Water Holding Capacity is found to be medium i.e., ranging from 44.7 – 47.5 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 8.05 to 8.54
- The available Nitrogen content range between 389.5 to 524 mg/kg
- The available Phosphorus content range between 3.01 to 6.19 mg/kg
- The available Potassium range between 26.1 mg/kg to 51.3 meq/l

Observation:

The pH of the Soil indicates that the soil is Neutral and arid region and ideal for plant growth

3.4 WATER ENVIRONMENT

The study area is studded with few tanks that serve as the source of drinking water and also their surplus feeds adjoining tanks. 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 freshwater for couple of months after rainy season.

Surface Water

The pH varied from 7.59 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 543mg/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 112mg/l. Nitrates is 12 mg/l. while sulphates varied from 41.5mg/l.

Ground Water

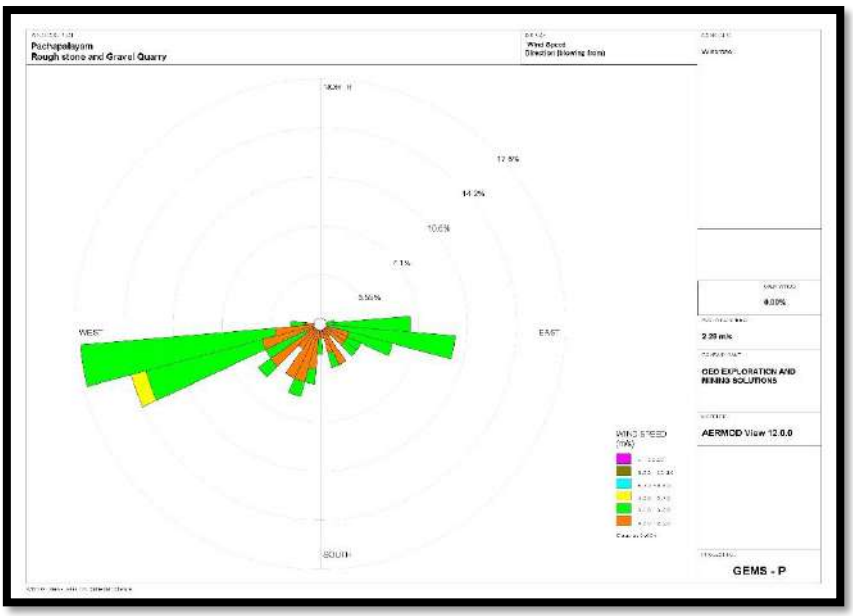
The pH of the water samples collected ranged from 7.19 to 7.79 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. Total Dissolved Solids were found in the range of 488– 668mg/l in all samples. Total hardness varied between 198.44–211.92 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, PM_{10} ranges from 41.0 µg/m^3 to 48.6 µg/m^3, $PM_{2.5}$ data ranges from 17.9 µg/m^3 to 22.9 µg/m^3, SO_2 ranges from 4.1µg/m^3 to 8.6µg/m^3 and NO_2 data ranges from 22.0 µg/m^3 to 27.0 µg/m^3. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

The minimum & maximum concentrations of PM_{10} were found to be 41.0 µg/m^3 in Core zone e & 48.6 µg/m^3 in Myleripalayam village respectively. The minimum & maximum concentrations of $PM_{2.5}$ were found to be 17.9 µg/m^3 in Papampatti village & 22.9 µg/m^3 in Pachapalayam village area respectively. The maximum concentration in the core zone is due to the cluster of quarries situated within 500m radius.

3.7 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 (Eight) locations around the proposed project area. Noise levels recorded in core zone during day time were from 41.8-42.4 dB (A) Leq and during night time were from 36.6-36.8 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 39.7 to 41.4 dB (A) Leq and during night time were from 36.0 to 38.1 dB (A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.8 ECOLOGICAL ENVIRONMENT

The study involved in the collection of primary data by conducting a survey in the field, examination of floral and faunal records in previously published reports and records. Analysis of the information is the view of the possible alteration in the environment of the project site. For the survey of fauna, both direct and indirect observation methods were used.

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

3.9 SOCIO ECONOMIC ENVIRONMENT

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.

The socio-economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis.

The proposed project will aim to provide preferential 72 persons to the local people there by improving the indirect employment opportunity for 100 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

4.3 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
- 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;

4.4 AIR ENVIRONMENT

ANTICIPATED IMPACT

- Garland drain, settling tank will be constructed along the proposed mining lease area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system.
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic (every 6 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.

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 includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day. i.e., at the time lunch hours, controlled charge per hole as well as charge per round of hole.
- Before loading of material water will be sprayed on blasted material.
- Dust mask will be provided to the workers and their use will be strictly monitored.

Haul Road & Transportation –

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with taurpaulin
- The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & loading points will be carried out twice a day

- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-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
- AAQ monitoring will be conducted six months once to assess effectiveness of mitigation measures proposed

4.5 NOISE ENVIRONMENT

ANTICIPATED IMPACT

Noise pollution poses a major health risk to the mine workers. Following are the sources of noise in the existing open cast mine project are being observed such as Drilling, & Blasting, Loading and during movement of vehicles.

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 though training and awareness.
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.

4.6 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

There is no Forest land, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km.

There are no migratory corridors, migratory avian-fauna, and rare endemic and endangered species. There are no wild animals in the area. No breeding and nesting site were identified in project site. No National Park and Wildlife Sanctuary found within 10km radius. The dumps / bunds around the mine itself act as a good barrier for entry of stray animals. In the post mining stage, barbed wire fencing is proposed all around the mined-out void to prevent fall of animals in the mine pits.

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 details of year wise proposed plantation program are given in Table 4.13.

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.

4.7 SOCIO ECONOMIC ENVIRONMENT

Impact and Mitigation Measures: The proposed project could result due to migrant workers, worker camps, induced development etc. Due to the migrant workers, there would impact on the existing infrastructure facilities in the surrounding villages. The impact of the proposed project on socio economic conditions of the study area is as follows.

Impacts		**Mitigation measures**
Positive	**Negative**	
It would generate employment opportunities to the local people and reduce the migrants to outside ➢ Increase of floating population. ➢ Increase in demand of services includes hotels, lodges, public transport (including taxis), etc. ➢ Economic up liftment of the area. ➢ Rapid growth of sector will result in increase of incomes in the area. ➢ Expanding of services like retail shops, banks, automobile workshops, school, health care, etc. ➢ The project would also trigger many direct and indirect benefits for economic advancement and social development of project area.	➢ There will be structural changes in occupation and alternative works will be performed. ➢ Expecting release of surreptitiously air Pollution during the operation period. ➢ Loss of cultivable lands. ➢ Increase in the cost of man power in the agriculture sector due to Industrial/Mining services wage rates. This has affected cultivation. ➢ Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.	➢To prevent the air, water and noise pollution for this implements the adequate scientific measures (treat) as per the pollution control regulatory standards. ➢Employment facilities to the local people on the priority bases to the impacted families who lost their land due to the proposed Project. ➢Periodical monitoring of the families in surrounding villages. Regular medical check-up and developing infrastructure. ➢Initiating Skill development programs for better opportunities for the educated youth. ➢ Dust and air control twice time using water sprinkler. ➢ Greenbelt will be developed in and around the project site

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

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

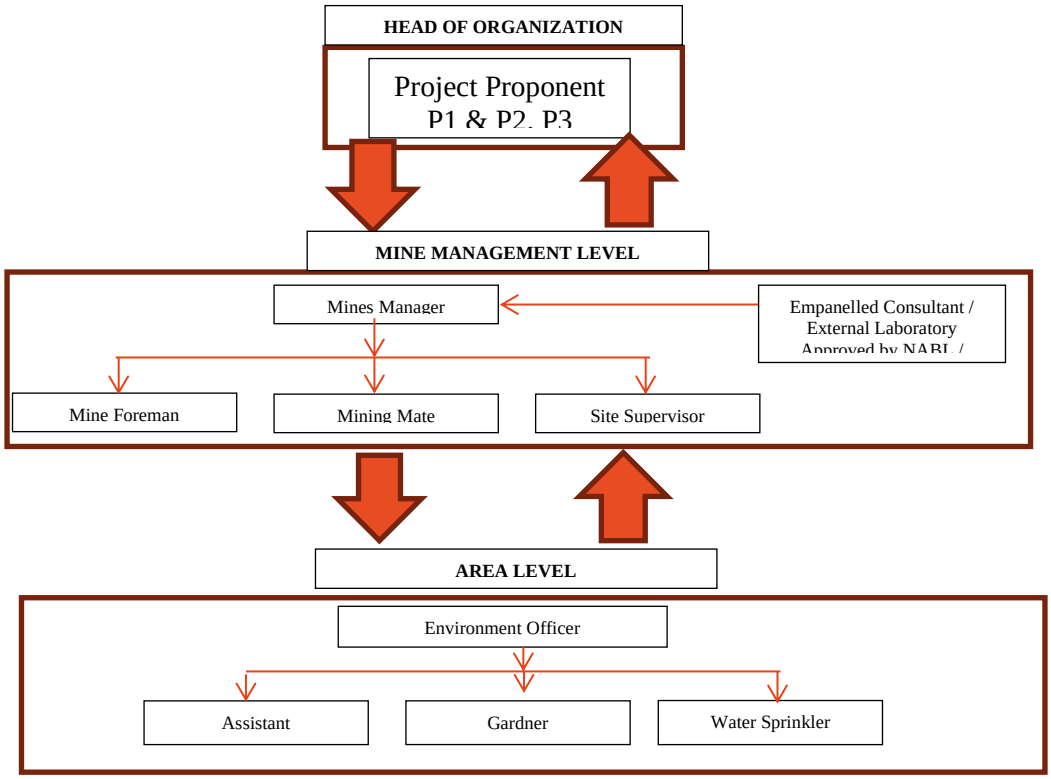
6. ENVIRONMENT MONITORING PROGRAM

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	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative

					humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

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 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities.

The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for 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

CUMULATIVE PRODUCTION LOAD OF ROUGH STONE IN CLUSTER

Quarry	Production for five-year plan period	Per Year Production in m^3	Per Day Production in m^3	Number of Lorry Load Per Day
P1	2,26,170	45,234	151	13
P2	60,002	12,000	40	3
P3	1,51,295	30,259	101	8
Total	**4,37,467**	**87,493**	**292**	**24**
E1	4,37,002	87,400	291	24
E2	1,94,880	38,976	130	11
E3	3,59,870	71,974	240	20
Total	**9,91,752**	**198350**	**661**	**55**
Grand Total	**1,429,219**	**285843**	**953**	**79**

CUMULATIVE PRODUCTION LOAD OF GRAVEL IN CLUSTER

Quarry	Production for five-year plan period	Per Year Production in m^3	Per Day Production in m^3	Number of Lorry Load Per Day
P1	7,764	3,882	13	1
P2	-	-	-	-
P3	10,064	5,032	17	1
Total	**17,828**	**8,914**	**30**	**2**
E1	-	-	-	-
E2	23,520	7,840	26	2
E3	37,208	12,402	41	3
Total	**60,728**	**20.242**	**67**	**5**
Grand Total	**78,556**	**29,156**	**97**	**7**

PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER

Location ID	N1	N2	N3	N4	N5	N6	N7	N8
Maximum Monitored Value (Day) dB(A)	47.9	48.1	49.8	48.6	45.9	46.80	49.70	46.20
Incremental Value dB(A)	66.1	60.1	48.1	35.0	26.1	23.4	24.8	27.0
Total Predicted Noise level dB(A)	66.2	60.4	52.0	48.8	45.9	46.8	49.7	46.3

EMISSION ESTIMATION FROM CLUSTER MINES

EMISSION ESTIMATION FOR QUARRY "P1"				
	Activity	**Source type**	**Value**	**Unit**
Estimated Emission Rate for PM_{10}	Drilling	Point Source	0.084754060	g/s
	Blasting	Point Source	0.001057833	g/s
	Mineral Loading	Point Source	0.042052163	g/s

	Haul Road	Line Source	0.002491204	g/s/m
	Overall Mine	Area Source	0.056234368	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.00062964	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000034139	g/s
EMISSION ESTIMATION FOR QUARRY "P2"				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.059622401	g/s
	Blasting	Point Source	0.000182248	g/s
	Mineral Loading	Point Source	0.036951733	g/s
	Haul Road	Line Source	0.002484642	g/s/m
	Overall Mine	Area Source	0.036995409	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000162883	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000003583	g/s
EMISSION ESTIMATION FOR QUARRY "P3"				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.072580791	g/s
	Blasting	Point Source	0.000487218	g/s
	Mineral Loading	Point Source	0.040257349	g/s
	Haul Road	Line Source	0.002488007	g/s/m
	Overall Mine	Area Source	0.050392825	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000394932	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000017069	g/s
EMISSION ESTIMATION FOR QUARRY "E1"				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.100180541	g/s
	Blasting	Point Source	0.002440795	g/s
	Mineral Loading	Point Source	0.043929822	g/s
	Haul Road	Line Source	0.002496159	g/s/m
	Overall Mine	Area Source	0.062966882	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.001007484	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000068258	g/s
EMISSION ESTIMATION FOR QUARRY "E2"				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.079111546	g/s
	Blasting	Point Source	0.000749573	g/s
	Mineral Loading	Point Source	0.041471936	g/s
	Haul Road	Line Source	0.002490031	g/s/m
	Overall Mine	Area Source	0.055354816	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000539628	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000028463	g/s
EMISSION ESTIMATION FOR QUARRY "E3"				
Estimated Emission Rate for PM_{10}	**Activity**	**Source type**	**Value**	**Unit**
	Drilling	Point Source	0.095549644	g/s
	Blasting	Point Source	0.001926459	g/s
	Mineral Loading	Point Source	0.043949312	g/s
	Haul Road	Line Source	0.002496221	g/s/m
	Overall Mine	Area Source	0.057891143	g/s
Estimated Emission Rate for SO_2	Overall Mine	Area Source	0.000962446	g/s
Estimated Emission Rate for NOx	Overall Mine	Area Source	0.000054089	g/s

SOCIO ECONOMIC BENEFITS

Location ID	Project Cost	CER
P1	Rs. 86,85,000/-	Rs.5,00,000
P2	Rs. 36,85,670/-	Rs.5,00,000
P3	Rs. 1,31,74,000/-	Rs.5,00,000
Total	**Rs.2,55,44,670/-**	**Rs.15,00,000/-**
E1	Rs.3,19,54,000/-	Rs.5,00,000
E2	Rs.62,38,000/-	Rs.5,00,000
E3	Rs.1,07,83,000/-	Rs.5,00,000
Total	**Rs. 4,89,75,000/-**	**Rs.15,00,000/-**
G.Total	**Rs.7,45,19,670/-**	**Rs.30,00,000/-**

8. PROJECT BENEFITS

The Proposed Project for Quarrying Rough Stone and gravel at Pachapalayam and Kallapalayam Village aims to cumulatively production about **3,77,465m^3** Rough Stone over a period of 5 Years and Gravel **17,828m^3** for period of two year. 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.

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